

# 2024 US Equity Outlook: "All You Had To Do Was Stay"

**We forecast the S&P 500 index will end 2024 at 4700, representing a 12-month price gain of 5% and a total return of 6% including dividends.** Our baseline assumption during the next year is the US economy continues to expand at a modest pace and avoids a recession, earnings rise by 5%, and the valuation of the equity market equals 18x, close to the current P/E level. Our forecast falls slightly below the typical 8% return during presidential election years. At this time next year, portfolio managers will look back and realize the best investment strategy for 2024 was to follow Taylor Swift's advice in the song from her 1989 album: "All You Had To Do Was Stay" – invested.

**Our macro forecasts imply a benign outcome for equities, but the current starting point will limit the potential appreciation for the benchmark US equity index in 2024.** First, our economists forecast above-consensus GDP growth of 2.1% in 2024, but this view is already reflected in equity prices. Second, margins have stabilized, but substantial expansion from current elevated levels appears unlikely. Third, equity multiples appear fairly valued based on the current macro environment but are unlikely to expand in 2024. The equal-weight S&P 500 P/E multiple has de-rated to the 74<sup>th</sup> percentile since 1976, but the aggregate P/E still trades in the 87<sup>th</sup> percentile. The Fed has likely finished its hiking cycle but will remain on hold until 4Q 2024 (vs. market pricing of a cut in 2Q). We also discuss upside and downside return scenarios, depending on the interest rate and growth outlook.

**The massive outperformance of the "Magnificent 7" mega-cap tech stocks has been a defining feature of the equity market in 2023.** The stocks should collectively outperform the remainder of the index in 2024. The 7 stocks have faster expected sales growth, higher margins, a greater re-investment ratio, and stronger balance sheets than the other 493 stocks and trade at a relative valuation in line with recent averages after accounting for expected growth. However, the risk/reward profile of this trade is not especially attractive given elevated expectations.

**David J. Kostin**  
+1(212)902-6781 | david.kostin@gs.com  
Goldman Sachs & Co. LLC

**Ben Snider**  
+1(212)357-1744 | ben.snider@gs.com  
Goldman Sachs & Co. LLC

**Ryan Hammond**  
+1(212)902-5625 |  
ryan.hammond@gs.com  
Goldman Sachs & Co. LLC

**Cormac Conners**  
+1(212)357-6308 |  
cormac.x.conners@gs.com  
Goldman Sachs & Co. LLC

**Lily Calcagnini**  
+1(212)357-5913 | lily.calcagnini@gs.com  
Goldman Sachs & Co. LLC

**Jenny Ma**  
+1(212)357-5775 | jenny.ma@gs.com  
Goldman Sachs & Co. LLC

**Daniel Chavez**  
+1(212)357-7657 |  
daniel.chavez@gs.com  
Goldman Sachs & Co. LLC

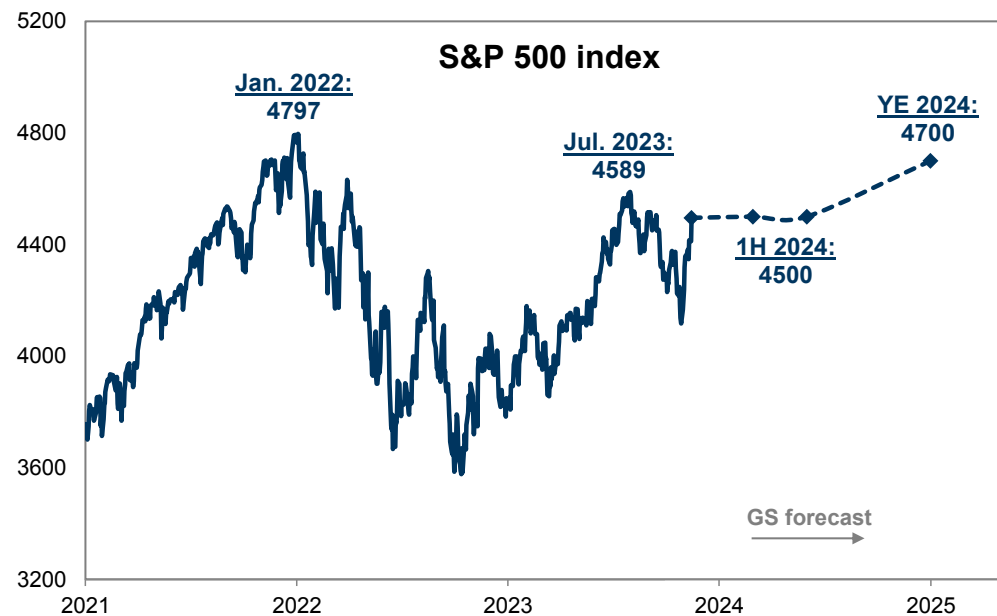
## PM Summary: “Long Story Short” — S&P 500 will end 2024 at 4700 (+5%)

**The launch of singer-songwriter Taylor Swift’s “Eras” tour represented one of the most notable cultural events of 2023.** Global ticket sales are estimated to exceed \$1 billion. The tour’s economic multiplier effect is significant. As evidence, the Federal Reserve Bank of Philadelphia specifically noted in a recent Beige Book commentary that “May was the strongest month for hotel revenue in Philadelphia since the onset of the pandemic, in large part due to an influx of guests for the Taylor Swift concerts in the city.”

**The Eras tour will conclude in late November 2024, roughly corresponding to the 12-month horizon of the market forecast in this report.** As homage to the global icon, our *2024 US Equity Outlook* is subtitled “All You Had To Do Was Stay” – invested. The title of the song from Taylor Swift’s 1989 album reflects our baseline forecast that despite intermittent volatility, fund managers will ultimately be rewarded for staying invested through the end of next year.

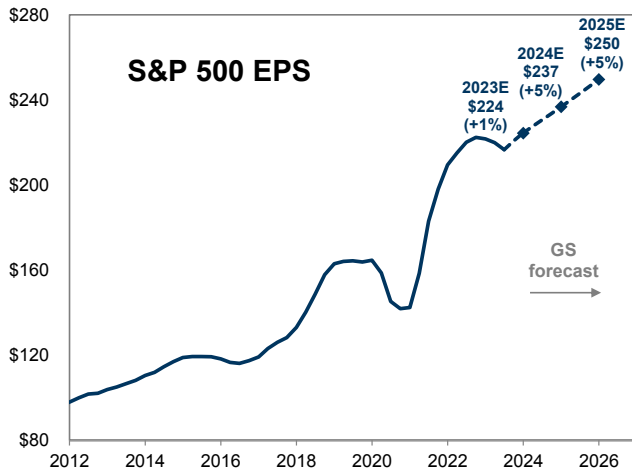
**Continued economic and EPS growth will lift the S&P 500 index to 4700 (+5%) at the end of next year. However, the benchmark will still remain slightly below its January 2022 all-time high of 4797.** Our interim 3-month (4500) and 6-month (4500) S&P 500 index targets reflect a flat market during 1H 2024 (Exhibit 1). We believe the returns to the index will be concentrated in 2H 2024. Resilient economic growth in the beginning of the year will force the market to push back its current pricing that Fed cuts will begin in 2Q, and US election uncertainty will suppress risk appetite. Later in the year, the first Fed cut and resolution of election uncertainty will lift US equity prices.

**Exhibit 1: Goldman Sachs US Portfolio Strategy S&P 500 price targets: The path to 4700 at year-end 2024**



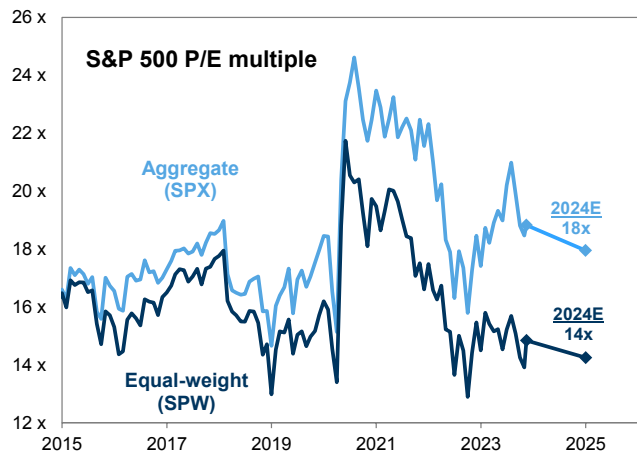
Source: Goldman Sachs Global Investment Research

**Exhibit 2: The path of S&P 500 EPS**



Source: FactSet, Goldman Sachs Global Investment Research

**Exhibit 3: S&P 500 aggregate and equal-weight P/E**



Source: FactSet, Goldman Sachs Global Investment Research

**We remain constructive on US equities, but the current starting point will limit the potential appreciation for the index in 2024.**

**First, our economists forecast above-consensus full-year GDP growth of 2.1% in 2024. However, this view is already reflected in current equity prices.** Despite many economists forecasting a recession, the performance of cyclical stocks vs. defensive stocks is consistent with a 2% real GDP growth regime.

**Second, margins have stabilized, but substantial expansion from the current elevated level is unlikely due to diminishing tailwinds for S&P 500 profitability.** S&P 500 ex-Energy net profit margins troughed in 4Q 2022 and have sequentially improved for three consecutive quarters. However, resilient input cost growth, rising interest expense, and higher effective tax rates will allow only minimal margin expansion in 2024. Instead, profit growth will equal sales growth. History shows that revenue growth typically tracks nominal GDP growth. Sales-weighted global nominal GDP growth is consistent with our 5% EPS growth forecast in both 2024 and 2025 to \$237 and \$250 per share, respectively.

**Generative artificial intelligence (AI) represents one potential driver of corporate earnings upside, but in most cases it will have limited impact on profitability next year.** Certain companies have been obvious near-term beneficiaries of the AI-driven demand for computing power to run AI large language models. Other firms are potential long-term beneficiaries that may experience an EPS boost from the impact of AI adoption on labor productivity in coming years.

**Compared with consensus forecasts, our 2024 EPS estimate is above the median earnings estimate of other strategists but below the bottom-up analyst consensus.** While we forecast stable margins, bottom-up consensus assumes significant margin expansion that supports 11% EPS growth in both 2024 (\$245) and 2025 (\$273). The top-down consensus 2024 EPS estimate equals \$230.

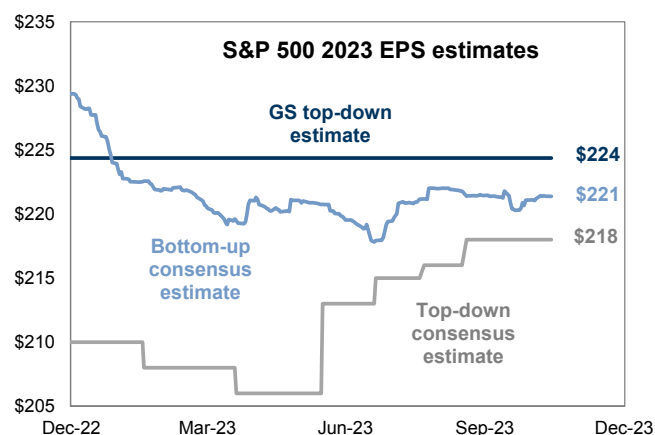
**Third, our top-down valuation model suggests that at a forward P/E multiple of 19x, the aggregate S&P 500 index trades in line with fair value on both a historical absolute basis and relative to interest rates, but is unlikely to expand meaningfully in 2024.** Note that equity valuations appear less stretched in absolute and relative terms after adjusting for record high market concentration. The equal-weight S&P 500 has de-rated to the 74<sup>th</sup> percentile P/E multiple since 1976, but the aggregate S&P 500 P/E still trades in the 87<sup>th</sup> percentile. The valuation premium of the aggregate vs. equal-weight S&P 500 equals 27%, well above the historical average but below the Tech Bubble peak of 111% in 1999.

