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TOP *of* MIND

ALL ABOUT BANK(PANIC)S

The recent banking turmoil in the US and Europe seems to have calmed, but whether this stress will resurge, and its implications for growth, monetary policy, and markets—let alone the banking industry itself—is Top of Mind. We turn to former policymakers Daniel Tarullo and Thomas Hoenig, Yale's Gary Gorton, and GS bank analysts to understand what caused the recent crisis, how likely it is to repeat, and what rules and regulations might help prevent that, with Tarullo focused on more stress tests, Hoenig on more capital, and Gorton on more deposit insurance. GS economists then dig into the growth and central bank implications of these events, concluding that a pullback in lending is likely to drag on US growth, which means the Fed may have to tighten less, but will still need to carefully balance price and financial stability goals. GS strategists also assess asset impacts, interpreting the seeming disconnect between rates and equities as an expectation that credit tightening will have a concentrated sectoral impact. Finally, we zero in on the potential next shoe to drop: CRE.

"Given the role that bank runs played in this episode—and especially the extraordinary speed of deposit outflows—I couldn't agree more with the calls to review liquidity regulations.

- Daniel K. Tarullo

The stress tests required under [Dodd-Frank], while valuable, were incorrectly thought to be more useful than understanding that we cannot predict where problems will come from and how they might evolve.

- Thomas Hoenig

You can't solve every problem with higher capital and liquidity requirements. Amid huge demand for safe assets, not enough of them exist to back up all short-term debt.

- Gary Gorton"

WHAT'S INSIDE

Allison Nathan | allison.nathan@gs.com

Jenny Grimberg | jenny.grimberg@gs.com

Ashley Rhodes | ashley.rhodes@gs.com

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

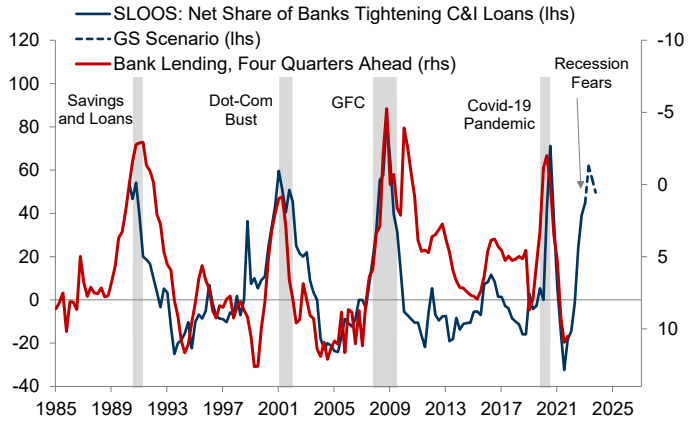
- We recently lowered our 2023 US growth forecast to 1.1% (from 1.5%) to reflect a bank lending pullback amid banking stresses, although we think tighter credit will be a headwind that helps the Fed keep growth below potential rather than a hurricane that pushes the economy into recession.
- We recently raised our 12m US recession odds to 35% (from 25%) to reflect increased near-term uncertainty around the economic effects of small bank stress.

Datapoints/trends we're focused on

- Fed policy; we expect the Fed to deliver 25bp hikes in May and June for a terminal rate of 5.25-5.5%.

Tighter bank lending standards likely ahead

Index (lhs), percent change, year ago (inverted, rhs)



Source: Federal Reserve Bank, NBER, Goldman Sachs GIR.

Japan

Latest GS proprietary datapoints/major changes in views

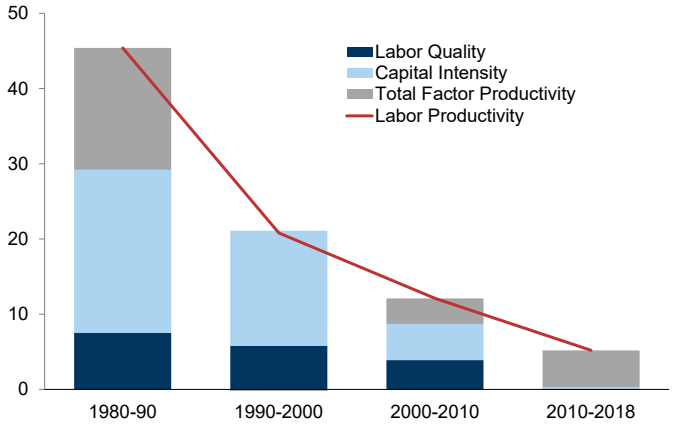
- We recently raised our estimates of 2023 macro wage growth in Japan to 2.8% (from 2.4%) following higher-than-expected initial *shunto* wage negotiation results.

Datapoints/trends we're focused on

- BoJ policy; under incoming Governor Ueda we continue to expect the BoJ to adjust yield curve control (YCC) in 2Q23 by targeting 5y yields rather than 10y yields.
- Inflation; we see a high bar for achieving the BoJ's 2% inflation target from the perspective of wage growth given recent stagnation in labor productivity.
- Gov debt sustainability risk, which we see as limited.

Japan's labor productivity growth has deteriorated

Factor decomposition of labor productivity growth, %



Source: Kyoji Fukao, "Secular Stagnation in Wages," 2021, Goldman Sachs GIR.

Europe

Latest GS proprietary datapoints/major changes in views

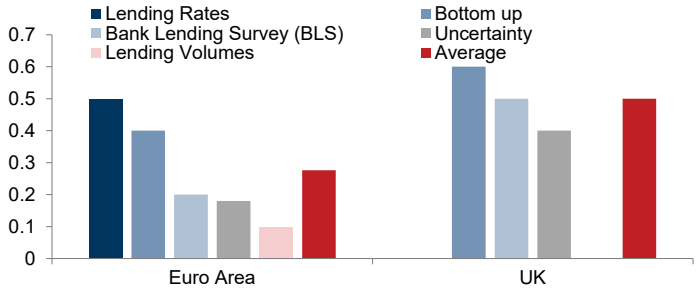
- We recently lowered our 2023/24 EA and 2023 UK growth forecasts to reflect tigher lending standards amid bank stress, but continue to expect the EA and UK to avoid an outright recession as the European banking system remains healthy and other growth drivers offset drags from tighter credit.
- We recently raised our 2023 EA core inflation forecast to 4.0% (from 3.7%) to reflect recent wage growth strength.

Datapoints/trends we're focused on

- ECB policy; we expect 25bp ECB hikes in May and June for a 3.5% terminal rate, due to likely persistent high core inflation.

A modest growth drag from tighter credit in Europe

Estimated GDP hit from recent banking stress , %



Note: Lending rates/vol estimates impact of lending rates/vol on GDP growth using VAR model. Bottom up estimates how much banks would have to tighten credit to restore capital ratio. BLS relates bank lending standards (measured by BLS) to high-frequency indicators (incl. bank stocks, yields, spreads, sentiment indicators). Uncertainty relates index of daily Bloomberg articles mentioning "banking", "crisis" and "Europe" or "UK" to quarterly GDP growth.

Source: Goldman Sachs GIR.

Emerging Markets (EM)

Latest GS proprietary datapoints/major changes in views

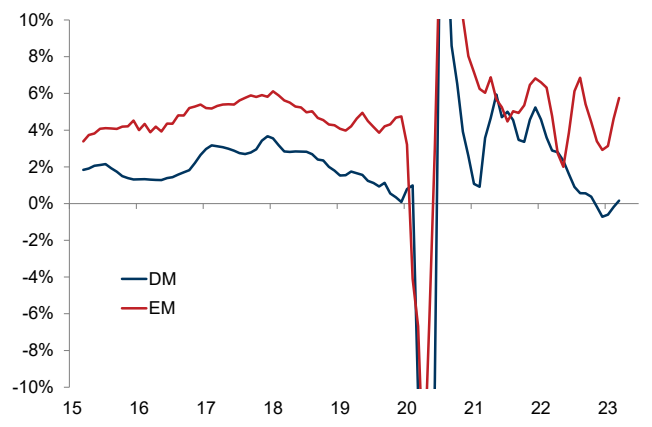
- We recently raised our '23 China growth forecast to 6.0% (from 5.5%) on a rapid rise in domestic mobility and strong activity data as China continues to recover after reopening.

Datapoints/trends we're focused on

- China macro policy, which we expect will gradually normalize in 2023 from the expansionary stance of 2022.
- EM growth, which has been, on average, stronger than DM growth, with Asia and CEEMEA outperforming LatAm.
- EM inflation, which we think is now past its peak and will decline significantly over the course of 2023.

EM economies are outgrowing DM economies

GS Current Activity Indicators), 3m moving avg, % mom annual



Source: Goldman Sachs GIR.

All about bank(panic)s

Although the recent banking turmoil in the US and Europe seems to have calmed, whether this stress will resurge, and its implications for growth, monetary policy, and markets—let alone the banking industry itself—is Top of Mind.

For context on the recent crisis, we first turn to Daniel Tarullo, former Chairman of the Federal Reserve Board's Committee on Supervision and Regulation, Thomas Hoenig, former President of the Federal Reserve Bank of Kansas City and Vice Chairman of the Federal Deposit Insurance Corporation (FDIC), and Gary Gorton, Professor at Yale University who has written extensively on bank panics. While they disagree on who/what is ultimately responsible for the crisis, they generally agree that it was a classic bank run, which Gorton argues is always about runs on short-term debt. The short-term debt at the root of the recent crisis was uninsured deposits, which both catalyzed and exacerbated the failure of Silicon Valley Bank (SVB).

GS bank analysts Richard Ramsden, Chris Hallam, and Ryan Nash then explain how: as the Fed sharply tightened financial conditions last year to rein in inflation, companies found it more difficult to raise cash, leading to deposit outflows. To meet those outflows, SVB sold long-term Treasuries it held on its balance sheet—the value of which had plummeted as interest rates rose—at a loss. A capital raise to cover those losses failed, and a significant run on deposits occurred, resulting in the largest bank failure since the 2008 financial crisis. These events, they say, prompted a broad migration of deposits from the banking system into money market funds as well as migrating to global systemically important banks (G-SIBs), forcing some banks to source liquidity from the Fed.

The good news is that this deposit migration and need for emergency funding seems to have slowed in the most recent week—suggesting the situation has stabilized somewhat (see pg. 9).

But even if that remains the case, what are the implications of the recent events for bank lending, growth, and central bank policy? GS US economists David Mericle and Manuel Abecasis expect small banks, which play an important role in the US economy, to pull back on lending, which they estimate will exert a 0.25-0.5pp drag on growth this year. This, they say, would have the same impact on the economy as roughly 25-50bp of rate hikes, which means that the Fed may have to tighten less to keep growth below potential and return inflation to target. That said, they continue to expect two more 25bp Fed hikes in May and June, for a terminal rate of 5.25-5.5%.

But what might happen if inflation proves more stubborn than expected? Indeed, these events have shone a spotlight on the broader conundrum that central banks face when monetary policy goals come into tension with financial stability, as is the case today. GS Head of European Rates Strategy George Cole turns for guidance to European central banks. He finds that central banks tend to be more successful at separating—and achieving—conflicting price and financial stability goals when the nature of the financial stability problem is liquidity rather than solvency. He concludes that banks' cost of capital has not yet risen sufficiently to reverse the tightening delivered so far, consistent with GS economists' view that the Fed and ECB will continue hiking (see pg. 25). But he cautions that if higher rates erode the credit quality of riskier assets, central banks will find it harder to separate monetary policy from financial stability.

GS market strategists Dominic Wilson and Vickie Chang then assess the market implications of the recent events, and, in particular, what to make of the apparent disconnect between rates, which seem to be pricing a larger growth hit than equities. They attribute this disconnect to the view that a significant credit crunch is likely, but that its growth impact will be heavily concentrated on smaller firms, so that larger businesses will likely experience a smaller growth hit while also benefitting from less restrictive policy. Such a scenario, they say, would suggest that the recent shifts in rates and US-linked EM currencies are likely unsustainable, and that equities look vulnerable to growth and policy risks.

The million-dollar question, though, is what policies, rules, and regulations could/should/will be put in place to protect against the recent events repeating and ensure a healthy banking system? Tarullo advocates for all banks with over $100bn in assets to be subjected to annual Fed stress tests that include several scenarios to uncover different kinds of vulnerabilities. He also believes that liquidity regulations should be reviewed and sizable available-for-sale securities on bank balance sheets should be marked-to-market. Hoenig believes that more stringent capital requirements are necessary, and that those requirements should rely on simple leverage ratios—equity-to-assets—instead of risk-weighted ratios, which he thinks paint a misleading picture of banks' health. Gorton, though, argues that "you can't solve every problem with higher capital and liquidity requirements". He thinks policymakers should consider providing insurance for all deposits used for transactions, which would reduce the risk of bank runs, and, more broadly, focus on closely monitoring short-term debt in all its various forms.

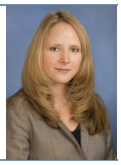
Alec Phillips, GS Chief US Political Economist, then surveys such actions and their likelihood, concluding that it's ultimately up to Congress to provide an explicit deposit guarantee, which he thinks is unlikely in the current political climate.

Even without such a guarantee, US policymakers have taken several steps to shore up the financial system. So, how vulnerable is the system today to further stresses? Ramsden, Hallam, and Nash don't think US G-SIBs look vulnerable and point out that regional banks also look well-capitalized, although they caution that it will be difficult to assess their true state until 1Q23 earnings results are reported. Gorton, Hoenig, and Tarullo, for their part, warn of the risk of further stresses, with Tarullo arguing that "no one should be so bold as to foreclose on the possibility of another shoe dropping".

What could this next shoe be? GS credit strategists Lotfi Karoui and Vinay Viswanathan dig into one likely culprit: Commercial Real Estate (CRE) loans, and office loans in particular, given their expectations of rising office loan delinquency rates and small banks' disproportionate exposure to them. But they argue that systemic risk stemming from credit markets is likely to be limited given healthier fundamentals elsewhere in the space.

Allison Nathan, Editor

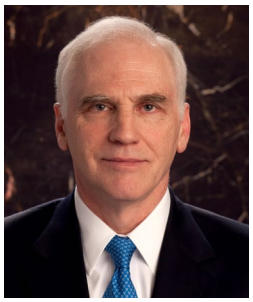
Email: allison.nathan@gs.com
Tel: 212-357-7504
Goldman Sachs & Co. LLC



Interview with Daniel K. Tarullo

Daniel K. Tarullo is a former member of the Federal Reserve Board, serving from 2009-2017. He is currently Nomura Professor of International Financial Regulatory Practice at Harvard Law School. Below, he discusses his views on what was behind the recent bank stresses.

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



Allison Nathan: As former Chairman of the Federal Reserve Board's Committee on Supervision and Regulation in the wake of the Global Financial Crisis, you've seen banking crises play out firsthand. Was there anything unusual or different about the recent crisis?

Daniel Tarullo: In broad terms, this was a textbook bank run; a piece of information—namely, large unrealized losses in Silicon Valley Bank's (SVB) asset book—generated uncertainty about its health that motivated some depositors to rationally withdraw their money even if the bank may have been solvent, because, from the depositor's point of view, why take the chance that it wasn't? And other depositors followed. This scenario is eminently comparable to the 1920/30s, when small depositors saw their fellow depositors lining up outside banks to withdraw their money and joined in. The only difference here is that instead of depositors lining up, venture capitalists used social media and other means to spread the word to their portfolio companies that they should pull their money out of SVB. Today's technology that allows for rapid communication and the transfer of money with a touch of a button substantially accelerated the speed of the run, but the underlying dynamics were basically the same.

Allison Nathan: What was responsible for the recent crisis?

Daniel Tarullo: In the first instance, the responsibility lies with bank management. From what we know, the liability side of SVB's balance sheet was mishandled. Beyond that, while a good bit of the story remains to be uncovered, it's apparent that some sort of supervisory failure occurred. Any time a bank grows fourfold within just a few years, that should be a warning sign to regulators, because rapid growth often outstrips the risk management capacities of the institution. And the piece of information that jumped out at me during the recent Senate Banking hearing was that the top 10 depositors of SVB had an aggregate of $13bn in uninsured deposits. With total deposits of roughly $200bn, it's not a stretch to say that's an anomalous situation, and one that should have been noticed and zeroed in on to understand the vulnerabilities that it created.

But it's important to note that the supervisory process can fail in multiple ways. The most obvious way is that a regional Federal Reserve Bank or regional office of the OCC fails to identify risks because they are looking in the wrong place or are too slow to react. The second type of failure is one in which the overall supervisory policies put in place by the agency, in this case the Board of Governors of the Fed, themselves fall short of what's needed, either due to a top-down decision to go a little easy on banks or because the supervisors haven't yet identified new vulnerabilities that the onsite teams need to be looking for. And the final type of failure is one in which the dedicated supervisors identify a problem but fail to quickly and adequately follow up to ensure that the bank has taken the appropriate remedial steps.

Based on what we know so far, it seems that the last form of supervisory failure was present to some degree; we know that supervisors at the San Francisco Fed identified some of the very issues that clearly lay at the heart of SVB's failure. But it appears they may not have followed up quickly enough given the magnitude of the problem and the fast-growing nature of SVB. I also suspect that the effort by the Board of Governors over the past four or five years to relax supervisory oversight contributed to the supervisory failure.

Allison Nathan: It's been argued that the 2018 rollback of Dodd-Frank—bill S.2155—that exempted smaller banks from strict federal oversight set the stage for the recent crisis. You opposed that rollback—what's your view?

Daniel Tarullo: I opposed that bill because I thought it went way too far in raising the threshold for banks that would receive special regulation—the $250bn asset threshold struck me then, and strikes me now, as too high. The bill was based on the false premise that banks with $100-250bn in assets are not as a group systemically important, which recent events have proven untrue. So, the legislation was ill-advised, and may have contributed to a sense that supervisors and regulators should ease up on smaller banks.

That said, I don't see a strong direct connection between S.2155 and SVB's failure, because the rules and regulations SVB would have been subjected to before S.2155 would not have uncovered its vulnerabilities. Based on prevailing metrics, SVB's capital and liquidity coverage ratios might well have been within the acceptable range. And the stress test that SVB would have been required to participate in a year earlier was a single scenario stress test that posited a *reduction* in interest rates, rather than the sharp increase in rates that triggered its troubles. But that's not to say that the supervisory gap is not very problematic and that there may have been a need to change regulations to apply them in a more discriminating way to banks of a particular size. And the Fed had a lot of authority to do that, even under S.2155; it basically chose not to exercise that authority.

Allison Nathan: So, how would you rate policymakers' response to the crisis? Was guaranteeing the uninsured deposits of SVB and Signature Bank the right action?

Daniel Tarullo: Answering that question requires some speculation because we, the public, don't have all the granular information that the regulators and other decision-makers had during the weekend following SVB's failure. That said, almost any government of any country, when faced with a burgeoning banking or financial crisis, will take whatever steps are necessary to tamp down that crisis before it becomes full-blown. Those actions may exacerbate the moral hazard problem, which will have to be dealt with after the crisis

passes. But that reaction—even overreaction—is very understandable when governments are otherwise facing a crisis that could inflict substantial harm to their economy. And, while another shoe may drop, at least at this point, the actions taken by the agencies and the Administration appear to have stabilized the situation. So, the actions so far seem to have been appropriate, but we will have to wait a bit longer before we can be confident.

Allison Nathan: How concerned are you that we are at the beginning rather than the end of this crisis?

Daniel Tarullo: No one should be so bold as to foreclose on the possibility of another shoe dropping. Other bank portfolios, particularly portfolios of longer-date fixed income instruments, have presumably undergone the same impact from the Fed's rate hikes and have not been marked-to-market. So, the risk of further stresses is out there.

Allison Nathan: Could increasing deposit insurance by raising insured caps, or even guaranteeing all deposits, be a more lasting solution to the recent crisis?

