Note: The following is a redacted version of the original report published November 8, 2023 [28 pgs].

Goldman Sachs | Economics Research

8 November 2023 | 11:01AM EST

Global Economics Analyst

Macro Outlook 2024: The Hard Part Is Over

- The global economy has outperformed even our optimistic expectations in 2023. GDP growth is on track to beat consensus forecasts from a year ago by 1pp globally and 2pp in the US, while core inflation is down from 6% in 2022 to 3% sequentially across economies that saw a post-covid price surge.
- More disinflation is in store over the next year. Although the normalization in product and labor markets is now well advanced, its full disinflationary effect is still playing out, and core inflation should fall back to 2-2½% by end-2024.
- We continue to see only limited recession risk and reaffirm our 15% US recession probability. We expect several tailwinds to global growth in 2024, including strong real household income growth, a smaller drag from monetary and fiscal tightening, a recovery in manufacturing activity, and an increased willingness of central banks to deliver insurance cuts if growth slows.
- Most major DM central banks are likely finished hiking, but under our baseline forecast for a strong global economy, rate cuts probably won't arrive until 2024H2. When rates ultimately do settle, we expect central banks to leave policy rates above their current estimates of long-run sustainable levels.
- The Bank of Japan will likely start moving to exit yield curve control in the spring before formally exiting and raising rates in 2024H2, assuming inflation remains on track to exceed its 2% target. Near-term growth in China should benefit from further policy stimulus, but China's multi-year slowdown will likely continue.
- The market outlook is complicated by compressed risk premia and markets that are quite well priced for our central case. We expect returns in rates, credit, equities, and commodities to exceed cash in 2024 under our baseline forecast. Each offers protection against a different tail risk, so a balanced asset mix should replace 2023's cash focus, with a greater role for duration in portfolios.
- The transition to a higher interest rate environment has been bumpy, but investors now face the prospect of much better forward returns on fixed income assets. The big question is whether a return to the pre-GFC rate backdrop is an equilibrium. The answer is more likely to be yes in the US than elsewhere, especially in Europe where sovereign stress might reemerge. Without a clear challenger to the US growth story, the dollar is likely to remain strong.

Jan Hatzius
+1(212)902-0394 | jan.hatzius@gs.com
Goldman Sachs & Co. LLC

Dominic Wilson
+1(212)902-5924 |
dominic.wilson@gs.com
Goldman Sachs & Co. LLC

Joseph Briggs
+1(212)902-2163 |
joseph.briggs@gs.com
Goldman Sachs & Co. LLC

Vickie Chang
+1(212)902-6915 | vickie.chang@gs.com
Goldman Sachs & Co. LLC

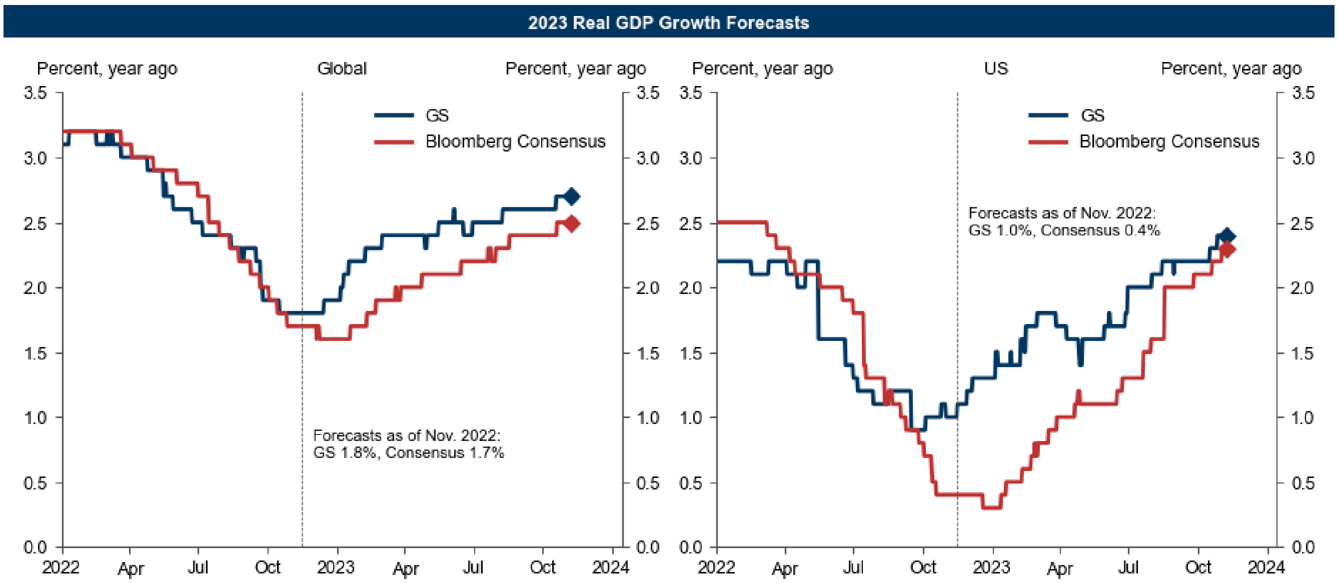
Devesh Kodnani
+1(917)343-9216 |
devesh.kodnani@gs.com
Goldman Sachs & Co. LLC

Giovanni Pierdomenico
+44(20)7051-6807 |
giovanni.pierdomenico@gs.com
Goldman Sachs International

Macro Outlook 2024: The Hard Part Is Over

The global economy has outperformed even our optimistic expectations in 2023. As Exhibit 1 shows, we now estimate that global GDP will grow 2.7% this year, 1pp above the Bloomberg consensus forecast of a year ago. The United States is on track for growth of 2.4%, a full 2pp above the consensus forecast of a year ago. The surprises elsewhere are generally smaller, but we do expect beats in 88% of the economies under our coverage on a GDP-weighted basis.

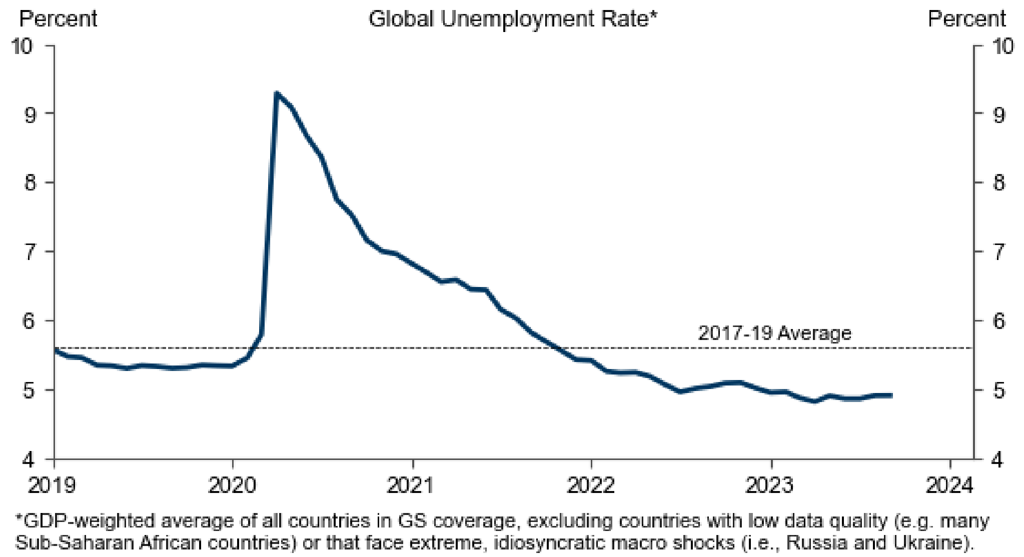
Exhibit 1: Growth Has Outperformed Our Optimistic Expectations in 2023



Source: Bloomberg, Goldman Sachs Global Investment Research

Solid GDP growth has translated into more-than-solid labor market performance. Exhibit 2 shows that the unemployment rate across all economies under our coverage that produce high-quality labor market data continued to edge down in 2022-2023 and now stands about ½pp below its pre-pandemic level. Importantly, this improvement is visible even in some key economies that have seen very low real GDP growth, such as the Euro area.

Exhibit 2: Unemployment Has Settled Below Pre-Pandemic Levels



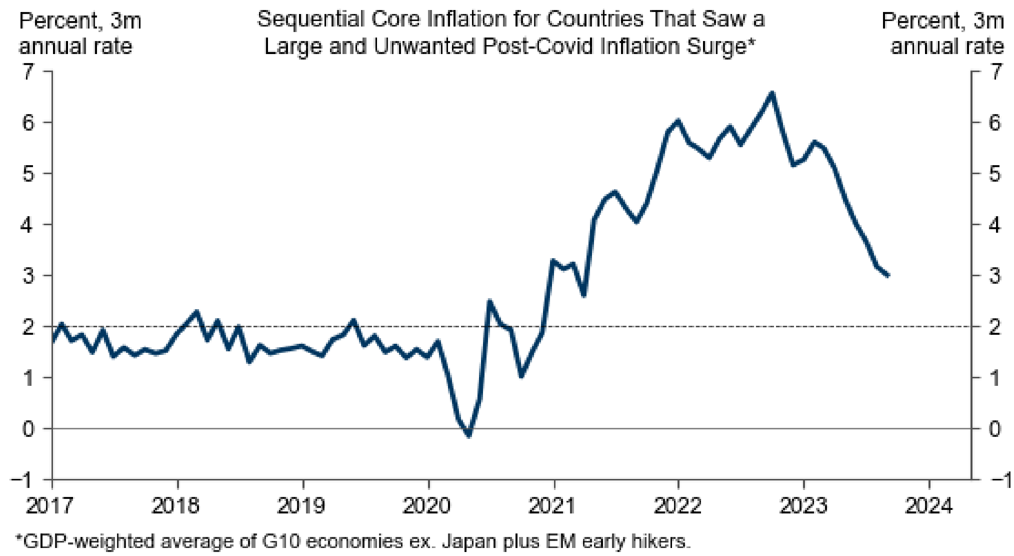
Source: Haver Analytics, Goldman Sachs Global Investment Research

These positive surprises came despite several unexpected negative shocks. First, both short-term and long-term interest rates rose significantly further than implied by market pricing—partly due to better-than-expected growth data but also partly due to more hawkish central bank reaction functions, at least early in the year. Second, there was a brief but serious bout of banking sector instability in the US and Europe during the spring. And third, the Israel-Hamas war is a sobering reminder of the growing security risks facing the world order, although so far it has not had a major impact on oil prices, financial markets, or the real economy outside the Middle East.

But in an important way, even these observations still understate the amount of good news that 2023 has delivered. Not only have growth and employment surprised to the upside in the face of several negative shocks, but all this has occurred alongside much lower inflation across all economies that saw a large and unwanted post-pandemic price surge in 2021-2022.