**Our baseline macro forecasts point to a roughly unchanged equal-weight S&P 500 P/E of 14x at year-end 2024 and a P/E of 18x for the aggregate S&P 500 index.** We expect the Fed has finished its hiking cycle and Treasury yields have peaked. However, solid economic growth means the Fed will remain on hold until 4Q 2024, compared with market pricing of cuts beginning in 2Q. In our baseline, we assume real 10-year UST yields will equal 2.3% at year-end 2024. Based on our top-down valuation model, this macro combination supports the current P/E multiple, but implies little scope for valuation expansion. We forecast the yield gap will rise slightly from 315 bp today to 325 bp at year-end 2024. We believe the fundamentals of the largest stocks will support the current valuation premium of the aggregate vs. equal-weight S&P 500 index through 2024.

**We expect positive returns to equities, but a 5% return risk-free in cash remains a competitive alternative.** In the current interest rate environment, the 3-month Treasury bill yields 5.5%, similar to the earnings yield on the S&P 500 index. Households, mutual funds, pension funds, and foreign investors collectively have a current allocation to stocks (48%) ranking in the 97<sup>th</sup> percentile vs. history while bond (20%) and cash (14%) allocations rank at the 43<sup>rd</sup> and 23<sup>rd</sup> percentiles, respectively. We forecast most of these ownership categories will be net sellers of stocks in 2024. During 2023, money market mutual funds have received about \$1.2 trillion of net inflows compared with \$17 billion inflows for US stocks. We forecast that at \$550 billion net corporate buybacks will represent the largest source of demand for shares.

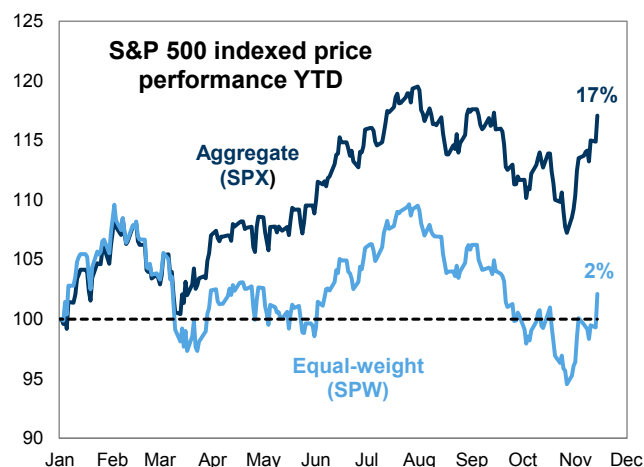
**We expect the equity market will oscillate in its pricing of alternative scenarios around our baseline forecast.** If economic growth is resilient but the Fed cuts the funds rate sooner than our economists expect, the corresponding valuation expansion would push the S&P 500 to 5000 (+11%). However, if inflation concerns reignite, leading to higher interest rates and weaker growth, valuations would contract and the S&P 500 would fall to 4150 (-8%). In a mild recession, we expect the S&P 500 would drop by 18% to 3700 at year-end 2024.

Exhibit 4: S&amp;P 500 2023 EPS: GS vs. consensus



Source: Bloomberg, FactSet, Goldman Sachs Global Investment Research

Exhibit 5: S&amp;P 500 price performance: Aggregate vs. equal-weight



Source: Goldman Sachs Global Investment Research

### We were right, but wrong.

**Published exactly one year ago, our 2023 US Equity Outlook was subtitled “Paradise Lost” in reference to the fact the cost of money was no longer free and the equity story for 2023 would be about the lack of earnings growth.** The first paragraph in the report predicted that “Zero earnings growth will match zero appreciation in the S&P 500. Our valuation model implies an unchanged P/E multiple of 17x and a year-end index level of 4000.”

**We correctly predicted the aggregate S&P 500 index would show no profit growth.** We originally forecast \$224 of EPS and 10½ months into the year the market is on track to deliver earnings in line with that number. The equal-weighted S&P 500 index has also posted flat EPS.

**However, we were wrong because, while the equal-weight index has posted virtually no appreciation YTD, the aggregate index has posted a 19% total return led by stellar returns of a select few mega-cap stocks.** The combination of strong realized sales growth, upward estimate revisions, association with the AI theme, and valuation expansion explain the narrow rally. The “Magnificent 7” (AAPL, MSFT, GOOGL, AMZN, NVDA, META, TSLA) now comprise 29% of S&P 500 market cap and collectively have returned 71% YTD. The remaining 493 stocks in the index have returned just 6%.

**Our baseline forecast suggests that mega-cap tech stocks will continue to outperform the remainder of the S&P 500 in 2024, but the risk/reward profile of this trade is not particularly attractive given elevated expectations.** The Magnificent 7 stocks collectively have faster expected 2023-2025 sales growth (11% vs. 3%), higher 2023 margins (22% vs. 10%) and a greater re-investment ratio (61% vs. 18%) than the other 493 stocks and trade at a relative valuation in line with recent averages after accounting for expected growth (0.9x relative PEG ratio). However, the risk/reward of this trade is not particularly attractive given high expectations. Elevated hedge fund ownership and a potential inflection in AI enthusiasm represent two risks to the mega-cap tech stocks.

**Although we forecast a below-average annual return at the S&P 500 index level, more attractive investment opportunities exist beneath the surface.** We highlight three recommendations:

**1. Own quality stocks alongside persistent “late cycle” anxiety.** Investors should tilt their portfolios toward stocks with “quality” attributes in an environment of persistent investor concern about an impending recession. Despite our economists’ optimistic US economic growth outlook, it seems likely that widespread economic anxiety will generally remain elevated next year. This should support the outperformance of stocks with “quality” attributes such as high profitability, strong balance sheets, stable sales and earnings growth, and low historical drawdown risk.

**2. Own growth stocks with high returns on capital given stable economic growth and interest rates.** We identify regimes in which both market pricing of growth and interest rates do not increase or decrease drastically during 6-month periods and find that our long/short Growth and Returns factors typically perform well during these periods.

**3. Own beaten-down cyclicals given recession risk is lower than feared.** Our economists’ full-year 2024 US real GDP growth forecast of 2.1% is 1 pp higher than consensus. While cyclicals on average are pricing economic growth consistent with our economists’ forecast ([Exhibit 18](#)), there are some cyclical stocks that have lagged meaningfully and present attractive tactical opportunities if economic data surprise to the upside relative to consensus expectations.

**Despite our optimistic baseline market outlook, portfolio managers will need to stay invested through volatility around several economic, financial, corporate, political, and geopolitical “known knowns” on the 2024 calendar:**

- **Economically**, fear of a recession will plague investors despite the Goldman Sachs economics view that the likelihood of a recession beginning during the next year is only 15% (vs. Bloomberg consensus of 55%).
- **Financially**, the commercial real estate plight will likely imperil several regional banks holding mortgages where the collateral value is below the loan amount. As of 3Q, US banks held \$2.8 trillion of commercial real estate loans and 64% of the total (\$1.8 trillion) was held by banks with less than \$100 billion of assets. More than \$500 billion of commercial real estate loans will mature in 2024.
- **From a corporate perspective**, “unknowns” include at least one consequential antitrust ruling expected in 1Q (*US vs. Google*) as well as many other government lawsuits in the US and the EU alleging monopolistic practices by leading “Big Tech” firms such as AMZN, META, and AAPL that collectively account for 29% of the S&P 500 index.
- **Politically**, the quadrennial sweepstakes also known as the US presidential election will take place in just 51 weeks. Prediction markets are signaling that a Biden-Trump rematch is the most likely general election contest. Recent polls suggest the general election is basically a toss-up.
- **Geopolitically**, the Israel-Hamas War, the Russia-Ukraine War, and the US-China Trade War remain enormous sources of potential financial market risk.

**In the Federal Reserve’s semiannual Financial Stability Report, survey participants identify risks to their market outlooks.** The most recent report highlighted persistent inflation and monetary policy, commercial and residential real estate, and banking sector stress as the top three risks.

## Earnings: “Out of the Woods” — 5% growth in both 2024 and 2025

**Following 1% profit growth in 2023 (\$224), we forecast S&P 500 EPS will grow by 5% in 2024 (\$237) and by 5% in 2025 (\$250).** Excluding Financials, Real Estate, and Utilities, we expect revenues to increase by 5% next year, in line with nominal GDP growth, and margins to expand by 19 bp to 11.4%. Similarly, our forecast for 2025 reflects modest 5% sales growth and a further 15 bp of margin expansion to 11.6%. We model sales, margins, and EPS as a function of economic growth, inflation, interest rates, oil, and the USD.

**Our top-down 2024 EPS estimate of \$237 is above the top-down strategist consensus forecast of \$230 (+6% growth) but below bottom-up analyst consensus of \$245 (+11% growth).** Based on our macro earnings model, US economic growth accounts for roughly 50% of the variability in annual EPS growth. Our economists forecast real US economic growth will average 2.1% in 2024 (vs. consensus of 1.0%). They assign a 15% probability of a recession beginning during the next 12 months, well below the consensus of 55%. Above-trend economic growth is the primary reason our EPS forecast exceeds the top-down consensus.

**However, our EPS estimates are below the bottom-up analyst consensus forecasts.** The literal bottom line is that consensus forecasts 2025 S&P 500 net margins will be 100 bp greater than our baseline (12.6% vs. 11.6%). The longstanding EPS revision pattern is that during the 24-month forecast horizon analysts cut their initial EPS estimate by 8%. If history is a guide, the bottom-up consensus 2025 EPS estimate of \$273 will be lowered by 8% to \$251 – consistent with our current 2025 estimate of \$250.