Daniel Tarullo: Before we talk about raising the deposit limit or guaranteeing all deposits, we need to get a better handle on the deposit profiles of other banks—not just the amount of uninsured deposits, but the nature of them and how they're being used—to get a sense of how sticky they might be. That said, especially in light of the FDIC's recent revelation about the concentration of deposits at SVB, we shouldn't delude ourselves into thinking that raising the deposit limit to $500k, for example, will do anything to prevent the kinds of bank runs that we're worried about. Deposit protection as a "solution" would require a profound change in the nature of the government's relationship to the financial system—with Congress willing to provide a public subsidy to banks—or big increases in the premiums charged by the FDIC or the capital requirements imposed by regulators to offset the fact that even the largest depositors would no longer care about the condition of banks. And while full deposit insurance would be one solution, it's likely not the only one, especially if the problem is more discretely limited to a subset of banks with $100-250bn of assets. So, I hope people don't jump to conclusions without carefully considering the implications of such large and fundamental shifts.

Allison Nathan: What—if any—adjustments to rules and regulations would strengthen the health of the system?

Daniel Tarullo: First, the system would be much healthier if every bank with over $100bn in assets had to participate in the Fed's stress test every year, and that test included multiple scenarios to uncover different kinds of vulnerabilities. All but the smallest banks should be subject to a rigorous assessment of their capital positions. Second, given the role that bank runs played in this episode—and especially the extraordinary speed of deposit outflows—I couldn't agree more with the calls to review liquidity regulations. Even before these events, I worried that these regulations, not just for mid-sized banks, but for the largest banks, were too onerous in some respects, while being too lax in others; such regulations should protect the banking system and the public but also allow banks to perform intermediating roles, especially in periods of stress.

Third, it's pretty clear that the absence of mark-to-market requirements for the large asset portfolios of bigger banks needs to be addressed. It's almost a no-brainer that securities in any sizable "available-for-sale" portfolio needs to be marked-to-market. The harder question is whether "held-to-maturity" portfolios should be similarly marked. Five years ago, I probably would've said they should. But today, concerns about the robustness of Treasury markets amid an explosion of Treasury issuance give me pause; if requiring banks to mark-to-market these portfolios is a large disincentive for banks to hold Treasuries, market functioning could deteriorate further. Other regulatory changes may be appropriate. But before we impose them on mid-sized banks, we need to be sure they have a real financial stability benefit.

Allison Nathan: What—if any—more lasting impacts might the recent events have on the banking industry?

Daniel Tarullo: These events will force policymakers to contemplate where the US banking system is headed. Specifically, the SVB episode has put front and center the question of the viability of the business model of mid-sized banks, which must be analyzed. It may be that such an analysis reveals a vibrant business model for these banks. But given the growing importance of scale in succeeding in the banking industry today, regulators may have a choice to make—allow these banks to operate with relatively less costly regulation so that they can continue to compete but recognize that the recent crises will likely repeat; or impose more regulation on these banks to bolster financial stability, which would diminish their medium-term prospects. And if they decide the latter, what are the implications for M&A? We're already concerned that very large banks acquiring other banks will lead "too big to fail" to become "too bigger to fail". So, how do we feel about the super-regionals acquiring one of these mid-sized institutions, or several of them merging? That set of issues demands serious thought.

Allison Nathan: As a former member of the Federal Reserve Board, did you agree with the March Fed rate hike?

Daniel Tarullo: Before the SVB events, I thought a 25bp hike was warranted. But given that the episode in itself tightened financial conditions, I thought it appropriate to pause at the last meeting. In any case, the Fed's action didn't seem to roil financial markets, so it's hard to be too critical.

Allison Nathan: How should the Fed weigh inflation risks versus financial stability risks going forward?

Daniel Tarullo: The conventional wisdom of central bankers is not to use monetary policy for financial stability purposes, because there are other tools for that. But that position is convincing only if those other tools are actually used. One would hope that the FOMC would have considered the impact of rapidly rising rates on bank asset portfolios and net interest margins as well as the implications for non-bank financial institutions. If the Fed feels that its price stability mandate requires those rapid rate increases, it needs to be using its supervisory oversight to be sure bank funding will not be badly disrupted as a result.

Interview with Thomas Hoenig

Thomas Hoenig is former President of the Federal Reserve Bank of Kansas City and Vice Chairman of the Federal Deposit Insurance Corporation (FDIC). He is currently a Distinguished Senior Fellow at George Mason University's Mercatus Center. Below, he argues that recent banking stress was primarily the result of poor bank management and inadequate capital, and that more stringent capital requirements will be necessary to create a safer banking industry.

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

Allison Nathan: Who/what is responsible for the recent stresses in the US banking sector?

Thomas Hoenig: Bank management is first and foremost responsible for the recent crisis, which resulted from poor asset risk management and inadequate levels of bank capital to weather that mismanagement. Bank supervisors, who were apparently aware of the risks building up at these banks but did not address them in a serious or timely enough fashion, also bear some responsibility. Monetary policy errors over the past decade were another major contributor to this episode. It would be impossible to tighten policy after more than decade of zero or very low interest rates in an economy as complex as the US' without adverse consequences. Easy policy in the wake of the Global Financial Crisis (GFC) and the pandemic was warranted, but the Fed maintained zero interest rate policy and continued to expand the base money supply by $120bn per month for well over a year after the pandemic crisis had passed. And when that caused an inflation problem, the Fed increased rates by a factor of 20 in the span of a year, which was inevitably going to result in bad outcomes. And it did. This was a predictable monetary policy error that we're now paying for.

Allison Nathan: That said, you've called the recent bank failures inevitable given the Dodd-Frank regulatory framework. But hasn't that framework made the banking industry safer?

Thomas Hoenig: No. Dodd-Frank legislation was more form than substance, providing a false sense of security rather than substantive changes that would have required banks to hold substantially more capital to survive the unforeseen stresses they inevitably encounter. Provisions requiring living wills of the largest institutions, including regional institutions, were at best exercises in contingency planning, but in reality turned out to be a very substantial paper exercise—in fact, thousands of pages long—and very difficult to understand. And the stress tests required under the legislation, while valuable, were incorrectly thought to be more useful than understanding that we cannot predict where problems will come from and how they might evolve.

Allison Nathan: But didn't Dodd-Frank substantially increase the amount of capital banks—especially global systemically important banks (G-SIBs)—were required to hold, leaving the banking industry well-capitalized, and effectively safer, today than it was before the GFC?

Thomas Hoenig: Banks and even bank supervisors talk about how well-capitalized the banking industry is today. I wish that were true, but, unfortunately, saying it doesn't make it so. When assessing capital adequacy, Dodd-Frank relies on a risk-weighted capital system that has misled banks, bank supervisors, and the public about the true health of banks. That's because, for example, US government securities are assigned a risk weight of 0% under this system since they're assumed to be very low risk, which means that no capital is necessary to fund growth in these assets. But owning these types of securities in an environment of sharply rising rates is precisely what triggered Silicon Valley Bank's (SVB) troubles. If capital rules had instead relied on simple leverage ratios—equity-to-assets, or tangible capital—the substantial growth in SVB's asset base would have undoubtedly been slower because the bank would have had to fund every dollar of every asset that they grew with, say, 10-15% or more of their own money. That may have given them a stronger capital base to survive the stresses they faced. Focusing more on these simple leverage ratios would create a safer banking industry.

> "When assessing capital adequacy, Dodd-Frank relies on a risk-weighted capital system that has misled banks, bank supervisors, and the public about the true health of banks."

It's also important to note that while capital levels improved in the wake of Dodd-Frank, improvement from a very low base doesn't mean the levels are now adequate. During the GFC, some institutions had tangible capital of around 3%, and today they have 6%, which they claim is enough. But remember that the industry lost 6% of its capital in the GFC. Before the FDIC was founded and before Dodd-Frank and its extensive "too big to fail" safety net, banks held at least 10-12% tangible capital. Even then, the banking industry encountered problems, but at least it had a bigger capital base that helped banks survive. I've argued in the past that at least 10% equity-to- assets is an adequate ratio, and various academic studies suggest adequate equity-to-asset ratios are in the neighborhood of 15%—well above where they stand on average today. So, capital levels are better, but not necessarily adequate relative to the risk that this highly leveraged industry periodically encounters.

The banking industry argues that raising capital requirements would slow loan growth, which it may, but it would also create a safer industry, which could ultimately reduce the cost of capital and provide institutions more staying power during recessions. And even if banks' cost of capital rises, forcing them to charge higher rates to cover their costs, that in itself

would discipline out the highest risk activities, lowering the likelihood of a crisis.

Allison Nathan: But wasn't the source of the recent bank stresses a liquidity problem triggered by a run on deposits rather than a capital adequacy problem?

Thomas Hoenig: One always follows the other. In the case of SVB, the fear of insolvency given the bank's enormous unrealized losses led to a liquidity problem that hastened its failure. But the fundamental cause of the failure was poor management practices, inadequate capital, and assets that were obviously substantially underwater. So, it was a solvency problem that became a liquidity problem.

> "…the fundamental cause of [SVB's] failure was poor management practices, inadequate capital, and assets that were obviously substantially underwater. So, it was a solvency problem that became a liquidity problem."

Allison Nathan: Some people argue that the 2018 rollback of Dodd-Frank, which exempted smaller banks from strict federal oversight, contributed to the recent crisis. Do you agree?

Thomas Hoenig: That argument is a bit of a red herring. While the regulatory changes no longer required a standard stress test for all banks, nothing in those changes prevented bank supervisors from scrutinizing asset/liability management programs and the capital adequacy of smaller banks, and requiring more capital for higher-risk assets. And when unrealized losses were mounting, as was clearly visible in the Fed's June 2022 stress test results report, nothing kept bank supervisors from flagging their concerns and advising these banks to strengthen their capital accounts. For that matter, nothing prevented bank management from using its good sense to acknowledge the risks that they were exposing themselves to.

Allison Nathan: How would you rate policymakers' response to the recent bank crises? Has it been sufficient to stabilize the banking industry and shore up confidence in it?

Thomas Hoenig: That remains to be seen. However, on the day that the extent of SVB's troubles came to light, the degree of policymakers' surprise and their inability to execute a purchase and assumption over that weekend did not reflect favorably on them. But, while it is difficult to say for sure without insight into everything that occurred over that weekend, I honestly probably would have also supported the systemic exemption they pursued to protect the depositors of SVB. I am concerned about the moral hazard issue that this type of action exacerbates, which, again, could be mitigated by raising capital ratios to put a greater cushion in place between depositors, the FDIC, and investors. But in a crisis, you do what you have to, and this action seemed like a reasonable one to take to stave off further bank runs. Hopefully, all participants—the banks that will remain under pressure because rates are still high, as well as their supervisors—will learn from this episode and be better prepared in the future. That will determine the ultimate grade policymakers will get for how they dealt with the recent stresses.

Allison Nathan: Has the stress in the European bank industry—and the Credit Suisse developments in particular—been an extension of US bank stresses, or is it something different?

Thomas Hoenig: The Credit Suisse situation is different by a degree, perhaps, but the fundamental problems are the same—bad management, inadequate capital, and an unfortunate need to intervene and therefore extend the moral hazard issue.

Allison Nathan: How concerned are you that other banks might fail? Is the worst of the current crisis more likely behind us, or ahead of us?

Thomas Hoenig: I'd like to tell you that I think this crisis has reached its end. But given that the US banking system has roughly $23tn of assets, and one bank with $200bn of assets caused the recent stresses, it's reasonable to expect that there are other weak links in the system. Again, the speed and magnitude of the policy rate hikes we've seen will continue to have major effects on all institutions, and the recent events must serve as a wakeup call for the Fed, the bank supervisors, the FDIC, and the OCC to scrutinize all banks of substance that could pose a systemic problem.

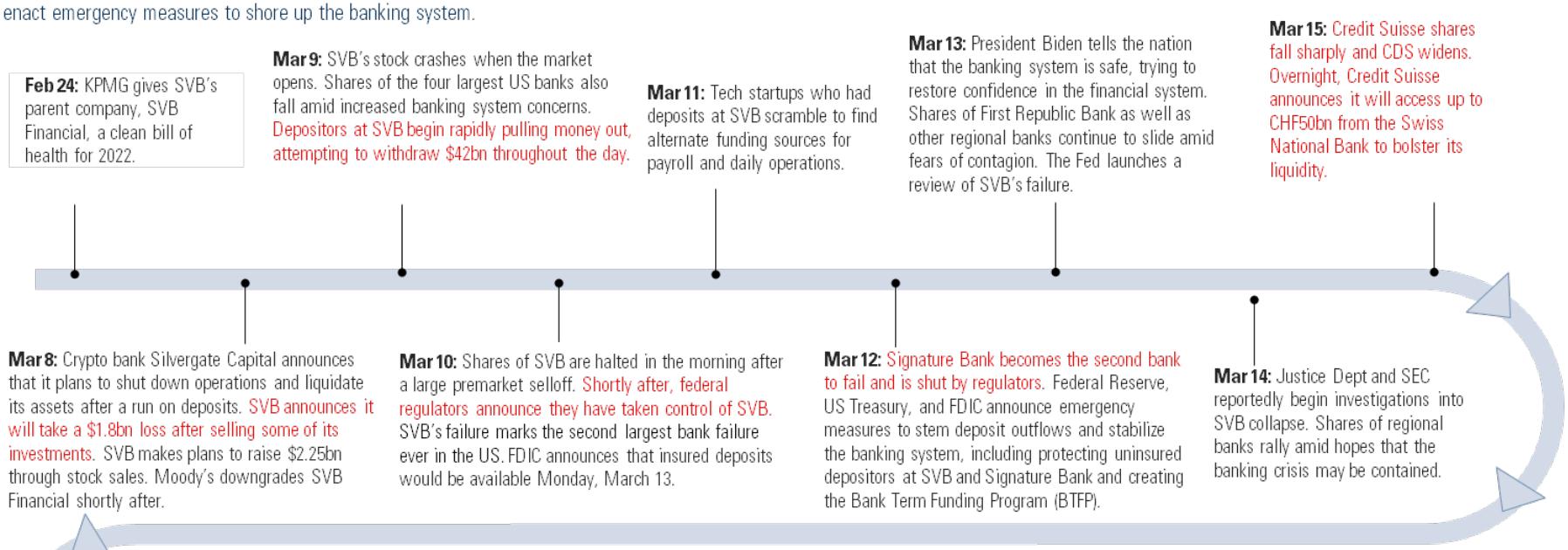
Policymakers also need to be better prepared to execute the purchase and assumption of failing institutions, which effectively protects all depositors because the deposits are sold to another bank or third party—hopefully at a premium to reduce the cost to the FDIC—without having to invoke the systemic risk exemption. And the banking industry must be better prepared from a liquidity perspective, but especially from a capital perspective, so that in these uncertain times, it can better weather the unexpected. I realize those are big issues, but we are heading down a rough road ahead, and they need to be considered in order to maintain a sustainable banking system and recovering economy.

Allison Nathan: You served as President of the Kansas City Fed for two decades. Given the current stress in the US banking sector, should inflation remain the Fed's policy priority?

Thomas Hoenig: Yes, because if it isn't, we could very well end up with a repeat of the 1970s when policymakers stopped hiking too soon and inflation re-ignited to an eye-watering 14%. But, again, we must be prepared to deal with the reality that prioritizing price stability will inevitably have consequences for financial stability. Balancing this priority with maintaining financial stability will undoubtedly be no small challenge. And I'll say again that the best way the banking industry itself can meet this challenge is by maintaining capital levels that are high enough to endure the unexpected problems that will inevitably surface. It's always the unexpected that becomes the next crisis, whether it's subprime loans in 2008 or government securities and duration risks today. So, I hope this episode ultimately leads to stronger capital positions across the industry, and that banks also take this opportunity to scrub their portfolios and make sure they are concentrated in high-quality assets.

March 2023: Banking stresses emerge, regulators intervene

Banking stresses emerge in the US and Europe. Silicon Valley Bank (SVB) and Signature Bank fail after rapid runs on deposits. Federal regulators enact emergency measures to shore up the banking system.



Feb 24: KPMG gives SVB's parent company, SVB Financial, a clean bill of health for 2022.

Mar 8: Crypto bank Silvergate Capital announces that it plans to shut down operations and liquidate its assets after a run on deposits. SVB announces it will take a $1.8bn loss after selling some of its investments. SVB makes plans to raise $2.25bn through stock sales. Moody's downgrades SVB Financial shortly after.

Mar 9: SVB's stock crashes when the market opens. Shares of the four largest US banks also fall amid increased banking system concerns. Depositors at SVB begin rapidly pulling money out, attempting to withdraw $42bn throughout the day.

Mar 10: Shares of SVB are halted in the morning after a large premarket selloff. Shortly after, federal regulators announce they have taken control of SVB. SVB's failure marks the second largest bank failure ever in the US. FDIC announces that insured deposits would be available Monday, March 13.

Mar 11: Tech startups who had deposits at SVB scramble to find alternate funding sources for payroll and daily operations.

Mar 12: Signature Bank becomes the second bank to fail and is shut by regulators. Federal Reserve, US Treasury, and FDIC announce emergency measures to stem deposit outflows and stabilize the banking system, including protecting uninsured depositors at SVB and Signature Bank and creating the Bank Term Funding Program (BTFP).

Mar 13: President Biden tells the nation that the banking system is safe, trying to restore confidence in the financial system. Shares of First Republic Bank as well as other regional banks continue to slide amid fears of contagion. The Fed launches a review of SVB's failure.

Mar 14: Justice Dept and SEC reportedly begin investigations into SVB collapse. Shares of regional banks rally amid hopes that the banking crisis may be contained.

Mar 15: Credit Suisse shares fall sharply and CDS widens. Overnight, Credit Suisse announces it will access up to CHF50bn from the Swiss National Bank to bolster its liquidity.

Mar 16: US federal regulators announce that 11 banks have deposited roughly $30bn into First Republic Bank to shore up its liquidity. Federal Reserve data show that banks had borrowed $11.9bn from the BTFP. US Treasury Secretary Yellen says that the US banking system is "sound". ECB hikes rates by 50bp despite banking stress. ECB President Lagarde says the Euro area banking sector is resilient.

Mar 17: SVB's parent company, SVB Financial, files for Chapter 11 bankruptcy protection. Credit Suisse and First Republic shares continue to fall as concerns remain high.

Mar 18: UBS begins talks to take over Credit Suisse in a deal facilitated by Swiss regulators, including the SNB, Swiss Federal Department of Finance, and FINMA.

Mar 19: UBS agrees to take over Credit Suisse for over $3bn. The SNB announces up to CHF200bn of additional liquidity assistance to both UBS and CS to support the deal. As part of the deal, Credit Suisse's CHF15.8bn in AT1s bonds will be completely written down by FINMA. FDIC announces deal to sell 40 branches of Signature Bank.

Mar 20: First Republic Bank shares continue to decline despite the fresh inflow of deposits. CEOs of large banks discuss additional efforts to stabilize First Republic Bank.

Mar 21: First Republic Bank shares rise over 30% amid increasing optimism about the banking system. US Treasury Secretary Yellen says regulators could protect deposits at other banks if needed.

Mar 22: Fed raises rates by 25bp. Chair Powell says the US banking system is "sound and resilient" and that "all depositors' savings and the banking system are safe". Shortly after, US Treasury Secretary Yellen says she has "not considered or discussed anything having to do with blanket insurance or guarantees of deposits".

Mar 24: Investors spark a selloff in Deutsche Bank over sentiment contagion.

Mar 27: First Citizens acquires all of SVB's deposits, loans, and branches. FDIC agrees to provide First Citizens with a $35bn loan and share any losses or gains on SVB's commercial loans.

Source: Wall Street Journal, various news sources, Goldman Sachs GIR.

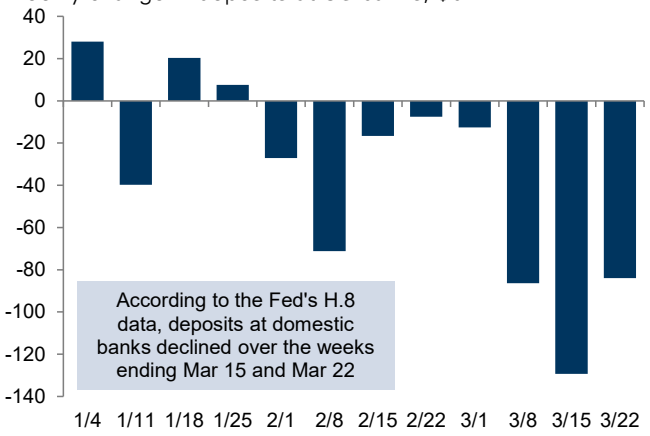
Monitoring small bank stress in the US

David Mericle, GS Chief US Economist, Vinay Viswanathan, GS mortgage strategist, and James Yaro, GS equity research analyst, assess recent pressures on small banks and their spillover effects. They find that while funding markets continue to function and banks have access to liquidity, some banks have faced meaningful deposit outflows and will face higher borrowing costs as other funding sources replace deposits.