To demonstrate the size of the improvement, Exhibit 3 plots the average core CPI inflation rate of all G10 economies minus Japan (where higher inflation was desired) plus the EM "early hiker" economies that experienced the biggest inflation surges and thus delivered the most aggressive monetary policy tightening. Since the end of 2022, sequential core inflation in this group of economies has fallen from 6% to 3% sequentially. Central banks have therefore achieved more than three-quarters of the adjustment needed to get inflation back to their targets.

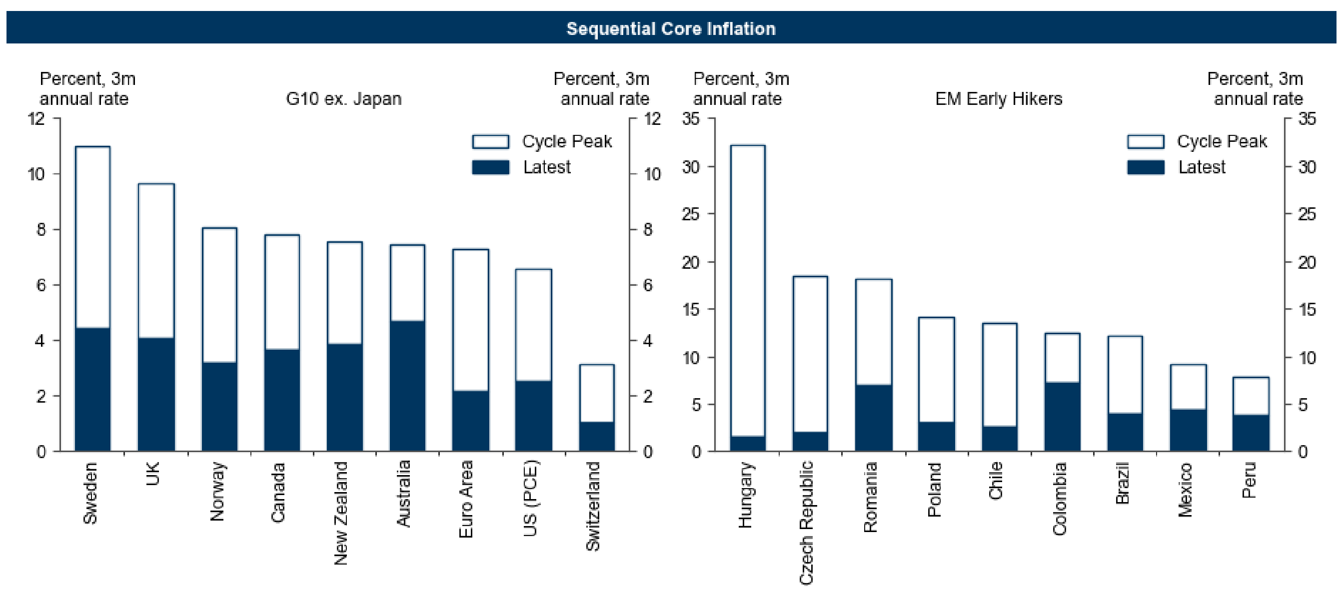
Exhibit 3: A Sharp Drop in Core Inflation Across the Economies That Saw a Post-Pandemic Surge



Source: Haver Analytics, Goldman Sachs Global Investment Research

The improvement is widespread across economies. Exhibit 4 shows that every economy in our group of G10 and EM economies has seen a very meaningful—and in most cases dramatic—inflation decline from the peak.

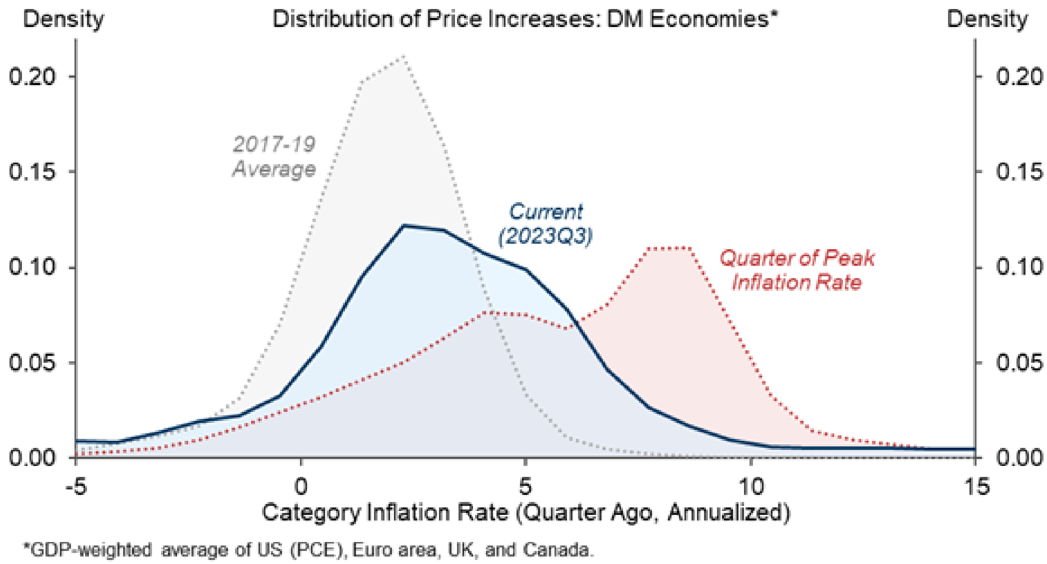
Exhibit 4: Core Inflation Has Declined Very Meaningfully Everywhere



Source: Haver Analytics, Goldman Sachs Global Investment Research

The improvement is also broad across price index components. Exhibit 5 shows that the right tail of the distribution of price changes (which captures big price increases) has shifted partway back toward its pre-pandemic position, although it has not fully normalized because of "catch-up" moves in lagging areas where prices are set relatively infrequently (e.g., healthcare and insurance). By contrast, the left tail of the distribution (outright price declines) has remained stable throughout this episode. This means that the drop in prices of items such as energy or US used cars over the past year is the exception, and that a re-anchoring of low and stable inflation in more regular expenditures such as restaurant meals or household products is the more dominant reason for the improvement.

Exhibit 5: Inflation Is Falling Because the Right Tail of Price Increases Is Normalizing

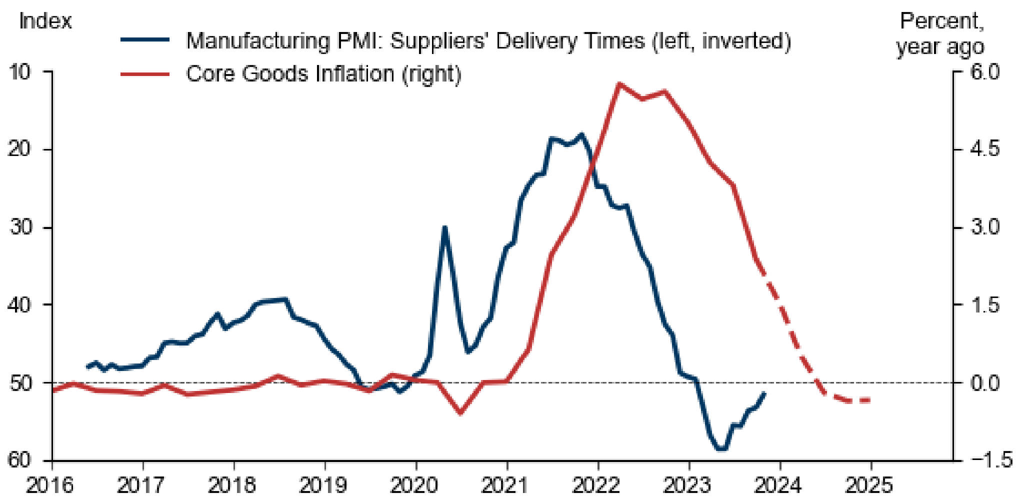


Source: Haver Analytics, Goldman Sachs Global Investment Research

The Last Mile

We don't think the last mile of disinflation will be particularly hard. First, although the improvement in the supply-demand balance in the goods sector—measured for example by supplier delivery lags—is now largely complete, the impact on core goods disinflation is still unfolding and will likely continue through most of 2024 (Exhibit 6).

Exhibit 6: Goods Disinflation Still Has Further to Run

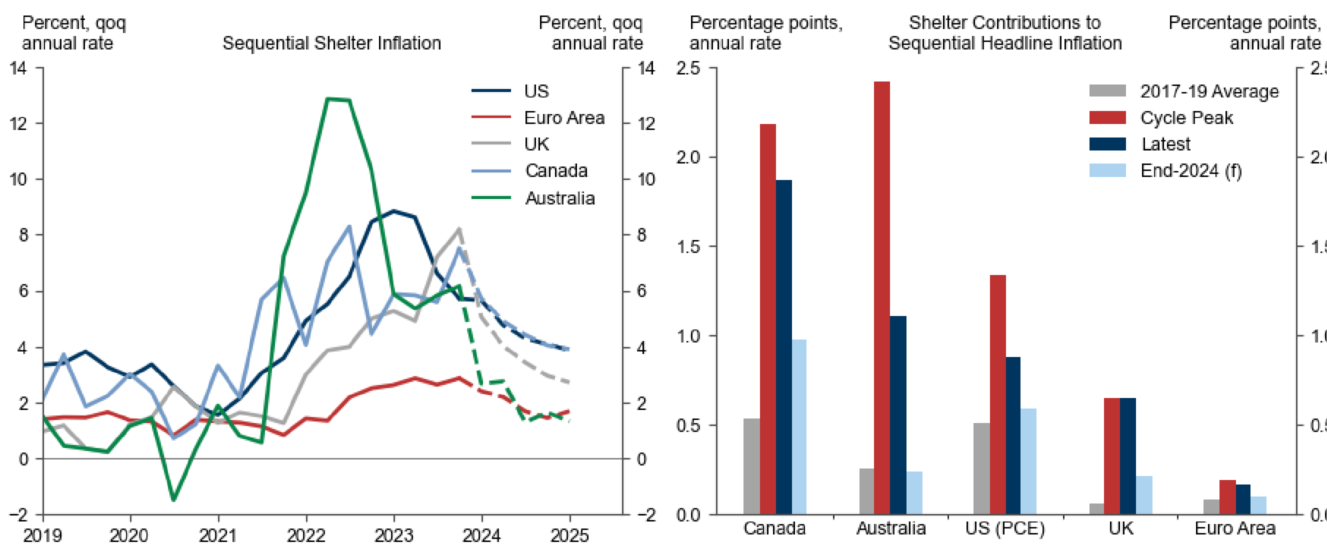


Note: For both PMIs and inflation, we show the GDP-weighted average of the US (PCE), the Euro Area, the UK, Canada, and Australia. Dashed line indicates GS forecast.

Source: Haver Analytics, Goldman Sachs Global Investment Research

Second, shelter inflation has considerably further to fall. This is true across DM economies, although the size of the impact is smaller in the Euro area and the UK where owner-occupied housing is excluded from the key inflation measures (Exhibit 7).