**Exhibit 7: Goldman Sachs top-down vs. consensus top-down and bottom-up forecasts**

	2022	GS top-down			Cons. BOTTOM-UP		
		2023E	2024E	2025E	2023E	2024E	2025E
S&P 500 ex. Fin, RE, Utils							
Sales growth	13 %	3 %	5 %	5 %	2 %	5 %	6 %
Profit Margin	11.6%	11.2%	11.4%	11.6%	11.0%	11.9%	12.6%
Year/Year growth	(21)bp	(39)bp	19 bp	15 bp	(60)bp	86 bp	68 bp
<b>S&amp;P 500 adjusted EPS</b>	<b>\$222</b>	<b>\$224</b>	<b>\$237</b>	<b>\$250</b>	<b>\$221</b>	<b>\$245</b>	<b>\$273</b>
Year/Year growth	6 %	1 %	5 %	5 %	(0)%	11 %	11 %
					Cons. TOP-DOWN		
					2023E	2024E	2025E
					\$218	\$230	NA
					(2)%	6 %	NA

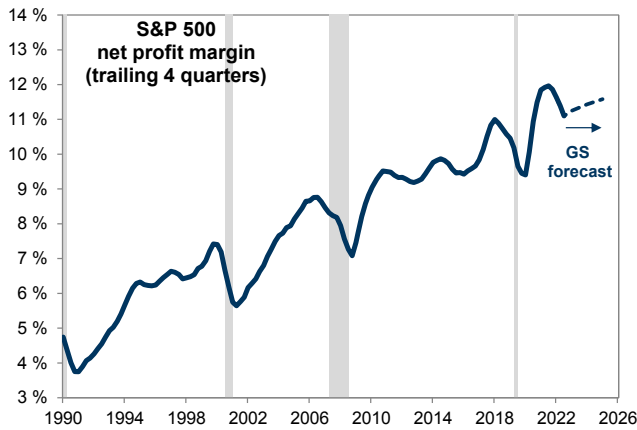
Source: FactSet, Bloomberg, Goldman Sachs Global Investment Research

**Substantial margin expansion from the current elevated level is unlikely due to diminishing tailwinds for S&P 500 profitability.** We forecast margins for the aggregate S&P 500 index will increase by a modest 35 bp during the next two years



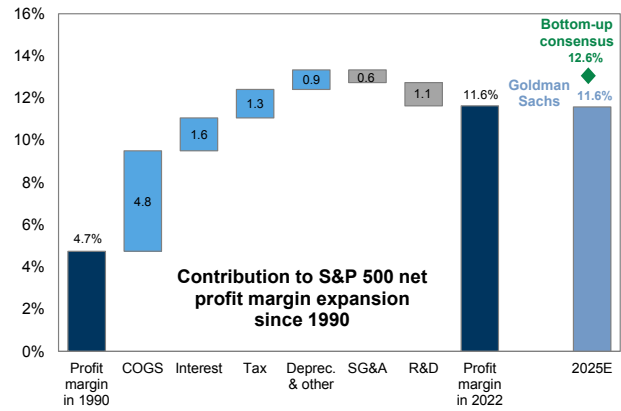
while consensus forecasts expansion of 150 bp (Exhibit 7). Although operating leverage should support margins, headwinds include resilient wage growth, “higher for longer” interest rates, and higher tax expense. Our analysis of the long-term drivers of profitability found that declining costs of goods sold has contributed almost 70% of the 700 bp expansion in S&P 500 net profit margin since 1990 (Exhibit 9). Geopolitical tensions and efforts to onshore or nearshore operations are additional challenges to significant profit margin expansion. On the other hand, the adoption of AI is a potential source of upside risk to margins if companies become more productive or reduce labor costs.

**Exhibit 8: We forecast modest expansion in S&P 500 net margins**



Source: Goldman Sachs Global Investment Research

**Exhibit 9: Drivers of S&P 500 profit margin expansion**



Source: Goldman Sachs Global Investment Research

---

## Valuation: “Champagne Problems” — S&P 500 trades at a P/E of 18x

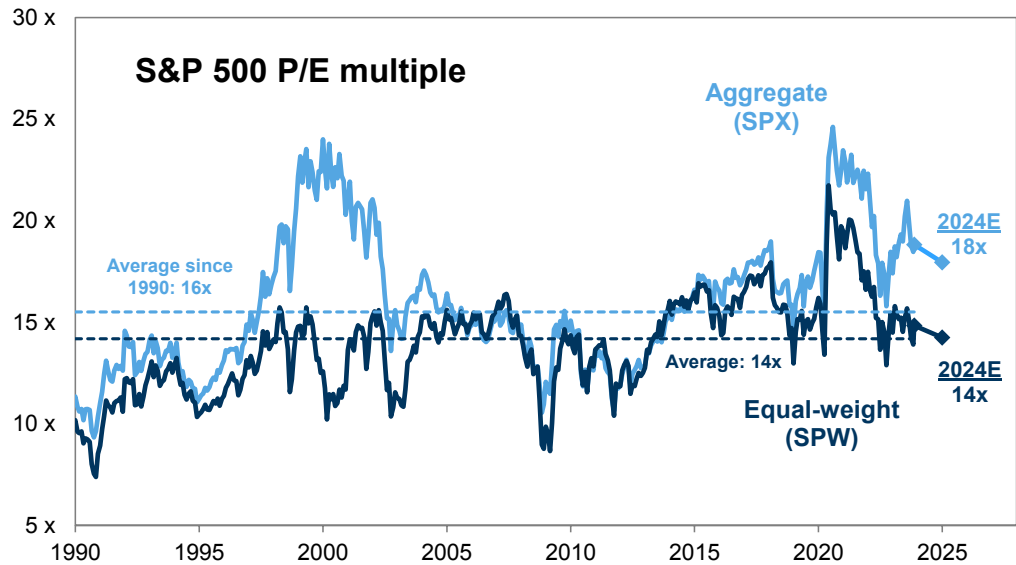
---

**Restrictive monetary policy for most of next year will keep the fed funds rate higher-for-longer than consensus expects and will constrain equity valuation expansion.** Our economists believe that July 2023 marked the final Fed hike of this tightening cycle and that the funds rate is unlikely to rise above the current 5.25%-5.50% level. However, our economists expect that, amid resilient economic growth, the Fed will remain on hold until 4Q 2024 when core PCE falls below 2.5%. That forecast stands in contrast with the 100 bp of Fed cuts in 2024 currently reflected in forward market pricing.

**Historically, equity valuations have expanded following the end of Fed hiking cycles, but multiple expansion is usually accompanied by a decline in bond yields.** In October, 10-year nominal and real 10-year US Treasury yields likely peaked for this cycle at just below 5% and just above 2.5%, respectively. However, our economists forecast the 10-year Treasury yield at the end of 2024 will equal 4.6%, modestly above the current level. Our baseline forecast assumes the real 10-year US Treasury yield ends next year at 2.3%, modestly above the current level. Our expectation of a broadly stable interest rate regime is consistent with our baseline forecast of stable equity valuations.

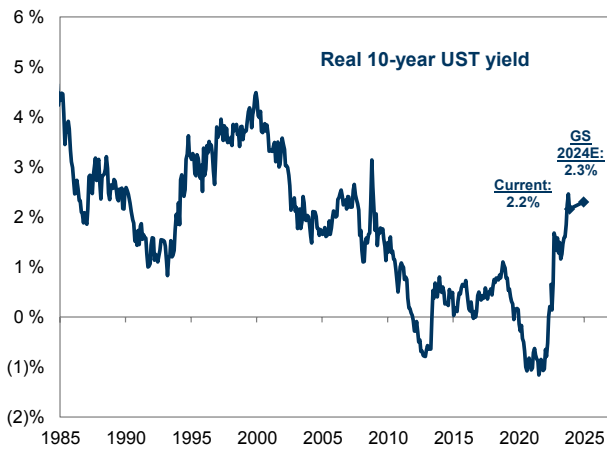
**We forecast at year-end 2024 the aggregate S&P 500 forward P/E multiple will equal 18x, roughly unchanged from the current level.** Our top-down valuation model suggests that the S&P 500 trades in line with fair value on both a historical absolute basis and relative to interest rates. Based on this model, we forecast that the yield gap between equities and real yields will rise slightly to 325 bp and rank at the 88<sup>th</sup> percentile vs. history. The yield gap, a proxy for the equity risk premium, is at the narrowest level since 2002. Our model suggests the yield gap in 2024 will be broadly consistent with the level that prevailed prior to the Global Financial Crisis.

Exhibit 10: Aggregate vs. equal-weight S&P 500 P/E



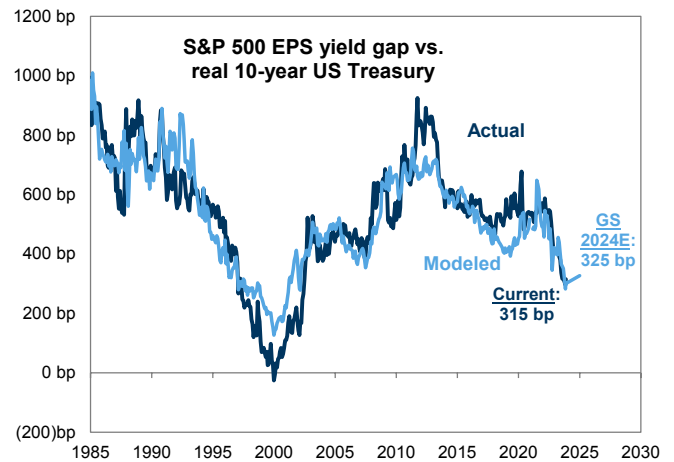
Source: FactSet, Goldman Sachs Global Investment Research

Exhibit 11: The path of real yields



Source: Goldman Sachs Global Investment Research

Exhibit 12: We expect the yield gap will remain narrow



Source: FactSet, Goldman Sachs Global Investment Research

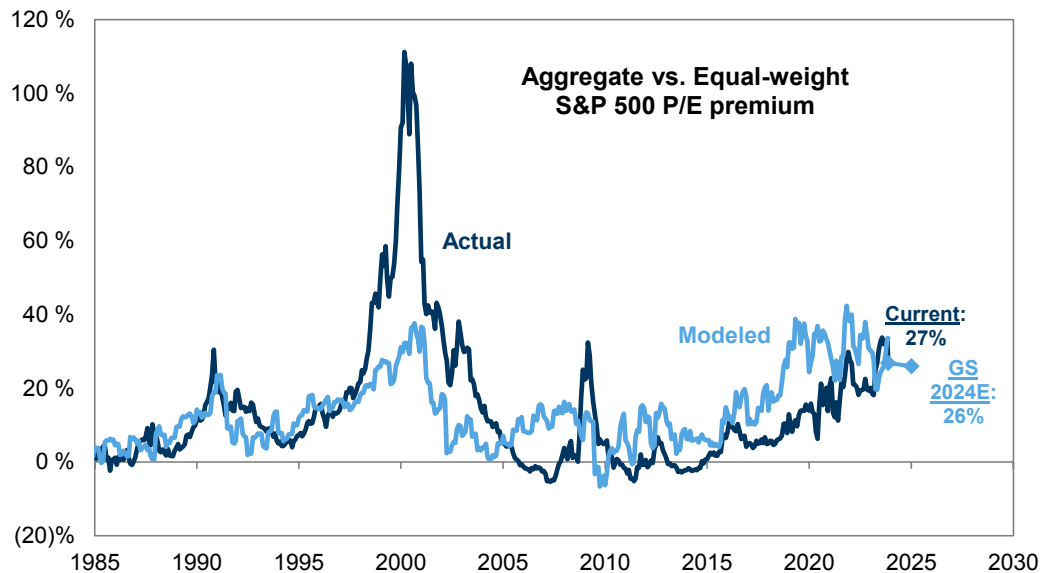
**To account for the outsized impact of the largest tech stocks on the aggregate P/E multiple, we decompose our valuation forecast into two components:** First, we model the equal-weight S&P 500 forward P/E. Second, we model the premium of the aggregate P/E to the equal-weight P/E. We combine these two forecasts to arrive at a forecast for the aggregate P/E multiple.

**Our baseline macro forecasts point to a roughly unchanged equal-weight S&P 500 P/E of 14x at year-end 2024 that would rank in the 65<sup>th</sup> percentile since 1976. In contrast, the aggregate S&P 500 P/E of 18x will rank in the 83<sup>rd</sup> percentile versus history.** Current equity valuations appear less stretched in absolute and relative terms after adjusting for record high market concentration. We model the equal-weight P/E as

a function of real yields, the distance of forward inflation from 2%, the tightness of the labor market, demographics, and the change in earnings growth.

**We believe the fundamentals of the largest stocks will support the current valuation premium of the aggregate vs. equal-weight index through 2024.** The valuation premium of the aggregate vs. equal-weight S&P 500 equals 27%, well above the historical average. We model this premium as a function of the difference in aggregate vs. median long-term EPS growth and return on equity, as well as CEO confidence. Long-term expected EPS growth for the aggregate index equals 14%, vs. 9% for the equal-weight S&P 500, and LTM aggregate ROE equals 21%, vs. 18% for the equal-weight S&P 500. Based on consensus and GS analyst estimates, the largest stocks will likely maintain their premium growth, profitability, and therefore valuation premium.