Depositors have likely moved from banks to money market funds, although the squeeze on deposits seems to be abating

Following the emergence of banking stresses, deposits at US banks declined…

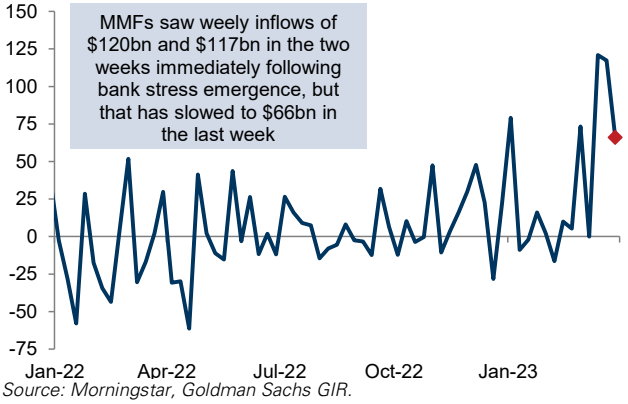
Weekly change in deposits at US banks, $bn



Source: Federal Reserve, Goldman Sachs GIR.

…while money market funds—a likely destination for bank deposit outflows—saw large inflows, suggesting some migration away from deposits, but that has since slowed somewhat…

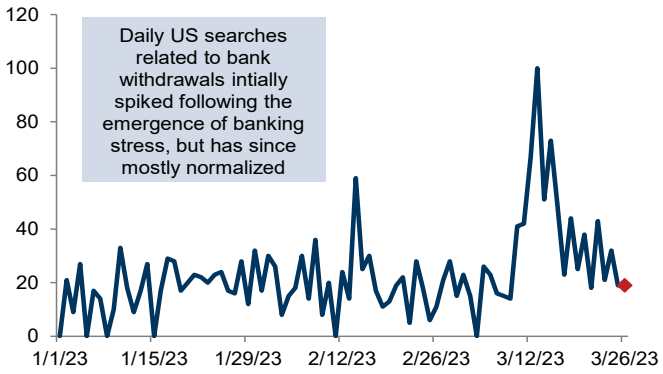
Money market fund (MMF) net flows, $bn



Source: Morningstar, Goldman Sachs GIR.

…and internet searches for withdrawal related words have declined, suggesting bank deposit outflows have diminished

Daily US Google searches related to bank withdrawals, index

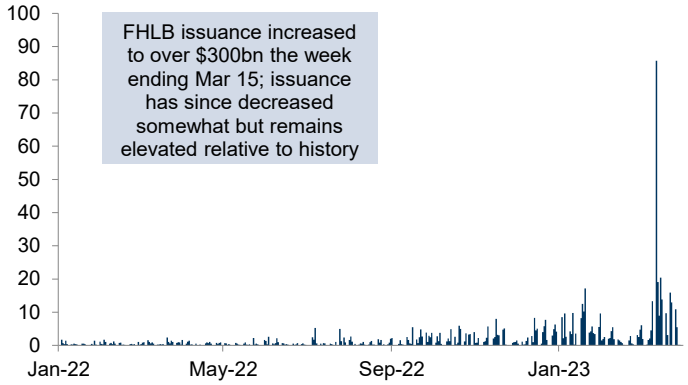


Source: Google Trends (https://www.google.com/trends), Goldman Sachs GIR.

Banks have shored up liquidity by borrowing from FHLBs, the Discount Window, and the BTFP, which has helped to maintain healthy market functioning even as funding costs have risen somewhat

Daily bond issuance by Federal Home Loan Banks (FHLBs)—an indirect measure of banks' use of wholesale funding markets to meet liquidity needs—has risen…

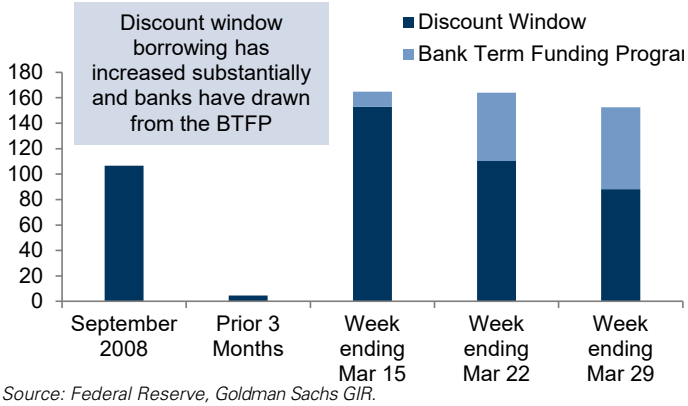
Daily FHLB issuance of floating-rate bonds, $bn



Source: FHLB, Goldman Sachs GIR.

…and usage of the Fed's Discount Window has increased in recent weeks as has banks' usage of the newly introduced Bank Term Funding Program (BTFP)

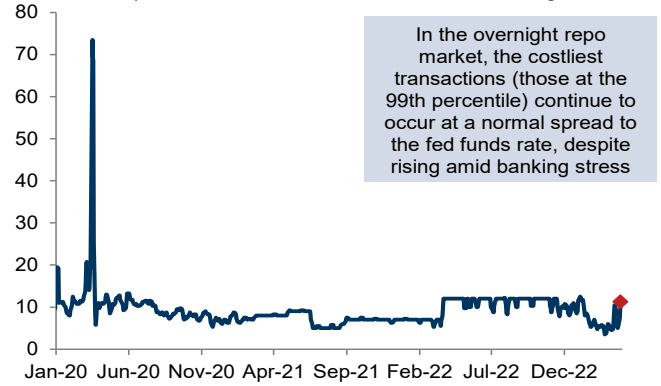
Federal Reserve facility usage, $bn



Source: Federal Reserve, Goldman Sachs GIR.

Borrowing costs in US money markets have risen, but the system's overall functioning remains smooth

SOFR (99th percentile) minus fed funds rate (5d avg.)



Source: Haver Analytics, Goldman Sachs GIR.

Equity research views are expressed by James Yaro, an Equity Research Analyst covering advisors and investment banks, and large-cap banks; Macro research views are expressed by David Mericle, GS Chief US Economist and Vinay Viswanathan, GS mortgage strategist.

Q&A on US and European banks

Richard Ramsden, Chris Hallam, and Ryan Nash answer questions about the state of the US and European banking systems

Q: What led to the recent US bank stresses?

A: Over the course of the Covid pandemic, a combination of extraordinary fiscal stimulus and quantitative easing (QE) resulted in significant growth in the Fed's balance sheet, and therefore deposits in the financial system. Between March 2020 and December 2021, deposits in the financial system grew by around 25%, or $4tn. This deposit growth happened at a time when lending growth was anemic, so banks invested a significant share of the deposit inflows into securities; securities portfolios on banks' balance sheets grew by 48%, or $2tn, over the same period.

Against this backdrop, as the Fed started to tighten financial conditions last year both through short-term rate hikes and quantitative tightening (QT) to bring inflation under control, banks began to experience two key shifts. First, they faced deposit outflows—with deposits down around 10% from their peak—as companies found it more difficult to raise cash in a higher rate environment. Second, banks experienced significant unrealized losses on their securities books as the value of these securities fell as interest rates rose, resulting in losses of ~9% of total securities books as of 4Q22. Silicon Valley Bank (SVB) was the first major bank that sold securities and crystalized those losses to meet deposit outflows. A capital raise to cover these losses failed, and a significant run on deposits occurred, which resulted in the bank entering into FDIC receivership.

The FDIC's initial decision not to make all depositors whole led depositors more broadly to reassess counterparty risk for the first time since the Global Financial Crisis (GFC), resulting in deposits moving from the banking system into money market funds as well migrating to global systemically important banks (G-SIBs), which, given their higher capital and liquidity requirements, were deemed to be less risky.

Q: What makes this banking crisis different?

A: Most banking crises happen alongside concerns about a deteriorating macroeconomic backdrop, which leads to questions about credit quality and, in turn, the adequacy of bank capital. For example, in 2008 we estimate that US banks incurred close to $1.5tn of credit losses on loans and securities as asset values fell sharply and borrowers struggled to repay their loans, forcing banks to raise around $150bn of capital.

The current crisis is different in that it has occurred at a time when unemployment and default rates are very low. Net charge-offs for the banking system—the value of loans that are unlikely to be recovered—are close to 30-year lows, and the banking system appears very well capitalized. The cause of the current crisis has instead been a duration mismatch between the asset and liability sides of bank balance sheets. Whereas banks had very long duration assets, deposits turned out to be much shorter in duration than had been assumed. This is also the first banking crisis that is playing out in a digital age, in which the interplay between technology and social media is resulting in deposit runs happening much faster than in the past. For example, SVB lost 25% of its deposits in one morning, while First Republic Bank (FRC) lost around 58% of its uninsured deposits in approximately three days.

Q: Has the stress on the US banking system diminished recently?

A: The data paints a mixed picture. Banks have several ways of generating liquidity: (1) increasing deposits, which are their primary funding source, (2) accessing government funding facilities such as the Fed's discount window and the Bank Term Funding Program (BTFP), which allows banks to pledge eligible collateral at par (1yr term funding at a rate of 1yr OIS+10bp), (3) entering into repurchase agreements with their securities through the Fed's Reserve Repo Facility (RRP), and (4) pledging collateral to the Federal Home Loan Bank (FHLB).

On the positive side, borrowing from the Fed emergency lending facilities—the discount window and the BTFP—stabilized between March 15 and 22 and has since declined slightly over the week ending March 29, although usage of the discount window remains significantly elevated relative to pre-crisis levels. On the negative side, flows into money market mutual funds, a likely destination for outflows from bank deposits, were elevated at $120bn in the weeks of March 15 and 22, although fell to only $66bn in the week of March 29. Concerns around counterparty risk and the ability to earn higher yields have also led corporate treasurers to move deposits out of smaller banks. This is backed up by the Fed's H.8 release—that reports total deposits across the banking system—which showed that over the past two weeks on net, small bank deposits declined ~$190bn and large bank deposits declined ~$23bn, although we note that the data may have been impacted by certain banks being added or removed from the list. Despite this deposit migration, so far, we've seen increases in deposit pricing—one method of attracting deposits—mostly among credit unions and online banks, with regional banks increasing deposit rates only slightly, likely in part because raising deposit pricing could be interpreted as a sign of weakness by investors.

In addition, while FHLB borrowing—an indirect measure of the degree to which banks are turning to wholesale funding markets to meet liquidity needs—has fallen from around $380bn in the week of March 15 to around $80bn in the week of March 22, it remains elevated relative to history (annual FHLB issuance is normally around $400-600bn). On top of that, balances in RRP fell by $125bn the week of March 15, which suggests that banks' funding needs were large enough to drive FHLB issuance rates above what could be earned at the RRP, and money market fund investors may have rotated assets out of the RRP and into FHLB debt, driving liquidity into the banking system.

Q: What has been the regulatory response and how effective has it been?

A: So far, the regulatory response has consisted of the following: (1) an implicit guarantee on all deposits and (2) the creation of the BTFP. The response falls short of the blanket guarantee on deposits that the market seemed to have been looking for, which the FDIC doesn't have the legal authority to

explicitly grant and can only be done by Congress (see pgs. 18-19). Without a full guarantee, we believe that corporate treasurers are likely to continue shifting deposits either into money market funds or larger institutions, although we expect the speed of the migration will moderate, as some data suggests it may have begun to do. It's also still not clear if weaker institutions can be acquired by larger institutions outside of the FDIC process, given (1) the significant negative mark-to-market, and hence capital need, on fixed rate loans and securities that would occur in a transaction, (2) the President's Executive Order that instructs agencies to examine the impact of consolidation on competition, and (3) that the very largest banks (those with more than 10% of total industry deposits like BAC and JPM) are not permitted to acquire other banks without an exemption to go above the 10% cap.

Q: How vulnerable do other US banks in our coverage look at this point?

A: US G-SIBs don't look vulnerable. Post the GFC, these institutions have been forced to operate with considerably more capital, liquidity, and oversight than other institutions. Common Equity Tier 1 (CET1) capital ratios for G-SIBs average 12.3%, well above regulatory minimums, and tangible common equity to tangible assets (TCE/TA) ratios—a metric used to assess the health of banks—stand at 6%. While requiring G-SIBs to mark-to-market their held-to-maturity securities would result in CET1 ratios falling to 4.5% and TCE/TA ratios falling to an estimated 4.7%, these institutions are unlikely to experience the types of deposit outflows that could prompt the selling of such securities before they mature, given G-SIBs' lower risk profile.

Regional bank CET1 ratios average 9.5%, also well above regulatory minimums, and their TCE/TA ratios stand at 5.6%, with those only slightly falling to 5.1% after taking into account the full mark-to-market on held-to-maturity securities portfolios. All that said, until 1Q23 earnings results come in, it is difficult to know what the deposit migration has been from the regional banking system and if some of that liquidity will return once the crisis subsidies.

Q: Post the recent bank failures, are policymakers likely to enact tougher regulations on regional banks?

A: Currently, regional banks are subject to less onerous regulations in areas such as capital, stress testing, leverage, and liquidity (see pgs. 21, 28, and 29 for more details on the current state of US bank regulation and acronym definitions). Following the recent events, we expect regulators to look to enhance regulations on regional banks, with a focus on capital and liquidity for banks with less than $250bn in assets. In particular, we see potential for raising minimum capital requirements, no longer allowing regional banks to exclude AOCI from regulatory capital—which could result in Tier 1 common ratios for regional banks falling from 9.9% to 7.7%—and subjecting regional banks to LCR and NSFR requirements.

Q: How great has contagion been outside of the US, and is it likely contained at this point?

A: The market has put pressure on the weakest links in the banking system since the failure of SVB, with Credit Suisse (CS) being the most notable example. However, we believe that the European policy response has been successful in terms of limiting any further contagion into the European banking system from the US bank stresses. In many ways, the resolution to CS is a classic bank resolution, in which the troubled CS is being acquired by UBS and recapitalized through a combination of the full write-down of CS's ~$16bn of Additional Tier 1 (AT1) bonds and a $9bn government guarantee. While we saw some moderate European bank credit default swap (CDS) spread widening in the days following the announcement of the acquisition, we believe that some of this was driven by institutions looking to reduce counterparty exposure in the context of limited liquidity in the CDS market.

Q: Will the recent US and European bank crises impact bank lending and credit availability?

A: We expect the recent crises to impact the availability of credit in the real economy. Lending standards were already tightening heading into this banking crisis, and concerns around liquidity are likely to exacerbate those trends. While the impact will likely vary by product, we expect some pull back on banks' corporate lending, and, in particular, commercial real estate (CRE) lending. Much of this lending is conducted by banks with <$250bn in assets—indeed, we estimate that banks with <$250bn in assets hold ~75% of total domestic CRE loans on their balance sheets, although CRE as an asset class represents only 25% of total lending across the banking system. Deterioration in credit quality in CMBS pools already occurred in February (defaults in office CMBS were up 55bp MoM), and this trend could accelerate in coming months as lending availability continues to deteriorate (see pg. 24).

Other areas we think could be particularly impacted are residential mortgages and auto, which together make up a quarter of bank loan books. More broadly, our economists look for a 2.5% drag on the total stock of bank lending in the US (see pgs. 14-15) and a ~10pp tightening in European bank lending standards on the back of the recent crises, which will likely impact growth in both regions.

Richard Ramsden, Head of the Financials Group
Email: richard.ramsden@gs.com Goldman Sachs and Co. LLC
Tel: 212-357-9981

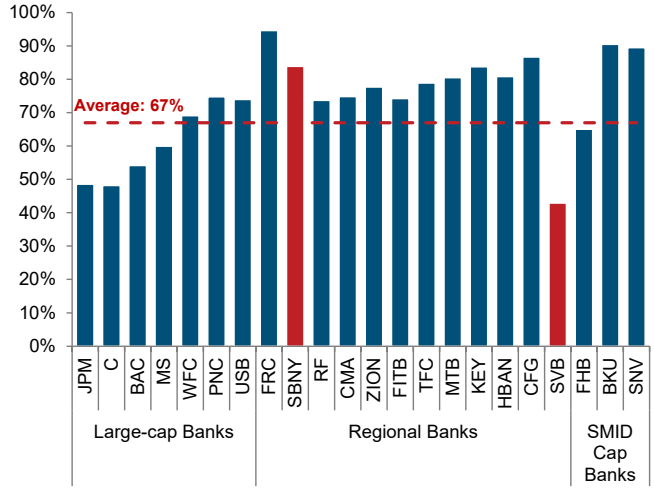
Chris Hallam, European Banks Equity Research Analyst
Email: chris.hallam@gs.com Goldman Sachs International
Tel: 44-20-7552-2958

Ryan Nash, US Regional Banks Equity Research Analyst
Email: ryan.nash@gs.com Goldman Sachs and Co. LLC
Tel: 212-902-8963

The state of US banks in pics

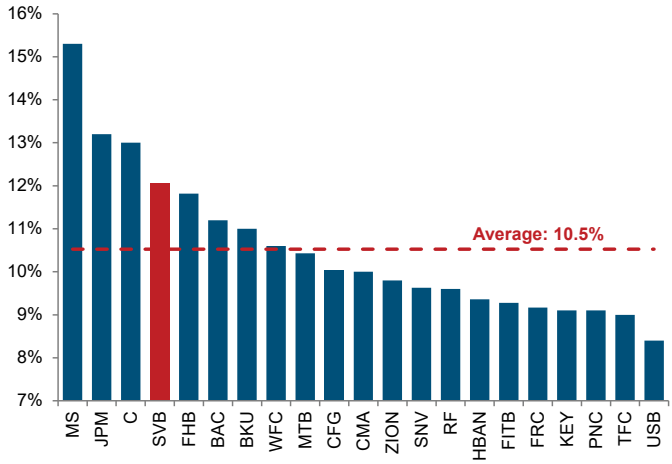
Funding positions are healthy: the average loan to deposit ratio is well below 100%, with Silicon Valley Bank's having been particularly low...

Loan to Deposit ratio (4Q22)



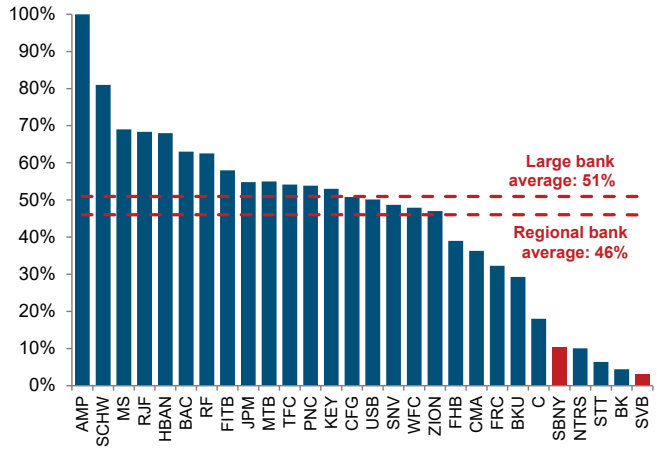
...and capital positions are sound: CET1 ratios are well above regulatory minimums, with Silicon Valley Bank's sitting at the higher end of the range

Common Equity Tier 1 (CET1) ratio (4Q22)



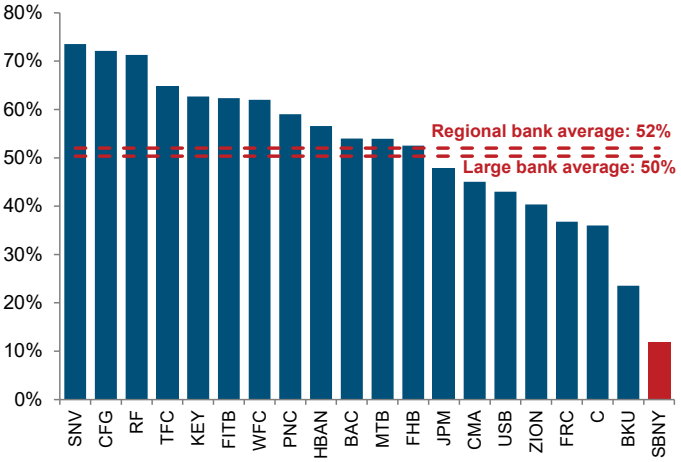
While significant deposit outflows precipitated the recent crisis, the risk of significant deposit flight looks relatively low, with roughly half of deposits being FDIC insured...

