Macroeconomic Forecasts, 1Q2024 Domestic Metrics



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Table of Contents

Summary	3
Macroeconomic Indicators	4
Why the Fed Might Be Wrong on Their Predictions (In a Good Way)	5
Why the Fed Might Be Correct on their Predictions (In a Bad Way)	8
Where Does This Lead Us	12
Disruptive ("Black Swan") Events	13
Data Analysis	16
Correlations	17
Real & Nominal GDP Growth, Real & Nominal Disposable Income Growth, and CPI Inflation Rate	e 18
Employment	21
Federal Funds (Primary Credit) Rate	26
Treasury Yields (1, 3, & 6-month; 1, 3, 5, 7, 10, 20, & 30-year series)	29
30-year Mortgage Rate	35
Moody's AAA & BAA Rates; and the BofA BBB Corporate Yield	37
Prime Rate	40
US Average Retail Gasoline Price	40
House and Commercial Real Estate Price Indexes	43
Dow Jones Total Stock Market Index (end-of-quarter); S&P 500 (quarterly average); and the	
Market Volatility Index (VIX)	45
Regression Analyses	47
Appendix A: Data Sources	91
Appendix B: Methodologies	97
Section I: General Forecasting Methodology	97
Section II: Exponentially Smoothed State Space Representations & Generic "ETS" Methodology.	99
Section III: Regression Construction	100
Appendix C: Variable Correlations	102
References	.105

Summary

On April 5, 2024, the Bureau of Labor Statistics reported that the economy added 303,000 jobs in March, 2024¹. The jobs gains for March, 2024, are so high that the rate cuts that were suggested by Powell as recently as two months ago are now significantly in question². The strong economy, as indicated by growth in jobs and real GDP, does have some gaps and some pain points; a flat real wage and higher housing costs are still causing some issues with consumers.

The strong jobs report is highlighting how the economy has emerged from the COVID crisis, while the increase in housing costs (increases in mortgage rates, decreases in inventory, stagnant new home construction, and lingering issues with high rental costs) signal the toll that COVID has put on our economy. Although we haven't seen a significant increase in failure within the housing market, some cracks have emerged – the percentage of mortgages that are 30 and 90-days delinquent has been ticking up recently. These defaults are not nearly as impactful as the 30 and 90-day delinquencies in the credit card and auto loan sectors. Both of these sectors are show default rates that are near (or surpassing) default rates we saw prior to the 2008 recession. There are some concerns with the economy.

Can the economy keep up the blistering pace of hiring or will firms start pulling back? It is clear that some sectors have over-extended – the automobile industry seems to be suffering a bit and has made some inventory adjustments and some reduction in force. However, the service sector is still quite strong and hiring in these areas does not seem to be subsiding. If the US sees robust hiring in April and May, 2024, then it is unlikely that the FED will cut rates. And, if inflation remains stubbornly high (above the 2% Taylor-rule target), then it is a possibility that the FED could enact an additional 25 basis point increase to the Federal Funds target rate.

¹ https://www.bls.gov/news.release/pdf/empsit.pdf

² https://www.pbs.org/newshour/economy/is-the-fed-going-to-cut-interest-rates-what-was-once-a-question-of-when-is-now-less-certain

Macroeconomic Indicators

Our examination of the short-run and long-run trends of the U.S. economy start with the Federal Reserve's predictions. We evaluate what the Fed is likely seeing with respect to the current state (and trend) of the economy, identify areas where the Fed might be making more conservative or less conservative assumptions, and then offer our own predictions based on the available data.

Federal Reserve Board: Predictions								
	Range				N	/Iedian		
Variable	2024	2025	2026	Long Run	2024	2025	2026	Long Run
Change in Real GDP	1.3 - 2.7	1.7 - 2.5	1.7 - 2.5	1.6 - 2.5	2.1	2.0	2.0	1.8
Unemployment	3.8 - 4.5	3.7 - 4.3	3.7 - 4.3	3.7 - 4.3	4.0	4.1	4.0	4.1
PCE Inflation	2.2 - 2.9	2.0 - 2.5	2.0 - 2.3	2.0	2.4	2.2	2.0	2.0
Core PCE Inflation	2.4 - 3.0	2.0 - 2.6	2.0 - 2.3		2.6	2.2	2.0	
Federal Funds Rate	4.4 - 5.4	2.6 - 5.4	2.4 - 4.9	2.4 - 3.8	4.6	3.9	3.1	2.6

Table 1: Federal Reserve Board March 2024 Predictions

Source of data: https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20240320.pdf

Note: The predictions for each year are the predicted values for each metric during December of the associated year. For example, the Fed's prediction for personal consumption expenditures is between 2.2 and 2.9% in December, 2024.

The Fed believes that the economy is going to grow at 2.1% for the remainder of 2024. They are also seeing unemployment hovering around 4.0% and anticipate inflation around 2.4% (and 2.6% without including food and energy costs). The Fed also anticipates that the effective federal funds rate will fall between 4.4% and 5.4% (or, at a median value of 4.6%).

Why the Fed Might Be Wrong on Their Predictions (In a Good Way)

Employment & Unemployment

Figure 1: Unemployment Rate



Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)

We might have a small disagreement with the Fed regarding the unemployment rate. The median prediction from the Fed is 4.0% for December, 2024. The 3.8% unemployment rate reported for March, 2024³, marks the 26th month in a row that the United States has experienced unemployment rates below 4.0%. The last time this event occurred was between November, 1967 and January, 1970 (27 months in a row at unemployment below 4.0%). Typically, we would caution against a prediction that the U.S. will continue with this trend; there are very few historic occurrences of 20-plus months of unemployment below 4.0%. However, the staggering number of new jobs added in March, 2024 (see figure below), suggest that the they economy might be ready to set a new record with 30-plus consecutive months below 4.0%.

³ https://www.bls.gov/news.release/empsit.nr0.htm

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Figure 2 Number of Jobs Added in the Economy



Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)

GDP & GDP Growth

Another area where the Fed might be 'off' with their predictions is the year-over-year growth in the GDP by December, 2024. The current trend in year-over-year growth is suggesting that the economy is on pace for 2.5 - 3.0 % annual growth. The huge number of jobs added to the economy in March, 2024, is indicative of the economy growing, not shrinking. Additionally, supply-chains appear to be moving towards a 'corrected' state; delivery time diffusions (an index calculated by examining current delivery times relative to delivery times in the prior month) show negative movements, indicating that current deliveries are taking less time that deliveries in the prior month (see next figure). The correction of supply chains and the growth of the GDP indicate a strong economy moving forward.

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Figure 3 Year over Year Growth in GDP



Figure 4: Delivery Time Diffusions

Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)



Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)

Why the Fed Might Be Correct on their Predictions (In a Bad Way)

Inflation

Figure 5 Personal Consumption Expenditures Inflation



Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)





Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)

The current rate of Personal Consumption Expenditure inflation (PCE) is just above 2.4%. The current rate of PCE inflation less food and energy costs is just above 2.6%. Because the inflation rate is so closely tied to the Fed's policy, it is very likely that the Fed's prediction of 2.4% and 2.6% respectively will be correct. If core inflation numbers start to spike (as might be the case with the increase in jobs created), the Fed may engage in an additional round (or rounds) of 25 bp rate hikes. The Fed has taken an anti-inflation stance the last 2 years and is certainly enacting policy that is geared towards lowering inflationary pressures. We believe that the Fed is going to enact contractionary monetary policy in order to keep inflation down.

Defaults

The figures below show the percentage of credit card accounts at 90-days delinquent, the percentage of auto loans at 90-days delinquent and the percentage of mortgages at 30-days and 90-days delinquent. The rapid increase in the percentage of credit cards accounts and auto loan accounts that are 90-days delinquent is staggering.

The delinquency rates for credit cards and auto loans are currently surpassing the delinquency rates these types of loans prior to the great recession. It is quite likely that consumers took their rebate checks and saving from meme-stock gains and purchased new and used cars. Additionally, with very low labor-force participation, it is also likely that a sizeable number of consumers have been living off their credit cards (after drawing down their savings – see figure below).

The only 'silver lining' of these default rates is that mortgage default rates are still below pre-great recession and pre-COVID levels. This low percentage of 30-day and 90-day delinquencies for mortgages could be a result of higher mortgage rates during COVID and changes in under-writing processes. Both of these movements could have 'weeded out' buyers who didn't have long-run capacity to pay their mortgage loans. These same events did cause a spike in rental prices, however. Overall, the risks for defaults fall mainly in personal credit card accounts and auto loans and not with mortgage loans.

These trends could easily turn into a drag on economic growth, leading to lower GDP over the next three quarters and increasing the unemployment rate. These default numbers are quite concerning. If the Fed is evaluating these trends with a more 'bearish' perspective, then the Fed's predictions on GDP growth and unemployment rate could be accurate.



Figure 7: Percentage of Credit Card Accounts at 90-days Delinquent

Figure 8: Percentage of Auto Loans at 90-days Delinquent



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Figure 9: Personal Savings



Source(s): Federal Reserve Economic Database (https://fred.stlouis.org)



Figure 10: Percentage of Mortgage Loans at 30-days Delinquent

Source(s): Federal Reserve Bank of New York (https://www.newyorkfed.org/microeconomics/databank.html)

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Figure 11: Percentage of Mortgages Loans at 90-days Delinquent

Source(s): Federal Reserve Bank of New York (https://www.newyorkfed.org/microeconomics/databank.html)

Where Does This Lead Us

We were surprised, as most were, that the job gains were so strong coming out of March. The first quarter was quite solid and, by many accounts, the economy should continue to strengthen through the next two quarters.

However, the increase in defaults in auto loans, in particular, is very unpleasant. With Tesla missing its delivery, Rivian pausing in Georgia, and Ford missing its predictions on electric vehicle sales, an increase in auto loan defaults could tighten the auto industry. Historically, negative movements in the auto industry signal negative movements in upstream and downstream sectors and could signal downward pressure in GDP growth.

Although we are mainly convinced that the economy is on a strong footing and that GDP will grow, unemployment will remain low, and inflationary pressures will continue to moderate, we cannot completely discount the impact of defaults in this important industry. We are suggesting a 20% chance that the economy starts showing signs of slowing down by the end of 3Q2024.

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 US 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 US 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-

 $^{2023.}html{\#:} ``:text=Not\%20 including\%20 the\%20 payouts\%2C\%20 the,a\%2013\%25\%20 increase\%20 from\%202022.$

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 US 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 US 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 US 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 US 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

- 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

18 Ibid.

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

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/

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

8. 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. Though the west has not agreed to purchase Russian oil with a price cap, Russia is now refusing to sell its resources for anything other than a market price. The resulting rising energy prices can only drain the level of wealth of (primarily) Europe, and raise prices globally. The impact of the Israel-Palestine conflict has also been speculated as impacting global economies²⁰.

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

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

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 ... US 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 following²¹:

- 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)

²¹ 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 ²²	
1-month, 3-year, and 5-year		1-year Treasury vield	
Treasury yield		, ,,	
3-month, 6-month and 7-year		2-year Treasury vield*	
Treasury yield	depends on	S-year measury yield	
20-year and 30-year Treasury		7-year Treasury yield [*]	
yield, and Moody's AAA 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.

²² 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 increased by an annual rate of 3.4% during 4Q2023 (+\$22.7T in 2017 US\$), down from the annualized rate of 4.9% during 3Q2023²³. Both quarters in 2H2023 were significantly higher than in 1H2023, leading us to think that Real GDP will be approximately 3.1% over 2023. Consumer spending is the usual source of gains during fourth quarters, along with government spending that is intended to be used before the end of a calendar year. This was the case in 2023, along with foreign imports decreasing Q/Q during 4Q2023²⁴. Nominal GDP increased by an annualized rate of 5.1% during 4Q2023 (+\$82.2T), meaning that CPI actually dropped very slightly on a Q/Q basis, even though it grew by approximately 3.35% during 2023²⁵.

We have previously noted that GDP is impacted by personal consumption, retail sales, government spending, international trade, and interest rates. We will consider these items individually.

Overall real disposable personal income was essentially flat for all of 2023 (growing consistently at 4% per year for the duration)²⁶. In contrast, nominal disposable personal income growth went from 15.4% (annualized) during 1Q2023, to 5.8% during 2Q2023, to 3.8% during 4Q2023²⁷; in contrast, nominal personal income went from 6.8% (annualized) during 1Q2023, to 4.0% during 2Q2023, to 4.0% during 4Q2023²⁸. With the convergence of personal income and disposable personal income (Figure 12), it would seem that wage earners are likely recognizing the slowing wage growth trend (see Figure 13), which will likely continue into 2024.



Figure 12: Real and Nominal Personal Income, Disposable Personal Income, and Personal Expenditures

²³ https://www.bea.gov/news/2024/gross-domestic-product-fourth-quarter-and-year-2023-third-estimate-gdp-industry-and
²⁴ Ibid.

²⁶ https://fred.stlouisfed.org/series/DSPIC96

²⁵ https://fred.stlouisfed.org/series/CPIAUCNS

²⁷ https://fred.stlouisfed.org/series/DSPI

²⁸ https://fred.stlouisfed.org/series/PI

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION





Inflation is a key part of these figures. Annualized inflation was 3.5% in 3Q2023, and dropped to under 0.5% during 4Q2024, meaning that inflation dropped from 6.45% during CY2022 to 3.35% during CY2023²⁹. Annualized core inflation (i.e., excluding food and energy prices) rose from 3.15% in 3Q2023 to 3.34% in 4Q2023³⁰.

The key concern is whether inflation will continue unencumbered at a level above 2.0%, or if it is gradually dropping. Inflation is driven by two forces: an excess availability of money in the financial system, and a limitation on the availability of desired goods.

To address the "excess availability of money", many wage adjustments come with the beginning of a fiscal year, i.e, January, which explains the slight increase of wages seen to the far right of Figure 13. We see similar behavior by examining real wages by industry in Figure 14.

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

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

Figure 14: Real Wages per Industry



Regarding "... the availability of desired goods", since a substantial portion of household spending is tagged to accommodate living requirements (including food and energy), we are also very concerned about these costs. Owners' equivalent rent of residences has grown by roughly 0.5% per month since mid-2022 (10% in total over 20+ months)³¹. CPI for food is increasing by 0.01% per month (0.25% over 20 months)³². CPI for energy spiked in mid-2022, and is approximately at the same level today that it was at YE2022 (down about 15% since mid-2022).

Real GDP is strongest along a crescent that runs from Idaho, though Nevada and Utah, to Arizona and Texas, and then jumping to Alabama, Florida, and the Carolinas³³. This is not unexpected during a 4Q period, with the West relying on agriculture, natural resources, and tourism; and the South & Southeast growing manufacturing industries. Personal income grew most prominently in many of the same states, led most strongly in the East by increases in Texas, Missouri, and from Mississippi to Florida and South Carolina³⁴.

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

 Nominal advance retail sales declined slightly in 4Q2023 from just under \$613B per quarter to \$610B. Again, increases during 3Q – in anticipation of 4Q retail sales – are not surprising. The decline during 4Q is also expected, but should be carefully watched as a potential harbinger of a recession³⁵.

³¹ https://fred.stlouisfed.org/series/CUSR0000SEHC

³² https://fred.stlouisfed.org/series/CPIUFDSL

³³ https://www.bea.gov/news/2024/gross-domestic-product-state-and-personal-income-state-4th-quarter-2023-and-preliminary ³⁴ Ibid.