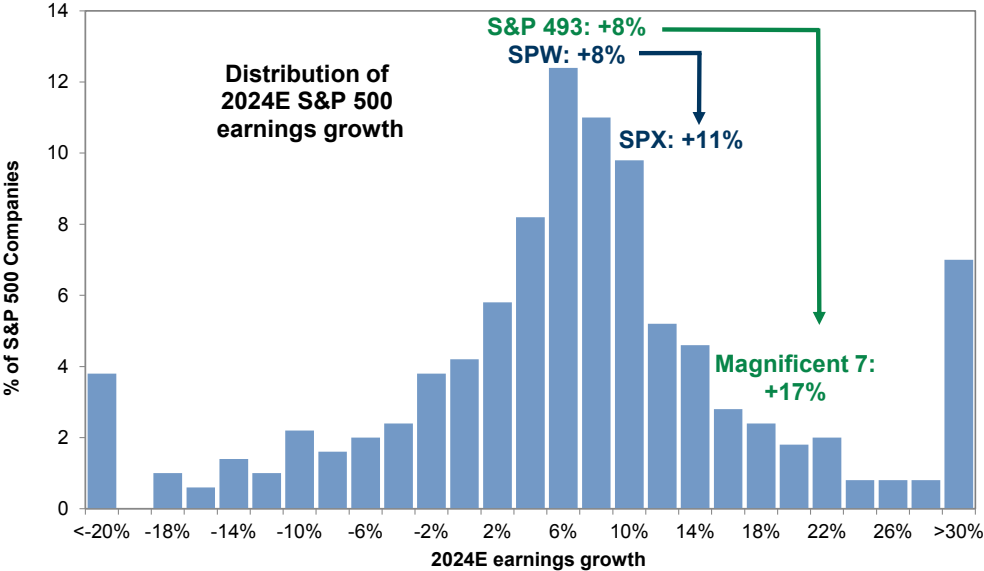
**Exhibit 13: Our model suggests the aggregate index will maintain its premium to the equal-weight index**



Source: FactSet, Goldman Sachs Global Investment Research

**From a return perspective, we forecast the aggregate S&P 500 index (SPX) will outperform the equal-weight index (SPW) by a much narrower gap than in 2023 when the aggregate has outperformed by 1,500 bp YTD (+19% vs. +4%).** Exhibit 14 shows the distribution of 2024 earnings growth for all 500 constituents of the index. Consensus expects the aggregate S&P 500 EPS will grow by 11% compared with 8% for the equal-weight index. Given our valuation model forecasts stable multiples for both indices, the superior return of the aggregate index will stem from its greater earnings growth. Investors should note that while the difference in 2024 EPS growth between the aggregate and equal-weight S&P 500 indices is 300 bp, the gap in EPS growth between the “Magnificent 7” and the remaining 493 stocks is three times as large, a substantial 9 pp (17% vs. 8%) because the left side of the distribution contains some large-cap stocks that are forecast to have negative EPS growth.

**Exhibit 14: Difference between aggregate and equal-weight S&P 500 EPS growth is much smaller than Magnificent 7 vs. S&P 493**



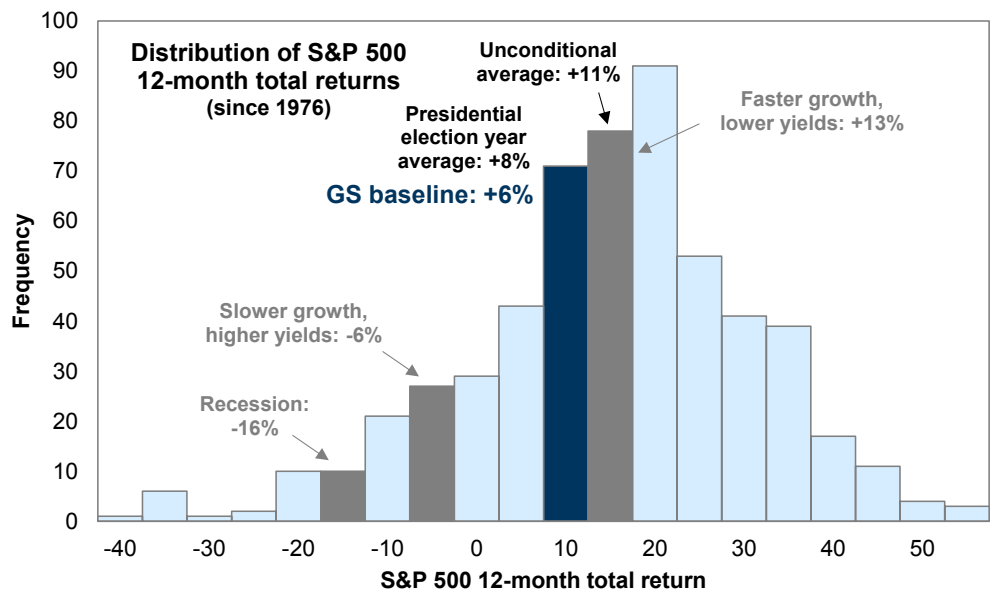
Source: FactSet, Goldman Sachs Global Investment Research

## Alternative return scenarios: “Blank Space” — Upside and downside

**Our baseline expectation that the aggregate S&P 500 index will post a 6% total return in 2024 is slightly below the typical return during presidential election years.** Putting aside uncertainty about the path of economic growth and interest rates, S&P 500 returns during years that included a US presidential election have closely resembled the unconditional trend. In 12 presidential election years since 1976, the aggregate S&P 500 index registered an 8% average total return, similar to the unconditional average return of 11%. Equal-weighted S&P 500 returns during election years outpaced the aggregate index by 300 bp annually with an average 11% return.

**Returns during election years are typically stronger post-Election Day and driven more by earnings growth than change in valuation.** In the median election year since 1976, the S&P 500 has typically appreciated by 5% between the start of the year and Election Day and risen 4% post-Election Day through year-end. Aggregate valuations were roughly flat during election years. Our interim 3-month (4500) and 6-month (4500) S&P 500 index targets reflect a flat market during 1H 2024.

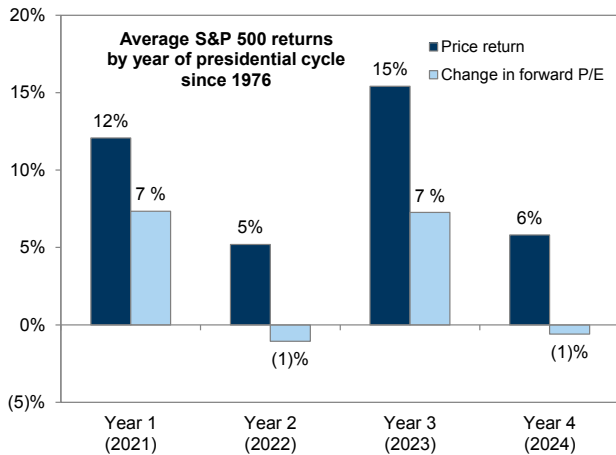
**Exhibit 15: Distribution of S&P 500 12-month total returns since 1976: Baseline and alternative scenarios**



GS baseline and scenarios reflect total return including dividends.

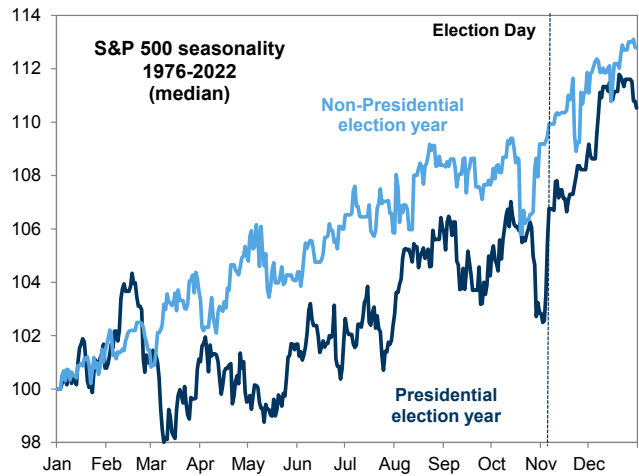
Source: Goldman Sachs Global Investment Research

**Exhibit 16: Average S&P 500 returns and changes in P/E by year of presidential cycle**



Source: Goldman Sachs Global Investment Research

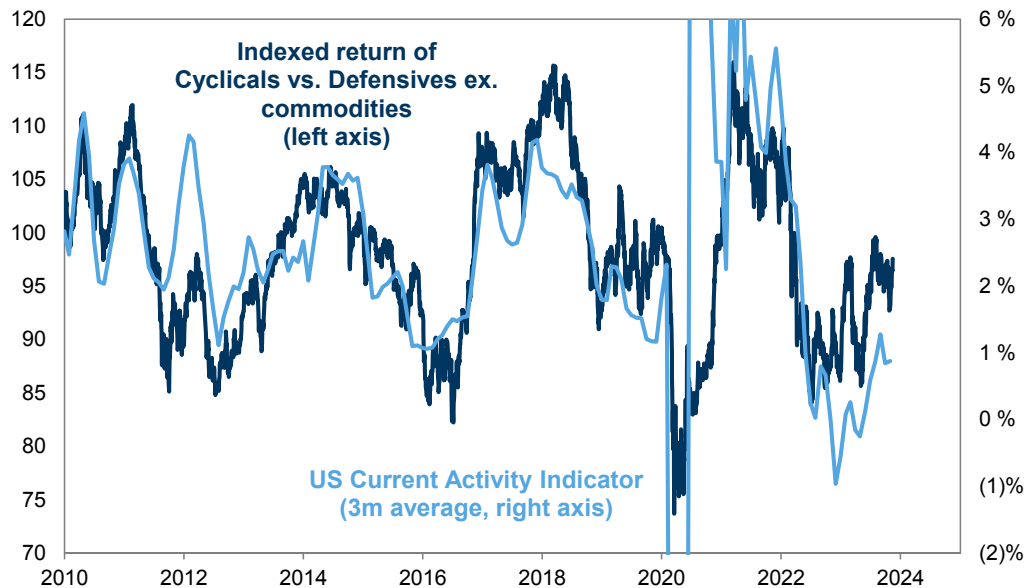
**Exhibit 17: Election year seasonality**



Source: Goldman Sachs Global Investment Research

**Our relatively benign macro forecast is currently reflected in the equity market. Accordingly, we believe investors should be particularly focused on the distribution of risks around our baseline forecast.** While our economists’ forecast that the US will avoid a recession in 2024 is an outlier relative to consensus, that view is already priced in the US equity market. The performance of cyclical stocks vs. defensive stocks (GSPUCYDE) is consistent with a 2% real GDP growth regime (Exhibit 18). We discuss below three alternative paths for the equity market in 2024 (Exhibit 19).

**Exhibit 18: US equities are pricing real GDP growth of roughly 2%**



Source: Goldman Sachs Global Investment Research

**Faster growth, lower yields: In a scenario where inflation and bond yields fall more quickly than we expect but growth remains strong, we expect the S&P 500 would end 2024 at 5000 (+11%).** The relief from peak and falling bond yields would more

closely mirror the historical playbook at the end of Fed hiking cycles, with valuations expanding modestly to 19x. Equity returns would also benefit from more rapid economic and earnings growth. At 5000, the index would trade 4% above the January 2022 all-time high of nearly 4800.

**Slower growth, higher yields: In a scenario where the economy manages to avoid a recession but bond yields rise by more than we expect, we forecast the S&P 500 would end 2024 at 4150 (-8%).** The resulting slowdown in economic and earnings growth would be exacerbated by valuation contraction in the higher interest rate environment. This backdrop could prove particularly challenging for the mega-cap tech stocks, which tend to be longer duration equities and well-owned among hedge funds, although the strength of their balance sheets would likely provide some insulation.