% of deposits that are FDIC insured (4Q22)



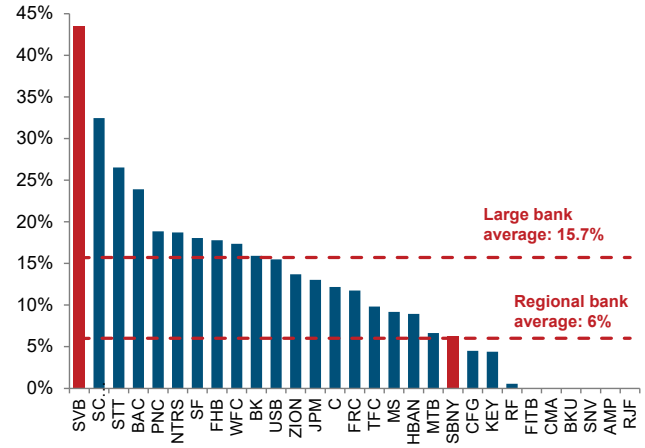
...and retail deposits, which are less prone to runs, account for around 50% of total deposits on average

GS estimated retail deposits as a % of total (4Q22)



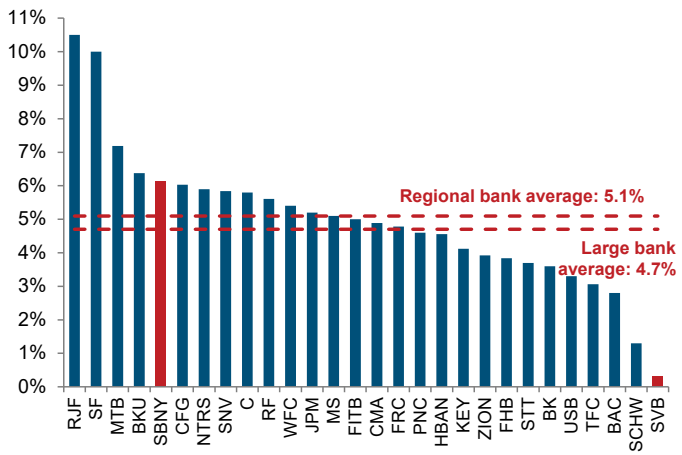
While held-to-maturity securities also played a large role, they generally account for small shares of banks' average earning assets, though some banks have relatively high shares...

HTM securities as a % of AEA (4Q22)



...even adjusted for rate-driven losses on HTM securities, regional and large banks' tangible common equity to tangible assets ratio is on average around 5%

TCE/TA adjusted for HTM unrealized losses (4Q22)



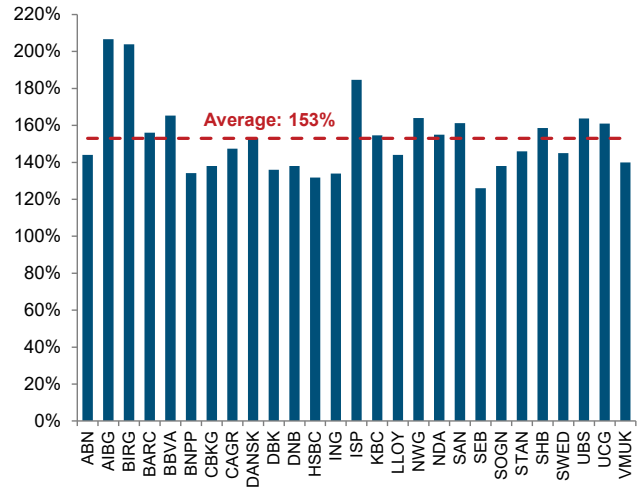
Source for all exhibits: Company data, SNL Financial, Goldman Sachs GIR.

Special thanks to GS US Banks analyst Will Miele for charts.

The state of European banks in pics

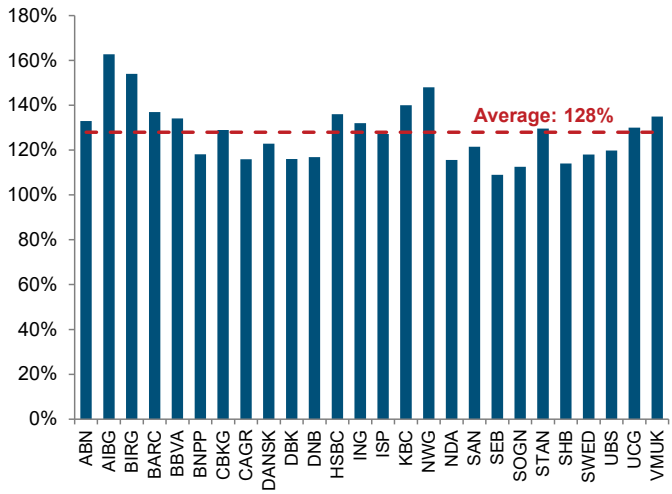
European banks are in a healthy position from a liquidity perspective

Liquidity Coverage Ratio (2022)



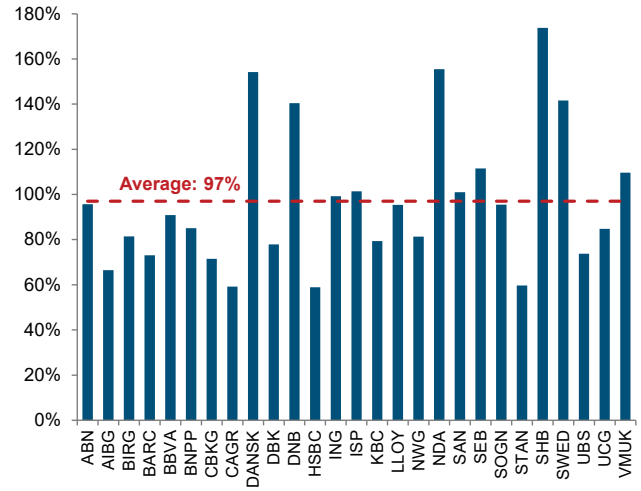
Funding positions are also healthy: the average funding ratio is well above 100%...

Net Stable Funding Ratio (2022)



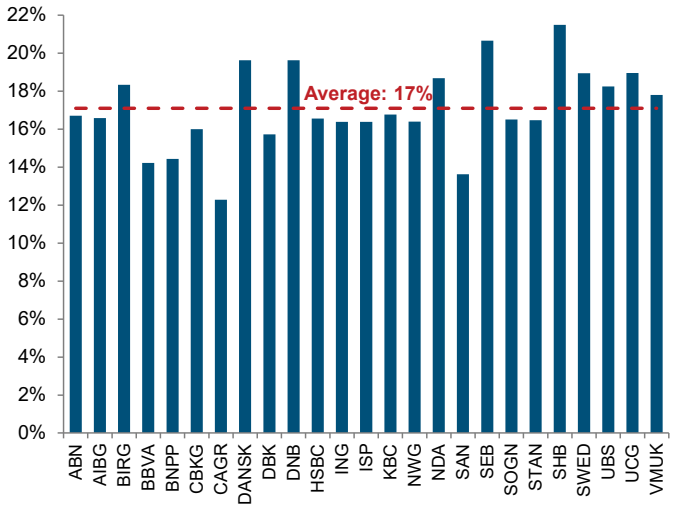
...and the average loan to deposit ratio is below 100%

Loan to Deposit ratio (2022)



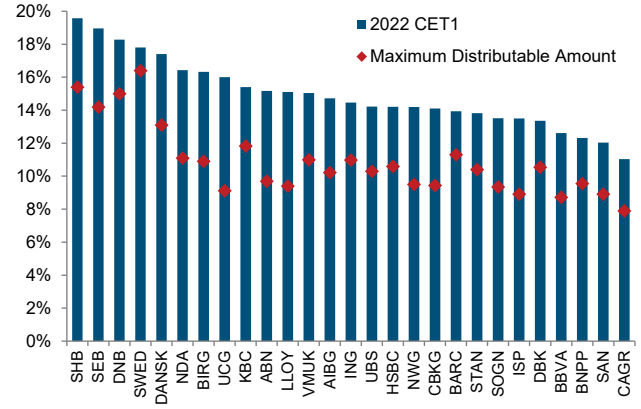
Capital positions are strong: Tier 1 capital ratios are high...

Tier 1 Capital Ratio (2022)



...and CET1 ratios are well above regulatory requirements...

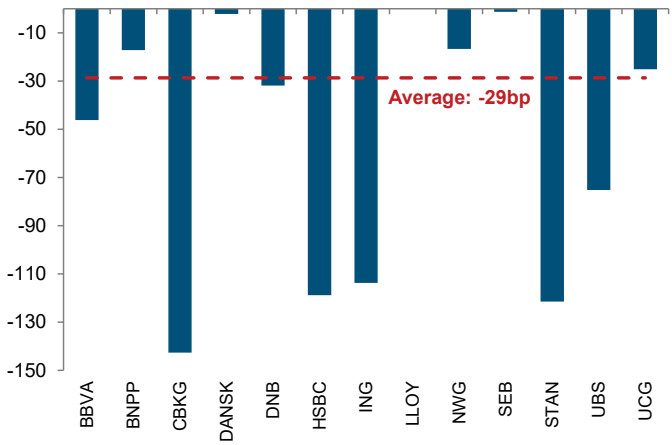
2022 CET1 ratio compared to regulatory requirement



Maximum Distributable Amount is the sum of the minimum capital requirement (Pillar I), the bank-specific capital requirement (Pillar II), and the Capital Requirements Directive (CRD) buffer requirement.

...with unrealized losses on held-to-maturity securities likely having only a limited impact on capital ratios

Est. impact to CET1 of unrealized losses on HTM securities, bp



Source for all exhibits: Company data, Goldman Sachs GIR.

Special thanks to GS Europe Banks analyst Patrik Nilsson for charts.

An economic headwind, not a hurricane

David Mericle and Manuel Abecasis assess the impact of recent small bank stress on lending, growth, and Fed policy

At the March FOMC meeting, both the statement and Chair Powell noted that recent stresses in the US banking sector are likely to result in tighter credit conditions, which will likely weigh on economic activity. While it is still too early to have a confident view on the implications of the banking turmoil for the US economy, we estimate that stress on small and midsize banks will result in a tightening of lending standards, which we think will impose a moderate drag on growth and could, in principle, substitute for some monetary policy tightening.

The current situation

Policy support to the banking sector has been aggressive (see pgs. 18-19), and the situation seems to have stabilized somewhat over the last week. Still, worries remain that the recent events have made large depositors such as corporate treasurers and wealthy individuals who are not fully protected by deposit insurance more concerned about risks at small and midsize banks, which could lead to continued outflows to larger banks and to alternatives to bank deposits like Treasury securities.

How serious is the problem at this point? Only regulators can see real-time changes in deposit levels at individual banks, but the data available to the public indicate that deposits have begun to migrate out of banks. Liquidity provision by the Federal Home Loan Banks (FHLBs), coupled with access to the discount window and the Fed's new Bank Term Funding Program, is helping banks meet their near-term needs, and banks have made use of these facilities to build up substantial cash positions. The extent of deposit outflows from small and midsize banks to large banks is less clear, and how far outflows will ultimately go is even less clear.

Accordingly, financial markets remain concerned about small and midsize banks. Although regional bank stock prices have recovered from their recent trough, the S&P regional banks ETF remains nearly a quarter below its level prior to the failure of Silicon Valley Bank (SVB).

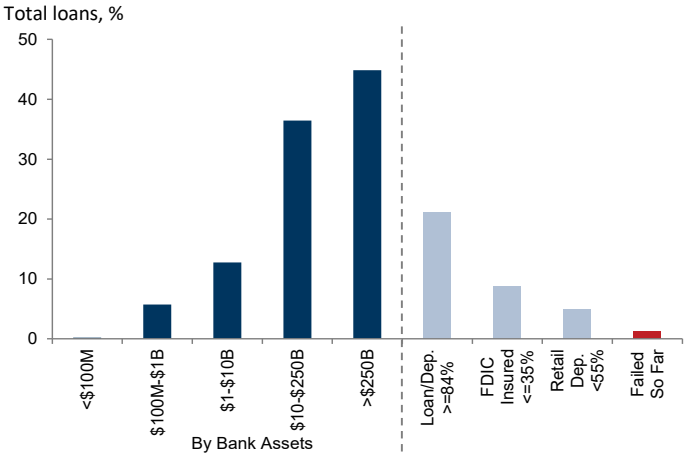
The role of small bank lending in the US economy

It is still too early to have a confident view on the implications of the recent banking turmoil for the US economy. Nevertheless, we know that small and medium-sized banks play an important role in the economy. Banks with less than $250bn in total assets account for around 50% of total commercial and industrial (C&I) bank lending and banks with less than 35% of deposits covered by FDIC insurance account for around 6%. Commercial and real estate (CRE) lending is even more exposed to smaller banks (see pg. 24), with banks with less than $250bn in total assets accounting for around 80% of total CRE bank lending and banks with low shares of FDIC-insured deposits accounting for 6%. Consumer lending is less exposed, as banks with less than $250bn in total assets account for around 45% of total consumer lending and banks with low shares of FDIC-insured deposits account for 1%.

By sector, we find that the manufacturing and commercial real estate industries account for nearly a third of bank borrowing, and the combined share is closer to 50% if including commercial real estate investment across other industries. Manufacturing and commercial real estate also account for a third of fixed investment GDP, which we expect to be disproportionately impacted by tighter lending standards.

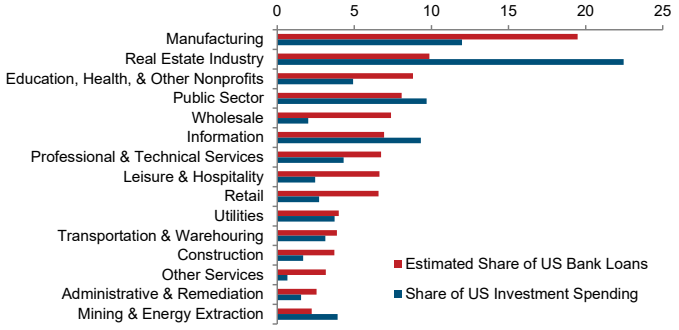
Encouragingly, though, we find a positive correlation across industries between bank-loan intensity and average firm size, which is important because larger firms tend to have greater access to alternative sources of capital. Other things equal, this means that the $16mn average firm size in the manufacturing sector argues for a relatively smaller drag on manufacturing capex.

Small and medium-sized banks account for ~55% of total loans



Source: Federal Deposit Insurance Corporation, Goldman Sachs GIR.

Manufacturing and CRE firms get nearly a third of bank lending



Note: Bank loan percentages reflect the average of: industry shares reported by regional banks (combined loan books of CFG, FITB, HBAN, KEY, MTB, RF, SNV, and ZION) and GS estimates using official data (Census Data Quarterly Financial Report for corporates and Federal Reserve Flow of Funds data for REITs and nonprofits). Data exclude loans to farms and to other banks. GDP and employment shares reflect 2022 data, investment shares reflect 2019 capital stock accounts as a percent of private and government fixed asset investment.

Source: Company data, Department of Labor, Department of Commerce, Federal Reserve Board, Goldman Sachs GIR.

Estimating the macroeconomic impact of small bank stress

We use two approaches to estimate the macroeconomic impact of small bank stress. In our first approach, we assume that small banks with a low share of FDIC-covered deposits reduce new lending by 40% and other small banks reduce new lending by 15%. We assume that large banks lend to some of the borrowers turned away by smaller banks but are a bit more conservative in their lending in general because of the heightened uncertainty of the economic environment, resulting in no net change in their lending. These assumptions imply a drag on the total stock of bank lending of just under 2.5%, or a bit over $300bn. We then use estimates of the elasticity of

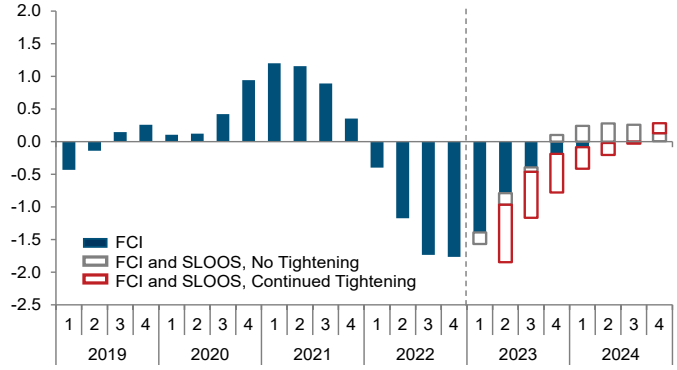
GDP to loan supply drawn from economic studies to estimate the impact on GDP[1]. This implies a drag on 2023 GDP growth of about 0.25% (Q4/Q4).

Second, we use the expanded version of our financial conditions growth impulse model that captures the effects of both changes in market-based financial conditions (as measured by our financial conditions index (FCI)) and changes in bank lending standards (as measured by the Fed's Senior Loan Officer Opinion Survey (SLOOS)). Changes in bank lending standards track subsequent changes in lending activity well, so this variable should also have a strong statistical connection with broader economic activity. We assume that bank lending standards will tighten more than during the dot-com crisis, but less than during the 2008 financial crisis or the height of the Covid pandemic. Our expanded FCI growth impulse model implies a growth drag of a further 0.5pp beyond that already implied by the lagged impact of the tightening in recent quarters. The estimates from these two approaches are consistent with findings from academic studies on the growth effects of falls in bank stock prices and accounting measures of equity capital.

We have also found that tighter lending standards have the largest impact on capex, and the tightening we assume implies an additional 3pp drag on capex in 2023 (Q4/Q4).

Our expanded FCI growth impulse model suggests that additional tightening in lending standards will subtract roughly 0.5pp from 2023 GDP growth...

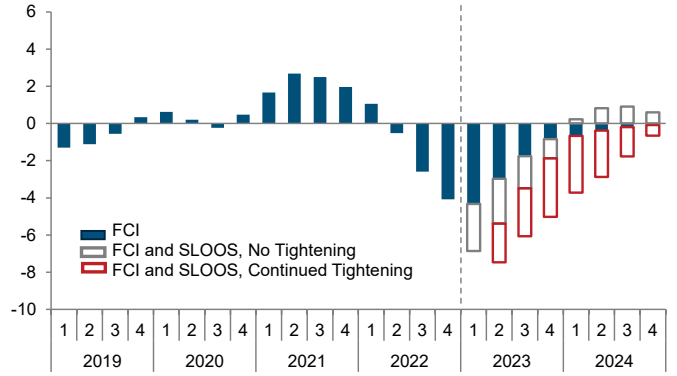
Annualized real GDP growth impulse, 3q centered moving average, pp



Source: Goldman Sachs GIR.

...and 3pp from capex growth

Annualized real capex growth impulse, 3q centered moving average, pp



Source: Goldman Sachs GIR.

Economic headwind, not hurricane

The impact of small bank stress is more likely to be a headwind, not a hurricane for economic growth, for several reasons. First, banks have already been tightening their lending standards since mid-2022, so the incremental impact of the recent turmoil on credit availability and growth should be much smaller than in a situation such as 2008 when the prior expansion was largely built on easy credit. Relatedly, the private sector runs a small financial surplus today, compared with a sizable deficit on the eve of the 2008 crisis. Second, we do not expect larger banks—which have higher capital and liquidity standards than smaller banks and are subject to more stringent stress tests—to reduce their loan supply further on the back of the recent turmoil. Third, unrealized losses on held-to-maturity government bond portfolios have diminished amid the recent rates market rally, another major difference with 2008 when problematic assets lost value during the crisis. Fourth, demand for credit in commercial real estate—where 80% of outstanding bank loans come from <$250bn asset banks—was already under pressure due to post-Covid changes in the real economy, so the incremental impact of reduced credit supply may end up being quite muted in that sector. And fifth, the multiplier effect should be low in an economy with excess demand for workers.

