Note: The following is a redacted version of the original report published on 18 November 2022 [20 pgs].

Goldman Sachs | Economics Research

18 November 2022 | 5:59PM EST

US Economics Analyst

2023 US Economic Outlook: Approaching a Soft Landing (Mericle)

- The key macroeconomic question of the year has been whether inflationary overheating can be reversed without a recession. Our analysis suggests that the answer is yes—an extended period of below-potential growth can gradually reverse labor market overheating and bring down wage growth and ultimately inflation, providing a feasible if challenging path to a soft landing.
- The initial steps along this path have been successful, but there is much further to go in 2023. We expect another year of below-potential growth and labor market rebalancing to solve much but not all of the underlying inflation problem. Unlike consensus, we do not expect a recession.
- The first step in keeping the adjustment process on track is ensuring that GDP growth remains below potential. The fiscal tightening that helped to slow the economy this year has mostly run its course, but the large tightening in financial conditions engineered by the Fed should keep GDP growth near 1% in 2023. Consumer spending should grow a bit more firmly as income begins to rise again, but this is likely to be offset by weakness elsewhere, especially in housing.
- The second step requires soft GDP growth to further reduce labor demand. So far, the speed and composition of labor market rebalancing have been encouraging. Our jobs-workers gap has shrunk substantially, driven by a decline in job openings rather than employment. In 2023, we expect a further large decline in job openings coupled with a ½pp rise in the unemployment rate to shrink the jobs-workers gap from the historical peak of 5.9 million reached earlier this year to the 2 million threshold that we estimate is necessary to dampen labor market overheating.
- The third step requires labor market rebalancing to slow wage growth. Wage growth has begun to moderate in recent months, and we expect it to fall to 4% by the end of 2023, not far above our 3.5% estimate of the pace compatible with 2% inflation. If so, this intermediate step would provide crucial early support for the view that overheating can be reversed without a recession.
- The fourth step requires softer wage growth to bring inflation back to target. This should get underway in 2023 but will take longer. We expect core PCE inflation to fall from roughly 5% to 3% by December 2023, driven largely by goods categories where supply chain recovery is now reversing pandemic shortages.

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

Alec Phillips
+1(202)637-3746 | alec.phillips@gs.com
Goldman Sachs & Co. LLC

David Mericle
+1(212)357-2619 |
david.mericle@gs.com
Goldman Sachs & Co. LLC

Spencer Hill, CFA
+1(212)357-7621 | spencer.hill@gs.com
Goldman Sachs & Co. LLC

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

Ronnie Walker
+1(917)343-4543 |
ronnie.walker@gs.com
Goldman Sachs & Co. LLC

Tim Krupa
+1(202)637-3771 | tim.krupa@gs.com
Goldman Sachs & Co. LLC

Manuel Abecasis
+1(212)902-8357 |
manuel.abecasis@gs.com
Goldman Sachs & Co. LLC

Services inflation is likely to fall meaningfully in the official data only with a longer lag, especially in the largest categories, shelter and health care.

- We expect the FOMC to slow the pace of rate hikes as it shifts to fine-tuning the funds rate to keep growth below potential, but to ultimately deliver a bit more than is priced, with a 50bp hike in December and three 25bp hikes next year raising the funds rate to a peak of 5-5.25%. Our recession odds are below consensus even though our Fed forecast is slightly more hawkish than consensus because we expect demand to prove more resilient than expected next year.

2023 US Economic Outlook: Approaching a Soft Landing

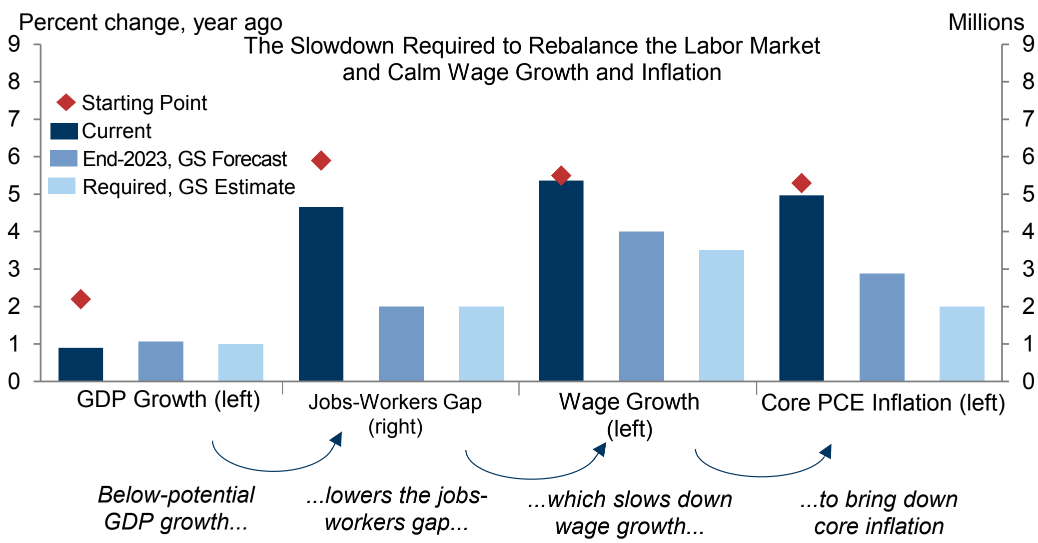
A year ago, the inflation problem began to broaden beyond the initial pandemic-driven dislocations and started to also include an element of textbook overheating in which labor demand far exceeded labor supply and high wage growth, high inflation, and high short-term inflation expectations reinforced each other in a feedback loop. Since then, the key macroeconomic question has been whether inflationary overheating can be reversed without a recession.

Earlier this year, we introduced a step-by-step framework for analyzing this question, summarized by the diagram in Exhibit 1.[1] Working backwards, we first asked how much wage growth would need to decline to be compatible with 2% inflation and concluded it would have to fall from 5.5% to 3.5%. We then asked how much the imbalance between labor demand and labor supply would need to shrink to dampen wage pressures and concluded that the jobs-workers gap would have to fall from 5.9 million, the widest gap in history, to 2 million. Finally, we asked how weak aggregate demand would have to be to reduce labor demand enough to achieve this rebalancing, assuming that labor supply rebounded only modestly, and concluded that an extended period of positive but below-potential GDP growth could reduce labor demand by the amount required. The punchline was that there is a plausible path to a soft landing, though calibrating policy just right to stay on that path would surely be challenging.

The initial steps along this path have been successful, but there is much further to go in 2023. Growth slowed quickly to a solidly below-potential pace this year, labor market rebalancing has gone very well so far, and recent months have finally brought signs of moderation in wage growth and inflation. We expect another year of below-potential growth and further labor market rebalancing in 2023 to solve much but not all of the underlying inflation problem. Unlike consensus, we do not expect a recession.

[1] These reports include More Jobs than Workers: A New Measure of Labor Market Tightness, What Will It Take to Restore Balance to the Labor Market?, Q&A on the Jobs-Workers Gap and the Risk of Recession, A Recession Is Not Inevitable, Prospects for a Soft Landing: What Could Make the Fed's Job Easier or Harder?, What Wage Growth Rate Is Compatible With 2% Inflation?, Taming Inflation Without a Recession: A Progress Report, and The Expected Path to Sustainable Wage Growth.

