**Note**: The following is a redacted version of the original report published May 22, 2023 [24 pgs].

Goldman Sachs | Global Macro Research

ISSUE 119 | May 22, 2023 | 4:05 PM EDT

# TOP *of* MIND

# DAUNTING DEBT LIMIT DYNAMICS

With the "early June" deadline by which the US Treasury estimates it could run out of money to pay its bills if the US debt limit isn't raised fast approaching and markets seemingly at the whim of every debt limit-related headline, US debt limit dynamics are Top of Mind. We dig into the history and mechanics of the US debt limit, how negotiations around raising it could evolve, and the potential economic and market implications if they fail. GS GIR's Alec Phillips has long maintained that raising the debt limit before the deadline is the most likely scenario, but places 10% odds on the deadline being missed, which could have severe economic consequences. But even if the limit is raised in time (as Phillips ultimately expects), we speak with David Beers, S&P's former head of sovereign credit ratings who oversaw its 2011 US credit rating downgrade, and GWU's Stephen Kaplan to explore whether the repeated brinkmanship around raising the debt limit could in and of itself undermine the value proposition of US assets.

Lawmakers will most likely agree on a deal in time... [but] I'd place the odds of not getting a deal in time at about 10%—higher than at any point since the 2011 debt limit crisis—because the politics for getting a deal done are worse today.

- Alec Phillips

The underlying issue, as it was back when S&P downgraded the US' credit rating, is the trajectory of public debt... Worsening political polarization was also an important factor in the [2011] downgrade... And it's hard to argue that political polarization has done anything other than continue to worsen since 2011.

- David Beers

Over the longer term, political polarization that manifests as repeated brinkmanship over raising the debt limit casts a cloud over not the institutional capacity of the US government to repay its debt, but the *political willingness* to do so, which can't be good for any US asset.

- Stephen B. Kaplan

## WHAT'S INSIDE

INTERVIEWS WITH:

**David Beers,** Former Head of Sovereign Credit Ratings, Standard & Poor's, Senior Fellow, Center for Financial Stability

**Stephen B. Kaplan,** Associate Professor of Political Science and International Affairs, George Washington University

**Alec Phillips,** Chief Political Economist, Goldman Sachs

MARKETS AROUND THE DEBT CEILING
Dominic Wilson and Vickie Chang, GS Markets Research

A LOOK AT SECTOR-LEVEL DEBT LIMIT RISK
Brian Lee and Noah Poponak, GS Equity Research

...AND MORE

Allison Nathan | allison.nathan@gs.com
Jenny Grimberg | jenny.grimberg@gs.com
Ashley Rhodes | ashley.rhodes@gs.com

Investors should consider this report as only a single factor in making their investment decision. For Reg AC certification and other important disclosures, see the Disclosure Appendix, or go to www.gs.com/research/hedge.html.

**The Goldman Sachs Group, Inc.**

# Macro news and views

## We provide a brief snapshot on the most important economies for the global markets

### US

**Latest GS proprietary datapoints/major changes in views**

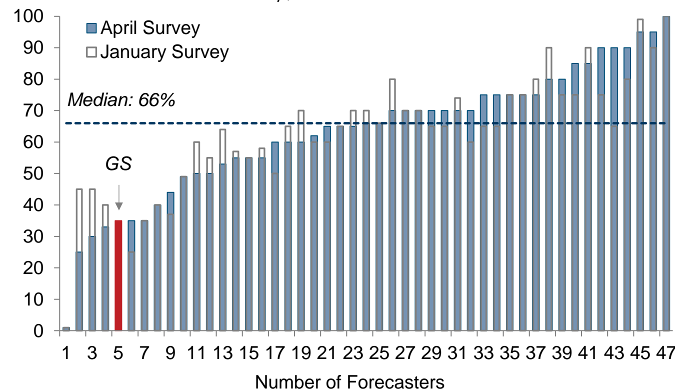
- No major changes in views.

**Datapoints/trends we're focused on**

- Fed policy; we expect the Fed to hold rates steady for the rest of the year as we think the Fed funds rate is at a level the Fed believes is sufficiently restrictive to tame inflation.
- Growth; we continue to expect the US to avoid a recession this year—placing 35% odds on one—and forecast above-consensus GDP growth of 1.6%yoy in 2023.
- Growth impact of bank stress; we estimate tighter lending standards will reduce growth by 0.4pp this year, though the extent of tightening and its impact remains highly uncertain.

**We still don't expect a recession in the US this year**

Estimated US recession probability (next 12m), Wall Street Journal Forecaster Survey, %




*Source: Wall Street Journal, Goldman Sachs GIR.*

### Japan

**Latest GS proprietary datapoints/major changes in views**

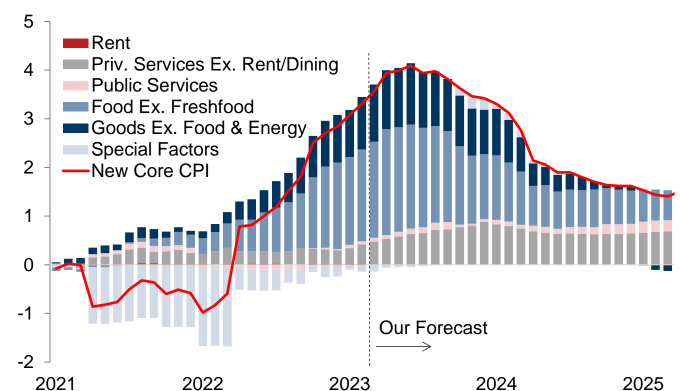
- We recently raised our FY2023 New Core CPI inflation forecast to 3.6% (from 2.9%) to reflect our expectations of a stronger outlook for food and services prices.

**Datapoints/trends we're focused on**

- BoJ policy; we continue to expect the BoJ to shorten the target maturity of yield curve control to five years from 10 in July, though the possibility of a general election, US banks stress, and US debt limit concerns could impact that timing.
- Inbound consumption, which we think will remain a tailwind for Japan's economy as visitors from China pick up.
- Consumer confidence, which improved strongly in April.

**We expect Japan New Core CPI inflation to continue accelerating through 2H23**

New Core CPI inflation (excl. fresh food and energy), %, yoy




*Source: Ministry of Internal Affairs and Communications, Goldman Sachs GIR.*

### Europe

**Latest GS proprietary datapoints/major changes in views**

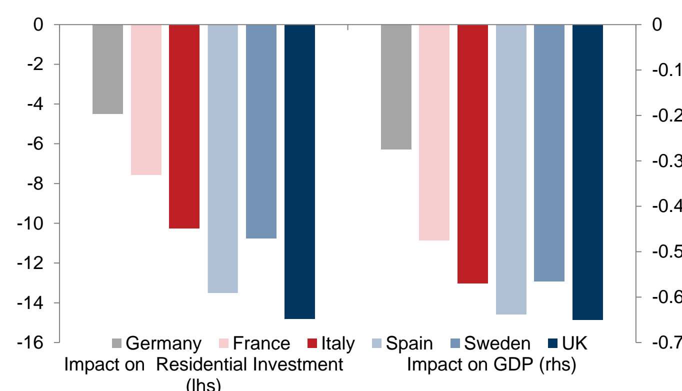
- No major changes in views.

**Datapoints/trends we're focused on**

- ECB policy; we expect 25bp hikes in June and July for a terminal rate of 3.75%, reflecting firm underlying inflation pressure, though risks are skewed to a higher terminal rate.
- BoE policy; we expect 25bp hikes in June and August for a terminal rate of 5%, reflecting continued firmness in the labor market, wage growth, and services inflation data.
- Europe housing drag; we expect policy tightening to lead to a sizable but manageable drag on growth from housing.
- EA core inflation, which we expect to fall to 3.7%yoy by YE.

**A steady drag from lower residential investment**

Cumulative impact of rate hikes on residential investment (lhs) and GDP (rhs), %




*Source: Goldman Sachs GIR.*

### Emerging Markets (EM)

**Latest GS proprietary datapoints/major changes in views**

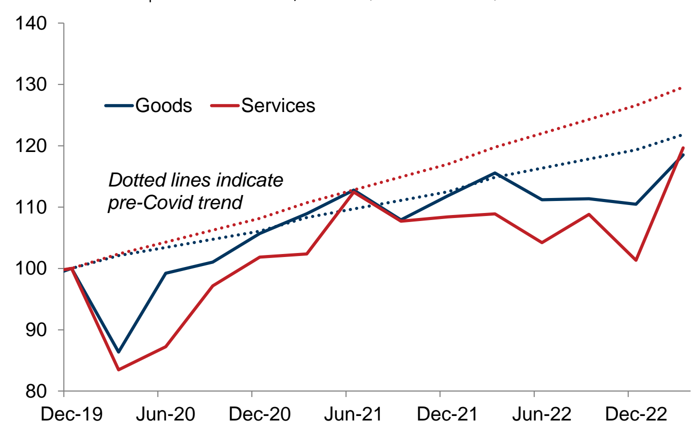
- We recently lowered our 2023 China headline CPI inflation forecast to 1.2% given weaker-than-expected inflation YTD.

**Datapoints/trends we're focused on**

- Soft Chinese data; we don't think it signals a turning point in China's recovery, but do believe some weak areas (property sector, youth employment, consumer confidence) may require more targeted policy support to counteract.
- CEEMEA growth, which we expect to average 2.3% in 2023 as we think the worst of its economic headwinds have passed.
- Turkish presidential election, which appears to be heading towards a second-round run-off on May 28.
- Thai elections, where the opposition received a strong mandate.

**China's consumption-led recovery still on track**

Real consumption vs. trend, index (4Q19 = 100)




*Source: NBS, Goldman Sachs GIR.*

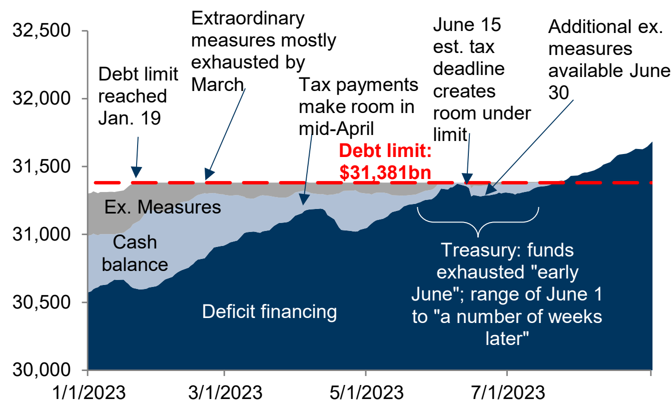
# Daunting debt limit dynamics

With the "early June" deadline by which the US Treasury estimates it could run out of money to pay its bills if the US debt limit isn't raised fast approaching and markets seemingly at the whim of every debt limit-related headline, US debt limit dynamics are Top of Mind. We dig into the history and mechanics of the US debt limit, how negotiations around raising it could evolve, and the potential economic and market implications if they fail. But even if they don't, and the limit is raised in time (as we expect), we explore whether the repeated brinkmanship around raising the debt limit could in and of itself undermine the value proposition of US assets.

But first, what is the US debt limit, and why all the focus on raising it? In short, it's a ceiling that Congress imposes on the amount of debt the federal government can incur to fund its spending (see pg. 17). So, Congress must not only authorize all government spending, but also the funding of it, and the debt limit was intended to be an efficient way to do the latter, by only requiring Congress to act when more net debt issuance is required than the existing ceiling allows. If the debt limit is not raised, the federal government will eventually run out of money to pay its bills, forcing it to stop important payments (Social Security, Medicare, defense) and risking a sovereign debt default. But what began as an attempt at efficiency has become a political tool, with the opposition party using the debt limit to extract concessions from the president's party in exchange for agreeing to raise it. Today, the GOP wants spending cuts in exchange for agreeing to raise the debt limit.