**Recession: In a recession, we expect the S&P 500 would end 2024 at 3700 (-18%).** Although not our baseline, we consider a relatively mild recession scenario. If a recession materializes and real GDP contracts, it would likely lead to a 15% decline in EPS in 2024, before rebounding by 9% in 2025. However, consensus estimates would be cut more gradually, with 2025 EPS estimates declining to roughly halfway between today's bottom-up consensus estimate of \$273 and our recession scenario EPS of \$209. We also assume the Fed would respond to the recession by easing the policy rate, leading real yields lower and cushioning the potential valuation decline. We forecast the S&P 500 P/E would contract to 15x. For historical context, during prior economic downturns S&P 500 EPS experienced a peak-to-trough decline of 11% and the index level typically fell by 24%, although prices and valuations typically bottom faster than earnings.

**Exhibit 19: S&P 500 index scenarios at year-end 2024**

	<b>Baseline</b>	<b>Faster growth lower yields</b>	<b>Slower growth higher yields</b>	<b>Recession</b>
2024 EPS growth	5 %	9 %	1 %	(15)%
Equal-weight P/E	14 x	15 x	13 x	13 x
%ile rank vs. history	65%	77%	58%	53%
Aggregate P/E	18 x	19 x	16 x	15 x
%ile rank vs. history	83%	86%	71%	64%
Real 10-yr UST yield	2.3 %	1.8 %	3.0 %	1.3 %
<b>S&amp;P 500 level</b>	<b>4700</b>	<b>5000</b>	<b>4150</b>	<b>3700</b>
% total return vs. current	6 %	13 %	(6)%	(16)%
%ile rank since 1976	29%	47%	13%	5%
GS subjective probability	50%	25%	10%	15%

GS baseline and scenarios reflect total return including dividends.

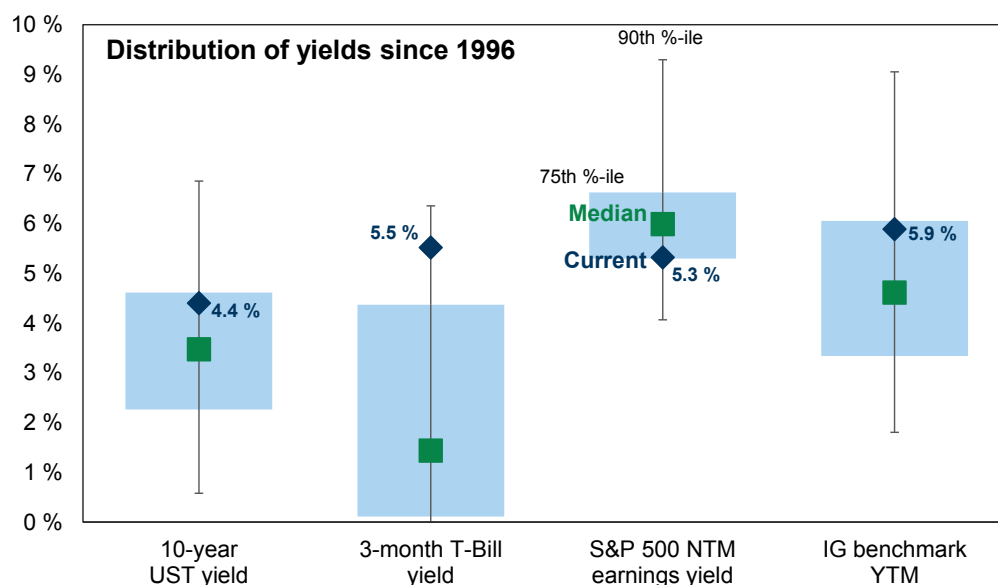
Source: Goldman Sachs Global Investment Research



## Money Flow: “Everything Has Changed” — From TINA to TARA

**The dramatic rise in Treasury yields during the past two years has sparked a seismic shift in the asset allocation trade off.** The 10-year US Treasury note currently yields 4.4%, roughly 300 bp above its level two years ago. Although the Treasury yield has retreated from its recent 5% peak, our rates strategists expect at year-end 2024 the 10-year will trade at the still-elevated level of 4.6%. Yield-bearing assets such as three-month Treasury bills and investment-grade corporate bonds have also become considerably more attractive than two-years ago. In contrast, equity valuations on an absolute and relative basis have actually become less attractive ([Exhibit 20](#)). Consequently, equities offer the narrowest risk premium relative to 10-year Treasury notes in more than 20 years.

**Exhibit 20: Yield-bearing assets offer attractive risk-adjusted yields relative to equities**



Source: Haver, FactSet, Goldman Sachs Global Investment Research

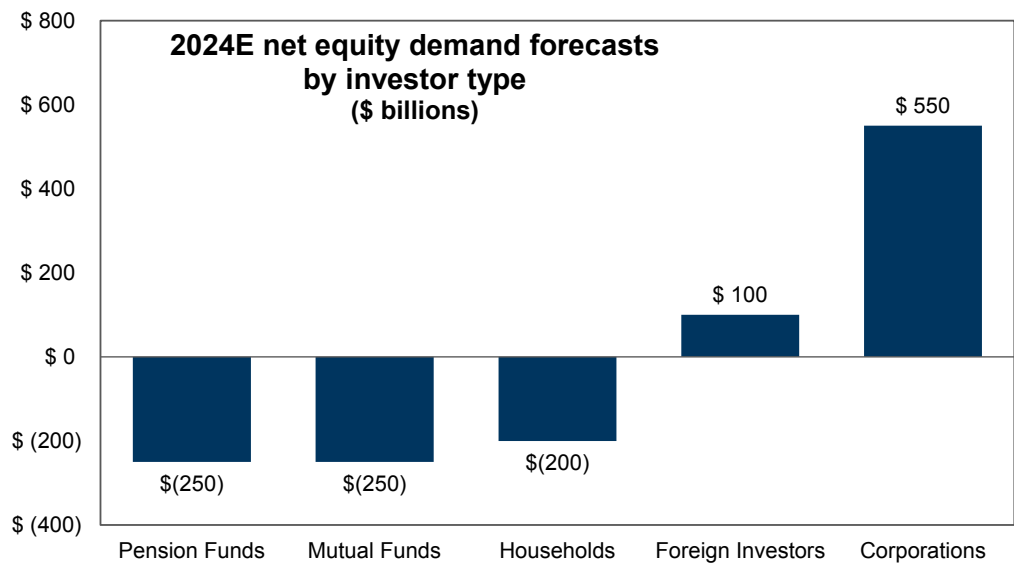
**US households directly own 39% of US equities. We forecast in 2024 they will be net sellers of stocks for a second consecutive year.** The new interest rate regime has led to a clear shift in the asset allocation calculus for households: After purchasing \$2.3 trillion in equities from 2020-2022, households have been net sellers of US stocks in 2023. In lieu of equities, households have chosen to purchase yield-bearing assets, such as Treasuries and money market funds. Given household balance sheets remain heavily tilted toward equities, we expect households will net sell \$200 billion in US stocks in 2024 and will continue to rotate toward yield-bearing assets.

**Similarly, in 2024 pension funds will also continue rotating away from equities and toward bonds.** The surge in interest rates means US corporate pension funds discount their future liabilities at a much higher rate than recent history allowed. According to Milliman, the largest defined benefit pension plans in the US are currently 104% funded, up from 90% at the start of 2021 when 10-year US Treasury bonds yielded just 0.9%.

Their improved funded status means pensions are incentivized to rotate away from equities and toward less risky assets, such as Treasuries. We forecast pension funds will be net sellers of \$250 billion of equities in 2024 as the environment of higher-for-longer rates will drive a sustained rotation away from stocks.

**Corporations and foreign investors will be net buyers of US stocks in 2024.** Similar to the last 23 years, we expect corporations will be the largest source of equity demand in 2024. We forecast buybacks will rise by 4% and cash M&A will rebound by 15% in 2024. The combination of buyback and M&A strength will lead corporations to be net purchasers of \$550 billion in US stocks in 2024. Our FX strategists expect the dollar will weaken modestly in 2024, which should drive continued net buying of US stocks by foreign investors (+\$100 billion).

**Exhibit 21: US Portfolio Strategy 2024E net equity demand forecasts**



Source: Federal Reserve and Goldman Sachs Global Investment Research

## Concentration: “Seven” — The “Magnificent 7” vs. the remaining 493

**The massive outperformance of mega-cap technology stocks has been a defining feature of the equity market in 2023.** The so-called “Magnificent 7” (AAPL, MSFT, GOOGL, AMZN, NVDA, META, TSLA) now comprise 29% of S&P 500 market cap and collectively have returned 71% YTD in 2023. The remaining 493 stocks in the index have returned just 6%. As a result, the top 7 stocks have accounted for 76% of the S&P 500 index’s 19% YTD return.

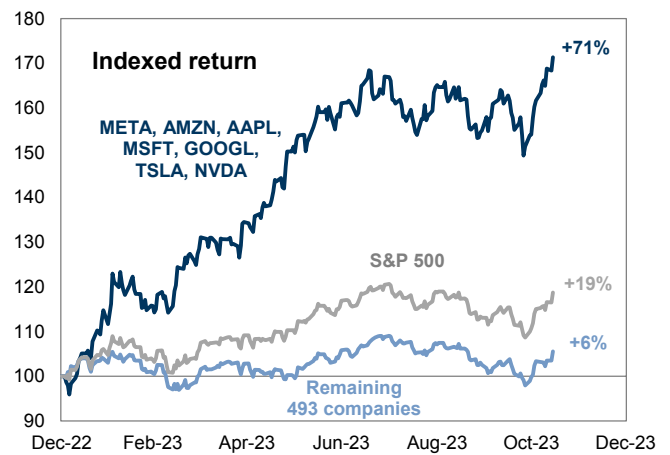
**However, the dominance of mega-cap tech in 2023 largely reflected a reversal of meaningful underperformance in 2022.** The Magnificent 7 stocks collectively returned -39% in 2022 compared with a -11% return for the remaining 493 constituents in the S&P 500.

**Exhibit 22: Share of largest seven companies’ market cap in S&P 500 is at an all-time high**



Source: Compustat, Goldman Sachs Global Investment Research

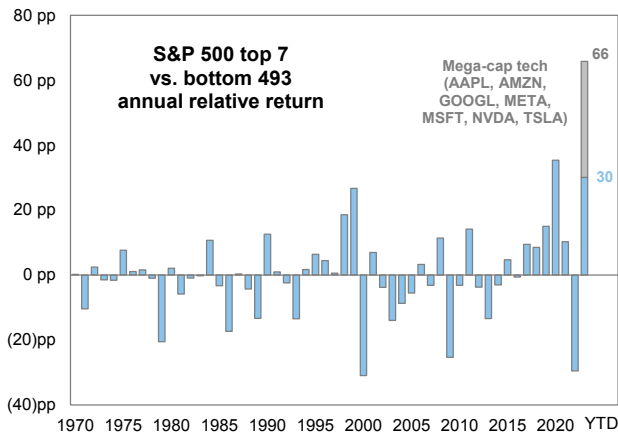
**Exhibit 23: The Magnificent 7 have led the index higher in 2023**



Source: FactSet, Goldman Sachs Global Investment Research

**The 30 pp of outperformance of the seven largest stocks at the start of this year vs. the rest of the index YTD ranks as the second largest annual difference since 1970.** Notably, during the year, META, NVDA, and TSLA displaced BRK.B, JNJ, and UNH among the 7 largest stocks in the index. This year’s return has only been surpassed by the 35 pp of outperformance during the COVID-affected 2020 calendar year. While the magnitude of outperformance has been striking, there has been no reliable historical relationship between the trailing and forward 12-month outperformance of the largest seven S&P 500 constituents vs. the remainder of the index. For example, the dramatic 27 pp outperformance of the largest seven stocks in 1999 was followed by 31 pp of underperformance in 2000, while the outperformance in 2020 was followed by another year of outperformance in 2021.

