Market Commentary: How Future Innovations Will Drive Wealth

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December 2024

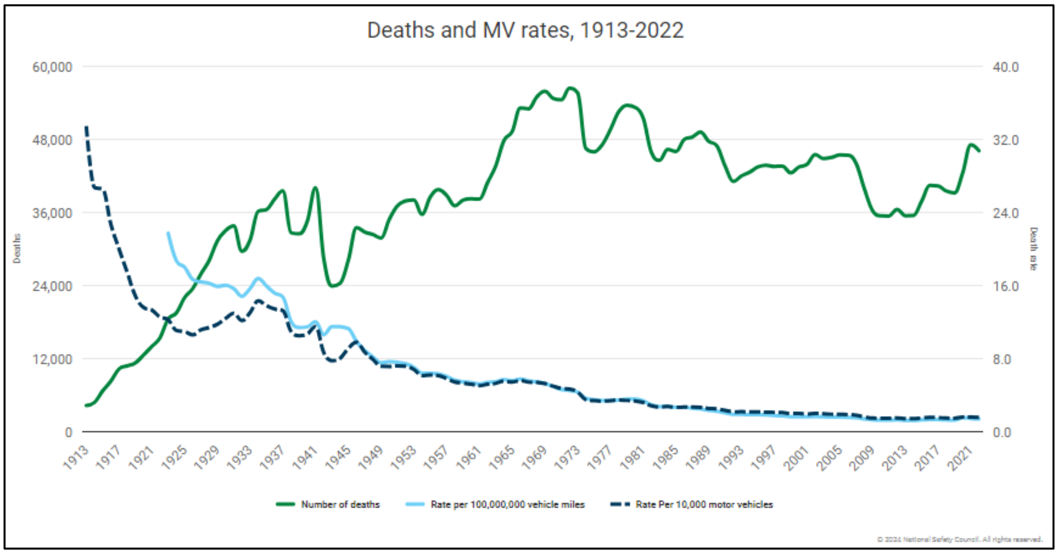
Happy New Year!

The first successful cross-country road trip was taken by Dr. H. Nelson Jackson with his chauffeur, Sewall K. Croker, in 1903. They left San Francisco on May 23, 1903, and arrived in New York City on July 26, a mere 63 days later.[1] It cost them $8,000 to make the trip, equivalent to $295,000 in current dollars.[2] The current cross-country record time is 25 hours and 39 minutes.[3]

One hundred years ago, there were only around 15.5 million cars on the road,[4] the average speed was around 35 – 45 miles per hour (MPH)[5] and there was a load of fatalities! At that time, the U.S. was in the infancy of car culture. Infrastructure such as roads and gas stations needed to be developed, and many advancements in car technology were yet to be initiated.

Innovation drives advances in quality of life and increases in general wealth through productivity gains.

Thanks to millions of iterative advancements, we now typically drive at least as fast as the speed limit allows, typically 65 MPH on highways, yet experience far fewer fatalities per mile driven (note chart below[6]). Cars have become extremely comfortable, with adjustable seating and heat and air conditioning among many other standard features. Additionally, we can call a friend or entertain ourselves by listening to pretty much any music, podcast or audio book via our pocket computers (e.g., iPhone) that wirelessly connect to both the world and our cars. It is



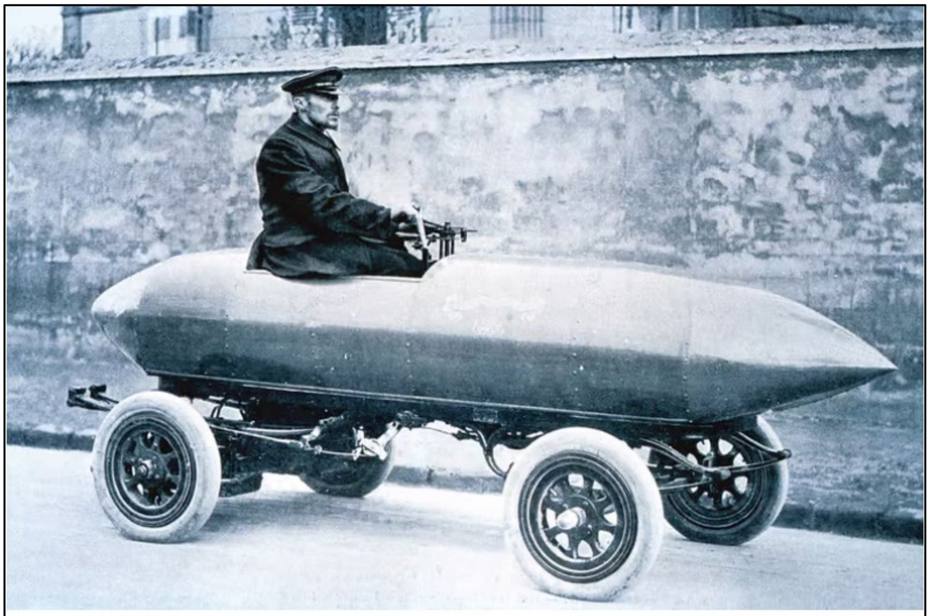
[1] FIRST CROSS-COUNTRY AUTOMOBILE TRIP | Encyclopedia of Cleveland History | Case Western Reserve University, Horatio Nelson Jackson - Wikipedia – 50 days of driving, 63 days to complete.
[2] Calculated by multiplying by the Consumer Price Index (CPI), Measuring Worth - purchasing power of the dollar.
[3] Cannonball Run challenge - Wikipedia
[4] United States: motor vehicles in use 1900-1988 | Statista
[5] SPEEDS ON RURAL HIGHWAYS, PAST AND PRESENT
[6] Historical Car Crash Deaths and Rates - Injury Facts