Exhibit 7: Shelter Cost Inflation Has Further to Fall



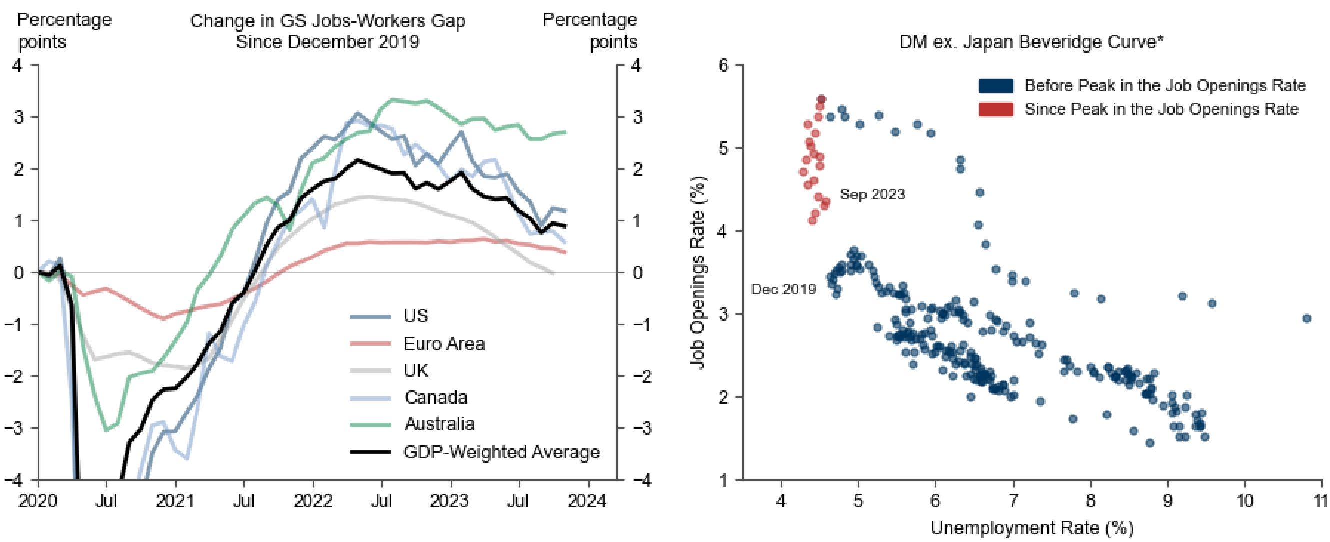
Note: Dashed lines indicate GS forecasts.

Source: Haver Analytics, Goldman Sachs Global Investment Research

Third, and most importantly, the supply-demand balance in the labor market continues to improve, as shown in Exhibit 8. The left chart shows that our jobs-workers gap—

measured as job openings minus unemployed workers—is trending down everywhere. In theory, this improvement could occur in a benign way via a decline in job openings or in a more pernicious way via an increase in unemployment. In practice, the adjustment has so far occurred almost entirely in a benign fashion, as job openings have declined without a rise in unemployment—or in more technical parlance, the "Beveridge curve" has shifted back most of the way to its pre-pandemic position, as shown in the right chart. We expect incremental rebalancing to remain mostly painless, as job opening rates remain elevated relative to levels implied by economic fundamentals (and thus have room to normalize further) in most major economies, and a full reversal to pre-pandemic levels is probably not required given that inflation undershot central bank targets during that period.

Exhibit 8: The Labor Market Is Easing as Job Openings Fall Without Higher Unemployment



Note: We use private-sector measures to nowcast job openings if official data is not yet available and assume unchanged latest values for the composite.

*We show the GDP-weighted average of the US, Germany, France, Italy, Spain, the UK, Canada, Australia, Sweden, and Norway, since 2001.

Source: Haver Analytics, Goldman Sachs Global Investment Research

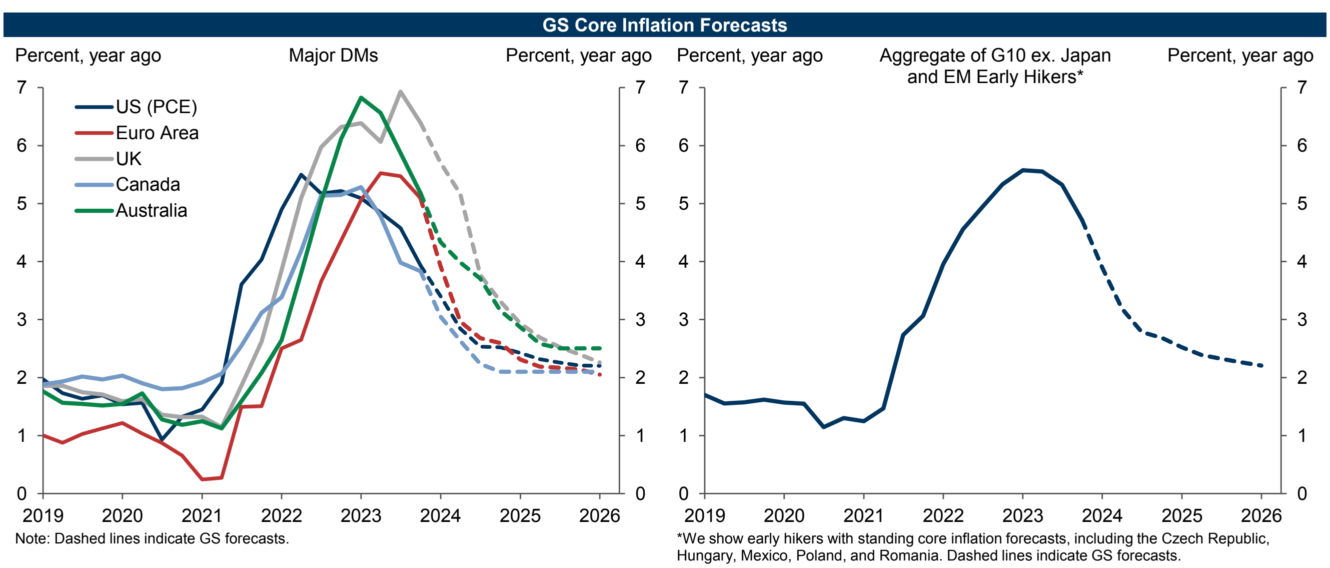
In light of this improvement and the sharp decline in headline inflation, it is not surprising that nominal wage growth has started to slow meaningfully back toward target-consistent levels (Exhibit 9). Together with generally anchored inflation expectations, this suggests that significant second-round effects from the earlier inflation surge are unlikely.

Exhibit 9: Sequential Wage Growth Is Slowing Everywhere

Source: Haver Analytics, Goldman Sachs Global Investment Research

The upshot from this discussion is that last year's disinflation does indeed have further to run. On average across the G10 ex. Japan and the EM early hikers, we expect a slowdown in sequential core inflation from 3% now to the 2-2½% range that would be broadly consistent with the inflation targets of most DM central banks by the end of 2024 (Exhibit 10). If anything, we think that the risks to the achievement of target-consistent inflation are on the earlier side.

Exhibit 10: Core Inflation Should Cool to Broadly Target-Consistent Levels by End-2024

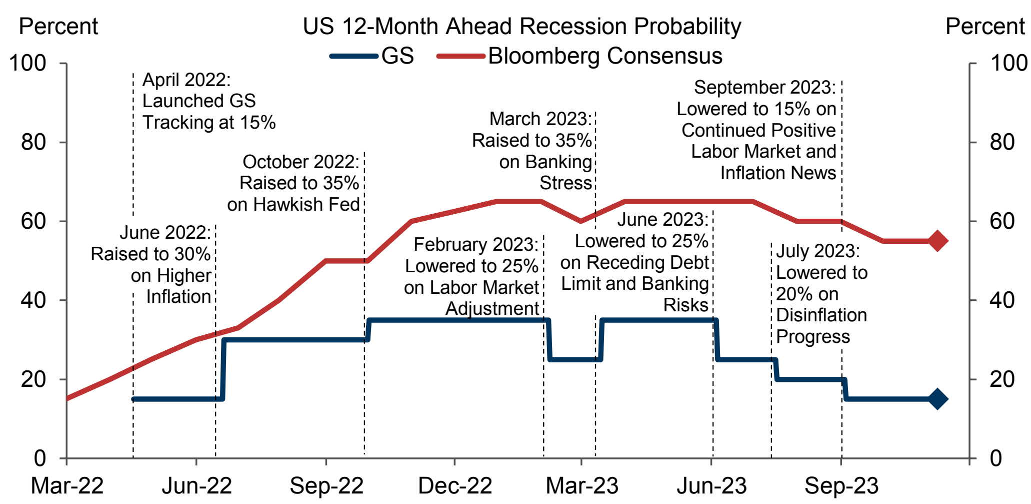


Source: Haver Analytics, Goldman Sachs Global Investment Research

There's Just No Need for a Recession

Despite the good news on growth and inflation in 2023, concerns about a recession among forecasters haven't declined much. Even in the US, which has outperformed so clearly on growth in the past year, Exhibit 11 shows that the median forecaster still estimates a probability of around 50% that a recession will start in the next 12 months.[1] This is down only modestly from the 65% probability seen in late 2022 and far above our own probability of 15% (which in turn is down from 35% in late 2022).

Exhibit 11: We Have Become More Confident That the US Economy Will Avoid Recession



Source: Bloomberg, Goldman Sachs Global Investment Research

More broadly, we expect another year of growth outperformance across most of the economies we cover. We forecast 2.6% global growth in 2024 on an annual average basis, a touch above our estimate of global potential growth (Exhibit 12). Most notably, our forecasts call for US growth to again outpace its DM peers, with country-level forecasts implying 1.1pp outperformance (vs. consensus) in the US, 0.5pp in Japan, 0.5pp in Canada, 0.3pp in China, 0.3pp in Australia, and 0.2pp in the Euro area.

[1] The latest estimate that the US economy will enter a recession as defined by the Business Cycle Dating Committee of the National Bureau of Economic Research in the next 12 months is 55% in the Bloomberg survey shown in the chart and 48% in the latest Wall Street Journal survey.

