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TOP of MIND

COMMERCIAL REAL ESTATE RISKS

The surge in rates and pullback in bank lending following this year's regional banking crisis has led to substantial stress in US commercial real estate (CRE), nowhere more prominently than in office. How the CRE crisis evolves—and whether it could spark another banking crisis and its market and macro impacts—is Top of Mind. We speak with RXR's Scott Rechler and Columbia's Stijn Van Nieuwerburgh, who agree that the CRE market will remain under pressure and take years to stabilize, causing widespread pain for CRE debt and equity investors. GS GIR's Lotfi Karoui and Vinay Viswanathan, however, argue that much of the risk from CRE has already been priced into public debt markets. We then dig into the risk to banks, with GS GIR bank analysts arguing that CRE risk will prove manageable given banks' relatively limited exposure to office and strong bank capital and reserve positions. But Rechler and Nieuwerburgh are more concerned that another round of the regional banking crisis owing to CRE stress amid other challenges lies ahead.

"Over the next couple of years, the CRE problem won't just be an office problem—multifamily will almost certainly be an area of stress... all real estate assets will need to come to terms with the higher rate environment.

- Scott Rechler

It could easily take several years for the office market to stabilize, which is why I've referred to all this as a trainwreck in slow motion.

- Stijn Van Nieuwerburgh

The signal from debt markets suggests that a lot of bad news has already been priced in.

- Lotfi Karoui and Vinay Viswanathan"

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

US

Latest GS proprietary datapoints/major changes in views

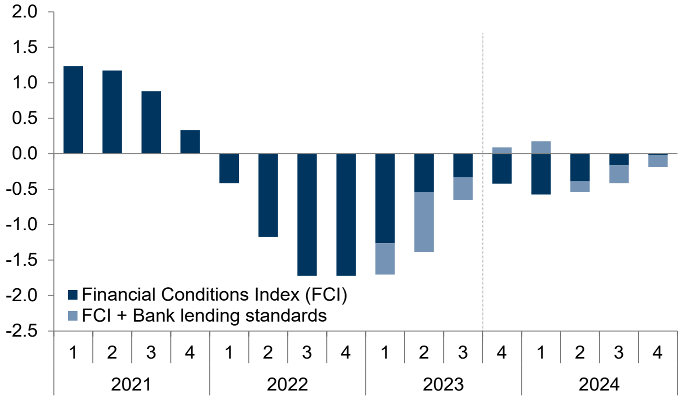
- We recently lowered our 4Q23/1Q24 GDP forecasts to 0.7%/1.9% (from 1.1%/2.1%) to reflect headwinds from higher oil prices. Given this, along with the resumption of student loan payments, UAW strike, tighter financial conditions, and consumer spending slowdown, we expect a temporary growth pothole in Q4.
- We recently pushed back our forecast for the first Fed rate cut to 4Q24 (from 2Q24) as we think that inflation will have to fall further than we previously assumed for the Fed to cut.

Datapoints/trends we're focused on

- Govt shutdown; while the govt has avoided a shutdown for now, we think the leadership vacuum in the House raises the odds of a shutdown, likely when the funding extension expires on Nov 17.

Fading monetary tightening drag weakens the case for Fed rate cuts

GDP growth impulse, 3-quarter centered moving average, pp



Source: Goldman Sachs GIR.

Japan

Latest GS proprietary datapoints/major changes in views

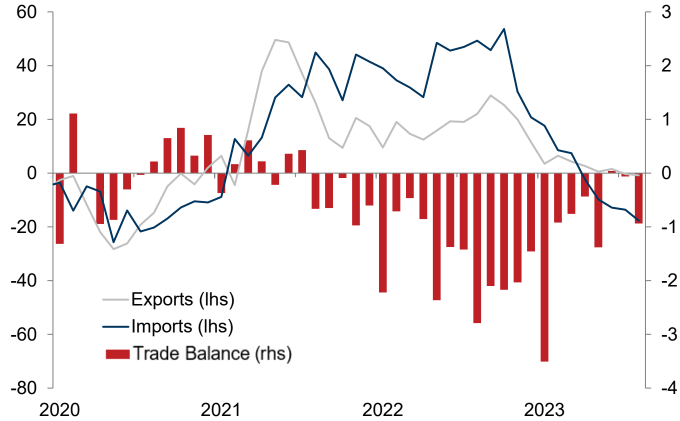
- We recently raised our FY23/24 New Core CPI (ex-fresh food & energy) forecasts to 3.9%/2.3% (from 3.8%/1.9%) to reflect Yen weakness. We also revised our FY23/24 Core CPI (ex-fresh food) forecasts to 3.1%/2.8% (from 2.8%/2.9%) to reflect revised energy price subsidy measures.

Datapoints/trends we're focused on

- BoJ policy; we expect the BoJ to exit yield curve control (YCC) in April 2024 and to end negative interest rate policy (NIRP) only in spring 2025.
- Japan trade balance, which, after shifting to a surplus for the first time in 2 years in Jun, recorded deficits in Jul and Aug.

Japan trade balance: short stint in surplus

Japan exports/imports (lhs), % chg yoy, and trade balance (rhs), ¥tn



Source: Ministry of Finance, Goldman Sachs GIR.

Europe

Latest GS proprietary datapoints/major changes in views

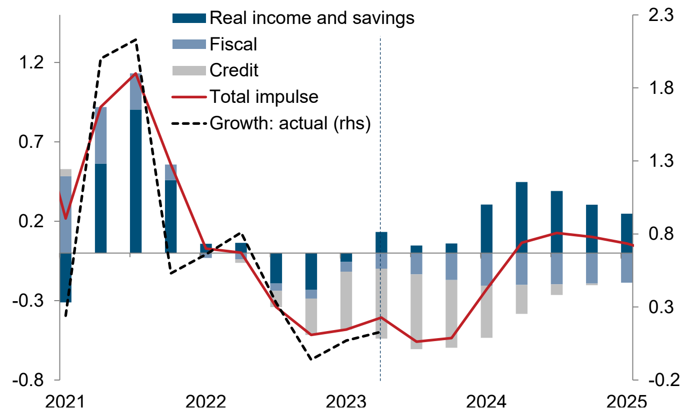
- No major changes in views.