Exhibit 1: . We Expect Another Year of Below-Potential GDP Growth in 2023 to Rebalance the Labor Market and Slow Wage Growth and Inflation, but Reaching the 2% Target Will Take Longer

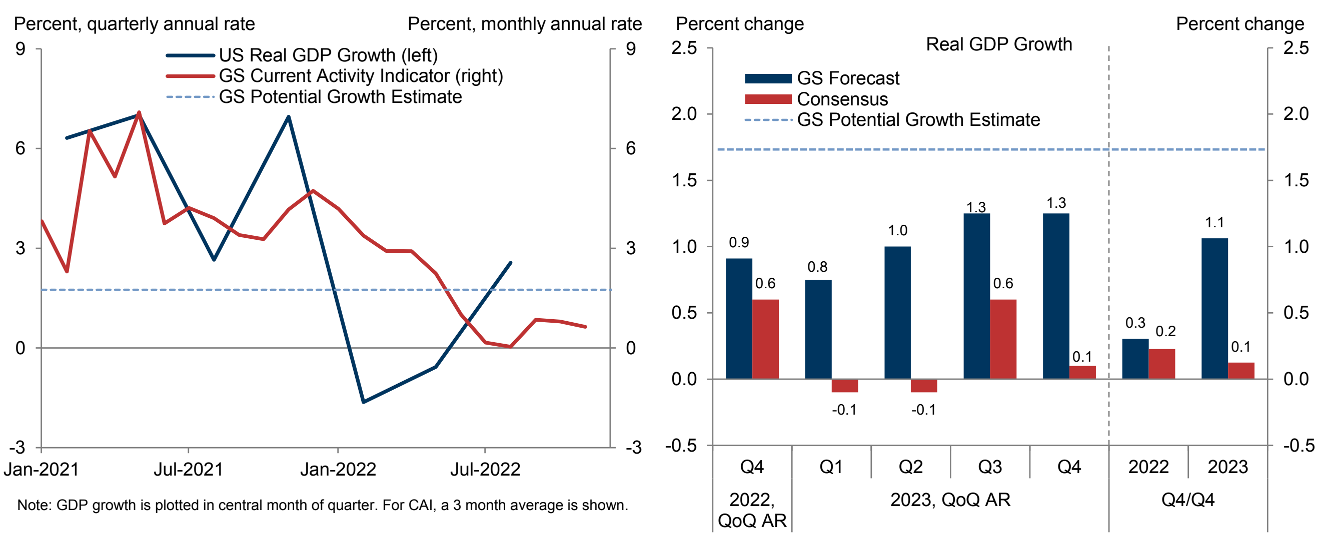


Source: Department of Commerce, Department of Labor, Goldman Sachs Global Investment Research

Another Year of Below-Potential Growth, Not a Recession

The first step in keeping the adjustment process on track is ensuring that GDP growth remains below potential. GDP growth is on track to slow from 5.7% in 2021 (Q4/Q4) to just 0.2% in 2022, meaning that so far, policy tightening has been very well calibrated to slow demand growth as much as possible without accidentally tipping the economy into a recessionary spiral, an underappreciated success. In 2023, we expect GDP growth of about 1%, below potential but well above consensus expectations.

Exhibit 2: GDP Growth Slowed Abruptly in 2022, and We Expect It to Remain Below Potential in 2023

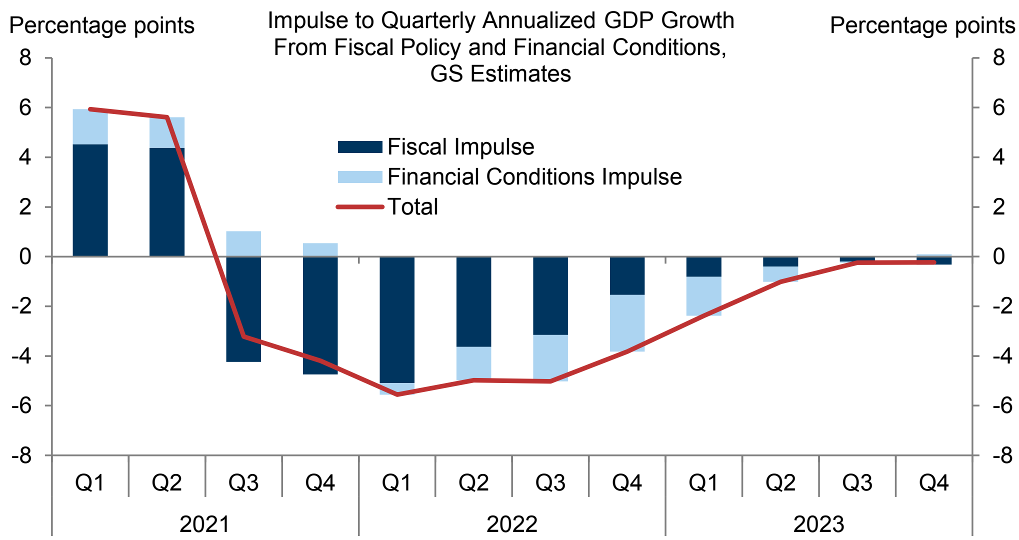


Note: GDP growth is plotted in central month of quarter. For CAI, a 3 month average is shown.

Source: Department of Commerce, Bloomberg, Goldman Sachs Global Investment Research

A year ago, our below-consensus growth forecast for 2022 largely reflected the drag we expected from fiscal and monetary policy tightening. Today, our above-consensus forecast for 2023 in part reflects the diminishing impact of policy restraint. The large drag from the expiration of pandemic fiscal relief measures is now mostly behind us, and our financial conditions index (FCI) framework implies that the impact of monetary policy tightening is peaking now and will gradually fade in 2023.

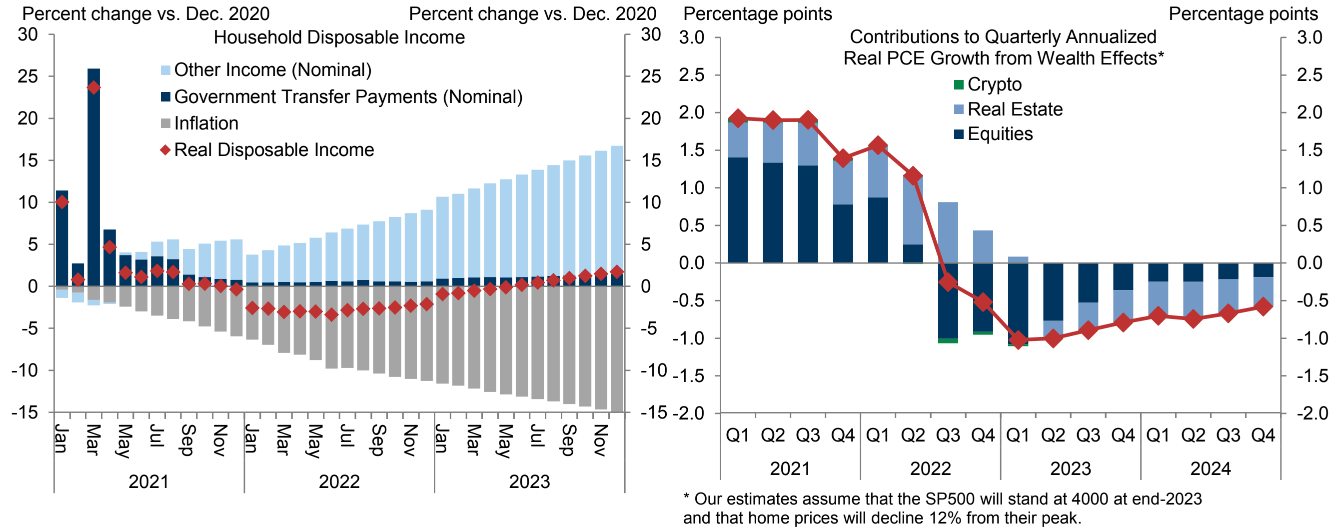
Exhibit 3: Fiscal Policy Tightening Is Mostly Behind Us, and the Impact of the Tightening in Financial Conditions Engineered by the Fed Is Likely Peaking Now