³⁵ https://fred.stlouisfed.org/series/RSXFS

- 3. Government spending grew steadily from 1Q2022 through 3Q2023, growing from \$8.3T to \$10T during the two-year period. Spending dropped to \$9.7T during 4Q2023³⁶.
- 4. The quarterly (nominal) trade deficit rose from \$185.9B to \$192.0B during 4Q2023, an annualized increase of almost 14.0%.³⁷ Exports of automotive parts, and consumer goods, rose during 4Q, as did services (travel & hospitality, primarily). As the USD gains strength against other currencies (making US-made products increasingly expensive), demand for those products & services are expected to decline in the coming months.³⁸

Given these changes, we continue to believe that US & global GDP strength will improve with *annualized US GDP to rise to 3.0% by YE2024*.

Other Commentary

- "Energy costs dropped much less than expected (-1.9% vs -4.6% in January), with gasoline declining 3.9% (vs -6.4%), utility gas service falling 8.8% (vs -17.8%) and fuel oil going down 5.4% (vs -14.2%). ... the monthly inflation rate rose to 0.4% from 0.3%, with prices for shelter and gasoline contributing over 60% of the increase. On the other hand, core inflation eased to 3.8% from 3.9%, compared to forecasts of 3.7%. The monthly rate remained steady at 0.4%, instead of forecasts of 0.3%." (https://tradingeconomics.com/united-states/inflation-cpi ; March 12, 2024)
- "Consumer prices rose 3.2% over the year in February, higher than the 3.1% annual rate in January and above what economists had predicted. An uptick in gas prices and housing prices was behind the unexpectedly high inflation rate. ... Ahead of the report, many economists had believed a surge in consumer prices in January that caught forecasters off guard was more of a statistical fluke and less an indication that inflation was flaring up again, and that it would resume its recent downward trend in coming months. But that uptick is proving more stubborn than expected." (https://www.investopedia.com/february-2024-cpi-8607820; March 12, 2024)
- "Already, it appears likely that the Fed will revise up its 2024 GDP growth projection of 1.4%. If
 its core PCE inflation projection moves up also, it's hard to imagine that the Fed would keep
 rate-cut guidance intact. That's especially the case because the Fed has subtly signaled concern
 about fueling the AI stock rally with rate cuts." (https://www.investors.com/news/economy/cpiinflation-risk-for-fed-rate-cuts-sp-500/; March 11, 2024)

Employment

Analysis

The civilian unemployment rate rose to 3.7% in 4Q2023³⁹, 3.8% in 1Q2024 and currently 3.8% at the time of this writing⁴⁰, with total nonfarm payroll employment roughly 6M greater than in Feb 2020⁴¹ (see Figure 15 and Figure 16). Quarterly growth held steady between 1.5% and 2.0% (annualized) during

³⁶ https://fred.stlouisfed.org/series/W068RCQ027SBEA

³⁷ https://fred.stlouisfed.org/series/BOPGSTB

³⁸ https://www.kiplinger.com/economic-forecasts/trade-deficit

³⁹ https://www.bls.gov/news.release/pdf/empsit.pdf

⁴⁰ https://www.wsj.com/articles/jobs-report-march-unemployment-02c4050d

⁴¹ https://fred.stlouisfed.org/series/UNRATE

2021. Annual growth of measured as 2.9%, during 2021; 4.3% during 2022, and 2.3% during 2023. Growth prior to 2020 averaged about 2.1M jobs/year, but was almost 2.8M jobs created during 2023⁴². Unemployment seems stable and dropping across the Southeast, except for states on the western bank of the Mississippi River⁴³.



Figure 15: US Unemployment Rate per County (March 2024)

⁴² https://fred.stlouisfed.org/series/PAYEMS

⁴³ https://www.axios.com/2024/03/25/america-unemployment-rate-swing-states

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION

Figure 16: US Unemployment Rate



Despite the jobs announcements, we have seen several employers announce reductions in force during both 2023 and 2024⁴⁴, with almost 85,000 layoffs announced in February 2024 alone⁴⁵. Most of the visibly publicized layoffs have been in larger organizations that have visibility into their risks and supply chains, and can anticipate changing needs it their staffing levels.

Job openings (per Figure 17) appear to be plateauing, with job openings per unemployed person stabilizing at around 0.7⁴⁶, but the rapid pace of the churn in openings and terminations/resignations makes it difficult to form a view of the situation without blurring due to the timing of statistics collection.

Labor force size, per Figure 18, appears to be growing at around 2.3M/year, and the labor force participation rate (Figure 19) is stable between 62.5% and 63% as of February, and the employment-population ratio is similar waffling just north of 60% (Figure 20). The LFPR will likely increase noticeably in March's statistics given the slight increase in unemployment rate and the higher than expected jobs found in March. This point matches ADP's National Employment Report⁴⁷.

The question regarding employment is one of whether employers will believe that interest rates will remain where they are, enough to affect sales and service engagements, or if they will fall in the near future. To recap, the market is seeing:

• Stronger than expected and growing job creation (implying that wages, though stagnating, are still able to be paid);

⁴⁴ See https://www.reuters.com/markets/us/us-layoffs-reach-14-month-high-amid-government-tech-cutbacks-2024-04-04/ and https://www.foxbusiness.com/lifestyle/layoffs-skyrocket-2024-here-companies-axing-jobs

⁴⁵ https://www.challengergray.com/blog/job-cuts-jump-in-february-2024-ytd-cuts-down-8-over-last-year/

⁴⁶ https://www.bls.gov/charts/job-openings-and-labor-turnover/unemp-per-job-opening.htm

⁴⁷ https://adpemploymentreport.com/

- Well publicized layoffs with a rate of +/- 1M/year;
- Job openings per unemployed person still high (0.7);
- And a stable, albeit waffling, labor force size and LFPR.

Given that the Fed is currently expected to offer at least a 25bp reduction in rates before the Fall of 2024, we are still concerned about the possibility of a recurrence of inflation (assuming that the FOMC makes good on that intimation – which is not a "sure thing"), and *we continue to expect layoffs to slow in the summer, and then increase over the year from 3Q24 through Summer 2025*.

Other Commentary

- "Through the first three months of the year, companies have announced 257,254 layoffs, down from 270,416 in last year's first quarter, another indication of a job market that continues to hold up in the face of high interest rates. A report from payroll processor ADP on Wednesday indicated a greater-than-expected 184,000 private-sector jobs were created last month, and the government on Friday is expected to report about 200,000 payroll jobs overall were added in March." (https://www.reuters.com/markets/us/us-layoffs-reach-14-month-high-amid-government-tech-cutbacks-2024-04-04/; April 4, 2024)
- "March was surprising not just for the pay gains, but the sectors that recorded them. The three biggest increases for job-changers were in construction, financial services, and manufacturing," said Nela Richardson, chief economist, ADP. "Inflation has been cooling, but our data shows pay is heating up in both goods and services." (https://adp-ri-nrip-static.adp.com/artifacts/us_ner/20240403/ADP_NATIONAL_EMPLOYMENT_REPORT_Press_Rele ase_2024_03%20FINAL.pdf; April 3, 2024)



Figure 17: Job Openings

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION





Figure 19: US Labor Force Participation Rate







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 21 and Figure 22), the Governors have shifted their opinions (between their December 2023 and March 2024 meetings) as shown in Table 2.

Year	December 2023	December 2023 range	March 2024 median	March 2024 range
	median			
2024	4.5%-4.75%	3.75%-5.5%	4.5%-4.75%	4.25%-5.5%
			(level from Dec.)	(↑ +/-50bp from Dec.)
2025	3.5%-3.75%	2.25%-5.5%	3.75%-4.0%	2.5%-5.5%
			(\uparrow 25bp from Dec.)	(↑ 25bp from Dec.)
2026	2.75%-3.0%	2.25%-5.0%	3.0%-3.25%	2.25%-5.0%
			(↑ 25bp from Dec.)	(level from Dec.)

 Table 2: Changes in FOMC Board of Governors' "Dot Plots" (Sept 2023 vs Dec 2023)

As of this writing, the Federal Reserve is hinting that it is intending to execute three 25 bp rate cuts, but that is despite the appearance of hedging by investors in the press of a more aggressive strategy by the Fed'. The "dot plots" not only characterize the Governors attitude of conservatism and "higher, for longer", but also the fact that they are actually becoming increasingly conservative as it is seen how resilient the economy has become. Playing this strategy out, if the economy continues to experience relatively low unemployment and strong spending, it is a very plausible possibility that the YE target for 2024 could be increased by another 25bp during a future dot plot. Given that the March 2024 jobs report was released after the FOMC Governors met, this seems like an increasingly likely outcome. On the other hand, if the economy does succumb to higher unemployment (which is the intention of the FOMC to instigate in a controlled fashion), then they will be expected to continue to cut rates, and questioned for any deviation from doing so by the press and political participants until November 4, 2024. Coincidentally, the FOMC's seventh meeting of the year is scheduled for November 7, 2024.





Source: https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20231213.pdf



Figure 22: FOMC "Dot Plot" from March 2024 Board of Governors' Meeting

Source: https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20240320.pdf

We feel that interest rates will end 2024, within 25 bp of their current level, though the direction of that change not entirely clear. The most likely case is a 25bp drop in 2024 (either early in 3Q2024, or after the election), with three 25 bp drops during 2025.

In Figure 23, we see the historical and projected relationship between the effective overnight lending rate and the 3-year T-bill yield.



Figure 23: Primary Credit, as a function of 3-year Treasury yield

Other Commentary

- "Despite the Fed's optimistic forecast of 2.1% GDP growth and a 4% unemployment rate, Rosenberg sees officials' prediction of a sharp drop in the median federal funds rate as a recession indicator. ... The Fed anticipates the median federal funds rate will drop by 150 basis points to 3.875% by 2025 and by 225 basis points to 3.125% by the end of 2026 ... The president of Rosenberg Research [David Rosenberg] also warned investors about the perilous terrain of the leveraged loan market, especially as economic downturns loom larger. 'Defaults are now piling up as the delinquency rate has topped 6%, double the average since 1997, while fast approaching levels that touched off the 2001, 2008 and 2020 recessions,' [Rosenberg] added." (https://www.businessinsider.com/recession-feds-rate-cut-forecast-point-economic-downturndavid-rosenberg-2024-3; March 28, 2024)
- "The Federal Reserve left the target for its policy rate, the federal funds rate, in the 5.25% to 5.5% range at its latest meeting. However, it did revise up its projections for gross domestic product (GDP) growth and core inflation for this year, and reduced its projections for the pace of rate cuts over the next two years. The result is that the Fed is still expecting a cumulative 75 basis points (0.75%) in rate cuts in 2024, but a slower path of rate cuts in 2025 and 2026. In addition, it signaled that the federal funds rate may not fall to 2.5% in the longer run as previously expected. (https://www.schwab.com/learn/story/fomc-meeting; March 20, 2024)

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

Analysis

The US Treasury yield curve is still exhibiting the pronounced inversion that has been seen for more than a year (Figure 24), starting at the 5-year maturities. Given this inversion, we interpret the markets as feeling that a near-term recession is still very possible. To emphasize this point, we note the track of yields as we move from 1-month (5.55%) to 3-month (5.28%) to 6-month (5.45%) maturities, i.e., a new, slight second inversion, implying that investors are extremely wary about the possibilities for short-term prospects for rates. Over the past three months, 5-year yields have risen from 4.31% to 4.43%; 20-year yields have gone from 4.41% to 4.78%; and 30-year yields have risen from 4.23% to 4.60%, indicating that prospects are positive.

We are now, interestingly, seeing multiple inversions within the yield curve: we first witness yield declines as we move up in maturities from one-month to 3-month period. Second, we see declines as we go from 6-months to 60-months; and, third, 30-year yields are about 20bp less than 20-year yields. We take this to mean that investors are simply extremely unsure of where the economy is headed, particularly in the short- to medium-term (i.e., through the 2028 election).

Based on the current situation, *we do not expect the yield curve's shape to change substantially until at least mid-year 2025.* Yields at the short end will stay relatively high (compared to historical values) until interest rates are viewed as consistently being lowered by the FOMC, which will likely not occur until the end of 1Q2025.

Figure 25 through Figure 33 illustrate the most significant correlations between Treasury yield rates.

Other Commentary

- "Dallas Federal Reserve President Lorie Logan said on Friday that an inflation landscape increasingly beset by upside risks argues against any imminent push toward easier monetary policy by the U.S. central bank. ... "I believe it's much too soon to think about cutting interest rates," Logan said in remarks prepared for a speech at Duke University. ... Before lowering rates, "I will need to see more of the uncertainty resolved about which economic path we're on. And, as always the (Federal Open Market Committee) should remain prepared to respond appropriately if inflation stops falling," she said. ... "I'm increasingly concerned about upside risk to the inflation outlook," Logan said. "The key risk is not that inflation might rise though monetary policymakers must always remain on guard against that outcome but rather that inflation will stall out and fail to follow the forecast path all the way back to 2% in a timely way," she said. The Fed must act to ensure it gets inflation back to 2%, she said. (https://www.reuters.com/markets/us/feds-logan-too-soon-start-thinking-about-rate-cuts-2024-04-05/; April 5, 2024)
- "U.S. bond giant PIMCO has trimmed its expectations for interest rate cuts by the Federal Reserve this year to two after data on Friday showing the U.S. economy created more jobs than expected last month, said a portfolio manager." (https://finance.yahoo.com/news/1-pimcotrims-2024-fed-154443771.html; April 5, 2024)
- "Bond yields are moving higher for several reasons. U.S. data has consistently come in stronger than expectations, leading some investors to believe that the Fed won't be able to cut interest rates without risking an inflationary rebound. ... The latest evidence of a robust economy came this week, when stronger-than-expected March manufacturing data was followed by solid U.S. job openings figures for February and other data pointing to labor market strength." (https://www.reuters.com/markets/rates-bonds/uncertainty-over-rate-cuts-wobbles-us-government-bond-market-2024-04-04/; April 4, 2024)

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION





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

Figure 25: 1-month Treasury yield rates, as a function of 1-year Treasury yield rates



MACROECONOMIC FORECASTS, 1Q2024 – FINAL VERSION



Figure 26: 3-month Treasury yields, as a function of 3-year Treasury yields

Source: Authors' calculation

Figure 27: 6-month Treasury yields, as a function of 3-year Treasury yields





Figure 28: 3-year Treasury yields, as a function of 1-year Treasury yields







Figure 30: 7-year Treasury yields, as a function of 3-year Treasury yields

Source: Authors' calculation

Figure 31: 10-year Treasury yields, as a function of 5-year Treasury yields



MACROECONOMIC FORECASTS, 1Q2024 – FINAL VERSION



Figure 32: 20-year Treasury yields, as a function of 7-year Treasury yields





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, interest rates are driven by

traditional economic supply-and-demand forces. Mortgage rates have risen to 6.82%, up from 6.61% at YE2023 and 6.79% at the end of 1Q2024⁴⁸. This increase is due to the increasing yields of bonds and the increasing seasonal demand for new mortgages. Again, we are envisioning the net change of overnight borrowing rates during 2024 as being 50 bp, and the timing of those decreases to be after the summer home buying season, possibly even during 4Q2023. Until that time, it would not be surprising for *mortgage rates to return to 7% over the coming months before receding and ending 2024 as low as 6%.*





Other Commentary

- "Over 40% of U.S. mortgages originated in 2020 and 2021, when interest rates were at record lows. There were also some 14 million mortgage refinances during the same time." (https://www.forbes.com/advisor/mortgages/mortgage-interest-rates-forecast/; April 5, 2024)
- "This year, mortgage rates should be closer to 7%, and may dip to about 6%, but no lower. That will give borrowers a bit more buying power, and nudge a few owners who have been thinking of moving to list their houses. ... A tight market is hard on buyers, but it's good for builders. They'll be busy this year, putting up as many houses as they can. Whatever they build is sure to sell. Since hitting bottom in January 2023, permits for single-family homes are up 36%. Buyers who can't find anything in the used market will increasingly turn to new construction. Big builders generally have the room to offer sales incentives, via either price breaks or help buying

⁴⁸ https://fred.stlouisfed.org/series/MORTGAGE30US
down the rate on a customer's mortgage to ensure plenty of buyers." (https://www.kiplinger.com/economic-forecasts/housing; March 7, 2024)

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

Analysis

AAA bond rates tend to track with mid-duration Treasury yields, with rates for bonds with lower grades tending to be higher (in conjunction with their risk ratings). Moody's Seasoned AAA Corporate Bond yield was 5.13% at the end of 3Q2023, 4.74% at YE2023, and 5.01% at the end of 1Q2024. Moody's BAA yields were 6.16%, 5.64%, and 5.75%, respectively, mirroring the AAA bonds' yields with a narrowing spread (declining from 103bp to 74bp over the six month period). We present these returns, and related spreads, for these and and similar bonds, in Table 3⁴⁹.