Datapoints/trends we're focused on

- ECB policy; we believe the ECB's hiking cycle is now complete and that the ECB will remain on hold at 4.00% into 2024, with the first rate cut coming only in 4Q24, though growth weakness or labor market deterioration could prompt earlier rate cuts.
- BoE policy; we think the BoE's hiking cycle is now complete and that the BoE will remain on hold at 5.25% until 3Q24.
- Euro area growth, which we expect to stagnate in 2H23 before picking up in 1H24, reflecting fading headwinds from the energy crisis, a reduced credit drag, and a smaller fiscal drag.

Prospects for a better 2024 in the Euro area

Euro area growth impulse, % qoq (lhs), GDP growth, % qoq (rhs)



Source: Goldman Sachs GIR.

Emerging Markets (EM)

Latest GS proprietary datapoints/major changes in views

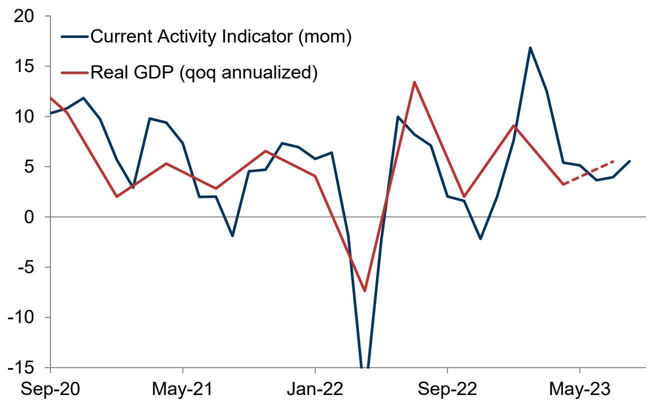
- No major changes in views.

Datapoints/trends we're focused on

- China growth; we think the recent improvement in growth and activity data are signs that growth has bottomed out for now. We continue to expect an improvement in sequential growth in H2, though see risks from the property downturn.
- China policy easing, which we expect more of, including further policy rate cuts, local govt bond issuance, and property easing.
- EM disinflation cycle, which we think is unlikely to be derailed by the recent increase in commodity prices or the early recovery in Asian export prices, and should pave the way for more rate cuts by EM central banks.

China on the up and up

China Current Activity Indicator and GDP, % change



Source: Haver Analytics, Goldman Sachs GIR.

Commercial real estate risks

The surge in interest rates and pullback in bank lending following the regional banking crisis earlier this year has led to substantial stress in US commercial real estate (CRE). Nowhere is this stress more visible than in the office sector, where these cyclical pressures have exacerbated the structural shift toward remote work, resulting in a sharp decline in property values that has reportedly led some property owners to hand back the keys to lenders. This stress is not only inflicting sizable pain on real estate investors, but also stoking further worries about the stability of small/regional banks, where the vast majority of US CRE bank lending sits. How the CRE crisis evolves—and whether it could spark another round of the banking crisis and its market and macro implications—is Top of Mind.

We first turn to Scott Rechler, Chairman and CEO of RXR, Stijn Van Nieuwerburgh, Professor at Columbia Business School, and GS credit strategists Lotfi Karoui and Vinay Viswanathan to assess how the crisis could evolve. They generally agree that the office sector will remain under pressure in the face of these significant cyclical and structural challenges. That said, Rechler argues that sentiment is worse than reality in the sense that demand (and rents) for space in the newest, highest-quality buildings remains strong, and the debate around return to work, he says, has been settled—people have returned, though a hybrid model of 3-5 in-office days seems to be the new normal.

Nieuwerburgh, however, estimates that even the highest-quality office buildings could lose around 20% in value while those of lower quality could lose 60% or more. And he is less convinced about the return to office, noting that office occupancy rates have remained remarkably stable at around 50% of pre-pandemic levels over the last 18 months. Karoui and Viswanathan, for their part, find that across all CRE property types, prices have room to move lower and cap rates—the net operating income (NOI) of a property divided by its current market value—higher, especially when benchmarked against 10y nominal yields. And they, as well as Rechler, point out that CRE stresses likely won't remain contained to office; multifamily properties may be the next shoe to drop given a surge in supply that may take a couple of years to absorb.

So, what will stabilize the CRE market, and how long might that take? Rechler explains that a lengthy process of revaluation, deleveraging, and recapitalization of the sector will be required as the $2.6tn of CRE loans maturing over the next five years come due amid a higher rate environment. In his view, this process will look similar to the resolution of the Savings and Loan (S&L) crisis in the 1990s, which took several years. He argues that we're still in the early innings of this process today, given that capitulation on valuations is just beginning and the pullback in CRE lending by banks further complicates matters. So, he expects stabilization only sometime in 2025.

While both Rechler and Miriam Wheeler, GS Head of the Global Real Estate Financing Group, believe that alternative sources of financing like private capital could help fill some of the capital gap left by the retreat of traditional lenders, neither think it will be enough to fully address the current funding challenges. So, Wheeler agrees that the stabilization process won't happen quickly, though, she says, perhaps more quickly than in the wake of the Global Financial Crisis (GFC) due to the significant amount of floating-rate debt in the market, which will force borrowers to decide what to do with properties sooner. And Nieuwerburgh warns that the current crisis in the office market is a "trainwreck in slow motion" given that the core problem is an oversupply of office space that will take time to reallocate for other purposes, even when such reallocations are physically and financially feasible—which they often aren't.

What could this all mean for real estate investors? Rechler and Nieuwerburgh see widespread pain for both CRE debt and equity holders. But Karoui and Viswanathan argue that CRE risk has already largely been priced into public debt markets (which GS structured products strategist Roger Ashworth details on pg. 15) and are relatively constructive on recent CMBS vintages that have benefitted from tighter post-pandemic underwriting standards.

Worries are greater for equity investors. Karoui and Viswanathan are especially concerned about CRE private equity investors given the scope for property value declines, a lack of structural protections, and uncertainty around future NOI growth. And GS US REITs analyst Caitlin Burrows expects more pain for some office REIT investors, although she thinks that REITs focused on other property types should fare better.