Exhibit 12: We Forecast Above-Consensus GDP Growth in 2024

Real GDP Growth / Percent Change yoy	Annual Average 2023 GS	2023 Consensus	2024 GS	2024 Consensus	2025 GS	2025 Consensus	Q4/Q4 2024 GS	Potential GS
US	2.4	2.3	2.1	1.0	1.9	1.8	1.8	1.8
Euro Area	0.5	0.5	0.9	0.7	1.5	1.5	1.3	1.1
Germany	-0.1	-0.4	0.6	0.5	1.3	1.5	1.0	1.3
France	0.9	0.8	1.1	0.8	1.3	1.4	1.3	1.1
Italy	0.7	0.7	0.7	0.6	1.2	1.2	1.2	0.8
Spain	2.4	2.3	1.7	1.4	1.7	2.0	1.8	1.3
Japan	1.9	1.9	1.5	1.0	1.1	1.0	1.3	0.9
UK	0.5	0.4	0.5	0.4	1.0	1.3	0.8	1.4
Canada	1.3	1.1	1.1	0.6	1.7	2.0	1.4	1.8
Australia	2.0	1.8	1.8	1.5	2.4	2.2	2.0	2.6
China	5.3	5.2	4.8	4.5	4.2	4.5	4.6	4.2
India	6.4	6.5	6.3	6.1	6.5	6.4	5.7	6.1
Brazil	3.1	3.0	1.6	1.6	2.4	2.0	2.5	2.1
Russia	2.4	2.0	2.1	1.3	1.3	1.2	0.9	2.0
World	2.7	2.5	2.6	2.1	2.7	2.7	2.6	2.5

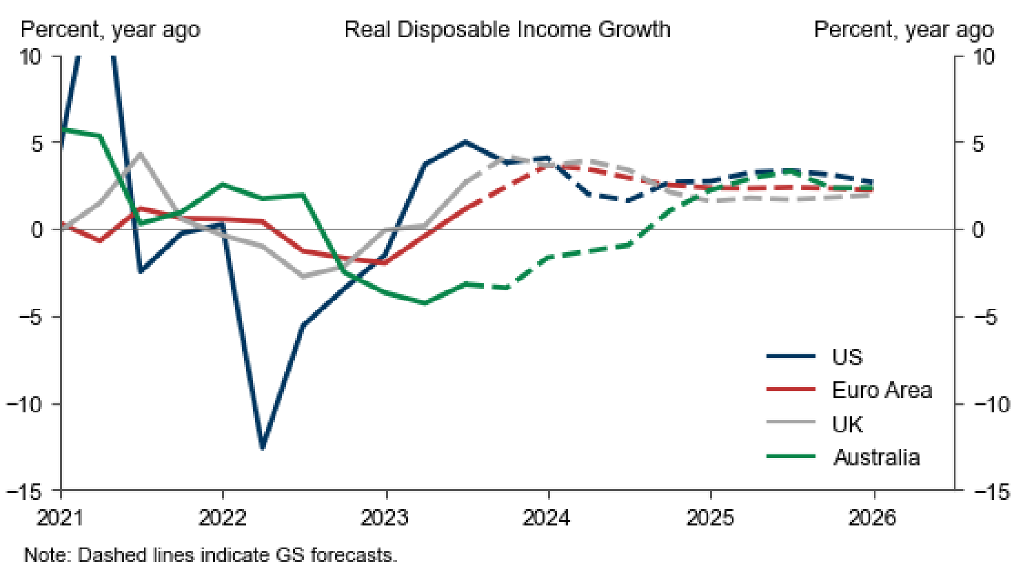
Note: All forecasts calculated on calendar year basis except when otherwise stated. IMF forecasts used for India 2025 consensus when quarters not available in Bloomberg. The global growth aggregates use market FX country weights.

Source: Bloomberg, Goldman Sachs Global Investment Research

There are four main reasons for our optimism on growth.

The first reason is our constructive outlook for real disposable income growth in an environment of much lower headline inflation and still-strong labor markets. Although we expect US real income growth to slow from the outsized 4% pace seen in 2023 to 2¾% in 2024, this should still be sufficient to support consumption and GDP growth of at least 2%. Meanwhile, both the Euro area and the UK should see a meaningful acceleration in real income growth—to around 2% by end-2024—as the Russian gas shock fades (Exhibit 13).

Exhibit 13: Continued Real Income Strength in the US and a Pickup in Europe



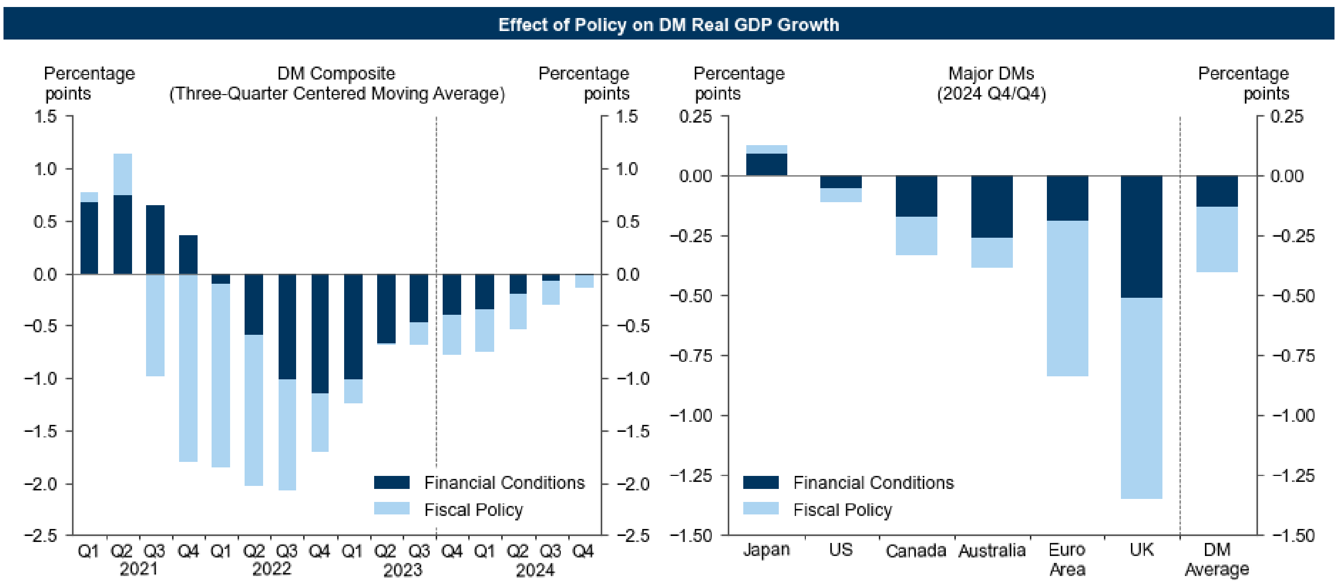
Source: Haver Analytics, Goldman Sachs Global Investment Research

The second reason is that while monetary and fiscal policy will likely weigh on growth across the G10, the biggest drag is behind us. As we have shown repeatedly, the maximum impact of monetary tightening on the *growth rate* (as opposed to *level*) of

GDP occurs with a short and reasonably predictable lag of about two quarters. We therefore expect a smaller drag from tighter financial conditions in 2024 than in 2023, even after factoring in the recent increase in long-term interest rates.

We estimate that fiscal policy will subtract 0.2pp from global growth in 2024, with only a slightly larger 0.3pp drag in DMs. The drag is likely to be small in the US because most pandemic-related stimulus has already ended and fiscal consolidation is unlikely to start in a presidential election year. It should be larger in the UK (where an election also looms but the energy crisis support will nevertheless roll off) and in Southern Europe (which will likely see the end of energy-related payments and a pullback in EU Recovery Fund spending). Our combined monetary and fiscal impulse estimate is set to fade despite modest fiscal headwinds, however, and points to a maximum pain point in late 2022 (Exhibit 14).

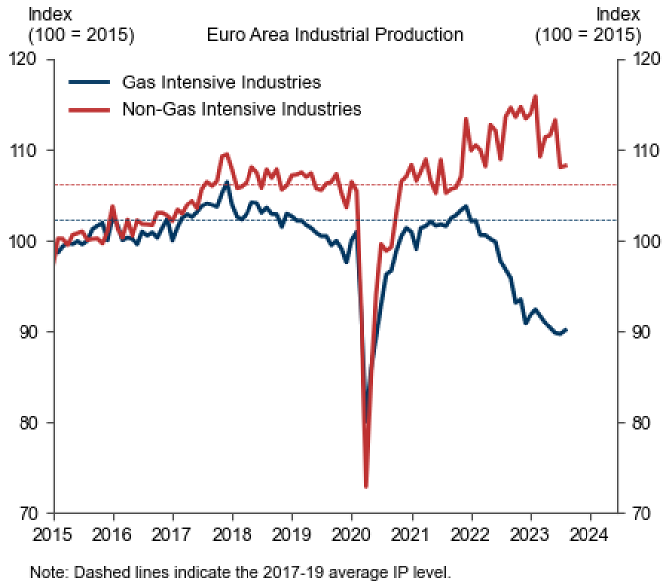
Exhibit 14: A Manageable Drag from Monetary and Fiscal Policy

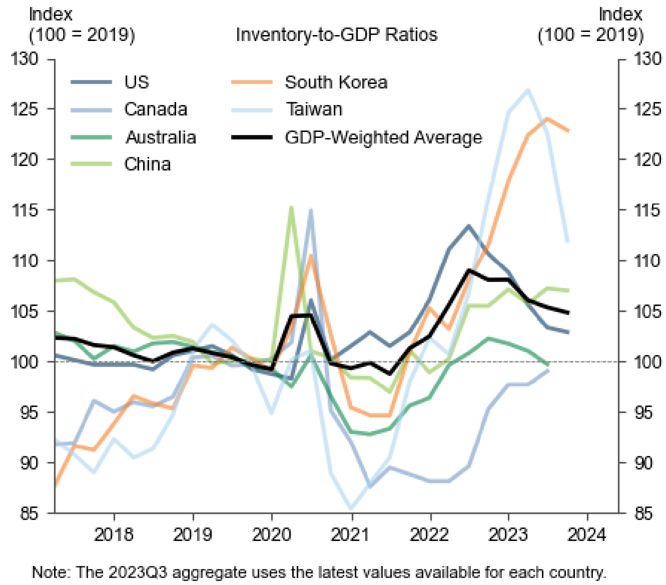


Source: Goldman Sachs Global Investment Research

The third reason is that manufacturing activity should recover somewhat in 2024 from a subdued 2023 pace. Weak industrial activity this year reflected a combination of unusual headwinds, including a rebalancing of spending back towards services from goods, the European energy crisis, an inventory destocking cycle that corrected for an overbuild in 2022, and a weaker-than-expected rebound in Chinese manufacturing. Most of these headwinds are set to fade this year, as spending patterns normalize, gas-intensive European production finds a trough, and inventories-to-GDP ratios stabilize, prompting a manufacturing recovery back towards trend from below (Exhibit 15).

