Macroeconomic Forecasts, 1Q2025
Domestic Metrics

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Summary

The last week has been a whirlwind of policy implementation and reaction from the market (and consumers and other countries). The economy may very well be heading for an economic recession. Economists from JP Morgan Chase[1], Goldman Sachs[2], Oxford Economics[3], and a survey of economists posted by Bankrate[4] have all stated an increase in odds/probability that the economy will enter a recession. Because the economy either will or won't fall into a recession, we think it is more appropriate to identify the underlying signals that support an economic recession and those signals that suggest a challenge to the economy, but do not indicate a recession.

We Are Heading for a Recession

Signal 1: The Equities Market and the Bond Market

The equities market took a beating the week of March 31 – April 4, 2025. The S&P 500 was down 7.6% for the week and down 10.6% from its high of 5688 on April 2, 2025. (See Figure 1.) As shown in Figure 2, the market is down 13.4% since the November election. The yields on 10-year Treasuries are down nearly 60 bps since January 1, 2025. The increase in bond prices and subsequent decrease in bond yields is pointing to investors moving away from equities and into more fixed-income assets. Although the equities market is not the economy (nor is the bond market), the movements illustrated signal weakness within the economy.

[1] https://www.bloomberg.com/news/articles/2025-04-03/jpmorgan-sees-global-recession-odds-at-60-if-tariffs-sustained?embedded-checkout=true
[2] https://www.npr.org/2025/04/01/nx-s1-5345764/goldman-sachs-raises-probability-of-a-u-s-recession-to-35
[3] https://finance.yahoo.com/news/us-economy-dangerously-vulnerable-to-recession-wall-street-reacts-to-tariff-fallout-155837444.html
[4] https://www.bankrate.com/banking/federal-reserve/economic-indicator-survey/#recession-risks

Figure 1: SP500 Index, April 1-6, 2025

Source: TradingView (https://www.tradingview.com/)

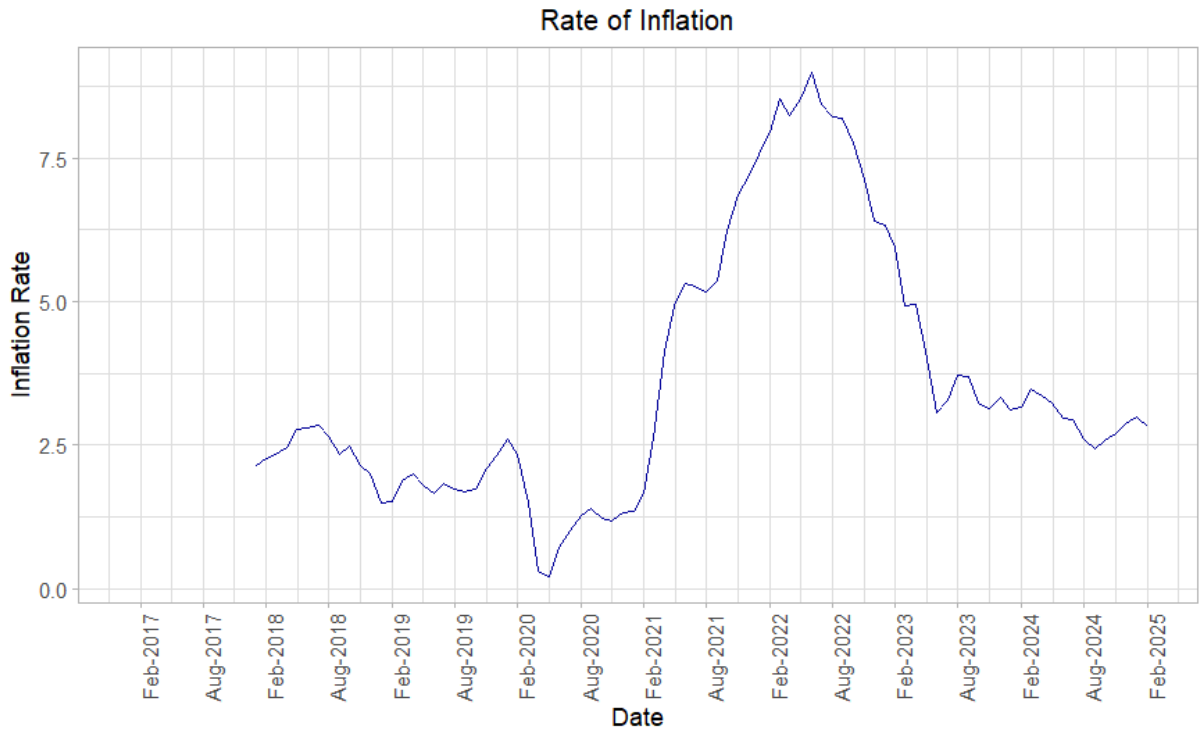
Figure 2: SP500 Index, October 2024 through April 6, 2025

Source: TradingView (https://www.tradingview.com/)

Signal 2: Stubborn Inflation and Looming Price Increases

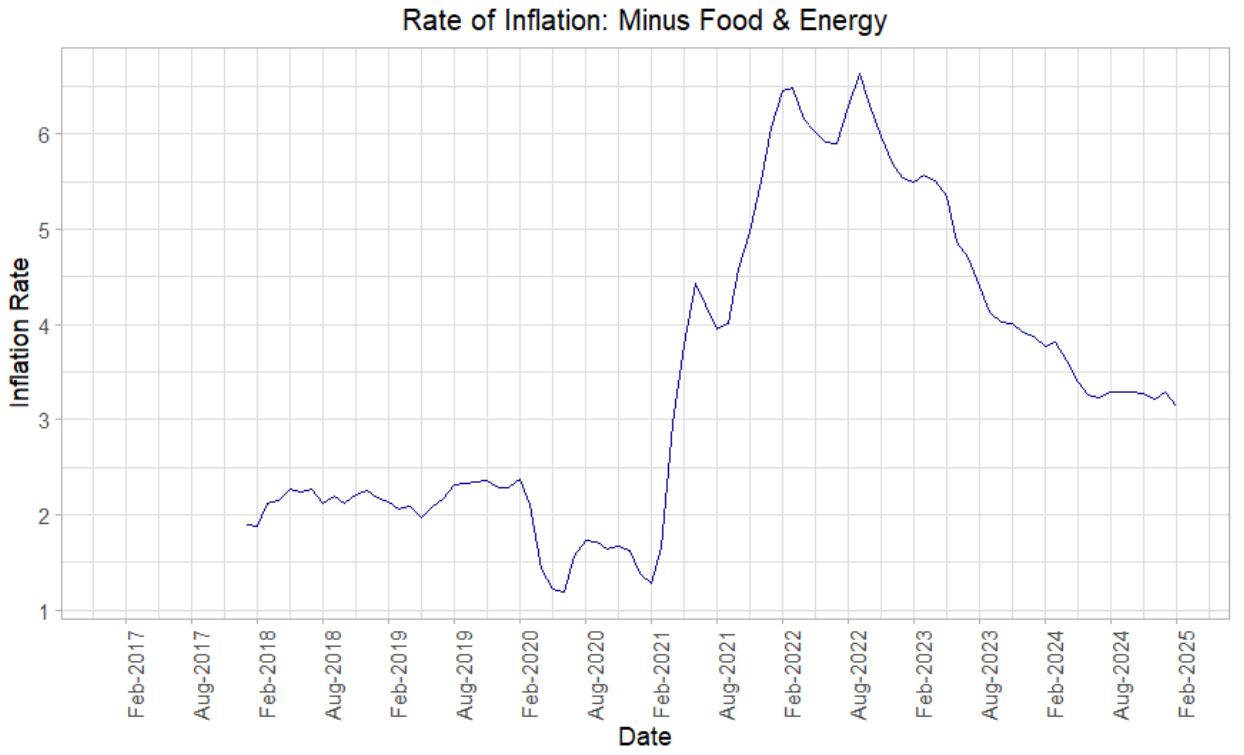
Prices have been contained, but have been stubborn. The Fed has been clear that it continues to push towards a 2% annual rate of inflation. However, the lack of significant downward pressure on prices suggests that Powell is unlikely to drop interest rates. The lack of downward pressure on prices and the increasing threat of inflation (Figure 3 & Figure 4) stemming from tariffs suggests that the Fed is unlikely to push interest rates downward. Because the Fed has indicated that it is targeting inflation rather than unemployment or GDP growth, it is likely that the Fed will hold interest rates constant rather than lower them and induce more inflationary pressures into the economy. If the economy starts to slip, it is unlikely that the Fed will pull out expansionary monetary policy to save the day.

Figure 3: US Nationwide Inflation



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

Figure 4: US Nationwide Inflation (less Food and Energy)

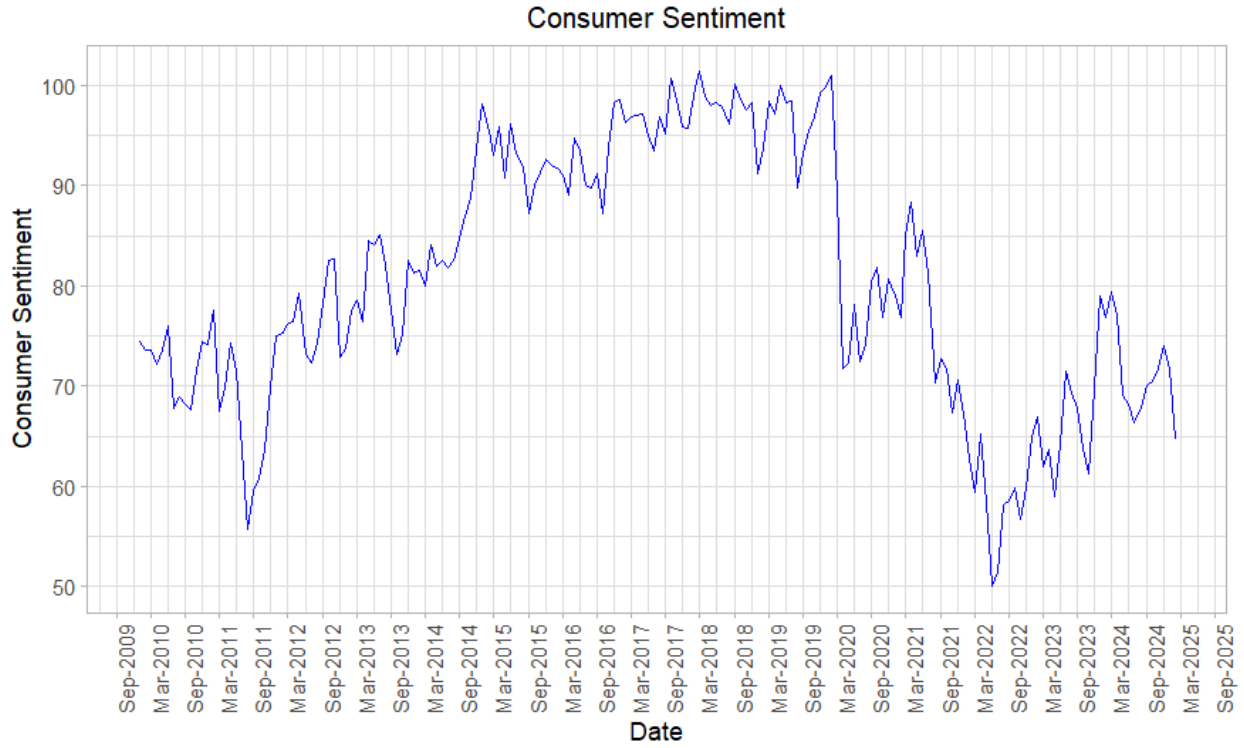


Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Signal 3: Consumers are Less Content and Becoming Pessimistic Towards the Future

Consumer sentiment is trending down. The University of Michigan measurement of Consumer Sentiment (Figure 5) spiked briefly after Trump won the election in November, 2024, but has dropped steadily since his inauguration. 70% of GDP is comprised of consumer spending and a drop in consumer confidence will likely translate to lower consumer spending. If consumers lose confidence in the future economic condition, they could very well reduce spending and, in turn, drive the economy towards the recession. Even a small decrease in consumer spending could have negative consequences for GDP over the next few quarters.

Figure 5: US Consumer Confidence (per the Univ. of Michigan)

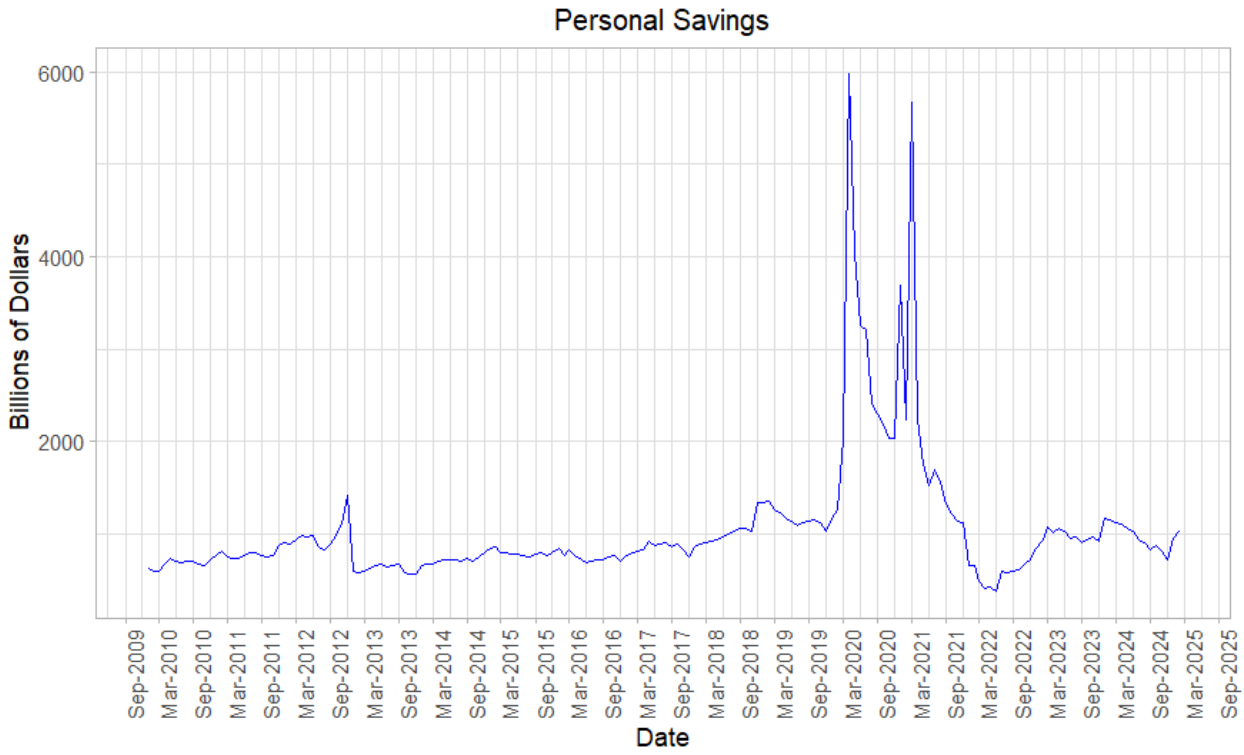


Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Signal 4: Consumers Have Less Savings, Are Savings Less as a Percentage of their Income and are More Delinquent on Loans

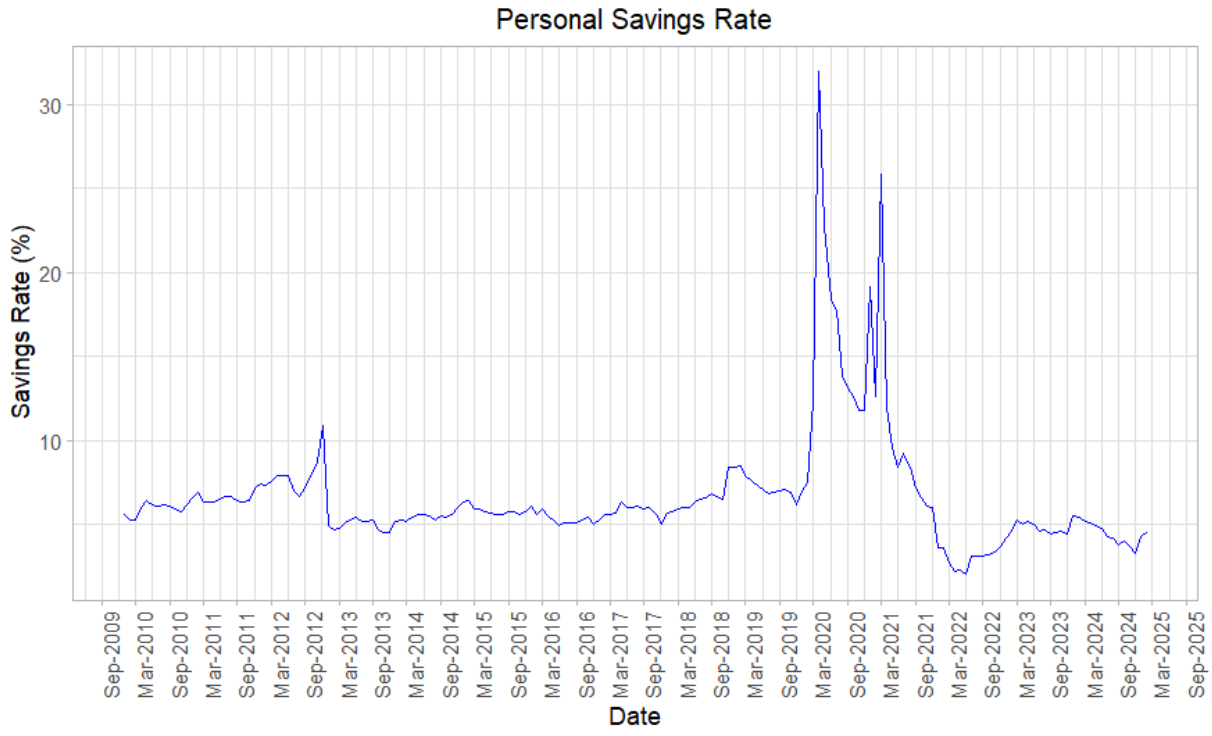
Consumers are saving less (dis-savings since COVID, per Figure 6), are saving a smaller percentage of their gross income (per Figure 7), and are increasingly becoming delinquent on their loans (per Figure 8). An increase in loan delinquencies, in conjunction with a decrease in savings and savings rate, indicates that consumers are becoming "stretched" with respect to their resources.

Figure 6: Personal Savings



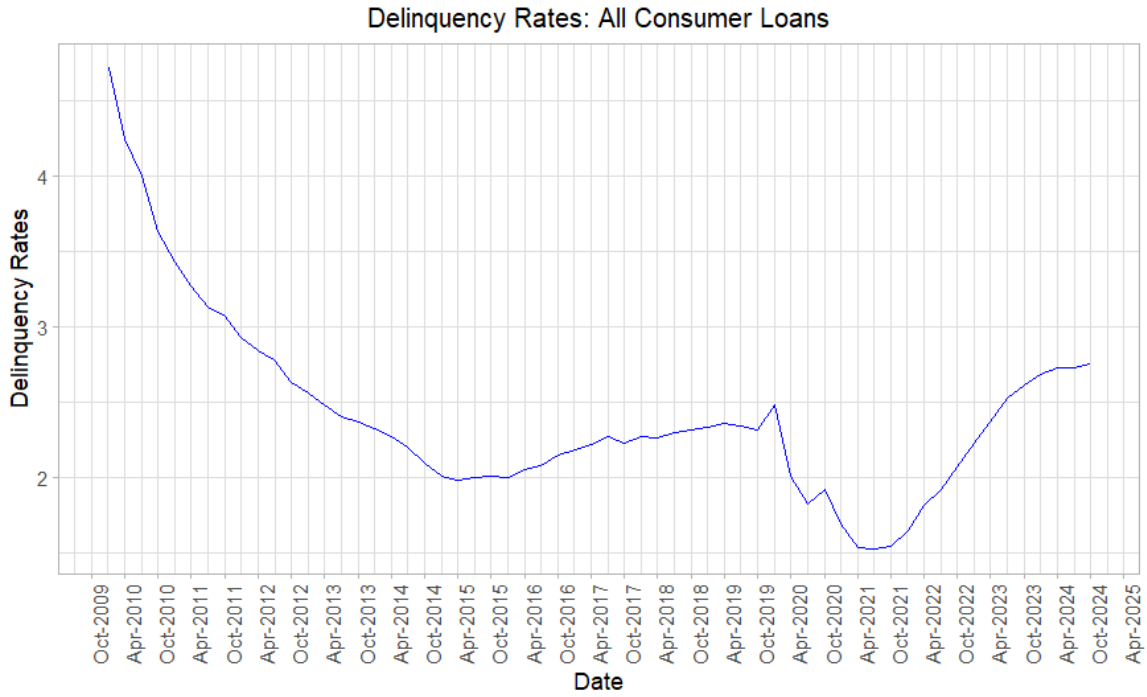
Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Figure 7: Personal Savings Rate



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

Figure 8: Delinquency Rates of all Consumer Loans

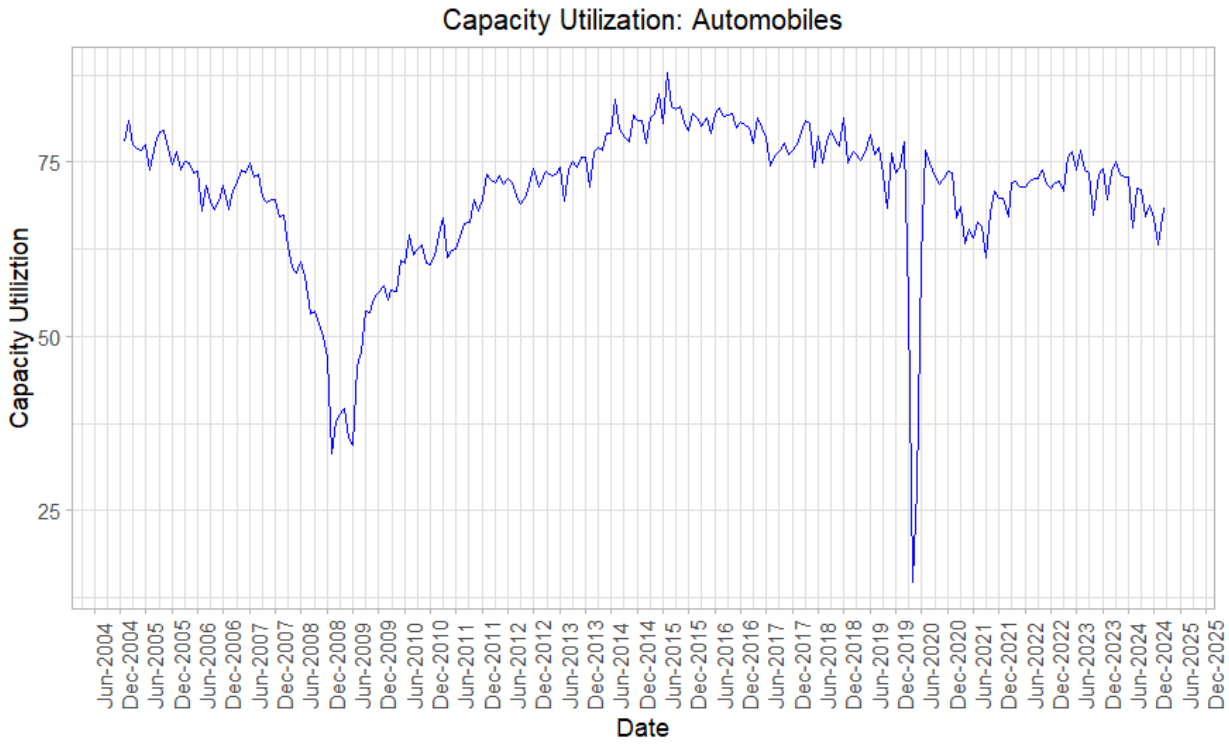


Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Signal 5: Capacity Utilization in the Automobile Industry is Trending Downward

Historically, a downward trend in the capacity utilization in the automobile industry (see Figure 9) has forecast economic recessions. The dramatic trends downward in 2007 and in 2020 were consistent with economic recessions. The more recent decreases in 2021 and 2023 are likely consistent with "soft landings" of our economy. The current downward trend is consistent with a recessionary environment.

Figure 9: Capacity Utilization of the Automotive Industry



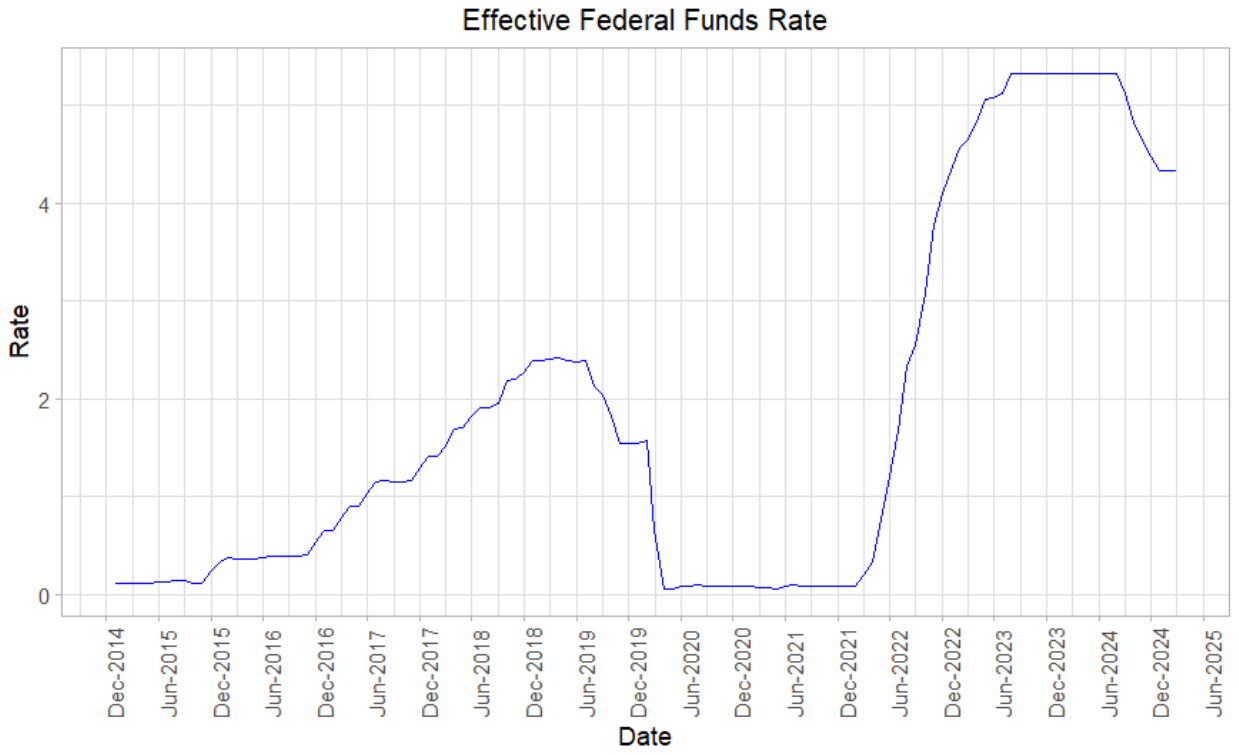
Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Signal 6: The Federal Reserve Bank is Not Coming to the Rescue

The Federal Reserve bank has pushed back on President Trump's request to decrease interest rates to off-set negative sentiments consistent with the new tariffs. (See Figure 10.) Because the Federal Reserve is concentrating on containing inflation (and because the new tariff policies are likely to increase upward pressure on prices), the Fed is holding strong to keeping interest rates constant. We believe that this type of "Volker-esque[5]" stance may allow the US to fall into a recession wither fewer obstacles.