All that said, the key question is what the stress in CRE could mean for US banks, which, according to GS bank analysts Ryan Nash, Robert Galante, and Christian DeGrasse hold 50% of CRE debt, with 75% of it concentrated in small/mid-sized banks. Despite the outsized role banks play in CRE lending, they ultimately believe that the risk to banks from CRE will prove manageable given banks' relatively limited overall exposure to the most problematic office sector—which accounts for only 3% of total bank loans—and strong bank capital and reserve positions, which Karoui and Viswanathan also cite as one of the key reasons why current CRE stresses are unlikely to pose systemic risk. And while GS European real estate analyst Jonathan Kownator explains that CRE risk isn't just a US problem—CRE in Europe is facing many of the same pressures—he similarly believes that CRE risks to European banks look largely contained, though he worries that significant losses on office loans could erode bank capital cushions.

Rechler and Nieuwerburgh, however, are more concerned. Nieuwerburgh takes little comfort from banks' relatively limited office exposures, arguing that the high leverage in the banking system today means that a non-trivial amount of banks' equity would be wiped out in the event of even a low-double digit loss on office debt. And both he and Rechler expect another round of the regional banking crisis—that could see hundreds of bank closures and consolidation in the industry—as banks grapple with significant declines in CRE loan values on top of other challenges. This, Nieuwerburgh says, poses risk of a credit crunch that extends beyond real estate, potentially tipping the economy into a long-feared, but so far elusive, recession.

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CRE credit risks: priced and non-systemic

Lotfi Karoui and Vinay Viswanathan argue that while the pressure on office is likely to persist, much of the risk from CRE has now been priced into debt markets, and fears of a systemic shock from CRE are overblown

Concerns over the US commercial real estate (CRE) sector, and the office market in particular, have risen over the past several months as interest rates have sharply increased and credit availability has declined. While we expect the pressure on office to persist, we think that much of the risk from CRE has already been priced into debt markets, and believe that fears of a potential systemic shock stemming from CRE are overblown.

Higher rates and tighter lending: a caustic combination

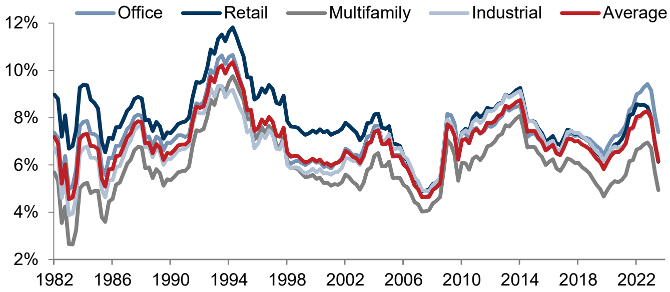
CRE depends heavily on financing and is thus inherently sensitive to credit availability. At the end of 2022, $5.6tn of commercial and multifamily loans were outstanding in the US. Half of these loans sit directly on commercial bank balance sheets, with small banks capturing a much larger share than large banks (see pg. 16). Six months after the material rise in stress levels among regional banks, the potential for disruptions to US CRE activity from a pullback in lending remains significant. Activity in the securitization (commercial mortgage-backed securities, or CMBS) market—an important source of financing—has also sharply contracted, with origination on pace to fall to the weakest annual volume this year since the Global Financial Crisis (GFC).

The CRE market is also a rates-sensitive asset class. Most CRE acquisitions are financed with mortgages, often involving a lump sum payment ("balloon" payments) when the loan matures. A key valuation metric for CRE investors is the "cap rate"—the ratio of a property's net operating income (NOI) to its sale price. When mortgage rates exceed cap rates, the economics of purchasing CRE becomes challenging, which weighs on transaction volumes and pushes prices lower (and cap rates higher) to adequately compensate investors.

These patterns have started to play out in recent months. Since the start of the Fed's hiking cycle in March 2022, CRE transaction volumes have declined sharply to a $69bn quarterly pace as of 3Q23—64% below year-ago levels and the lowest level since 2012 except for during the heights of the pandemic. Prices have also moved lower—the Green Street commercial property price index shows a 16% drop in prices across property types from their April 2022 peak, though less than 4% of this deterioration has occurred this year. That said, the upward adjustment in cap rates has room to run given that cap rates across all property types have moved only modestly higher in absolute terms (though the speed of the move has exceeded most past increases). And when benchmarked to 10-year nominal US Treasury yields, cap rates have actually moved *lower*. Considering the high bar for any relief from a funding cost standpoint, further upward pressure on cap rates and downward pressure on prices seems likely.

Room to run for cap rates when benchmarked to 10y nom. yields

US CRE cap rates as a spread over 10y nominal Treasury yields



Source: CoStar, Goldman Sachs GIR.

The headwinds: Structural in office, cyclical in multifamily, benign elsewhere

Across property types, structural challenges loom the largest for offices, owing largely to a severe imbalance between supply and demand. Over the last four quarters, office properties have faced negative net absorption of 54mn square feet, implying that significantly more supply was added to the market than removed. Notably, offices are the only property type experiencing such a large shortfall in absorption. Even prior to the pandemic, the office market was experiencing relatively higher vacancy rates. And this gap has since widened, with the average vacancy rate for office properties rising to 13% while remaining below 7% for other property types.

While the outlook for work-from-home behavior—which has and will continue to be a crucial determinant of office vacancies—remains uncertain, our economists estimate that the "work-from-home" share of the US workforce has stabilized at around 20-25%, down from a peak of 47% earlier in the pandemic but up significantly from its pre-pandemic average of 2.6%. Assuming further labor market rebalancing, which will modestly weaken firms' incentive to provide remote work benefits and lead to a decline in the remote share of job openings, they expect the amount of vacant available square footage to rise by 27% through 2030 as active leases expire, which should translate into a vacancy rate of around 16%.

Under the surface, office occupancy dispersion has been quite elevated across metropolitan areas, reflecting variations in industry concentration and demographic trends. San Francisco stands out as the only major metropolitan area where NOI for office properties has outright declined over the last two years. Other cities with large exposures to industries with high remote work activity, such as New York, Portland, and Seattle, have seen positive but weak NOI growth. By contrast, the Sun Belt region remains in a strong position, with office vacancy rates rising by less than 1% in Tampa, Orlando, and Dallas, and *declining* in Miami over the past two years.