Exhibit 15: Gas-Intensive European Manufacturing Is Finding a Trough and Inventories Are Edging Back to Normal Levels

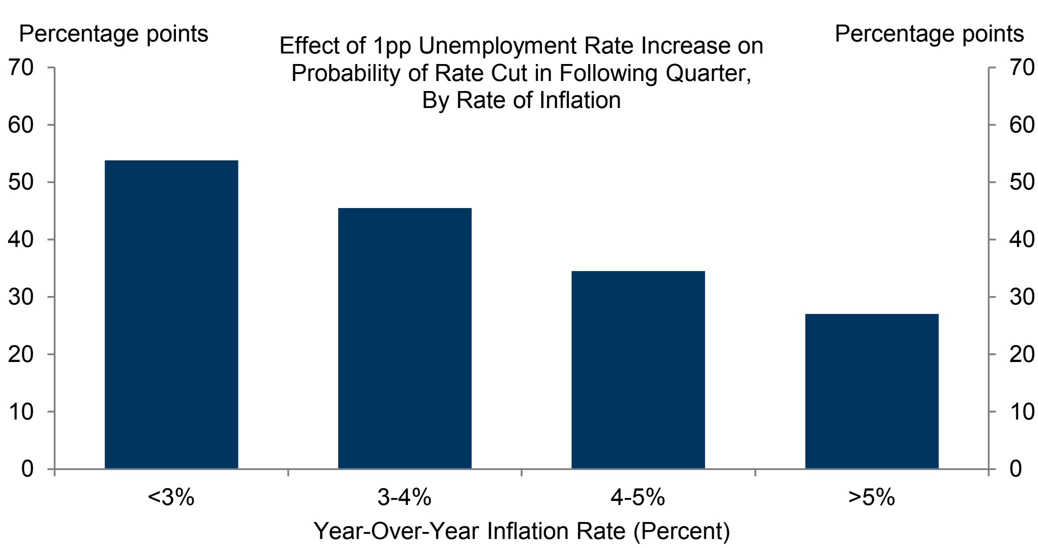




Source: Haver Analytics, Goldman Sachs Global Investment Research

The final and most novel reason for optimism on growth is that because central banks don't need a recession to bring inflation down, they will try hard to avoid one. Several of the EM early hikers—including Brazil and Poland—have already begun to cut policy rates from highly restrictive levels and are likely to deliver ongoing steady cuts. We see less scope for preemptive easing in DM economies, but think DM central banks would lose little time before pivoting to cuts if the growth outlook deteriorated meaningfully. Indeed, our analysis of past hiking cycles confirms that major central banks are twice as likely to cut rates in response to downside growth risks once inflation has normalized to sub-3% rates relative to when inflation is above 5% (Exhibit 16). This is an important insurance policy against a recession.

Exhibit 16: Central Banks Are More Willing to Pursue Insurance Cuts as Inflation Cools



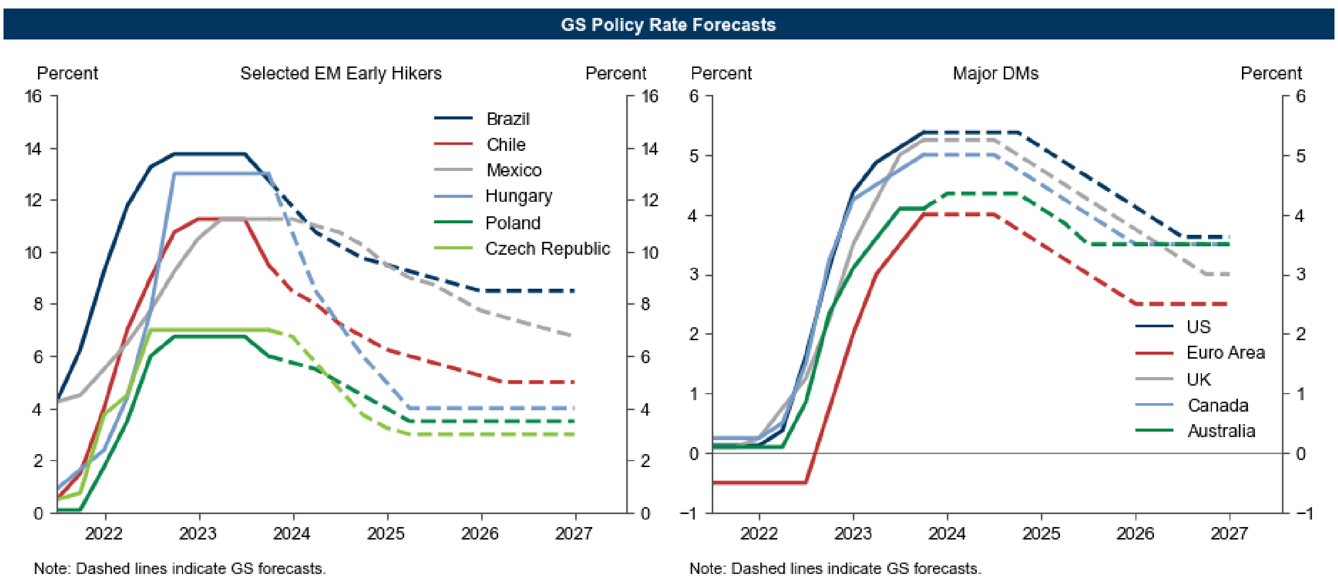
Source: Goldman Sachs Global Investment Research

A Higher Policy Rate Regime

Although we see a lower hurdle for rate cuts in 2024 and some EM central banks are already preemptively easing policy, our baseline economic forecasts call for inflation to remain modestly above target, unemployment rates to remain below their long-run levels, and GDP to grow at a roughly trend pace in 2024. So although we forecast that major DM central banks (aside from Japan) are finished hiking, our baseline forecast implies little incentive for them to cut interest rates in the near term, and we do not expect DM rate cuts until 2024H2 barring a weaker-than-expected growth outcome.

Across DM central banks, we expect the ECB, BoE, and BoC to start cutting on the earlier side, probably in 2024Q3 but possibly even earlier. This is because of the expected inflation progress in the Euro area and a weaker growth outlook in the UK, and because of a reaction function that puts more weight on the level of the policy rate relative to neutral in Canada. By contrast, we anticipate that growth outperformance in the US will lessen the urgency to lower rates and delay the first rate cut until 2024Q4, while firm inflation should keep Australia on hold until 2024Q4 as well. With inflation still modestly above official targets, central banks are likely to proceed cautiously after initiating their rate-cutting cycles, and in all cases we forecast only a gradual normalization at a 25bp per quarter pace (Exhibit 17).

Exhibit 17: Cuts Are Coming Sooner (in EM) or Later (in DM)



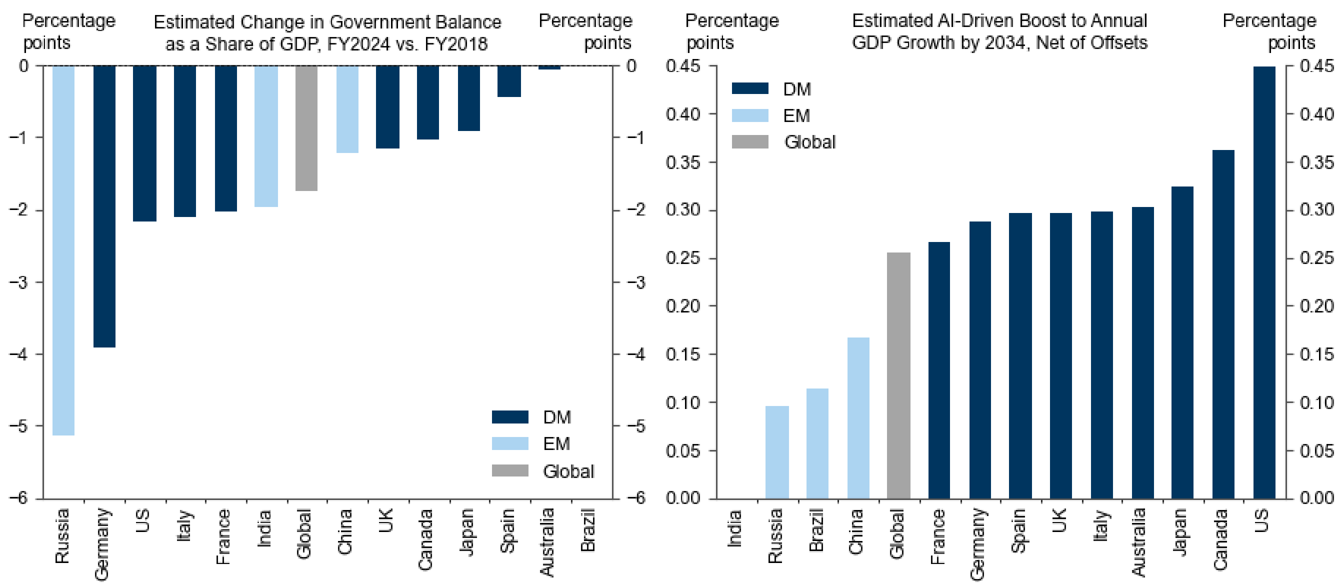
Source: Haver Analytics, Goldman Sachs Global Investment Research

When policy rates ultimately do settle, we expect central banks to leave them above the long-run sustainable levels they currently project. We are raising our long-run policy rate forecasts by 50bp in major DMs to 3.5-3.75% in the US, 2.5% in the Euro area, 3% in the UK, and 3.5% in both Canada and Australia, with similar upgrades in other economies.

The most important driver of this forecast change is our longstanding view that the neutral rate is a poorly identified concept, and that changes in financial conditions are more useful in determining the appropriate stance of policy. As labor markets rebalance, growth is around potential, and inflation normalizes back to target, many central banks will see the argument for further easing as relatively weak, especially when coming from above. And if economies do prove resilient with policy rates at elevated levels, some central banks could reevaluate their estimates of longer-run rates and conclude that, in retrospect, the downgrades during the post-2008 cycle were excessive.

Several economic fundamentals also argue for higher longer-run rates going forward. First, global government deficits are likely to remain elevated despite incremental fiscal consolidation. Second, higher investment this cycle—whether to facilitate the transition to "net zero" or the widespread adoption of generative AI—could also put upward pressure on near-term equilibrium interest rates. Finally, the productivity boosts promised by generative AI—which recently prompted us to upgrade our longer-run growth forecasts by 0.4pp in the US, 0.3pp in other DMs, and 0.2pp in advanced EMs—could put upward pressure on rates, especially if the generative AI adoption timeline is more frontloaded (Exhibit 18).