Fed implications

Unless bank stress significantly changes the economic outlook, the Fed's goal for the year will remain to keep demand growth positive but below potential in order to keep the rebalancing of supply and demand on track so that inflation eventually returns to the 2% target.

Earlier this winter, weak business confidence and the initial tightening in lending standards brought on by widespread recession fears helped to limit demand growth, sharing that burden with monetary policy tightening. Our analysis implies that incremental tightening in lending standards will also help to dampen demand somewhat, and could in principle substitute for some monetary policy tightening.

How many rate hikes would a tightening in lending standards be worth? Our rule of thumb is that 100bp in unanticipated rate hikes tends to tighten financial conditions by around 100bp on average, which reduces GDP growth over the next year by around 100bp. This means that our baseline estimates imply that banking stress and the resulting further tightening in lending standards would have the same impact on the economy as, and could substitute, for roughly 25-50bp tightening in our financial conditions index, around the amount one would expect from one to two 25bp rate hikes.

David Mericle, Chief US Economist

Email: david.mericle@gs.com *Goldman Sachs & Co. LLC*
Tel: 212-357-2619

Manuel Abecasis, US Economist

Email: manuel.abecasis@gs.com *Goldman Sachs & Co. LLC*
Tel: 212-902-8357

[1] The estimates of the elasticity of output to loan supply encompass a wide range, from Calomiris and Mason (2003), who estimate an elasticity of 0.45, to Ashcraft (2005), who estimates an elasticity of around 0.1, and Ashcraft (2003), who finds an elasticity close to zero. Peek and Rosengren (2000) estimate an elasticity of construction activity to changes in lending of 1.1. We deliberately use an elasticity from the lower end of the range of estimates, 0.1, because at a time when there is excess demand for workers, many of the workers who might have been employed by activities financed by these loans will instead find some other employment.

Interview with Gary Gorton

Gary Gorton is Frederick Frank Class of 1954 Professor of Finance at the Yale School of Management. He has authored numerous papers and books on bank panics, including *Slapped by the Invisible Hand: The Panic of 2007*. Below, he argues that insuring uninsured bank deposits would reduce the risk of bank runs, but that policymakers should focus on monitoring short-term debt—the root of financial crises—more broadly as well.

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

Jenny Grimberg: You've extensively studied US bank panics. Give us some context for why bank panics occur and how they evolve.

Gary Gorton: Banking panics, and, synonymously, financial crises, are due to bank runs. Banks are firms that issue short-term debt in various forms, and those forms of short-term debt are vulnerable to withdrawals or rollover failure. Bank runs have plagued market economies throughout history, in developed and emerging market economies, in countries with and without central banks and with and without deposit insurance. For a brief period in US history, 1934 to 2007, no bank panics occurred, because the dominant form of short-term debt was demand deposits, which were insured following the 1933 passage of nationwide deposit insurance. But the banking system morphed to be significantly more of a wholesale system starting in 2007; in 1984, around 75% of all bank deposits were insured, whereas today only around 50% are. Uninsured deposits are vulnerable to runs. That's no surprise to anyone, except apparently to the Fed.

Jenny Grimberg: So, is insuring uninsured deposits the answer to how to prevent bank panics?

Gary Gorton: Only two answers exist. One, backing short-term debt with high-quality collateral such as Treasuries. And two, insuring deposits, with the caveat that only transaction accounts—those with very low interest rates—should be insured. Households have checking accounts for transactional reasons, whereas some uninsured depositors, like companies, keep much more money in the bank than they need for transactions, which was clearly the case for SVB's largest depositors. Deposits that aren't required for transactions shouldn't be insured.

Jenny Grimberg: Backing deposits with Treasuries seems to have been the very thing that got Silicon Valley Bank (SVB) into trouble, because it faced large unrealized losses on these holdings as interest rates soared. So, should we really be encouraging more of this activity?

Gary Gorton: SVB's issue wasn't that it held Treasuries in its asset portfolio. In fact, it intended to hold those Treasuries to maturity, and if it had, those assets would've paid off. The problem was that its depositors became aware of and concerned about these large unrealized losses, which prompted a run on deposits so large that SVB was forced to sell assets to meet deposit outflows, thereby turning these unrealized losses into realized ones. Basically, if nobody knew what SVB held in its asset portfolio, the run on its deposits wouldn't have occurred. For all the focus on bank transparency, the reality is that banking traditionally has been an opaque business, and opacity in banking is desirable. A bank's asset portfolio should be something only its bank examiners see and monitor to prevent undue panic.

Jenny Grimberg: Some people have argued, though, that it's the responsibility of depositors to assess the banks they're putting money in. What's your view?

Gary Gorton: That argument, which would entail sending out call reports—quarterly reports of a bank's financial condition—to every American household, doesn't make sense and isn't going to work. Individual households don't know how to perform credit analysis, and call reports don't provide specific enough information in any case to accurately assess a bank's health. We're also not talking about investing in a portfolio or buying stocks but about money, which everyone needs for transactions. It makes no sense for you to write me a check and for me to say that I need a couple weeks to accept it because I must analyze your bank first. Large institutions that are more likely to have uninsured deposits, like many of SVB's depositors, may have more resources to be able to assess the health of the banks they utilize, but are also not experts in this area. It's no different than, say, how individuals and companies deal with the electrical grid—should I or my company study it because the power might go out? No. We have electrical grid experts for that, just as we have bank examiners.

Jenny Grimberg: Examiners from the San Francisco Fed reportedly issued warnings to SVB and placed the bank under supervisory review, yet the bank still failed. So, was this a failure of bank supervision?

Gary Gorton: We don't know what SVB was cited for by the San Francisco Fed examiners, and what—if any—actions the examiners took to remediate the problems, and we may never know because that information is proprietary. But the vulnerability of banks to a run on uninsured deposits doesn't seem to have been an area of focus for the Fed. And even if it was, they probably couldn't have done much about it—examiners can't dictate the amount of uninsured deposits that a bank can hold. But the Fed probably could've checked the bank's asset side more carefully to make sure it didn't have cracks that would cause uninsured depositors to run.

Jenny Grimberg: Has bank regulation—like Dodd-Frank—helped at all to reduce the system's vulnerability to the type of stresses that have recently played out?

Gary Gorton: No. The measures that Dodd-Frank implemented had nothing to do with bank runs. People look for excuses when the fact of the matter is that uninsured deposits are vulnerable to runs. It's that simple.

Jenny Grimberg: But could more regulation, like some of the proposals that came out of the recent Senate Banking Committee testimony, have prevented the recent stresses?

Gary Gorton: You can't solve every problem with higher capital and liquidity requirements. Amid huge demand for safe assets, not enough of them exist to back up all short-term debt. And so, requiring all short-term debt to be backed by such assets would drive short-term debt issuance into the private market. That's essentially what happened following the National Banking Acts of the 1860s, which required national banks to back their money with US Treasury bonds. Treasuries were in short supply, so a shadow banking system developed. That's a bad outcome; we shouldn't be adopting solutions that push risk out of the banking system. We've traditionally prevented that from happening through 'carrot and stick' bank regulation. The carrot was the profit that the limited number of "charter" banks permitted to operate in the regulated banking system earned, otherwise known as their 'charter value'. Banks had an incentive to behave because that charter value was significant and not worth jeopardizing. But we no longer have a carrot. Regulators now just beat banks with a stick every time something bad happens. That's not intelligent bank regulation.

Jenny Grimberg: Ultimately, who/what is really to blame for the recent bank stresses?

Gary Gorton: It's very easy to blame bank management. Anytime something bad happens at a financial firm, that seems to be the answer—the management was terrible, and they engaged in moral hazard. But that's not a satisfying explanation. I blame the general mindset of academics and policymakers, who seem to have no understanding of what a financial crisis is and what causes it—at root, financial crises are about short-term debt. But modern crises have obscured this underlying cause. The Global Financial Crisis (GFC) was a classic bank run. But because the run happened on trading floors, it wasn't observed by outsiders, who then only observed the *effects* of the run—bank bailouts and the so-called moral hazard that allegedly created—and incorrectly interpreted them as the *causes*, never mind that believing moral hazard to be the cause of financial crises doesn't explain why there were no financial crises between 1934 and 2007.

If policymakers actually understood that short-term debt was at the root of financial crises, they would go out and find it, and keep tabs on it. But that's the real challenge, because short-term debt comes in many forms. Repurchase agreements (repos), for example, grew into a large category of short-term debt over the last several decades. Variable denomination floating rate notes, which are retail products sold by non-financial firms like the financing arms of car companies that are redeemable on demand and pay interest based on the money market rate, are another form of short-term debt. The short-term debt at the root of the recent crisis was uninsured deposits, which, again, is why policymakers should very seriously consider insuring uninsured deposits.

> "At root, financial crises are about short-term debt."

Jenny Grimberg: Are you at all concerned, though, that doing so creates a moral hazard problem?

Gary Gorton: No. I don't think moral hazard problems exist. Some regulators and politicians seem to believe that banks are run by inherently evil people who turn up a risk dial on the wall whenever policymakers try to make the banking system safer. But I've done academic work on this, and I can't find any evidence of such moral hazard. I think it's a cheap out.

Jenny Grimberg: Unless policymakers insure uninsured deposits, should we expect to see more financial crises?

Gary Gorton: It's very likely. Financial crises are the norm in American history—the US has experienced a big financial crisis every decade or so. Policymakers could reduce the risk of bank runs if they insured uninsured deposits. But just insuring those and claiming victory over financial crises has proven wrong in the past. Remember that the short-term debt at the source of the GFC was repo, which underscores that the financial system, and with it the form of short-term debt, changes and evolves over time.

One form of short-term debt I'm particularly concerned about are stablecoins. I've argued that stablecoin issuers are equivalent to banks in that they both produce short-term debt. That makes stablecoins vulnerable to runs, and indeed we saw that with Tether during the recent crypto winter. But rather than reduce that vulnerability, and the systemic risk it creates when stablecoins are eventually integrated into the financial system, regulators have decided to seal crypto off from the banking system under the misguided notion that the crypto space is one homogenous, nefarious universe. So, they're creating the very systemic risk that they're trying to avoid.

Jenny Grimberg: So, what can policymakers do to make the financial system safer?

Gary Gorton: If I were a policymaker, I would do three things to make the banking system safer. One, again, I would seriously investigate insuring some uninsured deposits. Two, I would bring some crypto activities into the regulatory arena, for example by issuing fintech bank charters like the OCC originally did. And three, I would get serious about a central bank digital currency (CBDC), which wouldn't be vulnerable to runs and would eventually put stablecoins out of business. As I've said previously, stablecoins are really no different from the privately produced money of the pre-Civil War era, which led to bank runs and financial instability and eventually to the conclusion that the government should have a monopoly on circulating money. Why do we have to relearn that lesson? More broadly, I would again emphasize that to reduce the risk of financial crises, policymakers have to understand what causes them and monitor that—short-term debt, whatever new form it may come in.

Policy support for the banking system

Alec Phillips assesses the policy response to banking stresses so far and how it may evolve

As the US banking system has come under stress over the last few weeks, some small and mid-sized banks have faced deposit outflows triggered by concerns about unrealized losses on bank balance sheets. The policy response so far has taken two forms: (1) reassuring depositors by protecting all deposits in the two recent major bank closures and signaling similar treatment of any other near-term failures, and (2) increasing liquidity to banks so that they can handle deposit outflows in the event that they occur. While the risk of deposit flight looks lower than it did a few weeks ago, potential stabilization policies are still in focus given the unpredictability of depositor confidence. While an unlimited deposit guarantee could most effectively shore up depositor confidence, we think it's unlikely that the Treasury, Fed, or FDIC will be able to strengthen the FDIC's implicit guarantee beyond where it stands now, leaving Congress as the only plausible source of an explicit guarantee on uninsured deposits, although we see fairly low odds of congressional action.

No good options for executive action

The challenge confronting the Fed, Treasury, and FDIC is that while FDIC insurance for deposits less than $250k per bank (1) is explicit, (2) applies equally to FDIC-insured banks in all situations, and (3) requires no special approvals, none of the programs that could potentially protect deposits over $250k meet all three requirements:

Existing and potential federal deposit protections

	Agency	Source of funds*	Strength of Protection	Banks Covered	Extra approval needed
Deposits under $250k					
Standard policy ("Least Cost Method")	FDIC	DIF	Explicit	All banks	None
Deposits over $250k					
Standard policy ("Least Cost Method")	FDIC	DIF	Partial**	All banks	None
SRE	FDIC	DIF	Implicit	Closed banks only***	FDIC/Fed /Treasury
LED	FDIC	New fund	Explicit	All Banks	Congress****
Potential Treasury program	Treasury	ESF	Explicit	Participating banks	None
Raise $250k cap	FDIC	DIF	Explicit	All banks	Congress****

**The Deposit Insurance Fund (DIF) is funded via bank assessments; Exchange Stabilization Fund (ESF) consists of earnings on historical gold reserves, foreign currency, Treasury securities, and IMF Special Drawing Rights; a program under the LED would be funded via assessments on participating banks.*
***Protection of uninsured deposits depends on available assets after secured creditors and insured depositors have been made whole.*
****FDIC can use discretion to cover uninsured depositors on case-by-case basis.*
*****A liquidity event must be declared by the president and then face expedited vote in Congress; raising $250k limit would follow normal legislative process.*
Source: Bloomberg, Goldman Sachs GIR.

- **The Systemic Risk Exception (SRE):** The FDIC used its SRE to cover all Silicon Valley Bank (SVB) and Signature Bank deposits, insured and uninsured. Normally, the FDIC must use the least costly method of resolution but may take other steps if the least costly method would have "serious adverse effects on economic conditions or financial stability". However, this exception applies only to banks in FDIC receivership. While regulators have made it clear that any near-term bank failure would likely pose a systemic risk, the limits on this authority—namely, that it is a case-by-case determination made after a bank has been closed—have prevented regulators from using it to explicitly back all deposits. In essence, a de facto guarantee of all deposits exists, but it is implicit and comes with slight uncertainty due to the SRE's case-by-case nature. The challenge facing the banking system is that even a very small amount of uncertainty might not be acceptable to depositors when deposit alternatives exist.
- **The Liquidity Event Determination (LED):** The Dodd-Frank Act of 2010 repealed the FDIC's power to use the SRE to broadly backstop bank debt and uninsured deposits, as it did in 2008. Instead, the FDIC must use the LED process for a broad guarantee, but this has several disadvantages. First, and most importantly, the president must request congressional approval to use the LED. While Dodd-Frank lays out an expedited process to vote on approval, this nevertheless presents a major obstacle. Second, the current situation might not qualify as a "liquidity event" as defined in Dodd-Frank, which involves major market dysfunction. Third, the LED limits the FDIC to guaranteeing uninsured deposits held in non-interest-bearing transaction accounts. This could put smaller banks at a disadvantage if large banks decline to participate in the program and instead continue to pay interest on deposits. Given these disadvantages, it seems unlikely that the president would ask to cover deposits under this authority.
- **The Treasury Exchange Stabilization Fund (ESF):** The Treasury's broad discretion over how to use the ESF has put it into focus as a potential stabilization tool. Treasury used the ESF to backstop money market mutual funds (MMMFs) in 2008, and while Congress has blocked the ESF from future MMMF guarantees, it has not prohibited any other ESF-related activities. That said, we think it is unlikely that Treasury will take this route unless bank stress greatly worsens. In light of the pains the Biden Administration has taken to explain that its actions to date have not involved taxpayer funds, using Treasury funds could pose a high political hurdle. It would also seem to run counter to the intent of Congress, which specifically limited the FDIC's authority to explicitly back deposits above $250k (the FDIC has protected them on a case-by-case basis instead). It also seems unlikely that the Treasury could compel participation among all banks or levy mandatory assessments the way FDIC does. This could lead to an adverse selection issue, where participation in the program is limited to a subset of banks that are in greater need of insurance, which would raise the cost and further reduce demand for the insurance.

The upshot is that Biden, Powell, and Yellen have said virtually everything they can say about the FDIC's backing of uninsured deposits. Unless the Administration decides to use the ESF to establish a new program, this leaves any further deposit protection to Congress.

Will Congress act?

Launching a new program could avoid the above problems, but it would face an even greater obstacle: the need for bipartisan support in Congress. Currently, no consensus exists on what is needed. Congress is still primarily focused on bank regulatory changes to prevent similar failures, with less focus on deposit insurance reforms. The congressional calendar also works

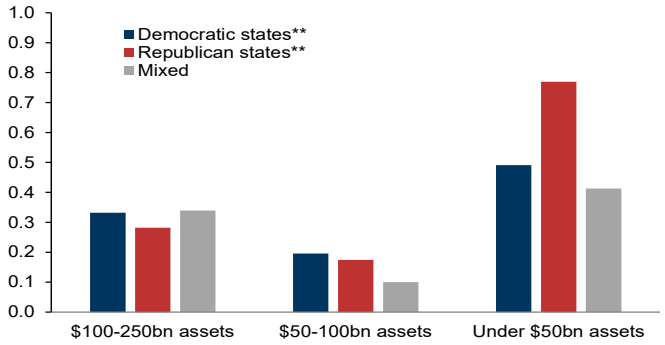
against quick action. The House and Senate will be in session at the same time for a total of eight days in each of April and May. The FDIC will issue a report on deposit insurance on May 1, so the issue is unlikely to move forward before then.

Expanding the deposit guarantee also faces some political opposition. While substantial public support exists for the Biden Administration's response to date, only a third of the public appears to believe that the current FDIC insurance limit of $250k should be raised. The House Freedom Caucus has publicly opposed unlimited deposit guarantees—including the FDIC's use of the SRE—and its 40-plus members could deny Republicans a majority on any vote. While potential Democratic support for deposit insurance changes might render the Freedom Caucus' support unnecessary for banking legislation, House Republican leaders might want to avoid conflict within the party ahead of potentially more important debates like raising the debt limit.

That said, while Republican lawmakers have, on average, been more skeptical of changes to deposit insurance, they disproportionately represent states with higher concentrations of uninsured deposits at small banks.

Republicans represent states with a higher concentration of uninsured deposits at small banks

Uninsured deposits by bank headquarter state*, $tn



*Excludes DE&UT based banks with few deposits from branches in those states.
**States with more than 2/3 of congressional delegation from one party.
Source: Bloomberg, Goldman Sachs GIR.

While a quick legislative solution seems unlikely, there are some reasons to believe Congress might attempt to modify deposit insurance over the medium term. The limit was last raised in 2010 and is not indexed to inflation, so the amount is likely due for a periodic increase. And as the FDIC has essentially established an ex-post unlimited guarantee, Congress could make it explicit without adding to the cost (whether congressional budget scorekeepers would see it this way is another question).

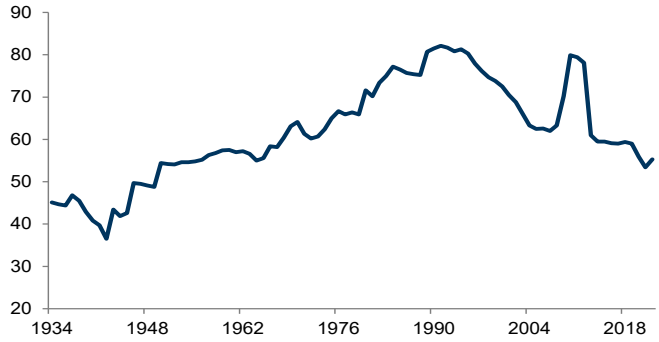
However, even medium-term reform faces some obstacles. First, any deposit insurance reforms that Congress passes would likely also include new regulatory policies. Conditioning deposit insurance expansion on regulatory changes would lower the odds of passage, although how much lower would depend on the particular regulatory changes on the table.