Source: Goldman Sachs Global Investment Research

An important consequence of the end of the fiscal tightening is that income should start growing again. Real disposable income fell for a year as special transfer payments expired and inflation outran wage growth. With few transfers left to lose and inflation likely to be more restrained in 2023, we expect real income to rise 3.5% next year, although this partly reflects large gains from interest income and tax rate normalization that will accrue mostly to high-income households and have less impact on spending. Offsetting the turnaround in income, wealth effects on consumer spending have shifted from positive to negative as higher interest rates have brought down equity and home prices, the latter of which likely have further to fall. We expect these forces, along with other influences including fading boosts from the reopening impulse and excess savings, to net out to consumption growth of roughly 1.5% in 2023.

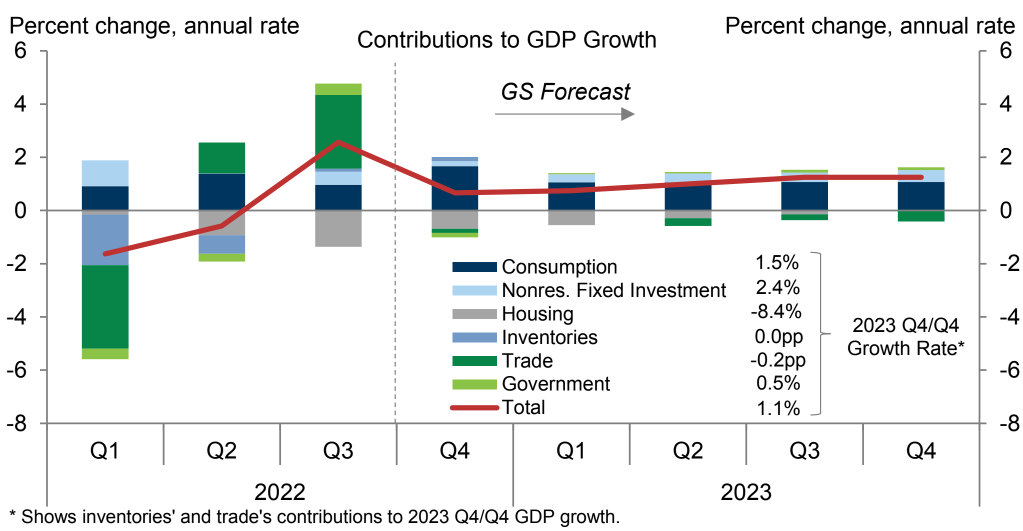
Exhibit 4: We Expect Consumer Spending to Grow 1.5% in 2023 as a Year of Falling Income Offset by Positive Wealth Effects Gives Way to a Year of Rising Income Offset by Negative Wealth Effects



Source: Department of Commerce, Goldman Sachs Global Investment Research

Other areas of the economy are likely to be weaker, especially the interest rate-sensitive housing sector, the business structures component of capital spending, and government spending. This should keep GDP growth near 1% in 2023, a pace that is likely close to a speed limit for the Fed until a larger dent has been put in the inflation problem, in that acceleration beyond this point would likely be unwelcome and might be met with further tightening to ensure that supply and demand continue to rebalance quickly.

Exhibit 5: We Expect GDP to Grow About 1% in 2023 as Weakness in Housing, Business Structures, and Government Spending Offsets Somewhat Firmer Consumption Growth



Source: Department of Commerce, Goldman Sachs Global Investment Research

Reversing Labor Market Overheating Without a Spike in the Unemployment Rate

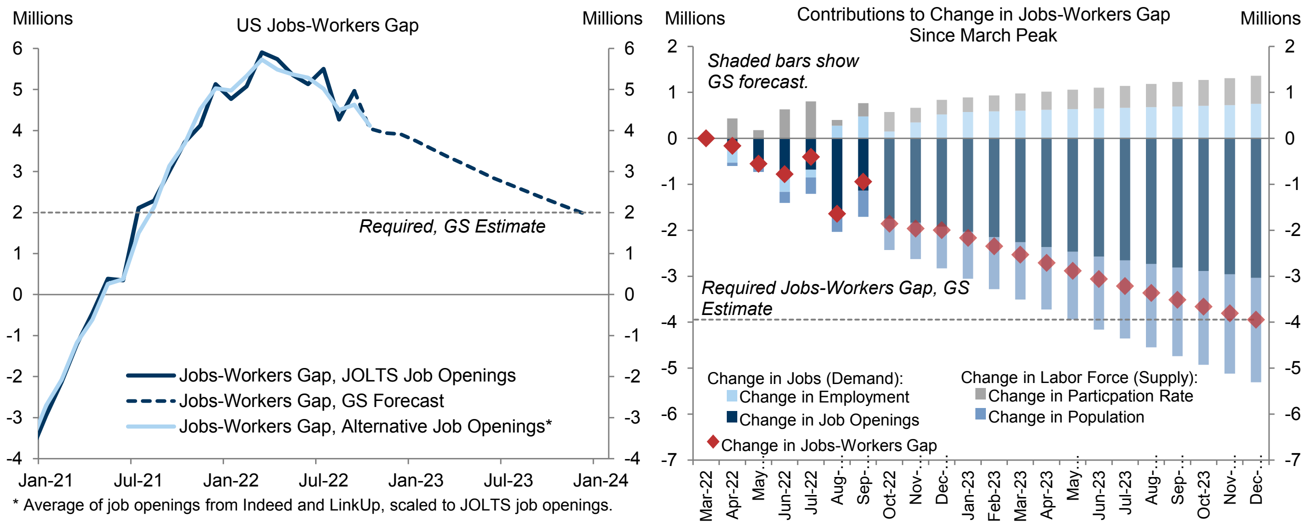
Below-potential growth has already produced a rebalancing in the labor market whose speed and composition have been very encouraging. Based on timely job openings measures from LinkUp and Indeed, we estimate that the jobs-workers gap—total labor demand (employment plus job openings) minus total labor supply (the size of the labor force)—has fallen from a peak of nearly 6 million to just over 4 million. All of the decline in labor demand so far has come from a decline in job openings—a drop that is much larger than any in US history seen outside a recession—rather than in employment.