Exhibit 18: Elevated Deficits and the Widespread Adoption of Generative AI Should Support Higher Long-Term Rates



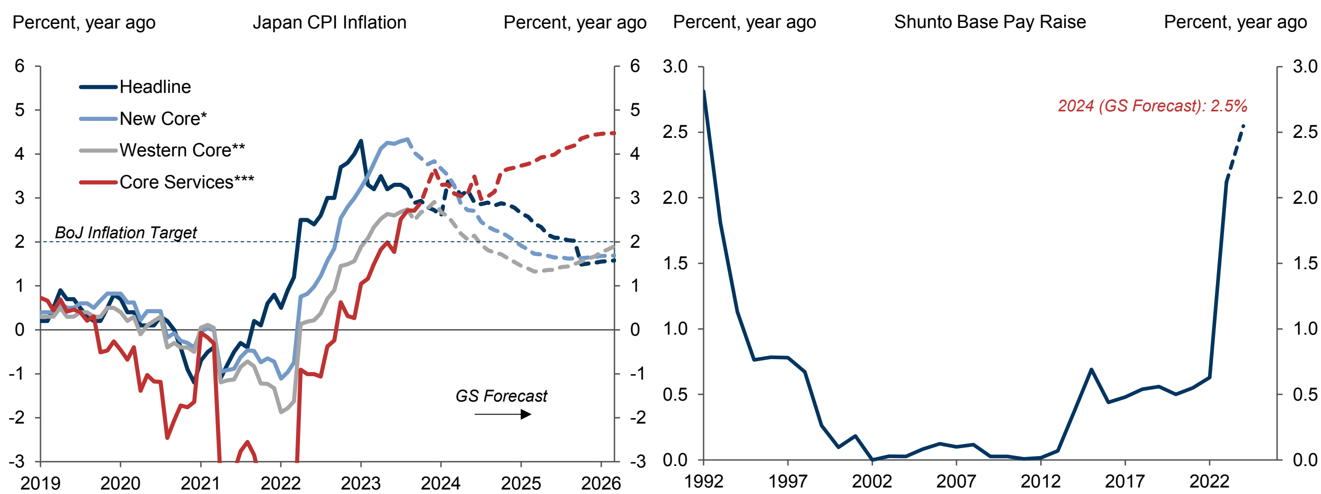
Source: Goldman Sachs Global Investment Research

The Bank of Japan Exits

Among DM economies, Japan stands apart because the inflation pickup was largely desired. After three decades of anemic price pressures or outright deflation, the strong 2023 *shunto* wage round signaled that the BoJ was moving towards its goal of establishing a virtuous cycle between wages and prices. Healing global supply chains imply that some moderation in Japanese inflation—which by all measures is currently above 2%—is likely in the pipeline, but underlying services inflation is likely to remain firm against a stronger labor market backdrop (Exhibit 19, left panel).

The BoJ is therefore poised to start moving toward an exit from yield curve control in April 2024, beginning with a pivot to a tightening bias and a further increase in the 10-year reference rate following a likely even stronger spring *shunto* (Exhibit 19, right panel). A formal abandonment of the policy is unlikely until October, once services inflation data has credibly validated that an established wage-price linkage is likely to keep inflation near target for the foreseeable future. Even so, Japanese inflation should remain far below what its G10 peers have experienced this cycle, and we therefore expect only a modest pace of rate hikes (with the deposit rate reaching just 0.25% by the end of 2025).

Exhibit 19: Japanese Inflation May Fall Back to the Target, But the BoJ's Eyes Are on the Shunto



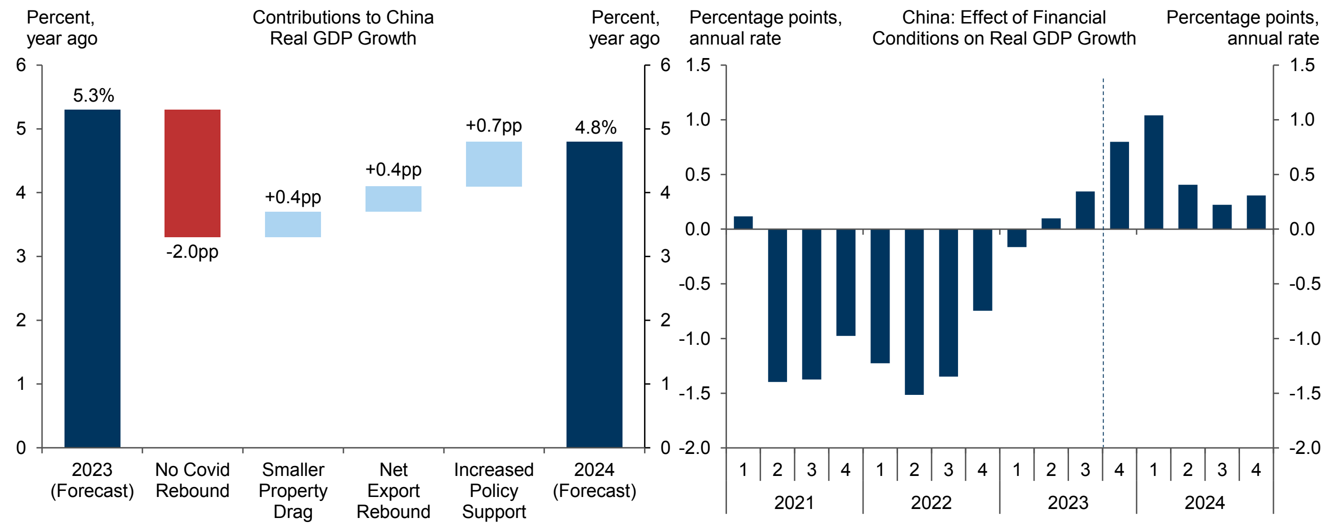
*CPI ex. fresh food and energy. **CPI ex. food and energy. ***Services CPI ex. rent and dining.

Source: Haver Analytics, Goldman Sachs Global Investment Research

Temporary Relief From China's Multi-Year Slowdown

China's reopening rebound in 2023 proved somewhat disappointing (although 2023 growth is set to outperform both our and consensus forecasts from last fall), and its multi-year property slowdown has continued to bite in 2023. Still, growth in China has picked up modestly in recent months and should benefit from further policy stimulus in the near term. We expect China's GDP growth to slow to 4.8% in 2024 as the easy gains from reopening fade into rear view, but supported by a slightly smaller housing drag, a modest rebound in global trade, and additional policy easing that should be frontloaded in H1 (Exhibit 20).

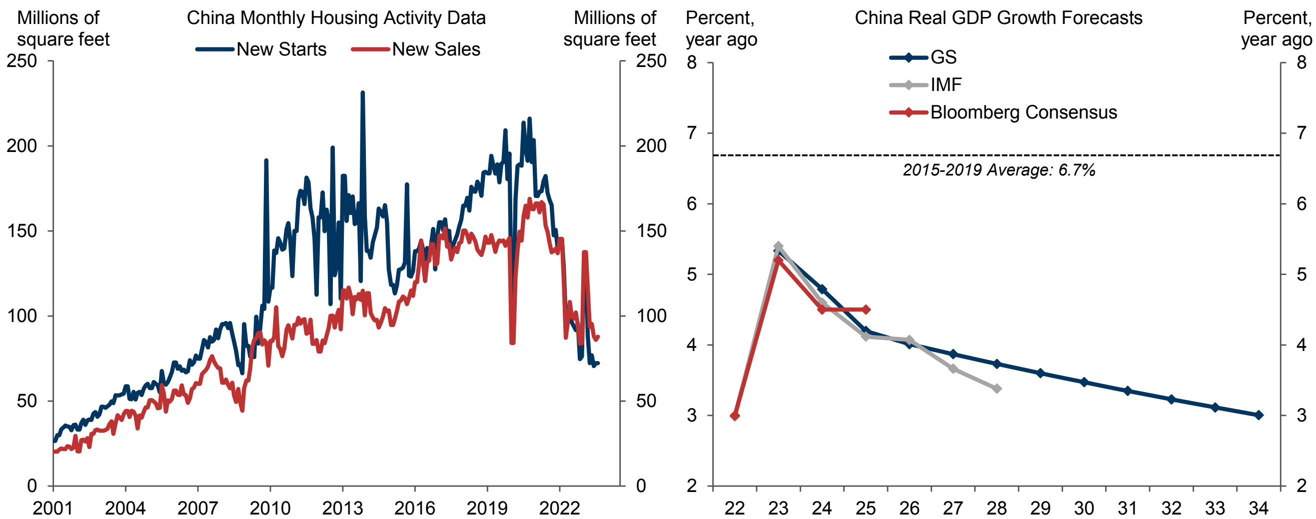
Exhibit 20: Growth in China Should Slow as Reopening Runs Its Course, Despite a Boost from Policy Easing



Source: Goldman Sachs Global Investment Research

While our 2024 growth forecast is slightly above consensus, we continue to see a challenging longer-run growth outlook for several reasons. First, the property downturn is likely to endure, and there is still a risk that the resulting pessimism becomes entrenched in self-fulfilling expectations. Second, China's ongoing demographic deterioration will require the country to reinvent its growth model with a persistently shrinking working-age population. Third, a modest cyclical rebound in exports is unlikely to reverse the ongoing diversification of global value chains away from China and toward some of its peers. We expect China's trend rate of growth to continue to slow, reaching just 3% within a decade—less than half the pre-covid norm (Exhibit 21).

Exhibit 21: An Ailing Property Sector and a Long Slide for Trend Growth in China



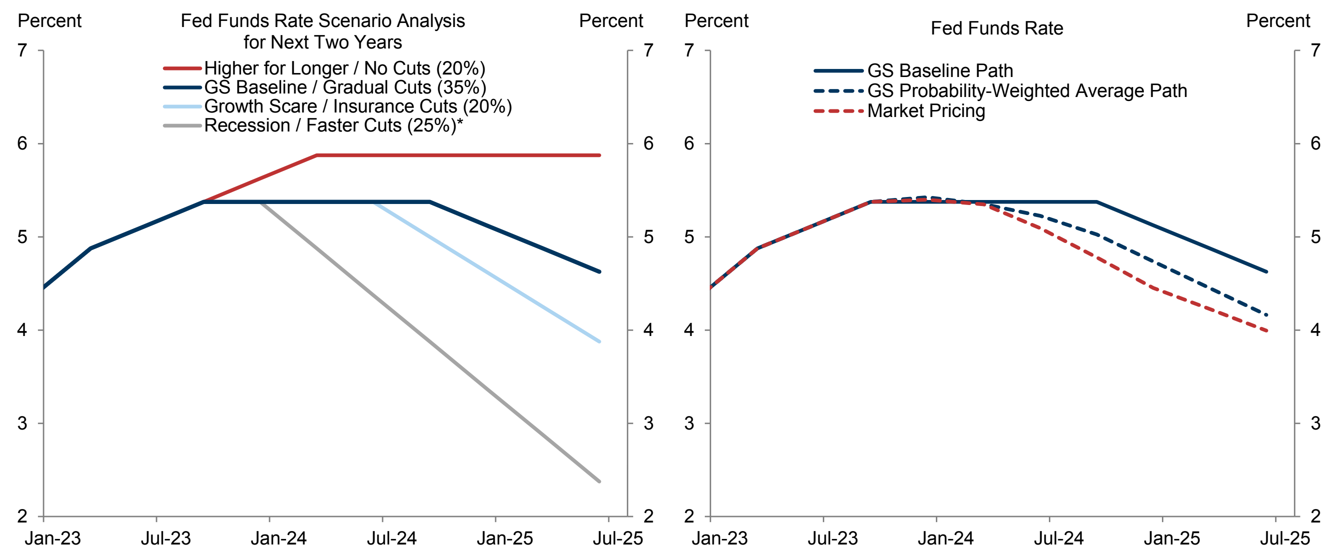
Source: Haver Analytics, Bloomberg, IMF, Goldman Sachs Global Investment Research

Elevated Uncertainty

Despite our broadly optimistic baseline expectations for 2024, data volatility remains elevated, and we continue to see higher-than-normal risks to our overall economic outlook.