Instrument	3Q2023	4Q2023	∆(3Q->4Q)	1Q2024	∆(4Q->1Q)
Moody's AAA Bonds	5.13%	4.74%	-39bp	5.01%	+27bp
Moody's BAA Bonds	6.16%	5.64%	-52bp	5.75%	+11bp
BAA-AAA Yield Spread	+103bp	+90bp	-13bp	+74bp	-16bp
1-year Treasury Yield	5.46%	4.79%	-67bp	5.03%	+24bp
7-year Treasury Yield	4.61%	3.88%	-73bp	4.20%	+32bp
2-year Treasury Yield	5.03%	4.23%	-80bp	4.59%	+36bp
10-year Treasury Yield	4.59%	3.88%	-71bp	4.20%	+32bp
10 yr-2 yr Yield Spread	-44bp	-35bp	+9bp	-39bp	-4bp

Table 3: Comparison between Moody's Bond Yields and Treasury Yields

Bond yields appear to have peaked in 4Q2023, on the average, about 3-10% higher than the recently preceding peak in 4Q2022. (BAA yields are higher than AAA, but their BAA peaks are only slightly higher than those of AAA bonds in 2022.) Comparing these changes to those of the 10/2 yield spread in Table 3, and we see that shorter maturity T-bills are also retreating more quickly than longer term bonds and equivalents.

Following on our previous conversation, however, yields for corporate bonds are still under pressure from government bond yields. In other words, corporate bonds are still not offering significant returns over risk-free bonds. (See Figure 35.)

⁴⁹ 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/baa



Figure 35: Moody's Seasoned AAA & BAA Corporate Bond Yields versus 1-year & 5-Year Treasury Yields

See Figure 36 for how Moody's AAA yields have historically tracked with the 7-year Treasury yield.



Figure 36: Moody's AAA-grade investment yields, as a function of 7-year Treasury yields

Source: Authors' calculation



Figure 37: Moody's BAA-grade investment yields, as a function of BofA BBB yields

Other Commentary

- "More companies have defaulted on their debt in 2024 than in any start to the year since the global financial crisis as inflationary pressures and high interest rates continue to weigh on the world's riskiest borrowers, according to S&P Global Ratings. ... This year's global tally of corporate defaults stands at 29, the highest year-to-date count since the 36 recorded during the same period in 2009, according to the rating agency. ... Subdued consumer demand, rising wages and high interest rates, which hurt more indebted companies, had all contributed to the increase in the number of companies struggling to repay their debt, S&P said." (https://www.ft.com/content/f811649b-f66d-43aa-8a66-2412a4f0be50; March 14, 2024)
- "S&P Global Ratings Credit Research & Insights expects the U.S. trailing-12-month speculativegrade corporate default rate to reach 4.75% by December 2024, from 4.5% in December 2023 (see chart 1). In our base case, we expect the default rate to finish the year higher than it is currently. This may however, include a peak default rate earlier in the year as we anticipate this year to see a continuation of the trends seen last year. This includes more defaults, a high proportion of distressed exchanges, and higher contributions from sectors with a consumerreliant nature or those with currently weak cash flow and high debt such as media and entertainment, consumer products, and health care."

(https://www.spglobal.com/ratings/en/research/articles/240215-default-transition-and-recovery-u-s-speculative-grade-corporate-default-rate-to-hit-4-75-by-december-2024-13002273; Feb. 15, 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 loans⁵⁰. The Prime Rate is currently (as of this writing) 8.50%⁵¹.

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 by at least 25 bp before YE2024, that will cause the Prime Rate to drop to between 8% and 8.25% by YE2024.*





US Average Retail Gasoline Price

Analysis

The US average retail gasoline price for regular unleaded gasoline is approximately \$3.53/gallon⁵² at the time of this writing, approximately the same price that it was one year ago. Further, retail gasoline is up by about 20c/gal in the past month⁵³.

The price of WTI crude spiked at \$133/barrel, but is currently \$86/barrel, despite pricing pressures because of the Israel-Hamas conflict that has been active for the past six months. (See Figure 39, for

⁵⁰ https://www.investopedia.com/terms/p/primerate.asp

⁵¹ https://fred.stlouisfed.org/series/DPRIME

⁵² https://gasprices.aaa.com/

⁵³ Ibid.

WTI crude prices, and Figure 40.) Oil prices have been expected to increase more significantly than they have due to the rising danger posed to oil tankers in the Red Sea transporting oil from the Middle East to Europe and other Western-allied nations (previously mentioned). Most recently, Israel and the U.S. have been preparing for the possibility of Iran retaliating for the Israeli strike on an Iranian consulate in Syria⁵⁴. Given the support for Israel that has been eroding as its conflict with Hamas as dragged on, it is doubtful that the country will do anything to prevent that outcome using anything other than diplomatic channels. Iran, on the other hand, is reputed to be planning a retaliatory attack that would include a swarm of Shahed loitering drones and cruise missiles, likely originating from Iraq or Syria before the end of Ramadan⁵⁵.

It has been widely believed that oil pumping in OPEC countries has been continuing with crude being stockpiled for times that pumping is less productive; in doing so, it offers negotiating leverage by those countries; the Energy Information Administration (EIA) estimates that OPEC's core members have around 4.5M barrels per day of spare capacity⁵⁶.

The second concern is the recently released projection for the number of hurricanes in 2024: this year is projected to be extremely active with 25 storms and 5 major storms⁵⁷. Hurricane season runs from June 1 to November 30. There are 22 oil drilling rigs in the Gulf of Mexico, with a varying number online at any particular moment⁵⁸. When Hurricane Ida formed in late August 2021⁵⁹, all 14 drilling rigs that were active at the time in the Gulf of Mexico were shut down for a week, and were gradually brought back online over the next few weeks⁶⁰.

Other Commentary

- "Aided by a whirlwind of bullish news, Brent prices surpassed the \$90 per barrel threshold and surged past the \$91 per barrel mark on Friday morning. The anticipation of Iran's retaliatory strike on Israel, a developing Mexico export shortage, and the continuation of OPEC+ cuts have boosted sentiment in the oil market recently. On the other hand, the potential of the Fed not cutting interest rates this year could pour some cold water on the oil price rally." (https://oilprice.com/Energy/Energy-General/Brent-Breaks-Above-91-as-Bullish-Sentiment-Builds.html; April 5, 2024)
- "We look for gas prices to rise at least a little more, likely reaching \$3.60 to \$3.70 per gallon later this spring. If any of the simmering geopolitical concerns flare up and cause significant losses in the supply of crude oil or refined fuels, retail gas prices could get near \$4 per gallon. Diesel should also rise from its current average of \$4.06 per gallon." (https://www.kiplinger.com/economic-forecasts/energy; March 24, 2024)
- "We expect the forecast weather trends for summer 2024 and winter 2024–25 will increase
 residential consumption in all regions of the United States compared with 2023. Sales of
 electricity to the residential and commercial sectors rise the most this year in the South Atlantic
 (6% and 2%, respectively). This region has the most electricity customer accounts, but it also has
 a large proportion of homes using electricity both for space heating and cooling. Industrial

59 https://www.weather.gov/mob/Ida

⁵⁴ https://www.bbc.com/news/world-middle-east-68757080

⁵⁵ https://www.cbsnews.com/news/iran-to-retaliate-israeli-bombing-syria-consulate-officials-believe/

 $^{^{56}\} https://www.economist.com/graphic-detail/2024/03/27/three-reasons-why-oil-prices-are-remarkably-stable$

⁵⁷ 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

⁵⁸ https://ycharts.com/indicators/gulf_of_mexico_oil_rotary_rigs

⁶⁰ https://ycharts.com/indicators/gulf_of_mexico_oil_rotary_rigs

Figure 39: Crude Oil vs Retail Gasoline Prices



Figure 40: Global crude oil prices



electricity consumption rises the most in the West South Central (up 4%), continuing a strong upward trend since the pandemic. (https://www.eia.gov/outlooks/steo/report/elec_coal_renew.php; March 12, 2024)

House and Commercial Real Estate Price Indexes

Analysis

There are approximately 131M households in the US as of YE2023, with 65% of those homes being owner occupied⁶¹. The US median residential home price is over \$412,000 (a Y/Y increase of 6.4%, with the fastest increasing prices as of this writing in Birmingham, AL), with the number of homes sold monthly approaching 340,000 (+2.6% Y/Y), as of February 2024 per Redfin⁶². Figure 41 shows the national housing inventory as reported by Zillow.

Figure 41: US Housing Inventory



According to CalculatedRisk Finance & Economics, Freddie Mac reports that the multi-family serious delinquency rate is up 3.5x during 2023. It has risen from 0.12% in January 2023, to 0.28% in December 2023, to 0.44% in January 2024. The multifamily serious delinquency rate is based on the unpaid principal balance of mortgage loans at least two monthly payments past due or in the process of foreclosure (excluding those loans in forebearance)⁶³.

Commercial Real Estate is still the more curious issue. First, we have seen significant changes in the rents achieved by class A office space since the end of the COVID-19 pandemic. Rob Sadow said it well: "The ship has sailed on full return to the office for most companies ... They're not going to go from three

⁶¹ https://www.census.gov/quickfacts/fact/table/US/VET605222

⁶² https://www.redfin.com/us-housing-market

⁶³ https://www.calculatedriskblog.com/2024/02/freddie-reports-surge-in-multifamily.html

days a week to five days a week by making their space nicer."⁶⁴ To that point, CBRE Econometric Advisors reported that asking rents for prime space in 16 U.S. markets went from \$61 per square foot in mid-2021, to \$70 per square foot in 2Q2023, to now "just under \$69" per square foot in 4Q2023⁶⁵. Recently opened premium properties have had similar issues in leasing at varying price points.

The Federal Reserve is aware of the impact that the change in employment models will have on the financing of buildings, but has stated that its higher priority concerns are controlling inflation and unemployment in the US⁶⁶. Federal Reserve Chairman Jerome Powell acknowledged that the shocks to the commercial real estate industry was a "shock to the system" that could take a period of years to worth through⁶⁷.

According to CommercialEdge, the national office vacancy rate was 19.7% (Moody's confirms 19.8%⁶⁸), with Detroit, Houston, and San Francisco leading that metric with 31.3%, 24.4%, and 24.0% vacancy, respectively. Austin, Dallas, Atlanta, and Orlando were the next highest South and Southeastern markets at 22.1%, 21.1%, 17.1% and 17.1%, correspondingly. Office building sales during the first two months of 2024 have sold for 4.7x of rent rates, totaling out at \$3.6B through February. The average office rent rate dropped 1.2% Y/Y to \$37.83/sq foot⁶⁹.

Regarding retail, like office and condominiums, there have not been significant numbers of projects for several years, meaning that the assets that are available and maintained are holding their values. CBRE states their belief that rents will hold steady through 3Q2024, and then rise slightly⁷⁰. Moody's believes that the 10.3% vacancy of retail that they report will remain stable⁷¹.

Other Commentary

- "[T]he retail sector continues to confront familiar financing obstacles due to persistent high
 interest rates, suggesting little change in this trend for the remainder of the year. Although
 bankruptcy announcements have been prevalent, the vacancy rate has remained steady. This
 stability is partly due to new, smaller store openings by entities that normally wouldn't fill this
 space, such as Macy's and Toys R Us." (https://cre.moodysanalytics.com/insights/cre-trends/q12024-preliminary-trend-announcement/; April 1, 2024)
- "... American Banker released a report showing that five banks in the U.S. hold a combined half trillion dollars in commercial real estate (CRE) loans. ... [T]he bank holding the largest amount of CRE loans is JPMorgan Chase whose bank holding company is also exposed to \$49 trillion in derivatives as of December 31, 2023 according to the Office of the Comptroller of the Currency. ... American Banker reported the following CRE totals for the five banks: JPMorgan Chase, \$173 billion; Wells Fargo, \$139.65 billion; Bank of America, \$82.8 billion; U.S. Bank, \$55.66 billion; and PNC Bank, \$48.89 billion." (https://wallstreetonparade.com/2024/03/report-five-banks-have-a-combined-half-trillion-dollars-in-commercial-real-estate-loans-number-1-is-jpmorgan-chase/; March 28, 2024)

⁶⁴ https://www.wsj.com/real-estate/commercial/the-real-estate-downturn-comes-for-americas-premier-office-towers-717477a9 ⁶⁵ lbid.

⁶⁶ https://www.businessinsider.com/commercial-real-estate-big-trouble-crash-bank-crisis-2024-2

⁶⁷ https://www.marketwatch.com/livecoverage/jerome-powell-testimony-s-p-500-futures-rebound-ahead-of-fed-chair-s-comments/card/bank-etfs-fall-as-powell-says-office-market-shock-to-the-system-could-take-years-to-work-through-at-banks-nN1mOOF3iMlZq4TDnFBu

⁶⁸ https://cre.moodysanalytics.com/insights/cre-trends/q1-2024-preliminary-trend-announcement/

⁶⁹ https://www.commercialedge.com/blog/national-office-report/

⁷⁰ https://www.cbre.com/insights/books/us-real-estate-market-outlook-2024/retail

⁷¹ https://cre.moodysanalytics.com/insights/cre-trends/q1-2024-preliminary-trend-announcement/

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 4, stocks have risen dramatically during 4Q2023 & 1Q2024, due to the remarkably resilient economy that we have discussed, averaging increases between 75 and 82 points for the entire six-month period. *We expect that traders will continue to gain ground through the end of 2024 as the Fed' very slowly projects interest rate drops, and given the upcoming US Presidential election*; regardless of which candidate wins the election, the current sentiment is that regulation will remain stable in light of the (expected) split Congress⁷².

Period	Index Range ⁷³	Trading Days	Avg points/day
1Q2023 (1/1/2023-3/31/2023)	38520.60 → 41136.55	62	42.2
2Q2023 (4/1/2023-6/30/2023)	41136.55 → 44411.47	61	53.7
3Q2022 (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

 Table 4: Approximate Quarterly Milestones for the Dow-Jones Total Market Index

We note in Table 5 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 3Q2023. *We feel that the overall performance of equities (as shown in these indexes) will continue to rise through 2024.*

Table 5: Approximate Quarterly Milestones for the Standard and Poor's 500 ("SP500") Index

Period	Index Range ⁷⁴	Trading Days	Avg points/day
1Q2023 (1/1/2023-3/31/2023)	3839.50 → 4109.31	62	4.35
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

However, again, the stability of the VIX is concerning: its quarterly average has gone from 13.6 at the end of 2Q2023, to 17.52 at the end of 3Q2023, to 12.5 at the end of 4Q2023, to 13.0 at the end of 1Q2024⁷⁵. 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 US Presidential election.