How has this been possible? Didn't a shift out in the Beveridge curve during the pandemic signal a breakdown in the efficiency with which workers matched to jobs, implying that a large decline in labor demand would unfortunately have to involve a large increase in the unemployment rate? And wouldn't this set in motion the usual recessionary vicious circle where job loss leads to a sharp pullback in spending, leading to more job loss? In our view, the Beveridge curve debate last summer missed several important points: what looked like a conventional shift out in the curve signaling a structural increase in mismatch was more a matter of unemployed workers temporarily not wanting or applying for jobs because of elevated unemployment benefits and Covid fears; standard measures of industry mismatch were low, not high; and the rate at which unemployed workers were flowing into new jobs was high, not low. These points have made us confident that the labor market is on a steep part of the Beveridge curve where a reduction in labor demand disproportionately takes the form of a decline in job openings.

This favorable trend is likely to continue for now. Job openings are still falling, and the layoff rate remains very low, despite recent layoffs in the technology sector. We expect a further large drop in job openings in 2023 coupled with a more limited ½pp rise in the unemployment rate to shrink the jobs-workers gap to the 2 million threshold that we estimate would slow wage growth to a sustainable rate.

Our forecast implies a trough to peak increase in the unemployment rate of 0.7pp, roughly one-third the increase seen in even the shallowest US recessions. In part for that reason and in part because we expect activity growth to remain positive, our forecast would probably not be classified as a recession.

Exhibit 6: We Expect the Jobs-Workers Gap to Shrink to the 2mn Threshold That We Estimate Is Needed by the End of 2023, Led by a Large Decline in Job Openings and a ½pp Rise in the Unemployment Rate



Source: Department of Labor, Indeed, LinkUp, Goldman Sachs Global Investment Research

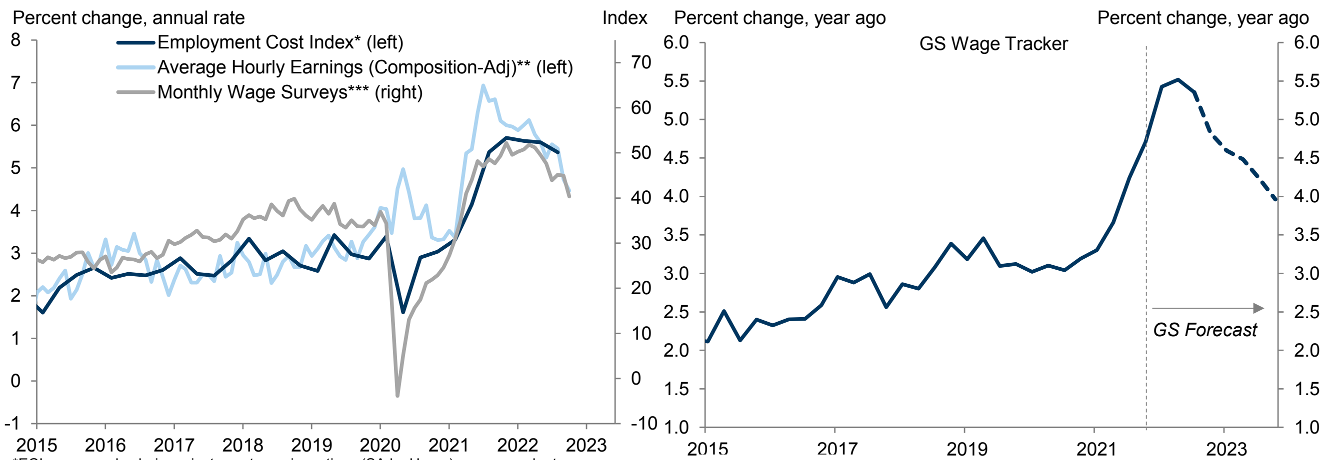
Wage Growth Slows Most of the Way to a Sustainable Rate

Only recently has labor market rebalancing begun to yield clearer evidence of a moderation in wage growth. Average hourly earnings have decelerated meaningfully and survey measures of current and future wage growth have fallen too, though the employment cost index decelerated only a touch in Q3.

We see some risk of an upcoming "January effect" where more wage contracts reset at the start of the year and incorporate larger than usual cost of living adjustments, resulting in an outsized jump in wages even after seasonal adjustment. But by the end of 2023, we expect a large decline in the jobs-workers gap to reduce wage growth from the peak of 5.5% reached in the middle of this year to 4%, not far above our 3.5% estimate of the pace compatible with 2% inflation.

Because lowering inflation to an acceptable rate is likely to take a while, a further decline in wage growth next year would be a crucial intermediate benchmark that could reassure policymakers that with patience, gradual labor market rebalancing can reverse inflationary overheating without a recession.

Exhibit 7: Wage Growth Is Showing Early Signs of Moderation and Should Fall to About 4% by Late 2023



*ECI wages and salaries private sector ex incentives (SA by Haver), qoq annual rate.
**6m annual rate.
***Average of NFIB, Dallas Fed manufacturing, Dallas Fed services, Richmond Fed manufacturing, Richmond Fed services, NY Fed services, and Kansas City Fed services.

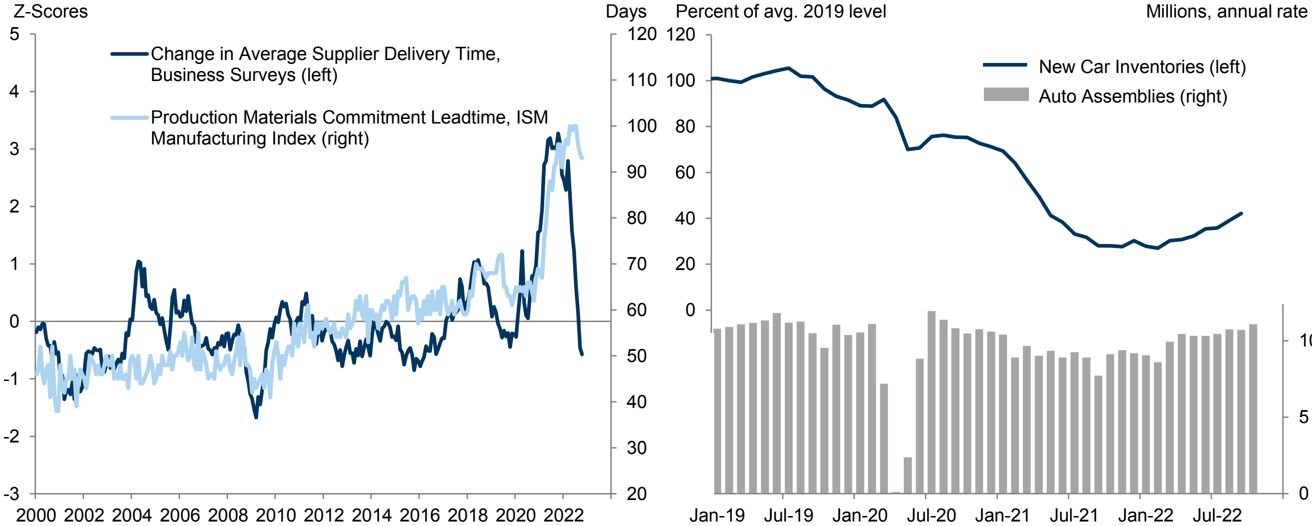
Source: Department of Labor, Federal Reserve, NFIB, Goldman Sachs Global Investment Research

Core Inflation Falls from 5% to 3%, Led by Goods Categories

The 2023 inflation outlook presents two quite different stories in the goods and services categories.