[5] https://www.federalreservehistory.org/people/paul-a-volcker

Figure 10: Effective Federal Funds Rate



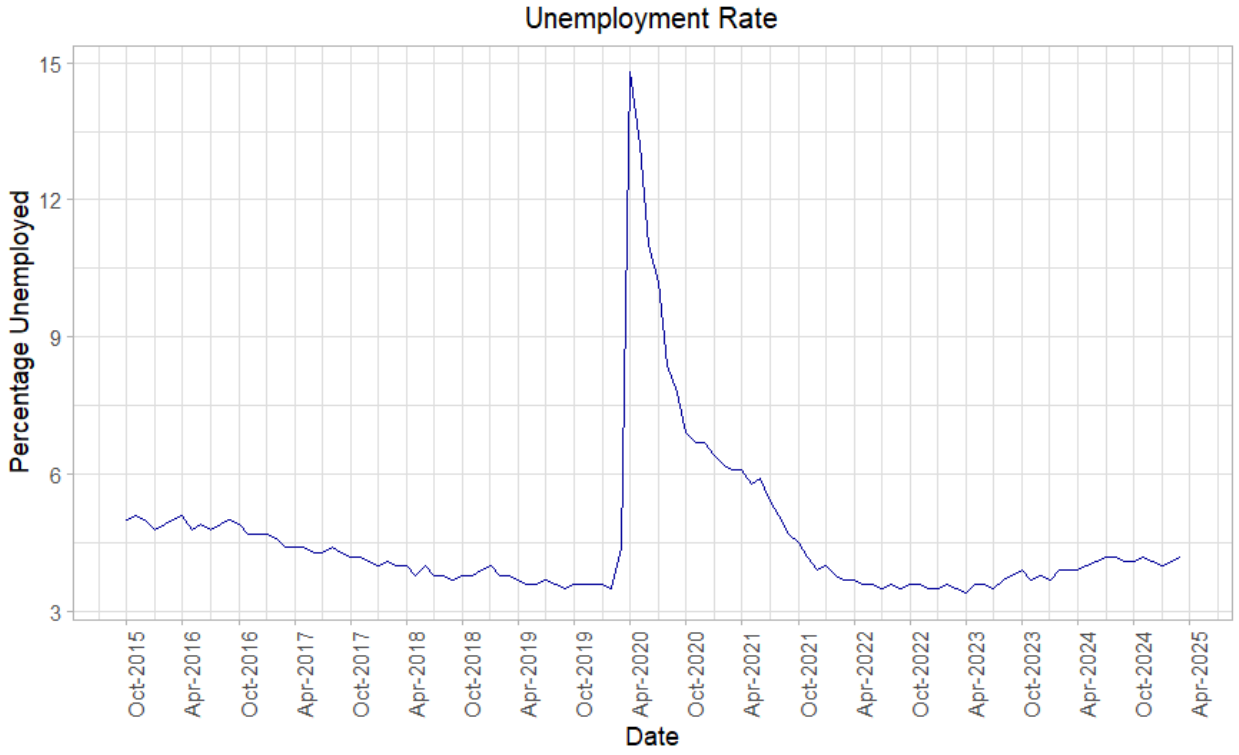
Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

We are Not Heading Towards A Recession

Signal 1: The Current Job Market is Holding Ground

The US added approximately 288,000 jobs to total payroll in March 2025. Although the unemployment rate (Figure 11) increased slightly from 4.1% to 4.2%, the unemployment rate has been remarkably stable since April 2022. These data suggest that, although the stock market may be experiencing turmoil, the fundamental aspect of the economy (i.e. jobs and employment) has been consistent and strong. There is little indication at this point that the labor market has become unstable.

Figure 11: US Nationwide Unemployment Rate



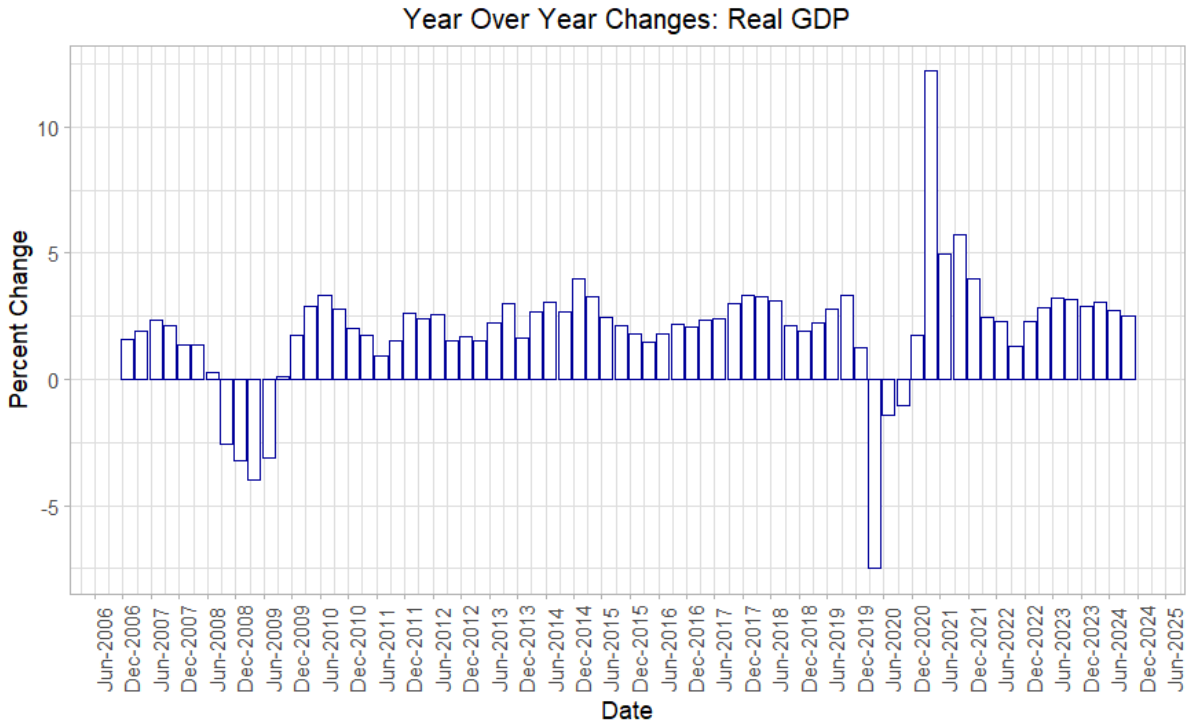
Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Signal 2: President Trump Initiates Policies Only to "Take them Back"

One of President Trump's most consistent policies is that he engages in alpha-beta testing over and over again. The president will announce a policy only to reverse the policy within a day or a week. His allies suggest that this is a "bargaining-from-strength" position. This may very well be true. He did announce tariffs on Canada and Mexico only to reverse them within a day or two. It is very likely that by April 15, 2025, President Trump has "negotiated" with dozens or more countries to eliminate most of the tariffs he enacted on April 2, 2025. If this is the case, the equities market will rebound and firms (and the economy) will go about business as usual.

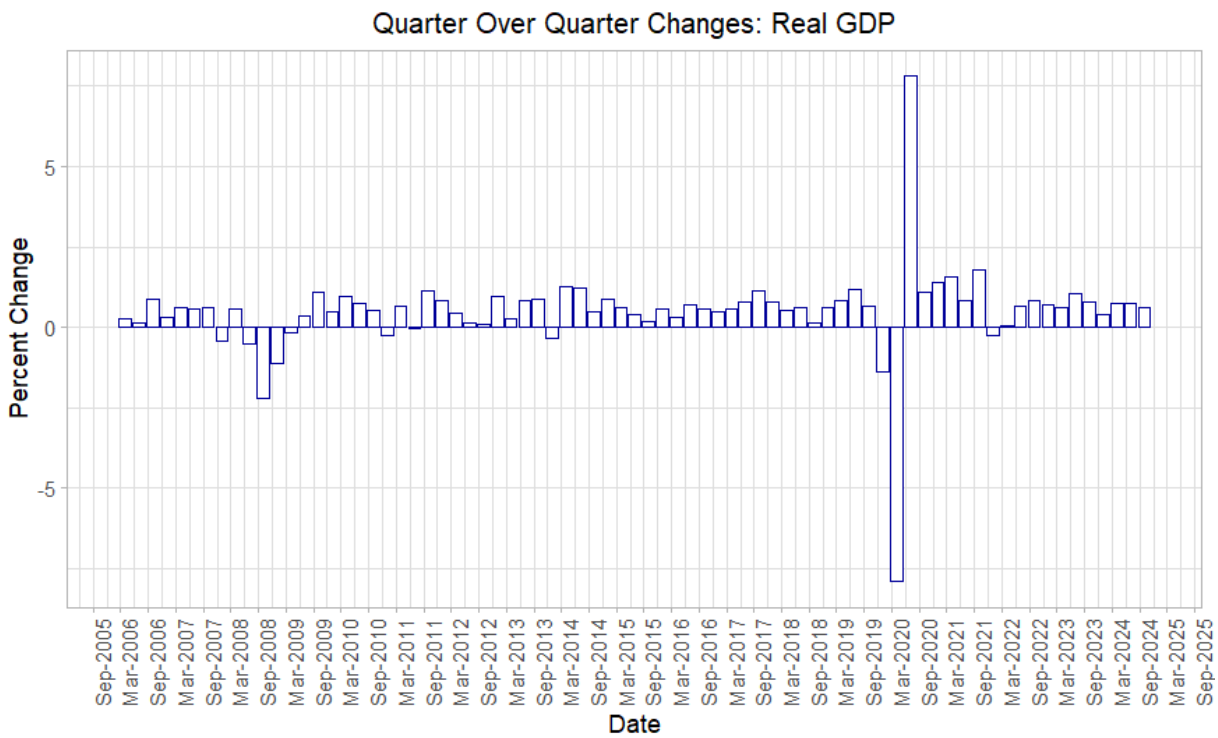
GDP growth is stable and strong (see Figure 12 and Figure 13), the housing market is adding inventory (see Figure 14), and the unemployment rate is steady (per Figure 11). The metrics that outline economic stability – GDP, GDP growth, and unemployment – all suggest the economy is sound.

Figure 12: Y/Y % change in Real GDP



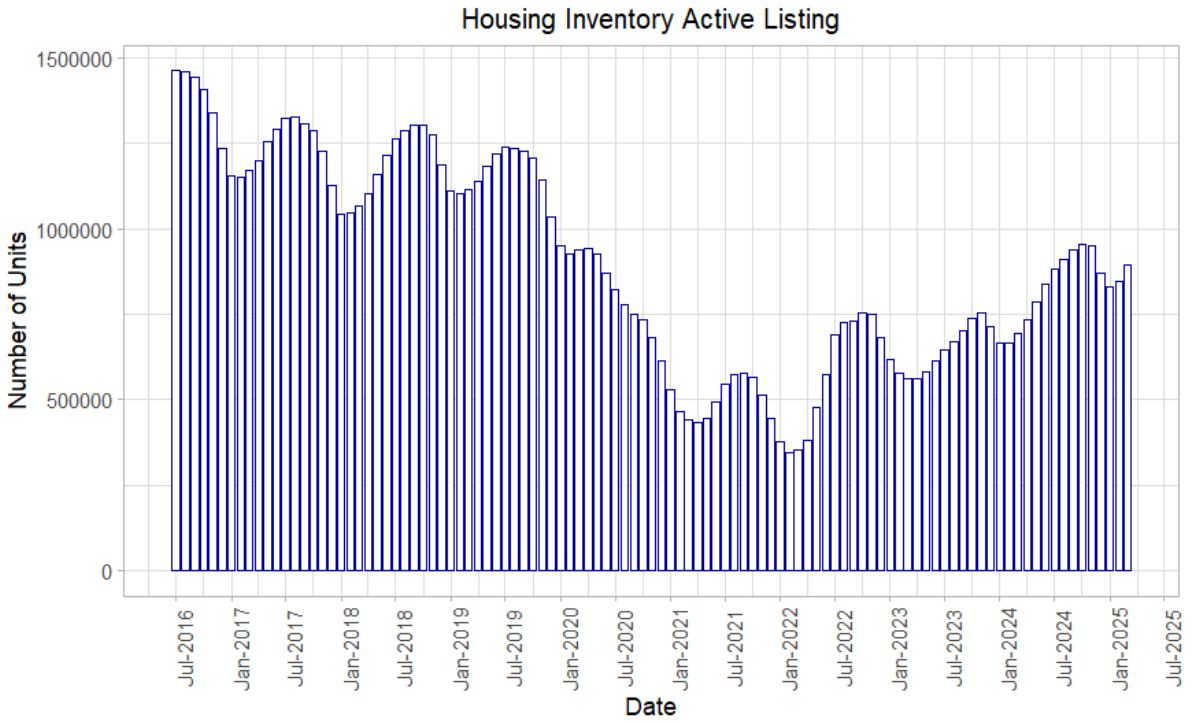
Source: Federal Reserve Economic Database (https://fred.stlouis.org/)

Figure 13: Q/Q % change in Real GDP



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

Figure 14: Active Residential House Listings



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

Six is Greater than Two

The six indicators of a pending recession may very well outweigh the strengths of the two indicators that the economy is strong. Because the "Trump Card" (pun intended) is so likely to be played (i.e., President Trump re-negotiating tariffs with most of the countries on his list), there is no guarantee that the economy will fall into a recession. Ignoring the indicators that the economy will fall into a recession would be dangerous. But, ignoring President Trump's tendency to undo his policies would also be dangerous.

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

   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. "Avian flu" (strain H5N1) has been recently reported as being found in a human in Louisiana[6].

2. Disinformation Campaigns: A staple of international conflicts (both military and otherwise), organized campaigns based on disinformation or propaganda have been around for hundreds of years. In the recent past, the U.S. has made allegations against foreign governments that there has been interference in federal elections (and caused social unrest) by using freely available social networks[7].

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."[8] In software security company Semperis' 2024 Ransomware Risk Report, 83% of 900 survey respondents reported being targeted in the past year[9], with an average cost of about $5M per breach globally[10].

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

[6] https://www.nbcnews.com/health/health-news/h5n1-bird-flu-mutations-human-transmission-cdc-rcna185554 and https://www.nytimes.com/2025/01/02/us/politics/bird-flu-biden-trump.html
[7] See, e.g., https://www.cnn.com/2024/10/30/europe/russian-disinformation-harris-walz-us-election-intl/index.html and https://www.nytimes.com/2024/07/09/business/russian-bots-artificial-intelligence-propaganda.html
[8] See https://us.norton.com/internetsecurity-malware-ransomware-5-dos-and-donts.html
[9] https://www.forbes.com/sites/heatherwishartsmith/2024/12/09/the-persistent-ransomware-threat-2024-trends-and-high-profile-attacks/
[10] https://assets.sophos.com/X24WTUEQ/at/9brgj5n44hqvgsp5f5bqcps/sophos-state-of-ransomware-2024-wp.pdf

country remains on both sides of the political fence, and what societal and legislative impacts these investigations may carry.[11]

5. Unanticipated Changes in Leadership: Donald Trump is currently 78 years old, and is currently the oldest President-Elect in the history of the United States. Given his age, his polarizing opinions, and the fact that there were two attempted assassinations against him during his campaign during 2024, one should consider the possibility of him not being able to serve out his Presidential term (which begins in January of 2025)[12]. While the rules for succession are clear in the event that he is not able to complete his term, the confusion surrounding any event that calls for succession always inject some ambiguity. Further, despite there being a fully Republican- dominated Congress as of 2025, positions on all issues are never perfectly aligned, allowing for discord if/when a leadership change does occur.

6. Supply Chain Disruptions: Several straits and canals are considered major trade bottlenecks because they are crucial waterways that connect different continents, meaning any disruptions in their operations can significantly impact global trade flows, causing delays and price fluctuations. Some most key bottlenecks are the Panama Canal, the Suez Canal, the Strait of Hormuz, the Strait of Malacca, the Turkish Straits (Bosporus and Dardanelles), and the English Channel. A blockage of the Suez Canal by the tanker Ever Given in March 2021 highlighted the fragility of key bottlenecks in trade[13]; these waterways are also subject to weather, geopolitical influences, and other issues[14]. Further, workers of these waterways and major ports can have significant impacts on these supply chains. Consider that shipyard workers on the U.S. Eastern seaboard and Gulf Coast voted to strike in October 2024; they have subsequently returned to work until January 2025.[15]

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 & Nevis[16]. Ecuador, Senegal, and China have canceled or withdrawn their currencies[17]. Along these lines, on January 10, 2024, the SEC approved the listing and trading of a number of spot bitcoin exchange-traded product (ETP) shares[18].

8. Global unrest: As we have now seen, Russia's (now stagnant) invasion of the Ukraine has led to a dramatic impact on the energy and grain sectors globally[19]. The impact of the Israel's current conflict(s) (with Hamas, Lebanon, and Iran) has also been speculated as impacting global economies[20]. Speculation regarding Iran's motives entails that Iran is interested in furthering its

[11] See https://www.insurancebusinessmag.com/us/risk-management/news/global-civil-unrest-on-the-rise-as-costofliving-crisis-intensifies-449683.aspx
[12] https://www.nytimes.com/2024/10/03/health/trump-health-records.html
[13] https://www.nytimes.com/2021/07/17/world/middleeast/suez-canal-stuck-ship-ever-given.html
[14] https://www.weforum.org/stories/2024/02/worlds-busiest-ocean-shipping-routes-trade.
[15] https://www.npr.org/2024/10/03/nx-s1-5139450/dockworkers-port-strike-deal
[16] https://www.atlanticcouncil.org/cbdctracker/
[17] Ibid.
[18] 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
[19] https://www.brookings.edu/articles/how-would-trump-and-harris-handle-the-russia-ukraine-war/
[20] https://www.washingtonpost.com/world/2024/09/30/israel-lebanon-hezbollah-hamas-war-news-gaza/ and https://www.nytimes.com/live/2024/10/01/world/israel-lebanon-hezbollah

nuclear weapons program in order to supply arms to Russia to help with their aforementioned conflict in Ukraine[21]. Regardless, Iran's unwillingness to work with the International Atomic Energy Agency (as called for by a United Nations resolution)[22] is causing concerns that could lead to actions that would significantly alter the U.S. consumer's economic balance, directly and indirectly.

9. Nature-based risks: While there has been a significant amount of propaganda about climate warning and similar risks, this comment is intended to focus on events such as strong hurricanes and the recent California wildfires. While we are not passing judgment on the surrounding issues and whether the activities of people are contributing to some disasters, we are more concerned about the financial impact of these events. FEMA's national flood insurance program is at risk of being scuttled, resulting in the elimination of over 4.7M flood insurance policies and over $1.3T in coverage, despite the program being over $22B in arrears since its introduction.[23] State Farm is the primary insurer in California aside from the state's FAIR Plan, and is currently estimating payouts at $7.6B as of this writing.[24] Other disasters are similarly testing financial infrastructures around the country.

[21] https://www.heritage.org/middle-east/report/iran-inching-toward-nuclear-weapons-breakout-what-does-mean-the-united-states
[22] Per https://www.iaea.org/sites/default/files/24/06/gov2024-39.pdf and https://www.iaea.org/sites/default/files/unsc_resolution2231-2015.pdf
[23] https://www.bloomberg.com/news/newsletters/2025-03-31/what-fema-s-demise-could-mean-for-flood-insurance
[24] https://www.coverager.com/state-farm-pays-out-over-2-5-billion-for-ca-wildfire-claims/

Data Analysis

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

Capitalytics provides the results of a rigorous analysis of every variable that is included in our quarterly macroeconomic study. These variables include the following[25]:

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)

[25] 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 135 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**[26]
1-month, 3-month, 6-month, 3-year Treasury yield		1-year Treasury yield
5-year Treasury yield		3-year Treasury yield*
7-year Treasury yield		5-year Treasury yield*
10-year Treasury yield	**… depends on …**	7-year Treasury yield*
20-year and 30-year Treasury yield, and		10-year Treasury yield*
30-year Mortgage rate		7-year Treasury yield*
Moody's AAA yield		30-year Mortgage rate*
Prime Rate and Fed Funds Rate		1-year Treasury yield

[26] 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 "*".

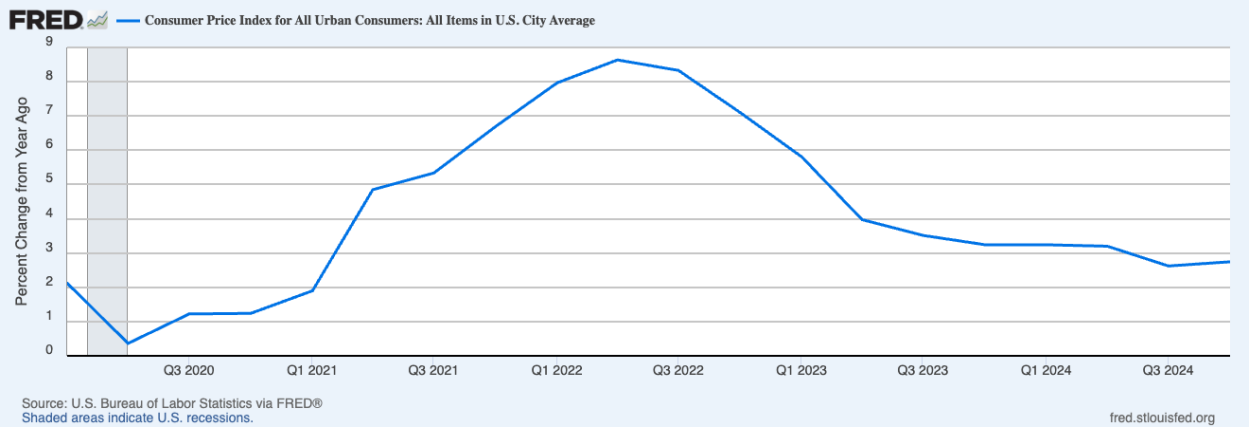
Real & Nominal GDP Growth, Real & Nominal Disposable Income Growth, and CPI Inflation Rate

Analysis

The Gross Domestic Product (GDP) of the US (or another country, or portion thereof) is the value of goods and services produced and sold. "Nominal" and "real" versions of GDP reflect the value of those goods and services with the effects of inflation (using then "current day $") and without the effects of inflation (using "chained $" that are pegged to a particular time). GDP is generally examined as a combination of subcategories of production: personal consumption, investment, government spending, imports, and exports. The difference in nominal GDP and real GDP is significantly affected by interest rates that are adjusted by central banks (the Federal Open Market Committee, or "FOMC", in the US).

With inflation being intertwined with the following conversations, we bring that topic to the forefront first. Figure 15 shows the inflation rate for all items across all urban consumers, reflecting the increasing cost of out-of-pocket expenditures of all urban households. Figure 16 shows the inflation rate based on the "Personal consumption" (or "private consumption expenditures" or "PCE") Price Index (also called the "PCEPI"), a category for calculating the US GDP; this index includes the increasing cost of the aforementioned basket of goods, and also includes goods and services purchased on behalf of households (e.g., as employment benefits offered by an employer or insurer). Inflation of CPI was 2.74% during 4Q2024, and inflation of PCEPI was 2.4% during the same period.

Figure 15: US Nationwide Inflation Rate

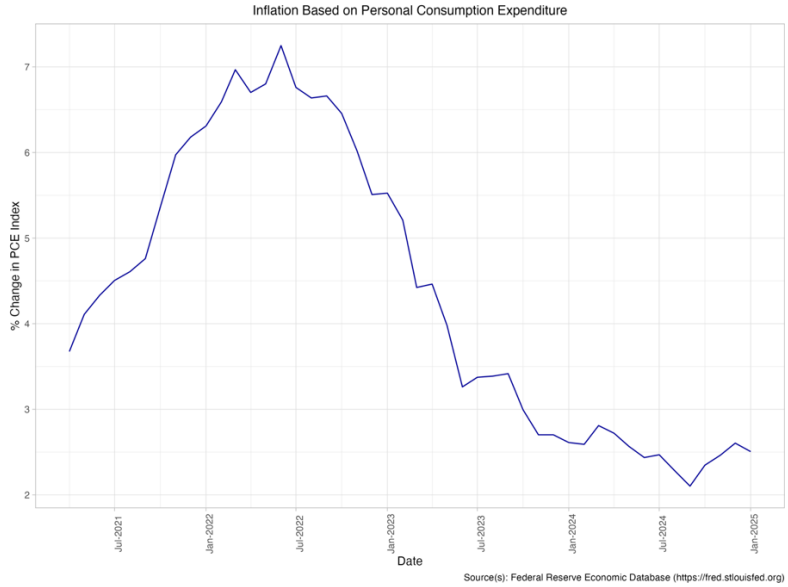


Inflation during 2025 (until the time of this writing) has ticked up notably due primarily to the new WH administration's policies. Newly re-elected President Trump is leaning hard on tariffs to control illegal immigration, drug imports, and to bring trade levels back to parity[27]. More generally, Trump also wants to raise revenue (through assessing tariffs) and as a negotiating tactic to exert influence over other countries.[28] However, many economists point out that the tariffs will likely increase prices of imported

[27] https://www.whitehouse.gov/fact-sheets/2025/02/fact-sheet-president-donald-j-trump-imposes-tariffs-on-imports-from-canada-mexico-and-china/
[28] https://www.cnn.com/2025/01/31/business/what-how-trump-tariffs-meaning/index.html

goods (with tariffs passed on to end purchasers) – thereby supporting less competitive domestic products – and increase inflation.[29,30]

Figure 16: US Nationwide Inflation based on PCE

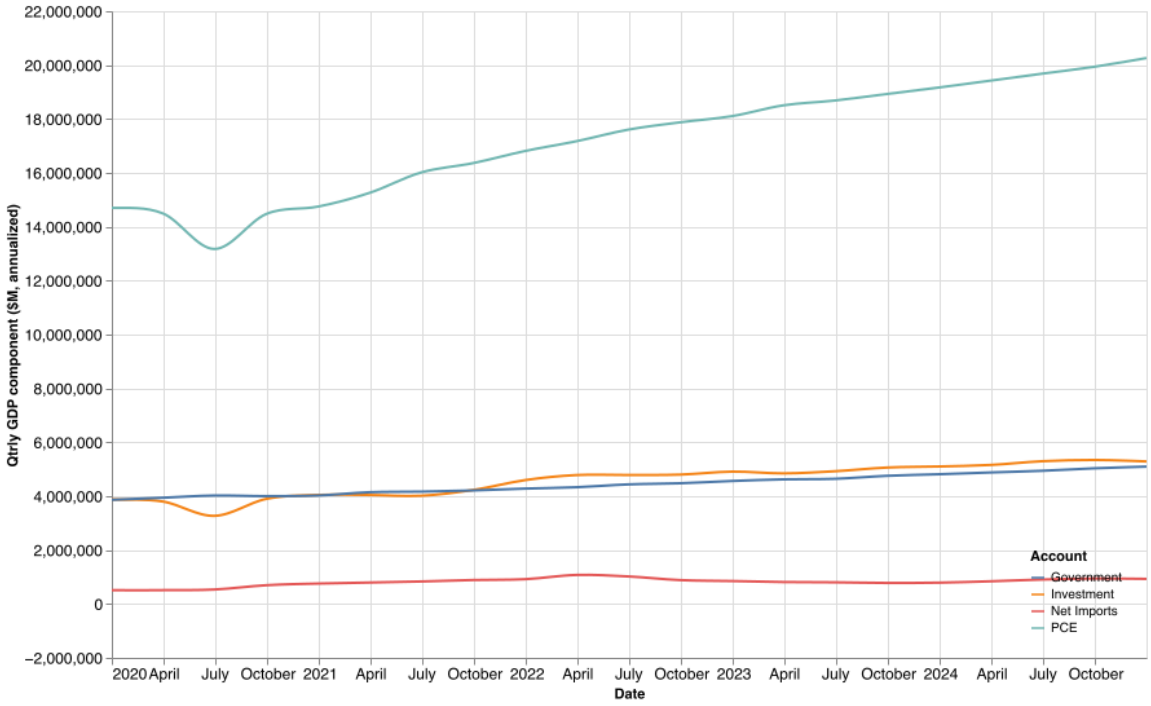


Overall percentage change GDP from the previous year has declined very gradually post-COVID, falling from 12.27% annualized Q/Q growth in 4Q2021, to 5.03% in 4Q2024.[31] Real GDP fell from 3.1% annualized growth in 3Q2024 to 2.3% annualized growth during 4Q2024, and were attributed to increases in consumer spending and government spending, held in check by decreases in investment[32]. Recognize that this period (4Q2024) contained the run-up to the 2024 election and the election itself, which was a very divisive election with much of the population feeling significant economic pressure at the "grass roots" level, and attributing that pressure (regarding the economy) as a significant driver for President Trump's victory[33].

We have discussed previously that US GDP is generally decomposed into categories of "Personal Consumption", "Investments", "Government Spending", "Imports", and "Exports". ("Imports" and "Exports" may be combined into a "net" figure based on one or the other group, or simply referred to as "Net Trade" or similar. We will show the difference between "Imports" and "Exports", and will refer to this value interchangeably as "Net Imports" and "Net Trade".) Figure 17 shows the (nominal) quarterly components of each of these areas of the US GDP.