⁷² https://www.axios.com/2023/09/17/2024-elections-senate-house-projections and https://www.economist.com/united-states/2024/03/24/both-chambers-of-americas-congress-may-flip-hands-in-november

⁷³ Index values found at https://www.marketwatch.com/investing/index/dwcf

⁷⁴ Index values found at https://www.marketwatch.com/investing/index/spx

⁷⁵ See https://fred.stlouisfed.org/series/VIXCLS

Other Commentary

"The top-performing S&P 500 stock of 2023, AI chipmaker Nvidia (NVDA), also continued its bullish momentum in the first quarter of 2024. Nvidia shares are up 82% year-to-date and 321% since the beginning of last year, pushing the company's market capitalization to \$2.29 trillion. ... On the other end of the spectrum, struggling electric vehicle maker Tesla (TSLA) was the worst-performing stock in the S&P 500 in the first quarter. Growing competition in China is forcing Tesla to cut prices on its EVs, and Tesla's once enviable automotive revenue growth slowed to just 3% year-over-year in the fourth quarter."

(https://www.forbes.com/advisor/investing/stock-market-outlook-and-forecast/; April 1, 2024)

- "In our view, it is unlikely that what has worked for the last year and a half, will be what continues to work. At the market bottom in October 2022, communications, consumer cyclicals, and technology were the three most undervalued sectors. One and a half years later, technology is now overvalued, and both communications and consumer cyclicals are nearing fair value. We think now is a good time for investors to look for contrarian investment opportunities, especially in those areas that have underperformed, are unloved—and most importantly—undervalued. " (https://www.morningstar.com/markets/q2-stock-market-outlook-contrarian-plays-increasingly-attractive; March 28, 2024)
- "Stocks look well positioned to outperform bonds and cash again this year, but high valuations mean investors need to be choosy. The equity risk premium, a measure of relative stock pricing versus bonds, looks more compelling for the equal-weighted S&P 500, sitting near the market's long-term average. This implies the need to look beyond the mega-cap stocks that have been dominating the widely cited market-cap-weighted index to source attractively priced names with good long-term prospects." (https://www.blackrock.com/us/individual/insights/takingstock-quarterly-outlook; March 21, 2024)

Regression Analyses

The following section document 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 1Q2015 and 4Q2023, inclusive.

Variable	Min Abs. Error	Average Error	Max Abs. Error
Real GDP Growth	626.36%	***	***
Nominal GDP Growth	280.98%	**	***
Real Disposable Income Growth	709.48%	**	***
Nominal Disposable Income Growth	568.50%	**	***
Inflation	0.00%	**	***
Unemployment Rate	204.42%	***	***
1-month Treasury Yield	***	**	***
3-month Treasury Yield	0.00%	430.34%	***
6-month Treasury Yield	227.03%	**	***
1-year Treasury Yield	871.45%	***	***
3-year Treasury Yield	13.38%	-113.97%	826.74%
5-year Treasury Yield	0.01%	-53.15%	394.56%
7-year Treasury Yield	15.55%	-57.48%	247.35%
10-year Treasury Yield	1.57%	7.22%	77.83%
20-year Treasury Yield	0.61%	1.70%	101.66%
30-year Treasury Yield	0.62%	-23.70%	70.53%
30-year Mortgage Rate	10.70%	-28.77%	54.18%
Moody's AAA Curve	11.05%	-33.78%	77.41%
Moody's BAA Curve	0.40%	18.05%	37.75%
BBB Corporate Yield	0.11%	1.06%	24.13%
Prime Rate	25.15%	-751.94%	***
US Average Retail Gasoline Price	0.52%	7.00%	88.91%
Cost of Federal Funds	14.83%	340.63%	***
Dow Jones Total Stock Market Index	102.33%	431.17%	794.74%
S&P 500 Stock Price Index	255.79%	936.24%	***
Commercial Real Estate Price Index	9.62%	-85.79%	162.77%
Residential Home Price Index	60.70%	237.40%	428.64%
Market Volatility Index	74.72%	**	***

Table 4: Regression Aggregate Errors for 1Q2015 through 4Q2023

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

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

REGRESSION FOR REAL GDP GROWTH Dependent variable (+/- SE): **Real GDP growth** 602.830 (+/- 73.946) Constant $p = 0.00002^{***}$ Moody's AAA Curve 64.604 (+/- 6.877) $p = 0.00001^{***}$ Real disposable income growth 8.798 (+/- 1.763) $p = 0.001^{***}$ Nominal disposable income growth -8.082 (+/- 1.655) $p = 0.001^{***}$ -15.323 (+/- 1.539) **Unemployment Rate** $p = 0.00001^{***}$ **CPI Inflation Rate** 12.873 (+/- 1.614) $p = 0.00003^{***}$ -37.149 (+/- 5.502) 30-year Mortgate Rate $p = 0.0001^{***}$ 37.826 (+/- 4.767) Prime Rate $p = 0.00003^{***}$ 0.003 (+/- 0.0004) Dow Total Stock Market Index $p = 0.0002^{***}$ -0.785 (+/- 0.152) Home Price Index $p = 0.001^{***}$ **Commercial Real Estate Price Index** -1.075 (+/- 0.097) $p = 0.00001^{***}$ -0.347 (+/- 0.058) Market Volatility Index $p = 0.0002^{***}$ -629.276 (+/- 73.262) LN 30-year Treasury Yield $p = 0.00002^{***}$ 576.139 (+/- 94.817) LN 20-year Treasury Yield $p = 0.0002^{***}$ -59.022 (+/- 17.015) 10-year Treasury Yield $p = 0.008^{***}$ -104.681 (+/- 15.336) 1-month Treasury Yield $p = 0.0001^{***}$ -8.874 (+/- 1.698) LN_1-month Treasury Yield

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

 $p = 0.001^{***}$

7-year Treasury Yield	-304.402 (+/- 51.616)
	p = 0.0003***
5-year Treasury Yield	83.332 (+/- 19.012)
	p = 0.002 ^{***}
LN_5-year Treasury Yield	-39.862 (+/- 11.580)
	p = 0.008***
6-month Treasury Yield	319.889 (+/- 34.917)
	p = 0.00001***
LN_6-month Treasury Yield	10.031 (+/- 2.572)
	p = 0.004 ^{***}
3-year Treasury Yield	206.127 (+/- 26.657)
	p = 0.00003***
1-year Treasury Yield	-329.442 (+/- 28.040)
	p = 0.00000 ^{***}
1-year Treasury Yield_2	71.108 (+/- 9.321)
	p = 0.00004***
3-year Treasury Yield_2	-51.249 (+/- 8.941)
	p = 0.0003***
6-month Treasury Yield_2	-43.259 (+/- 6.512)
	p = 0.0001***
5-year Treasury Yield_2	-15.973 (+/- 3.592)
	p = 0.002 ^{***}
7-year Treasury Yield_2	51.561 (+/- 10.675)
	p = 0.001 ^{***}
10-year Treasury Yield_2	19.047 (+/- 4.141)
	p = 0.002***
20-year Treasury Yield_2	-9.156 (+/- 2.811)
	p = 0.010 ^{***}
Observations	40
R ²	0.992
Adjusted R ²	0.965
Residual Std. Error	1.449 (df = 9)
F Statistic	36.441 ^{***} (df = 30; 9)
Note:	*p**p***p<0.01

	Dependent variable (+/- SE):
	Nominal GDP growth
Constant	-320.556 (+/- 44.708)
	p = 0.001***
SP500 Stock Price Index	0.198 (+/- 0.012)
	p = 0.00002***
Moody's AAA Curve	46.909 (+/- 6.859)
	p = 0.002***
Real disposable income growth	13.639 (+/- 1.646)
	p = 0.0005 ^{***}
Nominal disposable income growth	-12.143 (+/- 1.535)
	p = 0.001***
Unemployment Rate	-32.591 (+/- 1.838)
	p = 0.00002***
CPI Inflation Rate	10.700 (+/- 1.292)
	p = 0.0005 ^{***}
BBB corporate yield	-49.569 (+/- 3.357)
	p = 0.00003***
30-year Mortgate Rate	79.510 (+/- 10.318)
	p = 0.001***
Home Price Index	-1.053 (+/- 0.140)
	p = 0.001***
Commercial Real Estate Price Index	-1.734 (+/- 0.097)
	p = 0.00001***
Market Volatility Index	-1.536 (+/- 0.125)
	p = 0.0001 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	-30.154 (+/- 2.567)
	p = 0.0001***
LN_30-year Treasury Yield	1,064.145 (+/- 88.039)
	p = 0.0001 ^{***}
20-year Treasury Yield	139.442 (+/- 22.377)
	p = 0.002***
LN_20-year Treasury Yield	-1,484.191 (+/- 97.886)
	p = 0.00003***
10-year Treasury Yield	-43.362 (+/- 8.398)
	p = 0.004***
1-month Treasury Yield	-106.001 (+/- 7.536)

REGRESSION FOR NOMINAL GDP GROWTH

	p = 0.00004***
LN_1-month Treasury Yield	-7.460 (+/- 1.841)
	p = 0.010***
3-month Treasury Yield	-270.430 (+/- 27.098)
	p = 0.0002***
5-year Treasury Yield	142.759 (+/- 13.099)
	p = 0.0002***
LN_5-year Treasury Yield	-88.306 (+/- 10.693)
	p = 0.0005 ^{***}
6-month Treasury Yield	868.250 (+/- 50.942)
	p = 0.00002***
LN_6-month Treasury Yield	-139.175 (+/- 12.874)
	p = 0.0002***
3-year Treasury Yield	301.111 (+/- 11.534)
	p = 0.00001***
LN_3-year Treasury Yield	-99.104 (+/- 8.095)
	p = 0.0001***
1-year Treasury Yield	-514.320 (+/- 23.660)
	p = 0.00001***
LN_1-year Treasury Yield	137.703 (+/- 13.425)
	p = 0.0002***
1-year Treasury Yield_2	178.997 (+/- 12.543)
	p = 0.00004***
3-year Treasury Yield_2	-124.556 (+/- 10.506)
	p = 0.0001***
6-month Treasury Yield_2	-149.710 (+/- 12.201)
	p = 0.0001***
5-year Treasury Yield_2	-21.158 (+/- 1.523)
	p = 0.00004***
3-month Treasury Yield_2	17.523 (+/- 3.518)
	p = 0.005***
7-year Treasury Yield_2	29.505 (+/- 6.895)
	p = 0.008***
Market Volatility Index_2	0.015 (+/- 0.001)
	p = 0.0001***
Observations	40
R ²	0.999
Adjusted R ²	0.992
Residual Std. Error	0.776 (df = 5)

F Statistic	148.021 ^{***} (df = 34; 5)
	* ** ***

Note:

*p**p***p<0.01

	Dependent variable (+/- SE):
	Real disposable income growth
Constant	-482.804 (+/- 30.285)
	p = 0.00000 ^{***}
SP500 Stock Price Index	-0.052 (+/- 0.010)
	p = 0.0005***
Moody's AAA Curve	-73.656 (+/- 8.847)
	p = 0.00002***
Real GDP growth	1.037 (+/- 0.113)
	p = 0.00001***
Unemployment Rate	7.555 (+/- 1.706)
	p = 0.002***
CPI Inflation Rate	-6.173 (+/- 0.506)
	p = 0.00000***
Prime Rate	-53.057 (+/- 5.710)
	p = 0.00001***
Home Price Index	0.997 (+/- 0.191)
	p = 0.001***
Commercial Real Estate Price Index	0.473 (+/- 0.106)
	p = 0.002***
Market Volatility Index	-0.716 (+/- 0.124)
	p = 0.0003***
LN_Market Volatility Index	24.698 (+/- 4.015)
	p = 0.0002***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations) 21.339 (+/- 1.882)
	p = 0.00001***
LN_30-year Treasury Yield	408.087 (+/- 39.927)
	p = 0.00001***
10-year Treasury Yield	883.564 (+/- 71.749)
	p = 0.00000 ^{***}
LN_10-year Treasury Yield	-1,090.098 (+/- 70.923)
	p = 0.00000 ^{***}
LN_1-month Treasury Yield	9.807 (+/- 2.091)
	p = 0.002***
7-year Treasury Yield	-295.527 (+/- 32.461)
	p = 0.00001***
LN_7-year Treasury Yield	241.010 (+/- 29.533)

REGRESSION FOR REAL DISPOSABLE INCOME GROWTH

	p = 0.00002***	
3-month Treasury Yield	72.591 (+/- 9.061)	
	p = 0.00003***	
5-year Treasury Yield	-447.816 (+/- 47.163)	
	p = 0.00001***	
LN_5-year Treasury Yield	515.909 (+/- 37.893)	
	p = 0.00000 ^{***}	
LN_6-month Treasury Yield	-33.545 (+/- 6.502)	
	p = 0.001***	
3-year Treasury Yield	376.953 (+/- 22.742)	
	p = 0.00000***	
LN_3-year Treasury Yield	-285.451 (+/- 13.933)	
	p = 0.000***	
1-year Treasury Yield	-180.370 (+/- 17.403)	
	p = 0.00001***	
LN_1-year Treasury Yield	90.675 (+/- 7.705)	
	p = 0.00000 ^{***}	
3-year Treasury Yield_2	-14.960 (+/- 2.868)	
	p = 0.001***	
5-year Treasury Yield_2	47.370 (+/- 6.656)	
	p = 0.0001***	
7-year Treasury Yield_2	14.672 (+/- 3.831)	
	p = 0.005***	
1-month Treasury Yield_2	4.812 (+/- 0.577)	
	p = 0.00002***	
10-year Treasury Yield_2	-86.189 (+/- 9.237)	
	p = 0.00001***	
Observations	40	
R ²	0.996	
Adjusted R ²	0.981	
Residual Std. Error	1.741 (df = 9)	
F Statistic	68.433 ^{***} (df = 30; 9)	
Note:	*p**p***p<0.0	

	Dependent variable (+/- SE):	
	Nominal disposable income growth	
Constant	-835.522 (+/- 92.122)	
	p = 0.0003***	
SP500 Stock Price Index	-0.259 (+/- 0.016)	
	p = 0.00002***	
US Fed Reserve O-N Loan Rate	128.327 (+/- 13.798)	
	p = 0.0003***	
Moody's AAA Curve	-110.274 (+/- 8.558)	
	p = 0.0001***	
Real GDP growth	1.130 (+/- 0.082)	
	p = 0.00004***	
CPI Inflation Rate	-3.401 (+/- 0.436)	
	p = 0.001***	
BBB corporate yield	27.438 (+/- 3.403)	
	p = 0.0005 ^{***}	
30-year Mortgate Rate	-84.409 (+/- 8.321)	
	p = 0.0002 ^{***}	
Prime Rate	-40.923 (+/- 4.788)	
	p = 0.0004***	
Dow Total Stock Market Index	0.007 (+/- 0.001)	
	p = 0.0002***	
Home Price Index	1.899 (+/- 0.266)	
	p = 0.001***	
Commercial Real Estate Price Index	1.449 (+/- 0.127)	
	p = 0.0001***	
Market Volatility Index	-12.981 (+/- 1.645)	
	p = 0.001***	
LN_Market Volatility Index	237.585 (+/- 26.720)	
	p = 0.0003***	
US Avg Retail Gasoline Price (\$-gal; all grades, all formulation	s) 26.285 (+/- 3.644)	
	p = 0.001***	
20-year Treasury Yield	710.129 (+/- 49.427)	
	p = 0.00003***	
10-year Treasury Yield	269.635 (+/- 37.024)	
	p = 0.001***	
LN_10-year Treasury Yield	-741.013 (+/- 29.657)	