hard to get lost as we can connect a dynamic, always updating map and have it displayed on a screen conveniently placed on our dash.

Fast forward into the not-too-distant future and more of us will utilize self-driving cars, already a reality in certain areas (see, for example, Waymo). These vehicles will allow us to lounge in the back seat, increasing both our level of comfort and productivity. Odds are that all vehicles will be connected to a singular autonomous network, enabling higher order decision making, such as automatically diverting traffic due to a drone crash on I-95 and allowing cars to drive much faster. Traffic tickets and crashes may become relics of the past. Flying cars anytime soon?

Cars did not come onto the scene until the late 19th century, and the innovations over the 20th century and beyond are nothing short of breathtaking. Increases in car-related technology will continue to enhance productivity and quality of life, reconfiguring how we live, hopefully for the better.

EVs dominated speed records in the late 19th Century. This purpose-built car broke 65 MPH in 1899.[7]



Jenatzy created the first "purpose built" car for a land speed record which he named the "Jamais Contente." The torpedo-shaped electric vehicle made extensive use of "partinium", a strong, lightweight and expensive alloy made of aluminum, copper, zinc, silicon and iron which had not been previously used in a car. The car ran 65.79 mph (105.26 km/h) for the final chapter in the duel.

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[7] The fastest cars in history: 1894 to 1914

Through one of our main initiatives of uncovering beneficial investments for our clients, we tend to see some pretty cool technologies. Here are three that are top of mind:

- **Automated Optical AI Firearm Detection**: This software continuously analyzes security camera video feeds to detect firearms. It is already in use in many districts across America. Within seconds, the system highlights any firearm seen that poses a potential danger to a human operator who further confirms and connects with the relevant authorities.
- **Microscale Robotic Delivery of Biologics and Therapies**: A micro-sized wireless robot with an interchangeable payload that can navigate the body using an external magnetic field. It can access previously unreachable or sensitive areas of the body to deliver treatment.
- **Cashless Kiosk**: On a recent visit to Newark airport, I visited a kiosk where you wave your credit card upon entry and then walk out with anything you would like – and unfortunately, get charged for it!

Additionally, we continue to be blown away by the advances and complexities of semiconductors, a product that has found its way into a huge array of products from cars to clothing. *The Wall Street Journal* recently highlighted the world's most advanced chip-making machine in their fabulous article on maintaining such a machine onsite.[8] ASML's extreme ultraviolet lithography machine costs approximately $370 million and is comprised of over 100,000 components. Who figured this one out?


[9]

[8] It's the Most Indispensable Machine in the World—and It Depends on This Woman - WSJ
[9] It's the Most Indispensable Machine in the World—and It Depends on This Woman - WSJ

Deep Thought: Why Did Everything Take So Long?