[29] https://www.cnn.com/2025/02/10/economy/tariffs-trump-explained/index.html
[30] It should be noted that the Fed' (a) raised its core inflation (excluding the volatile food and energy components) projections for 2025 to 2.8% from 2.5%, and (b) lowered its gross domestic product growth forecast to 1.7% from 2.1%, per https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20250319.pdf.
[31] https://fred.stlouisfed.org/series/GDP
[32] https://www.bea.gov/data/gdp/gross-domestic-product
[33] See, e.g., https://www.cbsnews.com/news/factors-that-led-to-donald-trump-victory-60-minutes/; https://www.brookings.edu/articles/why-donald-trump-won-and-kamala-harris-lost-an-early-analysis-of-the-results/; and https://www.npr.org/2024/11/08/g-s1-33274/2024-election-how-trump-won-takeaways

Figure 17: GDP Component Size

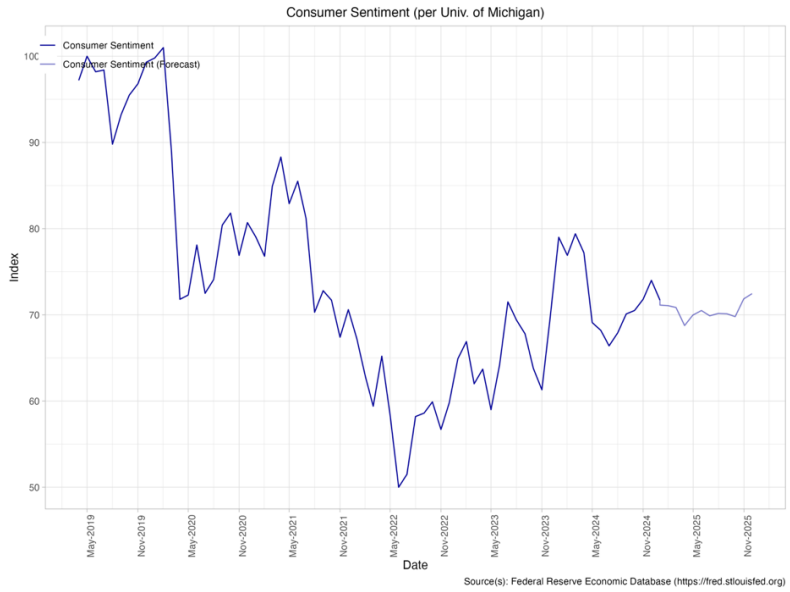


Source: Author's calculations, using data from the Bureau of Economic Analysis (https://www.bea.gov/)

PCE is historically the largest component of US GDP, and represents private consumption expenditures by households and non-profit organizations. During 4Q2024, the US saw the "personal consumption" component go from $20.0T to $20.4T, an increase of 1.84% (versus 1.5% for 3Q2024)[34], with real PCE increasing by 3.13% since 4Q2023 (and roughly the same value for 3Q2024)[35]. Disposable personal income increased by 1.4% during 4Q2024[36], with real disposable personal income increasing by 0.63% during the same period[37]. From YE2024 until the time of this writing, however, several reports indicate that GDP is expected to decline in reaction to the shifting WH administration policies[38]. Per Figure 18 and Figure 19, since YE2024, we are seeing a significant decline in consumer confidence, and an increase in inflation expectations[39]; much of the concern seems to stem from US President Trump's rapidly shifting economic policies and his newly implemented tariffs[40]. As such, reports of consumer spending are indicating that individuals are building capital buffers[41], and ***we are expecting real PCE to drop slightly during 2025***.

[34] See https://fred.stlouisfed.org/series/PCE
[35] https://fred.stlouisfed.org/series/PCEC96
[36] https://fred.stlouisfed.org/series/DSPI
[37] https://fred.stlouisfed.org/series/DSPIC96
[38] See https://www.cnbc.com/2025/02/28/the-first-quarter-is-on-track-for-negative-gdp-growth-atlanta-fed-indicator-says-.html ; https://www.barrons.com/livecoverage/stock-market-today-02282025/card/latest-data-suggest-first-quarter-gdp-decline-atlanta-fed-forecast-says-kNCRBVrmwIgpHZj7DqOf ; and https://www.atlantafed.org/cqer/feature/2025/02/14-gdpnow
[39] https://www.cbsnews.com/news/consumer-confidence-index-plummets-february-2025/ and https://www.cnn.com/2025/02/25/economy/us-consumer-confidence-february/index.html
[40] See https://www.reuters.com/markets/us/us-consumer-confidence-deteriorates-sharply-february-2025-02-25/ and https://www.conference-board.org/topics/consumer-confidence
[41] https://www.myperfectresume.com/career-center/careers/the-great-stay and https://www.bloomberg.com/news/articles/2025-02-26/us-workers-cite-growing-layoff-fear-in-philadelphia-fed-survey

Figure 18: US Consumer Confidence (per the Univ. of Michigan)



Looking at personal spending, which (again) is just over $20T per year, we look at non-real estate collateralized debt that is being used to fund some purchases[42]. Car loans (see Figure 20) have been growing steadily since YE2012 at a rate of over $43B/quarter; much of that 12-year period experienced unusually low interest rates, but the concern of whether consumers can regulate their spending after this period still remains. Additionally, we acknowledge the overall 36% inflation rate during the referenced period.

The unavoidable follow-on question is the ability of consumers to service the debt-load that they create. Per Figure 21, again, ***we see that delinquencies are creeping up***. Total consumer debt crossed above $18T during 4Q2024 (with the vast majority of it being paid per lenders' terms). In 2Q2021, balances that are 30 days late amounted to $460B, and balances that are at least 120 days late were $300B; during 4Q2024, these metrics were $1.08T and $470B, respectively, corresponding to 135% and 57% increases over a 3½ year period. Add to that over 2.3M car loans defaults during 2024.[43]

[42] Note that residential mortgages are generally included as part of "Investments", not "PCE", in GDP calculations.
[43] https://www.bloomberg.com/news/articles/2025-03-26/car-repossessions-surge-americans-struggle-with-auto-loan-payments

Figure 19: US Consumer Inflation Expectations (per Univ. of Michigan)

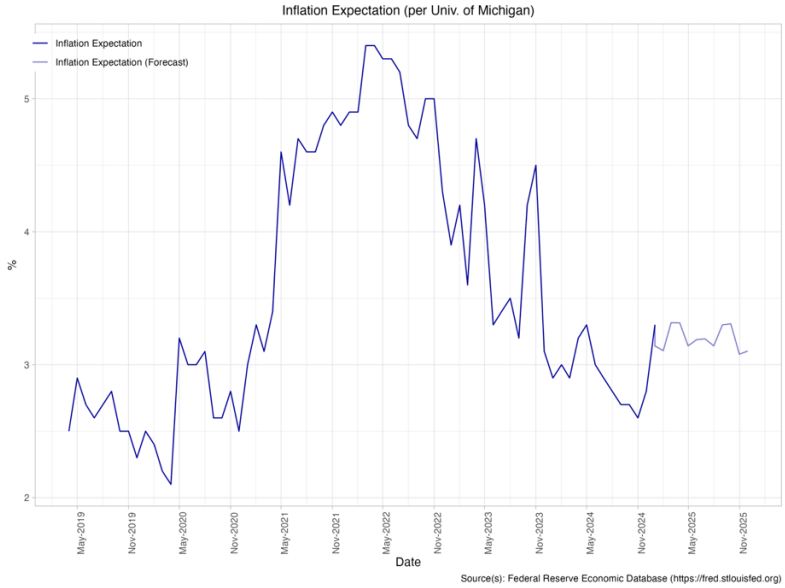
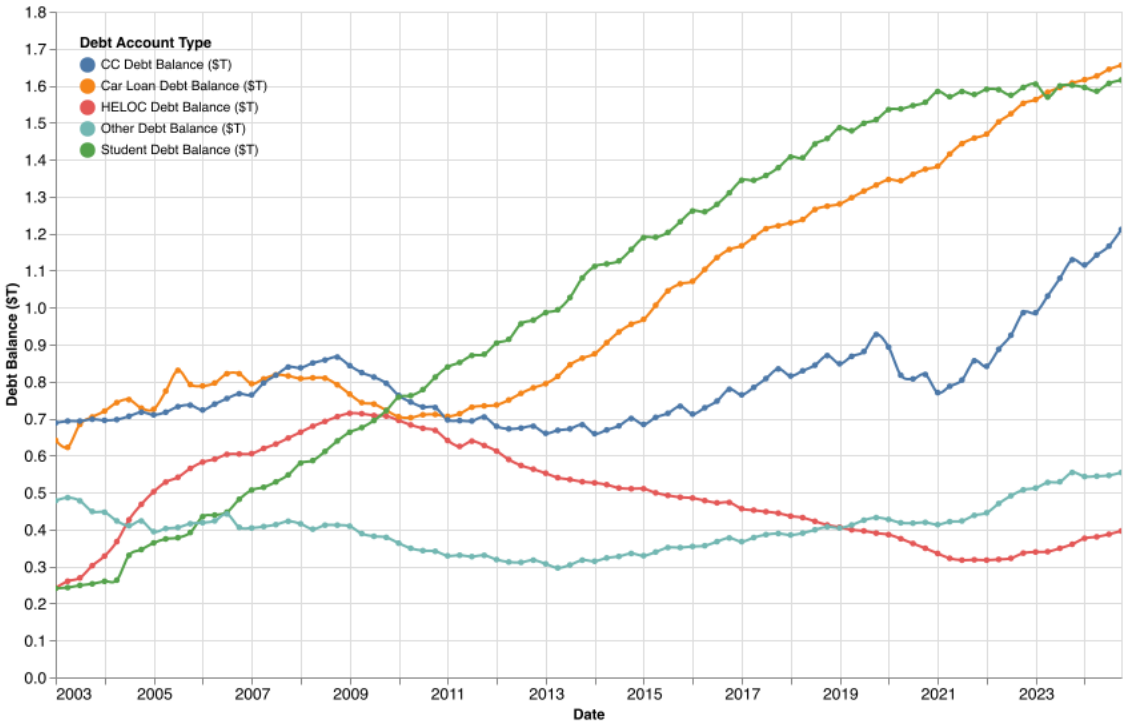
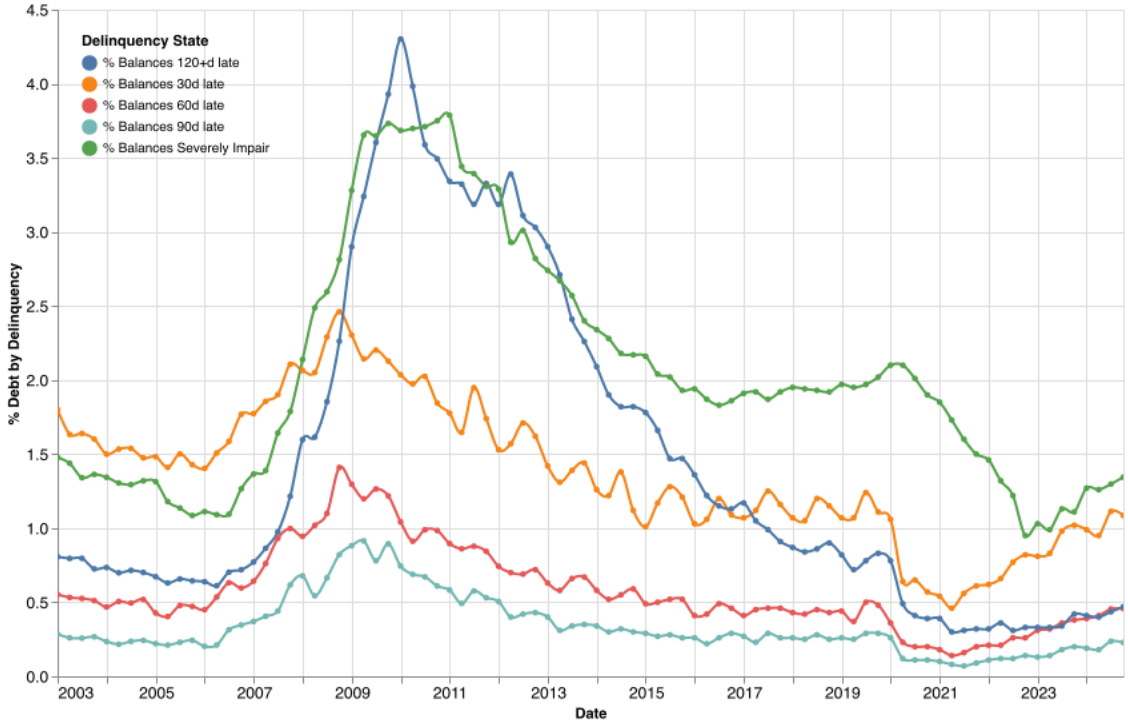


Figure 20: Debt Balances (excluding mortgages)



Source: Author's calculations, using data from the Federal Reserve Bank of New York (https://www.newyorkfed.org/)

Figure 21: Delinquency rates



Source: Author's calculations, using data from the Federal Reserve Bank of New York (https://www.newyorkfed.org/)

The "Investment" component of GDP represents "business spending on fixed assets such as land, buildings and equipment, plus investment in unsold inventory [and] also includes purchases of homes by consumers."[44] During 4Q2024, the US saw the "investment" component go from $1.38T to $1.31T, a decrease of 5.2%[45]. Many expected the pro-business WH administration accompanying President Trump to support this component of the GDP, but, as of this writing, it appears that business will likely pull back on spending until clarity and "stickiness" regarding tariffs becomes clear.

"Government spending" refers to spending by governments on goods and services at any administrative level in the US (state, federal, and local governments) on short- and long-term projects, with changes in government spending hopefully having a ripple effect on other components of the relevant economy (e.g., "PCE" and "Investment"). During 4Q2024, the US saw government spending increase from $7.05T to $7.11T; this category of spending has grown consistently by ± $100B/quarter since YE2021. In 2025, the Trump administration formed the US Department of Government Efficiency Service (by temporarily repurposing the US Digital Service), in order to "… [modernize] federal technology and software to maximize governmental efficiency and productivity."[46] Since its implementation, thousands of workers have been either offered retirement agreements, or laid off from their positions[47], with vocal attributions of saving taxpayers over $100B as of this writing[48], and a target of $2T in decreased

[44] https://www.bea.gov/system/files/2020-04/GDP-Education-by-BEA.pdf
[45] See https://fred.stlouisfed.org/series/NA000335Q
[46] https://www.whitehouse.gov/presidential-actions/2025/01/establishing-and-implementing-the-presidents-department-of-government-efficiency/
[47] https://www.reuters.com/world/us/white-house-begins-review-federal-agency-plans-second-round-mass-layoffs-sources-2025-03-21/ and https://apnews.com/article/doge-firings-layoffs-federal-government-workers-musk-d33cdd7872d64d2bdd8fe70c28652654
[48] https://doge.gov/savings

spending[49]. Given that US federal government spending was on the order of $7T per year in 2024[50], if successful, USDS/DOGE will potentially reduce this category of spending by more than 25%, and reduce overall US GDP (which is currently roughly $30T, annualized[51]) by 6.7%.

"Net Exports", or "Net Trade" refers to the balance between "Imports" and "Exports". (Again, we will examine "Imports" less "Exports" during this treatment.) During 4Q2024, "Net Trade" went from an import surplus of $943.7B to an import surplus of $931.1B, a 5.5% annualized decrease. However, over the previous 4 quarters, the metric actually rose from $791.1B to $931.1B, a 17.7% increase over the year[52].

President Trump has been very vocal about "correcting" the US's trade imbalance, particularly that between the US and certain countries, including China, Canada, and Mexico[53]. Since Trump's preferred tool for helping change these relationships is applying tariffs to goods imported from international goods, many are concerned about the impact of these policies on prices and inflation; however, President Trump does not seem worried about the potential for a trade war, as his attitude is that the US can more easily absorb the tariffs of good produced and imported from abroad than trading partners' citizenry can absorb their countries' comparable measures.[54] ***We expect this type of policy will affect previously mentioned consumer sentiment (regarding inflation and prices) through much of this administration's term.***

Although there have been several threatened and implemented retaliatory tariffs from other countries, the following US tariffs have been exercised as of this writing[55]:

- 10% tariffs on all Chinese imports as of February 4
- An additional 10% tariff on Chinese imports as of March 3
- 10% tariffs on Canadian energy, with 25% on other goods from Canada, and goods from Mexico as of March 4
    - A one-month exemption is granted to US automakers for their goods manufactured in Canada and Mexico on March 5
    - Additionally, a one-month postponement of the 25% tariffs is issued on many imports from Mexico and some imports from Canada on March 6
- 25% tariffs on all steel and aluminum imports are implemented on March 12, removing exemptions from his 2018 tariffs on the metals in addition to increasing the tariffs on aluminum from 10%.
- 25% tariffs on automobiles (by April 3) and automobile parts (by May 3) that are imported into the US[56]

[49] https://www.yahoo.com/news/elon-musk-and-doge-promised-up-to-2-trillion-in-government-savings-how-much-have-they-actually-saved-so-far-201718142.html
[50] https://www.cbpp.org/research/federal-budget/where-do-our-federal-tax-dollars-go
[51] https://fred.stlouisfed.org/series/GDP
[52] https://fred.stlouisfed.org/series/IMPGS
[53] https://www.nbcnews.com/business/economy/trump-trade-deficit-what-is-it-how-tariffs-impact-rcna190893 and https://www.politico.com/news/2025/02/05/trump-trade-deficit-2024-00202569
[54] https://apnews.com/article/trump-tariffs-canada-mexico-china-trade-surplus-3010e6368545e2976feb5ac6b41e528e
[55] https://apnews.com/article/tariffs-timeline-trade-war-trump-canada-mexico-china-a9d714eea677488ef9397547d838dbd0 and https://www.reuters.com/business/autos-transportation/us-car-buyers-face-higher-prices-less-choice-under-trumps-tariffs-2025-03-28/
[56] As occurred in 2020-2022 during the COVID-pandemic, we expect this measure to cause significant demand for, and upwards price pressure on, the automobile secondary market, as well as on automobile repairs and insurance premiums.

- Additional tariffs have been threatened on goods from any country that buys oil from Russia, Iran, and Venezuela[57]
- An additional 10% "baseline tariff" affecting all imported goods as of April 5, *except*
    - Japan and the E.U. incurring 24% and 20% tariffs on exported products, respectively;
    - An *additional* 34% tariff (on top of the current 20% rate, i.e., a total tariff rate of 54%) on Chinese goods; and
    - Mexico and Canada are exempt from this "baseline tariff", but previously standing tariffs remain in effect. [58]

The incoming White House administration has stated that they are determined to dampen demand for overseas' goods, and it is expected that other countries have and will continue to respond similarly to US goods *and services*.[59] Many are concerned about the US' GDP during 2025 given the unexpected flexibility with which President Trump has implemented his economic policies[60]; the unpredictable nature with which tariffs have already been threatened, deployed, and rescinded must cause investors and business owners to pause when considering investment in industry[61]. There will be some proactive stockpiling expected during 1H2025 in order to avoid price increases in conjunction with anticipated tariffs, but demand is expected to be lessened during 1Q2025; even President Trump acknowledges that his policies will create some "discomfort" for the population in the coming months[62].

During 2025, ***we expect for real GDP to be between 1.5% and 2.0% per annum***.

Other Commentary

- "JPMorgan economists recently raised their probability for a US recession to 40% as a result of trade policies. Goldman Sachs economists shaved their 2025 US growth forecast to 1.7% from 2.2%. At Morningstar, senior US economist Preston Caldwell writes that "higher tariffs would unambiguously reduce real GDP." In his estimation, a full implementation of the tariffs Trump proposed in his campaign will reduce the long-run level of US GDP by 1.6%, and even a watered-down version will reduce growth by 0.32% over the next three years." (https://www.morningstar.com/economy/what-trumps-trade-wars-could-mean-global-economy-markets; March 24, 2025)
- "Not long ago, US exceptionalism dominated the narrative; now the mood has turned sharply pessimistic. What changed? The shift stems largely from worsening soft data, with private sector surveys turning negative in recent weeks due to broad-based policy uncertainty and tariff implementation. Consumer sentiment has plunged, small-business uncertainty is near record highs, purchasing managers are increasingly downbeat and consumer inflation expectations are surging. At face value, these signals suggest a sharp pullback in economic activity. However, the US economy has been bolstered by exceptionally strong fundamentals over the past two years: robust income growth, healthy private sector balance sheets, fiscal tailwinds and strong productivity gains. … As a result, we have revised our GDP growth outlook down to 1.7% in 2025 and 1.6% in 2026. While we don't anticipate an outright pullback in economic activity, we see

[57] https://finance.yahoo.com/news/how-the-rollout-of-trumps-reciprocal-tariffs-could-become-an-absolute-nightmare-at-us-ports-080042120.html
[58] https://www.wsj.com/livecoverage/trump-tariffs-trade-war-stock-market-04-02-2025
[59] https://www.nytimes.com/2025/04/02/business/economy/tariffs-foreign-goods-tariffs-us-services.html
[60] https://www.nbcnews.com/business/economy/trump-tariffs-april-2-liberation-day-what-to-expect-rcna197822
[61] See, e.g., https://arstechnica.com/tech-policy/2025/02/americans-likely-to-pay-more-wait-longer-for-online-orders-from-china/
[62] Ibid.

the likelihood of a recession in the next 12-months at about 40%." (https://www.ey.com/en_us/insights/strategy/macroeconomics/us-economic-outlook; March 21, 2025)

- "The U.S.'s annual GDP growth is also projected to fall to 2.2% in 2025 and 1.6% in 2026 — down from earlier forecasts of 2.4% this year and 2.1% next year." (https://www.cnbc.com/2025/03/17/oecd-cuts-us-and-global-economic-growth-outlooks-as-trumps-trade-tariffs-weigh.html; March 17, 2025)
- "The latest and perhaps the most stunning one came on Friday, when the Atlanta Fed's GDPNow tracker showed the first quarter is on track for a 1.5% contraction. Only nine days earlier, on Feb. 19, it was pointing to growth of 2.3%. … Despite the shopping spree on imports, overall demand is weaker. Separate data on Friday showed Americans slashed their spending in January at the fastest pace in four years. Unseasonably cold weather was likely a factor, but Trump's policies—including plans to drastically cut federal spending and downsize the workforce—also had their fingerprints on it." (https://fortune.com/2025/03/01/us-economy-recession-outlook-q1-gdp-contraction-trump-tariffs-doge-job-cuts-consumer-spending-inflation/; March 1, 2025)

Employment

Analysis

Per Figure 22, unemployment remained relatively stable at 4.2% during 3Q2024 and 4Q2024, and it was relatively evenly distributed across the US, as shown in Figure 23. Approximately 7M people were unemployed during both quarters, and the civilian labor force actually dropped very slightly between 3Q2024 and 4Q2024; this situation has been consistent since April 2024.

Figure 22: US Nationwide monthly unemployment rate

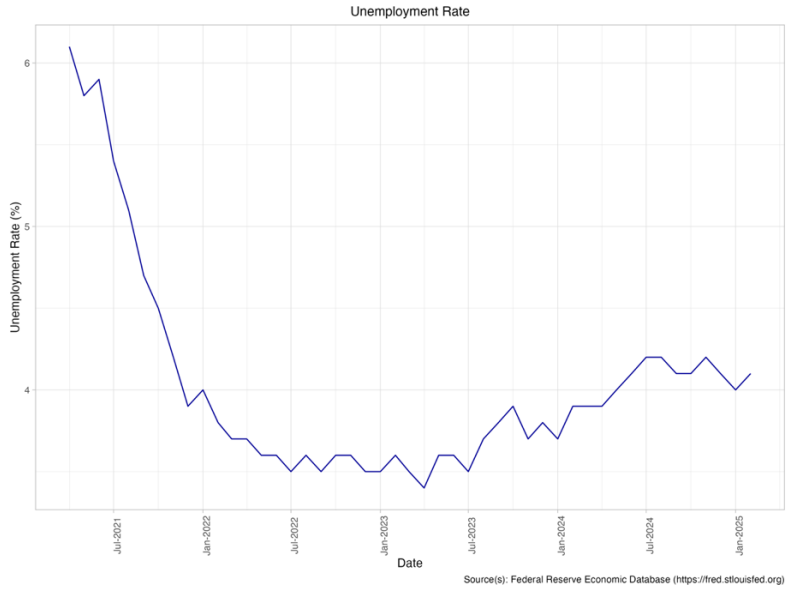
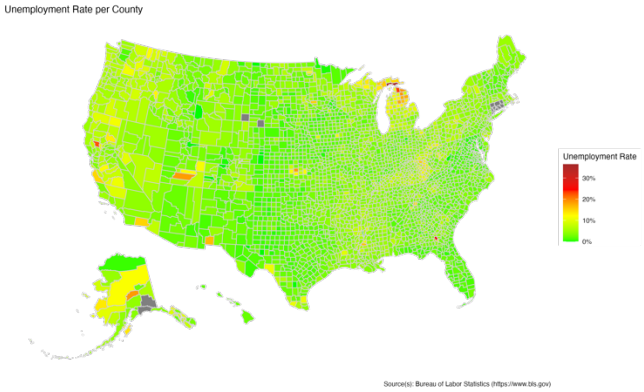


Figure 23: Nationwide unemployment per county



Job growth was approximately 1M new non-farm jobs being created during 3Q2024, and 1.5M new non-farm jobs during 4Q2024. However, job growth has been stifled during January and February 2025 to between 125k and 150k jobs per month, rising to 228k new jobs in March[63]; businesses have been uncertain of the direction of the economy and, as such, are restraining themselves from additional hiring. The Federal Open Market Committee (FOMC) Board of Governors is estimating that unemployment will rise to 4.4% at YE2025[64].

Back to the labor force, there was a noticeable jump in its size in January 2025 (see Figure 24), with only a slight retreat in February 2025, which is significant against the installation of the new administration. The slight decline in February may be enough to give one pause before declaring that any holdout workers are onboard as active jobseekers; the volatility of the new Trump administration seems to be causing anxiety across many swathes of the population[65]. Labor force participation continues to waffle as it has since mid-2023, along with the employment-population ratio. (See Figure 25 and Figure 26.)