REGRESSION FOR NOMINAL DISPOSABLE INCOME GROWTH

	p = 0.00001***
LN_1-month Treasury Yield	9.769 (+/- 2.291)
	p = 0.008***
7-year Treasury Yield	-669.166 (+/- 35.675)
	p = 0.00001***
LN_7-year Treasury Yield	268.511 (+/- 25.630)
	p = 0.0002***
3-month Treasury Yield	183.432 (+/- 17.435)
	p = 0.0002***
LN_5-year Treasury Yield	245.738 (+/- 14.586)
	p = 0.00002***
6-month Treasury Yield	-458.874 (+/- 17.458)
	p = 0.00001***
LN_6-month Treasury Yield	29.343 (+/- 4.242)
	p = 0.001***
3-year Treasury Yield	321.323 (+/- 22.357)
	p = 0.00003***
LN_3-year Treasury Yield	-174.586 (+/- 16.634)
	p = 0.0002***
1-year Treasury Yield_2	-167.626 (+/- 9.992)
	p = 0.00002***
3-year Treasury Yield_2	111.350 (+/- 7.885)
	p = 0.00004***
6-month Treasury Yield_2	126.214 (+/- 7.678)
	p = 0.00002***
5-year Treasury Yield_2	-26.245 (+/- 3.150)
	p = 0.0005***
1-month Treasury Yield_2	-10.719 (+/- 1.702)
	p = 0.002***
10-year Treasury Yield_2	32.678 (+/- 7.650)
	p = 0.008***
20-year Treasury Yield_2	-65.776 (+/- 6.176)
	p = 0.0002***
Market Volatility Index_2	0.071 (+/- 0.010)
	p = 0.002***
Observations	40
R ²	0.998
Adjusted R ²	0.988
Residual Std. Error	1.353 (df = 5)

F Statistic 96.096^{***} (df = 34; 5)

Note:

*p**p***p<0.01

	Dependent variable (+/- SE)	
	CPI Inflation Rate	
Constant	-18.037 (+/- 0.715)	
	p = 0.0002***	
SP500 Stock Price Index	0.009 (+/- 0.0004)	
	p = 0.0002 ^{***}	
US Fed Reserve O-N Loan Rate	-3.305 (+/- 0.442)	
	p = 0.005***	
Moody's AAA Curve	-2.956 (+/- 0.242)	
	p = 0.002***	
Moody's BAA Curve	3.735 (+/- 0.098)	
	p = 0.00004***	
Real GDP growth	-0.313 (+/- 0.021)	
	p = 0.001***	
Nominal GDP growth	0.298 (+/- 0.021)	
	p = 0.001***	
Real disposable income growth	-1.136 (+/- 0.018)	
	p = 0.00001***	
Nominal disposable income growth	1.081 (+/- 0.017)	
	p = 0.00001***	
Unemployment Rate	0.761 (+/- 0.023)	
	p = 0.0001***	
30-year Mortgate Rate	2.848 (+/- 0.077)	
	p = 0.00005 ^{***}	
Prime Rate	3.304 (+/- 0.112)	
	p = 0.0001***	
Dow Total Stock Market Index	-0.0003 (+/- 0.00001)	
	p = 0.00003***	
Home Price Index	-0.088 (+/- 0.006)	
	p = 0.001***	
LN_Market Volatility Index	-0.865 (+/- 0.032)	
	p = 0.0002 ^{***}	
30-year Treasury Yield	-30.644 (+/- 2.249)	
	p = 0.001***	
LN_30-year Treasury Yield	72.497 (+/- 5.403)	
	p = 0.001***	
20-year Treasury Yield	19.424 (+/- 1.615)	

REGRESSION FOR CPI INFLATION RATE

	p = 0.002***
LN_20-year Treasury Yield	-52.903 (+/- 3.024)
	p = 0.0005 ^{***}
10-year Treasury Yield	-15.904 (+/- 0.677)
	p = 0.0002 ^{***}
LN_10-year Treasury Yield	31.958 (+/- 1.430)
	p = 0.0002 ^{***}
1-month Treasury Yield	10.218 (+/- 0.588)
	p = 0.0005 ^{***}
LN_1-month Treasury Yield	0.903 (+/- 0.045)
	p = 0.0003 ^{***}
7-year Treasury Yield	17.136 (+/- 0.879)
	p = 0.0003 ^{***}
LN_7-year Treasury Yield	-7.862 (+/- 1.173)
	p = 0.007 ^{***}
3-month Treasury Yield	-4.802 (+/- 0.396)
	p = 0.002***
5-year Treasury Yield	11.889 (+/- 0.326)
	p = 0.00005 ^{***}
LN_5-year Treasury Yield	-18.426 (+/- 0.623)
	p = 0.0001***
6-month Treasury Yield	-14.736 (+/- 0.414)
	p = 0.00005 ^{***}
3-year Treasury Yield	-23.396 (+/- 1.068)
	p = 0.0003 ^{***}
LN_3-year Treasury Yield	10.188 (+/- 0.647)
	p = 0.001***
1-year Treasury Yield	16.188 (+/- 0.845)
	p = 0.0004***
LN_1-year Treasury Yield	-0.721 (+/- 0.062)
	p = 0.002***
5-year Treasury Yield_2	-0.677 (+/- 0.046)
	p = 0.001***
3-month Treasury Yield_2	0.653 (+/- 0.074)
	p = 0.004***
1-month Treasury Yield_2	-0.416 (+/- 0.052)
	p = 0.005***
Market Volatility Index_2	0.001 (+/- 0.00001)
	p = 0.00003***

Observations	40
R ²	1.000
Adjusted R ²	1.000
Residual Std. Error	0.018 (df = 3)
F Statistic	27,042.440 ^{***} (df = 36; 3)
Note:	*p**p***p<0.01

Unemployment Rate

	Dependent variable (+/- SE)	
	Unemployment Rate	
Constant	23.605 (+/- 1.321)	
	p = 0.0004 ^{***}	
SP500 Stock Price Index	-0.011 (+/- 0.0004)	
	p = 0.0002***	
US Fed Reserve O-N Loan Rate	4.355 (+/- 0.529)	
	p = 0.004***	
Moody's AAA Curve	3.856 (+/- 0.396)	
	p = 0.003***	
Moody's BAA Curve	-4.891 (+/- 0.215)	
	p = 0.0002 ^{***}	
Real GDP growth	0.411 (+/- 0.028)	
	p = 0.001***	
Nominal GDP growth	-0.391 (+/- 0.027)	
	p = 0.001***	
Real disposable income growth	1.487 (+/- 0.053)	
	p = 0.0002 ^{***}	
Nominal disposable income growth	-1.415 (+/- 0.050)	
	p = 0.0001 ^{***}	
CPI Inflation Rate	1.310 (+/- 0.039)	
	p = 0.0001 ^{***}	
30-year Mortgate Rate	-3.732 (+/- 0.137)	
	p = 0.0002 ^{***}	
Prime Rate	-4.326 (+/- 0.207)	
	p = 0.0003 ^{***}	
Dow Total Stock Market Index	0.0004 (+/- 0.00001)	
	p = 0.00003***	
Home Price Index	0.116 (+/- 0.007)	
	p = 0.0005 ^{***}	
LN_Market Volatility Index	1.133 (+/- 0.055)	
	p = 0.0003 ^{***}	
30-year Treasury Yield	40.240 (+/- 2.750)	
	p = 0.001***	
LN_30-year Treasury Yield	-95.143 (+/- 6.883)	
	p = 0.001***	

REGRESSION FOR UNEMPLOYMENT RATE

20-year Treasury Yield	-25.502 (+/- 2.024) p = 0.002 ^{***}
LN 20-vear Treasury Yield	69.408 (+/- 3.889)
	$p = 0.0004^{***}$
10-vear Treasury Yield	20.884 (+/- 0.691)
	$p = 0.0001^{***}$
IN 10-year Treasury Yield	-41,977 (+/- 1,391)
	$p = 0.0001^{***}$
1-month Treasury Yield	-13.419 (+/- 0.671)
,	$p = 0.0003^{***}$
LN 1-month Treasury Yield	-1.185 (+/- 0.049)
_ ,	p = 0.0002***
7-year Treasury Yield	-22.495 (+/- 1.031)
, ,	p = 0.0003***
LN_7-year Treasury Yield	10.351 (+/- 1.452)
	p = 0.006***
3-month Treasury Yield	6.316 (+/- 0.446)
	p = 0.001***
5-year Treasury Yield	-15.587 (+/- 0.525)
	p = 0.0001***
LN_5-year Treasury Yield	24.182 (+/- 0.695)
	p = 0.0001***
6-month Treasury Yield	19.317 (+/- 0.684)
	p = 0.0001 ^{***}
3-year Treasury Yield	30.717 (+/- 1.183)
	p = 0.0002***
LN_3-year Treasury Yield	-13.391 (+/- 0.694)
	p = 0.0004***
1-year Treasury Yield	-21.254 (+/- 0.980)
	p = 0.0003***
LN_1-year Treasury Yield	0.948 (+/- 0.077)
	p = 0.002***
5-year Treasury Yield_2	0.886 (+/- 0.070)
	p = 0.002***
3-month Treasury Yield_2	-0.859 (+/- 0.088)
	p = 0.003***
1-month Treasury Yield_2	0.548 (+/- 0.064)
	p = 0.004***
Market Volatility Index_2	-0.001 (+/- 0.00003)

	p = 0.0001***
Observations	40
R ²	1.000
Adjusted R ²	1.000
Residual Std. Error	0.023 (df = 3)
F Statistic	6,119.982 ^{***} (df = 36; 3)
Note:	*p**p***p<0.01

Treasury Yields (1, 3	8, &	6-month; 1, 3, 5	5, 7, 10,	, 20, 8	& 30-year series)
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	Dependent variable (+/- SE):
	1-month Treasury Yield
Constant	15.130 (+/- 4.808)
	p = 0.004***
Moody's AAA Curve	-1.550 (+/- 0.374)
	p = 0.0004 ^{***}
Real GDP growth	0.237 (+/- 0.029)
	p = 0.000***
Nominal GDP growth	-0.212 (+/- 0.026)
	p = 0.000***
Commercial Real Estate Price Index	0.026 (+/- 0.004)
	p = 0.00000 ^{***}
30-year Treasury Yield	-83.158 (+/- 22.361)
	p = 0.001***
LN_30-year Treasury Yield	120.188 (+/- 30.243)
	p = 0.0005 ^{***}
20-year Treasury Yield	49.891 (+/- 14.617)
	p = 0.003***
LN_20-year Treasury Yield	-71.972 (+/- 19.022)
	p = 0.001***
LN_10-year Treasury Yield	-1.055 (+/- 0.221)
	p = 0.0001***
7-year Treasury Yield	2.380 (+/- 0.226)
	p = 0.000***
20-year Treasury Yield_2	-5.001 (+/- 1.429)
	p = 0.002***
30-year Treasury Yield_2	7.990 (+/- 2.072)
	p = 0.001***
Observations	40
R ²	0.986
Adjusted R ²	0.979
Residual Std. Error	0.233 (df = 27)
F Statistic	153.813 ^{***} (df = 12; 27)
Note:	*p**p***p<0.01

REGRESSION FOR 1-MONTH TREASURY YIELD

	Dependent variable (+/- SE):
	3-month Treasury Yield
Constant	-11.476 (+/- 2.856)
	p = 0.0004***
Real disposable income growth	0.289 (+/- 0.044)
	p = 0.00000***
Nominal disposable income growth	-0.266 (+/- 0.044)
	p = 0.00001***
Unemployment Rate	-0.709 (+/- 0.073)
	p = 0.000 ^{***}
Dow Total Stock Market Index	0.0001 (+/- 0.00001)
	p = 0.00004***
20-year Treasury Yield	19.710 (+/- 3.641)
	p = 0.00001***
LN_20-year Treasury Yield	-28.522 (+/- 4.669)
	p = 0.00000***
20-year Treasury Yield_2	-1.437 (+/- 0.342)
	p = 0.0002 ^{***}
Observations	40
R ²	0.947
Adjusted R ²	0.935
Residual Std. Error	0.408 (df = 32)
F Statistic	81.624 ^{***} (df = 7; 32)
Note:	*p**p****p<0.01

REGRESSION FOR 3-MONTH TREASURY YIELD

	Dependent variable (+/- SE):
	6-month Treasury Yield
Constant	-16.508 (+/- 2.982)
	p = 0.00001***
Real disposable income growth	0.237 (+/- 0.037)
	p = 0.00000***
Nominal disposable income growth	-0.220 (+/- 0.037)
	p = 0.00001***
Unemployment Rate	-0.538 (+/- 0.073)
	p = 0.00000***
Commercial Real Estate Price Index	0.023 (+/- 0.004)
	p = 0.00001***
LN_30-year Treasury Yield	7.732 (+/- 2.782)
	p = 0.010 ^{***}
20-year Treasury Yield	16.141 (+/- 3.135)
	p = 0.00002***
LN_20-year Treasury Yield	-29.153 (+/- 4.987)
	p = 0.00001***
20-year Treasury Yield_2	-1.169 (+/- 0.281)
	p = 0.0003***
Observations	40
R ²	0.967
Adjusted R ²	0.958
Residual Std. Error	0.342 (df = 31)
F Statistic	112.260 ^{***} (df = 8; 31)
Note:	*p**p***p<0.01

REGRESSION FOR 6-MONTH TREASURY YIELD

	Dependent variable (+/- SE):	
	1-year Treasury Yield	
Constant	-19.615 (+/- 3.703)	
	p = 0.00001***	
Real disposable income growth	0.245 (+/- 0.038)	
	p = 0.00000***	
Nominal disposable income growth	-0.227 (+/- 0.039)	
	p = 0.00001***	
Unemployment Rate	-0.523 (+/- 0.084)	
	p = 0.00000***	
Commercial Real Estate Price Index	0.019 (+/- 0.003)	
	p = 0.000 ^{***}	
30-year Treasury Yield	24.758 (+/- 5.432)	
	p = 0.0001***	
LN_30-year Treasury Yield	-35.420 (+/- 7.698)	
	p = 0.0001 ^{***}	
30-year Treasury Yield_2	-1.858 (+/- 0.466)	
	p = 0.0004***	
Observations	40	
R ²	0.953	
Adjusted R ²	0.943	
Residual Std. Error	0.384 (df = 32)	
F Statistic	93.172 ^{***} (df = 7; 32)	
Note:	*p**p***p<0.01	

REGRESSION FOR 1-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	3-year Treasury Yield
Constant	-1.214 (+/- 0.654)
	p = 0.073 [*]
SP500 Stock Price Index	-0.002 (+/- 0.0004)
	p = 0.0001***
Real disposable income growth	0.178 (+/- 0.048)
	p = 0.001***
Nominal disposable income growth	-0.169 (+/- 0.048)
	p = 0.002 ^{***}
Unemployment Rate	-0.360 (+/- 0.055)
	p = 0.00000 ^{***}
Home Price Index	0.045 (+/- 0.007)
	p = 0.00000 ^{***}
Observations	40
R ²	0.862
Adjusted R ²	0.841
Residual Std. Error	0.504 (df = 34)
F Statistic	42.358 ^{***} (df = 5; 34)
Note:	*p**p***p<0.01