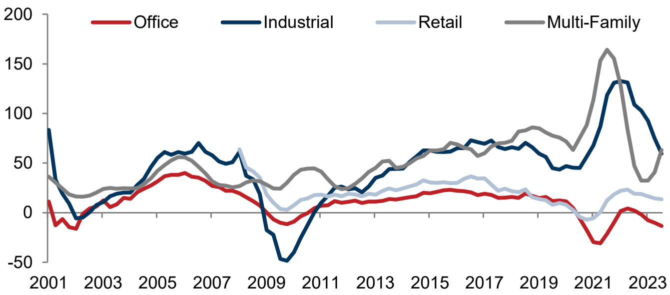
Concerns over multifamily properties have also grown. In our view, the challenges in this sector are cyclical in nature and hence more manageable. Net absorption of multifamily properties has improved over recent quarters despite an increase in vacancy rates from 4.8% in 3Q21 to 7.1% today. Unlike for the office sector, the weakness has been more visible in Sun Belt markets such as Atlanta, Austin, and Orlando, where vacancy rates have increased by 3% or higher over the last 12 months. Despite strong rent growth, the Sun

Belt markets currently have a high rate of multifamily development at a time of weakening net absorption. As the pipeline of properties under construction turns into new completed inventory, further erosion in NOI is likely. That said, we think the downturn in multifamily performance is likely manageable for two key reasons: i) the sizable growth in apartment rents over the prior two years, and ii) the idiosyncratic, regional nature of multifamily vacancies.

The picture is dramatically healthier for other property types. Retail properties have held up remarkably well, with the aggregate vacancy rate declining by only 0.6% over the past two years despite residual credit stress for shopping malls. The total vacancy rate for industrial properties has increased slightly (+0.7% over the past two years) but strong rent growth still underpins negligible credit stress. The healthiest segment remains hospitality properties. Luxury hotels have experienced exceptional strength, with vacancy rates declining by 6% over the last two years, though hotels oriented toward business travel continue to lag pre-pandemic performance metrics.

Negative net absorption for office leases/sub-leases

4-quarter moving average of net absorption, in square footage terms



Source: CoStar, Goldman Sachs GIR.

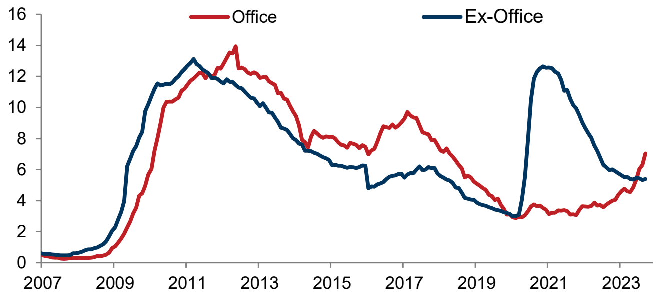
Financial distress: Priced in debt, less so in private equity

Financial distress has unsurprisingly been rising, with more borrowers falling behind on loan payments. FDIC data on bank loan performance indicates that the share of non-multifamily CRE loans behind on payments has increased to 0.82% from a trough of 0.54% in 3Q22, but is still well below the post-GFC (4.4%) and Savings & Loan Crisis (5.4%) peaks. More granular data from CMBS portfolios suggests a faster deterioration. For office properties, the delinquency rate for office CMBS loans has risen to 5.6% as of September 29 from 1.6% a year prior. The special servicing rate, which tracks the share of loans that are at risk of default and exploring potential workouts, has also grown rapidly for office loans. However, non-office CMBS loans have exhibited a decline in credit stress, particularly stemming from improvement in the retail and hospitality sectors.

We think delinquency rates on bank loans to office landlords could feasibly rise to their historic peaks, but other property types have stronger fundamentals and lighter leverage, which should mitigate the risk of distress on bank balance sheets. Perhaps more importantly, the signal from debt markets suggests that a lot of bad news has already been priced in (see pg. 15). Recent months of CMBS issuance have shown a sharp drop in loan-to-value (LTV) ratios, a notable shift in the property mix away from offices, and a significant back-up in funding costs. Put differently, the CRE debt market has turned into a lender's market, leaving us constructive on recent CMBS vintages given the generous risk premium embedded into prices and the healthy cushions provided by relatively low LTVs if property prices decline. We would emphasize that our constructive view is focused on recent loan vintages, which have benefitted from tighter post-pandemic underwriting standards. Older vintages could remain vulnerable to a further downward adjustment in property prices, especially in the office sector, given the possibility of lagged price discovery on the underlying properties. And the value proposition is much weaker for CRE equity compared to debt given the scope for property value declines, the lack of structural protection for equity investors, and uncertainty around future NOI growth.

Special servicing rates rising for office and moderating elsewhere

Special servicing rates for office and non-office CRE loans, %



Source: CoStar, Goldman Sachs GIR.

Still a high bar for systemic shock

While sentiment vis-à-vis the US banking system has stabilized in recent months, concerns over a potential systemic shock from CRE have not dissipated. We maintain that such fears are overblown, for three key reasons.

First, banks have already set aside reserves for office loan losses around 7.5%. While the CMBS market has breached this level of office loan losses in the past—through the 2000 and 2006-08 vintages of office loans, which suffered cumulative losses of 8% and 12-21%, respectively—CRE loan charge-off rates have significantly trailed CMBS loss rates in recent years.

Second, lender balance sheets are generally healthy, the bank failures of earlier this year notwithstanding. Bank capital ratios have strengthened over recent quarters, a trend which could continue in light of upcoming Basel III revisions. Moreover, a look at insurance company balance sheets shows a higher share of multifamily mortgages versus office mortgages, alongside generally low LTV ratios on outstanding loans.

Third, loan modifications (such as extensions) could make the accumulation of losses a slow process. Evidence of this trend is already apparent in the CMBS market, with just over 40% of office maturities over the past three months resolved by maturity extensions rather than full-principal payments. While this adjustment may prolong uncertainty over commercial real estate loan distress, it could also prevent the sudden erosion of balance sheets that often contributes to systemic risk.

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Interview with Scott Rechler

Scott Rechler is Chairman and CEO of RXR and member of the Board of Directors of the Federal Reserve Bank of New York. Below, he discusses the recent stress in US commercial real estate, which he says is still in its early innings, and how it could evolve from here.