We tend to take our modern life for granted. "What would we do without _____?" can be applied to many of our creature comforts. We humans have been around for tens of thousands of years. Why has it taken so long to come up with the wheel? The car? The article "Why Did Everything Take So Long?" by Katja Grace in *Meteuphoric*[10] tackles the topic nicely:

"Humans have been 'behaviorally modern' for about [50 thousand years](). And apparently didn't invent, for instance:

- rope [until 28 thousand years ago]().
- the wheel [until at least 4000 BC]()
- writing [until 3000 BC]()
- woodblock printing [until 200 AD]()"

While Katja Grace partially answers her title question in the article, she came out with a follow-up article titled, "Why Everything Might Have Taken So Long"[11] which does a good job of providing a number of hypotheses. Some of my favorites include:

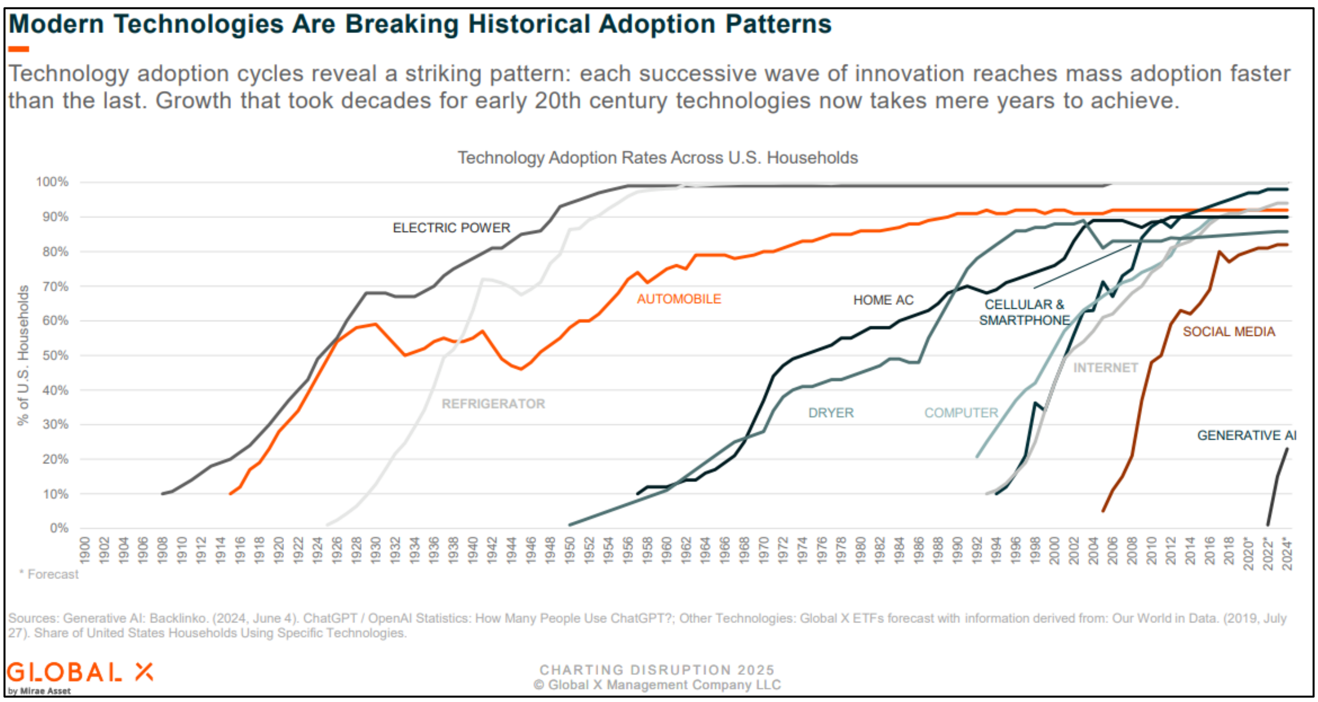
- "People in general are stupid in all domains, even now." (Confession: I have not invented anything.)
- "People are just really busy doing and thinking about other things." (e.g., kids, fun, work)

While note explicitly stated, it is worth noting that we are a wealthier, more connected and materially larger population than any other in history. This reality allows for increased sharing of ideas and insights, a higher statistical likelihood of breakthrough innovations (due to large population) and a reasonable safety net if the innovation fails (given overall wealth of population).

The Ljubljana Marshes Wheel: Oldest wooden wheel discovered. ~5k years old.

[10] [Why did everything take so long? | Meteuphoric]()
[11] [Why everything might have taken so long | Meteuphoric]()

McKinsey recently released a report[12] highlighting industries that they expect to reshape the global economy and, in the process, dramatically increase the categories' revenues and profitability. Five of the eighteen categories touch on transportation, including electric vehicles, shared autonomous vehicles, and future air mobility. Other categories included biotech, robotics and, of course, artificial intelligence (AI). Each of these industries has unique characteristics that dictate the types of companies involved and further influence how financial markets may value them. Furthermore, industries not explicitly highlighted may benefit materially by leveraging these innovations – further complicating the investing landscape. That said, the historical trend of innovation, which in fact has been increasing according to a Global X[13] analysis as can be seen on the chart below, has consistently resulted in global wealth increases which should translate into market growth over the long term.