REGRESSION FOR 3-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	5-year Treasury Yield
Constant	-1.698 (+/- 0.680)
	p = 0.018 ^{**}
SP500 Stock Price Index	-0.002 (+/- 0.0003)
	p = 0.00001***
Unemployment Rate	-0.212 (+/- 0.051)
	p = 0.0003 ^{***}
Home Price Index	0.038 (+/- 0.007)
	p = 0.00001 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.528 (+/- 0.179)
	p = 0.006 ^{***}
Observations	40
R ²	0.805
Adjusted R ²	0.783
Residual Std. Error	0.520 (df = 35)
F Statistic	36.206 ^{***} (df = 4; 35)
Note:	*p**p***p<0.01

REGRESSION FOR 5-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	7-year Treasury Yield
Constant	2.311 (+/- 0.718)
	p = 0.003***
SP500 Stock Price Index	-0.001 (+/- 0.0002)
	p = 0.005 ^{***}
Unemployment Rate	-0.124 (+/- 0.032)
	p = 0.0005 ^{***}
Home Price Index	0.020 (+/- 0.006)
	p = 0.002***
Commercial Real Estate Price Index	-0.013 (+/- 0.005)
	p = 0.010 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.470 (+/- 0.112)
	p = 0.0002 ^{***}
1-month Treasury Yield	0.338 (+/- 0.049)
	p = 0.00000 ^{***}
Observations	40
R ²	0.929
Adjusted R ²	0.917
Residual Std. Error	0.277 (df = 33)
F Statistic	72.429 ^{***} (df = 6; 33)
Note:	*p**p****p<0.01

REGRESSION FOR 7-YEAR TREASURY YIELD

	Dependent variable (+/- SE):	
	10-year Treasury Yield	
Constant	0.325 (+/- 0.378)	
	p = 0.396	
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.649 (+/- 0.130)	
	p = 0.00002 ^{***}	
1-month Treasury Yield	0.284 (+/- 0.051)	
	p = 0.00001 ^{***}	
Market Volatility Index_2	-0.0002 (+/- 0.0001)	
	p = 0.003***	
Observations	40	
R ²	0.760	
Adjusted R ²	0.740	
Residual Std. Error	0.467 (df = 36)	
F Statistic	38.083 ^{***} (df = 3; 36)	
Note:	*p**p***p<0.01	

REGRESSION FOR 10-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	20-year Treasury Yield
Constant	2.402 (+/- 0.405)
	p = 0.00001 ^{***}
Unemployment Rate	-0.086 (+/- 0.023)
	p = 0.001***
Prime Rate	0.575 (+/- 0.118)
	p = 0.00003***
Commercial Real Estate Price Index	-0.010 (+/- 0.001)
	p = 0.000***
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.456 (+/- 0.073)
	p = 0.00000 ^{***}
3-month Treasury Yield	-0.457 (+/- 0.135)
	p = 0.002 ^{***}
6-month Treasury Yield_2	0.055 (+/- 0.014)
	p = 0.001***
Observations	40
R ²	0.955
Adjusted R ²	0.947
Residual Std. Error	0.189 (df = 33)
F Statistic	117.691 ^{***} (df = 6; 33)
Note:	*p**p***p<0.01

REGRESSION FOR 20-YEAR TREASURY YIELD
	Dependent variable (+/- SE):
	30-year Treasury Yield
Constant	3.219 (+/- 0.401)
	p = 0.000***
SP500 Stock Price Index	-0.001 (+/- 0.0001)
	p = 0.000 ^{***}
US Fed Reserve O-N Loan Rate	-2.433 (+/- 0.621)
	p = 0.001***
Nominal GDP growth	-0.021 (+/- 0.006)
	p = 0.001***
Real disposable income growth	-0.150 (+/- 0.037)
	p = 0.0004 ^{***}
Nominal disposable income growth	0.144 (+/- 0.036)
	p = 0.0004***
Unemployment Rate	-0.162 (+/- 0.037)
	p = 0.0002***
Prime Rate	0.655 (+/- 0.097)
	p = 0.00000 ^{***}
1-month Treasury Yield	1.945 (+/- 0.603)
	p = 0.004***
LN_1-year Treasury Yield	-0.248 (+/- 0.070)
	p = 0.002***
1-month Treasury Yield_2	0.078 (+/- 0.018)
	p = 0.0002***
Observations	40
R ²	0.945
Adjusted R ²	0.926
Residual Std. Error	0.198 (df = 29)
F Statistic	49.501 ^{***} (df = 10; 29)
Note:	*p**p***p<0.01

REGRESSION FOR 30-YEAR TREASURY YIELD

30-year Mortgage Rate

	Dependent variable (+/- SE):
	30-year Mortgate Rate
Constant	-0.600 (+/- 0.492)
	p = 0.231
SP500 Stock Price Index	-0.002 (+/- 0.0003)
	p = 0.00001 ^{***}
Home Price Index	0.032 (+/- 0.006)
	p = 0.00002 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.774 (+/- 0.130)
	p = 0.00000 ^{***}
1-month Treasury Yield	0.316 (+/- 0.058)
	p = 0.00001 ^{***}
Observations	40
R ²	0.910
Adjusted R ²	0.899
Residual Std. Error	0.386 (df = 35)
F Statistic	88.112 ^{***} (df = 4; 35)
Note:	*p**p***p<0.01

REGRESSION FOR 30-YEAR MORTGATE RATE

Moody's AAA & BAA Rates

	Dependent variable (+/- SE):
	Moody's AAA Curve
Constant	4.346 (+/- 0.254)
	p = 0.000***
SP500 Stock Price Index	-0.001 (+/- 0.00005)
	p = 0.000 ^{***}
Unemployment Rate	-0.081 (+/- 0.023)
	p = 0.002 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.394 (+/- 0.075)
	p = 0.00001***
3-month Treasury Yield	-2.007 (+/- 0.353)
	p = 0.00001 ^{***}
6-month Treasury Yield	1.813 (+/- 0.312)
	p = 0.00001 ^{***}
1-month Treasury Yield_2	0.099 (+/- 0.013)
	p = 0.00000 ^{***}
Observations	40
R ²	0.939
Adjusted R ²	0.927
Residual Std. Error	0.197 (df = 33)
F Statistic	84.100 ^{***} (df = 6; 33)
Note:	*p**p***p<0.01

REGRESSION FOR MOODY'S AAA CURVE

	Dependent variable (+/- SE):
	Moody's BAA Curve
Constant	3.683 (+/- 0.375)
	p = 0.000 ^{***}
SP500 Stock Price Index	-0.002 (+/- 0.0002)
	p = 0.000 ^{***}
US Fed Reserve O-N Loan Rate	-2.911 (+/- 0.779)
	p = 0.001 ^{***}
Unemployment Rate	-0.154 (+/- 0.031)
	p = 0.00002***
Home Price Index	0.037 (+/- 0.004)
	p = 0.000 ^{***}
1-month Treasury Yield	3.151 (+/- 0.737)
	p = 0.0002***
LN_1-month Treasury Yield	-0.191 (+/- 0.039)
	p = 0.00003 ^{***}
Observations	40
R ²	0.921
Adjusted R ²	0.907
Residual Std. Error	0.241 (df = 33)
F Statistic	64.354 ^{***} (df = 6; 33)
Note:	*p**p***p<0.01

REGRESSION FOR MOODY'S BAA CURVE

BBB Corporate Yield

	Dependent variable (+/- SE):
	BBB corporate yield
Constant	3.917 (+/- 0.286)
	p = 0.000 ^{***}
US Fed Reserve O-N Loan Rate	-3.109 (+/- 0.540)
	p = 0.00001***
Real GDP growth	0.270 (+/- 0.030)
	p = 0.000 ^{***}
Nominal GDP growth	-0.259 (+/- 0.030)
	p = 0.000 ^{***}
Real disposable income growth	0.008 (+/- 0.003)
	p = 0.004 ^{***}
Unemployment Rate	-0.138 (+/- 0.026)
	p = 0.00003***
CPI Inflation Rate	0.106 (+/- 0.029)
	p = 0.002 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	0.489 (+/- 0.077)
	p = 0.00001***
1-month Treasury Yield	2.674 (+/- 0.484)
	p = 0.00001***
3-month Treasury Yield	-2.501 (+/- 0.811)
	p = 0.005 ^{***}
6-month Treasury Yield	2.266 (+/- 0.520)
	p = 0.0002 ^{***}
LN_6-month Treasury Yield	-0.809 (+/- 0.155)
	p = 0.00003***
LN_1-year Treasury Yield	1.298 (+/- 0.160)
	p = 0.00000 ^{***}
6-month Treasury Yield_2	0.075 (+/- 0.020)
	p = 0.002 ^{***}
Market Volatility Index_2	-0.0001 (+/- 0.00002)
	p = 0.008 ^{***}
Observations	40
R ²	0.989
Adjusted R ²	0.983

REGRESSION FOR BBB CORPORATE YIELD

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION

Residual Std. Error	0.133 (df = 25)
F Statistic	164.899 ^{***} (df = 14; 25)
Note:	*p**p***p<0.01

Prime Rate

	Dependent variable (+/- SE):
	Prime Rate
Constant	-16.985 (+/- 2.540)
	p = 0.00000 ^{***}
Real disposable income growth	0.197 (+/- 0.027)
	p = 0.00000****
Nominal disposable income growth	-0.180 (+/- 0.027)
	p = 0.00000****
Unemployment Rate	-0.516 (+/- 0.053)
	p = 0.000 ^{***}
Dow Total Stock Market Index	0.0001 (+/- 0.00001)
	p = 0.000 ^{***}
30-year Treasury Yield	-12.258 (+/- 1.909)
	p = 0.00000***
LN_30-year Treasury Yield	38.146 (+/- 5.239)
	p = 0.00000***
20-year Treasury Yield	32.786 (+/- 2.731)
	p = 0.000 ^{***}
LN_20-year Treasury Yield	-58.744 (+/- 4.996)
	p = 0.000 ^{***}
20-year Treasury Yield_2	-1.927 (+/- 0.262)
	p = 0.00000 ^{***}
Observations	40
R ²	0.983
Adjusted R ²	0.978
Residual Std. Error	0.248 (df = 30)
F Statistic	190.973 ^{***} (df = 9; 30)
Note:	*p**p***p<0.01

REGRESSION FOR PRIME RATE

US Average Retail Gasoline Price

	Dependent variable (+/- SE):
	US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)
Constant	-0.922 (+/- 0.388)
	p = 0.025**
SP500 Stock Price Index	0.0004 (+/- 0.0001)
	p = 0.00001***
30-year Mortgate Rate	0.413 (+/- 0.099)
	p = 0.0003***
20-year Treasury Yield	1.889 (+/- 0.547)
	p = 0.002***
LN_20-year Treasury Yield	-3.758 (+/- 1.204)
	p = 0.004***
3-year Treasury Yield	-1.410 (+/- 0.415)
	p = 0.002***
LN_3-year Treasury Yield	1.389 (+/- 0.305)
	p = 0.0001***
1-year Treasury Yield	1.152 (+/- 0.318)
	p = 0.002***
LN_1-year Treasury Yield	-0.691 (+/- 0.157)
	p = 0.0002***
3-month Treasury Yield_2	-0.130 (+/- 0.025)
	p = 0.00002***
Observations	40
R ²	0.907
Adjusted R ²	0.879
Residual Std. Error	0.220 (df = 30)
F Statistic	32.359 ^{***} (df = 9; 30)
Note:	*p**p***p<0.0

REGRESSION FOR US AVG RETAIL GASOLINE PRICE (-GAL; ALL GRADES, ALL FORMULATIONS)

US Federal Reserve Overnight Lending Rate

	Dependent variable (+/- SE):
	US Fed Reserve O-N Loan Rate
Constant	-3.528 (+/- 1.179)
	p = 0.006 ^{***}
Real GDP growth	0.185 (+/- 0.062)
	p = 0.006***
Nominal GDP growth	-0.176 (+/- 0.062)
	p = 0.009***
Real disposable income growth	0.425 (+/- 0.129)
	p = 0.003***
Nominal disposable income growth	-0.394 (+/- 0.122)
	p = 0.004***
Unemployment Rate	-0.495 (+/- 0.071)
	p = 0.00000 ^{***}
CPI Inflation Rate	0.295 (+/- 0.092)
	p = 0.004***
BBB corporate yield	-0.406 (+/- 0.117)
	p = 0.002***
Home Price Index	-0.028 (+/- 0.008)
	p = 0.003***
Commercial Real Estate Price Index	0.037 (+/- 0.007)
	p = 0.00003 ^{***}
20-year Treasury Yield	5.190 (+/- 0.758)
	p = 0.00000 ^{***}
LN_20-year Treasury Yield	-9.819 (+/- 1.876)
	p = 0.00002***
Observations	40
R ²	0.969
Adjusted R ²	0.957
Residual Std. Error	0.324 (df = 28)
F Statistic	79.251 ^{***} (df = 11; 28)
Note:	*p**p***p<0.01

REGRESSION FOR US FED RESERVE O-N LOAN RATE

REGRESSION FOR DOW TOTAL STOCK MARKET INDEX		
	Dependent variable (+/- SE):	
	Dow Total Stock Market Index	
Constant	70,789.550 (+/- 3,785.765)	
	p = 0.000***	
BBB corporate yield	-3,868.762 (+/- 1,092.603)	
	p = 0.002 ^{***}	
LN_30-year Treasury Yield	-136,327.700 (+/- 10,334.650)	
	p = 0.000***	
LN_20-year Treasury Yield	126,077.800 (+/- 10,203.240)	
	p = 0.000***	
10-year Treasury Yield	16,889.960 (+/- 2,534.824)	
	p = 0.00000 ^{***}	
LN_6-month Treasury Yield	4,283.876 (+/- 912.723)	
	p = 0.0001***	
3-year Treasury Yield	-17,009.840 (+/- 3,468.096)	
	p = 0.00004 ^{***}	
1-year Treasury Yield	-6,181.083 (+/- 2,115.387)	
	p = 0.007***	
3-year Treasury Yield_2	2,637.540 (+/- 505.682)	
	p = 0.00002***	
5-year Treasury Yield_2	3,343.604 (+/- 635.821)	
	p = 0.00002***	
1-month Treasury Yield_2	1,095.239 (+/- 149.456)	
	p = 0.00000 ^{***}	
10-year Treasury Yield_2	-6,057.335 (+/- 890.420)	
	p = 0.00000***	
Observations	40	
R ²	0.976	
Adjusted R ²	0.967	
Residual Std. Error	1,664.571 (df = 28)	
F Statistic	105.130 ^{***} (df = 11; 28)	
Note:	*p**p***p<0.01	