[63] https://www.bls.gov/news.release/empsit.nr0.htm
[64] https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20250319.pdf
[65] See, e.g., https://www.nbcboston.com/news/politics/applying-a-wrecking-ball-mass-teachers-leaders-react-to-trumps-order-on-education/3664576/; https://www.axios.com/2025/03/24/trump-doge-government-jobs-bessent; and https://www.newsweek.com/donald-trump-republican-rebellions-ukraine-gaza-2037065

Figure 24: Level of US Civilian Labor Force

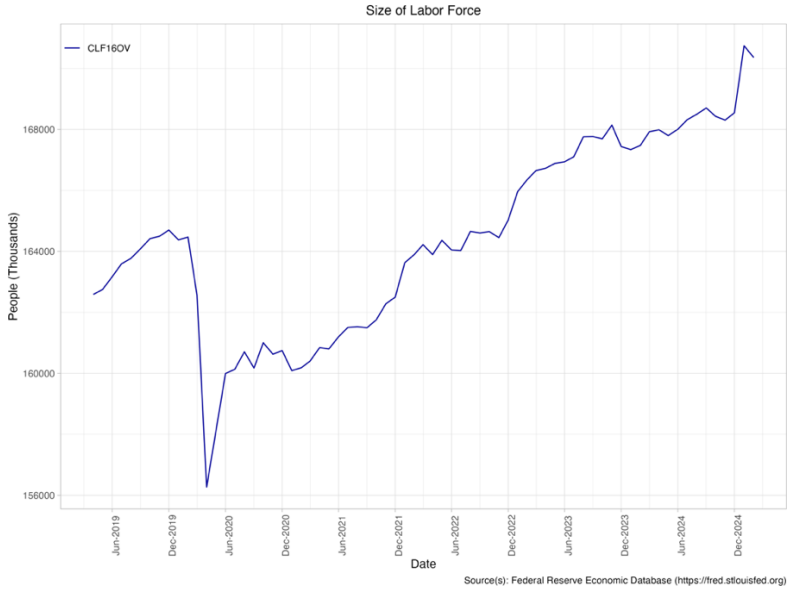


Figure 25: US Labor Force Participation Rate

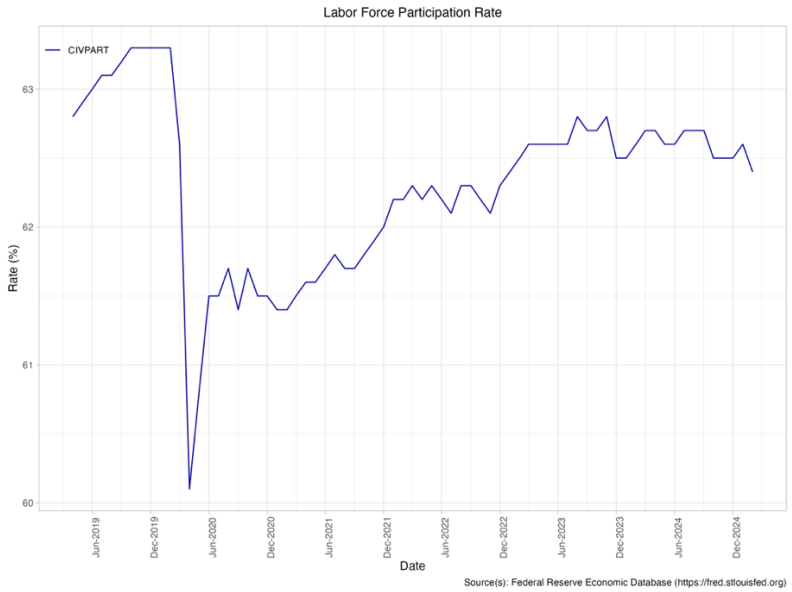
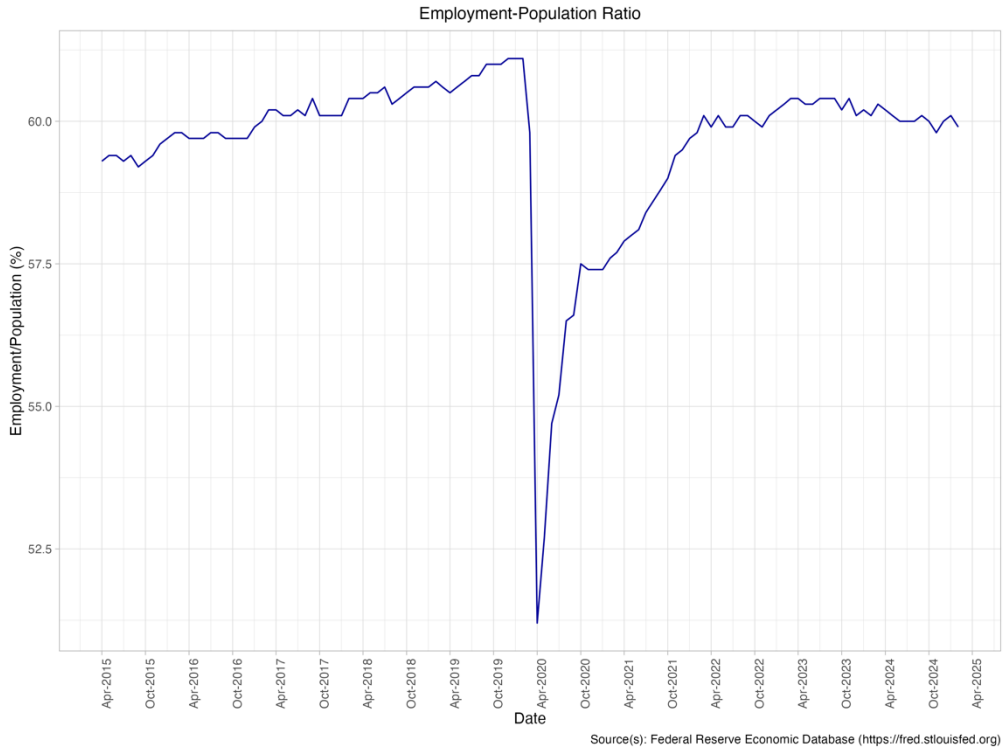


Figure 26: US Employment to Population Ratio (%)



Other Commentary

- "Absent a complete series of policy reversals, economists such as myself predict unfortunate consequences for the U.S. economy. Layoffs of federal employees and contractors are already causing spillover effects in the private-sector as well as among contractors and small businesses. The federal cutbacks will hit the D.C. area hardest, but almost 80% of federal workers do not work in the D.C. metro area—they are spread over every state and congressional district in the country. As a result, unemployment rates will likely rise over the coming months. The stock market declines may also lead to cutbacks in consumer spending. Plus, the trade war could stunt export growth and raise prices for consumers. Potential Medicaid cuts could also force closures of rural hospitals and squash spending on other goods and services as recipients have to dig deeper into their own pockets to buy needed health care. Deportations will likely lead to spiking prices for food and housing." (https://time.com/7269516/trumps-self-inflicted-economic-wounds/; March 20, 2025)
- "151,000 jobs were added in February, a moderate increase over the 125,000 added in January, when job growth was likely dampened by winter storms and the California wildfires. Hiring looked fairly normal across sectors, with typical additions in construction, manufacturing, transportation and service sectors. E-commerce delivery rebounded after the January storms. The big exception was a decline of 27,500 food service workers. A rebound had been expected after winter weather caused a drop in January. It's possible that fear of tighter immigration enforcement could have caused some workers to quit their jobs, given that the industry has a high share of such workers. … Gains in government employment were mostly limited to local governments, including schools. Federal employment dropped by 10,000. Because the Bureau of

> Labor Statistics survey takes place early in the month, it probably did not capture many of the recent layoffs in Washington, D.C. Federal job losses are likely to be much higher in the March report." (https://www.kiplinger.com/economic-forecasts/jobs; March 7, 2025)

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.

In his comments after the FOMC's meeting in March 2025, Chairman Jerome Powell emphasized the "uncertainties" of how the new WH administration's policies would affect the country's monetary policies. To wit, he said,

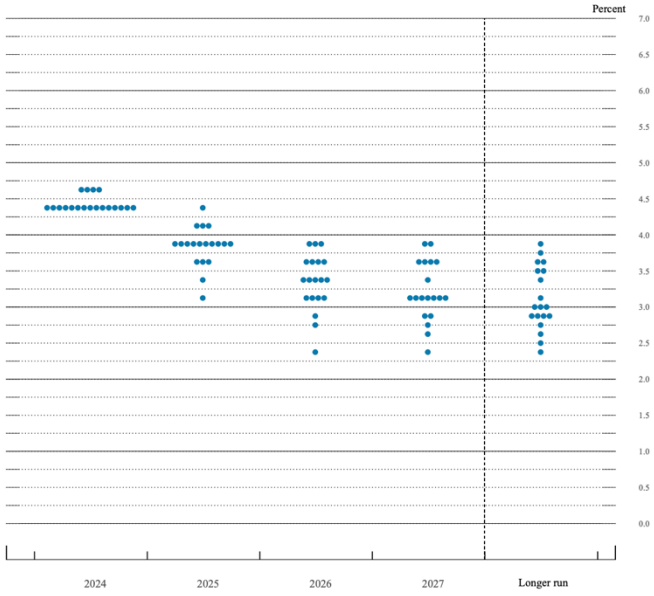
> "Looking ahead, the new Administration is in the process of implementing significant policy changes in four distinct areas: trade, immigration, fiscal policy, and regulation. It is the net effect of these policy changes that will matter for the economy and for the path of monetary policy. While there have been recent developments in some of these areas, especially trade policy, uncertainty around the changes and their effects on the economic outlook is high."

As such, while acknowledging that the Governors did not have hard quantitative data of the impact of WH policies yet, the FOMC Board of Governors took a cautious stance, not only regarding the target federal funds rate (held to between 4.25% and 4.5%), but also in their quantitative tightening measures (reducing the cap on Treasury redemptions from $25B/month to $5B/month) [66]. In the dot plots distributed after their recent meetings in December 2024 and March 2025 (see Figure 27 and Figure 28), we notice that the Governors' beliefs are more consistent between these two consecutive ballots than

[66] https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20241218.pdf

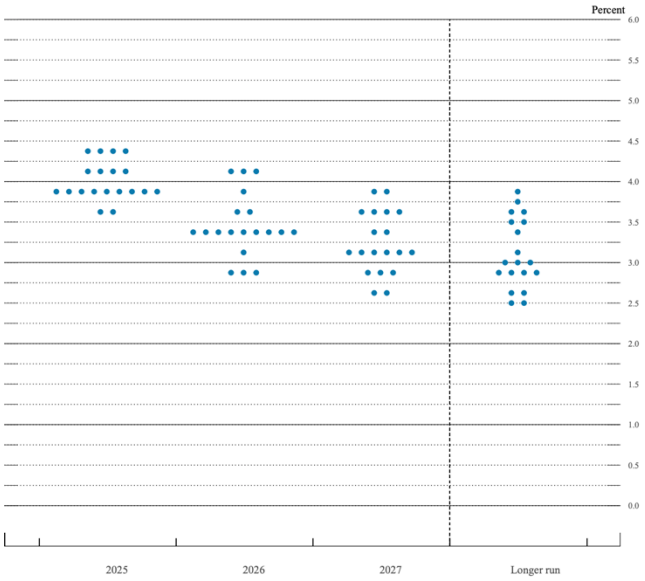
at any other point during the post-COVID recovery. We believe that this caution is wise, and that, accounting for the likely after-effects of the current tariff policies, ***rates will end 2025 around 4.5%.***

Figure 27: FOMC "Dot Plot" from December 2024 Board of Governors' Meeting



Source: https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20241218.pdf

Figure 28: FOMC "Dot Plot" from March 2025 Board of Governors' Meeting



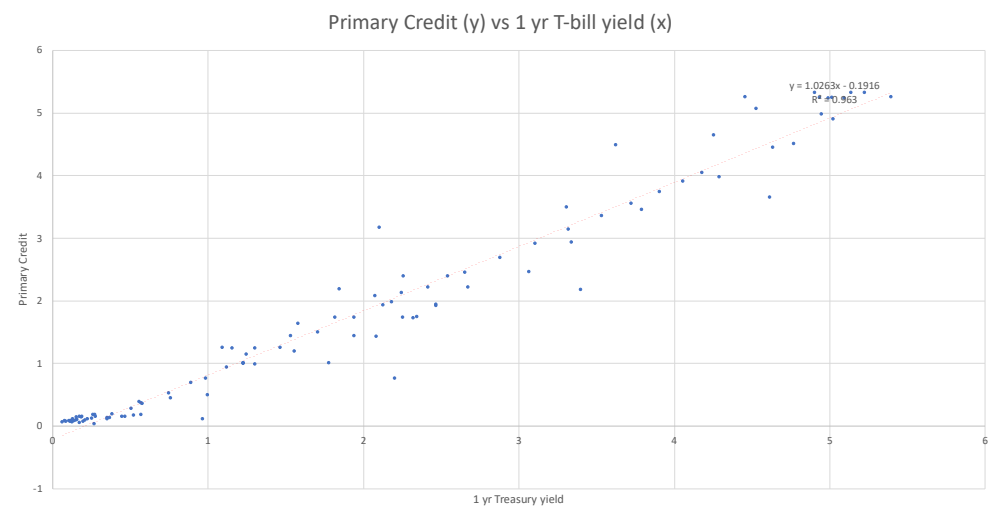
Source: https://www.federalreserve.gov/monetarypolicy/files/fomcprojtabl20250319.pdf

Table 1: Changes in FOMC Board of Governors' "Dot Plots" (Dec 2024 vs March 2025)

Year	Dec 2024 median	Dec 2024 range	March 2025 median	March 2025 range
2025	3.75%-4.0%	3.0%-4.5%	3.75%-4.0% (level from Dec)	3.5%-4.5% (↑ 50bp from Dec)
2026	3.5%-3.75%	2.25%-4.0%	3.25%-3.5% (↓ 25bp from Dec)	2.75%-4.25% (↑ 50bp from Dec)
2027	3.0%-3.25%	2.25%-4.0%	3.0%-3.25% (level from Dec)	2.25%-4.0% (level from Dec)

In Figure 29, we see the historical and projected relationship between the effective overnight lending rate and the 1-year T-bill yield.

Figure 29: Primary Credit, as a function of 1-year Treasury yield



Source: Authors' calculation

Other Commentary

- "An uncertain air over what is to come has dimmed the confidence of consumers, who in recent surveys have jacked up inflation expectations because of the tariffs. Retail spending increased in February, albeit less than expected though underlying indicators showed that consumers are still weathering the stormy political climate." (https://www.cnbc.com/2025/03/19/fed-rate-decision-march-2025.html; March 19, 2025)

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

Analysis

The U.S. government raises money to operate the federal government through the sale of U.S. Treasury Securities; these are debt instruments that are offered at fixed interest rates. Rates are expected to generally rise as maturity durations increase. The interest rates vary from day-to-day, and, when

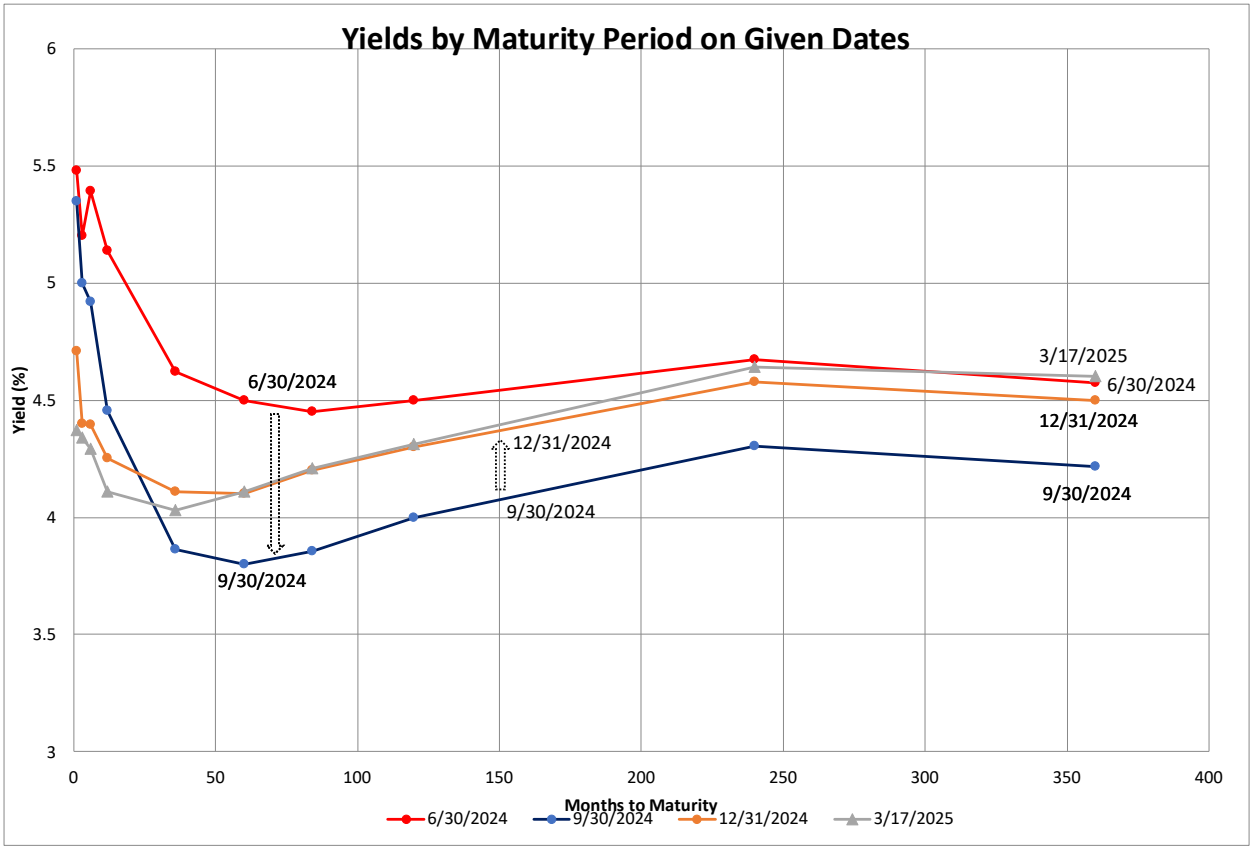
collected across all maturities, may be documented as a line chart (rate versus maturity) called a "yield curve". There are several different types of "Treasuries" (a generic name for "Treasury bonds", "Treasury notes", and "Treasury bills"), and most may be re-sold on the open secondary market.

Initial interest rates offered for Treasury Securities ("yields") are set when the security is initially sold, and may be affected by several factors, including (for example)

- The published target federal funds rate;
- Investor sentiment (i.e., supply and demand);
- Currently outstanding debt levels; and
- Anticipated future events (e.g., investors' beliefs regarding economic growth, inflation, and other geopolitical trends).

For the past few years, we have had to contemplate inversions occurring at various points on the yield curve. As of this writing, the Treasury yield curve still shows minimal interest being paid for a 36 month maturity (which is a change from previous values of 84 and 60 months as shown in Figure 30).

Figure 30: Recent Yield Curves

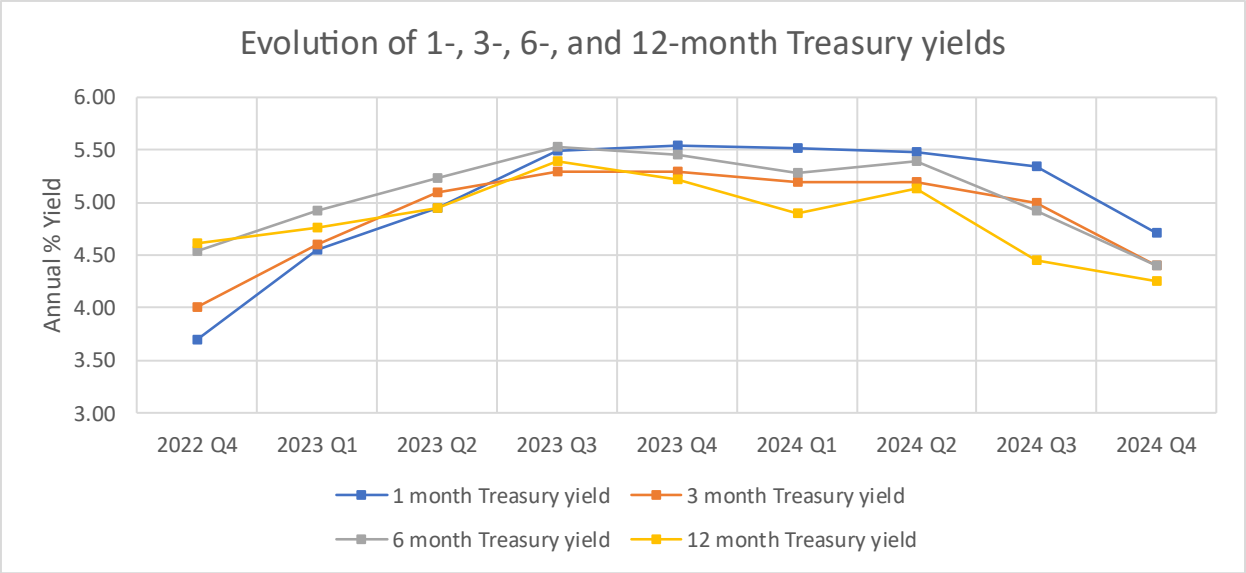


Source: Authors' calculation

Inkeeping with that analysis, we see how the rates for specific maturities have evolved recently in Figure 31 and Figure 32. From Figure 31, we see short-term maturity yields peaked in 3Q2023 before starting to very slowly tail off. One might recall that there was a second inversion that actually worked its way through short-term maturities at that time; the market appeared to be concerned until the FOMC

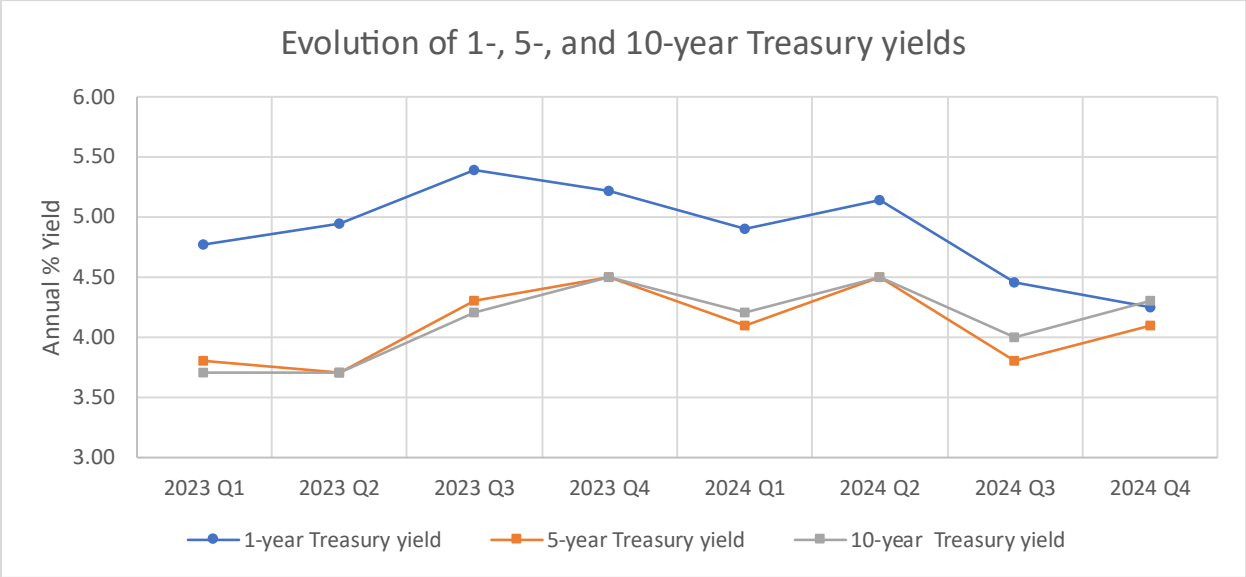
stopped raising its target federal funds rate. In Figure 32, we see similar concerns in 4Q2023, and then increased yields in mid-2024 based on (pro-business) President Trump's apparent standing in the 2024 Presidential election (which was tempered based on former Vice President Kamala Harris' campaigning later in the year).

Figure 31: Evolution of Short-Term Treasury Yields



Source: Authors' calculation

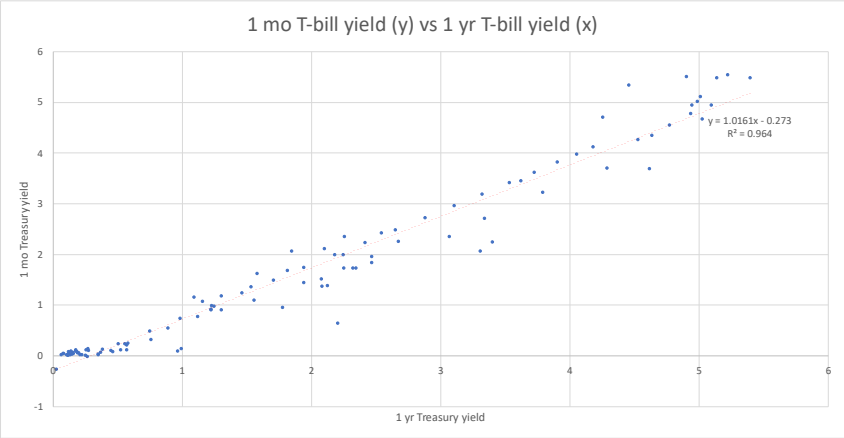
Figure 32: Evolution of Mid-Term Treasury Yields



Source: Authors' calculation

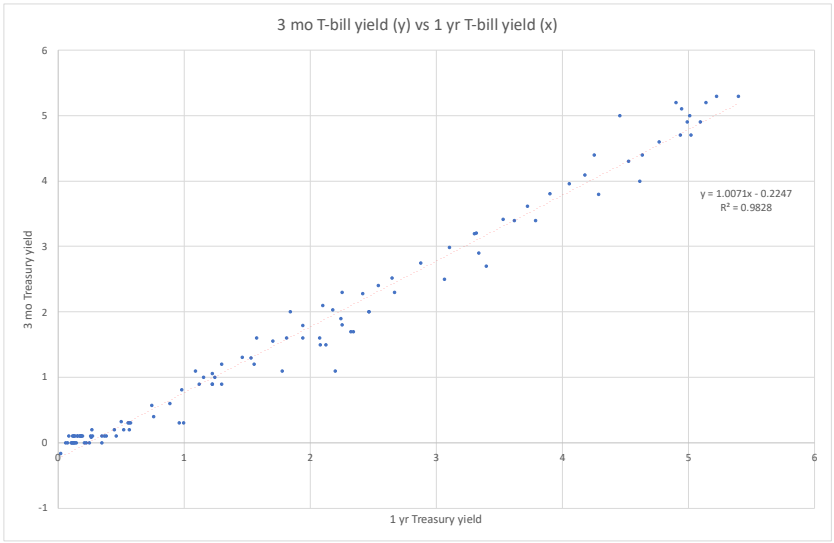
Figure 33 through Figure 41 illustrate the most significant correlations between Treasury yield rates.

Figure 33: 1-month Treasury yield rates, as a function of 1-year Treasury yield rates