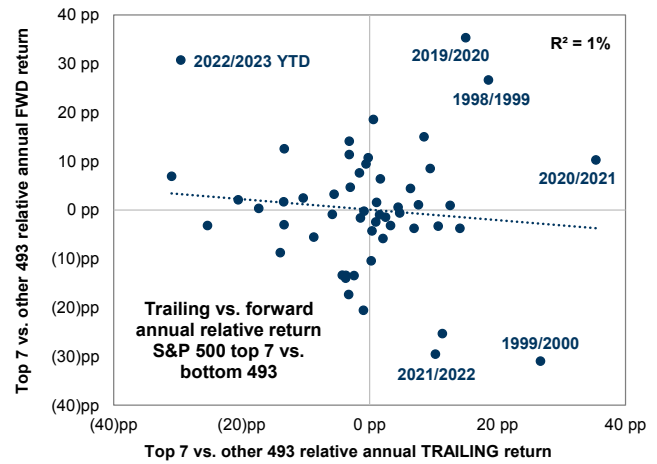
**Exhibit 24: Sharp outperformance of Top 7 vs. S&P 493**



Only 5 of the 7 largest stocks today were also among the 7 largest stocks at the start of 2023.

Source: Goldman Sachs Global Investment Research

**Exhibit 25: Little relationship between trailing and forward returns of Top 7 vs. S&P 493**



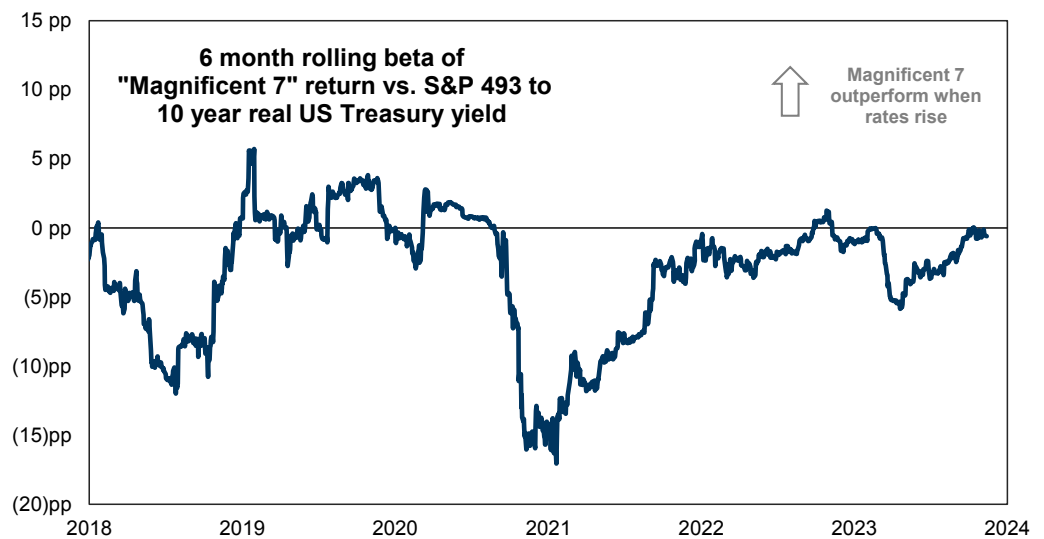
Source: Goldman Sachs Global Investment Research

**Our baseline forecast suggests that in 2024 the mega-cap tech stocks will continue to outperform the remainder of the S&P 500, but the risk/reward profile of this trade is not especially attractive given elevated expectations.** All investment forecasts include the disclaimer that “past performance is no guarantee of future results.” Nevertheless, the Magnificent 7 stocks have faster expected 2023-2025 CAGR sales growth (11% vs. 3%), higher 2023 margins (22% vs. 10%), and a greater re-investment ratio (61% vs. 18%) than the other 493 stocks and trade at a relative valuation in line with recent averages after accounting for expected growth (0.9x relative PEG ratio). From a macro perspective, our economists’ forecast for stable interest rates implies fundamentals rather than valuation changes will be the key driver of stock returns in 2024.

**The key determinant of whether the mega-caps will continue to outperform next year will be how realized sales and earnings growth compare with current expectations.** In 2000, the eventual underperformance of the mega-cap market leaders occurred when those companies failed to meet elevated growth expectations and multiples collapsed. If the Magnificent 7 repeat this dynamic and disappoint expectations in 2024, those stocks’ valuations will likely “catch down” towards the remainder of the index and underperform. Fading enthusiasm in AI is one potential way those growth expectations could deteriorate, as is an unfavorable outcome in one of the ongoing antitrust trials. Conversely, if the growth environment proves better than expected for the remainder of the index, the Magnificent 7 will underperform as the other 493 stocks “catch up.” From a macro perspective, a substantial decline in interest rates that occurs alongside a resilient economic growth environment would also help spur a “catch up.” Concentrated hedge fund positioning in the Magnificent 7 is another key risk to those stocks. However, P/E multiple expansion for the Magnificent 7 stocks is possible if their sales growth expectations accelerate due to faster-than-anticipated adoption of AI.

**We do not expect interest rates to be a major driver of Magnificent 7 performance in 2023.** The sensitivity of Magnificent 7 performance to real rates is currently close to zero, but the historical relationship has varied widely over time. Sometimes the market has treated the Magnificent 7 as a long duration asset, with the group underperforming as rates rise. In 2022 the Magnificent 7 underperformed the rest of the market alongside rising interest rates, but many investors overstated the impact of rates given earnings were falling concurrently. At other times, such as when investors were worried about the impact of rising interest rates, the market rewarded the Magnificent 7 for their strong balance sheets. The performance of these stocks during recent months demonstrates this dynamic (see [Exhibit 26](#)).

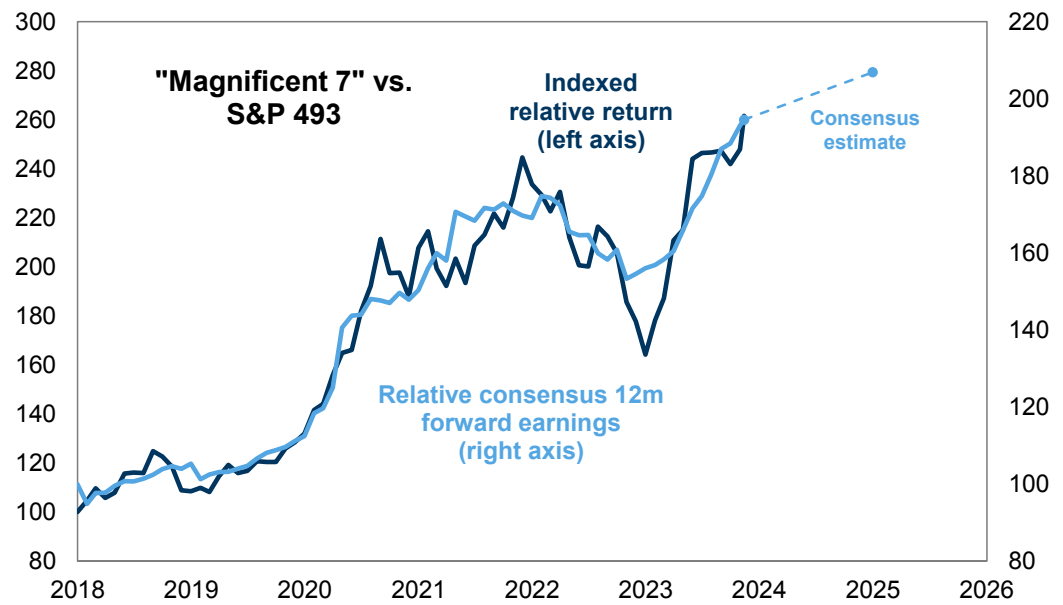
**Exhibit 26: Sensitivity of Magnificent 7 vs. S&P 493 performance to real rates**  
regression of daily returns, controlling for equity market pricing of economic growth



Source: Goldman Sachs Global Investment Research

**From a fundamental perspective, in recent years the trajectory of earnings has explained the performance of the Magnificent 7 relative to the rest of the market.** Mega-cap tech margins fell by 520 bp in 2022, compared with 60 bp of margin expansion for the remaining stocks, contributing to a 17% decline in EPS vs. 10% growth for the other 493 stocks. The outperformance of the Magnificent 7 this year has coincided with a rebound in margins and earnings that has outpaced the weakness across the rest of the market.

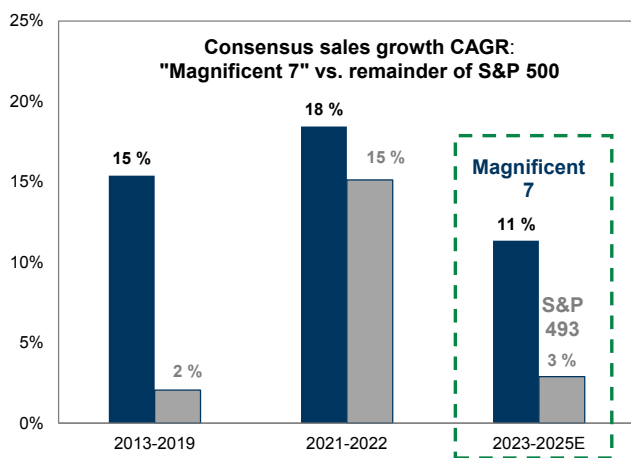
**Exhibit 27: Magnificent 7 have outperformed alongside an improvement in earnings**



Source: Goldman Sachs Global Investment Research

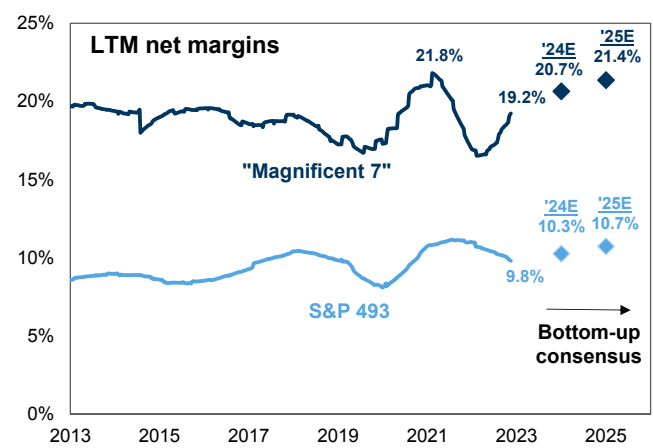
**Consensus expects the Magnificent 7 will continue to deliver faster growth than the rest of the index.** Analyst estimates show the mega-cap tech companies growing sales at a CAGR of 11% through 2025 compared with just 3% for the rest of the S&P 500. The net margins of the Magnificent 7 are twice the margins of the rest of the index, and consensus expects this gap will persist through 2025.