[12] Growth industries and the next big arenas of competition | McKinsey
[13] Charting Disruption – Global X ETFs

Talking Points: Full Year + December 2024

Full Year + Monthly Market Recap

December

The post-election rally in equities stalled out in December with only the Nasdaq managing slight gains for the month. Intermediate and longer-term treasury yields rose throughout the month due to renewed inflationary concerns (discussed in last month's commentary), while the front end of the yield curve (i.e., maturities of 2 years or less) declined as a result of the Fed's 25 basis point (BP) cut to benchmark rates in their final meeting of the year.

Equities in 2024

US equity markets followed up a strong 2023 with another stellar performance in 2024. All three major US indices posted solid gains, with the S&P 500 returning 23.31%, the Nasdaq 28.64%, and the Dow 12.88%. ***The strong performance in 2024 was driven by factors including resilient economic growth, falling inflation, Fed rate cuts, better than anticipated company earnings, advancements in AI, and Trump's election win***. Growth stocks outperformed their value counterparts largely due to the enthusiasm surrounding the AI boom.

From an earnings standpoint, throughout the year the majority of US companies were able to consistently beat expectations despite the elevated rate environment. The year began with a broad-based rally through March, fueled by some rather hopeful expectations for Fed rate cuts. While the Fed was forecasting three cuts, the market was pricing in upwards of six. Markets continued to rally despite tempered rate cut expectations, due to exuberance over AI and positive earnings.

In April, markets experienced a minor decline following rising geopolitical tensions related to the Middle East conflict which pushed energy prices higher and reignited inflationary concerns. However, these concerns proved short-lived as overall inflation data continued to cool, reaffirming its downward trend. At the same time, signs of a weakening labor market emerged, creating room for the Fed to begin cutting rates – a development viewed as positive for equities.[14]

A sell-off that began in mid-July, primarily due to concerns about slowing growth, snowballed in the first few days of August, resulting in a roughly 10% downturn. This sharp decline was largely triggered by the unwinding of a popular yen carry trade as highlighted in our note to investors at the time. Lingering concerns over weak job reports[15] led the Fed to finally cut benchmark rates by 50 bps at their meeting in September, the first interest rate cut since Covid.

The year concluded with a strong post-election rally following a Republican sweep (won back Presidency, maintained control of House, and gaining control of the Senate). Markets appreciated the lack of drama surrounding the final results and widely view president-elect Trump as a positive force for the economy (and therefore markets) due to his pro-growth agenda even though some of his flagship policies may prove inflationary (i.e. tariffs, mass deportation, etc.).

It is worth noting that even with very strong market performance there were times of material concerns surrounding continued economic growth due to a variety of factors including job data, inflation, and geopolitical tensions. The quick, yet brief, market decline surrounding the Yen carry trade highlights the interconnected nature of our global financial system and how seemingly disparate events can have a material effect on the markets. Longer term, we continue to believe that innovation will drive overall wealth and therefore equity markets higher.

Fixed Income in 2024

The yield curve was inverted as 2024 began, with markets grappling over whether the economy would experience a mild or more substantial recession. An inverted yield curve occurs when longer term interest rates are lower than short term rates. Earlier in the year, financial markets expected a six rate, driven by recessionary concerns and falling inflation, while the Federal Reserve projected only three cuts.