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

	Dependent variable (+/- SE):
	SP500 Stock Price Index
Constant	6,213.051 (+/- 208.609)
	p = 0.000 ^{***}
US Fed Reserve O-N Loan Rate	656.575 (+/- 185.110)
	p = 0.004 ^{***}
Moody's AAA Curve	413.876 (+/- 94.802)
	p = 0.001***
Real GDP growth	-7.331 (+/- 0.861)
	p = 0.00001***
CPI Inflation Rate	75.539 (+/- 4.937)
	p = 0.000 ^{***}
30-year Mortgate Rate	-575.433 (+/- 40.552)
	p = 0.000 ^{***}
Prime Rate	566.545 (+/- 58.645)
	p = 0.00000 ^{***}
LN_Market Volatility Index	67.506 (+/- 17.575)
	p = 0.003 ^{***}
30-year Treasury Yield	7,236.126 (+/- 1,003.332)
	p = 0.00001 ^{***}
LN_30-year Treasury Yield	-28,541.870 (+/- 2,194.483)
	p = 0.000***
20-year Treasury Yield	-5,457.637 (+/- 774.070)
	p = 0.00001 ^{***}
LN_20-year Treasury Yield	19,136.820 (+/- 1,379.376)
	p = 0.000 ^{***}
10-year Treasury Yield	1,784.711 (+/- 217.941)
	p = 0.00001 ^{***}
1-month Treasury Yield	-1,334.954 (+/- 284.494)
	p = 0.0005 ^{***}
LN_1-month Treasury Yield	-99.488 (+/- 25.759)
	p = 0.002 ^{***}
7-year Treasury Yield	-1,573.782 (+/- 140.651)
	p = 0.00000 ^{***}
LN_7-year Treasury Yield	2,543.163 (+/- 329.419)
	p = 0.00001***
3-month Treasury Yield	992.292 (+/- 247.482)

REGRESSION FOR SP500 STOCK PRICE INDEX

	p = 0.002 ^{***}
5-year Treasury Yield	-1,254.231 (+/- 191.887)
	p = 0.00002***
LN_6-month Treasury Yield	707.528 (+/- 75.154)
	p = 0.00000 ^{***}
1-year Treasury Yield	-1,220.586 (+/- 163.742)
	p = 0.00001 ^{***}
LN_1-year Treasury Yield	-686.265 (+/- 77.693)
	p = 0.00000 ^{***}
3-year Treasury Yield_2	273.734 (+/- 18.834)
	p = 0.000 ^{***}
5-year Treasury Yield_2	395.110 (+/- 42.736)
	p = 0.00000 ^{***}
3-month Treasury Yield_2	-140.888 (+/- 29.251)
	p = 0.0004***
1-month Treasury Yield_2	166.676 (+/- 21.052)
	p = 0.00001 ^{***}
10-year Treasury Yield_2	-366.327 (+/- 47.901)
	p = 0.00001 ^{***}
Observations	40
R ²	1.000
Adjusted R ²	0.999
Residual Std. Error	23.975 (df = 13)
F Statistic	2,142.835 ^{***} (df = 26; 13)
Note:	*p**p***p<0.01

House and Commercial Real Estate Price Indexes

	Dependent variable (+/- SE):
	Home Price Index
Constant	303.096 (+/- 16.885)
	p = 0.000 ^{***}
Moody's AAA Curve	40.243 (+/- 8.278)
	p = 0.0001 ^{***}
Real GDP growth	-0.426 (+/- 0.095)
	p = 0.0002 ^{***}
CPI Inflation Rate	3.796 (+/- 0.438)
	p = 0.000***
30-year Mortgate Rate	-20.060 (+/- 4.209)
	p = 0.0001 ^{***}
Prime Rate	19.627 (+/- 4.654)
	p = 0.0004 ^{***}
LN_30-year Treasury Yield	-569.889 (+/- 43.774)
	p = 0.000***
LN_20-year Treasury Yield	556.632 (+/- 37.884)
	p = 0.000****
7-year Treasury Yield	-130.760 (+/- 15.149)
	p = 0.000***
5-year Treasury Yield	16.939 (+/- 4.472)
	p = 0.001***
LN_6-month Treasury Yield	33.014 (+/- 5.697)
	p = 0.00001 ^{***}
3-year Treasury Yield	73.330 (+/- 18.195)
	p = 0.0005 ^{***}
1-year Treasury Yield	-84.519 (+/- 10.360)
	p = 0.00000 ^{***}
LN_1-year Treasury Yield	-23.381 (+/- 7.607)
	p = 0.006***
3-year Treasury Yield_2	7.828 (+/- 1.626)
	p = 0.0001 ^{***}
6-month Treasury Yield_2	6.295 (+/- 0.774)
	p = 0.00000***
Observations	40

REGRESSION FOR HOME PRICE INDEX

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION

R ²		(0.996
Ad	ljusted R ²	().994
Re	sidual Std. Error	3.678	3 (df = 24)
FS	Statistic	455.083**	^{**} (df = 15; 24)
Nc	ote:		*p**p***p<0.01

	Dependent variable (+/- SE):	
	Commercial Real Estate Price Index	
Constant	241.129 (+/- 52.200)	
	p = 0.0001***	
CPI Inflation Rate	5.707 (+/- 0.916)	
	p = 0.00001***	
30-year Mortgate Rate	-42.037 (+/- 14.568)	
	p = 0.008 ^{***}	
20-year Treasury Yield	112.088 (+/- 32.991)	
	p = 0.003***	
10-year Treasury Yield	275.619 (+/- 69.006)	
	p = 0.001***	
LN_10-year Treasury Yield	-350.096 (+/- 65.061)	
	p = 0.00002***	
7-year Treasury Yield	-437.048 (+/- 64.893)	
	p = 0.00000 ^{***}	
LN_7-year Treasury Yield	202.648 (+/- 36.496)	
	p = 0.00001 ^{***}	
LN_5-year Treasury Yield	74.499 (+/- 24.942)	
	p = 0.007***	
6-month Treasury Yield	120.826 (+/- 33.067)	
	p = 0.002***	
3-year Treasury Yield	365.632 (+/- 48.756)	
	p = 0.00000 ^{***}	
LN_3-year Treasury Yield	-82.537 (+/- 20.023)	
	p = 0.0004***	
1-year Treasury Yield	-253.923 (+/- 50.766)	
	p = 0.00004***	
1-year Treasury Yield_2	7.334 (+/- 1.901)	
	p = 0.001***	
10-year Treasury Yield_2	-20.990 (+/- 7.345)	
	p = 0.009***	
Observations	40	
R ²	0.971	
Adjusted R ²	0.955	
Residual Std. Error	9.362 (df = 25)	
F Statistic	59.997 ^{***} (df = 14; 25)	

REGRESSION FOR COMMERCIAL REAL ESTATE PRICE INDEX

Note:

*p**p***p<0.01

Market Volatility Index

	Dependent variable (+/- SE):
	Market Volatility Index
Constant	-872.792 (+/- 174.428)
	p = 0.0005 ^{***}
Moody's AAA Curve	-156.583 (+/- 13.754)
	p = 0.00000 ^{***}
Real GDP growth	21.698 (+/- 1.640)
	p = 0.00000 ^{***}
Nominal GDP growth	-20.474 (+/- 1.533)
	p = 0.00000 ^{***}
Real disposable income growth	-0.739 (+/- 0.099)
	p = 0.00002***
Prime Rate	-128.779 (+/- 13.319)
	p = 0.00001***
Dow Total Stock Market Index	0.002 (+/- 0.001)
	p = 0.008 ^{***}
Home Price Index	3.978 (+/- 0.331)
	p = 0.00000 ^{***}
Commercial Real Estate Price Index	-1.565 (+/- 0.158)
	p = 0.00000 ^{***}
US Avg Retail Gasoline Price (\$-gal; all grades, all formulations)	61.268 (+/- 5.815)
	p = 0.00000 ^{***}
30-year Treasury Yield	1,709.201 (+/- 168.178)
	p = 0.00000 ^{***}
20-year Treasury Yield	-2,066.105 (+/- 219.727)
	p = 0.00001***
LN_20-year Treasury Yield	1,150.243 (+/- 288.067)
	p = 0.003 ^{***}
10-year Treasury Yield	688.217 (+/- 52.819)
	p = 0.00000 ^{***}
LN_10-year Treasury Yield	-1,366.472 (+/- 104.887)
	p = 0.00000 ^{***}
5-year Treasury Yield	-263.838 (+/- 26.169)
	p = 0.00000***
LN_5-year Treasury Yield	628.724 (+/- 47.337)
	p = 0.00000 ^{***}

REGRESSION FOR MARKET VOLATILITY INDEX

6-month Treasury Yield	407.745 (+/- 38.722)
	p = 0.00000 ^{***}
LN_6-month Treasury Yield	-167.488 (+/- 12.931)
	p = 0.00000 ^{***}
3-year Treasury Yield	903.922 (+/- 83.361)
	p = 0.00000***
LN_3-year Treasury Yield	-573.733 (+/- 51.286)
	p = 0.00000 ^{***}
1-year Treasury Yield	-530.965 (+/- 53.280)
	p = 0.00000 ^{***}
LN_1-year Treasury Yield	271.546 (+/- 19.184)
	p = 0.00000***
1-year Treasury Yield_2	64.560 (+/- 7.714)
	p = 0.00001***
3-year Treasury Yield_2	-114.974 (+/- 12.457)
	p = 0.00001***
5-year Treasury Yield_2	-32.391 (+/- 4.325)
	p = 0.00002***
3-month Treasury Yield_2	-46.179 (+/- 3.846)
	p = 0.00000***
20-year Treasury Yield_2	212.025 (+/- 20.477)
	p = 0.00000***
30-year Treasury Yield_2	-186.867 (+/- 23.598)
	p = 0.00001***
Observations	40
R ²	0.986
Adjusted R ²	0.949
Residual Std. Error	2.987 (df = 11)
F Statistic	26.852 ^{***} (df = 28; 11)
Note:	*p**p***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
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Attribute	Referenced Source ⁷⁶
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 [BAMLCOA4CBBBEY], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/BAMLCOA4CBBBEY ⁷⁷

⁷⁶ Per https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20190213a1.pdf

⁷⁷ 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) ⁷⁸ .
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) ⁷⁹ .
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.

⁷⁸ Capitalytics 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

⁷⁹ Capitalytics 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)"⁸⁰.



Since the CCAR dataset is only released annually (through 1Q2024 as of this writing), and Capitalytics provides quarterly updates to its forecasts, the CCAR dataset is supplemented by the data sources

⁸⁰ 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) 1Q2024.

Table 17: Supplementary	Data	Sources	for	Data	Attributes
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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	End-of-quarter rates from the H.10 Release, Foreign Exchange
Exchange Rate (USD/Euro)	Rates, Federal Reserve Board.
Developing Asia Beal GDP	The nominal GDP-weighted aggregate of the Real GDP growth
Growth	for China, India, South Korea, Hong Kong Special
	Administrative Region, and Taiwan per OECD
	The nominal GDP-weighted aggregate of the inflation rate for
Developing Asia Inflation	China, India, South Korea, Hong Kong Special Administrative
	Region, and Taiwan per OECD
Developing Asia bilateral dollar	End-of-quarter rates from the H.10 Release, Foreign Exchange
exchange rate (F/USD, index)	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	End-of-quarter rates from the H.10 Release, Foreign Exchange
Rate (Yen/USD)	Rates, Federal Reserve Board.
UK Beal GDP Growth	Quarterly average of monthly series for "United Kingdom GDP
	Growth Rate" per tradingeconomics.com
	Quarterly average of monthly series for "United Kingdom
	Inflation Rate" per tradingeconomics.com
UK Bilateral Dollar Exchange Rate	End-of-quarter rates from the H.10 Release, Foreign Exchange
(USD/Pound)	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) 1Q2024.

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

MACROECONOMIC FORECASTS, 1Q2024 - FINAL VERSION

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's⁸¹ "forecast" package⁸²; specifically, the "ets" function (see p.39 of https://cran.r-project.org/web/packages/forecast/forecast.pdf)⁸³ 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)</pre>

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 $n+1^{st}$ forecasted value given the first n values of the metric's sequence (the "fitted" values)⁸⁴, 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

⁸¹ As of this writing, v.4.1.2 of the "R" language is available at <u>https://cran.r-project.org/</u>.

⁸² As of this writing, v.8.16 of the forecast package is available at <u>https://CRAN.R-project.org/package=forecast</u>.

⁸³ 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.