**Exhibit 28: Sales growth of Magnificent 7 vs. rest of S&P 500**



Source: FactSet, Goldman Sachs Global Investment Research

**Exhibit 29: Margins of Magnificent 7 vs. rest of S&P 500**

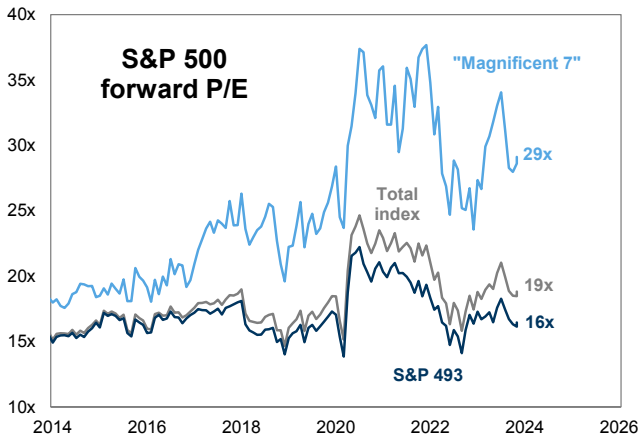


Source: FactSet, Goldman Sachs Global Investment Research

**From a valuation perspective, the Magnificent 7 trade at a large P/E premium vs. the rest of the market, but relative valuations stand in line with recent averages after accounting for expected growth.** The Magnificent 7 trades at a P/E of 29x, 1.7x the 17x P/E multiple of the median S&P 500 stock. This ratio ranks in the 91<sup>st</sup> percentile since 2012. However, on an earnings-weighted basis, the Magnificent 7 long-term expected EPS growth is 8 pp faster than the median S&P 500 stock (+17% vs. +9%).

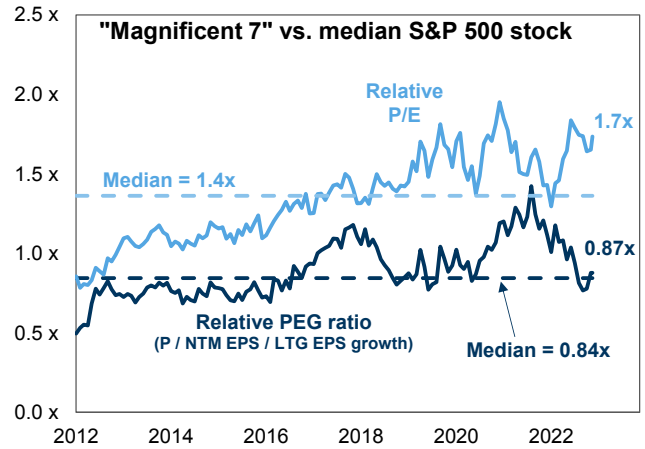
On a PEG ratio basis, the relative valuations are in line with the 10-year average.

**Exhibit 30: Magnificent 7 vs. rest of S&P 500 NTM P/E**



Source: FactSet, Goldman Sachs Global Investment Research

**Exhibit 31: Valuations appear less demanding after controlling for growth expectations**

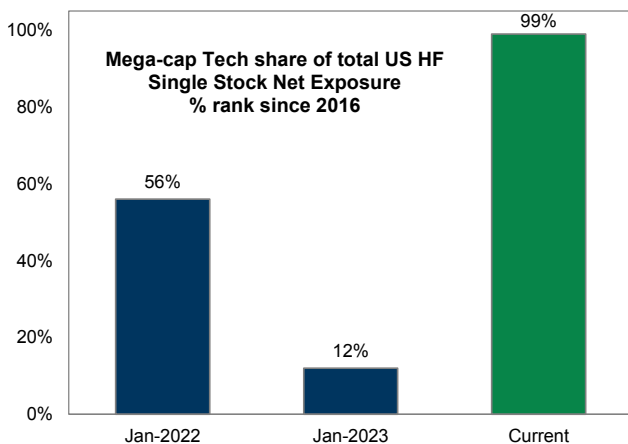


Source: FactSet, Goldman Sachs Global Investment Research

**Elevated hedge fund ownership and a potential inflection in AI enthusiasm**

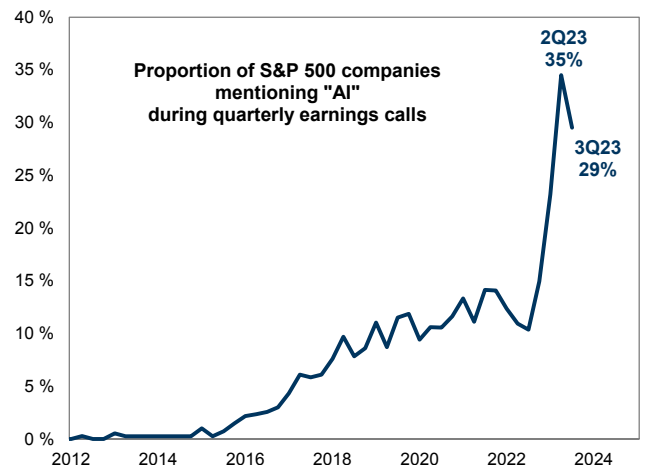
**represent two risks to the mega-cap tech stocks.** According to GS Prime Services data, at the start of 2023 US single stock hedge fund net exposures to the mega-cap tech stocks ranked in just the 12<sup>th</sup> percentile vs. history since 2016. Today, positions rank in the 99<sup>th</sup> percentile since 2016. The recent surge in enthusiasm regarding artificial intelligence (AI) may also have inflected. The emergence of ChatGPT, and AI more broadly, benefited the largest stocks who were either directly or indirectly involved in the development of the technology. However, the frequency of AI mentions in earnings transcripts declined during the 3Q earnings season after surging earlier in 2023. Likewise, Google search volumes for AI rose sharply in early 2023 but appear to have stabilized in recent weeks.

**Exhibit 32: Hedge fund positioning in mega-cap tech is now back at record highs**



Source: GS Prime Services, Goldman Sachs Global Investment Research

**Exhibit 33: Mentions of AI in earnings calls declined in 3Q**



Source: FactSet, Goldman Sachs Global Investment Research

# Disclosure Appendix

## Reg AC

We, David J. Kostin, Ben Snider, Ryan Hammond, Cormac Connors, Lily Calcagnini, Jenny Ma and Daniel Chavez, hereby certify that all of the views expressed in this report accurately reflect our personal views, which have not been influenced by considerations of the firm's business or client relationships.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

## Disclosures

### Basket disclosure

The ability to trade the basket(s) in this report will depend upon market conditions, including liquidity and borrow constraints at the time of trade.

## Regulatory disclosures

### Disclosures required by United States laws and regulations

See company-specific regulatory disclosures above for any of the following disclosures required as to companies referred to in this report: manager or co-manager in a pending transaction; 1% or other ownership; compensation for certain services; types of client relationships; managed/co-managed public offerings in prior periods; directorships; for equity securities, market making and/or specialist role. Goldman Sachs trades or may trade as a principal in debt securities (or in related derivatives) of issuers discussed in this report.

The following are additional required disclosures: **Ownership and material conflicts of interest:** Goldman Sachs policy prohibits its analysts, professionals reporting to analysts and members of their households from owning securities of any company in the analyst's area of coverage.

**Analyst compensation:** Analysts are paid in part based on the profitability of Goldman Sachs, which includes investment banking revenues. **Analyst as officer or director:** Goldman Sachs policy generally prohibits its analysts, persons reporting to analysts or members of their households from serving as an officer, director or advisor of any company in the analyst's area of coverage. **Non-U.S. Analysts:** Non-U.S. analysts may not be associated persons of Goldman Sachs & Co. LLC and therefore may not be subject to FINRA Rule 2241 or FINRA Rule 2242 restrictions on communications with subject company, public appearances and trading securities held by the analysts.

### Additional disclosures required under the laws and regulations of jurisdictions other than the United States

The following disclosures are those required by the jurisdiction indicated, except to the extent already made above pursuant to United States laws and regulations. **Australia:** Goldman Sachs Australia Pty Ltd and its affiliates are not authorised deposit-taking institutions (as that term is defined in the Banking Act 1959 (Cth)) in Australia and do not provide banking services, nor carry on a banking business, in Australia. This research, and any access to it, is intended only for "wholesale clients" within the meaning of the Australian Corporations Act, unless otherwise agreed by Goldman Sachs. In producing research reports, members of Global Investment Research of Goldman Sachs Australia may attend site visits and other meetings hosted by the companies and other entities which are the subject of its research reports. In some instances the costs of such site visits or meetings may be met in part or in whole by the issuers concerned if Goldman Sachs Australia considers it is appropriate and reasonable in the specific circumstances relating to the site visit or meeting. To the extent that the contents of this document contains any financial product advice, it is general advice only and has been prepared by Goldman Sachs without taking into account a client's objectives, financial situation or needs. A client should, before acting on any such advice, consider the appropriateness of the advice having regard to the client's own objectives, financial situation and needs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests and a copy of Goldman Sachs' Australian Sell-Side Research Independence Policy Statement are available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Brazil:** Disclosure information in relation to CVM Resolution n. 20 is available at <https://www.gs.com/worldwide/brazil/area/gir/index.html>. Where applicable, the Brazil-registered analyst primarily responsible for the content of this research report, as defined in Article 20 of CVM Resolution n. 20, is the first author named at the beginning of this report, unless indicated otherwise at the end of the text. **Canada:** This information is being provided to you for information purposes only and is not, and under no circumstances should be construed as, an advertisement, offering or solicitation by Goldman Sachs & Co. LLC for purchasers of securities in Canada to trade in any Canadian security. Goldman Sachs & Co. LLC is not registered as a dealer in any jurisdiction in Canada under applicable Canadian securities laws and generally is not permitted to trade in Canadian securities and may be prohibited from selling certain securities and products in certain jurisdictions in Canada. If you wish to trade in any Canadian securities or other products in Canada please contact Goldman Sachs Canada Inc., an affiliate of The Goldman Sachs Group Inc., or another registered Canadian dealer. **Hong Kong:** Further information on the securities of covered companies referred to in this research may be obtained on request from Goldman Sachs (Asia) L.L.C. **India:** Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (India) Securities Private Limited, Research Analyst - SEBI Registration Number INH000001493, 951-A, Rational House, Appasaheb Marathe Marg, Prabhadevi, Mumbai 400 025, India, Corporate Identity Number U74140MH2006FTC160634, Phone +91 22 6616 9000, Fax +91 22 6616 9001. Goldman Sachs may beneficially own 1% or more of the securities (as such term is defined in clause 2 (h) the Indian Securities Contracts (Regulation) Act, 1956) of the subject company or companies referred to in this research report. Investment in securities market are subject to market risks. Read all the related documents carefully before investing. Registration granted by SEBI and certification from NISM in no way guarantee performance of the intermediary or provide any assurance of returns to investors. Goldman Sachs (India) Securities Private Limited Investor Grievance E-mail: [india-client-support@gs.com](mailto:india-client-support@gs.com). Compliance Officer: Anil Rajput [Tel: + 91 22 6616 9000 | Email: [anil.m.rajput@gs.com](mailto:anil.m.rajput@gs.com)]. **Japan:** See below. **Korea:** This research, and any access to it, is intended only for "professional investors" within the meaning of the Financial Services and Capital Markets Act, unless otherwise agreed by Goldman Sachs. Further information on the subject company or companies referred to in this research may be obtained from Goldman Sachs (Asia) L.L.C., Seoul Branch. **New Zealand:** Goldman Sachs New Zealand Limited and its affiliates are neither "registered banks" nor "deposit takers" (as defined in the Reserve Bank of New Zealand Act 1989) in New Zealand. This research, and any access to it, is intended for "wholesale clients" (as defined in the Financial Advisers Act 2008) unless otherwise agreed by Goldman Sachs. A copy of certain Goldman Sachs Australia and New Zealand disclosure of interests is available at: <https://www.goldmansachs.com/disclosures/australia-new-zealand/index.html>. **Russia:** Research reports distributed in the Russian Federation are not advertising as defined in the Russian legislation, but are information and analysis not having product promotion as their main purpose and do not provide appraisal within the meaning of the Russian legislation on appraisal activity. Research reports do not constitute a personalized investment recommendation as defined in Russian laws and regulations, are not addressed to a specific client, and are prepared without analyzing the financial circumstances, investment profiles or risk profiles of clients. Goldman Sachs assumes no responsibility for any investment decisions that may be taken by a client or any other person based on this research report. **Singapore:** Goldman Sachs (Singapore) Pte. (Company Number: 198602165W), which is regulated by the Monetary Authority of Singapore, accepts legal responsibility for this research, and should be contacted with respect to any matters arising from, or in connection with, this research. **Taiwan:** This material is for reference only and must not be reprinted without permission. Investors should carefully consider their own investment risk. Investment results are the responsibility of the individual investor. **United Kingdom:** Persons who would be categorized as retail clients in the United Kingdom, as such term is defined in the rules of the Financial Conduct Authority, should read this research in conjunction with prior Goldman Sachs research on the covered companies referred to herein and should refer to the risk warnings that have been sent to them by Goldman Sachs International. A copy of these risks warnings, and a glossary of certain financial terms used in this report, are



available from Goldman Sachs International on request.