**Treasury likely to be unable to make payments by early June**

Projected public debt subject to limit, $bn




*Source: US Treasury, Goldman Sachs GIR.*

So, where do current debt limit negotiations stand? We turn to Alec Phillips, GS Chief Political Economist, for an update. He has long maintained that raising the debt limit before the deadline is the most likely scenario. The deal that will achieve this, he says, is one that will have bipartisan support from the center out in both the House and Senate—a relatively risky proposition for House Speaker McCarthy who relies on conservative House Republicans not only for votes on other issues, but also for abstaining from bringing a motion to remove him as speaker (that *Democrats* reportedly may save him from).

What would a deal most likely look like? Phillips expects a substantially pared back version of the House Republicans' Limit, Save, Grow Act that includes spending cuts, mainly in the form of discretionary spending caps, that will amount to a modest 0.2% of GDP, and doesn't include a repeal of the Inflation Reduction Act's renewable energy incentives or a nullification of President Biden's student loan debt relief initiative (for our equity analysts' take on the implications for key sectors—Brian Lee on Clean Energy and Noah Poponak on Defense—see pg. 16). But while such a deal apparently seems within reach, Phillips still places 10% odds on no action from Congress before the deadline, higher than at any point since the 2011 debt limit crisis. Should the deadline be missed, the economic damage, he warns, could be severe—as payments worth ~10% of GDP could be disrupted—so he expects the market to price in additional risk before the limit is finally raised.

So, how much—if any—concern are markets pricing about the looming debt limit deadline? GS market strategists Dominic Wilson and Vickie Chang note that, except for Treasury bills maturing around early June and US sovereign credit default swap (CDS) spreads, markets generally remain sanguine about debt limit risks (see pg. 8 for charts), which suggests the potential for sharp market moves if things go wrong. Wilson and Chang argue that such a scenario would look more like a US growth shock than a sovereign default shock, and could result in large declines in US equities, credit, and bond yields along with a sharp rise in implied equity volatility. So, they say, positioning for such moves would be a more efficient way to hedge against debt limit risk than rate or CDS spreads.

But even if the debt limit is raised before the deadline, would US assets really be in the clear? In the near term, this episode would almost surely be quickly forgotten. But Stephen Kaplan, Associate Professor at George Washington University, sees longer-term implications of these episodes for US assets. He argues that repeated brinkmanship over raising the debt limit creates the tail risk—however small it may be—of a US default that could eventually erode the willingness of countries and investors to hold US Dollars. Given the many benefits that the Dollar's unique role as the global reserve currency affords the US economy, Kaplan thinks that policymakers should be doing everything in their power to *protect* this role rather than undermine it, and therefore believes that the debt limit should be abolished. Phillips, for his part, doesn't believe that the Dollar is particularly harmed by the brinkmanship in the absence of reserve currency alternatives, and explains why abolishing the debt limit would be easier said than done.

David Beers, the long-time head of sovereign credit ratings at S&P when the rating agency downgraded the US' credit rating in 2011, takes an even broader perspective. He emphasizes that the 2011 rating downgrade occurred shortly *after* Congress finally agreed to raise the debt limit (and therefore went from AAA to AA+, rather than to the "D" that signals a default) and was motivated not by the contentious debt limit process, but by the concerning US fiscal and political trajectory that the debt limit process highlighted—both of which, he says, have deteriorated substantially in the 12 years since. In his view, the high level of indebtedness of many countries—including the US—is the real problem that could ultimately adversely impact US creditworthiness. And abolishing the debt limit would do little to solve these fiscal concerns.

**Allison Nathan, Editor**

*Email: allison.nathan@gs.com*
*Tel: 212-357-7504*
*Goldman Sachs & Co. LLC*

# Interview with Alec Phillips

Alec Phillips is Chief Political Economist at Goldman Sachs. Below, he discusses the current state of the US debt limit, and what to expect from yet another messy US debt limit episode.

**Jenny Grimberg: When will the US government run out of money to pay its bills?**

**Alec Phillips:** The Treasury estimates it will likely no longer be able to satisfy all government obligations by early June if Congress doesn't raise the debt limit by then, which I interpret to mean June 8/9 based on our projections of Treasury cash flows; we project that the Treasury's cash balance could dip well under $30bn by that point, which is roughly the minimum cash balance Treasury usually uses to project the deadline. But the range of possible dates is wide—Treasury estimates it could run out of money as early as June 1, and as late as a "number of weeks later." The deadline is unusually uncertain because the Treasury will take in a substantial amount of revenue ahead of the June 15 tax deadline. So, whereas the Treasury's cash position usually trends down in a straight line as the deadline approaches, this time the cash balance trends down and then curves back up, so the question is whether the cash balance will curve up before or after it hits zero. While we see even odds of Treasury being able to make payments until the second half of July, it's entirely reasonable that the Treasury is projecting early June, because if there is some risk that Treasury won't be able to make timely payments, then that should serve as the deadline for Congress to act. And we think it will act by then.

**Jenny Grimberg: Assuming lawmakers raise the debt limit in time, how long will it last?**

**Alec Phillips:** I would've put the odds of a short-term extension at nearly 50/50 a few weeks ago, when the White House's position was that it wouldn't negotiate spending cuts as part of a debt limit increase. At that point, extending the deadline to fiscal year end on September 30—when Congress will have to agree to a spending deal to avoid a government shutdown anyway—would have benefitted both parties: Democrats would have still been able to make the claim that the two negotiations were separate, and Republicans would have had more confidence that a spending deal would go along with the debt limit increase. But now that the White House is actively negotiating spending cuts, the case for a short-term extension looks weaker, and I think the deal will extend the debt limit to 2025.

**Jenny Grimberg: What could the spending cuts look like?**

**Alec Phillips:** They'll likely be substantially pared back in both size and scope from the House Republicans' Limit, Save, Grow Act. Over 10 years, the House bill would have cut average annual spending by around 0.8% of GDP, while spending cuts in the final deal will probably be closer to 0.2% of GDP. And unlike the House bill that includes a repeal of the Inflation Reduction Act's renewable energy incentives, a nullification of President Biden's student loan debt relief initiative, and caps on discretionary spending growth, the final debt limit deal will likely rely mainly on the discretionary spending caps.

**Jenny Grimberg: Will the House GOP agree to such a deal?**

**Alec Phillips:** Many House Republicans probably wouldn't support such a deal, but they don't have to, because little overlap exists in any case between a deal that conservative House Republicans would support and one that Senate Democratic leadership would support, and that Biden would sign into law. Ultimately, the final deal will be one that can pass in the House and Senate with bipartisan support from the center out. This poses a challenge for House Speaker McCarthy, who still needs to satisfy conservative House Republicans because he's relying on them not only for votes on other issues, but also to abstain from bringing a motion to remove him as speaker.

**Jenny Grimberg: Doesn't that reliance on conservative Republicans mean that McCarthy won't allow a vote on any debt limit bill that doesn't include significant spending cuts?**

**Alec Phillips:** Not necessarily. While any member of the Republican party can bring the motion to vacate, the motion needs a simple majority to pass. If a vote took place before the debt limit bill passes, some centrist Democrats would probably side with most Republicans to keep McCarthy on as speaker. And recent reports suggest that's exactly what would happen.

**Jenny Grimberg: How concerned are you that the debt limit won't get lifted in time?**

**Alec Phillips:** Lawmakers will most likely agree on a deal in time, whether it's a deal that raises the debt limit until 2025 or a short-term extension if a long-term deal can't be agreed to in time. That said, I'd place the odds of not getting a deal in time at about 10%—higher than at any point since the 2011 debt limit crisis—because the politics for getting a deal done are worse today. In 2011, both parties were very concerned about the fiscal outlook, which made Democrats more willing to discuss—and eventually help enact—meaningful spending cuts. Today, despite a higher debt-to-GDP ratio and a worse long-term fiscal outlook, both parties are less concerned. That makes Democrats less willing to do a deal. It actually makes it easier for Republicans to do a deal with smaller spending cuts, but tougher House politics given the thin GOP margin still make reaching a deal difficult.

**Jenny Grimberg: How much concern about the debt limit is the market pricing, and how does that compare to prior debt limit deadlines?**

**Alec Phillips:** Treasury bills maturing around early June have cheapened by around 50bp in May, as many buyers of Treasuries are avoiding holding securities maturing right after the debt limit deadline because of the risk that they may not be redeemed on time. Sovereign credit default swap (CDS) spreads have also sharply widened, well beyond 2011 and 2013 levels, reflecting an increased sense of risk around a US default. However, that widening also reflects current higher interest rates, given that resolving a default through CDS requires the protection holder to deliver the underlying security, and Treasuries are now trading at a steep discount to par due to rate increases in the past year. So, current spreads aren't directly comparable to 2011/2013 levels.

The Treasury bills curve didn't price concern until a week before the 2011 deadline, and a couple weeks before the 2013 deadline. This time the curve started reacting over a month ahead of the deadline, and clients have been asking about debt-limit risks to Treasury bills for several months. The early reaction is likely due to so many parallels between this episode and prior disruptive ones like 1995-96 and 2011—when Republicans also held the House majority with a Democratic president and demanded fiscal changes in return for a debt limit increase—so markets have been expecting and preparing for similar disruptions this time. But, so far equity volatility doesn't appear to reflect concerns, like 2011, when volatility didn't rise until a week before the deadline.

**Jenny Grimberg: How would payments be prioritized if the debt limit isn't lifted before the deadline?**

**Alec Phillips:** The Treasury would likely follow the 2011 and 2013 prioritization plans, essentially turning off all payments except for debt service until tax proceeds build sufficiently to pay a full day's worth, then stop payments again until another day's worth of payments could be made. The Treasury would almost certainly be able to continue making debt service payments. In terms of principal payments, the Treasury would just need to roll maturing Treasuries into new securities, and presumably those auctions would clear at some yield, however high it might be. And in terms of interest payments, it just so happens that none are due during the period in question in June.

**Jenny Grimberg: So, failing to raise the debt limit by the deadline wouldn't necessarily constitute a default?**

**Alec Phillips:** The White House—which views any failure to make a scheduled payment as a default—would consider it one. The rating agencies probably wouldn't. Moody's and S&P have said that their ratings are focused on the debt securities, so as long as debt payments are made, they wouldn't consider the US to be in default (see pg. 12). And while Fitch has said that any missed payment may be grounds for a rating downgrade, it has also stated that default relates *specifically* to debt.

**Jenny Grimberg: How concerned are investors about a US credit rating downgrade?**

**Alec Phillips:** The possibility of a downgrade is a very hot topic given that the S&P 500 fell nearly 7% the day after the S&P's downgrade of US credit in 2011. That said, market participants seem to be viewing a downgrade more as a negative sentiment catalyst than something that would have either a technical or fundamental impact. Current Treasury holders probably wouldn't have to do anything differently if the rating were downgraded, because as long as Treasuries are backed by the full faith and credit of the US government, they will likely be treated the same regardless of the rating.

**Jenny Grimberg: If the Treasury has to stop payments, how damaging would that be for the economy?**

**Alec Phillips:** The economic damage could be severe, as it would mean eliminating payments worth around $225bn/month in July or August, or 10% GDP (ann.). So, given the already fragile state of the economy, this is something that could tip the US into recession if it lasted for any significant period of time.

**Jenny Grimberg: Could political dysfunction around the debt limit hurt the Dollar's status as the global reserve currency?**

**Alec Phillips:** The US is one of only two countries—the other being Denmark—with a debt limit, and all else equal, that probably does reduce confidence in Treasuries and, ultimately, the Dollar. That said, the debt limit issue is a technical one; it's not about the US' credit and solvency. And the countries of other potential reserve currencies have their own issues—the Euro area has experienced its share of fiscal problems over the years, which arguably involved more credit risk than the present situation in the US. So, while the political dysfunction around the debt limit certainly doesn't do the Dollar's reserve status any favors, it's unclear how much it harms it in the absence of an obvious alternative.