⁸⁴ 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)⁸⁵.
- 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 guarter 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))</pre>
       > sp_ts
          Qtr1
                    0tr2
                               0tr3
                                         0tr4
                130.6591 1250.5201 998.4077
2008
2009 812.0470 799.5264 927.5045 1041.3728
       > m<-ets(sp_ts,model='ZZZ',opt.crit=c('mae'),additive.only=TRUE)</pre>
       > dsp_ts<-diff(sp_ts)</pre>
       > dsp_ts
            Qtr1
                        Qtr2
                                     Qtr3
                                                  0tr4
                              1119.860980 -252.112424
2008
2009 -186.360685 -12.520593 127.978126 113.868293
       > m<-ets(dsp_ts,model='ZZZ',opt.crit=c('mae'),additive.only=TRUE</pre>
```

- 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 values⁸⁶;
 - 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

⁸⁵ It bears noting that a lower value for the "score" indicates better accuracy of an algorithm.

⁸⁶ 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 slopes⁸⁷.

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 $0 \le \alpha \le 1$, 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.

$$\hat{y}_{\scriptscriptstyle T^{+1}\mid \scriptscriptstyle T} = \alpha y_{\scriptscriptstyle T} + \alpha (1{-}\alpha) y_{\scriptscriptstyle T^{-1}} + \alpha (1{-}\alpha)^2 y_{\scriptscriptstyle T^{-2}} + \dots + \epsilon_{\scriptscriptstyle T^{+1}}$$

⁸⁷ 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.

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

 Table 18: Mathematical Methods Associated with Trend & Seasonal Components

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 "Im" 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		Seasonal	
	N	Α	Μ
Ν	$\hat{y}_{t+h t} = \ell_t$ $\ell_t = lpha y_t + (1-lpha)\ell_{t-1}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t + s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t - s_{t-m}) + (1-\alpha)\ell_{t-1} \\ s_t &= \gamma(y_t - \ell_{t-1}) + (1-\gamma)s_{t-m} \end{split}$	$egin{aligned} \hat{y}_{t+h t} &= \ell_t s_{t-m+h_m^+} \ \ell_t &= lpha(y_t/s_{t-m}) + (1-lpha)\ell_{t-1} \ s_t &= \gamma(y_t/\ell_{t-1}) + (1-\gamma)s_{t-m} \end{aligned}$
Α	$\hat{y}_{t+h t} = \ell_t + hb_t$ $\ell_t = lpha y_t + (1-lpha)(\ell_{t-1} + b_{t-1})$ $b_t = eta^*(\ell_t - \ell_{t-1}) + (1-eta^*)b_{t-1}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t + hb_t + s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t - s_{t-m}) + (1-\alpha)(\ell_{t-1} + b_{t-1}) \\ b_t &= \beta^*(\ell_t - \ell_{t-1}) + (1-\beta^*)b_{t-1} \\ s_t &= \gamma(y_t - \ell_{t-1} - b_{t-1}) + (1-\gamma)s_{t-m} \end{split}$	$\begin{split} \hat{y}_{t+h t} &= (\ell_t + hb_t)s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t/s_{t-m}) + (1-\alpha)(\ell_{t-1} + b_{t-1}) \\ b_t &= \beta^*(\ell_t - \ell_{t-1}) + (1-\beta^*)b_{t-1} \\ s_t &= \gamma(y_t/(\ell_{t-1} + b_{t-1})) + (1-\gamma)s_{t-m} \end{split}$
$\mathbf{A}_{\mathbf{d}}$	$\hat{y}_{t+h t} = \ell_t + \phi_h b_t$ $\ell_t = lpha y_t + (1-lpha)(\ell_{t-1} + \phi b_{t-1})$ $b_t = eta^*(\ell_t - \ell_{t-1}) + (1-eta^*)\phi b_{t-1}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t + \phi_h b_t + s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t - s_{t-m}) + (1-\alpha)(\ell_{t-1} + \phi_{b_{t-1}}) \\ b_t &= \beta^*(\ell_t - \ell_{t-1}) + (1-\beta^*)\phi_{b_{t-1}} \\ s_t &= \gamma(y_t - \ell_{t-1} - \phi_{b_{t-1}}) + (1-\gamma)s_{t-m} \end{split}$	$\begin{split} \hat{y}_{t+h t} &= (\ell_t + \phi_h b_t) s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t/s_{t-m}) + (1-\alpha)(\ell_{t-1} + \phi b_{t-1}) \\ b_t &= \beta^*(\ell_t - \ell_{t-1}) + (1-\beta^*)\phi b_{t-1} \\ s_t &= \gamma(y_t/(\ell_{t-1} + \phi b_{t-1})) + (1-\gamma)s_{t-m} \end{split}$
М	$egin{aligned} \hat{y}_{t+h t} &= \ell_t b_t^h \ \ell_t &= lpha y_t + (1-lpha) \ell_{t-1} b_{t-1} \ b_t &= eta^* (\ell_t / \ell_{t-1}) + (1-eta^*) b_{t-1} \end{aligned}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t b_t^h + s_{t-m+h_m^+} \\ \ell_t &= \alpha (y_t - s_{t-m}) + (1-\alpha)\ell_{t-1}b_{t-1} \\ b_t &= \beta^* (\ell_t/\ell_{t-1}) + (1-\beta^*)b_{t-1} \\ s_t &= \gamma (y_t - \ell_{t-1}b_{t-1}) + (1-\gamma)s_{t-m} \end{split}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t b_t^h s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t/s_{t-m}) + (1-\alpha)\ell_{t-1}b_{t-1} \\ b_t &= \beta^*(\ell_t/\ell_{t-1}) + (1-\beta^*)b_{t-1} \\ s_t &= \gamma(y_t/(\ell_{t-1}b_{t-1})) + (1-\gamma)s_{t-m} \end{split}$
$\mathbf{M}_{\mathbf{d}}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t b_t^{\phi_h} \\ \ell_t &= \alpha y_t + (1-\alpha)\ell_{t-1}b_{t-1}^{\phi} \\ b_t &= \beta^*(\ell_t/\ell_{t-1}) + (1-\beta^*)b_{t-1}^{\phi} \end{split}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t b_t^{\phi_h} + s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t - s_{t-m}) + (1-\alpha)\ell_{t-1}b_{t-1}^{\phi} \\ b_t &= \beta^*(\ell_t/\ell_{t-1}) + (1-\beta^*)b_{t-1}^{\phi} \\ s_t &= \gamma(y_t - \ell_{t-1}b_{t-1}^{\phi}) + (1-\gamma)s_{t-m} \end{split}$	$\begin{split} \hat{y}_{t+h t} &= \ell_t b_t^{\phi_h} s_{t-m+h_m^+} \\ \ell_t &= \alpha(y_t/s_{t-m}) + (1-\alpha)\ell_{t-1} b_{t-1}^{\phi} \\ b_t &= \beta^* (\ell_t/\ell_{t-1}) + (1-\beta^*) b_{t-1}^{\phi} \\ s_t &= \gamma(y_t/(\ell_{t-1} b_{t-1}^{\phi})) + (1-\gamma) s_{t-m} \end{split}$

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 6: Correlation Factors found as of 1Q2024 Image: Correlation Factors found as of 1Q2024

Variable 1	Variable 2	Correlation
	Annualized US Inflation Rate (all items, all urban	
S&P500 Stock Price Index	areas)	0.610319
S&P500 Stock Price Index	Dow-Jones Total Stock Market Index	0.961326
S&P500 Stock Price Index	US Nat'l Residential Home Price Index	0.940581
S&P500 Stock Price Index	US Nat'l Commercial Real Estate Index	0.953552
Cost of Federal Funds	Moody's AAA Yield	0.783027
Cost of Federal Funds	Moody's BAA Yield	0.729064
Cost of Federal Funds	BofA BBB Corporate Yield	0.753822
Cost of Federal Funds	30-year Fixed Mortgage Rate	0.873025
Cost of Federal Funds	US Prime Rate	0.996451
Cost of Federal Funds	30-year Treasury Yield	0.770321
Cost of Federal Funds	20-year Treasury Yield	0.775294
Cost of Federal Funds	10-year Treasury Yield	0.839699
Cost of Federal Funds	1-month Treasury Yield	0.993302
Cost of Federal Funds	7-year Treasury Yield	0.883821
Cost of Federal Funds	3-month Treasury Yield	0.995667
Cost of Federal Funds	5-year Treasury Yield	0.913024
Cost of Federal Funds	6-month Treasury Yield	0.992507
Cost of Federal Funds	3-year Treasury Yield	0.950901
Cost of Federal Funds	1-year Treasury Yield	0.98575
Moody's AAA Yield	Moody's BAA Yield	0.979357
Moody's AAA Yield	BofA BBB Corporate Yield	0.948373
Moody's AAA Yield	30-year Fixed Mortgage Rate	0.968504
Moody's AAA Yield	US Prime Rate	0.762103
Moody's AAA Yield	Dow-Jones Total Stock Market Index	-0.765958
Moody's AAA Yield	US Nat'l Residential Home Price Index	-0.782516
Moody's AAA Yield	US Nat'l Commercial Real Estate Index	-0.834844
Moody's AAA Yield	Average Retail Gasoline Price (all grades)	-0.70789
Moody's AAA Yield	30-year Treasury Yield	0.985277
Moody's AAA Yield	20-year Treasury Yield	0.983358
Moody's AAA Yield	10-year Treasury Yield	0.984328
Moody's AAA Yield	7-year Treasury Yield	0.96316
Moody's AAA Yield	3-month Treasury Yield	0.780093
Moody's AAA Yield	5-year Treasury Yield	0.940369
Moody's AAA Yield	6-month Treasury Yield	0.784147
Moody's AAA Yield	3-year Treasury Yield	0.890681
Moody's AAA Yield	1-year Treasury Yield	0.804991
Moody's BAA Yield	BofA BBB Corporate Yield	0.984302
Moody's BAA Yield	30-year Fixed Mortgage Rate	0.943208
Moody's BAA Yield	US Prime Rate	0.707664
Moody's BAA Yield	Dow-Jones Total Stock Market Index	-0.778935
Moody's BAA Yield	US Nat'l Residential Home Price Index	-0.765857
Moody's BAA Yield	US Nat'l Commercial Real Estate Index	-0.809098
Moody's BAA Yield	Average Retail Gasoline Price (all grades)	-0.668728
Moody's BAA Yield	30-year Treasury Yield	0.949194
Moody's BAA Yield	20-year Treasury Yield	0.933292
Moody's BAA Yield	10-year Treasury Yield	0.948279
Moody's BAA Yield	7-year Treasury Yield	0.916362
Moody's BAA Yield	3-month Treasury Yield	0.724217
Moody's BAA Yield	5-year Treasury Yield	0.890969

MACROECONOMIC FORECASTS, 4Q2023 - FINAL VERSION

Moody's BAA Yield	6-month Treasury Yield	0.729601
Moody's BAA Yield	3-year Treasury Yield	0.836746
Moody's BAA Yield	1-year Treasury Yield	0.750236
Real GDP Growth Rate	Nominal GDP Growth Rate	0.958015
Real Disposable Income Growth Rate	Nominal Disposable Income Growth Rate	0.972444
BofA BBB Corporate Yield	30-year Fixed Mortgage Rate	0 937101
BofA BBB Corporate Vield	US Prime Rate	0.734239
BofA BBB Corporate Vield	Dow Jones Total Stock Market Index	0.754255
Both BBB Corporate Vield	US Not'l Decidential Llema Drice Index	-0.705075
		-0.085127
Both BBB Corporate Yield	US Nat'i Commercial Real Estate Index	-0./1/485
Both BBB Corporate Yield	30-year Treasury Yield	0.906143
BotA BBB Corporate Yield	20-year Treasury Yield	0.886116
BofA BBB Corporate Yield	10-year Treasury Yield	0.925711
BofA BBB Corporate Yield	7-year Treasury Yield	0.9022
BofA BBB Corporate Yield	3-month Treasury Yield	0.750213
BofA BBB Corporate Yield	5-year Treasury Yield	0.886116
BofA BBB Corporate Yield	6-month Treasury Yield	0.757527
BofA BBB Corporate Yield	3-year Treasury Yield	0.844766
BofA BBB Corporate Yield	1-year Treasury Yield	0.775239
30-year Fixed Mortgage Rate	US Prime Rate	0.856
30-year Fixed Mortgage Rate	Dow-Jones Total Stock Market Index	-0.628742
30-year Fixed Mortgage Rate	US Nat'l Residential Home Price Index	-0.63178
30-year Fixed Mortgage Rate	US Nat'l Commercial Real Estate Index	-0.701639
30-year Fixed Mortgage Rate	Average Retail Gasoline Price (all grades)	-0.626399
30-year Fixed Mortgage Rate	30-year Treasury Yield	0.960183
30-year Fixed Mortgage Rate	20-year Treasury Yield	0.965235
20 year Fixed Mortgage Rate	10 year Treasury Vield	0.903233
20 year Fixed Mortgage Rate	1 month Troasury Vield	0.304728
20 year Fixed Mortgage Rate	7 year Troasury Vield	0.729475
20 year Fixed Mortgage Rate	2 month Troosury Vield	0.904007
30-year Fixed Mortgage Rate	3-month Treasury Yield	0.878393
30-year Fixed Mortgage Rate	5-year Treasury Yield	0.979206
30-year Fixed Mortgage Rate	6-month Treasury Yield	0.884417
30-year Fixed Mortgage Rate	3-year Treasury Yield	0.954844
30-year Fixed Mortgage Rate	1-year Treasury Yield	0.900891
US Prime Rate	30-year Treasury Yield	0.745626
US Prime Rate	20-year Treasury Yield	0.765003
US Prime Rate	10-year Treasury Yield	0.81973
US Prime Rate	1-month Treasury Yield	0.992687
US Prime Rate	7-year Treasury Yield	0.866059
US Prime Rate	3-month Treasury Yield	0.992318
US Prime Rate	5-year Treasury Yield	0.897469
US Prime Rate	6-month Treasury Yield	0.989399
US Prime Rate	3-year Treasury Yield	0.939946
US Prime Rate	1-year Treasury Yield	0.981594
Dow-Jones Total Stock Market Index	US Nat'l Residential Home Price Index	0.921845
Dow-Jones Total Stock Market Index	US Nat'l Commercial Real Estate Index	0.927487
Dow-Jones Total Stock Market Index	Average Retail Gasoline Price (all grades)	0.60172
Dow-Jones Total Stock Market Index	30-vear Treasury Yield	-0.760963
Dow-Jones Total Stock Market Index	20-year Treasury Yield	-0.68728
Dow-lones Total Stock Market Index	10-year Treasury Yield	-0 699958
Dow-Jones Total Stock Market Index	7-vear Treasury Vield	-0 636235
LIS Nat'l Residential Home Price Index	IIS Nat'l Commercial Real Estate Index	0.030233
US Nat'l Residential Home Price Index	Average Retail Gaseline Brice (all grades)	0.711770
US Nat'l Residential Home Price Index	20 yoar Troasury Vield	0.711/79
		-0.771032
US INAT I RESIDENTIAL HOME Price Index		-0.684991
US Nat'l Residential Home Price Index	10-year Treasury Yield	-0./13752
US Nat'l Residential Home Price Index	/-year Treasury Yield	-0.661322
US Nat'l Residential Home Price Index	5-year Treasury Yield	-0.614527
US Nat'l Commercial Real Estate Index	Average Retail Gasoline Price (all grades)	0.734155
US Nat'l Commercial Real Estate Index	30-year Treasury Yield	-0.836445
US Nat'l Commercial Real Estate Index	20-year Treasury Yield	-0.788154
US Nat'l Commercial Real Estate Index	10-year Treasury Yield	-0.776926
US Nat'l Commercial Real Estate Index	7-year Treasury Yield	-0.725466

MACROECONOMIC FORECASTS, 4Q2023 - FINAL VERSION

US Nat'l Commercial Real Estate Index	5-year Treasury Yield	-0.677426
Average Retail Gasoline Price (all grades)	30-year Treasury Yield	-0.692099
Average Retail Gasoline Price (all grades)	20-year Treasury Yield	-0.679644
Average Retail Gasoline Price (all grades)	10-year Treasury Yield	-0.692897
Average Retail Gasoline Price (all grades)	7-year Treasury Yield	-0.683228
Average Retail Gasoline Price (all grades)	5-year Treasury Yield	-0.668531
Average Retail Gasoline Price (all grades)	3-year Treasury Yield	-0.623072
30-year Treasury Yield	20-year Treasury Yield	0.99541
30-year Treasury Yield	10-year Treasury Yield	0.986613
30-year Treasury Yield	7-year Treasury Yield	0.966006
30-year Treasury Yield	3-month Treasury Yield	0.772069
30-year Treasury Yield	5-year Treasury Yield	0.940205
30-year Treasury Yield	6-month Treasury Yield	0.775882
30-year Treasury Yield	3-year Treasury Yield	0.888109
30-year Treasury Yield	1-year Treasury Yield	0.798446
20-year Treasury Yield	10-year Treasury Yield	0.992662
20-year Treasury Yield	7-year Treasury Yield	0.970732
20-year Treasury Yield	3-month Treasury Yield	0.774533
20-year Treasury Yield	5-year Treasury Yield	0.942746
20-year Treasury Yield	6-month Treasury Yield	0.783051
20-year Treasury Yield	3-year Treasury Yield	0.891965
20-year Treasury Yield	1-year Treasury Yield	0.809162
10-year Treasury Yield	1-month Treasury Yield	0.633887
10-year Treasury Yield	7-year Treasury Yield	0.992946
10-year Treasury Vield	3-month Treasury Yield	0.843117
io year measury neta	5 month neusary neia	
10-year Treasury Yield	5-year Treasury Yield	0.979252
10-year Treasury Yield 10-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield	0.979252 0.848706
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield	0.979252 0.848706 0.943222
10-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield	0.979252 0.848706 0.943222 0.869441
10-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield 3-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 1-month Treasury Yield 1-month Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 5-year Treasury Yield 1-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 5-year Treasury Yield 1-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 6-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 5-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 5-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781 0.920723
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 3-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 1-year Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781 0.920723 0.998611
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10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield 3-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 1-year Treasury Yield 1-year Treasury Yield 1-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781 0.920723 0.998611 0.960421 0.993986
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield 3-month Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-wear Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 6-month Treasury Yield 6-month Treasury Yield 6-month Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781 0.920723 0.998611 0.960421 0.993986 0.926993
10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 10-year Treasury Yield 1-month Treasury Yield 7-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield	5-year Treasury Yield 6-month Treasury Yield 3-year Treasury Yield 1-year Treasury Yield 3-month Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 3-year Treasury Yield 3-month Treasury Yield 5-year Treasury Yield 3-year Treasury Yield 5-year Treasury Yield	0.979252 0.848706 0.943222 0.869441 0.758276 0.99787 0.836117 0.992355 0.920986 0.983281 0.890133 0.995765 0.896019 0.97402 0.914781 0.920723 0.998611 0.960421 0.993986 0.926993 0.989852
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