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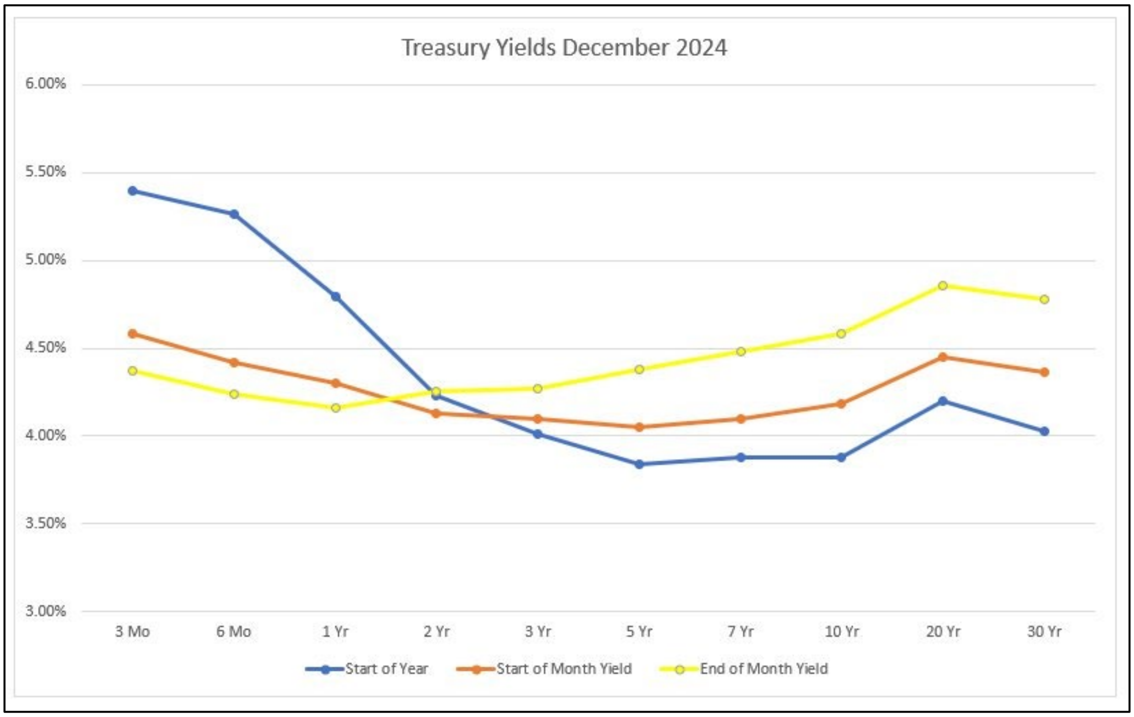
[14] Lowering rates is positive for businesses as it lowers cost of capital for everyone (commercial and consumer alike)
[15] Some may remember that there were lingering concerns around strong, inflationary job reports a mere year earlier



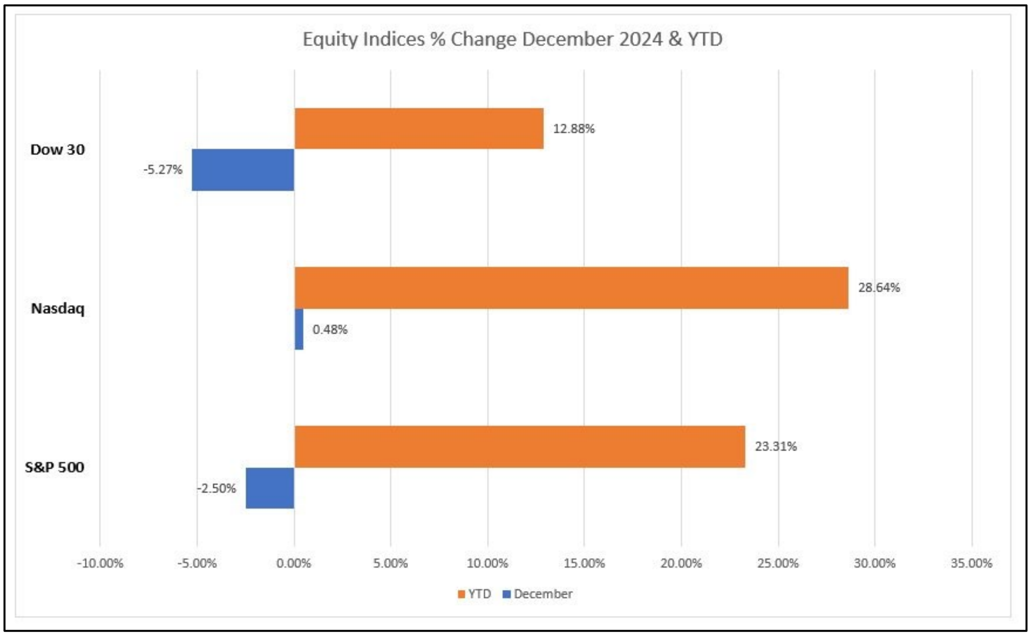
Through the first half of the year, yields remained elevated as the economy proved resilient and inflation did not decline as quickly as anticipated. This caused the anticipated rate cuts to be pushed further into the future. However, concerns that arose in mid-summer – heightened by troubling job reports and a worsening geo-political climate – provided the Fed with justification to begin cutting rates. In September, the Fed implemented a 50 BP cut, the first since the pandemic, signaling the start of an "easing" cycle.