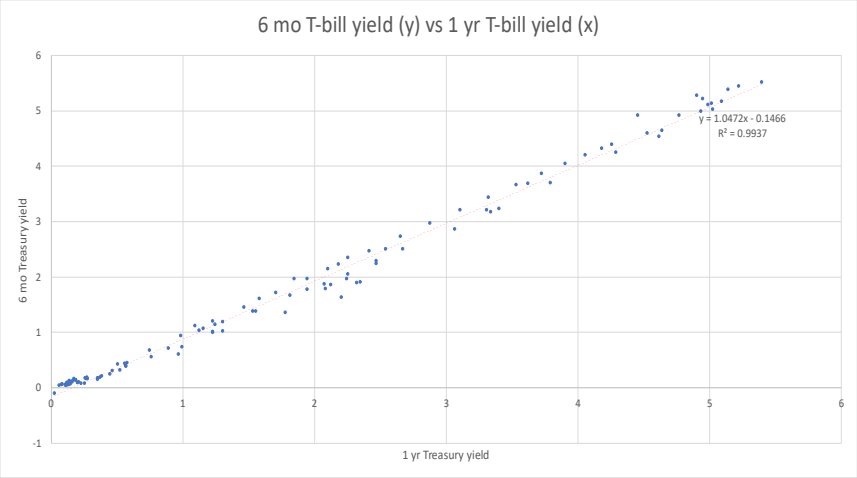
Source: Authors' calculation

Figure 34: 3-month Treasury yields, as a function of 1-year Treasury yields



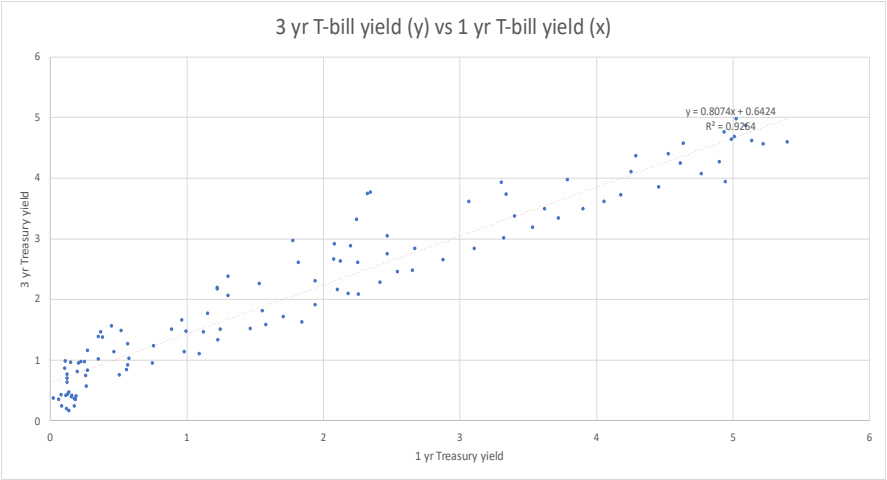
Source: Authors' calculation

Figure 35: 6-month Treasury yields, as a function of 1-year Treasury yields



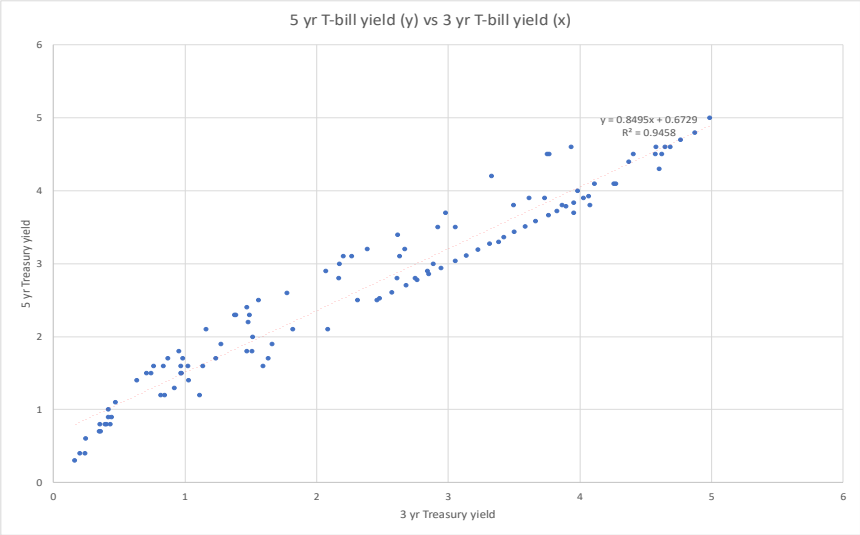
Source: Authors' calculation

Figure 36: 3-year Treasury yields, as a function of 1-year Treasury yields



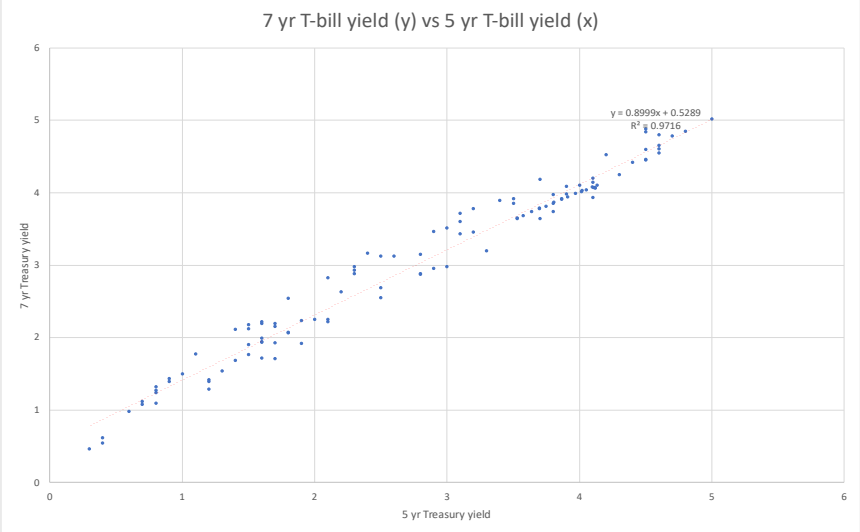
Source: Authors' calculation

Figure 37: 5-year Treasury yields, as a function of 3-year Treasury yields



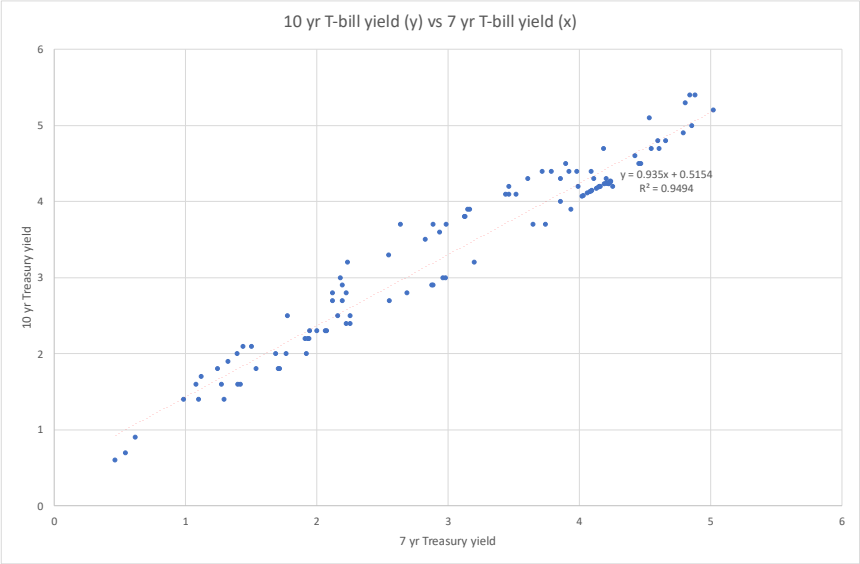
Source: Authors' calculation

Figure 38: 7-year Treasury yields, as a function of 5-year Treasury yields



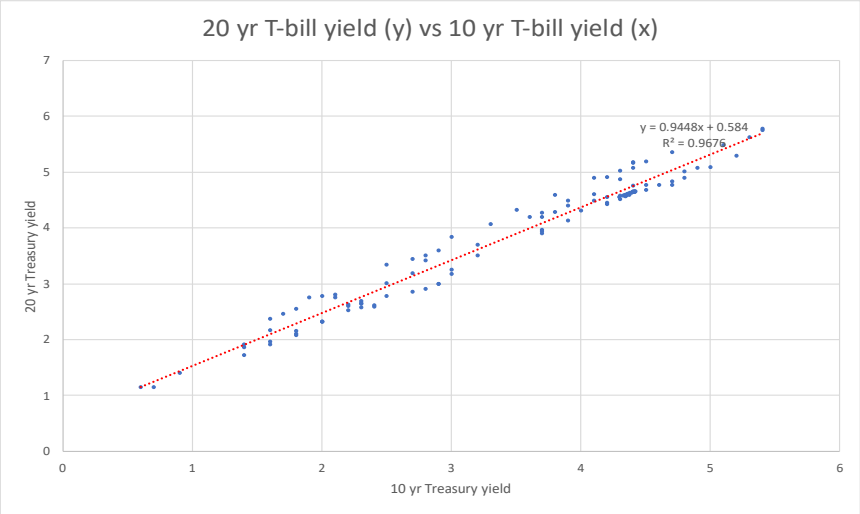
Source: Authors' calculation

Figure 39: 10-year Treasury yields, as a function of 7-year Treasury yields



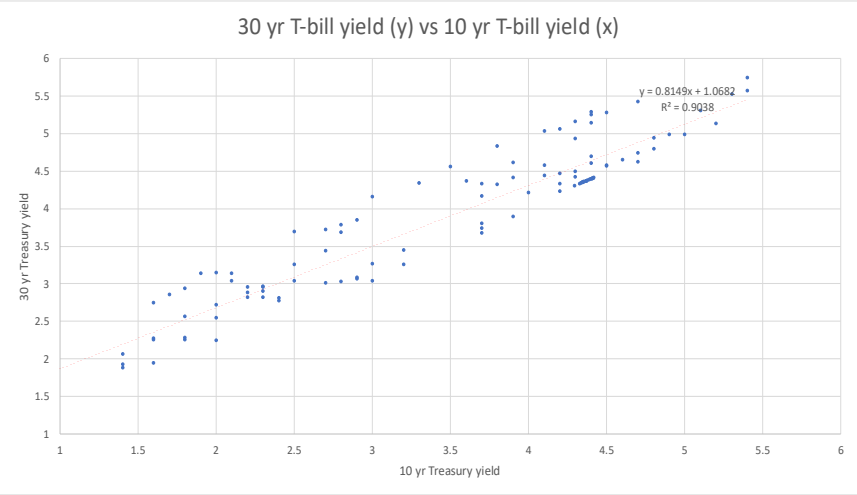
Source: Authors' calculation

Figure 40: 20-year Treasury yields, as a function of 10-year Treasury yields



Source: Authors' calculation

Figure 41: 30-year Treasury yields, as a function of 10-year Treasury yields



Source: Authors' calculation

Other Commentary

- "In the past couple weeks, chief rates strategists at Barclays, Royal Bank of Canada and Societe Generale have cut their year-end forecasts for 10-year yields in part, they said, because of Bessent's campaign to drive them lower. It's not just the jawboning, they added, but the fact that Bessent can follow it up with concrete action like limiting the size of 10-year debt auctions or advocating for looser bank regulations to boost bond demand or backing Elon Musk's frantic campaign to cut the budget deficit." (https://fortune.com/2025/03/23/bond-market-outlook-scott-bessent-10-year-treasury-yield/; March 23, 2025)

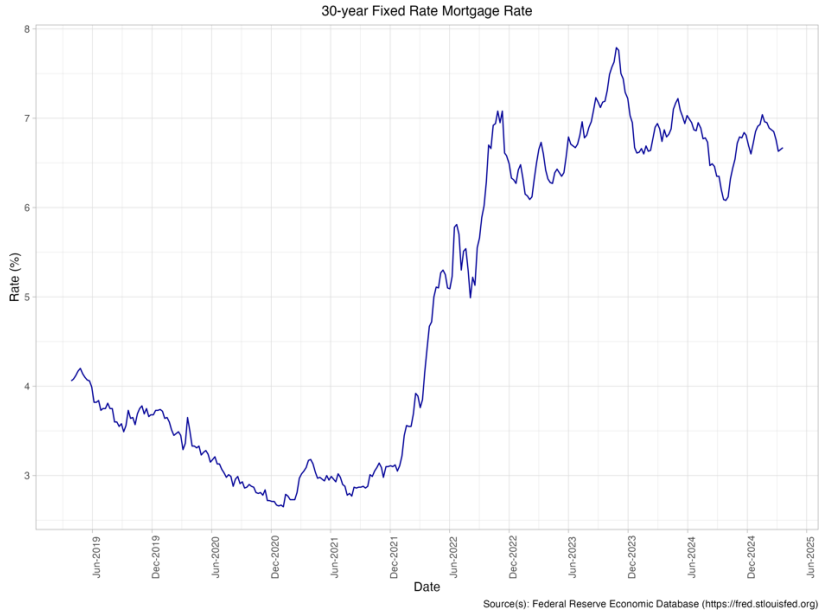
30-year Mortgage Rate & Residential Home Price Index

Analysis

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

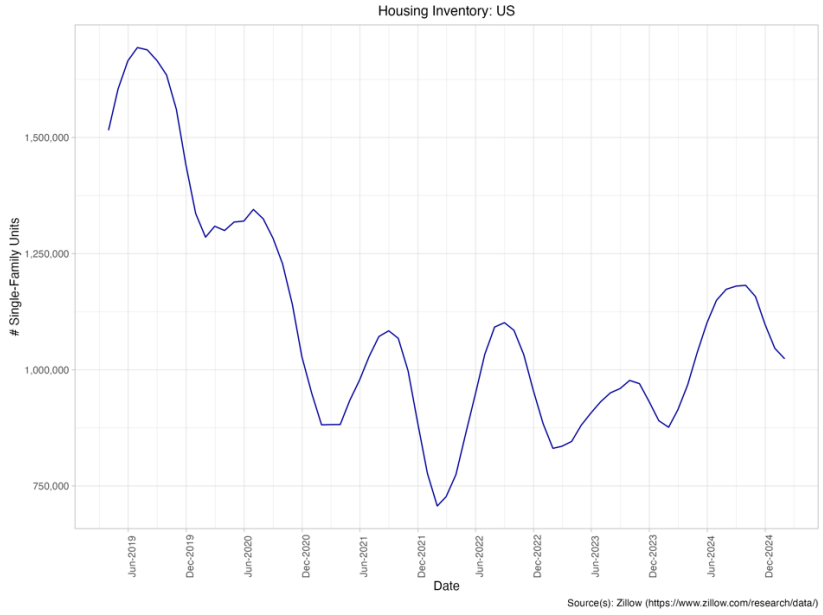
Figure 42 shows the nationwide average 30-year fixed-rate mortgage rate. We note that rates have been in generally the same range of values since late 2022, and are currently around 6.6% as of this writing. They have been declining from 7% since the new WH administration was installed, and only recently rebounded slightly due to increased applications from the buying pool.

Figure 42: US Nationwide Average 30-Year Fixed Rate Mortgage Rate



Based on Zillow's published data, Figure 43 presents the US housing inventory over the past five years. We note that the level of inventory appears to have peaked at YE2024 (since YE2020). Figure 44 and Figure 45 highlight the changes in nationwide median home price (and Y/Y percent change in median home price), peaking at about $375,000 at mid-year 2024, and essentially retreating since. Many home buyers are concerned about affordability, and hoping for lower rates & moderating insurance costs[67].

Figure 43: US Nationwide Housing Inventory



[67] See https://www.redfin.com/news/buyers-market-february-2025/; https://www.barrons.com/advisor/articles/homeowners-insurance-costs-soar-heres-which-states-notched-the-biggest-premium-increases-28404480?mod=article_inline; and https://finance.yahoo.com/news/trump-tariffs-could-impact-housing-120156222.html

Figure 44: Median US Home Price

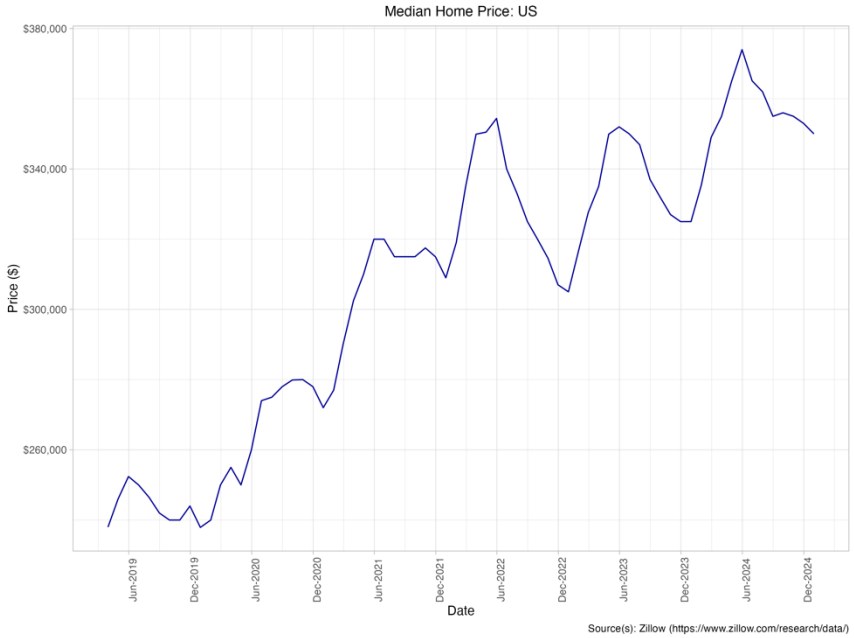
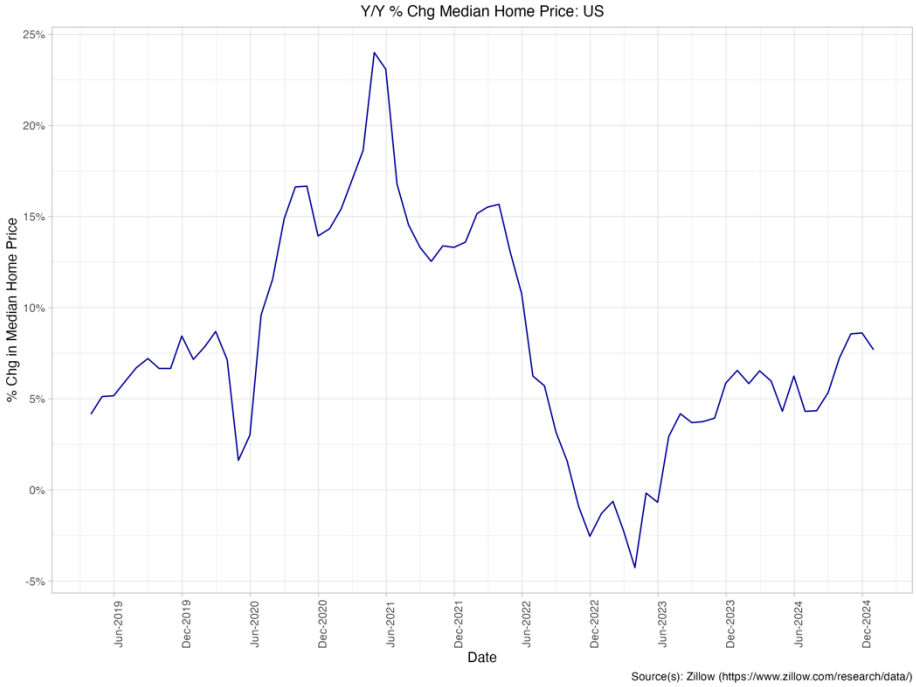


Figure 45: Y/Y % change in Median Home Price



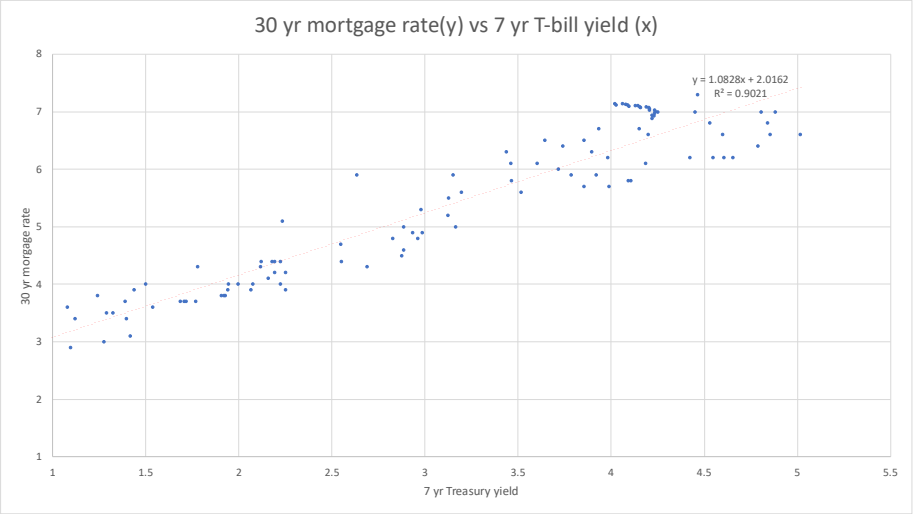
As of this writing, the 30-year fixed-rate mortgage has stayed under 7% since the week of January 16, 2025[68]. Again, rates are expected to follow mid-duration Treasury yields, meaning that they will be somewhat affected by FOMC interest rate decisions, employment, and market forces. The FOMC's

[68] https://www.freddiemac.com/pmms/docs/historicaleklydata.xlsx

expressed expectation at the moment is to potentially reduce their rates by 50bp during 2025[69], though opinions differ[70]; if they hold to that plan, then the expectation is for mortgage rates to fall to 6.25% - 6.5% by YE2025. ***We expect that mortgage rates will remain at essentially their current level for the primary part of the 2025 homebuying season.***

See Figure 46 regarding the correlation between the US 30-year fixed-rate mortgage rates and 7-year Treasury yields.

Figure 46: US 30-year (fixed rate) mortgage rate, as a function of a 7-year Treasury yield



Source: Authors' calculation

Other Commentary

- "47% of Americans note that mortgage rates would have to dip below 5% in order for them to be comfortable buying a home. Yet, almost half of home buyers believe that mortgage rates will stay elevated for the foreseeable future." (https://www.thestreet.com/real-estate/fannie-mae-makes-surprising-update-to-2025-mortgage-rate-forecast; Feb. 27, 2025)
- "Our mortgage rate forecast has been revised upward compared to last month given the rise in interest rates since our last forecast. We expect the 30-year fixed-rate mortgage to average 6.8 percent in 2025 and 6.5 percent in 2026 (up two-tenths and one-tenth, respectively, from our last forecast). However, interest rates remain volatile, particularly as the market attempts to adjust to changing expectations around Fed policy and other factors […] which adds risk to our outlook." (https://www.fanniemae.com/research-and-insights/forecast/economic-developments-february-2025; Feb 18, 2025)

[69] https://finance.yahoo.com/news/fed-sees-2-rate-cuts-in-2025-projects-higher-inflation-and-lower-economic-growth-182705456.html
[70] https://www.bloomberg.com/news/articles/2025-03-24/fed-s-bostic-now-sees-just-one-rate-cut-this-year-due-to-tariffs

Prime Rate

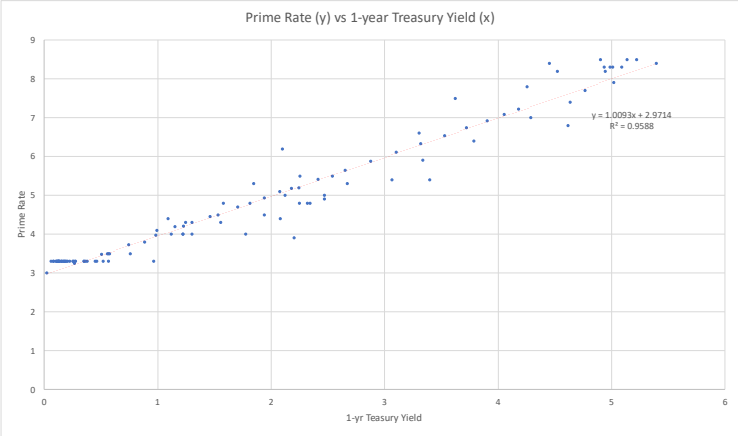
Analysis

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 loans[71]. The Prime Rate is currently (as of this writing) 7.5%[72].

We do not expect the relationship between the federal funds rate and the Prime Rate to change in the near future. If the FOMC only reduces the target federal funds rate by 50bp by YE2025 (though we are unsure that both cuts will actually occur), ***the Prime Rate will end 2025 at around 7.0%.***

See Figure 47 for the relationship between the Prime Rate and 1-year Treasury yield.

Figure 47: Prime Rate as a function of 1-year Treasury yields



Source: Authors' calculations

Other Commentary

- "The Fed refrained from cutting rates in its January 2025 meeting. Slightly sticky inflation along with policy uncertainty is likely to postpone the next rate cut until May. We expect three more rate cuts in 2025, bringing the year-end fed-funds rate to 3.50%-3.75%. We expect it to fall further to 2.25%-2.50% by the first half of 2027. Falling inflation along with slowing economic and job growth should induce much more cutting from the Fed. … Markets disagree with our view that the Fed will continue to push the federal-funds rate lower in 2026. By mid-2027, our forecast is 125 basis points below the federal-funds rate implied by futures markets. We think the market is projecting a terminal rate that's too high, reflecting an overestimate of the natural rate of interest." (https://www.morningstar.com/markets/when-will-fed-start-cutting-interest-rates; March 11, 2025)

[71] https://www.investopedia.com/terms/p/primerate.asp
[72] https://fred.stlouisfed.org/series/DPRIME

- "Ultimately it appears likely several interest rate cuts are coming in 2025. As Fed Governor Christopher Waller said in a speech on February 18, 'Waiting for economic uncertainty to dissipate is a recipe for policy paralysis.' Nonetheless, what the economic data reveals over the coming months will inform how aggressive the FOMC is in cutting rates in 2025." (https://www.forbes.com/sites/simonmoore/2025/03/03/heres-the-feds-remaining-2025-meeting-schedule-and-the-outlook-for-interest-rates/; March 3, 2025)

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

Analysis

Moody's AAA Corporate Bond is an investment bond that acts as an index of the performance of all bonds given an AAA rating by Moody's Investors Service. This corporate bond is also often used as an alternative to the U.S. 10-year Treasury Bill as benchmark indicator rate; as a result, AAA bond rates tend to track with mid-duration Treasury yields. Bonds with lower grades, e.g., Moody's BAA Corporate Bond (which tracks bonds given a BAA rating), tending have higher yields (due to their risk ratings). The ICE BofA BBB US Corporate Index is a trading index compiled by ICE Data Indices, LLC that includes all securities given an investment grade rating BBB by Bank of America.

The yields and related spreads for Moody's AAA & BAA Corporate Bonds; the BofA BBB Corporate Bond; and the traditional 10/2 U.S. Treasury yield spread are shown in Table 2[73].

Table 2: Comparison between Moody's Bond Yields, BofA BBB Yields, and U.S. Treasury Yields

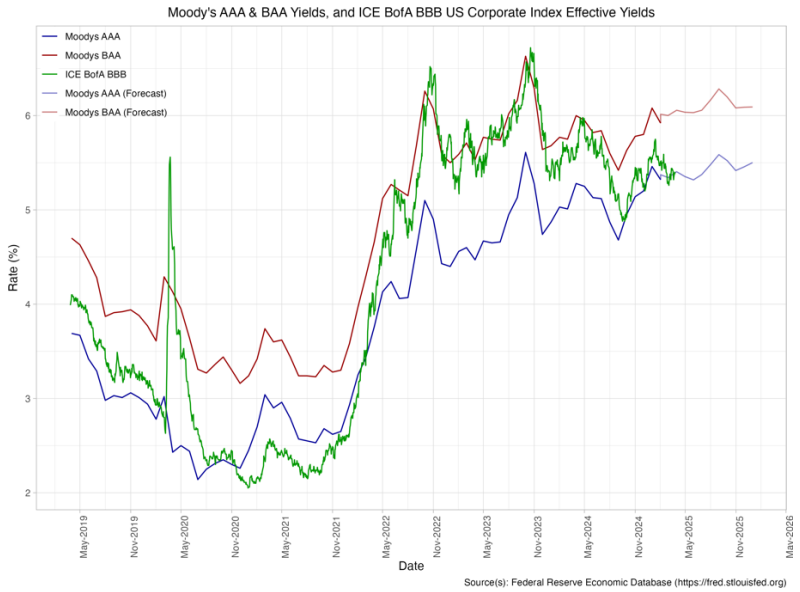
Instrument	3Q2024	4Q2024	Δ(3Q->4Q)
Moody's AAA Bonds (end of qtr)	4.68%	5.20%	+52bp
Moody's BAA Bonds (end of qtr)	5.42%	5.80%	+42bp
BAA-AAA Yield Spread	+72bp	+60bp	-12bp
BofA BBB Yields (end of qtr)	4.97%	5.55%	+58bp
2-year Treasury Yield (end of qtr)	3.66%	4.30%	+64bp
10-year Treasury Yield (end of qtr)	3.81%	4.52%	+71bp
10 yr-2 yr Yield Spread	+15bp	+22bp	+7bp

Given the "business friendly" attitudes of the new Trump administration, ***we expected that bond yields will decline***. However, President Trump's tactic of using tariffs as a universally appropriate cudgel has caused consternation in many sectors. Many executives are concerned about the magnitude of the implemented and proposed tariffs in many sectors, including

- automobiles and durable goods[74];
- oil and other commodities[75];
- consumer goods[76];
- groceries, beverages, & food services[77]; and others.

[73] See https://fred.stlouisfed.org/series/DGS10, https://fred.stlouisfed.org/series/DGS7, https://fred.stlouisfed.org/series/DGS2, https://fred.stlouisfed.org/series/DGS1, https://fred.stlouisfed.org/series/aaa, and https://fred.stlouisfed.org/series/baa
[74] https://www.cbsnews.com/news/trump-auto-tariffs-25-percent-rebuke-concern-us-trading-partners/
[75] https://www.cnbc.com/2025/03/27/oil-execs-slam-trumps-tariffs-and-drill-baby-drill-in-survey.html and https://www.brownfieldagnews.com/news/corn-growers-react-to-trumps-tariffs-at-commodity-classic/
[76] See https://www.cnbc.com/2025/03/04/trump-mexico-tariffs-will-raise-produce-prices-target-ceo-cornell-says.html and https://qz.com/walmart-respond-trump-tariffs-barbie-hasbro-acer-ford-1851767011/slides/2
[77] https://www.bbc.com/news/articles/cn0422zzpw8o and https://csnews.com/food-focused-retailers-need-prepare-tariffs-effects-foodservice

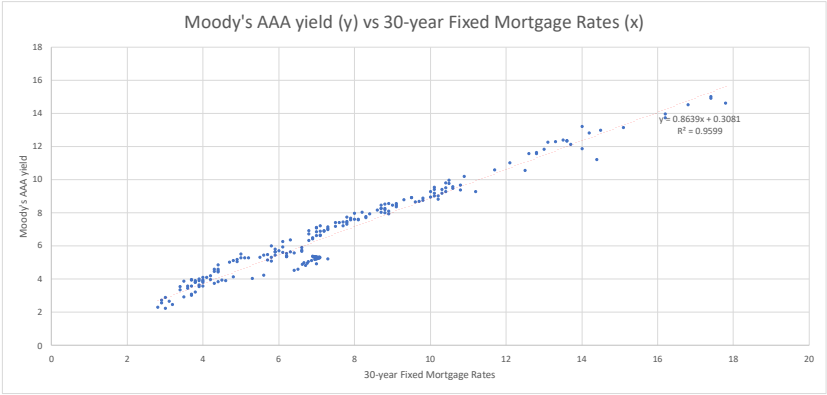
Figure 48: Moody's AAA, BAA, and ICE BBB Average Bond yields



The uncertainty of production costs affects employment, borrowing costs, manufacturing plans, and profits. In the case of corporate bond yields, the returns that borrowing companies pay is another increasing load on these businesses: investors will generally seek the safety of government Treasuries in times of volatility (when tariffs are implemented); as a result, the risk premium of corporate investments will widen (over "risk free" rates) from both directions – "risk free" rates will drop, and corporate debt premiums will increase in order to attract investors, resulting the widening of the risk spread between the two yield rates.

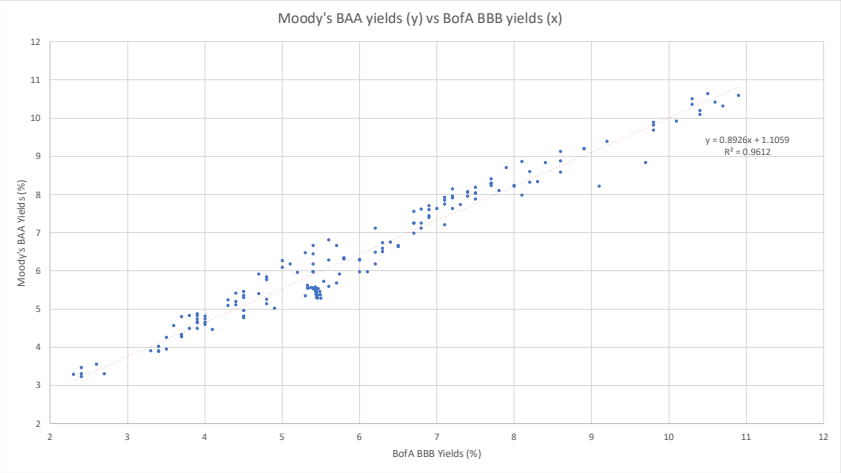
See Figure 49 and Figure 50 for how Moody's AAA & BAA Corporate Bond yields have historically correlated with other macroeconomic metrics.