**Jenny Grimberg: Given the disruptive uncertainty around the debt limit, why not just abolish it?**

**Alec Phillips:** The debt limit exists for a reason, even if raising it has become such a fraught process. The Constitution grants the power of issuing debt solely to Congress. And as issuing US debt is unavoidable given the US' current fiscal situation, it would be extremely cumbersome for Congress to approve every issuance of Treasury bills, which happens twice weekly. Abolishing the debt limit would probably require amending the Constitution, which seems difficult. Another option would be for the courts to decide that the debt limit is fundamentally incompatible with other laws that Congress has passed; the president must spend the money Congress appropriates and when you're running a deficit, if the debt limit isn't raised, that spending can't happen. But again, that would have to be litigated, and it's not clear how the courts would rule.

**Jenny Grimberg: If it can't easily be abolished, why not raise the debt ceiling to such a high level that it never gets hit?**

**Alec Phillips:** A proposal exists to increase the debt limit to a "gazillion" dollars, which would render the limit effectively nonexistent. But with neither party wanting to take responsibility for raising the debt limit by a smaller dollar amount, raising it a very large amount seems out of the question. Case in point, during the 2021 debt limit episode, Democrats had the power to increase the debt limit to any amount without any Republican support because they controlled Congress and the White House. But Democrats didn't do that, because they wanted Republicans to share the political burden of raising the debt limit. So, the odds of raising the debt limit to a very high level seem low.

**Jenny Grimberg: What are the most important developments to watch in the near term?**

**Alec Phillips:** First, Treasury cash flows, specifically withheld tax receipts, which have been falling and are now negative on a year-on-year basis. If they deteriorate more, the deadline could come sooner than expected. Second, negotiations between the White House and congressional leadership to see whether they cross any bright lines, meaning not necessarily negotiating the degree of things like the years or amount of spending caps but whether critical things are ruled in or out. And third, external pressure from former President Trump weighing in and influencing Republican views on a deal, or, on the Democratic side, pushback from the left on any concessions Biden makes. Those things won't be decisive, but could make it harder for both sides to reach a deal.

# Markets around the debt ceiling

Dominic Wilson and Vickie Chang assess the potential market impacts of a failure to raise the debt limit—which they think would look more like a growth shock than a default shock—and the best way to hedge against it

As the Treasury's estimated date of when it will likely exhaust its resources under the debt limit nears, markets have become increasingly sensitive to headlines around progress towards raising the debt limit in time. Although corners of the market have been reflecting debt limit-related risks for some time, markets have generally remained sanguine about those risks, consistent with our expectation that negotiations may go down "to the wire" but that the limit will ultimately be raised before the Treasury runs out of resources to meet its obligations (see pgs. 4-5). Signs of progress in negotiations helped drive further relaxation across assets last week.

That said, even with increased hope that a deal is in the offing, the risk of a failure to reach an agreement before the deadline remains the highest it's been since 2011 and is one of the most visible risks to our mainline view that sees lower US recession probabilities and chances of Fed easing than the market is currently pricing. We believe that realizing this risk would look more like a US growth shock than a sovereign default shock, and therefore maintain that downside equity or credit protection, or positioning for equity volatility upside, would be the most efficient way to hedge against debt limit risk.

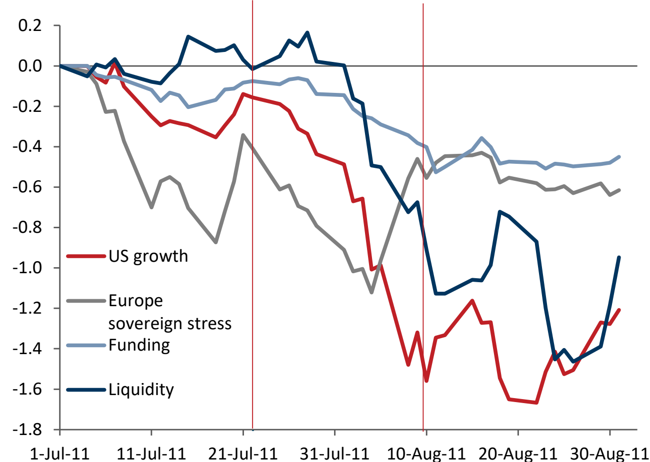
### Growth risk more than default risk

The risks from a failure to increase the limit are often framed in terms of the potential for default on Treasury obligations. In reality, that risk still looks extremely low in our view. The Treasury should have the revenues and the operational capacity to make debt payments, and we think will prioritize those above other payments, given the large risks and uncertainties associated with even a technical default. As a result, we believe the larger risk is that other government payments would need to be stopped to ensure continuing interest payments. Even though any period of diverted payments would likely be short, the hit to growth could still be severe given that payments worth around 10% of annualized GDP might need to be eliminated.

As a result, we think the market consequences of a debt ceiling crisis are likely to mostly follow the patterns of a large shock to the market's expectations for the US growth outlook. That broadly fits the experience of the 2011 debt ceiling impasse. In contrast to that episode, however, we think the medium-term risks to growth from fiscal tightening as part of a debt ceiling deal are lower now than they were in 2011—when the growth backdrop was also weaker—so the highest risk today seems to be a very sharp, but relatively short-lived, growth shock.

**Our factor models suggest that the market priced the 2011 debt ceiling primarily as a large negative shock to US growth amid deteriorating liquidity**

Cumulative change in factors from July 1 to August 31, 2011, index




*Note: Red lines denote window used in episode analysis.*
*Source: Goldman Sachs, Goldman Sachs GIR.*

### Assessing the potential asset shifts

To identify potential market impacts of a failure to raise the debt limit, we first use the 2011 episode as a guide and assume that market shifts would mirror the 2011 experience, focusing on a narrow window from July 22 to August 10 when debt limit dynamics appear to have been the primary driver of market moves (as opposed to the European sovereign debt crisis, weak US growth, and shifting Fed policy that occurred around the same time). We then also use our existing models to simulate a large growth shock, which allows us to abstract from other drivers more confidently, and to generate predicted shifts in bond yields when the Fed funds rate is not trapped at zero as it was in 2011, although the risk is that this approach misses any shifts to pricing that are not well-captured by an "average" growth shock.

The predicted impact on assets from these two approaches are similar, and underscore that markets treated the 2011 episode as a cyclical risk rather than as a sovereign default risk, as we also expect today:

- The clearest predictions are for large declines in US equities, credit, and bond yields and for a sharp rise in the VIX. Cyclical equities, including banks and small-cap stocks, would be expected to underperform.
- In volatility-adjusted terms, the predicted moves in the VIX are particularly large. In the last few years, however, the VIX appears to have been much less responsive to shifts in equity risk than in the past. Estimates based on a more recent window make the VIX outcomes look less distinctive relative to US equity and credit indices.
- The FX shifts are generally smaller. The most consistent predictions are for strength in the JPY and weakness in cyclical currencies, particularly those with strong linkages to the US (CAD and MXN). Gold rallied sharply in 2011, as did CHF. Our model estimates of a US growth shock imply much smaller shifts in these "safe haven" assets. Although the backdrop of the European sovereign crisis likely played a role in the big moves in those assets in 2011, we think

CHF and gold could rally more in a debt ceiling crisis than in an average growth shock.

- The 2011 experience points to more pressure on European equities, EUR/$, and long-dated yields than our model estimates of a "growth shock". We suspect these differences reflect the backdrop of the European sovereign crisis and the impact of the zero bound on the funds rate for the yield curve. In the current context, we would expect front-end yields to rally more and the yield curve to steepen more than in 2011.

Predicted impact on assets from our two approaches vs. implied options volatility for each asset

| | Approach 1: 2011 Episode Jul 22 to Aug 10 | Vol Scaled | Approach 2: Large US Growth Shock | Vol Scaled |
|---|---|---|---|---|
| ***Equities*** | | | | |
| **S&P 500** | -16.7% | 1.84 | -16.7% | 1.85 |
| **Russell 2000** | -21.6% | 1.82 | -21.2% | 1.79 |
| **Nasdaq 100** | -14.7% | 1.31 | -17.1% | 1.52 |
| **Eurostoxx 50** | -22.3% | 2.59 | -13.2% | 1.54 |
| **HSCEI Index** | -16.0% | 1.24 | -6.5% | 0.50 |
| **Nikkei 225** | -10.8% | 1.08 | -13.4% | 1.34 |
| **MSCI EM** | -17.9% | 2.01 | -11.9% | 1.34 |
| **Cyclicals/Defensives** | -7.2% | -- | -5.7% | -- |
| **VIX** | 145% | 3.19 | 161% | 3.53 |
| ***(VIX)**** | | | *59%* | *1.28* |
| **VIX 1m** | 66% | -- | 79% | -- |
| **VIX 6m** | 20% | -- | 30% | -- |
| ***FX*** | | | | |
| **EUR/USD** | -1.2% | 0.32 | 1.0% | 0.30 |
| **JPY/USD** | 2.1% | 0.37 | 3.9% | 0.68 |
| **GBP/USD** | -0.9% | 0.22 | -1.7% | 0.42 |
| **CAD/USD** | -4.1% | 1.22 | -2.6% | 0.76 |
| **AUD/USD** | -5.5% | 1.03 | -2.9% | 0.54 |
| **CNH/USD** | 0.4% | 0.15 | -0.6% | 0.18 |
| **MXN/USD** | -5.6% | 0.81 | -5.9% | 0.86 |
| **BRL/USD** | -3.7% | 0.46 | -3.1% | 0.39 |
| **CLPUSD** | -2.6% | 0.32 | -2.8% | 0.34 |
| **HUFUSD** | -3.9% | 0.47 | -0.3% | 0.04 |
| **CHF/USD** | 12.2% | 3.04 | 1.1% | 0.27 |
| **EUR/CHF** | -11.9% | 4.13 | -1.0% | 0.33 |
| **CAD/JPY** | -6.1% | 0.99 | -6.2% | 1.01 |
| **MXN/JPY** | -7.5% | 0.87 | -9.4% | 1.09 |
| ***Commodities*** | | | | |
| **Copper** | -11.1% | 0.89 | -6.3% | 0.50 |
| **Gold** | 11.3% | 1.56 | 1.9% | 0.26 |
| **Oil** | -16.6% | 0.82 | -15.5% | 0.76 |
| ***Credit*** | | | | |
| **CDX IG** | 24bp | 0.98 | 56bp | 2.31 |
| **CDX HY** | 218bp | 1.53 | 380bp | 2.67 |
| ***Rates*** | | | | |
| **UST 2y** | -21bp | 0.24 | -88bp | 1.02 |
| **UST 5y** | -59bp | 0.81 | -99bp | 1.36 |
| **UST 10y** | -86bp | 1.45 | -54bp | 0.91 |

**Alternative estimate for VIX using sensitivities from 2020-2021 sample.*
*Note: Vol-scaled returns are returns as a proportion of 3m implied volatility deannualized to three months.*
*Source: Bloomberg, Goldman Sachs, Goldman Sachs GIR.*

## Hedging debt limit risks: focus on liquid assets, not on spreads

We have shown elsewhere that the market impact of past debt ceiling crises includes movements in rate spreads. Specifically, short-dated bills maturing near the deadline often cheapen as the deadline looms. Indeed, Treasury bills maturing in early June have cheapened substantially, reflecting increased concerns that these bills may not be redeemed on time. We also observe some tendency for Treasuries to cheapen relative to swaps, and we see some potential for widening in other funding spreads in a debt limit crisis. We agree that a failure to reach a timely resolution could move spreads more clearly in this direction, but the movement in funding spreads was much more modest than the shifts in the cyclical backdrop in 2011, and we think it is hard to find actionable hedges in those spaces.