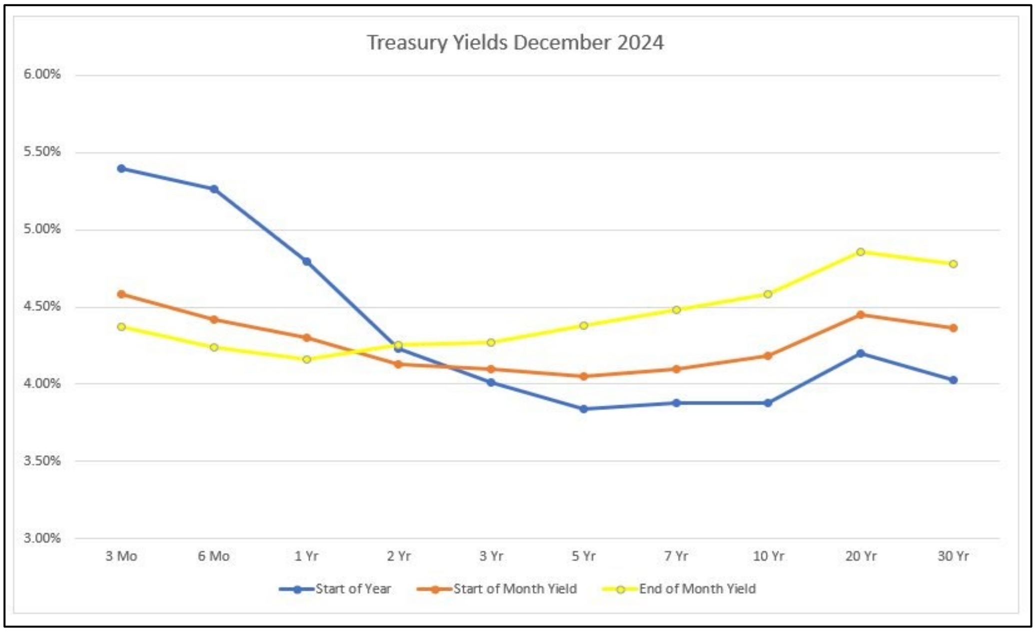
Interestingly, as the Fed lowered the Fed Funds rate, a short-term government rate, longer-term yields began to rise. This increase signaled a shift in market sentiment from recession fears to a recognition that the U.S. economy was more robust than expected. The yield curve then began to "normalize", moving away from its inverted state at the start of the year, reflecting a healthier economic outlook.

Longer-term yields continued to rise toward the end of the year, as markets grew concerned about potential inflationary policies under a possible Trump administration, including tariffs and mass deportations. Additionally, the lack of efforts to balance the budget and the potential for increased government debt could contribute to rising long-term rates.

As a result, the Fed's dot plot (which indicates individual members' projections for future interest rates) revealed that the majority now forecast only two rate cuts in 2025. This marked a shift from the start of 2024 when the Fed predicted three cuts, and markets priced in six. By the end of December, fed futures indicated an 80% chance of no more than a 50 BP reduction in rates in 2025.