Most importantly, risks around our policy rate forecasts are clearly skewed to the downside. While it is certainly possible that some central banks hike again in the next few months if inflation surprises to the upside, the convincing and continued progress on inflation limits the risk that central banks move much further into restrictive territory. At the same time, the hurdle for rate cuts will likely decline as inflation continues to fall back toward target levels, suggesting that—particularly at longer horizons—risks around our policy rate forecasts are asymmetrically skewed toward lower rates. As Exhibit 22 shows for the case of the Fed, this means that a probability-weighted version of our policy rate forecast is well below our modal baseline forecast.

Exhibit 22: Our Probability-Weighted Fed Funds Forecast is Below Our Modal Baseline Forecast



*This is the probability of a recession occurring at any point over the next two years. Our 12-month recession probability is 15%.

Source: Goldman Sachs, Goldman Sachs Global Investment Research

We also see downside risks around our growth outlook. The first stems from the continued downside surprises to global manufacturing business surveys. This raises the possibility that the improvement in manufacturing activity that we anticipate could be delayed, particularly if higher interest rates lead companies to normalize inventory levels (relative to sales) below 2019 levels, or if the still-elevated level of goods demand (particularly in the US) reverts towards its long-run trend more than we anticipate.

The second downside risk stems from geopolitical concerns. In particular, an escalation of the war in the Middle East that interrupts trade through the Strait of Hormuz could lead to more significant increases in oil and gas prices that would likely lower global growth, on net.

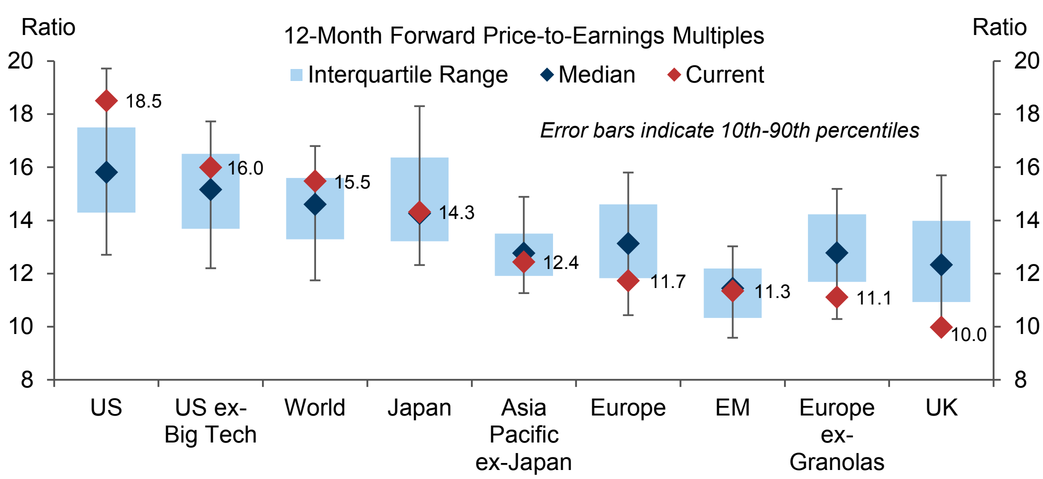
Good Macro, Tougher Valuations

These baseline forecasts for near-trend growth and cooling inflation represent a supportive macro backdrop for asset markets, although the skew of risks—particularly around rates—has implications for our markets outlook.

The main challenge to our benign baseline economic forecast is that valuations on many risk assets are richer than normal. In particular, the "carry" or "yield pickup" in credit, EM, and parts of the equity market is well below where it has been for significant parts of the recovery. Since April, pricing for most cyclical assets has also shifted toward our baseline forecasts, despite some rise in risk premium in the last three months. So, although our economic growth forecasts are well above consensus, the gap to market pricing generally seems smaller.

For credit and EM rates, tight spreads limit the potential outperformance versus risk-free rates, while for equities, valuation constraints remain in focus. US equity valuations do look richer than normal, with discounts in areas with more earnings risk. But even here, valuation concerns are narrower than sometimes presented. For mega-cap tech, valuations do not yet look "bubbly" if expected growth profiles are delivered. And outside US mega-caps, valuations look less stretched versus history—and in many areas have improved relative to last year—while the Equity Risk Premium is generally consistent with earlier periods of higher rates (Exhibit 23).

Exhibit 23: Aside From Tech, Absolute Equity Valuations Do Not Look Particularly Elevated



Note: Interquartile ranges and median are calculated from 2003-2023. GRANOLAS refers to 11 European stocks: GSK, Roche Holding, ASML, Nestlé, Novartis, Novo Nordisk, L'Oréal, LVMH, AstraZeneca, SAP, and Sanofi.

Source: FactSet, Goldman Sachs Global Investment Research

By contrast, government bond valuations have clearly improved. In part, this simply reflects the substantial rise in real yields. But we had seen the pricing of longer-dated forward yields as vulnerable to continued non-recessionary growth of the kind we have been forecasting, and after the recent sell-off, those anomalies are much smaller. The challenge to higher returns is therefore that the market is still pricing rate cuts that we think will not be delivered under our baseline forecasts. US rate volatility is more obviously too high, and is likely to fall in our central case, creating a tailwind for mortgage-backed securities, where spreads remain elevated.

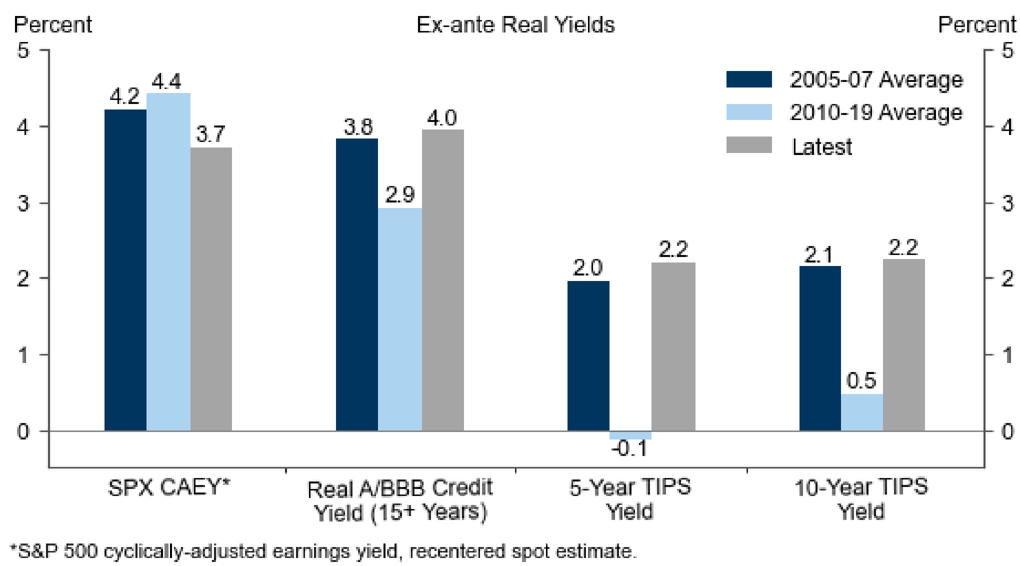
Balancing those valuation constraints against our macro view, we envisage positive returns in the mid-single to low-double digits for bonds, credit, and equities for the first time in several years. We expect the combination of supply constraints and steady demand growth to push prices of key commodities higher in 2024, with carry adding further to returns. But outside the risk of sharper supply disruptions, deeper upside to oil prices may be limited by potential supply responses from Saudi Arabia and US shale.

Better Real Returns After the "Great Escape"

2024 should cement the notion that the global economy has escaped the post-GFC environment of low inflation, zero policy rates and negative real yields. The period since the GFC has often felt like an inexorable move towards lower global yields and low inflation—"liquidity trap" and "secular stagnation" were the decade's buzzwords. For all the handwringing about post-covid policy excesses and the reemergence of inflation, that policy response has allowed asset markets to escape. Policy rates are firmly positive in most places, real yields have moved to pre-GFC levels along the curve, and deflationary risks seem remote.

The transition has been bumpy, but the upside of this "Great Escape" is that the investing environment now looks more normal than it has at any point since the pre-GFC era, and real expected returns now look firmly positive (Exhibit 24). Last year, we highlighted the "return of yield" as the key theme in our markets outlook. With risk-free rates rising further in nominal and real terms, the yield outlook is one that investors could only dream of for most of the period since 2008. Constructing portfolios to earn these higher yields with the right mix of exposures to tail risks remains a central pillar of our investment outlook.

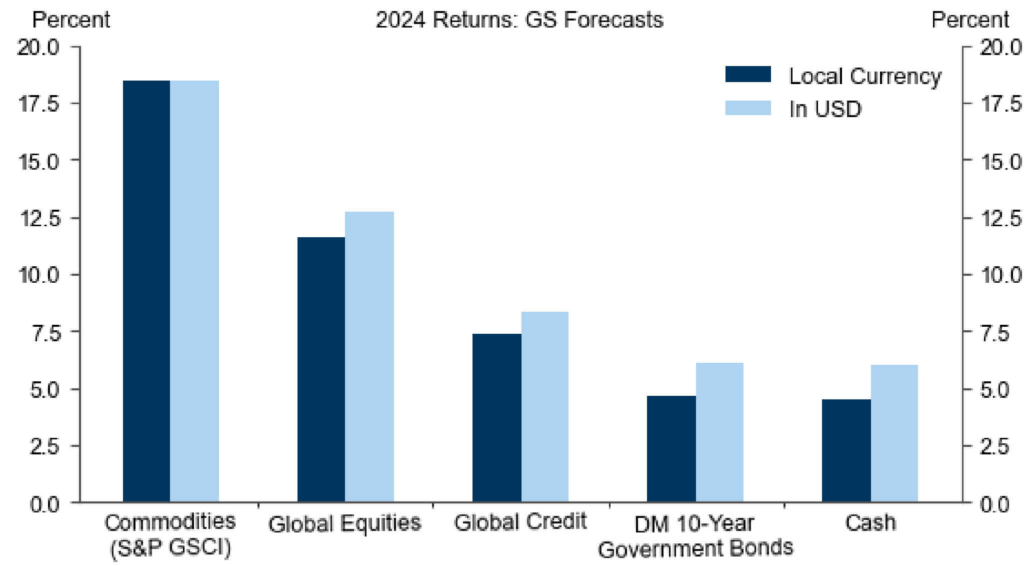
Exhibit 24: Real "Yields" on Core Assets Are Close to 2005-2007 Averages



Source: Shiller (2000), Haver Analytics, Goldman Sachs Global Investment Research

Although the return on cash remains high, we see other asset classes outperforming (at least modestly) in 2024 (Exhibit 25). If investors are willing to add risk in periods where markets doubt our baseline soft-landing forecasts, they may be able to add to those returns. Each asset class offers protection against at least one key tail risk: bonds should perform more strongly if recession risks rise; stronger global growth and risks of geopolitical disruptions pose upside to oil prices; and equities could outperform if central banks cut rates sooner than expected. While front-end yields still look attractive, we think this profile means that a more balanced asset exposure should probably replace the focus on cash that dominated in 2023, including a greater role for duration in portfolios. For investors assigning a higher probability to a recession and rate cuts, a firmer skew toward duration—and away from risky assets—would make sense.