US sovereign CDS has moved quite substantially since the start of the year, particularly at the 1-year tenor, which is priced at over 200bp, even after the relaxation across other asset markets last week. Although the payouts to an actual default could be substantial here, the asset is relatively illiquid, and in practice the threshold to trigger those contracts is high. It also offers only protection against a narrow outcome—actual default—that we think is the less likely fundamental risk, where downside in equities and credit is likely both in a default situation and in the more likely outcome where payments are diverted to meet debt servicing needs. We therefore maintain that positioning for shifts in liquid assets, particularly equity and credit downside or equity volatility upside, would provide a better hedge than spreads against this risk.

## Additional challenges from timing, starting point

In thinking about the market impact and positioning for it, investors face additional challenges.

- First, the exact timing of market fears around the debt ceiling is still uncertain. Although Treasury Secretary Yellen has remained focused on an early June deadline, we still see a small chance that the Treasury will revise its projected deadline to July if cash flows turn out better than expected. While also less likely, there is also a lingering risk of a short-term extension that pushes the deadline later into the year.
- Second, although a deal is likely to include some modest fiscal restraint, the lower risk of substantial fiscal tightening means that the market may be more reluctant to price a large growth shock than in 2011, if it expects any diversion of non-interest payments to be short lived. If the shock to growth expectations is smaller than in 2011, the market impact will be more modest and the case for hedging would then be weaker, except with a lot of confidence in the timing of any worry.
- Third, the starting point for some preferred implementations is less favorable than it was earlier in the year. The banking turmoil has already pushed some assets sharply in the direction of the moves we predict for a debt ceiling crisis, largely because it too has functioned as a shock to the growth outlook. With rate markets pricing more easing than we think the Fed will deliver, the entry points to position for further falls in UST yields or for curve steepening may be less favorable than our analysis implies.
- Fourth, market pressure could be short-lived. Although the prospect that the Treasury could be forced to redirect scheduled payments would likely trigger a sharp market reaction, it would also quickly increase the pressure for a resolution. With a lower prospect of sustained fiscal tightening from a deal than in 2011, a resolution could quickly reverse the market moves and much of the potential growth damage. This means that it makes sense to structure hedges that can be monetized quickly. It also increases the prospect that longer-term investors should simply ride out the volatility or use it as an opportunity to add risk.

Dominic Wilson, Senior Markets Advisor

*Email:* dominic.wilson@gs.com *Goldman Sachs & Co. LLC*
*Tel:* 212-902-5924

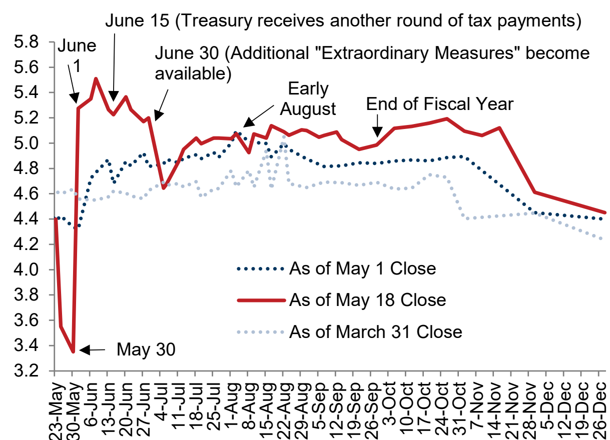
Vickie Chang, Global Markets Strategist

*Email:* vickie.chang@gs.com *Goldman Sachs & Co. LLC*
*Tel:* 212-902-6915

# Market pricing around the debt limit

Treasury bills maturing just after the expected debt limit deadline have cheapened substantially, reflecting concerns that they may not be redeemed on time…

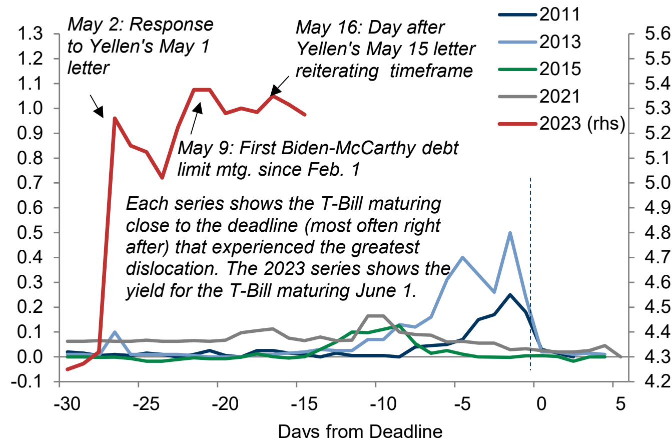
Treasury bill yields by security maturity date in 2023, %




Source: Bloomberg, Goldman Sachs GIR.

…and Treasury markets have responded much earlier to debt limit risks than in prior episodes, when bills maturing after the deadline didn't cheapen until around one to two weeks before the deadline

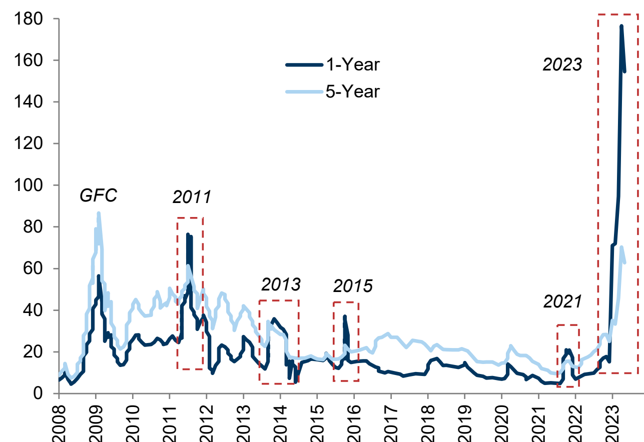
Treasury bill yields with the most dislocation per episode, %




Source: Bloomberg, Goldman Sachs GIR.

The cost of protecting against default has increased significantly, reflecting rising debt limit concerns

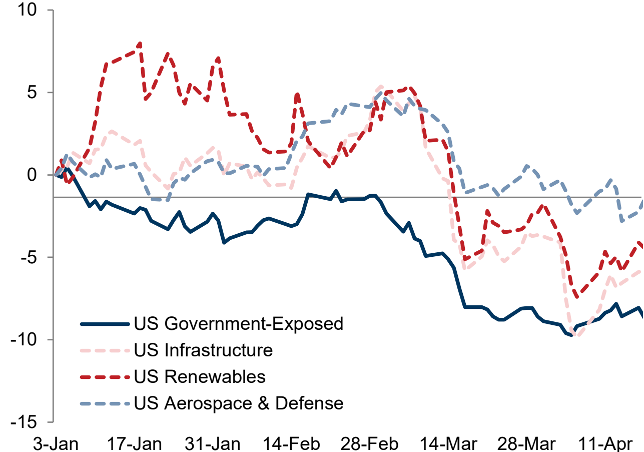
Monthly US sovereign CDS spreads, bp per year




Source: Bloomberg, Goldman Sachs GIR.

Stocks exposed to government spending have substantially underperformed this year, potentially in part reflecting the odds of spending cuts being included in a debt limit deal

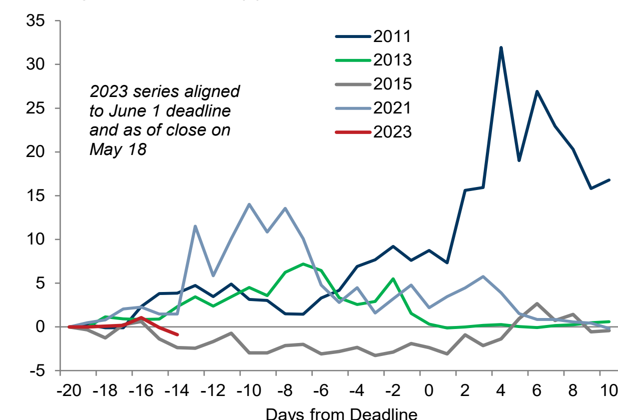
Returns vs. S&P 500, %, 01/03/2023=100




Source: Goldman Sachs GIR.

However, the effect of debt limit risk on the equity market as a whole appears modest and volatility remains low, though it took time to climb in prior episodes…

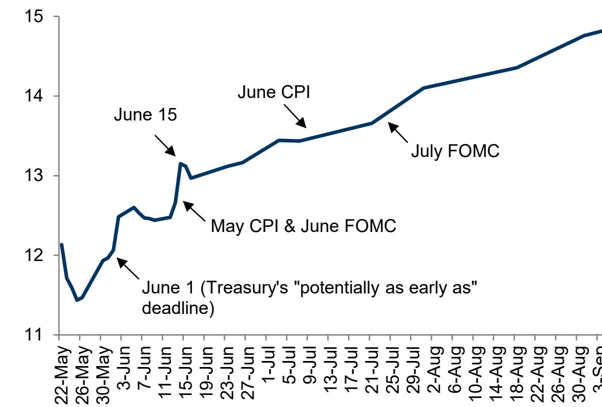
Change in VIX level, pp




Source: CBOE, Goldman Sachs GIR.

…and the equity implied volatility curve is showing some signs of debt limit-related concern, with a kink just following the June 1 deadline

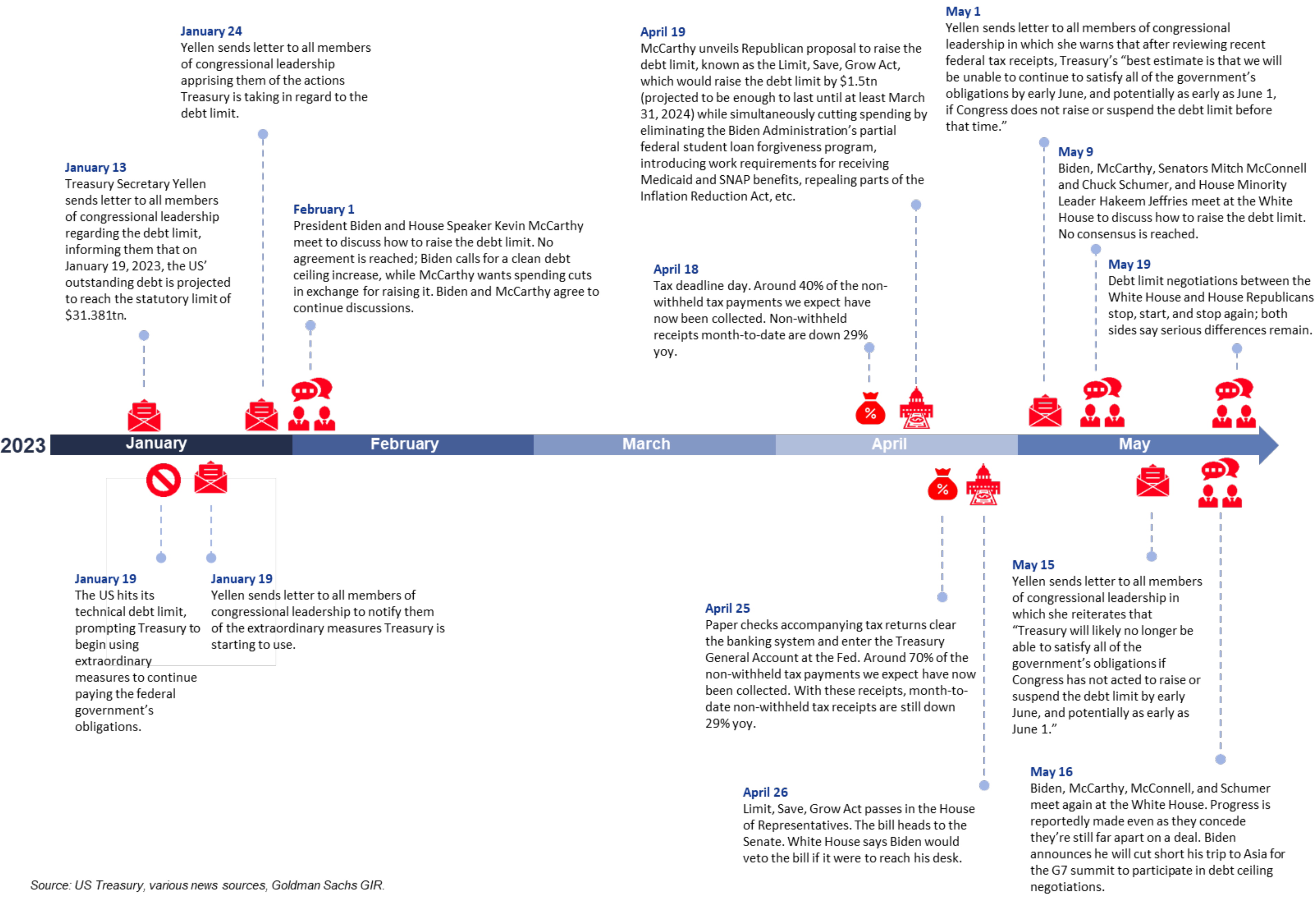
Equity options implied volatility, SPX term structure, pts




Note: Data as of May 18, 2023 close.
Source: Goldman Sachs GIR.