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

Allison Nathan: What's driving the stress in the US commercial real estate (CRE) sector?

Scott Rechler: Stress in the sector owes to two main factors. First and foremost is the regime change in interest rates. As interest rates have normalized from the near-zero levels of the past decade+, assets that were purchased and financed in the low-rate environment need to be revalued and recapitalized, which is pressuring real estate valuations and capital structures as these loans come due. In other words, assets that were originally considered to have low leverage are turning out to have too much debt and too little equity—requiring equity injections—when refinancing at today's lower valuations and higher interest rates.

Second, some CRE subsectors are facing structural and other cyclical challenges. On the office side, the debate around return-to-office following the pandemic has been settled—people have returned. But the new normal is a hybrid world, with most companies requiring office attendance 3-5 days/week. In our office properties in New York, for example, office attendance has returned to pre-pandemic levels Tuesday through Thursday, with lower levels on Mondays and Fridays, and that seems likely to remain the case. And the multifamily sector is experiencing a surge in supply that will pressure values. So, between the rate regime change that is impacting every segment of the real estate market and these additional issues in some subsectors, it's a particularly challenging period for CRE.

Allison Nathan: The narrative around the office subsector seems dire. Are prevailing concerns justified, or overblown?

Scott Rechler: There are valid reasons to be concerned, but the sentiment is worse than the reality. People tend to paint all office buildings with the same brush, but some will be competitive, and others won't be. A useful analogy is the experience of malls following the proliferation of e-commerce. The fear was that all malls would become obsolete because people could instead shop online. But the reality was that over several years, malls in a convenient location that offered a "destination" experience flourished, while the rest did not survive. Similarly, newer/high-quality office buildings that are sufficiently attractive in terms of location, comfort, floor plans, amenities, etc. to convince workers to commute to the office are in high demand. The newest/best-quality buildings in New York City, for example, are filling up at record-high rents; in the last quarter alone, RXR leased around one million square feet of space to a mix of law firms, consumer product, fashion, and media companies in these types of buildings. On the other side of the spectrum, though, are older, outdated buildings that will be challenged to continue to attract tenants. Many of these buildings will need to be converted for alternative use, which will require substantial capital, or be sold at essentially land value and then torn down. So, the negative sentiment around these buildings is warranted. Most buildings fall somewhere in between these two buckets, requiring some capital to make them attractive to companies and workers, and the question is whether the economics can work to achieve this.

"People tend to paint all office buildings with the same brush, but some will be competitive, and others won't be."

Allison Nathan: You mentioned that the multifamily segment is also facing challenges. Could that be the next shoe to drop in CRE?

Scott Rechler: The multifamily segment saw a large number of transactions in 2021/22 at the lowest cap rates and, in turn, net operating income (NOI) yields in history, with an expectation that rents would continue to rise. But rents have not risen, while interest rates have. At the same time, a record-high number of units in new developments—around one million—are coming online, which should weigh on rents for an extended period. So, I expect the multifamily sector to remain under pressure over the near-to-medium term. Over the longer term, it's a different story; a structural shortage of housing across the US should provide a tailwind to the sector once the current surge in supply is absorbed. But, over the next couple of years, the CRE problem won't just be an office problem—multifamily will almost certainly be an area of stress and, as I said, all real estate assets will need to come to terms with the higher rate environment.

Allison Nathan: Is there a useful historical analogy for the type and degree of CRE stress today?

Scott Rechler: The experience of the early 1990s—the tail end of the Savings and Loan (S&L) crisis—provides a useful analogy. A key driver of that crisis was a change in tax policy. In 1986, tax policy that had driven capital into CRE and other assets for tax reasons—resulting in artificially inflated real estate values—was changed, forcing valuations for all assets bought or capitalized pre-1986 to be adjusted for the new tax regime. Similarly, the new interest rate regime today will force a process of revaluation, deleveraging, and recapitalization of real estate assets across every subsector. It's also interesting to note that the 2008 crisis was distinct in that it primarily stemmed from rampant speculation in a highly levered system. When that system imploded, capital was quickly injected into the most vulnerable areas, allowing for a relatively rapid recovery. But it's a very different situation today.

> “Over the next couple of years, the CRE problem won’t just be an office problem—multifamily will almost certainly be an area of stress… all real estate assets will need to come to terms with the higher rate environment.”

Allison Nathan: So, how long could the revaluation/ deleveraging/recapitalization process take, what will it look like, and how much progress has been made so far?

Scott Rechler: In the early 1990s, that process took 2-4 years as loans matured and needed to be restructured, and with $2.6tn in CRE loans coming due over the next five years, I expect a similarly lengthy process today. That process starts with capitulation on valuation. Right now, transactions are few and far between and liquidity is limited because valuations have, for the most part, not yet adjusted to the reality of the new rate regime. Marking-to-market the value of assets to levels that are attractive to trade in the current economic environment will spark more activity and bring capital in from the sidelines, helping to move this process forward.

But we are in the early innings. Heading into Q4, we are just starting to see signs of capitulation, with some lenders and borrowers beginning to acknowledge the need to lower marks and recapitalize. That process should gain momentum into 2024, but I don’t expect the sector to achieve a sense of stability until 2025. An additional impediment is that most of the liquidity on the sidelines is opportunistic capital seeking higher-yielding investments, but traditional lenders will likely also need to participate in the recapitalization. That will be difficult because these lenders are under pressure from regulators, rating agencies, their shareholders, and/or their boards to reduce their CRE exposure and are, therefore, only lending to their best customers on their best projects, if at all.

Allison Nathan: Could alternative capital sources fill the funding gap left by the retreat of traditional lenders?

Scott Rechler: In the near term, the private sector is certainly stepping in and using opportunistic capital to help fill the funding hole. RXR has either made or is in the process of making $1bn of loans via debt-like structures that are earning equity-like returns. So, the opportunity is compelling. But, again, we and other participants in the market like us are opportunistic, so a more traditional first-mortgage lender would still be required to fully address the current challenges.

Longer term, I could envision a scenario in which non-bank lenders emerge from this cycle as the primary financiers for CRE transactions instead of traditional banks. As banks become more utility-like—mainly serving as conduits between customers and non-bank lenders—some private equity shops are already aligning themselves with banks to take the lead on this activity. So, the industry could evolve, and much of the risk currently assumed by banks could move to unregulated areas of the financial sector. Going back to the 1990s analogy, the securitization of the real estate sector emerged from the S&L crisis, with commercial mortgage-backed securities (CMBS) and REITs becoming actively traded. We could see a similar evolution of the industry coming out of the current crisis.