Second, no consensus exists on how much the deposit insurance limit should rise, whether an expansion should target particular types of accounts or depositors, and who should pay for it. At the moment, the greatest support seems to be around additional coverage for non-interest-bearing transaction accounts, as many of these deposits are assumed to be business accounts used for paying employees and suppliers (non-interest-bearing accounts represent $4.7tn in deposits and transaction accounts represent $6.1tn). Raising the limit on non-interest-bearing transaction accounts in 2009 cut uninsured deposits roughly in half. That said, the insured deposit share also rose during the 1980s despite a fall in the real value of the deposit insurance limit, likely the result of increasing depositor attention to bank risk and the advantage of staying below the FDIC limit at each bank. Even without policy changes, the uninsured share of bank deposits seems likely to fall given the recent events.

Insuring all deposits seems even less likely. Even during the financial crisis, the temporary unlimited deposit insurance stopped short of covering all deposits. Furthermore, limiting coverage to non-interest-bearing accounts would still leave trillions of dollars of deposits uninsured. While it is not entirely clear whom the more than $9tn in uninsured deposits in the banking system belong to, data from the Fed's Z.1 (Flow of Funds) report implies that much of it is not just business checking accounts. And even if we assume that every dollar of deposits belonging to businesses and state/local governments is uninsured (this could not be true since the first $250k of even very large deposits is insured), this would still leave around half of uninsured deposits likely belonging to high-net-worth households. While many of these deposits might not be at small and mid-sized banks, this is among the many reasons that Congress is likely to hesitate in insuring all deposits.

Even during the financial crisis, not all deposits were insured

FDIC-insured share of domestic deposits, percent



Source: FDIC, Goldman Sachs GIR.

Fed data imply that much of the more than $9tn in uninsured deposits is not just business checking accounts

Federal Reserve Z.1 Flow of Funds data, $bn

	Checkable Deposits	Time Deposit & Saving	Total Deposits
Household	4,548	10,403	14,951
Top 1% net wealth			3,868
90-99th percentile net wealth			5,618
50-90th percentile net wealth			4,771
Below 50th percentile net wealth			694
Noncorporate business*	356	1,335	1,691
Corporate non financial business*	1,067	292	1,358
Financial companies and funds*	441	716	1,158
State/Local (incl retirement)	383	370	753
Foreign	83	702	785
Total	**6,879**	**13,818**	**20,696**

*Business checkable assets include currency; we adjust the checkable deposit figures to account for this.
Source: Bloomberg, Goldman Sachs GIR.

Alec Phillips, Chief US Political Economist

Email: alec.phillips@gs.com *Goldman Sachs & Co. LLC*
Tel: 202-637-3746

A history of US bank regulation

1782-1913: "WILDCAT" BANKING AND FREQUENT CRISES

Recessions and bank panics occur frequently. Between the 1830s and 1864, bank regulation is extremely lax and varies widely by state. Thereafter, a dual system evolves, with regulation and chartering at the federal and state levels.

1782: The first chartered US bank opens to help finance the Revolutionary War.

1792: Credit crisis leads to bank runs.

1796: Land speculation bubble bursts, businesses fail.

1791-1811: First Bank of the USA effectively serves as the country's first central bank. It holds gold and silver reserves and acts as a lender of last resort to state banks. In 1811, the bank's charter is allowed to expire amid political opposition to the perceived concentration of power at the federal level. Following a similar experience with another federal charter, banking is left entirely to the states.

1819: The Second Bank of the US calls in its loans. Many banks fail.

1837: Bank runs lead to failures of several banks over the following years.

1857: Overextension of banks to finance railroad construction. Hundreds of banks fail.

1863-64: The government faces new financing pressures during the Civil War. Congress establishes a single national currency. The Office of the Comptroller of the Currency is created to handle federal chartering, administer regular bank examinations, and collect data more frequently from banks.

1873: Reckless expansion during post-Civil War booms leads to broad bank failures.

1893: Panic occurs after a railroad company declares bankruptcy.

1901: Stock market crashes after short selling of Northern Pacific Railroad.

1907: A failed attempt by speculators to corner the market on a mining company's stock leads to the collapse of the country's third-largest trust company and a massive bank panic. These events provide the impetus for establishing a central bank.

1907: NYSE crashes, leading to a run on banks. Thousands of businesses fail.

1913: The Federal Reserve is established, with regulatory authority over national banks as well as any state banks that are members of the Fed.

1781 1791 1801 1811 1821 1831 1841 1851 1861 1871 1881 1891 1901 1911

1913-1980: NEW RULES, RESTRICTIONS, REPORTING

Bank regulation becomes more rigorous, particularly in the wake of the Great Depression. The Fed's powers expand. Bank crises become far less frequent. Restrictions limit bank branching and activities, albeit with major loopholes.

1927: The McFadden Act allows national banks to establish branches in the state where they are headquartered, under states' terms for state banks. National banks often face resistance from states and local communities.

1929-39: Great Depression. Stock market crashes and there are widespread bank failures.

1933-35: The Glass-Steagall Act separates commercial and investment banking, grants the Fed additional powers, and establishes the Federal Deposit Insurance Corporation in an effort to prevent bank runs. Congress establishes the Securities and Exchange Commission. "Regulation Q" prohibits banks from paying interest on demand deposits and caps interest rates on deposits.[1]

1956: The Bank Holding Company (BHC) Act grants the Fed new powers to regulate BHCs and control their geographic expansion. BHCs are required to divest non-bank operations. However, banks exploit loopholes in the act until legislation closes them in 1970 and 1987.

1966: Interest-rate ceilings are applied to thrift institutions.

1978: International Banking Act applies domestic bank regulation to any foreign banks operating in the US.

Late 1970s: Regulators ease interest-rate ceilings on some deposits amid rising inflation and market interest rates. In 1980, Congress decides to phase out the ceilings over the course of several years.

1913 1918 1923 1928 1933 1938 1943 1948 1953 1958 1963 1968 1973 1978

1980S-PRESENT: REGULATORY SWINGS

Deregulation paves the way for the savings and loan (S&L) crisis. Relaxation of old rules enables industry consolidation. The 2008 crisis prompts a new wave of reforms. Along the way, regulation adjusts to increased securitization and globalization. In 2018, regulation eases again as parts of Dodd-Frank are rolled back.

Early 1980s: Restrictions on interstate banking are relaxed. Thrift institutions, under pressure from asset-liability mismatch, are permitted to expand their activities. International debt crises prompt capital adequacy requirements.

1986-96: Falling property values trigger Savings and Loan crisis. Hundreds of institutions fail.

Late 1980s-early 1990s: Regulation is tightened again following the S&L crisis.

1987: The Fed eases Glass-Steagall by allowing some large commercial banks to underwrite securities.

1988: Basel I sets international capital standards.

1994: Riegle-Neal Act removes remaining restrictions on interstate banking/branching, opening the door for increased M&A.

1999: Gramm-Leach-Bliley Act removes the separation of commercial and investment banking established by Glass-Steagall.

2000: Commodity Futures Modernization Act removes most over-the-counter derivatives from regulation by the Commodity Futures Trading Commission.

2004: Basel II rules encourage banks to grow and diversify.

2007-2008: Global Financial Crisis (GFC). Subprime mortgage crisis. Bear Stearns bailout. Lehman Brothers failure.

2010: Basel III increases capital requirements and introduces new liquidity rules.

2010: Congress passes complex and far-reaching financial-market reforms under the Dodd-Frank Act.

2017: Treasury Department releases recommendations for regulatory rollback.

2018: Trump Administration rolls back parts of 2010 Dodd-Frank Act for small and medium sized banks.

2023: President Biden calls for tighter bank regulation in the wake of the largest bank collapse since the GFC.

1980 1985 1990 1995 2000 2005 2010 2015 2020

Denotes major bank panic/crisis

[1] These restrictions were aimed at encouraging banks to provide credit to their communities rather than invest it with larger banks. They also sought to prevent banks from competing up the rates paid on deposits, which was thought to encourage riskier activity to compensate for the hit to profits. The ban on paying interest on demand deposits remained in effect until 2011.

Source: Dean Anderson, "Summing it Up: A Brief History of the Economy, Regulations and Bank Data," Federal Reserve Bank of Atlanta, December 6, 2016; FDIC; Federal Reserve History; compiled by Goldman Sachs GIR.

Which banks, what rules?

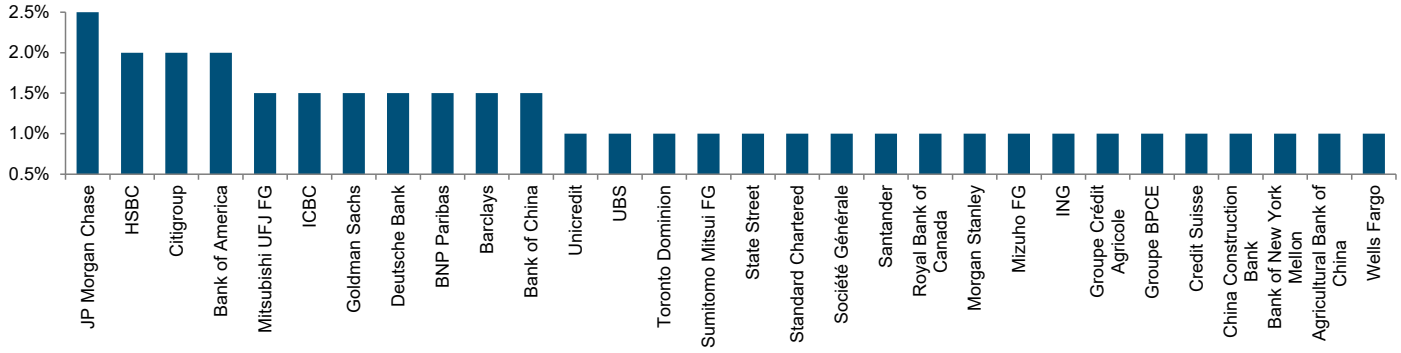
Which US banks are subject to which regulatory requirements?

Category	Category I	Category II	Category III	Category IV	Other
Thresholds	US G-SIBs	≥$700bn in assets or ≥$75bn in cross-jurisdictional activity	≥$250bn in assets or ≥$100bn in assets and ≥$75bn weighted short-term wholesale funding, nonbank assets, or off-balance-sheet exposure	$100bn to $250bn in assets	$50bn to $100bn in assets
Banks	BAC, BK, C, GS, JPM, MS, STT, WFC	NTRS	COF, SCHW, PNC, USB, TFC	ALLY, AXP, CFG, DFS, FITB, HBAN, KEY, MTB, RF	CMA, SNV, RJF, ZION
Capital	G-SIB surcharge				
	TLAC				
	Required to recognize elements of AOCI in regulatory capital	Required to recognize elements of AOCI in regulatory capital	May opt out of recognizing AOCI in regulatory capital	May opt out of recognizing AOCI in regulatory capital	May opt out of recognizing AOCI in regulatory capital
	Countercyclical capital buffer	Countercyclical capital buffer	Countercyclical capital buffer		
	Advanced and Standardized Approach to calculating risk-based capital ratios	Advanced (except for US Intermediate Holding Companies) and Standardized Approach to calculating risk-based capital ratios	Standardized Approach to calculating risk-based capital ratios	Standardized Approach to calculating risk-based capital ratios	Standardized Approach to calculating risk-based capital ratios
	Stress Capital Buffer	Stress Capital Buffer	Stress Capital Buffer	Stress Capital Buffer	
Stress testing	Annual company run stress tests	Annual company run stress tests	Company run stress tests every other year		
	Annual CCAR	Annual CCAR	Annual CCAR	CCAR every other year	
	Annual capital plan submission	Annual capital plan submission	Annual capital plan submission	Annual capital plan submission	
Leverage	Enhanced SLR	SLR	SLR		
	US leverage ratio	US leverage ratio	US leverage ratio	US leverage ratio	US leverage ratio
Liquidity	Full LCR	Full LCR	Full LCR for banks w/ ≥$75bn weighted short-term wholesale funding, reduced LCR for <$75bn (85% of full)	Reduced LCR for banks w/ between $50bn and $75bn in weighted short-term wholesale funding (70% of full LCR), no LCR for <$50bn	
	Full NSFR	Full NSFR	Full NSFR for banks w/ ≥$75bn weighted short-term wholesale funding, reduced NSFR for <$75bn (85% of full)	Reduced NSFR for banks with between $50bn and $75bn weighted short-term wholesale funding (70% of full LCR), no NSFR for <$50bn	
	Resolution planning				

Note: For detailed acronym and term definitions, see "A snapshot of global banking regulation" exhibit on pgs. 28-29.
Source: Federal Reserve, US Department of Treasury, Goldman Sachs GIR.

Which global banks are considered systemically important?

Financial Stability Board/Basel Committee on Banking Supervion's Nov 2022 global list of G-SIBs by additional common equity capital requirement as a % of risk-weighted assets (effective beginning Jan 1, 2024).



Note: UBS has announced the acquisition of Credit Suisse, subject to certain regulatory approvals and customary closing conditions; the Fed has its own set of capital requirements for US G-SIBs.
Source: Financial Stability Board, Goldman Sachs GIR.

Special thanks to GS Europe Banks analyst Benjamin Caven-Roberts for chart.

The market impact of bank stress

Dominic Wilson and Vickie Chang explore the cross-asset implications of recent bank stress

At a high level, the cross-asset implications of the recent US banking turmoil depend on the amount of growth damage from the resulting credit tightening, and how much credit restraint substitutes for the monetary policy tightening that otherwise would have occurred. In this context, a key challenge is to understand what markets are pricing, and what looks most mispriced relative to our views. Against our baseline expectation for moderate growth damage, rates at first glance appear to be pricing a larger hit to growth than equities. We believe that this seeming disconnect owes to the market pricing a significant credit crunch whose growth impact will be heavily concentrated on smaller businesses, with larger firms likely to experience a smaller growth hit while also benefitting from less restrictive policy. This would suggest that the shifts in rates and US-linked EM currencies are likely unsustainable, and that equities look vulnerable to both growth and policy risks.

Our baseline: moderate growth hit, low systemic shock risk…

Our baseline view is that the risk of a sharp systemic shock remains relatively low. The main risk is that banks, especially smaller ones, will tighten their lending standards, which will weigh on economic growth. While the extent of that impact remains highly uncertain, our economists expect a total US growth drag from tighter lending conditions of 0.25-0.5pp this year, which they estimate would substitute for 25-50bp of Fed rate hikes that would otherwise have been needed to keep growth below potential (see pgs. 14-15). Our frameworks suggest that such a growth shift would result in modest declines in equities, yields, and commodity prices, although given the range of possible outcomes, markets are probably also worrying about a much larger downside tail risk than this central case.

Comparing actual asset performance vs. the estimated asset market impacts of our base case and a recession case shows different assets aligned with different growth scenarios

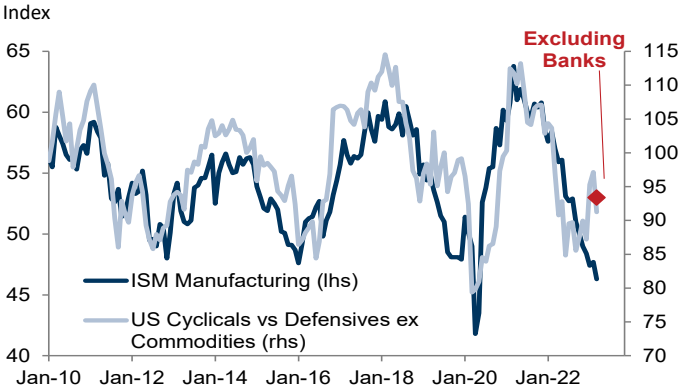
	Actual: Mar 8 - Mar 31	Moderate US growth impact	US recession scenario
S&P 500	2.9%	-3.5%	-17%
Russell 2000	-4.1%	-4.6%	-22%
Nasdaq 100	7.9%	-3.6%	-18%
KBW Bank Index	-21.1%	-5.4%	-25%
Eurostoxx 50	0.6%	-2.1%	-14%
HSCEI Index	3.6%	-0.3%	-7%
Nikkei 225	-5.3%	-2.6%	-14%
Cyclicals/Defensives	-3.7%	-1.0%	-6.0%
VIX	-2.1%	19.8%	168%
EUR/USD	2.9%	0.6%	1.1%
JPY/USD	3.4%	0.8%	4.1%
MXN/USD	-0.1%	-0.9%	-6.1%
Gold	8.2%	0.8%	1.9%
CDX IG	1bp	8bp	54bp
CDX HY	8bp	54bp	366bp
UST 2y	-104bp	-30bp	-92bp
UST 5y	-78bp	-27bp	-103bp
UST 10y	-52bp	-20bp	-56bp

Source: Bloomberg, Goldman Sachs GIR.

…but markets tell a more complicated story

When we compare the expected cross-asset footprint of a moderate US growth downgrade with the actual shifts in markets since just before banking system stresses intensified sharply (March 8), the differences across asset classes are striking. The S&P 500 has fallen, but by less than our base case growth impact would normally suggest, while the Nasdaq has risen. In contrast, the shifts in US rates and parts of EM FX are much closer in magnitude to the predicted moves from a recessionary-level hit to US growth.

US cyclical equities have underperformed, but are still not pricing recessionary outcomes



Source: Bloomberg, Goldman Sachs GIR.

Squaring the circle: a concentrated sectoral growth hit…

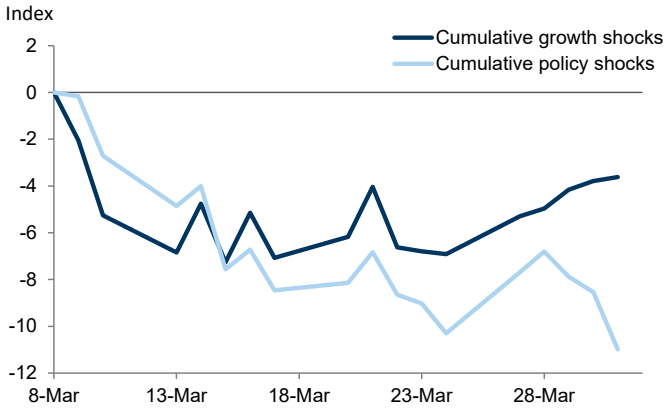
One potential conclusion from these moves is that recent market stresses have caused a significant disconnect between rates and equity markets. At first glance, the moves in rates, including the pricing of Fed cuts as soon as June, look consistent with a large hit to growth, and in equities, a smaller one.

While positioning may have played a role in the seeming dislocation, we think the market is pricing a more nuanced story—one that reflects a concentrated sectoral growth hit. If the growth drag is concentrated in smaller regional banks and their borrowers (smaller businesses, commercial real estate borrowers, and their suppliers), then it may be felt unevenly across the economy even if the aggregate growth impact is significant. Other areas of the economy, including larger companies who may maintain access to bank credit and public markets (and perhaps consumer relative to commercial borrowers) might then escape with less growth damage. In addition, as the Fed likely shifts towards easier policy relative to the counterfactual as tighter credit conditions substitute for rate hikes, the benefits of a less restrictive policy path are likely to accrue to all. If the listed sector is heavily comprised of those who are not in the eye of the storm, then they may experience a smaller growth hit while benefitting from lower rates.

…could mean more persistent dispersion across assets…

This is a version of the broader phenomenon of financial crises where more resilient areas of the economy can benefit from easier policy on the back of someone else's growth problem. Through the lens of the framework above, rates and commodities may face the larger aggregate growth shock to the economy, while the listed equity sector on average may feel a more modest growth shock accompanied by an easier policy path.

Markets pricing negative growth shock and dovish policy shock

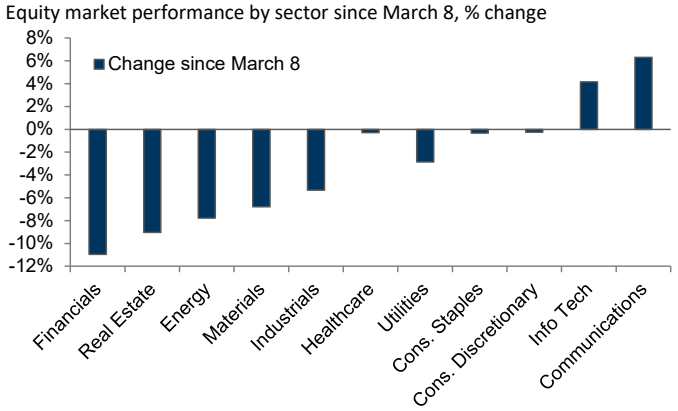


Source: Bloomberg, Goldman Sachs GIR.