Special thanks to GS US economists Alec Phillips and Tim Krupa for these charts.

# Timeline of the 2023 debt limit process




Source: US Treasury, various news sources, Goldman Sachs GIR.

# Interview with David Beers

David Beers is the former Head of Sovereign Credit Ratings at Standard & Poor's (1995-2011). He is also a former Special Adviser to the Bank of England's International and Markets Directorates and former Special Adviser to the Governor at the Bank of Canada. Currently, he is a Senior Fellow at the Center for Financial Stability. Below, he argues that the debt ceiling could potentially cause a US sovereign default, but even if it were abolished, the risk of a sovereign default wouldn't necessarily fall to zero given the state of US public finances.

The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.

**Allison Nathan: You were Head of Sovereign Credit Ratings at Standard & Poor's (S&P) for several years. Walk us through what a rating speaks to, and what factors determine a country's credit rating.**

**David Beers:** Rating agencies provide an opinion on the creditworthiness of governments, corporates, and other issuers of debt; ratings from S&P speak to the probability of default of such borrowers. A AAA-rated issuer has a near-zero likelihood of defaulting over a specified time horizon. A AA+ rating—the US' current S&P rating—signals very strong creditworthiness and only a miniscule increase in default probabilities over AAA. The further down the rating scale, the higher the implied default probabilities, with BBB- the dividing line between investment-grade and speculative-grade, and the lowest rating being D, which stands for default.

When rating sovereigns, all the large rating agencies consider a combination of political, economic, fiscal, and monetary factors. The specific methodology and weight assigned to each factor vary by agency, but one common area of focus is the trajectory of public debt. Each rating agency also has a view of the political factors that may partially explain trends in public debt, such as policymakers' fiscal priorities, the degree of political polarization, etc.

**Allison Nathan: If credit ratings are intended to speak to the probability of default, and the risk of default on local currency-denominated government debt for countries that print their own money is technically zero, shouldn't the credit rating of these countries always be AAA?**

**David Beers:** No; it's not true that sovereigns can't default on their local currency debt. A comprehensive database of sovereign defaults I developed in 2014 shows that over 30 local currency defaults have occurred since 1960. Some large debt restructurings are currently underway, for example in Ghana, where the government has had to restructure both its local and foreign currency debt. So, while the frequency of default is lower for local than foreign-currency denominated obligations, local currency defaults have occurred.

While such defaults have historically been confined to emerging market sovereigns, the US has a very rare feature in its political system that could potentially cause a sovereign default: the debt ceiling. The debt ceiling is peculiar and somewhat contradictory: on the one hand, Congress authorizes the executive branch to spend money that it is then legally obligated to spend, but on the other hand, if Congress doesn't raise the debt ceiling, the executive branch can't borrow the money it needs to fund this spending. Without that funding, the government will eventually run out of resources to service Treasury debt, which, of course, would lead to a default. The debt ceiling issue arises periodically, such as in 2011 after Republicans gained control of the House of Representatives under President Obama, again in 2013 under a similarly divided government, and of course now. So, this isn't the first time a crisis exists around the debt ceiling that puts the US at risk of defaulting on its obligations, and I suspect it won't be the last. While the US has never defaulted on its sovereign debt obligations because of the debt limit not being raised in time, and I'm inclined to think that President Biden and congressional Republicans will come to an agreement to avert a default this time, the existence of a debt ceiling creates risk in that regard.

> "The US has a very rare feature in its political system that could potentially cause a sovereign default: the debt ceiling."

**Allison Nathan: You led the decision to downgrade the US' credit rating from AAA to AA+ during the 2011 debt limit crisis, yet the US didn't actually default on its debt at that time. So, do you still believe that the downgrade was the right decision?**

**David Beers:** Yes. The debt ceiling per se was not what drove the downgrade; it had been resolved a few days prior to the downgrade. Had the US actually defaulted, the rating wouldn't have dropped one notch to AA+, but rather to D. The rating was lowered for two reasons: the rising trajectory of public debt and increased political polarization, and developments along both dimensions since the downgrade only reaffirm my confidence in the decision.

S&P's preferred measure of public debt, at least during my tenure, was "net general government debt", which for the US includes federal, state, and local government debt, although the majority of net general government debt is federal given that only the US government can issue Treasuries and most states and localities are limited by legislators as to how much they can borrow. In 2011, net general government debt stood at 76% of GDP. S&P expected net debt to reach 85% of GDP by 2021. This was well *under* its outturn of 98%, which was impacted by the onset of Covid-19. So, leaving aside Covid's extraordinary impact, S&P's expectations on the rising debt burden were remarkably prescient.

Worsening political polarization was also an important factor in the downgrade because it made reaching a bipartisan consensus about fiscal priorities on taxes, spending, and the size of deficits more difficult. And it's hard to argue that political polarization has done anything other than continue to worsen since 2011. So, S&P's original concerns on this issue resonate today too.

**Allison Nathan: But even if the US' fiscal and political situation has deteriorated further, doesn't the unique role of the US Dollar as the global reserve currency afford the US extraordinary fiscal flexibility that doesn't impair its creditworthiness since there will effectively always be demand for US debt?**

**David Beers:** No; the Dollar's unique global position shouldn't be the end of the matter in judging the US' creditworthiness. Take the UK as an example. Sterling was the primary reserve currency in the run-up to WWII, but during that time, the UK's fiscal situation was precarious—it ran up a massive debt burden during both the first and second world wars to finance its war effort, to the point where its debt burden was much higher than the US' today. Reserve currencies can also be displaced: Sterling ceded its role as the global reserve currency to the Dollar and its international usage gradually declined post-WWII. So, I don't put much stock on reserve currency status alone when it comes to assessing sovereign creditworthiness.

**Allison Nathan: If the debt limit were abolished, as some people argue that it should be, would that alleviate rating agencies' concerns about the US' ability to repay its debts?**

**David Beers:** Not necessarily. Countries without debt ceilings have run into debt difficulties, so the risk of a US sovereign default wouldn't necessarily drop to zero even if the debt limit is eliminated. The underlying issue, as it was back when S&P downgraded the US' credit rating, is the trajectory of public debt. The US can't just keep borrowing and expect that its creditworthiness won't suffer.

> "The US can't just keep borrowing and expect that its creditworthiness won't suffer."

**Allison Nathan: The prospect of US indebtedness leading to a sovereign default seems to be a bit like waiting for Godot—always feared and never realized. Shouldn't the US' experience thus far of running up more and more debt with seemingly no significant adverse consequences put concerns around its public finances to bed?**

**David Beers:** No. It's a myth that governments can borrow at will, because if that were true, then no sovereign would ever default on its debt. But they have, and will continue to do so. Admittedly, this is mainly an emerging markets story, but developed economies aren't impervious to debt crises—remember the European debt crisis during which Greece, Portugal, Ireland, and Cyprus had to restructure their debts. So, the idea that we shouldn't care about the debt burdens of countries or the private sector of a country is a dangerous notion that, as it has always done, will come back to bite us when we least expect it.

Many sovereigns today are as indebted as they've ever been. Public debt—net, gross, however it's measured—both in the US and globally is at or close to all-time highs. And leverage in the private sector is also at an all-time high in many places. If the private sector runs into trouble, which it very well could given the current environment of high leverage and rising interest rates, that would adversely affect public finances. And that's before even considering contingent liabilities, which have an annoying habit of migrating onto sovereigns' balance sheets when governments have to bail out banks, for example, which fortunately we haven't seen much of since the Global Financial Crisis, *except* in the US. All of this could ultimately have an adverse impact on the US' creditworthiness, and eventually the US will have to rethink its fiscal priorities if it wants to avoid risking a debt crisis.

> "The idea that we shouldn't care about the debt burdens of countries or the private sector of a country is a dangerous notion that, as it has always done, will come back to bite us when we least expect it."

**Allison Nathan: With all that in mind, how likely is another downgrade of the US' credit rating?**

**David Beers:** I have no special insight into what the rating agencies are currently thinking; for all I know, they may have become more risk averse since 2011 in the sense that they don't want to be the center of controversy they would almost certainly be if they downgraded the US again. Frankly, the question of whether the rating agencies will or won't downgrade the US doesn't really matter, because at the end of the day the market—not the rating agencies—has the final say on the US' creditworthiness. And the market has grown more concerned. Two years ago, the US ranked 10th in the market for five-year credit default swaps (CDS). Now it ranks 16th, with the higher number signifying a higher likelihood of default. And the US is ranked further down the list than AA-rated UK, A+-rated Japan, and BBB-rated Portugal, indicating that the market perceives the US to be a higher default risk than some lower-rated sovereigns. So, the CDS market today is more conservative than the rating agencies with respect to the US' perceived creditworthiness.

**Allison Nathan: Despite the market's increased concern over a US default, it isn't pricing a high probability of default, and neither are rating agencies, which still rate the US very highly. Shouldn't that assuage concerns over a potential US default?**

**David Beers:** No. Markets are notoriously bad at predicting defaults of all kinds, and the rating agencies aren't any better at it than the CDS market. If markets were truly forward-looking, financial crises, banking crises, etc. would rarely occur, and market discipline would restrain both public and private debt. So, we shouldn't let the market's and rating agencies' relative lack of concern lull us into a false sense of comfort, nor should it prevent the US from making the difficult choices needed to put its finances in order.