On the goods side, supply chain recovery finally appears to be yielding the deflationary payback that has been deferred for more than a year by a series of further pandemic- and war-related disruptions. As production of items such as autos rebounds and inventories are rebuilt, competition should reverse the scarcity effects that raised retail margins and consumer prices earlier in the pandemic. In addition, more moderate commodity price inflation, falling transportation costs, and downward pressure on import prices from dollar appreciation should also help to reduce core PCE goods inflation, which we expect will fall sharply from 5.7% year-over-year now to -1.6% by December 2023.

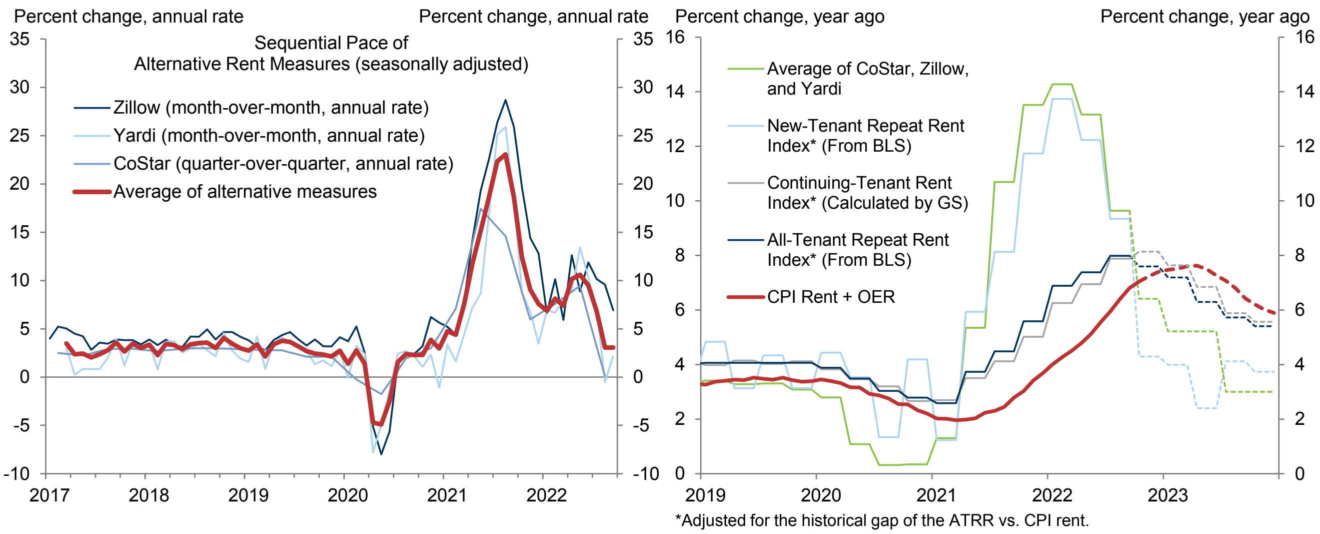
Exhibit 8: As Supply Chains Recover, Production Rebounds, and Inventories Rebuild, Competition Should Unwind Scarcity Effects and Lower Prices in Supply-Constrained Goods Categories Like Autos



Source: Federal Reserve, Institute for Supply Management, Department of Commerce, Goldman Sachs Global Investment Research

On the services side, disinflation will take longer. We expect core PCE services inflation to fall only modestly from 4.9% now to 4.4% by December 2023. The broad reason is that there will likely be some lag from a slowdown in wage growth to a slowdown in inflation in labor-intensive services categories. A more specific reason is that the largest categories, health care and shelter, already appear destined to run hot because of lags in the official data. In the health care category, a large Medicare fee adjustment in response to cost increases this year will affect government-paid services directly and likely spill over to privately-paid services. In the shelter category, web-based alternative measures of new tenant rents have already decelerated sharply to an annualized growth rate of about 3%. But the official series—which covers rents on both new tenant and continuing tenant leases—is likely to rise a firmer 6% next year as continuing tenant rents catch up to market rates, though it should decelerate sequentially.

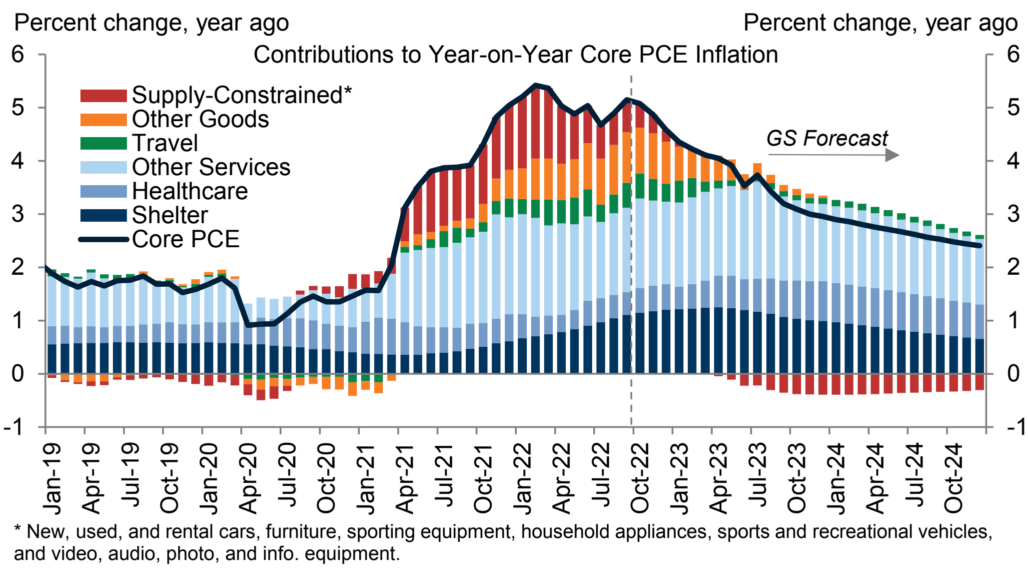
Exhibit 9: Alternative Data Show a Sharp Slowdown in New Tenant Rent Growth, but Shelter Inflation Is Likely to Remain High in the Official Data in 2023 as Continuing Tenant Rents Catch Up to Market Rates



Source: Zillow, Yardi, CoStar, Department of Labor, Goldman Sachs Global Investment Research

Taken together, we expect year-over-year core PCE inflation to decline from 5.1% in September to 2.9% in December 2023. We expect an even larger decline in year-over-year core CPI inflation from 6.3% in October to 3.2% in December 2023. As we noted last year, this would mean that the large divergence between CPI and PCE in 2022 should fade in 2023 as declines in durable goods prices weigh more heavily on the CPI and the health services categories in the two indices move in opposite directions.