Figure 49: Moody's AAA-grade investment yields, as a function of 30-year Fixed Interest Mortgage Rates



Source: Authors' calculation

Figure 50: Moody's BAA-grade investment yields, as a function of BofA BBB yields



Source: Authors' calculation

Other Commentary

- "U.S. tariffs set to be imposed on imports from Canada, China and Mexico – ranging from 10% to 25% – and suggestions of forthcoming tariffs on the European Union mark a sharp escalation in trade protectionism. This shows that tariffs will be a key policy tool for the new U.S. administration, as telegraphed during the presidential campaign. The effective rate of U.S. tariffs will be close to 1930s levels if fully implemented. We think 10% tariffs could be the new baseline for the U.S. to earn tax revenue, while 25% may prove to be used more as leverage in negotiations – as seen in the decision to delay tariffs on Mexico for a month. But uncertainty is high. What's key for markets is how long 25% tariffs last: the longer they hold, the more permanent the supply chain shifts. Legal challenges could delay implementation and add to market volatility, in our view. How countries retaliate is also important – and could draw further U.S. escalation. These actions, and their ripple effects, could dent corporate and investor confidence." (https://www.blackrock.com/corporate/insights/blackrock-investment-institute/publications/tariffs-signal-global-trade-shift; Feb. 3, 2025)
- "While Chinese imports have lowered consumer prices in the past during periods of low tariffs, that came at the cost of jobs leaving the U.S. and reducing long-term competitiveness of key industries such as manufacturing, renewables, and semiconductors. As the U.S. economy evolves to meet new challenges of our time, as it relates to controlling inflation and decreasing reliance, corporate profitability will remain volatile given higher input costs from higher tariffs. These sectors could also see a greater need for cost-cutting measures or price adjustments, which could lead to layoffs or higher prices for consumers depending on pricing power." (https://www.morganstanley.com/im/en-us/individual-investor/insights/articles/unintended-consequences.html; November 1, 2024)

US Average Retail Gasoline Price

Analysis

The U.S. average retail price for regular unleaded gasoline is approximately $3.16 per gallon for regular unleaded as of this writing, up about 4% since our last report. Since YE2024, crude oil prices have been

mixed, as seen in Figure 51. On the whole, Y/Y change in prices have been slightly down from 2024 to 2025 -- currently around $70/bbl -- which has been seen as a positive for end consumers.

However, as we alluded to in the previous section, President Trump's tariffs have had repercussions on oil and other natural resources. Given the administration's position on immigration, President Trump has not made any friends in either Venezuela[78] or the Middle East. As such, with expected increasing demand due to spring & summer travel, and reduced sources of imports, demand is projected as continuing to exceed supply.[79]

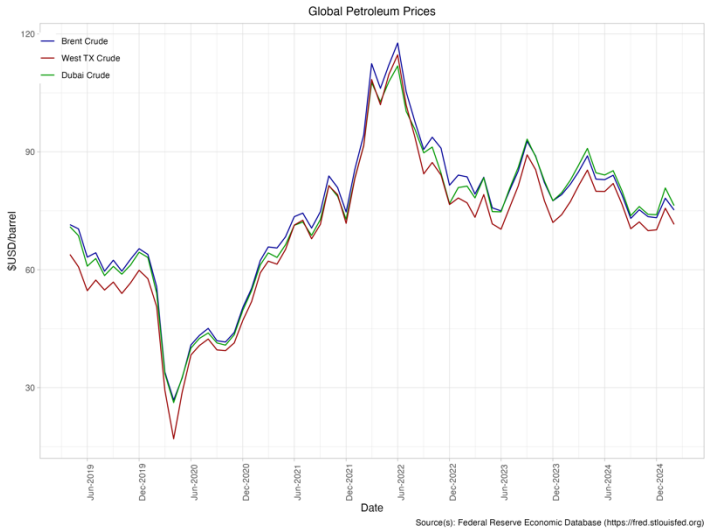
In contrast, if President Trump is able to fulfill his promise to help end the Russia-Ukraine conflict[80], it is expected that Russian oil will return to global markets, which will help apply downward pressure to both oil and natural gas prices.[81] However, petroleum executives were extremely critical of President Trump's policies in a survey from the Federal Reserve Bank of Dallas; therein, the President's flippant attitude regarding his administration's "flexible" application of tariffs was characterized as causing "chaos" and preventing the industry from being able to plan for additional capital investments.[82]

Finally, The Gulf and Caribbean are slightly warmer than average but are cooler than they were this time last year. Water temperatures in the eastern Atlantic are closer to average, if not slightly cooler, than last year, and substantially cooler than last year.[83] Colorado State University's tropical meteorology project team is forecasting 17 storms (nine of which will become hurricanes, and four of which will reach Category 3 status or stronger) in their first outlook for 2025, slightly less than what occurred in 2024.[84] Based on these points, tropical development should be relatively mild in the Gulf region in 2025, meaning that the impact of weather on US oil production will likely be limited.

We expect oil prices to remain in the $65/bbl to $75/bbl range under nominal circumstances.

[78] https://www.reuters.com/markets/commodities/oil-prices-hold-steady-investors-monitor-russia-ukraine-ceasefire-talks-2025-03-24/
[79] https://oilprice.com/Energy/Oil-Prices/Oil-Prices-Rise-On-Improving-Market-Sentiment.html
[80] https://www.wsj.com/world/russias-new-demands-signal-trouble-for-trumps-goal-of-a-quick-end-to-ukraine-war-e812231d
[81] https://www.reuters.com/markets/europe/russian-central-bank-sees-chance-prolonged-low-oil-price-cycle-2025-03-24/
[82] https://www.wsj.com/livecoverage/stock-market-today-dow-nasdaq-sp500-03-26-2025/card/energy-executives-sound-off-on-trump-s-tariffs-and-drill-baby-drill-chaos--iq5Kr7u2XdzKf3rxgzA5 and https://www.cnbc.com/2025/03/27/oil-execs-slam-trumps-tariffs-and-drill-baby-drill-in-survey.html
[83] https://weather.com/storms/hurricane/news/2025-04-03-april-hurricane-season-outlook-csu
[84] https://tropical.colostate.edu/forecasting.html

Figure 51: Global Crude Oil Prices



Other Commentary

- "This quarter's hot topic was President Trump's tariffs, which have raised the price of steel that is crucial to oil-and-gas production and caused economic uncertainty, as well as his promises to drive down energy costs. The executives, whose responses are provided in the report without attribution, did not hold back their displeasure. Here is some of what they said: … 'As a public company, our investors hate uncertainty. This has led to a marked increase in the implied cost of capital of our business, with public energy stocks down significantly more than oil prices over the last two months. This uncertainty is being caused by the conflicting messages coming from the new administration. There cannot be <<U.S. energy dominance>> and $50 per barrel oil; those two statements are contradictory. At $50-per-barrel oil, we will see U.S. oil production start to decline immediately and likely significantly (1 million barrels per day plus within a couple quarters). This is not <<energy dominance>>.'" (https://www.wsj.com/livecoverage/stock-market-today-dow-nasdaq-sp500-03-26-2025/card/energy-executives-sound-off-on-trump-s-tariffs-and-drill-baby-drill-chaos--iq5Kr7u2XdzKf3rxgzA5; March 26, 2025)
- "Corporate America's careful rhetoric — even as many big companies brace for the impact of the market volatility and the tariffs — illustrates the delicate diplomacy that business leaders are trying to engage in. They largely welcome Trump's other economic promises — including lower taxes and fewer regulations. … Now Trump's stop-and-start tariff policies seem to be complicating many companies' economic outlook. But business leaders are trying to avoid adding to investors' financial panic, according to Anna Tavis, who chairs New York University's department of human-capital management and talks to executives across corporate America." (https://www.npr.org/2025/03/14/nx-s1-5327534/trump-ceos-tariffs-economy-recession; March 14, 2025)

Commercial Real Estate Price Index

Commercial real estate (CRE) has been in a quandary since the COVID pandemic. First, office space has been under-utilized. Many businesses survived the pandemic with workers "working from home" (WFH);

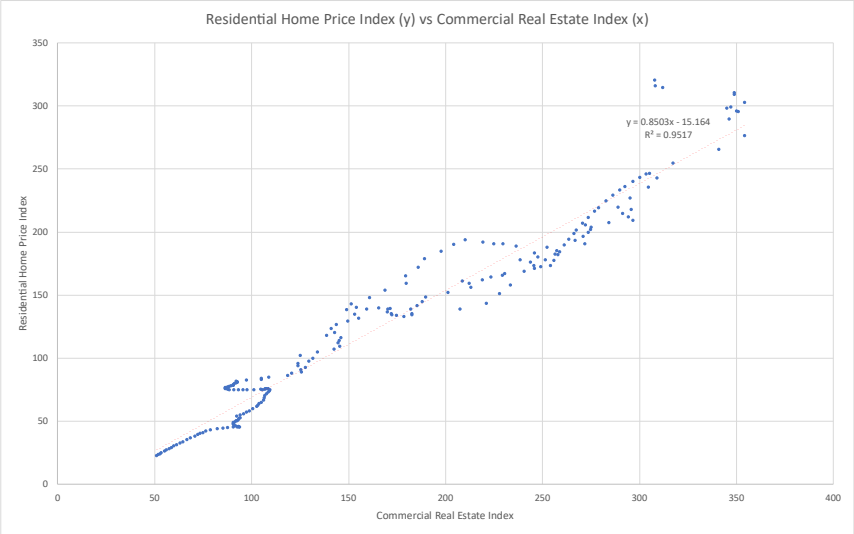
the approach was so successful that workers are now resistant to "return to the office" (RTO) per mandates by management. This trend is leaving offices with empty shells of leased office space, and senior leadership threatening workers with termination if they do not return[85].

Landlords are working to fill office space through refinancing and renegotiated terms. This problem has led to a glut of square footage in some markets, and delinquencies. According to data from the Mortgage Bankers Association, $957B of CRE loans are due in 2025, a Y/Y increase of maturities by 3%.[86] Delinquencies on Commercial Real Estate Loans rose to 1.57% in 4Q2024.[87] Since the end of 2024, Trepp reports that the Trepp CMBS Special Servicing Rate rose 45 basis points in February 2025 to 10.32%, following a slight decline in January (its first drop in over a year)[88]; their published office delinquency rate rose 63 basis points in December to 11.01%, approximately doubling during 2024.[89] (As an aside, Fitch Ratings' reported the office delinquency rate as 7.18% in December 2024, before declining by 44-bp to 6.74% in January 2025.[90]).

The interesting point to highlight here is that there is consistent data reflecting the possibility of office delinquencies having peaked, attributed to the RTO mandates. A Federal Reserve Discussion Paper suggests that higher delinquency rates on CRE loans seem to occur in larger banks, and is due to the affected banks' exposure to poorly performing office loans.[91] This point suggests that small banks are unlikely to face outsized losses unless new shocks unfold.[92]

Figure 52 highlights the relationship between residential and commercial prices.

Figure 52: Residential Home Price Index as a function of the Commercial Real Estate Index



Source: Authors' calculation

[85] https://www.wsj.com/real-estate/commercial/back-to-office-workers-landlords-e5e15663
[86] https://alternativecreditinvestor.com/2025/03/07/borrowers-get-creative-as-957bn-of-cre-debt-matures-in-2025/
[87] https://fred.stlouisfed.org/series/DRCRELEXFACBS
[88] https://www.trepp.com/trepptalk/topic/cmbs-delinquency-rate
[89] https://www.trepp.com/trepptalk/cmbs-delinquency-rate-surges-in-december-2024
[90] https://www.fitchratings.com/research/structured-finance/2025-kicks-off-with-lower-us-cmbs-delinquency-rate-as-resolutions-edge-out-defaults-07-02-2025
[91] https://www.federalreserve.gov/econres/feds/files/2024072pap.pdf
[92] https://www.trepp.com/trepptalk/regional-banking-crisis-two-years-on-markets-stabilize-but-commercial-real-estate-remains-vulnerable

Other Commentary

- "Regional banks have significantly higher exposure to commercial real estate loans compared to larger banks. CRE debt makes up 48% of total loans at regional banks versus only 13% at large banks. … [C]lose to 60% of regional banks have CRE-to-Equity ratios north of 300%, with close to a third above 400%, levels that regulators consider potentially risky. This concentration has not only made regional banks particularly vulnerable to the CRE market downturn precipitated by aggressive Fed hiking starting in 2022 but impinges on their ability to make new loans." (https://www.parkviewfinancial.com/post/parkview-insights-impact-of-regional-banking-stress-on-cre-lending; March 20, 2025)

Dow Jones Total Stock Market Index; S&P 500; 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 3, the market's growth during 4Q2024 was on par with preceding quarters, however, steep losses have been incurred by investors since the new WH administration took office for all of the previously mentioned reasons.

Table 3: Approximate Quarterly Milestones for the Dow-Jones Total Market Index

Period	Index Range[93]	Trading Days	Avg points/day
1Q2024 (1/1/2024-3/31/2024)	47787.47 → 52402.86	61	+75.7
2Q2024 (4/1/2024-6/30/2024)	52402.86 → 53905.94	63	+23.9
3Q2024 (7/1/2024-9/30/2024)	53905.94 → 56496.47	64	+40.5
4Q2024 (10/1/2024-12/31/2024)	56496.47 → 58399.25	61	+31.2
1Q2025 (1/1/2025-3/31/2025)	58399.25 → 55359.56	59	-51.5

We see the Standard & Poor's 500 Index ("SP500") in Table 4; the S&P 500 is an index of 500 very large, publicly traded companies in the U.S. The performance of the S&P 500 mirrors that of the DWCF, with the returns of the two indexes both showing growth during 4Q2024, and then reverting during 1Q2025. A comparison of the two metrics is shown in Figure 53.

Since YE2024, the new WH administration has gone to substantial lengths to address, in its own way, the "trade imbalance" between the United States and other countries. As shown in Table 3 and Table 4, there was a substantial decline in the market indices as new policies (primarily tariffs) emerged. As new trade policies emerged as this report has been prepared (in early April of 2025), we have now seen the SP500 drop by 10% of its value in less than a week; the NASDAQ market has lost 20% of its value since its most recent peak.[94] As a result of China, Canada, and the EU (among other countries) taking retaliatory action against the US, we expect global markets to continue their declines, with their ability to recover becoming a function of businesses' abilities to carve out new, economically viable supply chain paths, and consumers to find economical solution to their own interests. These statements are intentionally vague, since it is not clear how long it will take to find these new routes, particularly for US companies.

[93] Index values found at https://www.marketwatch.com/investing/index/dwcf
[94] https://www.nytimes.com/live/2025/04/04/business/trump-tariffs-stocks-economy

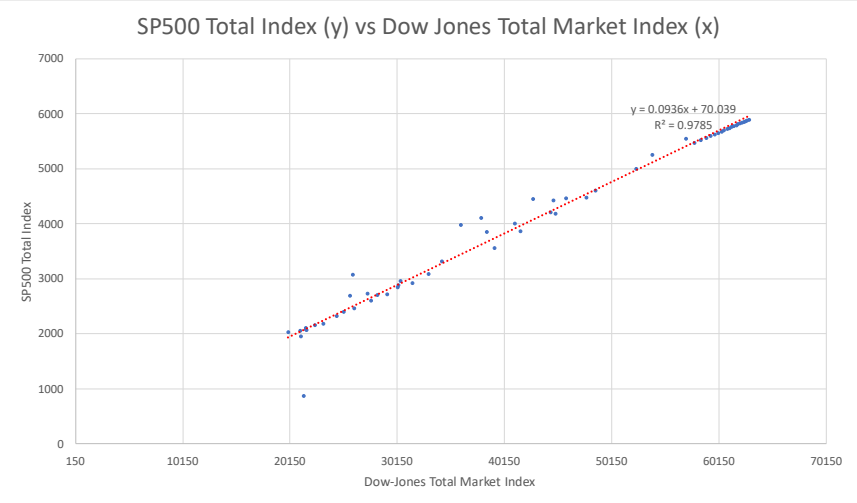
While businesses in other countries may ally themselves, US companies could find themselves on the same industrial "island" that Russia has been on for the past two years: isolated and struggling to survive.

Table 4: Approximate Quarterly Milestones for the Standard and Poor's 500 ("SP500") Index

Period	Index Range[95]	Trading Days	Avg points/day
1Q2024 (1/1/2024-3/31/2024)	4769.83 → 5254.35	61	+7.94
2Q2024 (4/1/2024-6/30/2024)	5254.35 → 5459.65	63	+3.26
3Q2024 (7/1/2024-9/30/2024)	5459.65 → 5708.75	64	+3.89
4Q2024 (10/1/2024-12/31/2024)	5708.75 → 5881.63	61	+2.83
1Q2025 (1/1/2025-3/31/2025)	5881.63 → 5612.62	59	-4.56

The VIX was up at the end of 3Q2024 to 16.3, and to 17.35 as of YE2024, and to 21.65 as of the end of 1Q2025. Volatility during 4Q2024 is likely attributable to the transition of power and financial contraction, as spikes in the VIX occurred on Oct 31, 2024 (rising to over 23, as Microsoft and Meta reported losses after market close) and Dec 18, 2024 (rising to over 27, when the FOMC pulled back on its expectations to only two rate cuts during 2025). Since YE2024, there has been a long and steady rise in the VIX from February 21 at 18, peaking at 27 on March 10, and bottoming on March 25 at 17. Given a solid month of elevated values, it is not surprising that the quarterly averages have gone from 17.07 in 3Q2024, to 17.36 in 4Q2024, to 18.46 in 1Q2025, and ***we will not be surprised to watch this metric continue to climb with the recent implementation of tariffs, potentially leading to a full global trade war.***

Figure 53: SP500 as a function of the Dow-Jones Total Market Index



Source: Authors' calculation

[95] Index values found at https://www.marketwatch.com/investing/index/spx

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 1Q2016 and 4Q2024, inclusive.

Table 4: Regression Aggregate Errors for 1Q2016 through 4Q2024

Variable	Min Abs. Error	Average Error	Max Abs. Error
Real GDP Growth	293.67%	**	***
Nominal GDP Growth	281.86%	**	***
Real Disposable Income Growth	831.10%	***	***
Nominal Disposable Income Growth	873.19%	***	***
Inflation	503.56%	***	***
Unemployment Rate	***	**	***
1-month Treasury Yield	515.88%	**	***
3-month Treasury Yield	0.00%	**	***
6-month Treasury Yield	***	**	***
1-year Treasury Yield	110.66%	**	***
3-year Treasury Yield	645.80%	**	***
5-year Treasury Yield	643.62%	***	***
7-year Treasury Yield	3.48%	62.42%	283.75%
10-year Treasury Yield	0.57%	4.79%	146.40%
20-year Treasury Yield	0.18%	-2.27%	66.13%
30-year Treasury Yield	0.50%	-6.16%	45.15%
30-year Mortgage Rate	0.03%	0.07%	28.34%
Moody's AAA Curve	0.21%	-1.21%	24.19%
Moody's BAA Curve	3.55%	-21.97%	56.20%
BBB Corporate Yield	1.27%	-68.37%	87.80%
Prime Rate	0.08%	-3.25%	35.51%
US Average Retail Gasoline Price	41.59%	571.99%	***
Cost of Federal Funds	182.41%	**	***
Dow Jones Total Stock Market Index	0.70%	-20.74%	85.26%
S&P 500 Stock Price Index	48.08%	784.46%	***
Commercial Real Estate Price Index	105.03%	420.51%	638.29%
Residential Home Price Index	2.35%	268.77%	634.97%
Market Volatility Index	***	***	***

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

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

REGRESSION FOR REAL GDP GROWTH

	Dependent variable (+/- SE):
	Real GDP growth
Constant	-39.090 (+/- 9.960)
	p = 0.0005***
Unemployment Rate	-8.329 (+/- 0.447)
	p = 0.000***
10-year Treasury Yield	163.966 (+/- 16.850)
	p = 0.000***
LN_10-year Treasury Yield	-298.221 (+/- 24.824)
	p = 0.000***
7-year Treasury Yield	-56.490 (+/- 8.840)
	p = 0.00000***
LN_7-year Treasury Yield	175.715 (+/- 23.294)
	p = 0.00000***
LN_6-month Treasury Yield	-7.535 (+/- 2.592)
	p = 0.007***
LN_3-year Treasury Yield	-42.733 (+/- 6.770)
	p = 0.00000***
LN_1-year Treasury Yield	14.950 (+/- 4.532)
	p = 0.003***
10-year Treasury Yield_2	-8.470 (+/- 1.140)
	p = 0.00000***
Market Volatility Index_2	-0.002 (+/- 0.0003)
	p = 0.00000***
Observations	40
R^2	0.945
Adjusted R^2	0.925
Residual Std. Error	2.036 (df = 29)
F Statistic	49.405*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR NOMINAL GDP GROWTH

	Dependent variable (+/- SE):
	Nominal GDP growth
Constant	-73.397 (+/- 11.882)
	p = 0.00000***
Unemployment Rate	-9.401 (+/- 0.507)
	p = 0.000***
Market Volatility Index	-0.513 (+/- 0.108)
	p = 0.00005***
LN_Market Volatility Index	12.084 (+/- 3.494)
	p = 0.002***
10-year Treasury Yield	173.051 (+/- 18.125)
	p = 0.000***
LN_10-year Treasury Yield	-317.595 (+/- 27.728)
	p = 0.000***
7-year Treasury Yield	-46.886 (+/- 10.131)
	p = 0.0001***
LN_7-year Treasury Yield	171.247 (+/- 22.067)
	p = 0.000***
LN_3-year Treasury Yield	-33.789 (+/- 3.414)
	p = 0.000***
10-year Treasury Yield_2	-10.257 (+/- 1.197)
	p = 0.000***
Observations	40
R^2	0.942
Adjusted R^2	0.925
Residual Std. Error	2.322 (df = 30)
F Statistic	54.276*** (df = 9; 30)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR REAL DISPOSABLE INCOME GROWTH

	Dependent variable (+/- SE):
	Real disposable income growth
Constant	188.103 (+/- 22.302)
	p = 0.0002***
SP500 Stock Price Index	0.217 (+/- 0.009)
	p = 0.00000***
US Fed Reserve O-N Loan Rate	47.162 (+/- 6.850)
	p = 0.0005***
Moody's AAA Curve	-31.540 (+/- 7.457)
	p = 0.006***
Moody's BAA Curve	116.091 (+/- 4.357)
	p = 0.00000***
Nominal GDP growth	0.494 (+/- 0.129)
	p = 0.009***
Unemployment Rate	17.370 (+/- 1.413)
	p = 0.00002***
CPI Inflation Rate	-2.350 (+/- 0.409)
	p = 0.002***
BBB corporate yield	-37.272 (+/- 6.798)
	p = 0.002***
30-year Mortgate Rate	71.737 (+/- 4.045)
	p = 0.00001***
Dow Total Stock Market Index	-0.015 (+/- 0.001)
	p = 0.00000***
Home Price Index	-2.245 (+/- 0.166)
	p = 0.00002***
Commercial Real Estate Price Index	1.237 (+/- 0.068)
	p = 0.00001***
Market Volatility Index	-4.207 (+/- 0.197)
	p = 0.00000***
LN_Market Volatility Index	77.502 (+/- 4.606)
	p = 0.00001***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	-52.769 (+/- 2.782)
	p = 0.00001***
LN_30-year Treasury Yield	-1,201.607 (+/- 39.686)
	p = 0.00000***
10-year Treasury Yield	-254.731 (+/- 28.960)

	p = 0.0002***
LN_10-year Treasury Yield	915.253 (+/- 61.865)
	p = 0.00001***
LN_7-year Treasury Yield	338.462 (+/- 34.385)
	p = 0.0001***
3-month Treasury Yield	263.274 (+/- 12.124)
	p = 0.00000***
5-year Treasury Yield	-145.280 (+/- 14.216)
	p = 0.0001***
LN_5-year Treasury Yield	-177.224 (+/- 33.013)
	p = 0.002***
6-month Treasury Yield	-959.892 (+/- 32.775)
	p = 0.00000***
LN_6-month Treasury Yield	39.836 (+/- 2.404)
	p = 0.00001***
LN_3-year Treasury Yield	-142.744 (+/- 12.765)
	p = 0.00004***
1-year Treasury Yield	769.234 (+/- 25.506)
	p = 0.00000***
1-year Treasury Yield_2	-119.076 (+/- 3.871)
	p = 0.00000***
3-year Treasury Yield_2	-43.067 (+/- 2.948)
	p = 0.00001***
6-month Treasury Yield_2	183.705 (+/- 6.090)
	p = 0.00000***
5-year Treasury Yield_2	33.228 (+/- 2.688)
	p = 0.00002***
3-month Treasury Yield_2	-78.981 (+/- 2.846)
	p = 0.00000***
7-year Treasury Yield_2	22.003 (+/- 4.052)
	p = 0.002***
20-year Treasury Yield_2	24.070 (+/- 2.882)
	p = 0.0002***
Observations	40
R^2	0.999
Adjusted R^2	0.995
Residual Std. Error	0.939 (df = 6)
F Statistic	227.358*** (df = 33; 6)

Note: *p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR NOMINAL DISPOSABLE INCOME GROWTH

	Dependent variable (+/- SE):
	Nominal disposable income growth
Constant	228.631 (+/- 37.162)
	p = 0.0002***
SP500 Stock Price Index	0.214 (+/- 0.010)
	p = 0.000***
Moody's BAA Curve	136.359 (+/- 7.245)
	p = 0.00000***
Real GDP growth	-6.293 (+/- 1.288)
	p = 0.001***
Nominal GDP growth	6.637 (+/- 1.178)
	p = 0.0004***
Unemployment Rate	16.591 (+/- 1.462)
	p = 0.00001***
CPI Inflation Rate	-3.597 (+/- 0.631)
	p = 0.0003***
BBB corporate yield	-71.216 (+/- 7.375)
	p = 0.00001***
30-year Mortgate Rate	90.824 (+/- 6.261)
	p = 0.00000***
Dow Total Stock Market Index	-0.015 (+/- 0.001)
	p = 0.000***
Home Price Index	-2.155 (+/- 0.215)
	p = 0.00001***
Commercial Real Estate Price Index	0.879 (+/- 0.113)
	p = 0.00003***
Market Volatility Index	-4.230 (+/- 0.243)
	p = 0.00000***
LN_Market Volatility Index	75.124 (+/- 5.705)
	p = 0.00000***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	-61.472 (+/- 3.846)
	p = 0.00000***
LN_30-year Treasury Yield	-1,342.042 (+/- 58.806)
	p = 0.000***
10-year Treasury Yield	-293.041 (+/- 21.138)
	p = 0.00000***
LN_10-year Treasury Yield	1,080.492 (+/- 40.088)

	p = 0.000***
7-year Treasury Yield	266.926 (+/- 23.304)
	p = 0.00001***
3-month Treasury Yield	260.396 (+/- 18.779)
	p = 0.00000***
5-year Treasury Yield	-346.194 (+/- 25.866)
	p = 0.00000***
6-month Treasury Yield	-806.976 (+/- 41.447)
	p = 0.000***
LN_6-month Treasury Yield	35.188 (+/- 2.334)
	p = 0.00000***
LN_3-year Treasury Yield	-132.212 (+/- 8.182)
	p = 0.00000***
1-year Treasury Yield	673.938 (+/- 34.112)
	p = 0.000***
1-year Treasury Yield_2	-99.537 (+/- 5.192)
	p = 0.000***
3-year Treasury Yield_2	-50.314 (+/- 4.378)
	p = 0.00001***
6-month Treasury Yield_2	155.225 (+/- 6.745)
	p = 0.000***
5-year Treasury Yield_2	58.316 (+/- 5.074)
	p = 0.00001***
3-month Treasury Yield_2	-66.439 (+/- 3.196)
	p = 0.000***
20-year Treasury Yield_2	20.185 (+/- 3.025)
	p = 0.0001***
Observations	40
R^2	0.996
Adjusted R^2	0.984
Residual Std. Error	1.626 (df = 9)
F Statistic	82.200*** (df = 30; 9)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR CPI INFLATION RATE