In other words, substituting regional bank credit tightening for Fed tightening as the source of growth pressure on the economy may lead to unusually large differences in the distribution of that impact and its cross-asset footprint. Indeed, credit tightening (without a recession) suggests US Dollar weakness, unlike the monetary policy tightening that it is substituting for, given that tighter credit conditions lower the expected real rate of return on domestic assets, deterring portfolio flows and weakening the currency.

The dispersion of sector performance within the equity market also provides some support for this idea. Banks, commodity sectors, some industrial cyclicals, and small-cap stocks have all underperformed recently while defensive sectors and less cyclical "growth" companies have generally outperformed and, in many cases, have moved higher since the regional bank crisis began. In this scenario in which distributional differences across shocks accounts for the cross-asset "disconnect", the dispersion across assets, and the dramatic underperformance of parts of the equity market, could prove persistent.

Sectoral dispersion lends support to the idea that the market may be pricing a very uneven sectoral growth shock



Source: Bloomberg, Goldman Sachs GIR.

...but watch for spillover risks

However, under this interpretation, maintaining current pricing relies on a narrow balancing act. To justify the size of the rate and commodity declines, the aggregate hit to GDP growth would still need to be much larger than in our central case. But given the assumption in this explanation that pressures would be disproportionately felt by one part of the economy, this implies a very large hit to those sectors, and the larger that hit, the harder it is to be confident that its effect will not spill over into the broader economy, especially as small businesses play a large role in driving growth and employment.

Too much weight on big growth shock with low spillovers

Given that the notion of a concentrated sectoral growth shock and aggregate economy-wide easing seems to best fit the cross-asset footprint, we draw four broad market conclusions:

1. Unless the amount of the credit restraint and the resulting growth damage ultimately proves larger than we expect, the shifts in rates (especially at the front end) and US-linked EM currencies are unlikely to be sustainable, and the market has likely overshot in these areas. Indeed, markets have already retraced some of these moves in recent days.
2. With rates markets already pricing the imminent end of the Fed tightening cycle and the Fed projecting a material growth slowdown, we think yields at current levels are vulnerable to better data. But the lower rate profile could persist in the short term, as the market and/or the Fed may not push back meaningfully on more dovish pricing over that period. In that case, equities might lead the way higher with rates following later, and market-based financial conditions could ease more in the near term.
3. The equity outlook is more complicated. If growth damage is modest, as in our base case, and the market relaxes about underlying growth risks, equities might experience some cyclical relief, but will face pressure from higher rates. In such a scenario, the outperformance of tech and defensive areas is likely to unwind somewhat. If the growth damage is larger, but heavily concentrated in the "small-cap US economy", it might be possible to justify resilient equity prices in less-affected areas that benefit from a less hawkish Fed. However, if a sharper hit to growth challenges the assumption that spillovers to other parts of the economy can remain limited, it remains safer to position for downside in areas more directly affected by credit problems—ongoing decompression in credit indices, small-cap equities and suppliers to small businesses relative to larger ones, weak balance sheet companies relative to stronger ones, industrial cyclicals relative to consumer-related areas, and commercial real estate relative to residential property (see pg. 24).
4. While we have more sympathy for continued segmentation in pricing within the US, the divergence being priced between the US and the rest of the world is more open to challenge. For instance, we think some of the relative cyclical resilience in Europe is more open to challenge, and that sovereign credit is likely to underperform there as a result. And whereas the US yield curve has also steepened sharply, as would be expected with the market pricing a higher chance of imminent easing, and would steepen further in a recession, 1y1y European rates have more room to rally than their US counterparts at this juncture.

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

Commercial Real Estate: Bad timing

Lotfi Karoui and Vinay Viswanathan assess vulnerabilities in Commercial Real Estate (CRE)

While stress in the banking sector has abated, the active role of small and regional banks as lenders to commercial properties continues to fuel concerns about the outlook for the Commercial Real Estate (CRE) market, especially for the office sector. The prospect of lingering pressure on bank balance sheets could not be more ill-timed for the CRE sector, as it adds to an already long list of secular and cyclical challenges. We expect office loan delinquencies to materially increase, but think this is unlikely to lead to systemic risk given healthier fundamentals in other CRE subsectors, as well as other credit markets.

A growing list of challenges for the CRE sector

CRE borrowers have been facing three key headwinds: (1) growing downward pressure on net operating income, driven by declining appraisal values and, in some cases, increasing vacancy rates; (2) higher refinancing costs; (3) a greater sensitivity to floating rate debt relative to past cycles.

Office properties are a particular area of concern. Total office utilization is less than half of the pre-Covid levels, and vacancy rates have increased to 13% according to CoStar data. This backdrop has materially pressured rents and leasing activity for office landlords, with office appraisal values falling by 25% over the past year, including a 10% decline in February alone. As such, the aggregate level of leverage for office borrowers has grown substantially, with office properties now accounting for ~30% of total commercial mortgage debt vs. only ~20% of total CRE asset value. These figures will likely deteriorate further as more firms let office leases expire to reduce costs.

A greater sensitivity of interest expenses to floating rate structures relative to previous cycles has also weighed on office profitability. Floating rate mortgages grew notably in the aftermath of the pandemic; in 2021, 45% of commercial mortgage originations had a floating base rate, up from below 10% in 2011. While many borrowers likely bought hedges to protect against rising interest rates, these hedges need to be reset, which is a costly proposition in the current environment. That said, other property types have proved more resilient. While apartment vacancy rates have risen and rent growth has moderated, large rent increases over the prior three years put them in a position of strength. Occupancy and rental income for industrial and retail properties have also remained strong.

Add reduced credit availability to the list

The CRE market is naturally dependent on leverage, giving banks an instrumental role in facilitating transactions. Over half of the $5.6tn of CRE loans outstanding are owned by banks, with small banks capturing a much larger share than large banks—70% of bank commercial mortgage holdings sit outside of the top 25 largest banks (by assets). The potential for disruptions to US CRE activity from a pullback in small bank credit availability is therefore substantial, unaided by the fact that the segments most dependent on bank financing—offices and retail properties—are also facing the strongest risk of functional obsolescence.

While banks are likely to manage capital more conservatively going forward, the incremental impact of such a shift may be smoother than expected given the sharp tightening in lending standards that banks have already reported based on survey data. That said, we expect delinquencies on office loans to materially increase from today's low levels, given rising interest expenses, elevated near-term refinancing needs, and declining occupancy rates. Collectively, these headwinds will likely force office landlords to lower rents and/or accept lower square footage from tenants as old leases expire.

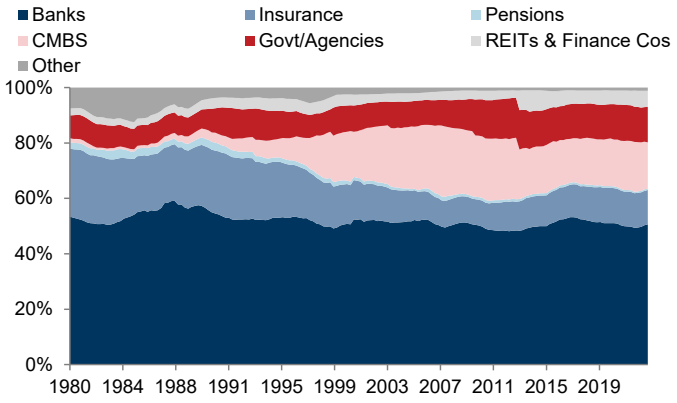
Front-loaded losses from CRE loans, limited systemic risk

The timing and the magnitude of bank losses stemming from delinquent CRE loans relative to previous cycles remain uncertain. The history of recent decades suggests losses on CRE loans typically follow a multiyear process. For example, losses on the 2007 vintage of commercial loan mortgages started to accelerate almost three years later in 2010. This lag reflects the time-consuming nature of the process that takes place between the default event (i.e., when a borrower stops servicing debt) and when the collateral is liquidated. Considering today's greater vulnerability of borrowers to higher funding costs, we see risks for a more front-loaded path for losses relative to the aftermath of the Global Financial Crisis as the pressure from both reduced credit availability and falling net operating income could provide greater incentives for borrowers to default "strategically".

For smaller banks that have disproportionate exposure to these losses and are already in focus in the wake of the recent bank turmoil, this outlook means more pressure on balance sheets and a contraction of credit availability in the broader economy. The profitability of large money center banks will also likely be impacted, but their more diversified business mixes suggest the net impact will likely be manageable. More importantly, we think the risk of a vicious circle of large leveraged losses and undercapitalized balance sheets that would pose a threat to financial stability is still limited, given healthier fundamentals in other CRE subsectors such as apartment and industrial properties, as well as in other parts of credit markets.

Banks hold over half of the overall stock of CRE loans

Ownership structure of the CRE loan market



Source: Federal Reserve Board, Goldman Sachs GIR.

Lotfi Karoui, Chief Credit Strategist

Email: lotfi.karoui@gs.com *Goldman Sachs & Co. LLC*
Tel: 917-343-1548

Vinay Viswanathan, Mortgage Strategist

Email: vinay.viswanathan@gs.com *Goldman Sachs & Co. LLC*
Tel: 212-934-7099

Central bank policy snapshot

	What have they done?	What have they said?	What do we expect?
FED	**Federal funds rate: 4.75%-5.00%** • The Fed has increased the federal funds rate target range by 475bp since the start of 2022. • The Fed, working with the US Treasury, announced the Bank Term Funding Program (BTFP), which provides advances of up to one year to any federally insured bank that is eligible for discount window access, in return for eligible collateral.	**March FOMC Statement** (3/22/2023) • "The U.S. banking system is sound and resilient. Recent developments are likely to result in tighter credit conditions for households and businesses and to weigh on economic activity, hiring, and inflation. The extent of these effects is uncertain. The Committee remains highly attentive to inflation risks." • "The Committee anticipates that some additional policy firming may be appropriate in order to attain a stance of monetary policy that is sufficiently restrictive to return inflation to 2 percent over time." **Jay Powell** (3/22/2023) • "… the Federal Reserve, working with the Treasury Department and the FDIC, took decisive actions to protect the U.S. economy and to strengthen public confidence in our banking system. These actions demonstrate that all depositors' savings and the banking system are safe." • "We remain committed to bring inflation back down to our 2 percent goal and to keep longer-term inflation expectations well anchored." • "…the events of the last two weeks are likely to result in some tightening credit conditions... Such a tightening in financial conditions would work in the same direction as rate tightening… you can think of it as being the equivalent of a rate hike or perhaps more than that."	• We expect the Fed to deliver 25bp hikes in May and June for a peak funds rate of 5.25-5.50%.
ECB	**Deposit facility rate: 3.00%** • The ECB has increased their deposit rate by 350bp since it began raising rates in July 2022. • The ECB started capped APP run-off of €15bn/month in March, which will run through June.	**Christine Lagarde** (3/16/2023) • "We are monitoring current market tensions closely and stand ready to respond as necessary to preserve price stability and financial stability in the euro area. The Euro area banking sector is resilient, with strong capital and liquidity positions. In any case, our policy toolkit is fully equipped to provide liquidity support to the Euro area financial system if needed and to preserve the smooth transmission of monetary policy." • "The elevated level of uncertainty reinforces the importance of a data-dependent approach to our policy rate decisions, which will be determined by our assessment of the inflation outlook." • "Inflation is projected to remain too high for too long."	• We expect the ECB to deliver 25bp hikes in May and June for a terminal rate of 3.5%. • We expect the ECB to end reinvestments completely after June and move to fully passive balance sheet run-off.
BOE	**Bank Rate: 4.25%** • The BoE has increased their deposit rate by 415bp since it began raising rates in December 2021.	**March Policy Statement** (3/23/2023) • "The UK banking system maintains robust capital and strong liquidity positions and is well placed to continue supporting the economy in a wide range of economic scenarios, including in a period of higher interest rates… the UK banking system remains resilient." • "The MPC will continue to monitor closely any effects on the credit conditions faced by households and businesses, and hence the impact on the macroeconomic and inflation outlook." • "The MPC will continue to monitor closely indications of persistent inflationary pressures, including the tightness of labor market conditions and the behavior of wage growth and services inflation. If there were to be evidence of more persistent pressures, then further tightening in monetary policy would be required."	• We do not expect the BoE to deliver any more rate hikes this year and expect the terminal rate will remain at 4.25%.

Source: Federal Reserve, European Central Bank, Bank of England, Goldman Sachs GIR.

Price stability vs. financial stability

George Cole assesses whether price stability and financial stability objectives can be pursued separately, finding that it depends on the nature of the financial stability problem

Since the outbreak of financial market turmoil, including bank failures and takeovers on both sides of the Atlantic, major central banks including the Fed, ECB, and BoE have all raised rates. So far, despite shifting more cautious on the macro outlook as a result of a potential tightening in credit conditions, central banks have been fairly confident about their ability to reduce risks in the financial system with little cost to the real economy, and at the same time continue their fight against inflation via high rates. Indeed, the ECB has been the most explicit, with President Lagarde stating that "there is no trade-off between price stability and financial stability… As we have proven many times, we are able to set the appropriate policy stance to control inflation and at the same time use other instruments to address risks to monetary policy transmission."

In practice, however, there is no neat division between either the problem set or the instruments for dealing with inflation and financial stability. From the Global Financial Crisis (GFC) to the pandemic, the financial stability and inflation objectives of the Fed and other major central banks pointed in the same direction, generally requiring low interest rates and substantial liquidity injections. Low interest rates designed to raise inflation aided with financial stability and instruments traditionally deployed for financial stability, such as liquidity provision, loans, and asset purchases, became key monetary policy tools. But since the resurgence of inflation starting in 2021, monetary policy and financial stability objectives may come into tension as rates rise and central bank balance sheets shrink. The experience in Europe over the last decade helps shed light on when and how the 'separation principle' can operate successfully, and when it cannot, which ultimately seems to depend on the nature of the financial stability problem.

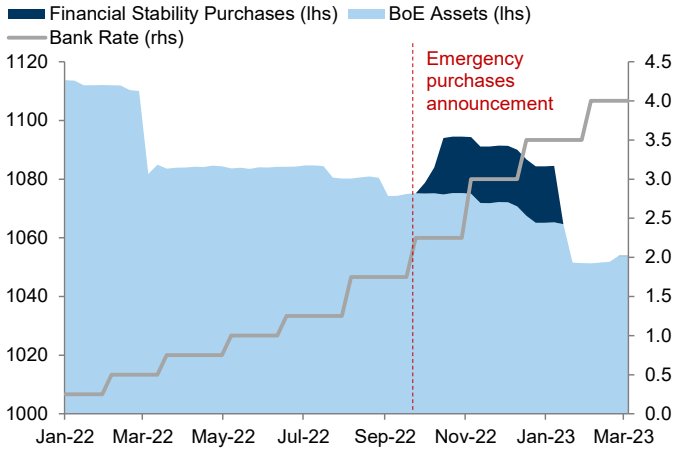
The recent BoE experience: a successful separation

The BoE's recent experience with the LDI-driven bond market selloff is most recent example of a central bank facing this tension. In September 2022, a surprise expansion of the UK budget catalysed a Gilt market selloff that began to spiral as leveraged positions in the LDI pension community unwound. The need to raise cash for margin calls led to more selling, and Gilt market volatility was only arrested when the BoE announced an emergency asset purchase programme on September 28 and a term-repo liquidity facility on October 10. The return to asset purchases occurred despite inflation of around 10%, and did not prevent the BoE from continuing its sequence of rate hikes at each policy meeting. Optically then, this seems like a successful example of the separation between a financial stability operation—in this case to restore market functioning to the Gilt market and provide liquidity indirectly to pension funds—and the need to combat higher inflation through tighter policy. Not only did the BoE continue to hike rates, but they commenced asset sales-- including fully divesting the emergency purchases—over subsequent months.

What features allowed this to succeed? First, the root of the problem was a liquidity crisis, not a solvency crisis. Indeed, higher rates implied that defined-benefit pension liabilities were falling faster than the assets were losing value. Second, despite growth expectations falling due to higher natural gas prices, inflation expectations were extremely elevated. Of course, growth expectations endured a negative impact as higher rates weighed on the housing market, which was already in motion given the hiking cycle, but accelerated as rates sold off. But the catalyst for the Gilt selloff was a significant increase in government spending that supported household income. Finally, although stress in the pension system could potentially have had negative consequences for both the financial system and household expectations of lifetime wealth, there was no imminent shock to incomes, credit, or cash availability, as there may be during periods of banking stress. Together, this meant that the BoE was not only able to hike rates, but also accelerate the tightening path in response to high inflation expectations.

BoE emergency asset purchases didn't stop hikes

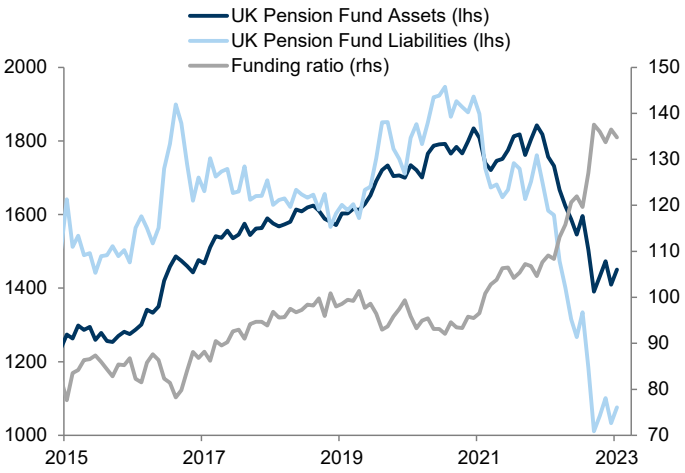
BoE balance sheet (£bn, lhs); BoE Bank Rate (%, rhs)



Source: Bank of England, Goldman Sachs GIR.

LDI crisis driven by liquidity, not by solvency

Assets and liabilities of UK pension funds (£bn, lhs); funding ratio (%, rhs)



Source: Haver Analytics, Goldman Sachs GIR.

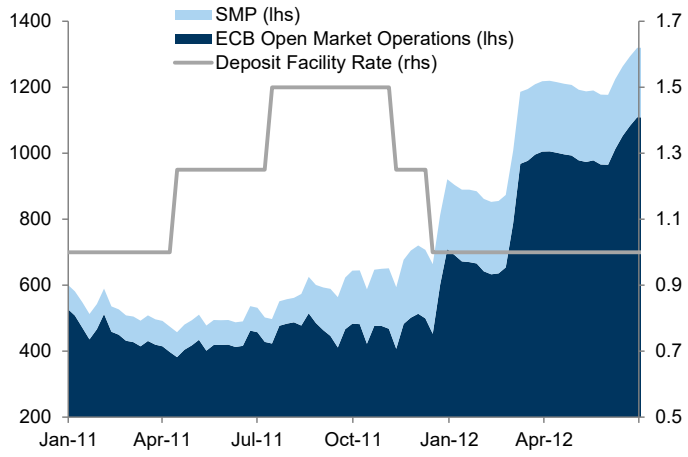
The 2011 ECB experience: a failed separation

In contrast, the ECB in 2011 provides an example of an attempted separation of financial stability and monetary policy that failed. In the aftermath of the GFC and at the beginning of the European sovereign debt crisis, the ECB responded to high

headline inflation with two rate hikes in April and July 2011, despite a steady trend wider in sovereign credit spreads and lower in bank stocks between the two meetings. During this time, the ECB was conducting fixed rate full allotment lending operations to banks, as well as purchases of sovereign bonds under its Securities Markets Programme (SMP).