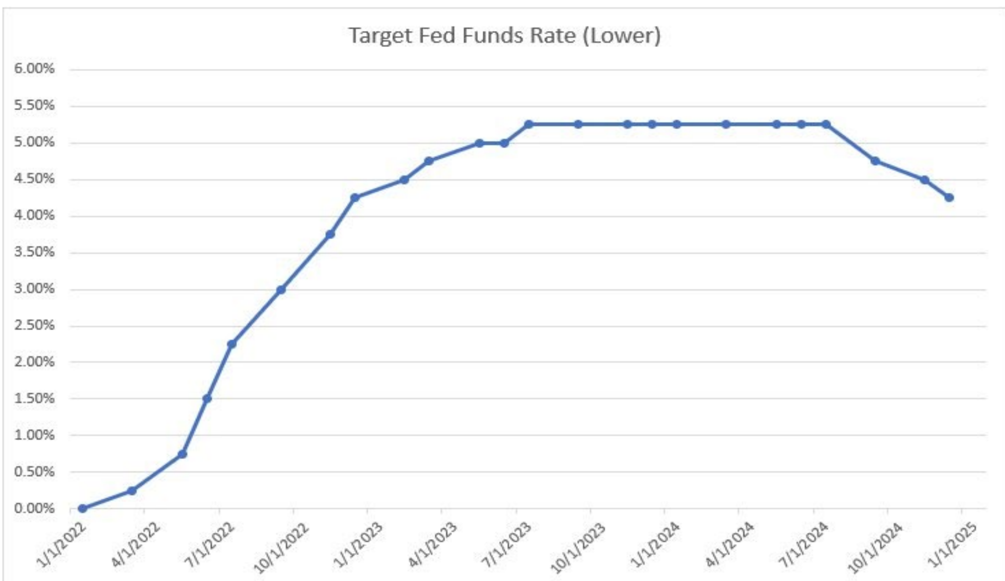
Graphs/Visuals





Fed Interest Rate Decisions Since Start of Hiking Cycle

FOMC Meeting Date	Hike/Cut	*Target Fed Funds Rate (Lower)*	*Target Fed Funds Rate (Upper)*
Start of 2022	-	*0.00%*	*0.25%*
3/16/2022	**0.25%**	*0.25%*	*0.50%*
5/4/2022	**0.50%**	*0.75%*	*1.00%*
6/15/2022	**0.75%**	*1.50%*	*1.75%*
7/27/2022	**0.75%**	*2.25%*	*2.50%*
9/21/2022	**0.75%**	*3.00%*	*3.25%*
11/2/2022	**0.75%**	*3.75%*	*4.00%*
12/14/2022	**0.50%**	*4.25%*	*4.50%*
2/1/2023	**0.25%**	*4.50%*	*4.75%*
3/22/2023	**0.25%**	*4.75%*	*5.00%*
5/3/2023	**0.25%**	*5.00%*	*5.25%*
6/14/2023	**0.00%**	*5.00%*	*5.25%*
7/26/2023	**0.25%**	*5.25%*	*5.50%*
9/20/2023	**0.00%**	*5.25%*	*5.50%*
11/1/2023	**0.00%**	*5.25%*	*5.50%*
12/13/2023	**0.00%**	*5.25%*	*5.50%*
1/31/2024	**0.00%**	*5.25%*	*5.50%*
3/20/2024	**0.00%**	*5.25%*	*5.50%*
5/1/2024	**0.00%**	*5.25%*	*5.50%*
6/12/2024	**0.00%**	*5.25%*	*5.50%*
7/31/2024	**0.00%**	*5.25%*	*5.50%*
9/18/2024	**-0.50%**	*4.75%*	*5.00%*
11/7/2024	**-0.25%**	*4.50%*	*4.75%*
12/18/2024	**-0.25%**	*4.25%*	*4.50%*



Probability of Upcoming Fed Interest Rate Decisions

12/31/2024	*Hike*	*Hold*	*Cut*	*Hike 25bps*	*Cut 25bps*	*Cut 50bps*	*Cut 75bps*
January	0.00%	90.40%	9.60%	0.00%	9.60%	0.00%	0.00%

Highlights/Notes

Highlight: Renewed inflationary concerns pushed intermediate/longer-term yields higher and lowered forecasts for rate cuts in 2025. As a result, the post-election rally in equities stalled out.

FAM Sentiment Summary

2024	January	February	March	April	May	June	July	August	September	October	November	December
Fed	MILDLY BEARISH	MILDLY BEARISH	MILDLY BULLISH	BEARISH	MILDLY BEARISH	NEUTRAL	MILDLY BULLISH	MILDLY BULLISH	BULLISH	MILDLY BULLISH	BULLISH	MILDLY BEARISH
Interest Rate Decisions	NEUTRAL	n/a	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	BULLISH	NEUTRAL	BULLISH	NEUTRAL
Commentary	BEARISH	MILDLY BEARISH	BULLISH	BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BULLISH	BULLISH	BULLISH	MILDLY BULLISH	MILDLY BULLISH	BEARISH
Economic Data	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	MILDLY BULLISH	MILDLY BULLISH	NEUTRAL	MILDLY BEARISH	MILDLY BULLISH	NEUTRAL	NEUTRAL
Inflation	NEUTRAL	MILDLY BEARISH	BEARISH	BEARISH	NEUTRAL	BULLISH	BULLISH	BULLISH	MILDLY BULLISH	NEUTRAL	NEUTRAL	MILDLY BULLISH
Employment/Labor Market	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	BULLISH	NEUTRAL	MILDLY BULLISH	BEARISH	BEARISH	BULLISH	NEUTRAL	NEUTRAL
Housing/Real Estate	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BULLISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BULLISH	MILDLY BULLISH
GDP	BULLISH	n/a	NEUTRAL	BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BULLISH
Consumer Spending	MILDLY BEARISH	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BULLISH	MILDLY BULLISH	NEUTRAL	MILDLY BULLISH	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH
Consumer Sentiment	MILDLY BULLISH	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH
Global Events/News	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH
China	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BULLISH	NEUTRAL	MILDLY BEARISH	NEUTRAL	BULLISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BULLISH
Europe	NEUTRAL	NEUTRAL	MILDLY BULLISH	MILDLY BULLISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BULLISH	NEUTRAL	MILDLY BULLISH	MILDLY BEARISH	NEUTRAL
Russia Ukraine War	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH	NEUTRAL
Israel Hamas War	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	BEARISH	BEARISH	BEARISH	BEARISH	MILDLY BEARISH	NEUTRAL
US Politics	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	BULLISH	MILDLY BULLISH
2024 Election	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	BULLISH	MILDLY BULLISH
Budget Negotiations	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL
Earnings	NEUTRAL	MILDLY BULLISH	MILDLY BEARISH	NEUTRAL	BULLISH	MILDLY BULLISH	MILDLY BULLISH	NEUTRAL	NEUTRAL	MILDLY BULLISH	NEUTRAL	NEUTRAL
Banking Turmoil	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	MILDLY BEARISH	NEUTRAL	MILDLY BEARISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL
Crypto	BULLISH	BULLISH	BULLISH	NEUTRAL	MILDLY BULLISH	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL	BULLISH	BULLISH