Exhibit 10: We Expect Core PCE Inflation to Fall from 5.1% Today to 2.9% in December 2023, Led Mainly by Goods Categories

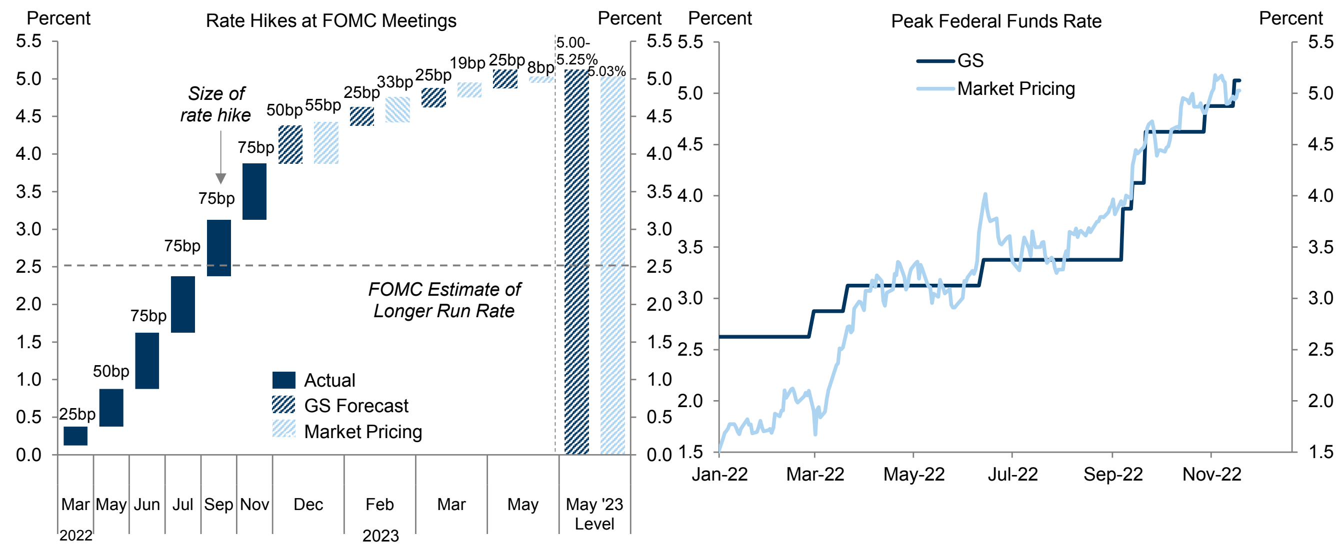


Source: Department of Commerce, Goldman Sachs Global Investment Research

Fine-Tuning the Funds Rate

We expect the FOMC to slow the pace of rate hikes to 50bp in December and to 25bp in February, March, and May, raising the funds rate to a peak of 5-5.25%.

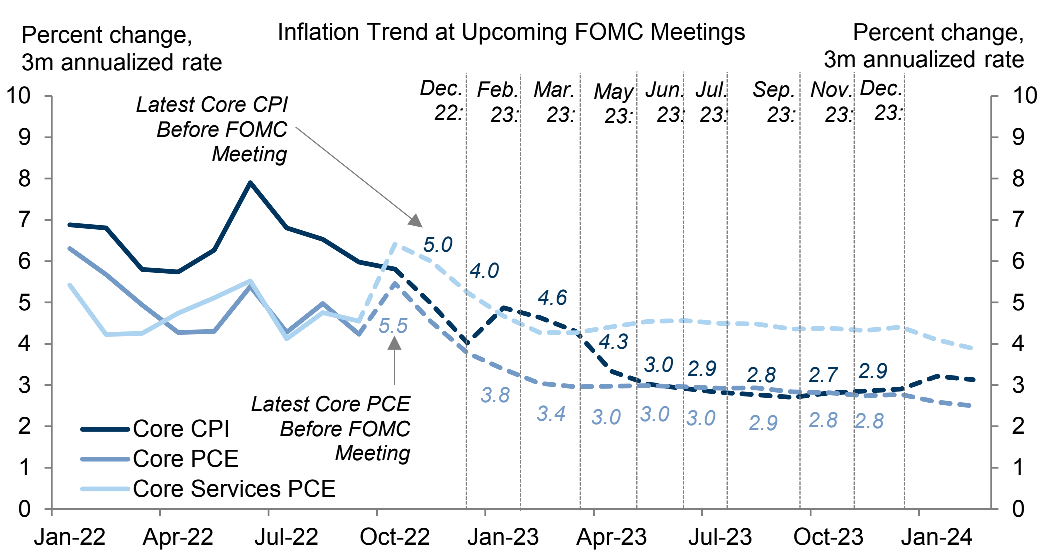
Exhibit 11: We Expect a 50bp Hike in December Followed by 25bp Hikes in February, March, and May to Raise the Funds Rate to a Peak of 5-5.25%



Source: Federal Reserve, Goldman Sachs Global Investment Research

We see a couple reasons for hikes to continue through the spring. First, our forecast implies that the inflation trend is likely to remain uncomfortably high for a while longer. Second, with the fiscal tightening now mostly behind us and household real disposable income rising again, the FOMC will need to tighten financial conditions enough to keep the economy on a solidly below-potential growth path.

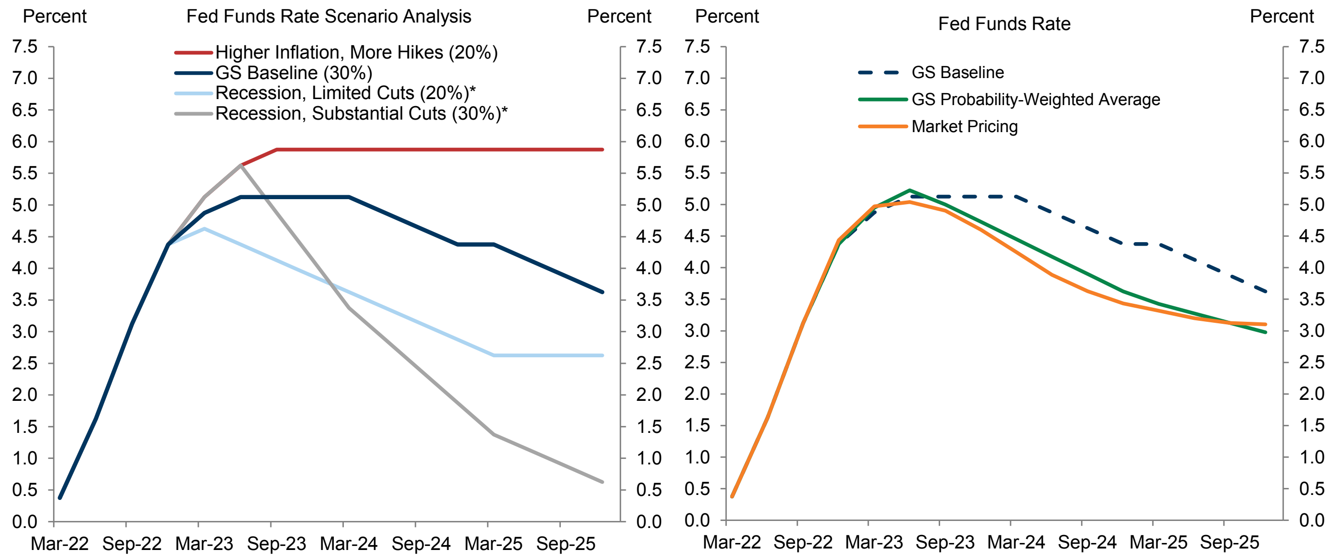
Exhibit 12: The Inflation Trend Will Remain High in Early 2023, Creating Pressure to Keep Hiking