ECB hiked in 2011 alongside SMP

ECB balance sheet (€bn, lhs); ECB Deposit Facility rate (%, rhs)

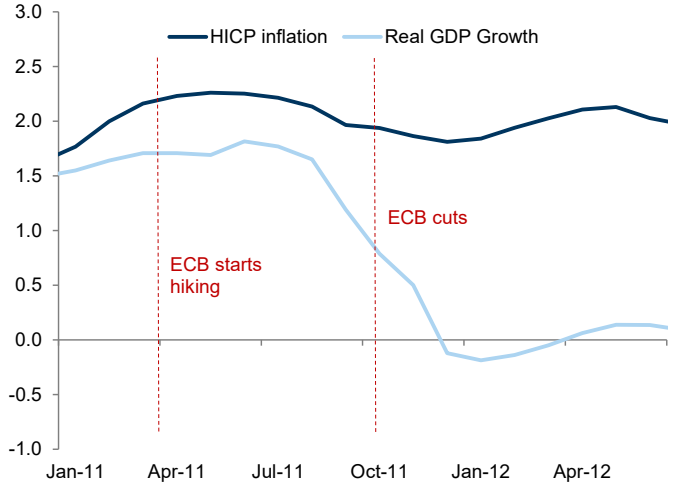


Source: ECB, Goldman Sachs GIR.

Unlike for the BoE, the issue was not purely one of liquidity, but solvency of sovereign governments (which remained uncertain until area-wide backstops were put in place throughout 2011 and 2012, culminating in the ECB's Outright Monetary Transactions (OMT) programme). Liquidity provision to banks and scattergun bond purchases under the SMP proved insufficient to insulate the real economy. Over time, financial conditions continued to tighten, ultimately affecting bank lending and thus macroeconomic expectations, with both growth and inflation expectations falling from mid-2011. Rate cuts—including into negative territory—and asset purchases were ultimately needed on top of liquidity provision.

Deteriorating growth and low inflation expectations ended hikes

Consensus Economics: Euro area 1y ahead expectations, %



Source: Consensus Economics, Goldman Sachs GIR.

All about the nature of the financial stability problem

The key takeaway from these experiences is that the ability to separate financial stability and monetary policy objectives depends on the nature of the financial stability problem. Liquidity issues are easier to keep separate from monetary policy imperatives than solvency issues, because they can be dealt with effectively using balance sheet policy such as term funding. Of course, liquidity and solvency issues are themselves linked, especially if assets need to be sold at a deep discount during periods of liquidity stress. But that is where early and substantial balance sheet intervention from central banks can sever the link between liquidity and solvency and insulate the broader financial system and economy from greater risks. It is more challenging to maintain the separation when solvency issues begin to negatively affect the macroeconomic outlook, even if the starting point of the economy is strong.

Central banks likely to be able to maintain the separation between monetary policy and financial stability, for now

In the current episode, both our forecasts and central bank actions suggest the impact on the macroeconomy from a higher cost of capital for banks is not yet big enough to reverse the tightening delivered so far this cycle. We expect further hikes from the ECB and the Fed, even though aggressive front-loading through 50bp hikes is now much less likely. This suggests that although the macro outlook is less rosy, central banks will maintain the separation between monetary policy and financial stability for now. The Fed will continue to offer liquidity through its Bank Term Funding Program, which offers funding at par against high-quality collateral such as Treasuries.

This liquidity provision can occur alongside high rates (and low market value for bonds) because there is little concern about the underlying credit quality of the asset—after all, even if a 30-year US Treasury trades well below par, it will pay the full face value upon maturity. However, if credit quality begins to deteriorate in riskier assets due to higher policy rates, such as real estate loans, it will begin to be more difficult to sustain generous liquidity provision without also lowering the policy rate. That is, when higher rates begin to widen credit premia across the economy, central banks will find it harder to separate monetary policy from financial stability.

George Cole, Head of European Rates Strategy

Email: george.cole@gs.com *Goldman Sachs International*
Tel: 44-20-7552-1214

A snapshot of global banking regulation

CAPITAL

Basel	**Basel Framework**[2] A set of standards for banking supervision developed by the **Basel Committee on Banking Supervision (BCBS)**, a body established in 1974 by the governors of G10 central banks that has since expanded to include representatives from 28 member economies. The committee's efforts to establish international standards for capital adequacy led to the 1988 Basel Capital Accord, now known as Basel I, which called for banks to meet a **risk-based capital requirement**, i.e., to maintain a minimum ratio of capital to **risk-weighted assets (RWA)** of 8%. The Basel framework has since evolved to include expanded capital rules and new supervisory processes under Basel II (released in 2004)—which includes the **Advanced Approaches** capital framework requiring large banks to use more complex procedures to model risk—Basel III (released in 2010), and finalized Basel III post-crisis reforms, informally known as "Basel IV" (published in 2017). Regulators in member economies are responsible for adopting Basel standards nationally; implementation and timelines vary by country.
Basel III	**Basel III** The latest set of bank rules issued by the BCBS. Basel III is intended to enhance bank governance, risk management, and transparency, as well as improve the banking sector's resilience to shocks. Basel III has increased risk-based capital requirements: While the minimum ratio for total capital to RWA remains 8%, the ratio for **Tier 1 capital**—a category of high-quality capital consisting of common stock, disclosed reserves, and some forms of preferred stock—has increased to 6% from 4% previously. Basel III has also introduced a new requirement for **Common Equity Tier 1 (CET1) capital**—the highest-quality capital, calculated as the sum of common shares and stock surplus, retained earnings, accumulated other comprehensive income (AOCI), qualifying minority interest, and regulatory adjustments—of 4.5% at minimum. Basel III also calls for capital "buffers" above the minimum capital ratios. Banks that fail to maintain a mandatory 2.5% **capital conservation buffer** made of up common equity will face restrictions on capital distributions and discretionary bonuses. National regulators may also impose a **countercyclical buffer** requirement of up to 2.5% if and when they deem aggregate credit growth to be excessive. Aside from more stringent capital requirements, Basel III introduced new rules intended to limit excessive bank leverage and strengthen banks' liquidity profiles (see leverage ratio, liquidity coverage ratio, and net stable funding ratio below). Basel III post-crisis reforms include revised standardized and internal ratings-based approaches for credit risk, revisions to the credit valuation adjustment (CVA) framework, a revised standardized approach for operational risk, revisions to the measurement of the leverage ratio and a leverage ratio buffer for G-SIBs (see below), and an aggregate output floor.
G-SIB Framework	**Global Systemically Important Bank (G-SIB) Framework** A 2011 Basel framework calling for additional capital buffers for **global systemically important banks (G-SIBs)**, sometimes called the G-SIB surcharge. The framework demands additional CET1 capital ranging from 1.0% to 2.5% of RWA; each bank falls into a "bucket" within this range based on its systemic importance, taking into account size, interconnectedness, cross-border activity, substitutability, and complexity. An "empty" bucket of 3.5% exists to deter banks from becoming more systemically important. This upper bound can increase over time if systemic importance scores go up. Currently, Basel designates 30 banks as systemically important. The Fed has its own set of G-SIB requirements for US firms.
TLAC	**Total Loss-Absorbing Capacity (TLAC)** A standard issued by the Financial Stability Board (FSB), an international body that works closely with the BCBS, to ensure that G-SIBs can absorb losses before/during resolution and perform critical functions without resorting to taxpayer support or impeding financial stability. The FSB initially required a minimum TLAC equal to 16% of RWA, which rose to 18% in January 2022.
Leverage Ratio	**Leverage Ratio** A component of Basel III that sets a 3% minimum for **Tier 1 capital** as a share of non-RWA. The leverage ratio is agnostic between high- and low-risk assets, which may incentivize banks to step away from lower-risk, lower-return businesses. Banks began disclosing ratios to national supervisors in 2015. The United States has introduced **supplementary leverage ratios (SLR)** that bring the minimum total leverage ratio requirements to 5% for bank holding companies and 6% for their insured depository institutions.
CCAR	**Comprehensive Capital Analysis and Review (CCAR)** The Federal Reserve's process for evaluating the capital planning and capital adequacy of the 34 largest bank holding companies (BHCs), including their ability to withstand stress. BHCs prepare and submit capital plans to the Fed on an annual or every-other-year basis, depending on size (see pg. 21 for details) providing details on their implementation of capital adequacy standards and a forward-looking assessment of their capital positions. For example, BHCs must disclose plans for dividend payments, share repurchases, or other decisions that could affect their capital. The Fed may object to a bank's capital plan, at which point the bank will resubmit a revised version. CCAR has been conducted since 2011. The Fed conducts Dodd-Frank Act supervisory stress testing (DFAST) in parallel with CCAR to assess banks' resilience in the face of hypothetical adverse economic scenarios. BHCs also conduct their own tests under these scenarios.
Stress Capital Buffer	**Stress Capital Buffer (SCB)** The Federal Reserve requires large banks to hold enough capital to cover stress test losses and dividends or 2.5% of RWA, whichever is larger. The SCB was created in 2020. The SCB replaces the capital conservation buffer in the ratio in which it is applied (US Standardized).

Sources for both pages of this guide: Bank for International Settlements and Basel Committee on Banking Supervision, Federal Reserve Board, US Securities and Exchange Commission, US Department of the Treasury, Financial Conduct Authority, European Securities and Markets Authority, Goldman Sachs GIR.

[2] Unless otherwise noted, requirements and dates of implementation refer to Basel guidelines. National implementation may differ.

LIQUIDITY

LCR	**Liquidity Coverage Ratio (LCR)** A component of Basel III aimed at improving banks' short-term resilience to liquidity risks. The LCR requires banks to hold enough **high-quality liquid assets (HQLA)** to cover their total net cash outflows over a 30-day stress scenario involving a market shock. HQLA consist of cash or assets that can be converted into cash with little or no loss in value, with Level 1 HQLA being the safest and most liquid (e.g., cash deposited at central banks, sovereign debt). Less liquid Level 2 assets are limited to 40% of total HQLA and must be valued net of haircuts of up to 50% that reflect potential losses under the stress scenario. The BCBS calls for banks to report their LCR to national supervisors at least monthly and potentially weekly or daily. The BCBS has recommended that national regulators allow the LCR to temporarily fall below 100% during severe market stress. The LCR was phased in gradually, beginning with a 60% minimum in 2015 and increasing in 10% increments to reach 100% in 2019. The US began with an 80% minimum in 2015 and was fully phased in by 2017, although banks under $250bn in assets were exempted from/subjected to a less stringent LCR as part of the 2018 Economic Growth, Regulatory Relief and Consumer Protection Act (see "Dodd-Frank" below).
NSFR	**Net Stable Funding Requirement (NSFR)** A component of Basel III aimed at strengthening banks' liquidity profiles over a longer term by ensuring they have adequate stable funding to cover at least 100% of the stable funding they require over a one-year period. Stable funding is based on a weighted calculation that considers the maturity of a bank's liabilities and the likelihood of its funding sources being withdrawn. The required amount of stable funding is based on the tenor, quality, and liquidity of bank assets. The NSFR came into full force in 2018, though banks under $250bn in assets were exempted from/subjected to a less stringent NSFR in the 2018 Act.
CLAR	**Comprehensive Liquidity Analysis and Review (CLAR)** The Federal Reserve's process for assessing banks' liquidity profiles. CLAR was first implemented in 2012 for a group of SIBs. It includes a liquidity stress test and an assessment of the bank's liquidity planning processes (e.g., its approach to managing a liquidity crisis).
Resolution Planning	**Resolution Planning** **The Dodd-Frank Wall Street Reform and Consumer Protection Act** (see below) requires large banks to submit resolution plans to the Federal Reserve and FDIC. Each plan, commonly referred to as a living will, must describe the company's strategy for rapid and orderly resolution in the event of material financial distress or company failure. For many US banks, resolution planning is the binding liquidity constraint.

ACTIVITY

Credit Limits	**Single-Counterparty Credit Limits** Rules intended to limit bank interconnectedness—particularly among **systemically important financial institutions (SIFIs)**—and thereby reduce the risk of contagion. The Basel framework sets rules for reporting large exposures to individual counterparties and limits them to 25% of Tier 1 capital (15% for exposures between G-SIBs). Exposures to sovereigns and their central banks and clearing exposures to qualifying central counterparties (CCPs) are exempt.
Short Sales	**Short-Selling Regulations** Rules in most major developed markets that restrict short-selling (the sale of a security that the seller does not own, which becomes profitable when the price of that security falls). These rules often ban/heavily restrict naked short-selling (when the seller has not borrowed or arranged to borrow the security).
Dodd-Frank	**Dodd-Frank Wall Street Reform and Consumer Protection Act** Complex and far-reaching US financial market legislation developed in the wake of the Global Financial Crisis and passed by Congress in 2010. The Act includes measures to reform financial services regulation and bank supervision (particularly for SIFIs), improve transparency and accountability in certain financial instruments, and strengthen consumer protection. The Act created (1) a parallel set of regulatory requirements to the Basel III Advanced requirements (US Standardized) and (2) the Collins Floor Amendment, which requires that banks hold the more binding of Basel III Advanced minimum requirements and US Standardized (for all G-SIBs except BK, Standardized is binding). A partial repeal of the Dodd-Frank Act, the **Economic Growth, Regulatory Relief and Consumer Protection Act**, was passed in 2018.
Title VII	**Title VII** A section of Dodd-Frank that called for stricter regulations on over-the-counter (OTC) swaps markets, including requirements for clearing and exchange-trading of clearable derivatives contracts; increased reporting and transparency; higher margin requirements; and mandatory registration by swap participants. Title VII applies to a broad definition of US persons and includes far-reaching extraterritorial provisions.
Volcker Rule	**Volcker Rule** A component of Dodd-Frank that prohibits US banks and US subsidiaries of non-US banks from engaging in proprietary trading, or trading for their own account, with exemptions for activities such as underwriting, market making, hedging to mitigate risk, and trading in US government debt. These rules came into effect July 21, 2015. Limits on bank investment in venture capital and securitized loans were rolled back on June 25, 2020.
MiFID	**EU Markets in Financial Instruments Directive (MiFID)** A European Union legislative framework that became effective in 2007 with measures to increase competition in financial services, harmonize trading rules across EU members, and strengthen investor protection. In 2011, the European Commission proposed an amended directive, **MiFID II**, and a new regulation, **Regulation (EU) No 600/2014**. These frameworks require clearable derivatives to trade on organized trading platforms; create a new multilateral trading venue for non-equity instruments; increase equity market transparency; and extend transparency standards to other instruments. Both took effect in 2018.
EMIR	**European Market Infrastructure Regulation (EMIR)** The European Union's regulation of OTC derivatives, which include requirements for reporting, risk management, and central clearing, as well as margin rules for derivatives that are not centrally cleared. EMIR applies to non-EU entities transacting with EU entities. It took effect in August 2012, with an amended version, EMIR Refit, adopted in 2019 and scheduled to come into force in 2024.

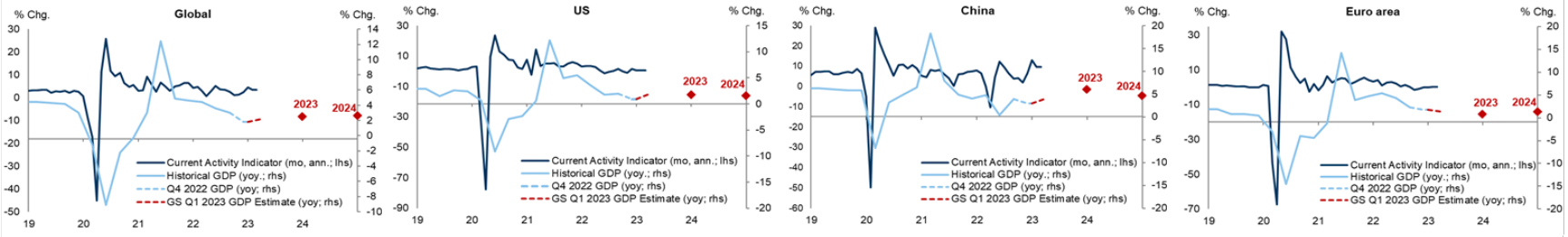
GS GIR: Macro at a glance

Watching

- **Globally,** we expect annual average GDP growth to slow to 2.5% in 2023, reflecting ongoing drags from monetary policy tightening and recent banking stresses in the US and Europe. While we've continued to see unfavorable inflation news across the US and Europe and expect a moderate boost to headline inflation from China's reopening recovery, we think that 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 GDP growth to slow to 1.1% in Q4 2023, reflecting a negative impulse from tighter financial conditions and additional drags from a pullback in bank lending amid recent bank stresses. We see a 35% probability of entering a recession over the next year, reflecting increased uncertainty around the economic effects of bank stress. While the near-term inflation outlook appears challenging, 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 deliver 25bp hikes in May and June for a peak funds rate of 5.25-5.5%, although we continue to see a wide range of possible paths for the funds rate. On the fiscal policy front, 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 we would expect in early to mid-August.
- **In the Euro area,** we expect GDP growth to slow to an above-consensus 0.7% in 2023, reflecting historically elevated energy prices driven by the war in Ukraine and tighter bank lending standards amid recent banking stresses. We expect core inflation to remain strong over the coming months, before declining gradually to 4.0%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 May and June for a terminal rate of 3.5%, reflecting continued firm underlying inflation pressure, although recent banking sector stresses have raised uncertainty around the outlook for ECB policy. On balance sheet policy, we expect the ECB to stop reinvestments completely after the capped APP run-off of €15bn/month ends in June, implying an acceleration in balance sheet shrinkage to around €20bn/month.
- **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—which has been mainly driven by a strong rebound in consumption—and policymakers' continued focus on growth, though uncertainties remain around the shape of the property sector recovery and the extent of the export slowdown this year.
- **WATCH FINANCIAL STABILITY AND CREDIT CONDITIONS.** Recent banking sector stress in the US and Europe could result in tighter lending conditions and weigh on growth, and has increased uncertainty around the path of central bank policy. Our baseline remains for a moderate but manageable pullback in lending, but risks are tilted to the downside in the event of further bank failures or continued deposit outflows.

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						Markets									Equities								
GDP growth (%)	2023			2024		Interest rates 10Yr (%)	Last	E2023	E2024	FX	Last	3m	12m	S&P 500	E2023		E2024		Returns (%)	12m	YTD	E2023 P/E
	GS (Q4/Q4)	GS (CY)	Cons. (CY)	GS (CY)	Cons. (CY)										GS	Cons.	GS	Cons.				
Global	2.5	2.5	2.4	2.6	2.8	US	3.48	4.20	4.00	EUR/$	1.09	1.05	1.10	Price	4,000	–	–	--	S&P500	-3.0	7.0	18.9x
US	1.1	1.7	1.0	1.5	1.0	Germany	2.30	2.75	2.25	GBP/$	1.24	1.18	1.25	EPS	$224	$222	$237	$248	MXAPJ	16.0	4.0	13.9x
China	6.5	6.0	5.3	4.6	5.0	Japan	0.35	0.90	0.75	$/JPY	133	132	125	Growth	1%	0%	5%	12%	Topix	9.0	7.0	13.6x
Euro area	0.6	0.7	0.5	1.3	1.2	UK	3.40	4.00	3.75	$/CNY	6.85	6.80	6.50						STOXX 600	4.0	8.0	12.8x
Policy rates (%)	2023			2024		Commodities	Last	3m	12m	Credit (bp)	Last	2Q23	4Q23	Consumer	2023		2024		Wage Tracker 2022 (%)			
	GS	Mkt.		GS	Mkt.										CPI (%, yoy)	Unemp. Rate	CPI (%, yoy)	Unemp. Rate	Q1	Q2	Q3	Q4
US	5.38	4.41		4.63	3.51	Crude Oil, Brent ($/bbl)	80	-	-	USD IG	138	117	115	US	4.5	3.6	2.9	3.6	5.5	5.6	5.8	5.4
Euro area	3.50	3.46		3.25	3.09	Nat Gas ($/mmBtu)	2.22	3.30	3.00	HY	455	400	390	Euro area	5.4	6.8	2.5	6.7	--	--	--	--
China	2.00	2.46		2.00	2.70	Copper ($/mt)	9,004	9,500	11,000	EUR IG	185	150	145	China	2.2	–	2.2	–	--	--	--	--
Japan	-0.10	0.09		-0.10	0.17	Gold ($/troy oz)	1,980	2,050	2,050	HY	474	415	405									

Note: We recently raised our December 2023 and December 2024 Brent price forecasts to $95/bbl and $100/bbl, respectively.
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 March 31, 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.

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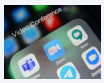

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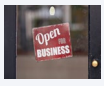

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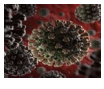

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