Notable Changes from Month Prior

- Fed Commentary - Mildly Bullish to Bearish
  - Several Fed members including Powell have made comments recently that would indicate a slower pace of rate cuts for 2025. This was confirmed by the release of the Fed's dot plot which showed just two cuts forecasted for all of 2025.
- Fed Interest Rate Decisions - Bullish to Neutral
  - The Fed's decision to cut benchmark interest rates by 25bps was expected and priced in well before the announcement was made.
- Fed - Bullish to Mildly Bearish
  - The combination of the above changes in sentiment related to the Fed's commentary/interest rate decisions moved the overall sentiment for the Fed more bearish.

Key Topics/Items

- ***BEARISH***
    - Continued rise in intermediate and longer-term treasury yields
    - The Fed's dot plot showing that the majority of members are calling for just two cuts in 2025 (a result of recent rise in inflation expectations and flatlining data)
- ***MILDLY BEARISH***
    - Trump targeting "BRICs Countries" (whom have been pushing for "de-dollarization") with 100% tariffs
    - Turmoil in South Korean government where the President briefly declared martial law and as a result was impeached
    - France dealing with drama/turmoil related to its national budget
    - Syria's government being "overrun" after years of "quiet"
    - China announcing an antitrust probe against Nvidia for an acquisition it made back in 2020 (move is seen as a counter to Trump's recent tariff threats)
    - Retail sales for the month of November coming in higher than expected
    - Canadian dollar weakening to lowest levels in over four years after the country's Finance Minister resigned
    - The U.S. Consumer Confidence Index declining from 112.8 in November to 104.7 in December - reflecting growing concerns about the short-term outlook for income, business conditions, and job opportunities
    - Japanese Yen lowering to a 5-month low against the U.S Dollar
    - Energy prices rising after new data showed a colder than expected month of January
- ***NEUTRAL***
    - Powell commenting that, stronger economic data points recently point to the economy being healthier now than when they first began cutting - signaling to markets that there could be a slowdown in cuts moving forward
    - Launch of first ever private credit ETF
    - PPI for the month of November coming in higher than expected
    - The Swiss National Bank announcing a larger than expected rate cut (50bps cut, 25bps expected)
    - ECB announcing that it would be cutting rates by 25bps (as expected)
    - Fed announcing it would be cutting rates by 25bps at its December meeting (as expected)
    - President elect Trump and the CEO of SoftBank announcing plans to invest approximately $100 billion into US projects over the next four years
    - Government avoiding a potential shutdown
    - Mike Johnson being re-elected as Speaker of the House by slim margin
    - Tesla reporting an annual decline in vehicle deliveries for the first time in over ten years
- ***MILDLY BULLISH***

- November's jobs report pointing to the labor market being in a fairly good spot (hiring increased by more than expected, overall unemployment rate rose but remained in line with expectations)
- November CPI and Core CPI data coming in line with expectations (although flatlining on a month over month basis)
- Comments from China's Politburo (country's top governing body) where they pledged to adopt a "moderately loose" monetary policy stance while implementing more "proactive" fiscal policy (implying that they are ready and willing to act)
- Final estimate of Q3 GDP showing that the economy grew by 3.1% which was higher than expected
- Existing home sales for the month of November seeing biggest uptick on year over year basis since 2021 (even though on an annual basis 2024 lowest since 1995)
- PCE and Core PCE for the month of November coming in lower than expected
- US home prices rising at the slowest pace of the year for the month of October

- ***BULLISH***
  - Trump announcing Paul Atkins (who is considered to be "pro-crypto") as his pick to run the SEC

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