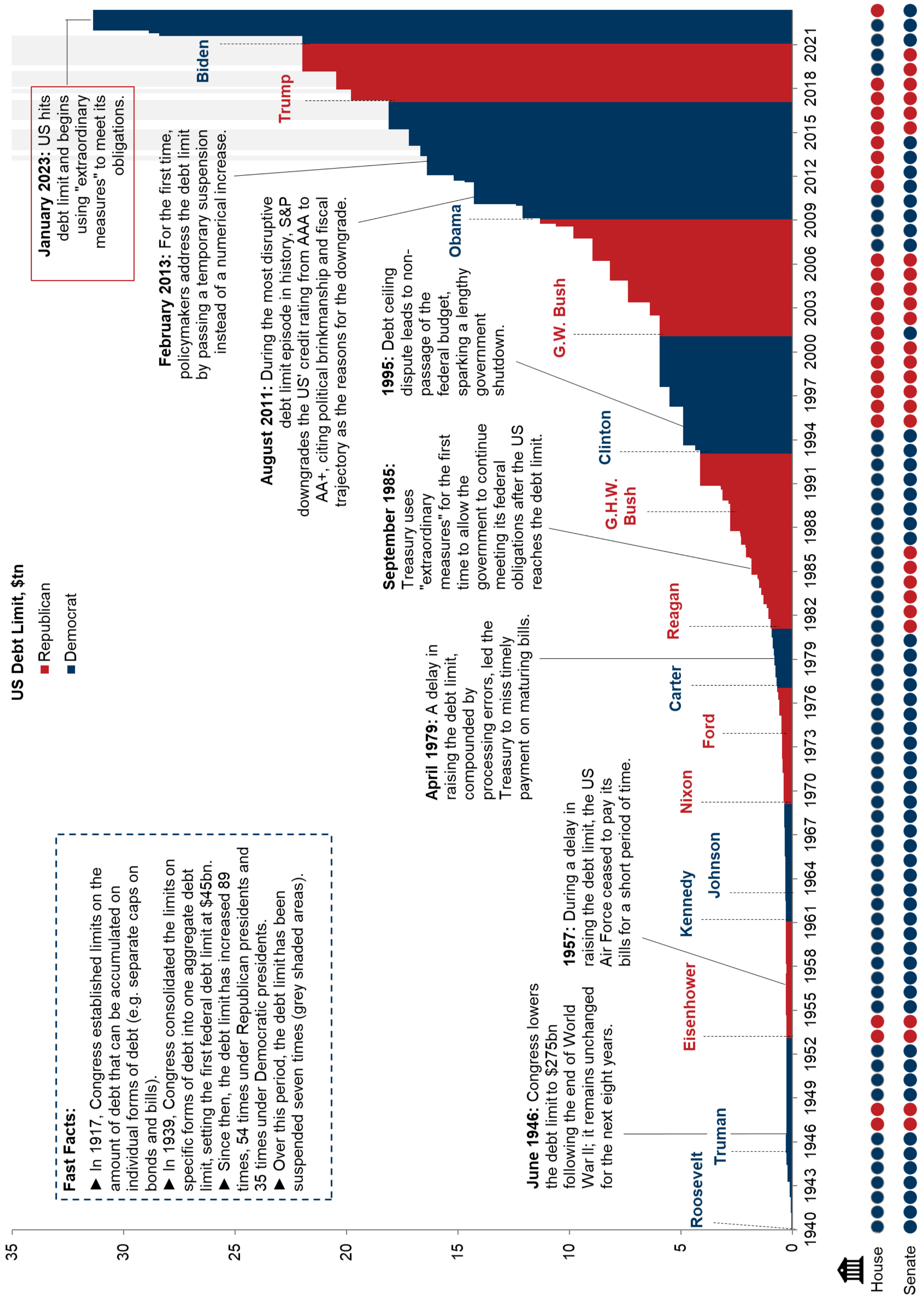
# Rating agency snapshot

| | What happens if the debt limit is not raised within a few days of the deadline? | What if the Treasury misses a non-debt service payment? | What if the Treasury misses a debt service payment? |
|---|---|---|---|
| **Fitch Ratings** | 04/25/2023: **"If, ahead of the X-date, we were to assess the risk of a default as having become more material, the US' rating would likely be placed on Rating Watch Negative and further rating action could be considered."** | 04/25/2023: **"Prioritizing debt payments to avoid an immediate default, if this were possible, might not be consistent with a 'AAA' rating,"** suggesting that a failure to make scheduled non-interest payments would trigger a downgrade. | 04/25/2023: **"If the limit were not raised or suspended in time to avoid a default, the US's rating would be moved to 'RD' (Restricted Default). Affected Treasury securities would carry a 'D' rating until the default was cured."** |
| **Moody's Investors Service** | We think they will not view approaching the deadline as downgrade-worthy, but might place on review/negative outlook if Congress gets close to the deadline. | 05/11/2023: **"Our definition of a default is a missed interest payment. Any other payments that might be missed...Social Security, prioritization of other payments, that's not a default by our standard...A missed interest payment would need to occur for a downgrade to happen."**<br><br>05/04/2023: "If the X-date passes without a deal and the government opts to prioritize interest payments: A decision to prioritize interest payments may not affect the US sovereign credit profile as it would continue to meet its debt obligations." | 05/11/2023: **"If we had a missed interest payment, the scenario would be first if it was resolved within 15 days, we would keep that rating very close to Aaa, probably at Aa1 provided there was a resolution before the next interest payment in 15 days and the debt limit issue was resolved."**<br><br>05/04/2023: "We would classify a missed interest payment as an event of default, which would result in a downgrade of the US sovereign rating." |
| **S&P Global Ratings** | We think they are unlikely to downgrade in advance of the deadline. | 01/20/2023: "What happens if there is no resolution to the debt ceiling impasse and the Treasury exhausts all 'extraordinary measures'? Does that result in a sovereign default? **Such a scenario might have credit rating implications but may not necessarily result in a default.** There is a date at which the Treasury has no more space to deploy extraordinary measures and maneuver...Reaching such a date is not necessarily an event of default or the equivalent of missing a debt service payment." | 01/20/2023: **"Default occurs when a payment of a security is missed (according to our ratings definitions and criteria). After a default is cured, we would assign a new rating based on our assessment of the new circumstances."** |

Special thanks to GS US economists Alec Phillips and Tim Krupa for this table.

*Source: Fitch Ratings, Moody's Investors Service, S&P Global Ratings, Goldman Sachs GIR.*

# A history of the US debt limit




*Note: Grey bars indicate periods when the debt ceiling was suspended.*
*Source: Bipartisan Policy Center, Haver Analytics, White House History, US Senate, Goldman Sachs GIR.*

# Interview with Stephen B. Kaplan

Stephen B. Kaplan is Associate Professor of Political Science and International Affairs at George Washington University. Below, he argues that political brinkmanship around raising the debt limit could, over the longer term, challenge the US Dollar's role as the global reserve currency—and the benefits that unique role affords the US economy.

*The views stated herein are those of the interviewee and do not necessarily reflect those of Goldman Sachs.*

**Allison Nathan: Why and how did the US debt limit come about?**

**Stephen Kaplan:** Congress established the US debt limit in 1917 in an effort to improve efficiency and the government's ability to manage its debts by streamlining congressional approval of debt issuance. Prior to its establishment, Congress had to approve each new bond issuance to fund its spending. But the increased funding pressures of WWI created the need for a more efficient process to approve new debt issuance, and the debt limit, which provided authorization for debt issuance up to a certain limit, was born; in 1939, this authorization was modified so that all federal debt issuance fell under it. So, the government effectively created two separate congressional processes, one that approves the budget and new spending, and one that approves the financing of that spending. It's often misunderstood that the debt limit in and of itself is not associated with new spending, but the financing of spending that Congress has already approved and authorized the government to spend. Over the last century, Congress has raised the debt limit close to 100 times to fund its spending. This was, for the most part, a fairly perfunctory process until more recently, and prior to 2011 in particular.

**Allison Nathan: Why has raising the debt limit become a more fraught process recently?**

**Stephen Kaplan:** A certain amount of political theater probably always existed around the debt ceiling. But, amid a rise in political polarization in the US over the last several years, the debt limit has increasingly become a political tool for the opposition party to attempt to influence government spending. At no time until the current moment was this clearer than in 2011, when the stage was set for political sensationalism around the process with a large Republican majority in the House—and the emergence of the powerful fiscally-conservative Tea Party—demanding sizable spending cuts from President Obama in return for raising the debt limit. Since then, the potential for political brinkmanship around raising the debt limit—and the worst-case scenario of the US defaulting on its debt—has remained a tangible risk, with a similar political setup today substantially increasing that risk.

> "The debt limit has increasingly become a political tool for the opposition party to attempt to influence government spending."

**Allison Nathan: But since the US has never defaulted on its debt as a result of the debt limit, is that really a credible risk?**

**Stephen Kaplan:** On the one hand, it's easy to shrug off wrangling over raising the debt limit as just political theater, because no rational politician wants a default. On the other hand, the brinkmanship creates the tail risk of a mistake or miscalculation that can't be ignored. And particularly with the X-date—the date on which the US government will be unable to meet all its obligations—so uncertain this time, the chance of a mistake is higher. So, the risk that the US will default is small, but nonetheless there.

> "The brinkmanship creates the tail risk of a mistake or miscalculation that can't be ignored… the risk that the US will default is small, but nonetheless there."

**Allison Nathan: Could this tail risk undermine the value proposition of the Dollar/US assets more broadly?**

**Stephen Kaplan:** The role of the Dollar as the global reserve currency is not currently in question. People often talk about the potential for the Renminbi to become a competing reserve currency, for example. But most of the recent increase in the use of the Renminbi is associated with Chinese trade, such as Brazil and China committing to denominate trade between them in Renminbi. And Chinese Renminbi account for only around 2.5% of global currency reserves compared to around 54% for the Dollar, with the Euro not making much more progress in becoming a global reserve currency, either. So, from an economic and market standpoint there is little reason to be concerned about the demand and need for US dollars.

But, over the longer term, political polarization that manifests as repeated brinkmanship over raising the debt limit casts a cloud over not the institutional capacity of the US government to repay its debt, but the *political willingness* to do so, which can't be good for any US asset. Brazil denominating its trade in anything other than the Dollar would have been unthinkable only a couple decades ago. And if uncertainty about the United States resolving its medium-term fiscal issues persists and policymakers continue to try to use debt repayment as a negotiating tool to address these issues, countries and investors will no doubt have a growing incentive to consider other alternatives.

Rising powers are certainly increasing their efforts to promote their currencies and diversify their currency portfolios more broadly. For China in particular I've argued that its currency strategy has shifted from one that aims to undervalue the

Renminbi in order to improve its export competitiveness to one that aims to strengthen the Renminbi and leverage its large buildup of Dollar reserves to increasingly invest globally, especially in developing countries, which could create a challenge to the Dollar in developing economies over the long run.

This is a slow-moving process. But, given the importance of the Dollar for the US economy and the advantages that come with the Dollar serving as the global reserve currency—in particular, the US' relatively low cost of capital stemming from the global demand for dollars—policymakers should be doing everything in their power to *protect* the Dollar's unique role in the world, not create uncertainty around it.

> "Over the longer term, political polarization that manifests as repeated brinkmanship over raising the debt limit casts a cloud over not the institutional capacity of the US government to repay its debt, but the *political willingness* to do so, which can't be good for any US asset."

**Allison Nathan: Given all the above, should the debt limit be abolished?**

**Stephen Kaplan:** Yes. Of all the outstanding political questions today, that one has one of the most straightforward answers: the debt ceiling has no value, and it actually generates unnecessary costs, so it should be abolished.

> "Of all the outstanding political questions today, [should the debt limit be abolished] has one of the most straightforward answers: the debt ceiling has no value, and it actually generates unnecessary costs, so it should be abolished."

**Allison Nathan: But wouldn't abolishing the debt limit ultimately lead to even less fiscal discipline, worsening the US' already concerning fiscal trajectory?**

**Stephen Kaplan:** The evidence suggests otherwise. For example, studies done by the nonpartisan Congressional Budget Office (CBO), find that debt limit negotiations are an ineffective means of controlling deficits. At the same time, the tail risk of default has a real economic cost; in prior contentious debt limit episodes, US borrowing costs rose, if for only a short period of time, and would obviously rise substantially if the tail risk is realized. So, with no benefit, why incur the cost associated with having a debt limit at all?

**Allison Nathan: If abolishing the debt limit is a no-brainer, why does it still exist?**

**Stephen Kaplan:** My best guess is because of the politics surrounding the issue. Just as both parties use the debt ceiling to critique the incumbent party's spending, no one party wants to be associated with abolishing the debt limit, so doing so would need to be a bipartisan effort. And bipartisan efforts are few and far between amid today's polarized political landscape.