Exhibit 25: We Expect Higher Returns on Non-Cash Assets Than Cash in 2024



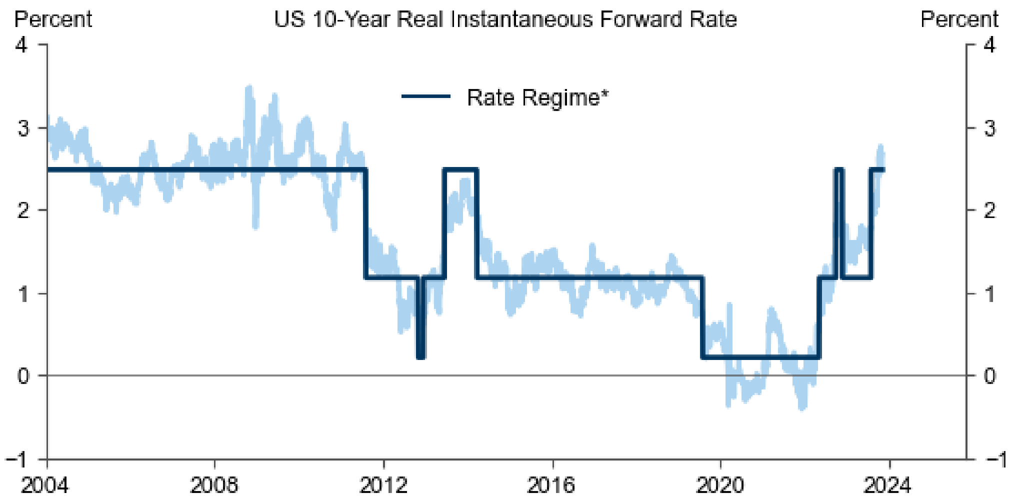
Source: Bloomberg, Datastream, Bloomberg-Barclays, ICE-BAML, iBoxx, Goldman Sachs Global Investment Research

A more constructive view on the value of duration in portfolios is a new element for our outlook. In part, this simply reflects higher running yields, which provide investors with a larger cushion. But it also reflects the likely skew of returns. The value of bonds as a recession hedge should rise in a world where central banks cut interest rates to offset downside growth risk, especially as inflation falls further. Longer-dated yields above the cash rate would make the case for adding duration simpler, so the market may need to reach that point, particularly if worries about fiscal sustainability require a larger premium than we expect. But we think there is already a greater role for longer-dated bonds in portfolios heading into 2024, or, given the risk of steeper curves, for levered positions in shorter maturities.

Surviving Higher Rates: More Worries Outside of the US

The big question is whether this return to the pre-GFC yield backdrop proves persistent. For the US, we have more confidence that longer-run rates will ultimately settle higher than the Fed expected last cycle (Exhibit 26). A period of "higher for longer" yields may expose areas of vulnerability in the US—whether it is the access to finance for smaller companies, continued pressure on some credit provision by small banks, or subdued mortgage, housing, and commercial real estate activity—although we do not expect these to threaten the overall economic outlook. The public debt profile is also increasingly of concern, but we think markets will remain patient unless next year's US elections bring the possibility of fresh unfunded fiscal expansion.

Exhibit 26: US Forward Real Rates Have Shifted Back to Pre-GFC Levels



*Regime mean rate identified using a Markov-switching model on instantaneous forwards estimated by Gurkaynak, Sack, and Wright (2006).

Source: Gurkaynak, Sack, and Wright (2006), Haver Analytics, Goldman Sachs Global Investment Research

Resilience in the US looks surer than in some other economies, however. Japan is unique in being the place where we expect policy rate hikes to begin rather than end in 2024, and, like the US, may escape to an earlier era. In other places, the risks seem larger. While we forecast a better Euro area growth profile in 2024, the recent macro underperformance could signal larger scarring effects from the shock to energy supply, more exposure to the growth slowdown in China, or a more persistent drag from tighter financial conditions. The impact of higher nominal rates on Italy's debt sustainability is another medium-term risk we worry about if global rates remain high.

For China, the balancing act between structural headwinds and near-term stimulus is more of the same, not an escape from recent challenges. Given prevailing negativity about China's growth, local assets could make some gains if growth surprises to the upside, but a sustained recovery probably depends on a larger shift in policy direction.

Higher yields and continued US dollar strength are also complicating the policy trade-offs in China and Japan. The longer US yields remain under upward pressure, the harder it will be for Japanese policymakers to resist yen weakness unless they are prepared to contemplate more aggressive tightening of monetary policy. And in China, the more US yields rise and the dollar strengthens, the harder it becomes for Chinese policymakers to justify resisting a weaker currency. Many of these concerns are well reflected in markets, but these tensions could grow if US rates push higher.

The bottom line is that although we expect a broad range of DM and EM economies to avoid recession in the coming year, the case for US growth outperformance looks stronger. While market pricing probably embeds a more optimistic growth view than the consensus forecast, we think the fact that our US GDP growth forecasts lie further above consensus than in Europe and China still carries real information. Alongside our expectation of broad-based declines in inflation, this backdrop weakens the case for material US dollar weakness—just as in 2023—even though the end of the Fed rate cycle and a benign global growth picture tend to weigh on the dollar. Without material upside surprises in other major economies, it is hard to have much confidence in extended dollar weakening, and we therefore view risks as skewed toward continued dollar strength.

Beyond the growth challenges from higher rates and ongoing geopolitical risks, the biggest reason that a shift toward more balanced allocations may prove premature is the obvious one: the prospect that better growth, stickier inflation, and weaker fiscal positions lead to continued upward pressure on yields and downward pressure on valuations. We think those concerns are likely to remain a feature of the near-term outlook, at least until inflation eases enough to settle them.

Appendix

GS Market Forecasts: Positive Returns on Equities, Credit, and Bonds; USD Stays Strong

	Current	GS Forecasts			Forward pricing			Upside vs. forward pricing		
	Level	3m	6m	12m	3m	6m	12m	3m	6m	12m
Equities										
S&P 500	4378	4500	4500	4700	4426	4472	4564	2%	1%	3%
STOXX Europe 600	443	450	460	480	446	444	447	1%	4%	7%
Topix	2333	2500	2600	2650	2329	2304	2281	7%	13%	16%
MSCI AC Asia-Pac ex Japan	494	515	525	550	499	503	507	3%	4%	8%
MSCI EM	961			1050	969	976	989			6%
10 Year Government Bond Yields										
US	4.57%	4.75%	4.71%	4.58%	4.58%	4.57%	4.57%	17 bps	14 bps	1 bps
Germany	2.66%	2.69%	2.56%	2.31%	2.65%	2.64%	2.63%	4 bps	-8 bps	-32 bps
Japan	0.88%	1.06%	1.19%	1.30%	0.95%	1.00%	1.10%	11 bps	19 bps	20 bps
UK	4.27%	4.32%	4.18%	4.06%	4.29%	4.27%	4.30%	3 bps	-9 bps	-24 bps
2 Year Government Bond Yields										
US	4.92%	5.00%	4.96%	4.72%	4.74%	4.58%	4.35%	26 bps	38 bps	37 bps
Germany	2.98%	3.06%	2.94%	2.55%	2.80%	2.60%	2.29%	26 bps	34 bps	26 bps
Japan	0.13%	0.10%	0.12%	0.22%	0.19%	0.24%	0.32%	-9 bps	-12 bps	-10 bps
UK	4.63%	4.62%	4.38%	3.90%	4.42%	4.23%	4.12%	20 bps	14 bps	-22 bps
Corporate Bond Spreads (bps, upside vs. spot)										
Bloomberg Barclays US IG	125	120	118	115				-5	-7	-10
Bloomberg Barclays US HY	398	383	378	370				-15	-20	-28
iBoxx EUR IG	169	165	162	159				-4	-7	-10
BAML EUR HY	461	458	454	450				-3	-7	-11
JP Morgan EMBI Div.	430			410						-20
Commodities										
WTI Crude Oil ($/bbl)	77.4	84.0	88.0	89.0	76.8	76.0	73.8	9%	16%	21%
Brent Crude Oil ($/bbl)	81.6	88.0	92.0	93.0	81.0	80.1	78.1	9%	15%	19%
LME Copper ($/mt)	8,112	8,400	8,850	10,000	8,189	8,258	8,391	3%	7%	19%
Iron Ore 62% Fe ($/mt)	125	130	120		120	115		8%	4%	
COMEX Gold ($/troy)	1,974	2,050	2,050	2,050	1,987	2,017	2,071	3%	2%	-1%
TTF Natural Gas (EUR/MWh)	46.6	45	44	54	48.0	46.3	50.4	-6%	-5%	7%
FX (upside vs. USD)										
EUR/USD	1.07	1.04	1.06	1.10	1.07	1.08	1.09	-3%	-2%	1%
USD/JPY	150	155	155	150	148	146	142	-4%	-6%	-5%
GBP/USD	1.23	1.18	1.20	1.25	1.23	1.23	1.23	-4%	-3%	1%
AUD/USD	0.64	0.62	0.64	0.66	0.65	0.65	0.65	-4%	-1%	2%
USD/CHF	0.90	0.92	0.90	0.85	0.89	0.88	0.87	-3%	-2%	1%
USD/MXN	17.5	17.0	17.0	17.3	17.7	18.0	18.6	4%	6%	8%
USD/BRL	4.87	4.80	4.70	4.60	4.92	4.96	5.06	2%	6%	10%
USD/INR	83.2	84.0	83.0	82.0	83.5	83.9	84.6	-1%	1%	3%
USD/CNY	7.26	7.30	7.30	7.15	7.18	7.17	7.09	-2%	-2%	-1%

Source: Bloomberg, Datastream, Bloomberg-Barclays, ICE-BAML, iBoxx, Goldman Sachs, Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Jan Hatzius, Dominic Wilson, Joseph Briggs, Vickie Chang, Devesh Kodnani and Giovanni Pierdomenico, 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

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. Compliance Officer: Anil Rajput |Tel: + 91 22 6616 9000 | Email: 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. 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. 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 resolution ("ACPR") and regulated by the Autorité de contrôle prudentiel et de resolution and the Autorité des marches 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 (Finansinpektionen) 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. 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.