	Dependent variable (+/- SE):
	CPI Inflation Rate
Constant	79.389 (+/- 6.590)
	p = 0.00001***
SP500 Stock Price Index	0.005 (+/- 0.001)
	p = 0.00001***
US Fed Reserve O-N Loan Rate	23.753 (+/- 2.062)
	p = 0.00001***
Moody's AAA Curve	-19.848 (+/- 1.342)
	p = 0.00000***
Real GDP growth	0.709 (+/- 0.085)
	p = 0.00004***
Nominal GDP growth	-0.825 (+/- 0.090)
	p = 0.00002***
Real disposable income growth	-2.043 (+/- 0.082)
	p = 0.000***
Nominal disposable income growth	1.902 (+/- 0.077)
	p = 0.000***
BBB corporate yield	8.253 (+/- 0.591)
	p = 0.00000***
30-year Mortgate Rate	3.352 (+/- 0.368)
	p = 0.00002***
Prime Rate	-16.428 (+/- 1.531)
	p = 0.00001***
Dow Total Stock Market Index	-0.0004 (+/- 0.00004)
	p = 0.00001***
Commercial Real Estate Price Index	-0.043 (+/- 0.005)
	p = 0.00004***
Market Volatility Index	-0.192 (+/- 0.014)
	p = 0.00000***
LN_Market Volatility Index	3.183 (+/- 0.298)
	p = 0.00001***
30-year Treasury Yield	41.759 (+/- 3.759)
	p = 0.00001***
LN_30-year Treasury Yield	-129.318 (+/- 11.361)
	p = 0.00001***
20-year Treasury Yield	-14.085 (+/- 2.670)

	p = 0.001***
LN_20-year Treasury Yield	58.737 (+/- 7.279)
	p = 0.00005***
10-year Treasury Yield	18.710 (+/- 1.737)
	p = 0.00001***
LN_10-year Treasury Yield	-23.519 (+/- 2.955)
	p = 0.00005***
LN_1-month Treasury Yield	0.799 (+/- 0.116)
	p = 0.0002***
7-year Treasury Yield	-29.068 (+/- 2.380)
	p = 0.00001***
LN_7-year Treasury Yield	67.941 (+/- 4.717)
	p = 0.00000***
3-month Treasury Yield	-17.630 (+/- 1.648)
	p = 0.00001***
5-year Treasury Yield	-2.592 (+/- 0.655)
	p = 0.005***
6-month Treasury Yield	14.398 (+/- 1.567)
	p = 0.00002***
LN_6-month Treasury Yield	-9.910 (+/- 0.840)
	p = 0.00001***
3-year Treasury Yield	4.044 (+/- 1.104)
	p = 0.007***
LN_3-year Treasury Yield	-28.749 (+/- 2.190)
	p = 0.00001***
1-year Treasury Yield	-6.857 (+/- 1.093)
	p = 0.0003***
LN_1-year Treasury Yield	19.069 (+/- 1.455)
	p = 0.00001***
Observations	40
R^2	1.000
Adjusted R^2	0.999
Residual Std. Error	0.088 (df = 8)
F Statistic	1,203.716*** (df = 31; 8)
Note:	*p<0.1; **p<0.05; ***p<0.01

Unemployment Rate

REGRESSION FOR UNEMPLOYMENT RATE

	Dependent variable (+/- SE):
	Unemployment Rate
Constant	-198.374 (+/- 10.877)
	p = 0.0004***
SP500 Stock Price Index	-0.020 (+/- 0.001)
	p = 0.001***
US Fed Reserve O-N Loan Rate	-51.359 (+/- 2.914)
	p = 0.0004***
Moody's AAA Curve	43.141 (+/- 2.273)
	p = 0.0004***
Real GDP growth	-1.366 (+/- 0.048)
	p = 0.0001***
Nominal GDP growth	1.540 (+/- 0.059)
	p = 0.0002***
Real disposable income growth	4.011 (+/- 0.177)
	p = 0.0002***
Nominal disposable income growth	-3.667 (+/- 0.160)
	p = 0.0002***
CPI Inflation Rate	1.842 (+/- 0.090)
	p = 0.0003***
BBB corporate yield	-18.999 (+/- 1.026)
	p = 0.0004***
30-year Mortgate Rate	-17.399 (+/- 1.005)
	p = 0.0005***
Prime Rate	42.192 (+/- 2.414)
	p = 0.0005***
Dow Total Stock Market Index	0.002 (+/- 0.0001)
	p = 0.001***
Commercial Real Estate Price Index	0.111 (+/- 0.008)
	p = 0.001***
Market Volatility Index	0.522 (+/- 0.034)
	p = 0.001***
LN_Market Volatility Index	-7.387 (+/- 0.499)
	p = 0.001***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	2.952 (+/- 0.246)
	p = 0.002***

30-year Treasury Yield	-153.805 (+/- 9.374)
	p = 0.0005***
LN_30-year Treasury Yield	462.812 (+/- 28.616)
	p = 0.001***
20-year Treasury Yield	100.108 (+/- 5.396)
	p = 0.0004***
LN_20-year Treasury Yield	-267.748 (+/- 13.699)
	p = 0.0003***
10-year Treasury Yield	-39.728 (+/- 4.181)
	p = 0.003***
1-month Treasury Yield	-3.748 (+/- 0.446)
	p = 0.004***
LN_1-month Treasury Yield	-2.099 (+/- 0.083)
	p = 0.0002***
LN_7-year Treasury Yield	-49.904 (+/- 3.273)
	p = 0.001***
3-month Treasury Yield	48.289 (+/- 2.346)
	p = 0.0003***
5-year Treasury Yield	111.914 (+/- 6.950)
	p = 0.001***
LN_5-year Treasury Yield	-109.566 (+/- 6.526)
	p = 0.0005***
6-month Treasury Yield	-52.881 (+/- 2.924)
	p = 0.0004***
LN_6-month Treasury Yield	29.871 (+/- 1.515)
	p = 0.0003***
3-year Treasury Yield	-39.957 (+/- 2.330)
	p = 0.0005***
LN_3-year Treasury Yield	104.857 (+/- 5.837)
	p = 0.0004***
1-year Treasury Yield	18.429 (+/- 1.054)
	p = 0.0005***
LN_1-year Treasury Yield	-55.098 (+/- 2.934)
	p = 0.0004***
3-year Treasury Yield_2	6.907 (+/- 0.411)
	p = 0.0005***
5-year Treasury Yield_2	-11.197 (+/- 0.775)
	p = 0.001***
10-year Treasury Yield_2	3.837 (+/- 0.559)

	p = 0.007***
Observations	40
R^2	1.000
Adjusted R^2	1.000
Residual Std. Error	0.036 (df = 3)
F Statistic	2,411.268*** (df = 36; 3)
Note:	*p<0.1; **p<0.05; ***p<0.01

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

REGRESSION FOR 1-MONTH TREASURY YIELD

	Dependent variable (+/- SE):
	1-month Treasury Yield
Constant	-10.562 (+/- 3.335)
	p = 0.004***
Moody's AAA Curve	-2.615 (+/- 0.681)
	p = 0.001***
Nominal GDP growth	-0.070 (+/- 0.017)
	p = 0.0004***
Unemployment Rate	-0.887 (+/- 0.149)
	p = 0.00001***
CPI Inflation Rate	-0.185 (+/- 0.044)
	p = 0.0003***
Dow Total Stock Market Index	0.0001 (+/- 0.00002)
	p = 0.0004***
LN_30-year Treasury Yield	12.443 (+/- 3.439)
	p = 0.002***
10-year Treasury Yield	49.387 (+/- 11.758)
	p = 0.0003***
LN_10-year Treasury Yield	-56.510 (+/- 11.304)
	p = 0.00004***
7-year Treasury Yield	-31.186 (+/- 8.196)
	p = 0.001***
LN_7-year Treasury Yield	27.557 (+/- 6.569)
	p = 0.0003***
7-year Treasury Yield_2	3.992 (+/- 0.986)
	p = 0.0004***
10-year Treasury Yield_2	-5.301 (+/- 1.287)
	p = 0.0004***
Observations	40
R^2	0.975
Adjusted R^2	0.964
Residual Std. Error	0.372 (df = 27)
F Statistic	88.127*** (df = 12; 27)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 3-MONTH TREASURY YIELD

	Dependent variable (+/- SE):
	3-month Treasury Yield
Constant	-1.206 (+/- 1.174)
	p = 0.313
SP500 Stock Price Index	-0.001 (+/- 0.0002)
	p = 0.002***
Moody's AAA Curve	-2.973 (+/- 0.599)
	p = 0.00003***
Real GDP growth	0.309 (+/- 0.059)
	p = 0.00002***
Nominal GDP growth	-0.284 (+/- 0.055)
	p = 0.00002***
Home Price Index	0.036 (+/- 0.006)
	p = 0.00001***
LN_30-year Treasury Yield	11.201 (+/- 3.677)
	p = 0.005***
20-year Treasury Yield	3.806 (+/- 0.796)
	p = 0.00005***
LN_20-year Treasury Yield	-16.425 (+/- 3.970)
	p = 0.0003***
LN_7-year Treasury Yield	3.841 (+/- 0.733)
	p = 0.00002***
Observations	40
R^2	0.972
Adjusted R^2	0.964
Residual Std. Error	0.360 (df = 30)
F Statistic	115.868*** (df = 9; 30)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 6-MONTH TREASURY YIELD

	Dependent variable (+/- SE):
	6-month Treasury Yield
Constant	-6.941 (+/- 2.685)
	p = 0.016**
Moody's AAA Curve	-1.794 (+/- 0.494)
	p = 0.002***
Nominal GDP growth	-0.089 (+/- 0.014)
	p = 0.00000***
Unemployment Rate	-0.913 (+/- 0.110)
	p = 0.000***
CPI Inflation Rate	-0.137 (+/- 0.032)
	p = 0.0002***
Dow Total Stock Market Index	0.0001 (+/- 0.00001)
	p = 0.00001***
30-year Treasury Yield	-16.510 (+/- 3.669)
	p = 0.0002***
LN_30-year Treasury Yield	50.146 (+/- 9.468)
	p = 0.00002***
10-year Treasury Yield	52.433 (+/- 8.637)
	p = 0.00001***
LN_10-year Treasury Yield	-68.943 (+/- 9.314)
	p = 0.00000***
7-year Treasury Yield	-32.196 (+/- 6.029)
	p = 0.00002***
LN_7-year Treasury Yield	30.078 (+/- 5.055)
	p = 0.00001***
7-year Treasury Yield_2	3.488 (+/- 0.720)
	p = 0.0001***
10-year Treasury Yield_2	-4.019 (+/- 0.980)
	p = 0.0004***
Observations	40
R^2	0.987
Adjusted R^2	0.980
Residual Std. Error	0.269 (df = 26)
F Statistic	150.633*** (df = 13; 26)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 1-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	1-year Treasury Yield
Constant	0.033 (+/- 0.515)
	p = 0.950
Moody's AAA Curve	-2.582 (+/- 0.377)
	p = 0.00000***
Real GDP growth	0.089 (+/- 0.026)
	p = 0.002***
Nominal GDP growth	-0.083 (+/- 0.024)
	p = 0.002***
30-year Mortgate Rate	1.982 (+/- 0.234)
	p = 0.000***
LN_30-year Treasury Yield	4.140 (+/- 1.393)
	p = 0.006***
20-year Treasury Yield	-1.905 (+/- 0.553)
	p = 0.002***
10-year Treasury Yield	1.623 (+/- 0.540)
	p = 0.006***
Observations	40
R^2	0.984
Adjusted R^2	0.980
Residual Std. Error	0.252 (df = 32)
F Statistic	278.309*** (df = 7; 32)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 3-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	3-year Treasury Yield
Constant	4.812 (+/- 1.955)
	p = 0.021**
Moody's AAA Curve	-1.616 (+/- 0.303)
	p = 0.00001***
Moody's BAA Curve	-0.870 (+/- 0.200)
	p = 0.0002***
Unemployment Rate	-0.191 (+/- 0.025)
	p = 0.00000***
BBB corporate yield	1.563 (+/- 0.143)
	p = 0.000***
30-year Treasury Yield	-32.442 (+/- 8.198)
	p = 0.0005***
LN_30-year Treasury Yield	45.787 (+/- 11.324)
	p = 0.0004***
20-year Treasury Yield	28.384 (+/- 5.578)
	p = 0.00002***
LN_20-year Treasury Yield	-37.112 (+/- 7.331)
	p = 0.00003***
20-year Treasury Yield_2	-2.554 (+/- 0.514)
	p = 0.00003***
30-year Treasury Yield_2	3.066 (+/- 0.729)
	p = 0.0003***
Observations	40
R^2	0.995
Adjusted R^2	0.994
Residual Std. Error	0.115 (df = 29)
F Statistic	599.067*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 5-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	5-year Treasury Yield
Constant	-11.393 (+/- 1.757)
	p = 0.00000***
Real GDP growth	-0.020 (+/- 0.005)
	p = 0.0003***
Unemployment Rate	-0.277 (+/- 0.044)
	p = 0.00000***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	0.269 (+/- 0.070)
	p = 0.001***
30-year Treasury Yield	17.951 (+/- 2.657)
	p = 0.00000***
LN_30-year Treasury Yield	-25.285 (+/- 3.778)
	p = 0.00000***
30-year Treasury Yield_2	-1.326 (+/- 0.224)
	p = 0.00001***
Observations	40
R^2	0.978
Adjusted R^2	0.974
Residual Std. Error	0.200 (df = 33)
F Statistic	246.281*** (df = 6; 33)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 7-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	7-year Treasury Yield
Constant	1.067 (+/- 0.346)
	p = 0.005***
SP500 Stock Price Index	0.001 (+/- 0.0001)
	p = 0.000***
Real GDP growth	-0.129 (+/- 0.021)
	p = 0.00000***
Nominal GDP growth	0.125 (+/- 0.019)
	p = 0.00000***
BBB corporate yield	0.784 (+/- 0.056)
	p = 0.000***
Home Price Index	-0.019 (+/- 0.003)
	p = 0.00000***
LN_Market Volatility Index	-0.253 (+/- 0.072)
	p = 0.002***
6-month Treasury Yield	0.277 (+/- 0.045)
	p = 0.00000***
Observations	40
R^2	0.986
Adjusted R^2	0.983
Residual Std. Error	0.147 (df = 32)
F Statistic	330.055*** (df = 7; 32)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 10-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	10-year Treasury Yield
Constant	5.229 (+/- 0.395)
	p = 0.000***
SP500 Stock Price Index	0.0004 (+/- 0.0001)
	p = 0.00001***
Unemployment Rate	-0.124 (+/- 0.024)
	p = 0.00001***
Commercial Real Estate Price Index	-0.017 (+/- 0.002)
	p = 0.000***
1-month Treasury Yield	-0.604 (+/- 0.097)
	p = 0.00000***
LN_6-month Treasury Yield	-0.256 (+/- 0.058)
	p = 0.0001***
1-year Treasury Yield	1.361 (+/- 0.122)
	p = 0.000***
Observations	40
R^2	0.970
Adjusted R^2	0.964
Residual Std. Error	0.201 (df = 33)
F Statistic	175.244*** (df = 6; 33)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 20-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	20-year Treasury Yield
Constant	0.396 (+/- 0.147)
	p = 0.012**
US Fed Reserve O-N Loan Rate	2.039 (+/- 0.475)
	p = 0.0002***
1-month Treasury Yield	-1.617 (+/- 0.468)
	p = 0.002***
3-year Treasury Yield	1.719 (+/- 0.137)
	p = 0.000***
1-year Treasury Yield	-0.973 (+/- 0.167)
	p = 0.00001***
LN_1-year Treasury Yield	-0.354 (+/- 0.057)
	p = 0.00000***
Observations	40
R^2	0.975
Adjusted R^2	0.971
Residual Std. Error	0.168 (df = 34)
F Statistic	262.724*** (df = 5; 34)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR 30-YEAR TREASURY YIELD

	Dependent variable (+/- SE):
	30-year Treasury Yield
Constant	0.436 (+/- 0.190)
	p = 0.029**
US Fed Reserve O-N Loan Rate	0.260 (+/- 0.037)
	p = 0.00000***
BBB corporate yield	0.275 (+/- 0.051)
	p = 0.00001***
LN_5-year Treasury Yield	2.028 (+/- 0.233)
	p = 0.000***
LN_3-year Treasury Yield	-1.402 (+/- 0.165)
	p = 0.000***
3-year Treasury Yield_2	-0.228 (+/- 0.039)
	p = 0.00001***
5-year Treasury Yield_2	0.251 (+/- 0.044)
	p = 0.00001***
Observations	40
R^2	0.984
Adjusted R^2	0.982
Residual Std. Error	0.117 (df = 33)
F Statistic	346.014*** (df = 6; 33)
Note:	*p<0.1; **p<0.05; ***p<0.01

30-year Mortgage Rate

REGRESSION FOR 30-YEAR MORTGATE RATE

	Dependent variable (+/- SE):
	30-year Mortgate Rate
Constant	4.115 (+/- 0.279)
	p = 0.000***
Dow Total Stock Market Index	-0.00005 (+/- 0.00001)
	p = 0.00001***
Home Price Index	0.023 (+/- 0.003)
	p = 0.000***
Commercial Real Estate Price Index	-0.016 (+/- 0.002)
	p = 0.000***
LN_6-month Treasury Yield	-0.724 (+/- 0.126)
	p = 0.00001***
1-year Treasury Yield	0.651 (+/- 0.054)
	p = 0.000***
LN_1-year Treasury Yield	0.731 (+/- 0.148)
	p = 0.00003***
Observations	40
R^2	0.988
Adjusted R^2	0.986
Residual Std. Error	0.162 (df = 33)
F Statistic	459.062*** (df = 6; 33)
Note:	*p<0.1; **p<0.05; ***p<0.01

Moody's AAA & BAA Rates

REGRESSION FOR MOODY'S AAA CURVE

	Dependent variable (+/- SE):
	Moody's AAA Curve
Constant	2.127 (+/- 0.201)
	p = 0.000***
US Fed Reserve O-N Loan Rate	2.335 (+/- 0.510)
	p = 0.0001***
Real GDP growth	0.270 (+/- 0.047)
	p = 0.00001***
Nominal GDP growth	-0.269 (+/- 0.048)
	p = 0.00001***
Real disposable income growth	-0.170 (+/- 0.050)
	p = 0.003***
Nominal disposable income growth	0.165 (+/- 0.048)
	p = 0.002***
1-month Treasury Yield	-2.880 (+/- 0.484)
	p = 0.00001***
3-year Treasury Yield	1.288 (+/- 0.102)
	p = 0.000***
LN_1-year Treasury Yield	-0.309 (+/- 0.083)
	p = 0.001***
3-month Treasury Yield_2	-0.152 (+/- 0.035)
	p = 0.0002***
1-month Treasury Yield_2	0.184 (+/- 0.029)
	p = 0.00000***
Observations	40
R^2	0.972
Adjusted R^2	0.962
Residual Std. Error	0.160 (df = 29)
F Statistic	99.599*** (df = 10; 29)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR MOODY'S BAA CURVE

	Dependent variable (+/- SE):
	Moody's BAA Curve
Constant	0.274 (+/- 0.577)
	p = 0.639
SP500 Stock Price Index	-0.001 (+/- 0.0001)
	p = 0.00000***
Real GDP growth	0.126 (+/- 0.025)
	p = 0.00003***
Nominal GDP growth	-0.119 (+/- 0.023)
	p = 0.00002***
Home Price Index	0.018 (+/- 0.004)
	p = 0.00002***
LN_Market Volatility Index	0.309 (+/- 0.111)
	p = 0.010***
7-year Treasury Yield	1.626 (+/- 0.201)
	p = 0.000***
3-year Treasury Yield	-0.862 (+/- 0.180)
	p = 0.00004***
Observations	40
R^2	0.946
Adjusted R^2	0.934
Residual Std. Error	0.218 (df = 32)
F Statistic	80.052*** (df = 7; 32)
Note:	*p<0.1; **p<0.05; ***p<0.01

BBB Corporate Yield

REGRESSION FOR BBB CORPORATE YIELD

	Dependent variable (+/- SE):
	BBB corporate yield
Constant	0.633 (+/- 0.519)
	p = 0.233
US Fed Reserve O-N Loan Rate	-0.360 (+/- 0.061)
	p = 0.00001***
Real GDP growth	0.085 (+/- 0.019)
	p = 0.0002***
Nominal GDP growth	-0.072 (+/- 0.019)
	p = 0.001***
Unemployment Rate	0.220 (+/- 0.046)
	p = 0.00004***
LN_30-year Treasury Yield	2.821 (+/- 0.448)
	p = 0.00000***
LN_3-year Treasury Yield	0.707 (+/- 0.111)
	p = 0.00000***
3-year Treasury Yield_2	0.316 (+/- 0.041)
	p = 0.000***
7-year Treasury Yield_2	-0.282 (+/- 0.057)
	p = 0.00003***
Market Volatility Index_2	0.0001 (+/- 0.00003)
	p = 0.002***
Observations	40
R^2	0.980
Adjusted R^2	0.974
Residual Std. Error	0.178 (df = 30)
F Statistic	163.834*** (df = 9; 30)
Note:	*p<0.1; **p<0.05; ***p<0.01

Prime Rate

REGRESSION FOR PRIME RATE

	Dependent variable (+/- SE):
	Prime Rate
Constant	-1.683 (+/- 0.397)
	p = 0.0002***
Real GDP growth	0.477 (+/- 0.049)
	p = 0.000***
Nominal GDP growth	-0.437 (+/- 0.044)
	p = 0.000***
Home Price Index	0.029 (+/- 0.002)
	p = 0.000***
LN_7-year Treasury Yield	1.325 (+/- 0.168)
	p = 0.000***
Observations	40
R^2	0.937
Adjusted R^2	0.930
Residual Std. Error	0.497 (df = 35)
F Statistic	130.855*** (df = 4; 35)
Note:	*p<0.1; **p<0.05; ***p<0.01

US Average Retail Gasoline Price

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

	Dependent variable (+/- SE):
	US Avg Retail Gasoline Price ($-gal; all grades, all formulations)
Constant	-40.421 (+/- 3.011)
	p = 0.00002***
US Fed Reserve O-N Loan Rate	-11.436 (+/- 0.889)
	p = 0.00002***
Moody's AAA Curve	8.536 (+/- 0.553)
	p = 0.00001***
Real GDP growth	-0.231 (+/- 0.043)
	p = 0.002***
Nominal GDP growth	0.317 (+/- 0.040)
	p = 0.0003***
Real disposable income growth	0.877 (+/- 0.061)
	p = 0.00001***
Nominal disposable income growth	-0.826 (+/- 0.058)
	p = 0.00001***
Unemployment Rate	0.472 (+/- 0.091)
	p = 0.003***
CPI Inflation Rate	0.514 (+/- 0.038)
	p = 0.00002***
BBB corporate yield	-3.202 (+/- 0.206)
	p = 0.00001***
Prime Rate	8.349 (+/- 0.744)
	p = 0.00003***
Home Price Index	-0.018 (+/- 0.003)
	p = 0.002***
Commercial Real Estate Price Index	0.036 (+/- 0.004)
	p = 0.0002***
Market Volatility Index	0.049 (+/- 0.006)
	p = 0.0002***
LN_Market Volatility Index	-0.912 (+/- 0.147)
	p = 0.001***
LN_30-year Treasury Yield	10.871 (+/- 2.007)
	p = 0.002***
LN_20-year Treasury Yield	-13.544 (+/- 1.514)
	p = 0.0002***

10-year Treasury Yield	-19.069 (+/- 2.274)
	p = 0.0002***
LN_10-year Treasury Yield	37.002 (+/- 4.224)
	p = 0.0002***
LN_1-month Treasury Yield	-0.483 (+/- 0.083)
	p = 0.002***
7-year Treasury Yield	16.353 (+/- 1.655)
	p = 0.0001***
LN_7-year Treasury Yield	-30.643 (+/- 2.909)
	p = 0.00005***
3-month Treasury Yield	7.150 (+/- 0.679)
	p = 0.00005***
LN_5-year Treasury Yield	-5.954 (+/- 0.838)
	p = 0.0004***
6-month Treasury Yield	-7.867 (+/- 0.705)
	p = 0.00004***
LN_6-month Treasury Yield	4.129 (+/- 0.342)
	p = 0.00002***
3-year Treasury Yield	-4.379 (+/- 0.734)
	p = 0.001***
LN_3-year Treasury Yield	12.858 (+/- 1.014)
	p = 0.00002***
1-year Treasury Yield	6.540 (+/- 0.715)
	p = 0.0001***
LN_1-year Treasury Yield	-7.288 (+/- 0.522)
	p = 0.00001***
1-year Treasury Yield_2	-1.020 (+/- 0.117)
	p = 0.0002***
6-month Treasury Yield_2	0.712 (+/- 0.094)
	p = 0.0003***
5-year Treasury Yield_2	0.915 (+/- 0.083)
	p = 0.00004***
30-year Treasury Yield_2	-0.738 (+/- 0.121)
	p = 0.001***
Observations	40
R^2	0.999
Adjusted R^2	0.995
Residual Std. Error	0.045 (df = 6)
F Statistic	226.369*** (df = 33; 6)

Note: *p<0.1; **p<0.05; ***p<0.01

US Federal Reserve Overnight Lending Rate

REGRESSION FOR US FED RESERVE O-N LOAN RATE

	Dependent variable (+/- SE):
	US Fed Reserve O-N Loan Rate
Constant	-6.797 (+/- 2.138)
	p = 0.004***
Moody's AAA Curve	-2.907 (+/- 0.551)
	p = 0.00001***
CPI Inflation Rate	-0.139 (+/- 0.039)
	p = 0.002***
Commercial Real Estate Price Index	0.026 (+/- 0.005)
	p = 0.00003***
LN_30-year Treasury Yield	21.236 (+/- 3.829)
	p = 0.00001***
20-year Treasury Yield	5.276 (+/- 0.628)
	p = 0.000***
LN_20-year Treasury Yield	-28.077 (+/- 4.027)
	p = 0.00000***
LN_7-year Treasury Yield	3.989 (+/- 0.763)
	p = 0.00002***
Observations	40
R^2	0.962
Adjusted R^2	0.954
Residual Std. Error	0.405 (df = 32)
F Statistic	116.006*** (df = 7; 32)
Note:	*p<0.1; **p<0.05; ***p<0.01

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

REGRESSION FOR DOW TOTAL STOCK MARKET INDEX

	Dependent variable (+/- SE):
	Dow Total Stock Market Index
Constant	97,879.910 (+/- 9,703.190)
	p = 0.000***
Moody's AAA Curve	-19,296.130 (+/- 2,814.191)
	p = 0.00000***
Real disposable income growth	-1,474.545 (+/- 289.367)
	p = 0.00003***
Nominal disposable income growth	1,387.392 (+/- 282.943)
	p = 0.00004***
Unemployment Rate	2,218.750 (+/- 652.386)
	p = 0.003***
7-year Treasury Yield	-38,062.510 (+/- 8,262.006)
	p = 0.0001***
LN_7-year Treasury Yield	41,164.780 (+/- 8,941.571)
	p = 0.0001***
1-year Treasury Yield_2	-7,084.111 (+/- 1,208.329)
	p = 0.00001***
3-year Treasury Yield_2	6,613.823 (+/- 1,382.591)
	p = 0.0001***
3-month Treasury Yield_2	6,877.108 (+/- 1,433.580)
	p = 0.00005***
1-month Treasury Yield_2	-2,540.540 (+/- 822.365)
	p = 0.005***
20-year Treasury Yield_2	4,028.921 (+/- 723.061)
	p = 0.00001***
Observations	40
R^2	0.964
Adjusted R^2	0.950
Residual Std. Error	2,462.602 (df = 28)
F Statistic	69.076*** (df = 11; 28)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR SP500 STOCK PRICE INDEX