Allison Nathan: In the meantime, who will bear the pain of the necessary restructuring of the CRE sector?

Scott Rechler: The pain will be felt across the board. Both borrowers and lenders will be forced to take write-downs and losses from the valuation adjustments. These losses will vary by situation, but in the office space, we’re recapitalizing loans at 50 cents on the dollar from original levels, so essentially all the equity is wiped out as well as half of the debt.

Allison Nathan: Could CRE exposure lead to another leg of the regional banking crisis?

Scott Rechler: Regional banks, or banks that have less than $250mn in assets, are substantially exposed to stress in the CRE sector given that these banks hold around 70% of outstanding CRE bank loans that will need to be marked down in the coming months and years. On top of this exposure, these banks are facing the same duration risk that contributed to the collapse of Silicon Valley Bank and other banks earlier this year, as well as a higher cost of doing business amid a skittish depositor base and increased regulatory scrutiny. So, I expect another round of the regional banking crisis as banks work through these challenges, and I wouldn’t be surprised if, two years from now, 500-1000 fewer regional banks existed as some banks fold and other banks consolidate to achieve the scale required to remain competitive. Unlike in the 2008 crisis, where the risk was concentrated in some big money center banks, the fact that regional banks sit at the epicenter of this real estate crisis means that it will be felt more broadly in communities around the country that rely on regional banks for small business and personal loans.

> “I expect another round of the regional banking crisis as banks work through these challenges.”

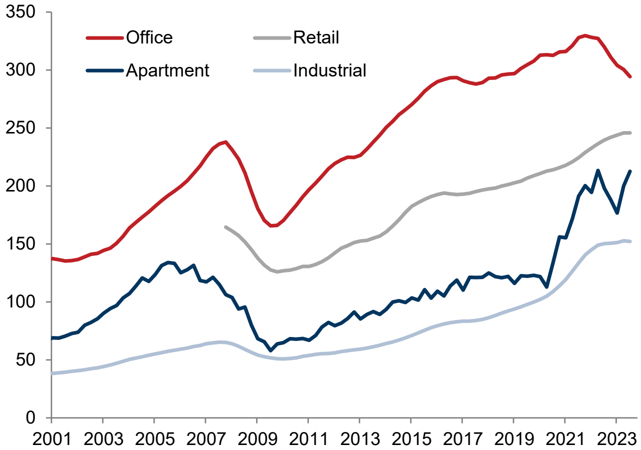
Allison Nathan: Could government intervention stem these risks, and what might that look like?

Scott Rechler: If any intervention were to take place, it would be to unclog the plumbing to facilitate the value destruction and recapitalization process, not to bail out the banks or the borrowers that are losing money. One way to do that would be to issue regulatory guidance that provides clarity on how high-risk legacy CRE loans should be accounted for versus lower-risk newly originated CRE loans so that regulators, rating agencies, and investors can better differentiate between those two types of loans on banks’ books. That would be a simple, costless way to provide better transparency. But if that guidance doesn’t generate sufficient liquidity to move the restructuring process along, policymakers could put in place a term loan facility where banks could borrow against those newly originated loans, which could help supercharge the flow of liquidity into the system. But, again, regardless of what the government does or doesn’t do, the process of value destruction will still need to take place, and that process will undoubtedly be painful.

What's going on in CRE?

While some sectors of commercial real estate (CRE) have held up relatively well, prices have fallen for the office sector…

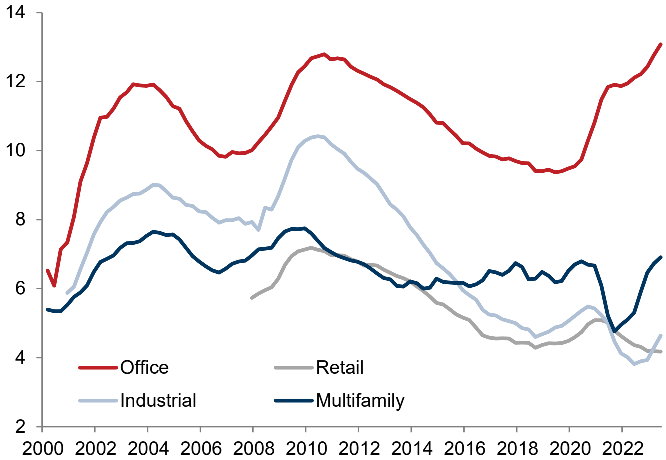
Median sales price per square foot by property type, $



Source: CoStar, Goldman Sachs GIR.

…and vacancy rates have increased more for the office sector, with office vacancies above 25-year highs

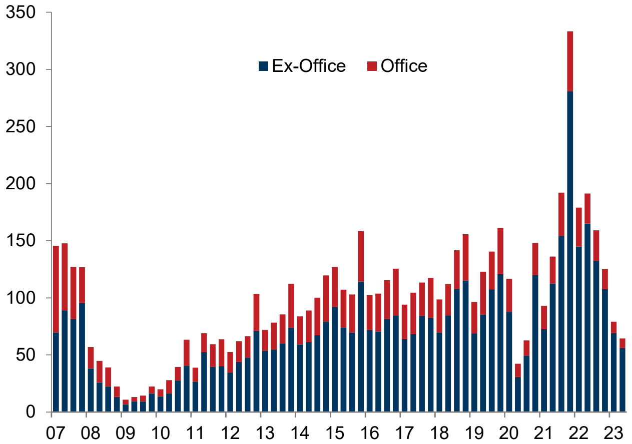
Vacancy rates by CRE sector, %



Source: CoStar, Goldman Sachs GIR.