Source: Department of Commerce, Department of Labor, Goldman Sachs Global Investment Research

We do not expect rate cuts next year because we do not expect a recession and we are skeptical that a decline in inflation alone would lead the FOMC to cut toward neutral because we suspect that the Fed leadership shares our skepticism about neutral rate estimates. Instead, we think the more natural path if inflation comes down is to simply wait until something goes wrong and then deliver either small cuts in response to a smaller threat, similar to the insurance cuts of 2019, or substantial cuts in response to a full recession. In the other direction, if inflation is stickier than we expect or underlying growth momentum is stronger, the FOMC would likely raise the funds rate to a higher level. Our Fed scenario analysis implies that our probability-weighted average view is a touch more hawkish than market pricing.

Exhibit 13: Our Scenario Analysis of Possible Fed Paths Implies That Our Probability-Weighted Average View Is a Touch More Hawkish Than Market Pricing



* The recession scenarios show unrealistically slow cuts to capture many sub-scenarios of recessions starting at various points in time.

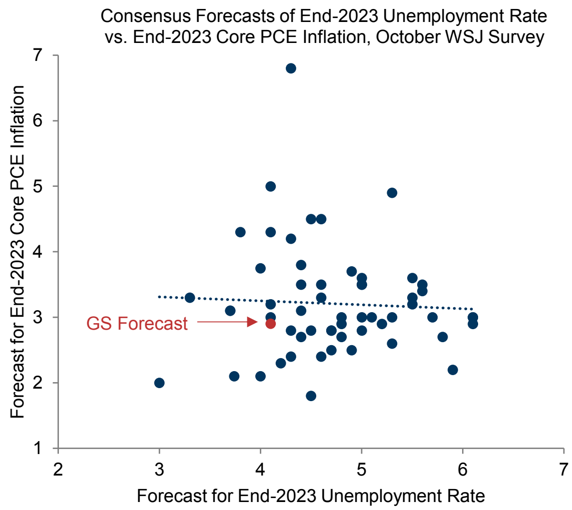
Source: Goldman Sachs Global Investment Research

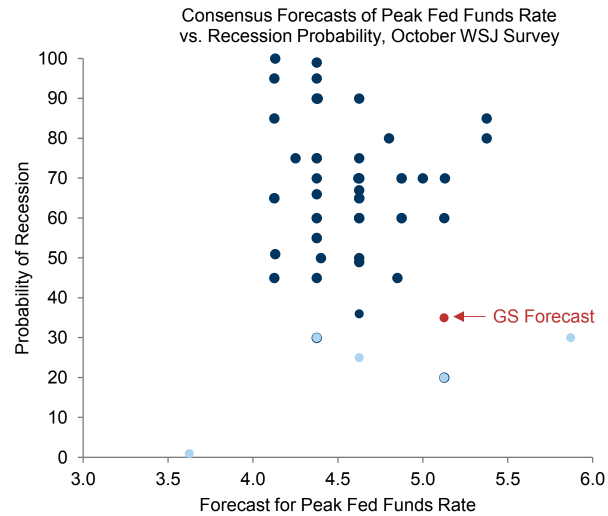
The Risks to Our Forecast of a Soft Landing

Why do our views differ from consensus? Why do we think the Fed can achieve a soft landing now when it couldn't in the 1960s and 1970s? And what would lead us to forecast a recession instead?

Relative to consensus, we expect roughly in-line inflation, a lower unemployment rate, higher GDP growth, and a slightly higher peak funds rate. On inflation, there is substantial disagreement among forecasters, but little of it appears to be driven by differences in unemployment rate forecasts—that is, by traditional Phillips curve effects. Instead, it is likely driven by views on whether resolving pandemic dislocations in the goods sector will deliver a long-awaited deflationary impulse. This has proven hard to time so far, but we think the process is finally on track. On the unemployment rate, we expect a smaller increase because we continue to take an optimistic view in the Beveridge curve debate. Our growth forecast is above consensus and our recession odds are below consensus even though our Fed forecast is slightly more hawkish than consensus because we expect demand to prove more resilient next year, and because our models imply that the drag on growth from the tightening in financial conditions is peaking now, whereas others likely expect the "long and variable lags" of monetary policy to peak later.

Exhibit 14: Relative to Consensus, We Expect a Slightly More Favorable Inflation-Unemployment Tradeoff and See Less Risk of Recession Despite Having a Slightly More Hawkish Fed Forecast



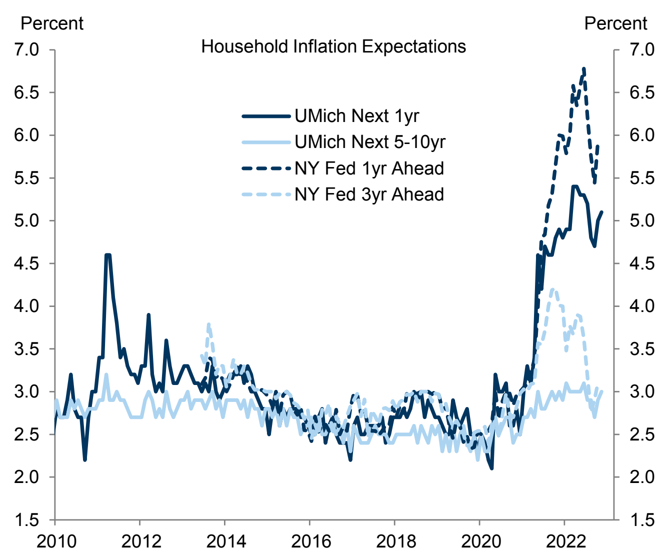


Source: Wall Street Journal, Goldman Sachs Global Investment Research

Why do we think the Fed can reverse overheating more successfully today than it could in the 1960s and 1970s? One reason is that the problem is less serious today: a part of the inflation overshoot still reflects pandemic-related supply-demand imbalances that will fade on their own; job openings are very elevated, but the employment-to-population ratio is not unsustainably high; and while short-term inflation expectations are high, long-term inflation expectations remain anchored, meaning that there is not yet a perception of high inflation as a new normal that only a deep recession could cure. Another reason is that monetary policymakers today have a more sophisticated understanding of both inflation dynamics and their policy tools, are more politically independent, and have better real-time data for monitoring the economy. Achieving a soft or at least "softish" landing is in large part a question of calibrating policy tightening correctly, and while this isn't easy, it has gone well so far this year.

Exhibit 15: Short-Term Inflation Expectations Remain High, but Long-Term Expectations Are Anchored

* Share of sentences mentioning higher prices less share of sentences mentioning lower prices, rescaled to PCE inflation.