	Dependent variable (+/- SE):
	SP500 Stock Price Index
Constant	10,584.590 (+/- 1,073.143)
	p = 0.00000***
Moody's BAA Curve	3,372.823 (+/- 539.745)
	p = 0.00001***
Real GDP growth	-442.736 (+/- 70.474)
	p = 0.00001***
Nominal GDP growth	472.813 (+/- 71.730)
	p = 0.00001***
Nominal disposable income growth	-13.727 (+/- 3.129)
	p = 0.0005***
Unemployment Rate	388.014 (+/- 89.512)
	p = 0.0005***
CPI Inflation Rate	-259.781 (+/- 54.396)
	p = 0.0002***
BBB corporate yield	-3,322.849 (+/- 511.068)
	p = 0.00001***
LN_30-year Treasury Yield	-9,341.784 (+/- 2,126.854)
	p = 0.0004***
LN_20-year Treasury Yield	-22,234.160 (+/- 4,123.234)
	p = 0.00005***
10-year Treasury Yield	-6,340.699 (+/- 1,104.255)
	p = 0.00003***
LN_10-year Treasury Yield	21,637.920 (+/- 3,092.964)
	p = 0.00001***
3-month Treasury Yield	3,764.953 (+/- 822.205)
	p = 0.0003***
6-month Treasury Yield	-8,558.827 (+/- 1,679.650)
	p = 0.0001***
LN_6-month Treasury Yield	2,058.179 (+/- 308.363)
	p = 0.00001***
3-year Treasury Yield	5,295.320 (+/- 845.403)
	p = 0.00001***
1-year Treasury Yield	4,152.362 (+/- 1,348.406)
	p = 0.007***
LN_1-year Treasury Yield	-3,063.130 (+/- 417.239)

	p = 0.00001***
1-year Treasury Yield_2	-794.313 (+/- 154.913)
	p = 0.0001***
6-month Treasury Yield_2	1,170.073 (+/- 189.006)
	p = 0.00001***
5-year Treasury Yield_2	-881.369 (+/- 158.692)
	p = 0.00004***
1-month Treasury Yield_2	-419.515 (+/- 68.824)
	p = 0.00002***
20-year Treasury Yield_2	1,640.190 (+/- 187.202)
	p = 0.00000***
Observations	40
R^2	0.993
Adjusted R^2	0.983
Residual Std. Error	141.586 (df = 17)
F Statistic	104.659*** (df = 22; 17)
Note:	*p<0.1; **p<0.05; ***p<0.01

House and Commercial Real Estate Price Indexes

REGRESSION FOR HOME PRICE INDEX

	Dependent variable (+/- SE):
	Home Price Index
Constant	5.004 (+/- 50.076)
	p = 0.923
US Fed Reserve O-N Loan Rate	-256.823 (+/- 23.912)
	p = 0.00001***
Moody's AAA Curve	227.296 (+/- 14.755)
	p = 0.00000***
Moody's BAA Curve	177.462 (+/- 10.721)
	p = 0.00000***
Real GDP growth	-23.420 (+/- 1.652)
	p = 0.00000***
Nominal GDP growth	23.187 (+/- 1.620)
	p = 0.00000***
Real disposable income growth	13.641 (+/- 1.373)
	p = 0.00001***
Nominal disposable income growth	-13.764 (+/- 1.345)
	p = 0.00001***
Unemployment Rate	15.268 (+/- 1.333)
	p = 0.00001***
BBB corporate yield	-257.841 (+/- 14.742)
	p = 0.00000***
30-year Mortgate Rate	48.340 (+/- 6.790)
	p = 0.0002***
Prime Rate	207.194 (+/- 14.088)
	p = 0.00000***
LN_Market Volatility Index	8.748 (+/- 1.235)
	p = 0.0002***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	-31.111 (+/- 2.320)
	p = 0.00000***
LN_30-year Treasury Yield	-853.692 (+/- 44.768)
	p = 0.00000***
20-year Treasury Yield	-1,616.356 (+/- 88.943)
	p = 0.00000***
LN_20-year Treasury Yield	1,596.889 (+/- 116.121)
	p = 0.00000***

10-year Treasury Yield	792.157 (+/- 47.086)
	p = 0.00000***
1-month Treasury Yield	-173.570 (+/- 8.992)
	p = 0.00000***
LN_1-month Treasury Yield	21.823 (+/- 1.831)
	p = 0.00001***
LN_7-year Treasury Yield	-379.435 (+/- 42.441)
	p = 0.00002***
3-month Treasury Yield	234.615 (+/- 19.896)
	p = 0.00001***
5-year Treasury Yield	-193.901 (+/- 17.946)
	p = 0.00001***
LN_5-year Treasury Yield	299.328 (+/- 31.004)
	p = 0.00002***
LN_6-month Treasury Yield	29.107 (+/- 4.780)
	p = 0.0003***
3-year Treasury Yield	189.805 (+/- 10.331)
	p = 0.00000***
LN_1-year Treasury Yield	-111.182 (+/- 6.348)
	p = 0.00000***
3-year Treasury Yield_2	-17.730 (+/- 1.643)
	p = 0.00001***
3-month Treasury Yield_2	5.734 (+/- 0.380)
	p = 0.00000***
7-year Treasury Yield_2	48.780 (+/- 6.149)
	p = 0.00005***
10-year Treasury Yield_2	-140.230 (+/- 8.321)
	p = 0.00000***
20-year Treasury Yield_2	169.612 (+/- 7.597)
	p = 0.00000***
Observations	40
R^2	1.000
Adjusted R^2	0.999
Residual Std. Error	1.262 (df = 8)
F Statistic	2,174.686*** (df = 31; 8)
Note:	*p<0.1; **p<0.05; ***p<0.01

REGRESSION FOR COMMERCIAL REAL ESTATE PRICE INDEX

	Dependent variable (+/- SE):
	Commercial Real Estate Price Index
Constant	250.603 (+/- 38.803)
	p = 0.00001***
US Fed Reserve O-N Loan Rate	57.899 (+/- 15.755)
	p = 0.002***
Real GDP growth	-2.927 (+/- 0.911)
	p = 0.005***
Nominal GDP growth	2.933 (+/- 0.825)
	p = 0.002***
Market Volatility Index	-1.184 (+/- 0.230)
	p = 0.00005***
LN_Market Volatility Index	36.476 (+/- 7.313)
	p = 0.0001***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	14.226 (+/- 4.853)
	p = 0.009***
30-year Treasury Yield	268.056 (+/- 74.170)
	p = 0.002***
LN_30-year Treasury Yield	-1,010.505 (+/- 163.784)
	p = 0.00001***
10-year Treasury Yield	-178.461 (+/- 47.512)
	p = 0.002***
LN_10-year Treasury Yield	442.594 (+/- 75.340)
	p = 0.00001***
1-month Treasury Yield	-59.164 (+/- 15.528)
	p = 0.002***
5-year Treasury Yield	151.268 (+/- 32.799)
	p = 0.0002***
LN_5-year Treasury Yield	-96.381 (+/- 26.586)
	p = 0.002***
LN_6-month Treasury Yield	28.206 (+/- 6.490)
	p = 0.0004***
LN_1-year Treasury Yield	-33.503 (+/- 9.476)
	p = 0.003***
1-year Treasury Yield_2	14.615 (+/- 1.335)
	p = 0.000***
5-year Treasury Yield_2	-33.621 (+/- 3.629)

	p = 0.000***
3-month Treasury Yield_2	-7.494 (+/- 1.103)
	p = 0.00001***
20-year Treasury Yield_2	15.736 (+/- 3.560)
	p = 0.0003***
Observations	40
R^2	0.993
Adjusted R^2	0.986
Residual Std. Error	4.125 (df = 20)
F Statistic	146.443*** (df = 19; 20)
Note:	*p<0.1; **p<0.05; ***p<0.01

Market Volatility Index

REGRESSION FOR MARKET VOLATILITY INDEX

	Dependent variable (+/- SE):
	Market Volatility Index
Constant	1,128.019 (+/- 111.119)
	p = 0.00000***
US Fed Reserve O-N Loan Rate	210.654 (+/- 30.979)
	p = 0.00003***
Moody's AAA Curve	-152.996 (+/- 16.677)
	p = 0.00001***
Nominal GDP growth	-0.493 (+/- 0.092)
	p = 0.0003***
Real disposable income growth	-13.049 (+/- 2.284)
	p = 0.0002***
Nominal disposable income growth	11.990 (+/- 2.157)
	p = 0.0002***
CPI Inflation Rate	-13.312 (+/- 1.655)
	p = 0.00001***
BBB corporate yield	50.886 (+/- 6.286)
	p = 0.00001***
30-year Mortgate Rate	31.282 (+/- 8.484)
	p = 0.004***
Prime Rate	-295.470 (+/- 28.072)
	p = 0.00000***
Dow Total Stock Market Index	-0.004 (+/- 0.0004)
	p = 0.00000***
Home Price Index	2.443 (+/- 0.185)
	p = 0.00000***
Commercial Real Estate Price Index	-1.262 (+/- 0.133)
	p = 0.00001***
US Avg Retail Gasoline Price ($-gal; all grades, all formulations)	29.520 (+/- 3.832)
	p = 0.00001***
30-year Treasury Yield	580.881 (+/- 64.854)
	p = 0.00001***
LN_30-year Treasury Yield	-1,295.930 (+/- 136.247)
	p = 0.00001***
20-year Treasury Yield	-382.999 (+/- 59.398)
	p = 0.00005***

LN_20-year Treasury Yield	591.828 (+/- 113.970)
	p = 0.0003***
1-month Treasury Yield	227.632 (+/- 24.976)
	p = 0.00001***
LN_7-year Treasury Yield	452.801 (+/- 39.779)
	p = 0.00000***
3-month Treasury Yield	-130.871 (+/- 23.752)
	p = 0.0002***
5-year Treasury Yield	-105.399 (+/- 11.869)
	p = 0.00001***
LN_6-month Treasury Yield	-90.918 (+/- 5.893)
	p = 0.000***
LN_3-year Treasury Yield	-227.069 (+/- 17.270)
	p = 0.00000***
LN_1-year Treasury Yield	174.618 (+/- 10.698)
	p = 0.000***
3-month Treasury Yield_2	19.235 (+/- 3.381)
	p = 0.0002***
7-year Treasury Yield_2	-17.731 (+/- 3.009)
	p = 0.0002***
1-month Treasury Yield_2	-23.230 (+/- 3.000)
	p = 0.00001***
10-year Treasury Yield_2	23.514 (+/- 3.359)
	p = 0.00003***
Observations	40
R^2	0.992
Adjusted R^2	0.973
Residual Std. Error	2.114 (df = 11)
F Statistic	50.812*** (df = 28; 11)
Note:	*p<0.1; **p<0.05; ***p<0.01

Appendix A: Data Sources

The following table lists the attributes provided by Capitalytics as part of its macro-economic forecast service. The sources for data that are defined by the document "2025 Stress Test Scenarios" (found at https://www.federalreserve.gov/publications/files/2025-stress-test-scenarios-20250205.pdf) are listed. Please note that shaded attributes are not discussed within this report.

Table 16: Data Values and Referenced Sources

Attribute	Referenced Source[96]
Real GDP growth	Bureau of Economic Analysis (NIPA table 1.1.6, line 1)
Nominal GDP growth	Bureau of Economic Analysis (NIPA table 1.1.5, line 1)
Real disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27, and NIPA table 1.1.4, line 2)
Nominal disposable income growth	Bureau of Economic Analysis (NIPA table 2.1, line 27)
Unemployment rate	Bureau of Labor Statistics (series LNS14000000)
CPI inflation rate	Bureau of Labor Statistics (series CUSR0000SA0)
3-month Treasury yield	Quarterly average of 3-month Treasury bill secondary market rate on a discount basis, H.15 Release, Selected Interest Rates, Federal Reserve Board (series RIFSGFSM03_N.B)
5-year Treasury yield	Quarterly average of the yield on 5-year U.S. Treasury bonds, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see Lars E. O. Svensson (1995), "Estimating Forward Interest Rates with the Extended Nelson-Siegel Method," Quarterly Review, no. 3, Sveriges Riksbank, pp. 13–26
10-year Treasury yield	Quarterly average of the yield on 10-year U.S. Treasury bonds, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see Lars E. O. Svensson (1995), "Estimating Forward Interest Rates with the Extended Nelson-Siegel Method," Quarterly Review, no. 3, Sveriges Riksbank, pp. 13–26
BBB corporate yield	Ice Data Indices, LLC, ICE BofA BBB US Corporate Index Effective Yield [BAMLC0A4CBBBEY], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/BAMLC0A4CBBBEY[97]

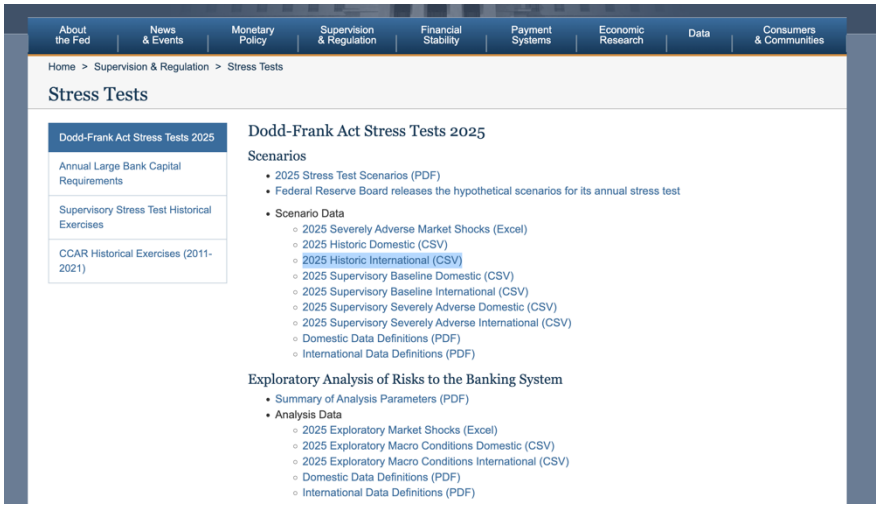
[96] Per https://www.federalreserve.gov/newsevents/pressreleases/files/bcreg20190213a1.pdf

[97] 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. 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.

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).
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).
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 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/2025-Table_1A_Historic_Domestic.csv and https://www.federalreserve.gov/supervisionreg/files/2025-Table_1B_Historic_International.csv (shown below, as of March 2025) by clicking the links marked "2025 Historical Domestic (CSV)" and "2025 Historical International (CSV)"[98].



Since the CCAR dataset is only released annually (through 4Q2024 as of this writing), and Capitalytics provides quarterly updates to its forecasts, the CCAR dataset is supplemented by the data sources shown below on a quarterly basis.

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

Table 17: Supplementary Data Sources for Data Attributes

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

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

While all data that is required for the Annual Stress Tests is available from at https://www.federalreserve.gov/supervisionreg/files/2024-Table_2A_Historic_Domestic.csv and https://www.federalreserve.gov/supervisionreg/files/2024-Table_2B_Historic_International.csv, Capitalytics provides 13 additional metrics per the information in the following table. These values are available from the point at which they are collected (which varies from metric to metric) through (and including) 3Q2024.

Table 17: Supplementary Data Attributes and Sources

Attribute	Capitalytics' Source
1-month Treasury yield	https://fred.stlouisfed.org/series/dgs1mo
6-month Treasury yield	https://fred.stlouisfed.org/series/dgs6mo
1-year Treasury yield	https://fred.stlouisfed.org/series/dgs1
3-year Treasury yield	https://fred.stlouisfed.org/series/dgs3
7-year Treasury yield	https://fred.stlouisfed.org/series/dgs7
20-year Treasury yield	https://fred.stlouisfed.org/series/dgs20
30-year Treasury yield	https://fred.stlouisfed.org/series/dgs30
US Average Retail Gasoline Price ($/gal; all grades, all formulations)	https://fred.stlouisfed.org/series/gasallm
S&P 500 Stock Price Index	https://fred.stlouisfed.org/series/sp500

Primary Credit	https://fred.stlouisfed.org/series/FEDFUNDS
Moody's AAA Rate	https://fred.stlouisfed.org/series/aaa
Moody's BAA Rate	https://fred.stlouisfed.org/series/baa
Dow Jones Total Industrial Average	https://fred.stlouisfed.org/series/djia

Appendix B: Methodologies

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

Section I: General Forecasting Methodology

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

For each metric, four distinct forecasts are produced.

1. The first forecast uses the full quarterly history of the metric as an input to an additive exponential smoothing representation. The process that is executed is that provided by R's[99] "forecast" package[100]; specifically, the "ets" function (see p.39 of https://cran.r-project.org/web/packages/forecast/forecast.pdf)[101] is designed to automatically determine the best fitting representation out of the "Generic 'ETS' Methodology" (discussed later in this section), including optimal parameters thereto, given a sequence of values. In our work, we have restricted our study to only "additive" forms (i.e., we set "`additive.only=TRUE`" in our calls), and our optimization criteria is set to the mean of absolute residuals (i.e., "`opt.crit=mae`"). Therefore, calls to generate our estimates through this procedure look something like the following command, where "s" is an appropriately populated array, vector, time series, or similar object.

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

   The results of this call are shown above each dataset, including the representation type returned (as described later this section), the initial values that are used by the software, the optimal smoothing parameters estimated, and the *n+1*st forecasted value given the first *n* values of the metric's sequence (the "fitted" values)[102], 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

[99] As of this writing, v.4.1.2 of the "R" language is available at https://cran.r-project.org/.

[100] As of this writing, v.8.16 of the forecast package is available at https://CRAN.R-project.org/package=forecast.

[101] 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.

[102] 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)[103].

2. The second forecast uses the differences between successive quarterly values in order to forecast the future quarterly differences. It should be noted that these sequences are (obviously) one data-point shorter than those in the preceding procedure. These values are forecasted using the same procedure as described in the first section, with forecasted values for the actual metric being built using the last known value for the metric and forecasts of incremental changes to the metric provided.

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

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

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

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

3. The third forecast uses the sequence of numbers from the second forecast, but partitions the dataset based on the quarter in which they are incurred. Assuming that the differences between quarters are associated with the ending points of each quarter (i.e., the difference between third and fourth quarter values are associated with a date of December 31st), four sequences of numbers are now created, with annual forecasts now being produced for each sequence using the same procedures as previously outlined. The final sequence appropriately interleaves the forecasted data-points.

4. The fourth forecast builds three sequences of values based the history of the metric to an observed point:

   - the slope of the "best fitting" line (based on minimizing the total absolute error) using the immediately preceding 2 years of values[104];
   - 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

[103] It bears noting that a lower value for the "score" indicates better accuracy of an algorithm.
[104] 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 slopes[105].

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.

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

[105] See the SP500 metric's analysis.

In this study, the relevance of quarterly samples more than 3 years old is eliminated by setting the number of terms in this type of expression to no more than 13.
The challenge with these forecasting techniques is to estimate the value of α such that some criteria is optimized, e.g., minimizing the sum of squared errors (SSE), across all values of a set of historical values. There are other forms of exponential smoothing methods that may account for any combination of forecasting *levels* (as in the Theta method), *trends* (for which a metric may, for instance, be growing or lessening according to a linear or higher order function), and *seasonality* (for which a metric may have engrained "cycles" on, e.g., a monthly, quarterly, or annual basis).

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

Table 18: Mathematical Methods Associated with Trend & Seasonal Components

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

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

Section III: Regression Construction

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

Each output variable is considered in turn as the response variable, with all other variables as possibilities for the control (independent) variables *excluding* any variables that have an 80% correlation with the response variable. Successive linear regressions are built; if any of the control variables' p-

values exceed 5%, or if the model's p-value exceeds 5% and the number of considered control variables is greater than one, the most offensive control variable is dropped, and the regression is re-run.

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

Appendix C: Variable Correlations

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

Table 5: Correlation Factors found as of 4Q2024

Variable 1	Variable 2	Correlation
S&P 500 Stock Price Index	Cost of Federal Funds	0.631866
S&P 500 Stock Price Index	Prime Rate	0.643187
S&P 500 Stock Price Index	**Dow-Jones Total Stock Market Index**	**0.974873**
S&P 500 Stock Price Index	US Nat'l Residential Home Price Index	0.948682
S&P 500 Stock Price Index	US Nat'l Commercial Real Estate Index	0.824375
S&P 500 Stock Price Index	Average Retail Gasoline Price (all grades)	0.681591
S&P 500 Stock Price Index	1-month Treasury Yield	0.642256
S&P 500 Stock Price Index	3-month Treasury Yield	0.638269
S&P 500 Stock Price Index	6-month Treasury Yield	0.627872
S&P 500 Stock Price Index	1-year Treasury Yield	0.613234
Cost of Federal Funds	Moody's AAA Yield	0.760177
Cost of Federal Funds	Moody's BAA Yield	0.701848
Cost of Federal Funds	BofA BBB Corporate Yield	0.735566
Cost of Federal Funds	US 30-year Fixed Interest Mortgage Rate	0.868893
Cost of Federal Funds	**Prime Rate**	**0.99636**
Cost of Federal Funds	10-year Treasury Yield	0.826798
Cost of Federal Funds	**1-month Treasury Yield**	**0.991001**
Cost of Federal Funds	7-year Treasury Yield	0.77237
Cost of Federal Funds	**3-month Treasury Yield**	**0.995733**
Cost of Federal Funds	5-year Treasury Yield	0.904275
Cost of Federal Funds	**6-month Treasury Yield**	**0.988652**
Cost of Federal Funds	3-year Treasury Yield	0.921546
Cost of Federal Funds	**1-year Treasury Yield**	**0.979387**
Moody's AAA Yield	**Moody's BAA Yield**	**0.979171**
Moody's AAA Yield	BofA BBB Corporate Yield	0.947986
Moody's AAA Yield	**US 30-year Fixed Interest Mortgage Rate**	**0.960816**
Moody's AAA Yield	Prime Rate	0.735631
Moody's AAA Yield	Dow-Jones Total Stock Market Index	-0.688906
Moody's AAA Yield	US Nat'l Residential Home Price Index	-0.735594
Moody's AAA Yield	US Nat'l Commercial Real Estate Index	-0.823407
Moody's AAA Yield	Average Retail Gasoline Price (all grades)	-0.700886
Moody's AAA Yield	**30-year Treasury Yield**	**0.96814**
Moody's AAA Yield	**20-year Treasury Yield**	**0.967574**
Moody's AAA Yield	**10-year Treasury Yield**	**0.982911**
Moody's AAA Yield	7-year Treasury Yield	0.857081
Moody's AAA Yield	3-month Treasury Yield	0.75544
Moody's AAA Yield	5-year Treasury Yield	0.936481
Moody's AAA Yield	3-year Treasury Yield	0.625116
Moody's BAA Yield	**BofA BBB Corporate Yield**	**0.983351**
Moody's BAA Yield	US 30-year Fixed Interest Mortgage Rate	0.93287
Moody's BAA Yield	Prime Rate	0.676593
Moody's BAA Yield	Dow-Jones Total Stock Market Index	-0.711597
Moody's BAA Yield	US Nat'l Residential Home Price Index	-0.729878
Moody's BAA Yield	US Nat'l Commercial Real Estate Index	-0.803038
Moody's BAA Yield	Average Retail Gasoline Price (all grades)	-0.667798
Moody's BAA Yield	30-year Treasury Yield	0.867124
Moody's BAA Yield	20-year Treasury Yield	0.874563

Moody's BAA Yield	10-year Treasury Yield	0.945682
Moody's BAA Yield	7-year Treasury Yield	0.736106
Moody's BAA Yield	3-month Treasury Yield	0.695134
Moody's BAA Yield	5-year Treasury Yield	0.885069
Real GDP Growth Rate	**Nominal GDP Growth Rate**	**0.958544**
Real Disposable Income Growth Rate	**Nominal Disposable Income Growth Rate**	**0.973139**
US Nat'l Unemployment Rate (annualized)	6-month Treasury Yield	-0.602755
US Nat'l Unemployment Rate (annualized)	1-year Treasury Yield	-0.612498
BofA BBB Corporate Yield	US 30-year Fixed Interest Mortgage Rate	0.932472
BofA BBB Corporate Yield	Prime Rate	0.712876
BofA BBB Corporate Yield	Dow-Jones Total Stock Market Index	-0.628681
BofA BBB Corporate Yield	US Nat'l Residential Home Price Index	-0.639654
BofA BBB Corporate Yield	US Nat'l Commercial Real Estate Index	-0.704392
BofA BBB Corporate Yield	30-year Treasury Yield	0.773967
BofA BBB Corporate Yield	20-year Treasury Yield	0.810175
BofA BBB Corporate Yield	10-year Treasury Yield	0.925204
BofA BBB Corporate Yield	7-year Treasury Yield	0.734896
BofA BBB Corporate Yield	3-month Treasury Yield	0.730594
BofA BBB Corporate Yield	5-year Treasury Yield	0.883782
US 30-year Fixed Interest Mortgage Rate	Prime Rate	0.850426
US 30-year Fixed Interest Mortgage Rate	US Nat'l Commercial Real Estate Index	-0.663798
US 30-year Fixed Interest Mortgage Rate	30-year Treasury Yield	0.873945
US 30-year Fixed Interest Mortgage Rate	20-year Treasury Yield	0.920057
US 30-year Fixed Interest Mortgage Rate	**10-year Treasury Yield**	**0.982482**
US 30-year Fixed Interest Mortgage Rate	1-month Treasury Yield	0.74429
US 30-year Fixed Interest Mortgage Rate	**7-year Treasury Yield**	**0.956704**
US 30-year Fixed Interest Mortgage Rate	3-month Treasury Yield	0.873375
US 30-year Fixed Interest Mortgage Rate	**5-year Treasury Yield**	**0.978373**
US 30-year Fixed Interest Mortgage Rate	6-month Treasury Yield	0.767511
US 30-year Fixed Interest Mortgage Rate	3-year Treasury Yield	0.881183
US 30-year Fixed Interest Mortgage Rate	1-year Treasury Yield	0.791467
Prime Rate	10-year Treasury Yield	0.804055
Prime Rate	**1-month Treasury Yield**	**0.990836**
Prime Rate	7-year Treasury Yield	0.757558
Prime Rate	**3-month Treasury Yield**	**0.992508**
Prime Rate	5-year Treasury Yield	0.886301
Prime Rate	**6-month Treasury Yield**	**0.987563**
Prime Rate	3-year Treasury Yield	0.912055
Prime Rate	**1-year Treasury Yield**	**0.976484**
Dow-Jones Total Stock Market Index	US Nat'l Residential Home Price Index	0.93448
Dow-Jones Total Stock Market Index	US Nat'l Commercial Real Estate Index	0.896552
Dow-Jones Total Stock Market Index	Average Retail Gasoline Price (all grades)	0.605592
Dow-Jones Total Stock Market Index	10-year Treasury Yield	-0.606375
US Nat'l Residential Home Price Index	**US Nat'l Commercial Real Estate Index**	**0.957501**
US Nat'l Residential Home Price Index	Average Retail Gasoline Price (all grades)	0.713329
US Nat'l Residential Home Price Index	10-year Treasury Yield	-0.651336
US Nat'l Commercial Real Estate Index	Average Retail Gasoline Price (all grades)	0.749923
US Nat'l Commercial Real Estate Index	10-year Treasury Yield	-0.755003
US Nat'l Commercial Real Estate Index	5-year Treasury Yield	-0.650631
Average Retail Gasoline Price (all grades)	10-year Treasury Yield	-0.672375

Average Retail Gasoline Price (all grades)	5-year Treasury Yield	-0.639993
30-year Treasury Yield	**20-year Treasury Yield**	**0.990299**
30-year Treasury Yield	**10-year Treasury Yield**	**0.956456**
30-year Treasury Yield	7-year Treasury Yield	0.886074
30-year Treasury Yield	5-year Treasury Yield	0.798239
30-year Treasury Yield	3-year Treasury Yield	0.660052
20-year Treasury Yield	**10-year Treasury Yield**	**0.982962**
20-year Treasury Yield	7-year Treasury Yield	0.927455
20-year Treasury Yield	5-year Treasury Yield	0.854596
20-year Treasury Yield	3-year Treasury Yield	0.730242
10-year Treasury Yield	1-month Treasury Yield	0.632045
10-year Treasury Yield	**7-year Treasury Yield**	**0.975983**
10-year Treasury Yield	3-month Treasury Yield	0.828869
10-year Treasury Yield	**5-year Treasury Yield**	**0.978763**
10-year Treasury Yield	6-month Treasury Yield	0.65677
10-year Treasury Yield	3-year Treasury Yield	0.828578
10-year Treasury Yield	1-year Treasury Yield	0.688699
1-month Treasury Yield	7-year Treasury Yield	0.753994
1-month Treasury Yield	**3-month Treasury Yield**	**0.995522**
1-month Treasury Yield	5-year Treasury Yield	0.830115
1-month Treasury Yield	**6-month Treasury Yield**	**0.990286**
1-month Treasury Yield	3-year Treasury Yield	0.915111
1-month Treasury Yield	**1-year Treasury Yield**	**0.979498**
7-year Treasury Yield	3-month Treasury Yield	0.76868
7-year Treasury Yield	**5-year Treasury Yield**	**0.984994**
7-year Treasury Yield	6-month Treasury Yield	0.780583
7-year Treasury Yield	3-year Treasury Yield	0.924522
7-year Treasury Yield	1-year Treasury Yield	0.810535
3-month Treasury Yield	5-year Treasury Yield	0.910684
3-month Treasury Yield	**6-month Treasury Yield**	**0.99764**
3-month Treasury Yield	3-year Treasury Yield	0.931282
3-month Treasury Yield	**1-year Treasury Yield**	**0.990346**
5-year Treasury Yield	6-month Treasury Yield	0.860392
5-year Treasury Yield	**3-year Treasury Yield**	**0.974365**
5-year Treasury Yield	1-year Treasury Yield	0.888162
6-month Treasury Yield	3-year Treasury Yield	0.943847

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