Overall CRE transaction volumes have contracted, with transaction volumes for office falling to multi-year lows…

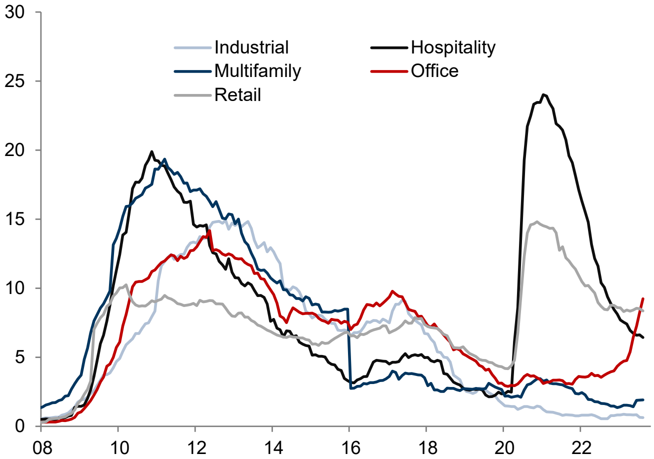
Total CRE transaction volumes, $bn



Source: RCA, Goldman Sachs GIR.

…and delinquency rates have surged for office properties, while remaining contained for most other CRE property types

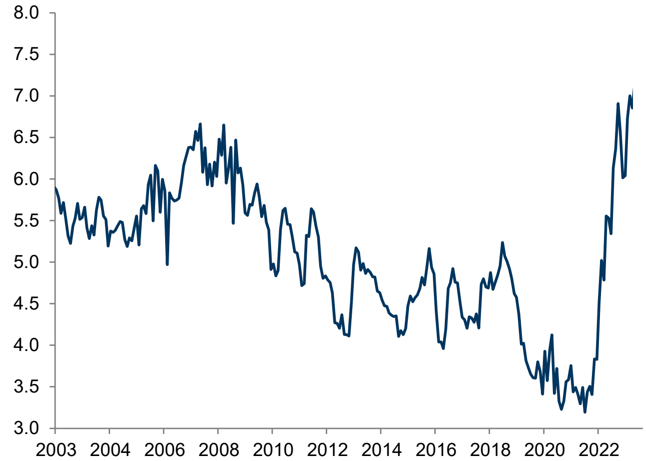
30+ day delinquency rates by property type, %



Source: Trepp, Goldman Sachs GIR.

Financing costs within CRE have risen sharply amid the higher rate environment…

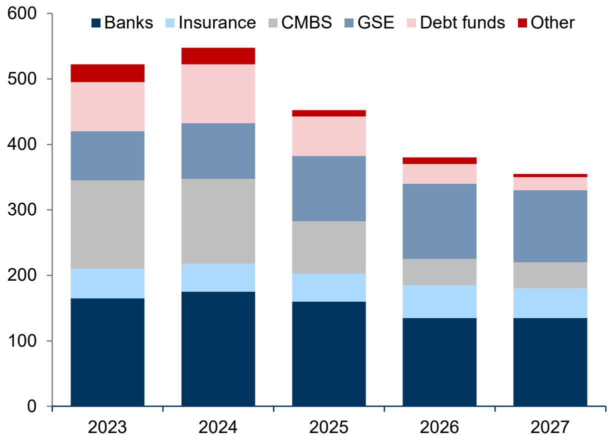
Average monthly weighted average coupon for CMBS loans by origination date, %



Source: Trepp, Goldman Sachs GIR.

…and refinancing needs for CRE borrowers are set to remain high, with roughly $1.1tn in maturities coming due over this year and next

Annual maturity wall on CRE loans by lender group, $bn



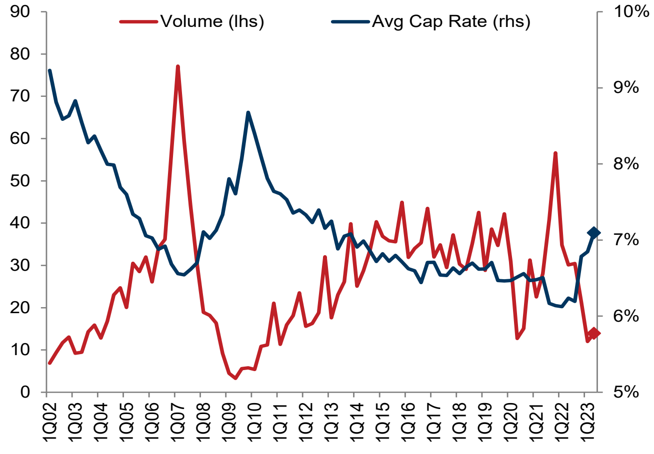
Source: RCA, Goldman Sachs GIR.

Special thanks to GS Structured Products Strategist Vinay Viswanathan for charts.

A closer look at US office distress

Office transaction volumes have sharply declined and cap rates have risen as the outlook for office fundamentals has become increasingly uncertain

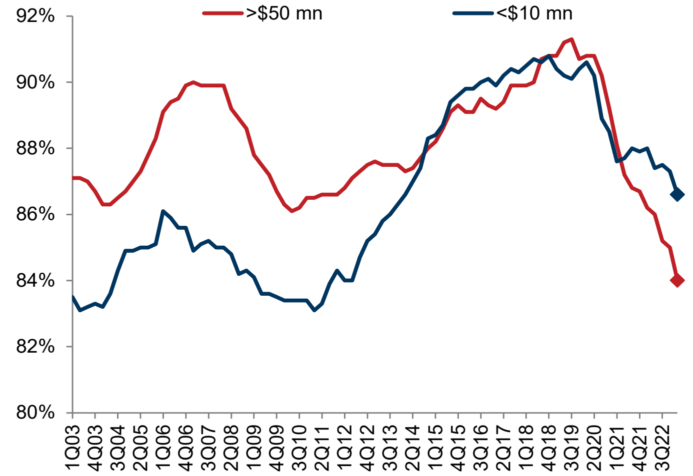
Office transaction volumes ($bn, lhs), avg cap rate (%, rhs)



Note: Cap rates are calculated by dividing the net operating income (NOI) of a property by its current asset value. The recent increase in cap rates is driven by a decline in property values, which is overwhelming the decline in NOI.
Source: MSCI Real Assets, Goldman Sachs GIR.

Larger office loans/properties have experienced more significant declines in occupancy over the past few years...