Source: Federal Reserve, University of Michigan, Goldman Sachs Global Investment Research

What would make us change our mind? We would raise our recession odds if the benign labor market adjustment led by a decline in job openings stops, if elevated near-term inflation expectations in the business sector make a return to pre-pandemic labor market conditions less effective in bringing down wage growth and inflation than we are assuming, or if new global supply shocks such as another large jump in energy prices add to inflation momentum and make the Fed's task even harder.

David Mericle

The US Economic and Financial Outlook

THE US ECONOMIC AND FINANCIAL OUTLOOK
(% change on previous period, annualized, except where noted)

	2020	2021	2022 (f)	2023 (f)	2024 (f)	2025 (f)	2022 Q1	2022 Q2	2022 Q3	2022 Q4	2023 Q1	2023 Q2	2023 Q3	2023 Q4
OUTPUT AND SPENDING														
Real GDP	-2.8	5.9	1.9	1.1	1.6	1.9	-1.6	-0.6	2.6	0.9	0.8	1.0	1.3	1.3
Real GDP (annual=Q4/Q4, quarterly=yoy)	-1.5	5.7	0.3	1.1	1.9	1.9	3.7	1.8	1.8	0.3	0.9	1.3	1.0	1.1
Consumer Expenditures	-3.0	8.3	2.8	1.9	1.8	1.9	1.3	2.0	1.4	3.3	1.5	1.5	1.5	1.5
Residential Fixed Investment	7.2	10.7	-10.2	-15.8	-0.1	2.0	-3.1	-17.8	-26.4	-21.3	-17.5	-10.0	-5.0	0.0
Business Fixed Investment	-4.9	6.4	3.3	1.9	3.3	3.6	7.9	0.1	3.7	0.1	2.1	2.3	2.4	3.0
Structures	-10.1	-6.4	-9.5	-4.8	2.4	3.0	-4.4	-12.7	-15.4	-10.9	0.0	0.0	1.0	2.0
Equipment	-10.5	10.3	4.5	2.0	2.6	3.0	11.4	-2.1	10.8	0.0	1.0	1.5	1.5	2.5
Intellectual Property Products	4.8	9.7	8.8	4.9	4.3	4.5	10.8	8.9	6.9	5.5	4.0	4.0	4.0	4.0
Federal Government	6.2	2.3	-3.1	-0.8	-0.1	0.0	-5.3	-3.4	3.7	-3.0	-1.0	-1.0	0.0	0.0
State & Local Government	0.4	-0.5	0.3	0.8	1.0	1.0	-0.4	-0.6	1.7	0.2	1.0	1.0	1.0	1.0
Net Exports ($bn, '12)	-923	-1,233	-1,369	-1,304	-1,351	-1,371	-1,489	-1,431	-1,274	-1,282	-1,282	-1,296	-1,308	-1,329
Inventory Investment ($bn, '12)	-55	-19	112	75	66	60	215	110	62	61	75	75	75	75
Industrial Production, Mfg.	-6.3	5.7	3.5	1.5	2.5	3.2	3.6	3.2	0.3	1.7	1.4	1.5	1.8	2.1
HOUSING MARKET														
Housing Starts (units, thous)	1,395	1,605	1,613	1,570	1,570	1,570	1,720	1,647	1,458	1,627	1,570	1,570	1,570	1,570
New Home Sales (units, thous)	831	769	631	549	722	786	776	609	608	533	496	528	559	613
Existing Home Sales (units, thous)	5,638	6,127	5,057	3,831	4,147	4,509	6,057	5,373	4,770	4,028	3,750	3,793	3,858	3,924
Case-Shiller Home Prices (%yoy)*	9.5	18.8	6.7	-7.5	-2.2	3.8	20.0	19.6	13.1	6.7	-1.0	-7.4	-8.2	-7.5
INFLATION (% ch, yr/yr)														
Consumer Price Index (CPI)**	1.3	7.1	6.8	3.2	2.6	2.5	8.0	8.6	8.3	7.2	5.7	4.0	3.2	3.1
Core CPI **	1.6	5.5	5.9	3.2	2.7	2.5	6.3	6.0	6.3	6.1	5.6	4.7	3.8	3.3
Core PCE** †	1.5	5.0	4.5	2.9	2.4	2.2	5.3	5.0	4.9	4.7	4.1	3.7	3.3	2.9
LABOR MARKET														
Unemployment Rate (%)^	6.7	3.9	3.6	4.1	4.2	4.2	3.6	3.6	3.5	3.6	3.8	3.9	4.0	4.1
U6 Underemployment Rate (%)^	11.7	7.3	6.7	7.7	8.0	7.9	7.0	6.6	6.7	6.7	7.0	7.2	7.5	7.7
Payrolls (thous, monthly rate)	-774	562	370	29	52	60	539	349	381	212	40	25	25	25
Employment-Population Ratio (%)^	57.4	59.5	60.0	59.6	59.4	59.2	60.1	59.9	60.1	60.0	59.9	59.8	59.7	59.6
Labor Force Participation Rate (%)^	61.5	61.9	62.3	62.2	62.0	61.8	62.4	62.2	62.3	62.3	62.3	62.2	62.2	62.2
Average Hourly Earnings (%yoy)	4.9	4.2	5.1	4.2	3.7	3.3	5.4	5.3	5.1	4.7	4.5	4.4	4.1	4.0
GOVERNMENT FINANCE														
Federal Budget (FY, $bn)	-3,132	-2,775	-1,375	-1,250	-1,350	-1,600	--	--	--	--	--	--	--	--
FINANCIAL INDICATORS														
FF Target Range (Bottom-Top, %)^	0-0.25	0-0.25	4.25-4.5	5-5.25	4.25-4.5	3.5-3.75	0.25-0.5	1.5-1.75	3-3.25	4.25-4.5	4.75-5	5-5.25	5-5.25	5-5.25
10-Year Treasury Note^	0.93	1.52	3.75	4.00	3.75	3.65	2.32	2.98	3.83	3.75	3.90	4.00	4.00	4.00
Euro (€/$)^	1.22	1.13	0.99	1.05	1.10	1.10	1.11	1.05	0.98	0.99	0.95	0.98	1.02	1.05
Yen ($/¥)^	103	115	144	125	115	115	121	136	145	144	145	133	128	125

* Weighted average of metro-level HPIs for 381 metro cities where the weights are dollar values of housing stock reported in the American Community Survey. Annual numbers are Q4/Q4.
** Annual inflation numbers are December year-on-year values. Quarterly values are Q4/Q4.
† PCE = Personal consumption expenditures. ^ Denotes end of period.
Note: Published figures in bold.
Source: Goldman Sachs Global Investment Research.

Source: Goldman Sachs Global Investment Research

Disclosure Appendix

Reg AC

We, Jan Hatzius, Alec Phillips, David Mericle, Spencer Hill, CFA, Joseph Briggs, Ronnie Walker, Tim Krupa and Manuel Abecasis, 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 the Global Investment Research Division 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. **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 and Type II Financial Instruments Firms 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

The Global Investment Research Division of Goldman Sachs 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.

Effective from the date of the United Kingdom's departure from the European Union and the European Economic Area ("Brexit Day") the following information with respect to distributing entities will apply:

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, the Republic of Cyprus and the Republic of Ireland; GS -Succursale de Paris (Paris branch) which, from Brexit Day, will be 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 our Global Investment Research Division. 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.