**Allison Nathan: What are the options to manage borrowing if the debt limit in its current form were abolished?**

**Stephen Kaplan:** The most obvious option would be for all spending approved by Congress to be automatically funded by new debt issuance. Beyond that, some countries take different approaches to spending caps that tend to be less disruptive. For example, Denmark also has a debt ceiling, but it is much higher than the country's level of spending, so the government does not bump up against it like the US government does. And Poland and Brazil both have constitutional spending caps; the Polish government's spending is capped as a share of GDP and the Brazilian government's spending is permitted to increase only in line with the previous year's inflation rate. But the most efficient approach would be to abolish the debt limit and implement a budgetary process that would see any increased spending be automatically met with increased financing, which would remove all funding uncertainty that has become the unnecessary and unfortunate hallmark of the US debt limit.

# A look at sector-level debt limit risk

## How might debt limit negotiations affect your sector—what are you assuming and what are the risks?

### Defense

Noah Poponak, GS Equity Research

- **Defense stocks are highly correlated to growth in the defense budget.** After a long period of growth, the US defense budget is at an all-time high, making declines mathematically easier than increases, especially as deficit hawks re-emerge in the US government spending debate. Historically, the Department of Defense (DoD) budget runs in ~8-10yr upturns and downturns. The budget is currently in its 9th year of an upcycle, and the investment account is up over 80% from its trough in 2015. We believe investors expect mid-single-digit growth to continue for several years given the geopolitical backdrop, which has been a large part of why the US defense budget has increased so much over the last decade. At the same time, the US government is re-evaluating spending levels following the pandemic, and the current negotiations over the debt ceiling could potentially lead to lower overall spending, including defense, even if only slightly. Furthermore, debt limit negotiations add the potential for a continuing resolution (CR). A CR would lead to the budget being temporarily funded at the previous year's level, resulting in flat growth and putting added pressure on the defense sector.
- **Margins—which are under pressure from contract terms and inflation—add additional bottom line risk, on top of the revenue risk created by the budget.** Defense companies in recent periods have reported profit margins below expectations. This appears in part due to a lag from cost input inflation in a backlog and long cycle business, as well as from tougher terms of trade with the Pentagon in contracts.
- **Valuations—which are at the high-end of the historical range following a flow of funds into the sector after Russia's invasion of Ukraine—also remain vulnerable.** The defense sector is trading at the high-end of the historical valuation range. It has historically traded near 70% of the market multiple at the low-end and 130% of the market multiple at the high-end; today it is near 120%. High multiples in the defense sector are vulnerable to a de-rating if the defense budget growth rate slows.

### Clean Energy

Brian Lee, GS Equity Research

- **The Inflation Reduction Act (IRA)—which provides roughly $400bn of energy and climate spending over the next decade—is the single largest climate-focused piece of legislation for the clean technology sector the US has ever passed.** We estimate that the IRA will improve the economics of most clean technology and be a catalyst for an acceleration in Green Capex. While the potential incremental impact of the IRA alone on investment in the energy system is challenging to isolate, for simplicity, we assume a baseline annual investment in the US low-carbon energy system without the IRA of about $1.4tn over 2023-2032. This implies additional capex incentivized by the IRA of about $1.5tn over the next decade, or $150bn annually on average, bringing total investment into the low-carbon energy system to about $2.9tn over 2023-2032.
- **The current debt limit negotiations underway in Washington pose some risk to the ultimate level of spending achievable under the IRA, as some Republicans are calling for a full repeal of the legislation**—which could put the $1.5tn in capex we estimate is incentivized by the IRA at risk. While we ultimately believe that the IRA would be challenging to re-litigate given a divided Congress and that the IRA legislation is a cornerstone of the Biden administration's agenda, the risk of spending cuts has increased.
- **A key piece of the IRA legislation's support for renewable energy comes in the form of federal investment tax credits (ITC), which have historically had bipartisan support.** Federal ITCs have existed in the US for over a decade and have been renewed twice with bipartisan support, first in 2015 and then again in 2020. The IRA has extended the ITC for 10 years, which is longer than prior extensions, but follows a precedent that has been set regarding policy support for renewables, and thus, gives us some incremental confidence that there is likely some level of bipartisan support.
- **Solar and wind have become significant job creation industries in the US over the past decade, and under the IRA legislation this is anticipated to accelerate further, which suggests continued political support.** As such, the impact to jobs is increasingly difficult to ignore for lawmakers where growth in clean energy is positively impacting their voting constituents, in our view. Additionally, income generated from property taxes from renewable energy infrastructure and the like could provide further incentives for lawmakers to support clean energy policies.

*Note: Noah Poponak is an Equity Research Analyst covering Aerospace and Defense; Brian Lee is an Equity Research Analyst covering Clean Energy.*

# All about the US debt limit

## What is the debt limit?

**The debt limit** is a ceiling imposed by Congress on the amount of outstanding **national debt** that the US federal government can incur. The national debt is the amount of money the federal government has borrowed to cover the outstanding balance of expenses incurred over time. The federal government borrows money by selling marketable securities such as Treasury bonds, bills, notes, and Treasury inflation-protected securities. The national debt is an accumulation of this borrowing, along with associated interest owed to the investors who purchased these securities.

The debt limit is a set dollar amount. It is not adjusted for inflation, and it is not related to future spending. Instead, it is the amount that Treasury can borrow to pay the bills that have become due based on prior policy decisions. Debates around the debt limit are therefore about authorizing the government to borrow to pay for spending that has already been authorized, *not* new spending.

## When, and why, was the debt limit established?

The debt limit was first enacted in 1917 through the **Second Liberty Bond Act,** which allowed Treasury to issue bonds and incur debt without specific congressional approval. Prior to this, Congress was required to approve each issuance of debt in a separate piece of legislation. The ceiling was enacted to simplify that process and enhance the government's borrowing flexibility. In 1939, Congress created the first aggregate debt limit—thereby eliminating the different limits on different types of debt—covering nearly all government debt through the **Public Debt Acts**. In September 1982, the federal debt limit was officially codified into law. Prior to that, all changes to the debt limit were legislated as amendments to the Second Liberty Bond Act.

## What happens when the US hits the debt limit?

Once the debt limit is reached, the federal government can no longer increase the amount of outstanding debt it incurs; it can only draw from any cash on hand and incoming revenues to pay its bills and continue funding programs and services. Treasury can also take **extraordinary measures** to extend how long it can continue to pay all the government's obligations while staying below the debt limit. These measures include using accounting techniques to temporarily reduce the amount of US Treasury securities issued to certain government accounts. In doing so, the level of outstanding debt temporarily declines, extending the amount of time that the government can continue to satisfy its obligations. Once Treasury exhausts its cash and extraordinary measures, the federal government loses any way to pay its bills and fund its operations beyond its incoming revenues until Congress suspends, raises, or temporarily extends the debt limit. While the US has hit the debt limit many times over the past several decades, **the debt limit has never caused the federal government to default on its sovereign debt obligations.**

## When will Treasury exhaust its resources under the current debt limit?

The US hit its technical debt limit of $31.381tn on January 19, 2023, prompting Treasury to begin using extraordinary measures to continue paying the government's obligations. While unpredictability in federal government cash flows makes it difficult to say for certain when such extraordinary measures and cash on hand will be exhausted, Treasury Secretary Yellen recently stated that Treasury's best estimate is that it will be unable to continue satisfying all government obligations "by early June, and potentially as early as June 1," although the actual date "could be a number of weeks later" (see pg. 9 for 2023 debt limit process timeline).

## What payments would be affected if Congress doesn't act in time?

It's difficult to know how exactly Treasury would operate in such a scenario given that it has never occurred before. During the **2011 debt limit crisis**, Treasury had a contingency plan in place that could be used in the current crisis. Under the 2011 plan, Treasury would continue to pay interest on Treasury securities as that interest comes due, and as securities mature, Treasury would pay the principal by auctioning new securities for the same amount, therefore keeping the overall stock of debt held by the public the same. It would delay payments for all other obligations—to Social Security beneficiaries, Medicare providers, etc.—until it had enough cash to pay at least a full day's obligations. However, Treasury may choose a different debt prioritization process this time.

## What has historical action around the debt limit looked like?

The debt limit was generally raised without controversy until 1953, when President Eisenhower requested an increase to the existing $275bn debt limit in his State of the Union address but Congress declined to raise the limit until over a year later in August 1954, when it approved a temporary increase. Since 1960, Congress has acted **78 separate times** to permanently raise, temporarily extend, or revise the definition of the debt limit (see pg. 13 for more detail on these actions).

*Source: The White House, US Department of the Treasury, Federal Reserve, Committee for a Responsible Federal Budget, Bipartisan Policy Center, Brookings Institution, Congressional Research Service, Goldman Sachs GIR.*

# Summary of our key forecasts

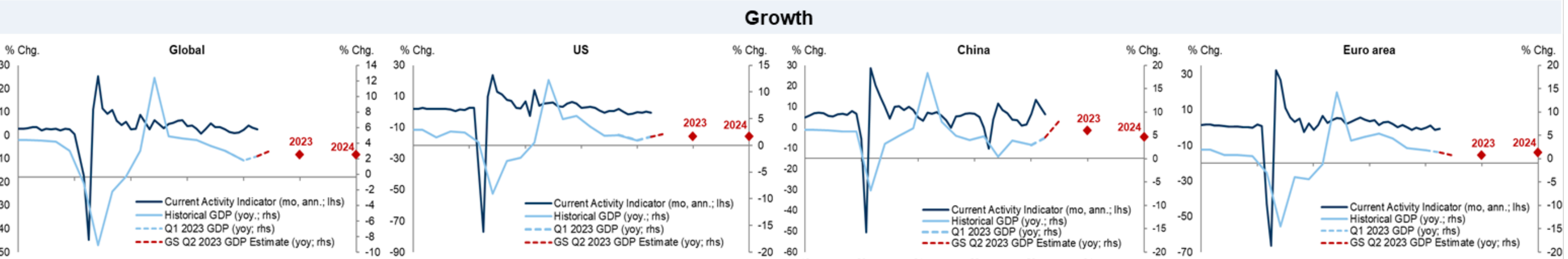
## GS GIR: Macro at a glance

### Watching

- **Globally,** we expect annual average real GDP growth to slow to 2.5% in 2023, reflecting ongoing drags from monetary policy tightening and banking stresses in the US and Europe. While we expect DM inflation to remain elevated over the near term, we think the combination of a moderation in demand growth, improvements in goods supply, and tighter monetary policy will be sufficient to bring inflation back toward DM central banks' targets over the next two years.
- **In the US,** we expect real GDP growth to slow to 1.6% yoy in 2023, reflecting a negative impulse from tighter financial conditions and additional drags from a pullback in bank lending following banking stress. We see a 35% probability of entering a recession over the next year, reflecting increased uncertainty around the economic effects of bank stress and the possibility that upside inflation surprises force the Fed to deliver more tightening, although we continue to think the US is headed for a soft landing. We expect core PCE inflation to decline to 3.3% by Dec 2023 reflecting continued supply chain recovery, a decline in shelter inflation, and slower wage growth. We expect the unemployment rate to remain at 3.6% through 2026.
- **We expect the Fed** to hold rates steady for the rest of the year as we think the federal funds rate is at the sufficiently restrictive level that the Fed believes is necessary to bring down inflation.
- **In the Euro area,** we expect real GDP growth to slow to 0.7% in 2023, reflecting historically elevated energy prices driven by the war in Ukraine and tighter bank lending standards amid the ongoing ECB hiking cycle. We expect core inflation to decline gradually to 3.7%yoy by the end of 2023, reflecting indirect pass-through from falling energy and food prices.
- **We expect the ECB** to deliver 25bp hikes in June and July for a terminal rate of 3.75%, reflecting continued firm underlying inflation pressure and hawkish ECB commentary, though risks are skewed to the upside given ongoing growth resilience, strong wage growth, and our sticky core inflation forecast.
- **In China,** we expect real GDP growth to accelerate to 6.0% yoy in 2023 on the back of China's ongoing post-reopening recovery and policymakers' continued focus on growth, although we think the easy part of the recovery is behind us and some persistent weaknesses in the economy around the property sector, youth employment, and consumer confidence may require more targeted policy support to counteract.
- **WATCH CREDIT CONDITIONS AND US DEBT LIMIT**. Following banking sector stress in the US and Europe, we expect a moderate but manageable growth drag from tighter lending conditions, although the timing and extent of credit tightening and its economic impact remain highly uncertain. In the US, we believe that raising the debt limit this year could rival the disruptive 2011 debt limit episode, but that Congress will ultimately raise the debt limit before Treasury is forced to delay scheduled repayments—which the Treasury indicated could be by "early June"—although we see a 10% chance of no action from Congress before the deadline.