**European Union and United Kingdom:** Disclosure information in relation to Article 6 (2) of the European Commission Delegated Regulation (EU) (2016/958) supplementing Regulation (EU) No 596/2014 of the European Parliament and of the Council (including as that Delegated Regulation is implemented into United Kingdom domestic law and regulation following the United Kingdom's departure from the European Union and the European Economic Area) with regard to regulatory technical standards for the technical arrangements for objective presentation of investment recommendations or other information recommending or suggesting an investment strategy and for disclosure of particular interests or indications of conflicts of interest is available at <https://www.gs.com/disclosures/europeanpolicy.html> which states the European Policy for Managing Conflicts of Interest in Connection with Investment Research.

**Japan:** Goldman Sachs Japan Co., Ltd. is a Financial Instrument Dealer registered with the Kanto Financial Bureau under registration number Kinsho 69, and a member of Japan Securities Dealers Association, Financial Futures Association of Japan Type II Financial Instruments Firms Association, The Investment Trusts Association, Japan, and Japan Investment Advisers Association. Sales and purchase of equities are subject to commission pre-determined with clients plus consumption tax. See company-specific disclosures as to any applicable disclosures required by Japanese stock exchanges, the Japanese Securities Dealers Association or the Japanese Securities Finance Company.

## Global product; distributing entities

Goldman Sachs Global Investment Research produces and distributes research products for clients of Goldman Sachs on a global basis. Analysts based in Goldman Sachs offices around the world produce research on industries and companies, and research on macroeconomics, currencies, commodities and portfolio strategy. This research is disseminated in Australia by Goldman Sachs Australia Pty Ltd (ABN 21 006 797 897); in Brazil by Goldman Sachs do Brasil Corretora de Títulos e Valores Mobiliários S.A.; Public Communication Channel Goldman Sachs Brazil: 0800 727 5764 and / or [contatogoldmanbrasil@gs.com](mailto:contatogoldmanbrasil@gs.com). Available Weekdays (except holidays), from 9am to 6pm. Canal de Comunicação com o Público Goldman Sachs Brasil: 0800 727 5764 e/ou [contatogoldmanbrasil@gs.com](mailto:contatogoldmanbrasil@gs.com). Horário de funcionamento: segunda-feira à sexta-feira (exceto feriados), das 9h às 18h; in Canada by Goldman Sachs & Co. LLC; in Hong Kong by Goldman Sachs (Asia) L.L.C.; in India by Goldman Sachs (India) Securities Private Ltd.; in Japan by Goldman Sachs Japan Co., Ltd.; in the Republic of Korea by Goldman Sachs (Asia) L.L.C., Seoul Branch; in New Zealand by Goldman Sachs New Zealand Limited; in Russia by OOO Goldman Sachs; in Singapore by Goldman Sachs (Singapore) Pte. (Company Number: 198602165W); and in the United States of America by Goldman Sachs & Co. LLC. Goldman Sachs International has approved this research in connection with its distribution in the United Kingdom.

Goldman Sachs International ("GSI"), authorised by the Prudential Regulation Authority ("PRA") and regulated by the Financial Conduct Authority ("FCA") and the PRA, has approved this research in connection with its distribution in the United Kingdom.

**European Economic Area:** GSI, authorised by the PRA and regulated by the FCA and the PRA, disseminates research in the following jurisdictions within the European Economic Area: the Grand Duchy of Luxembourg, Italy, the Kingdom of Belgium, the Kingdom of Denmark, the Kingdom of Norway, the Republic of Finland and the Republic of Ireland; GSI - Succursale de Paris (Paris branch) which is authorised by the French Autorité de contrôle prudentiel et de résolution ("ACPR") and regulated by the Autorité de contrôle prudentiel et de résolution and the Autorité des marchés financiers ("AMF") disseminates research in France; GSI - Sucursal en España (Madrid branch) authorized in Spain by the Comisión Nacional del Mercado de Valores disseminates research in the Kingdom of Spain; GSI - Sweden Bankfilial (Stockholm branch) is authorized by the SFSA as a "third country branch" in accordance with Chapter 4, Section 4 of the Swedish Securities and Market Act (Sw. lag (2007:528) om värdepappersmarknaden) disseminates research in the Kingdom of Sweden; Goldman Sachs Bank Europe SE ("GSBE") is a credit institution incorporated in Germany and, within the Single Supervisory Mechanism, subject to direct prudential supervision by the European Central Bank and in other respects supervised by German Federal Financial Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht, BaFin) and Deutsche Bundesbank and disseminates research in the Federal Republic of Germany and those jurisdictions within the European Economic Area where GSI is not authorised to disseminate research and additionally, GSBE, Copenhagen Branch filial af GSBE, Tyskland, supervised by the Danish Financial Authority disseminates research in the Kingdom of Denmark; GSBE - Sucursal en España (Madrid branch) subject (to a limited extent) to local supervision by the Bank of Spain disseminates research in the Kingdom of Spain; GSBE - Succursale Italia (Milan branch) to the relevant applicable extent, subject to local supervision by the Bank of Italy (Banca d'Italia) and the Italian Companies and Exchange Commission (Commissione Nazionale per le Società e la Borsa "Consob") disseminates research in Italy; GSBE - Succursale de Paris (Paris branch), supervised by the AMF and by the ACPR disseminates research in France; and GSBE - Sweden Bankfilial (Stockholm branch), to a limited extent, subject to local supervision by the Swedish Financial Supervisory Authority (Finansinspektionen) disseminates research in the Kingdom of Sweden.

## General disclosures

This research is for our clients only. Other than disclosures relating to Goldman Sachs, this research is based on current public information that we consider reliable, but we do not represent it is accurate or complete, and it should not be relied on as such. The information, opinions, estimates and forecasts contained herein are as of the date hereof and are subject to change without prior notification. We seek to update our research as appropriate, but various regulations may prevent us from doing so. Other than certain industry reports published on a periodic basis, the large majority of reports are published at irregular intervals as appropriate in the analyst's judgment.

Goldman Sachs conducts a global full-service, integrated investment banking, investment management, and brokerage business. We have investment banking and other business relationships with a substantial percentage of the companies covered by Global Investment Research. Goldman Sachs & Co. LLC, the United States broker dealer, is a member of SIPC (<https://www.sipc.org>).

Our salespeople, traders, and other professionals may provide oral or written market commentary or trading strategies to our clients and principal trading desks that reflect opinions that are contrary to the opinions expressed in this research. Our asset management area, principal trading desks and investing businesses may make investment decisions that are inconsistent with the recommendations or views expressed in this research.

We and our affiliates, officers, directors, and employees will from time to time have long or short positions in, act as principal in, and buy or sell, the securities or derivatives, if any, referred to in this research, unless otherwise prohibited by regulation or Goldman Sachs policy.

The views attributed to third party presenters at Goldman Sachs arranged conferences, including individuals from other parts of Goldman Sachs, do not necessarily reflect those of Global Investment Research and are not an official view of Goldman Sachs.

Any third party referenced herein, including any salespeople, traders and other professionals or members of their household, may have positions in the products mentioned that are inconsistent with the views expressed by analysts named in this report.

This research is focused on investment themes across markets, industries and sectors. It does not attempt to distinguish between the prospects or performance of, or provide analysis of, individual companies within any industry or sector we describe.

Any trading recommendation in this research relating to an equity or credit security or securities within an industry or sector is reflective of the investment theme being discussed and is not a recommendation of any such security in isolation.

This research is not an offer to sell or the solicitation of an offer to buy any security in any jurisdiction where such an offer or solicitation would be illegal. It does not constitute a personal recommendation or take into account the particular investment objectives, financial situations, or needs of

individual clients. Clients should consider whether any advice or recommendation in this research is suitable for their particular circumstances and, if appropriate, seek professional advice, including tax advice. The price and value of investments referred to in this research and the income from them may fluctuate. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. Fluctuations in exchange rates could have adverse effects on the value or price of, or income derived from, certain investments.

Certain transactions, including those involving futures, options, and other derivatives, give rise to substantial risk and are not suitable for all investors. Investors should review current options and futures disclosure documents which are available from Goldman Sachs sales representatives or at <https://www.theocc.com/about/publications/character-risks.jsp> and [https://www.fiadocumentation.org/fia/regulatory-disclosures\\_1/fia-uniform-futures-and-options-on-futures-risk-disclosures-booklet-pdf-version-2018](https://www.fiadocumentation.org/fia/regulatory-disclosures_1/fia-uniform-futures-and-options-on-futures-risk-disclosures-booklet-pdf-version-2018). Transaction costs may be significant in option strategies calling for multiple purchase and sales of options such as spreads. Supporting documentation will be supplied upon request.

**Differing Levels of Service provided by Global Investment Research:** The level and types of services provided to you by Goldman Sachs Global Investment Research may vary as compared to that provided to internal and other external clients of GS, depending on various factors including your individual preferences as to the frequency and manner of receiving communication, your risk profile and investment focus and perspective (e.g., marketwide, sector specific, long term, short term), the size and scope of your overall client relationship with GS, and legal and regulatory constraints. As an example, certain clients may request to receive notifications when research on specific securities is published, and certain clients may request that specific data underlying analysts' fundamental analysis available on our internal client websites be delivered to them electronically through data feeds or otherwise. No change to an analyst's fundamental research views (e.g., ratings, price targets, or material changes to earnings estimates for equity securities), will be communicated to any client prior to inclusion of such information in a research report broadly disseminated through electronic publication to our internal client websites or through other means, as necessary, to all clients who are entitled to receive such reports.

All research reports are disseminated and available to all clients simultaneously through electronic publication to our internal client websites. Not all research content is redistributed to our clients or available to third-party aggregators, nor is Goldman Sachs responsible for the redistribution of our research by third party aggregators. For research, models or other data related to one or more securities, markets or asset classes (including related services) that may be available to you, please contact your GS representative or go to <https://research.gs.com>.

Disclosure information is also available at <https://www.gs.com/research/hedge.html> or from Research Compliance, 200 West Street, New York, NY 10282.

© 2023 Goldman Sachs.

**No part of this material may be (i) copied, photocopied or duplicated in any form by any means or (ii) redistributed without the prior written consent of The Goldman Sachs Group, Inc.**