*Goldman Sachs Global Investment Research.*

### Growth




*Source: Haver Analytics and Goldman Sachs Global Investment Research.*
*Note: GS CAI is a measure of current growth. For more information on the methodology of the CAI please see "Improving Our Within-Month CAI Forecasts," Global Economics Comment, Mar. 06, 2023.*

### Forecasts

**Economics**

| GDP growth (%) | 2023 GS (Q4/Q4) | 2023 GS (CY) | 2023 Cons. (CY) | 2024 GS (CY) | 2024 Cons. (CY) |
|---|---|---|---|---|---|
| Global | 2.5 | 2.5 | 2.6 | 2.5 | 2.8 |
| US | 1.1 | 1.6 | 1.1 | 1.6 | 0.8 |
| China | 6.1 | 6.0 | 5.7 | 4.6 | 5.0 |
| Euro area | 0.6 | 0.7 | 0.6 | 1.3 | 1.0 |

| Policy rates (%) | 2023 GS | 2023 Mkt. | 2024 GS | 2024 Mkt. |
|---|---|---|---|---|
| US | 5.13 | 4.47 | 4.38 | 3.58 |
| Euro area | 3.75 | 3.60 | 3.50 | 3.09 |
| China | 2.00 | 2.33 | 2.00 | 2.56 |
| Japan | -0.10 | 0.05 | -0.10 | 0.13 |

**Markets**

| Interest rates 10Yr (%) | Last | E2023 | E2024 |
|---|---|---|---|
| US | 3.70 | 3.90 | 3.75 |
| Germany | 2.43 | 2.75 | 2.25 |
| Japan | 0.40 | 0.75 | 0.70 |
| UK | 3.90 | 4.00 | 3.75 |

| FX | Last | 3m | 12m |
|---|---|---|---|
| EUR/$ | 1.08 | 1.05 | 1.10 |
| GBP/$ | 1.25 | 1.22 | 1.26 |
| $/JPY | 138 | 140 | 125 |
| $/CNY | 7.00 | 7.10 | 6.80 |

| Commodities | Last | 3m | 12m |
|---|---|---|---|
| Crude Oil, Brent ($/bbl) | 76 | 89 | 100 |
| Nat Gas ($/mmBtu) | 2.59 | 3.30 | 3.00 |
| Copper ($/mt) | 8,201 | 7,750 | 10,000 |
| Gold ($/troy oz) | 1,962 | 2,050 | 2,050 |

| Credit (bp) | | Last | 2Q23 | 4Q23 |
|---|---|---|---|---|
| USD | IG | 143 | 117 | 115 |
| | HY | 477 | 400 | 390 |
| EUR | IG | 184 | 150 | 145 |
| | HY | 462 | 415 | 405 |

**Equities**

| S&P 500 | E2023 GS | E2023 Cons. | E2024 GS | E2024 Cons. |
|---|---|---|---|---|
| Price | 4,000 | -- | -- | -- |
| EPS | $224 | $221 | $237 | $245 |
| Growth | 1% | 0% | 5% | 11% |

| Returns (%) | 12m | YTD | E2023 P/E |
|---|---|---|---|
| S&P500 | -5.0 | 10.2 | 19.4x |
| MXAPJ | 17.0 | 1.5 | 14x |
| Topix | 1.0 | 9.2 | 14.9x |
| STOXX 600 | 1.0 | 15.0 | 13.1x |

| Consumer | 2023 CPI (%, yoy) | 2023 Unemp. Rate | 2024 CPI (%, yoy) | 2024 Unemp. Rate | Wage Tracker 2023 (%) Q1 | Q2 | Q3 | Q4 |
|---|---|---|---|---|---|---|---|---|
| US | 4.3 | 3.6 | 2.8 | 3.6 | 5.3 | -- | -- | -- |
| Euro area | 5.2 | 6.8 | 2.4 | 6.7 | -- | -- | -- | -- |
| China | 1.2 | -- | 2.6 | -- | -- | -- | -- | -- |

*Source: Bloomberg, Goldman Sachs Global Investment Research. For important disclosures, see the Disclosure Appendix or go to www.gs.com/research/hedge.html.*

**Market pricing as of May 19, 2023.**

# Glossary of GS proprietary indices

## Current Activity Indicator (CAI)

GS CAIs measure the growth signal in a broad range of weekly and monthly indicators, offering an alternative to Gross Domestic Product (GDP). GDP is an imperfect guide to current activity: In most countries, it is only available quarterly and is released with a substantial delay, and its initial estimates are often heavily revised. GDP also ignores important measures of real activity, such as employment and the purchasing managers' indexes (PMIs). All of these problems reduce the effectiveness of GDP for investment and policy decisions. Our CAIs aim to address GDP's shortcomings and provide a timelier read on the pace of growth.

*For more, see our CAI page and Global Economics Analyst: Trackin' All Over the World – Our New Global CAI, 25 February 2017.*

## Dynamic Equilibrium Exchange Rates (DEER)

The GSDEER framework establishes an equilibrium (or "fair") value of the real exchange rate based on relative productivity and terms-of-trade differentials.

*For more, see our GSDEER page, Global Economics Paper No. 227: Finding Fair Value in EM FX, 26 January 2016, and Global Markets Analyst: A Look at Valuation Across G10 FX, 29 June 2017.*

## Financial Conditions Index (FCI)

GS FCIs gauge the "looseness" or "tightness" of financial conditions across the world's major economies, incorporating variables that directly affect spending on domestically produced goods and services. FCIs can provide valuable information about the economic growth outlook and the direct and indirect effects of monetary policy on real economic activity.

FCIs for the G10 economies are calculated as a weighted average of a policy rate, a long-term risk-free bond yield, a corporate credit spread, an equity price variable, and a trade-weighted exchange rate; the Euro area FCI also includes a sovereign credit spread. The weights mirror the effects of the financial variables on real GDP growth in our models over a one-year horizon. FCIs for emerging markets are calculated as a weighted average of a short-term interest rate, a long-term swap rate, a CDS spread, an equity price variable, a trade-weighted exchange rate, and—in economies with large foreign-currency-denominated debt stocks—a debt-weighted exchange rate index.

*For more, see our FCI page, Global Economics Analyst: Our New G10 Financial Conditions Indices, 20 April 2017, and Global Economics Analyst: Tracking EM Financial Conditions – Our New FCIs, 6 October 2017.*

## Goldman Sachs Analyst Index (GSAI)

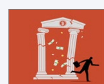
The US GSAI is based on a monthly survey of GS equity analysts to obtain their assessments of business conditions in the industries they follow. The results provide timely "bottom-up" information about US economic activity to supplement and cross-check our analysis of "top-down" data. Based on analysts' responses, we create a diffusion index for economic activity comparable to the ISM's indexes for activity in the manufacturing and nonmanufacturing sectors.

## Macro-Data Assessment Platform (MAP)

GS MAP scores facilitate rapid interpretation of new data releases for economic indicators worldwide. MAP summarizes the importance of a specific data release (i.e., its historical correlation with GDP) and the degree of surprise relative to the consensus forecast. The sign on the degree of surprise characterizes underperformance with a negative number and outperformance with a positive number. Each of these two components is ranked on a scale from 0 to 5, with the MAP score being the product of the two, i.e., from -25 to +25. For example, a MAP score of +20 (5;+4) would indicate that the data has a very high correlation to GDP (5) and that it came out well above consensus expectations (+4), for a total MAP value of +20.

# Top of Mind archive

**Issue 118**
***US-China: more decoupling ahead?***
*May 1, 2023*



**Issue 117**
***All about bank(panic)s***
*April 3, 2023*

**Issue 116**
***(Japanese) Bonds, Bonds, Bonds***
*February 23, 2023*

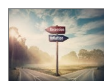
**Issue 115**
***The Bigger Worry: Growth or Inflation?***
*January 27, 2023*

**Special Issue**
***2022: 3 themes in charts***
*December 15, 2022*

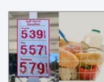
**Issue 114**
***The Winter of Crypto's Discontents***
*December 9, 2022*

**Issue 113**
***Central Bank Tightening: what could break?***
*November 11, 2022*

**Issue 112**
***China's Congress: an inflection point?***
*October 11, 2022*



**Issue 111**
***Will slaying inflation require recession?***
*September 13, 2022*



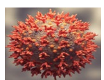
**Issue 110**
***Food, Fuel, and the Cost-of-Living Crisis***
*July 28, 2022*

**Issue 109**
***Equity bear market: a paradigm shift?***
*June 14, 2022*

**Issue 108**
***(De)Globalization Ahead?***
*April 28, 2022*

**Issue 107**
***Stagflation Risk***
*March 14, 2022*

**Issue 106**
***Russia Risk***
*February 24, 2022*



**Issue 105**
***2022: The endemic year?***
*January 24, 2022*

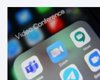
**Special Issue**
***2021: 4 themes in charts***
*December 17, 2021*

**Issue 104**
***Investing in Climate Change 2.0***
*December 13, 2021*

**Issue 103**
***Inflation: here today, gone tomorrow?***
*November 17, 2021*

**Issue 102**
***Europe at a Crossroads***
*October 18, 2021*

**Issue 101**
***Is China Investable?***
*September 13, 2021*

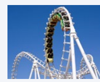


**Issue 100**
***The Post-Pandemic Future of Work***
*July 29, 2021*

**Issue 99**
***Bidenomics: evolution or revolution?***
*June 29, 2021*

**Issue 98**
***Crypto: A New Asset Class?***
*May 21, 2021*

**Issue 97**
***Reflation Risk***
*April 1, 2021*



**Issue 96**
***The Short and Long of Recent Volatility***
*February 25, 2021*

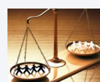
**Issue 95**
***The IPO SPAC-tacle***
*January 28, 2021*

**Special Issue**
***2020 Update, and a Peek at 2021***
*December 17, 2020*

**Issue 94**
***What's In Store For the Dollar***
*October 29, 2020*

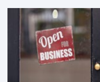
**Issue 93**
***Beyond 2020: Post-Election Policies***
*October 1, 2020*

**Issue 92**
***COVID-19: Where We Go From Here***
*August 13, 2020*



**Issue 91**
***Investing in Racial Economic Equality***
*July 16, 2020*

**Issue 90**
***Daunting Debt Dynamics***
*May 28, 2020*



**Issue 89**
***Reopening the Economy***
*April 28, 2020*

**Issue 88**
***Oil's Seismic Shock***
*March 31, 2020*

*Source of photos: www.istockphoto.com, www.shutterstock.com, US Department of State/Wikimedia Commons/Public Domain.*

## Disclosure Appendix

### Reg AC

We, Allison Nathan, Jenny Grimberg, Ashley Rhodes, Vickie Chang, Alec Phillips, and Dominic Wilson 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.

We, Brian Lee, CFA and Noah Poponak, CFA, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

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. **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.

**© 2023 Goldman Sachs.**

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