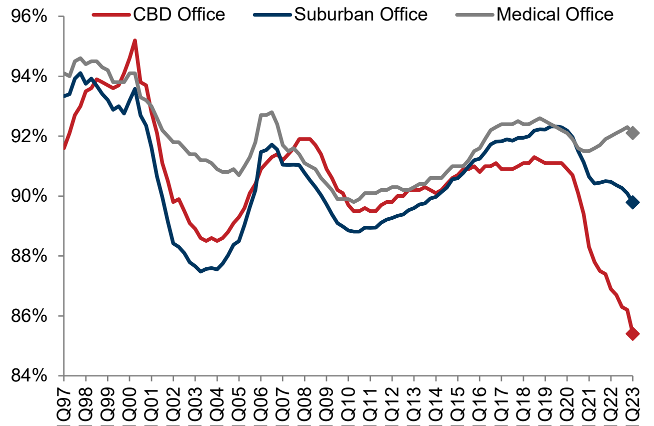
Office occupancy for properties with CMBS loans of each size



Note: Data as of Q1 2023.
Source: CoStar, Goldman Sachs GIR.

...as have offices in central business districts...

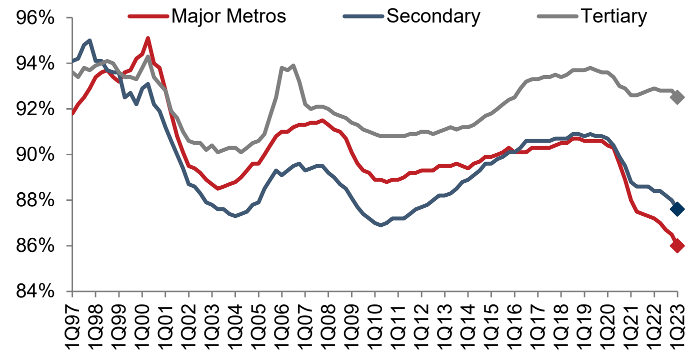
US office occupancy by office type, %



Note: Data as of Q1 2023.
Source: CoStar, Goldman Sachs GIR.

...and in the major metro areas of the country

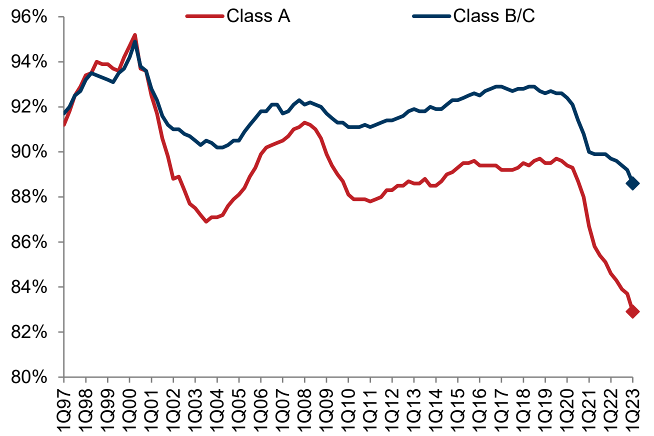
US office occupancy by market type



Note: Major metros include the six largest metro markets: Boston, Chicago, DC Metro, LA Metro, NYC Metro, SF Metro. Secondary markets include Atlanta, Austin, Baltimore, Charlotte, Cincinnati, Cleveland, Columbus, Dallas, Denver, Detroit, Houston, Indianapolis, Jacksonville, Kansas City, Las Vegas, Memphis, Milwaukee, Minneapolis, Nashville, Norfolk, Orlando, Philly Metro, Phoenix, Pittsburgh, Portland, Raleigh/Durham, Sacramento, Salt Lake City, San Antonio, San Diego, Seattle, South Florida, St. Louis, Tampa. Tertiary markets include all others.
Source: CoStar, Goldman Sachs GIR.

All qualities of office properties have experienced large declines in occupancy rates over the last few years...

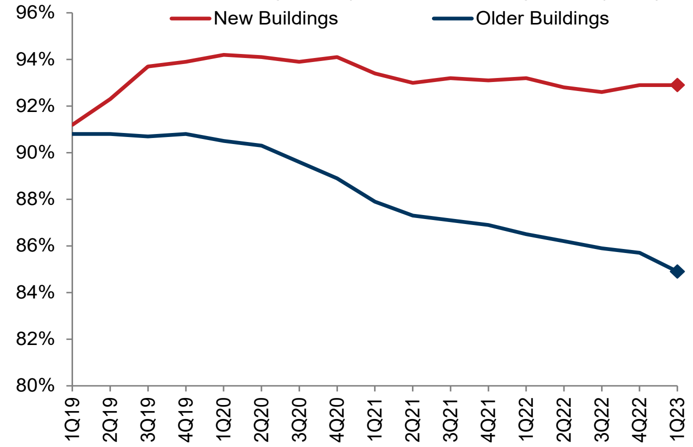
CoStar Class A and Class B/C office occupancy



Note: Data as of Q1 2023.
Source: CoStar, Goldman Sachs GIR.

...though newer properties have held up relatively well

CoStar 2008-2018 buildings and pre-2008 buildings occupancy



Note: Data as of Q1 2023.
Source: CoStar, Goldman Sachs GIR.

Special thanks to GS Real Estate/REITs analysts Julien Blouin and Ling Yin for charts.

Interview with Stijn Van Nieuwerburgh

Stijn Van Nieuwerburgh is the Earle W. Kazis and Benjamin Schore Professor of Real Estate and Professor of Finance at Columbia University's Graduate School of Business. Below, he argues that the worst of the stress in the US office sector is still to come, which could have significant negative implications for investors, banks, and the broader economy.

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

Jenny Grimberg: How stressed is US commercial real estate (CRE)?

Stijn Van Nieuwerburgh: To gauge the amount of stress in the sector, I start by looking at the underlying asset fundamentals. For the office market—my main area of focus—lease-level data from CompStak shows that office property cash flows have fallen by around 20% in real terms since the onset of the pandemic. The commercial mortgage-backed securities (CMBS) market is also showing clear signs of distress in office. The BBB- rated tranches in more recent CMBX vintages, which have a larger share of office collateral than earlier vintages, have experienced much larger price declines recently than those in the earlier vintages. And the performance of single-asset, single-borrower (SASB) office deals, which are collateralized by a single large commercial property loan and are a pure-play view on office credit, is also sending a distress signal.

Jenny Grimberg: Is the worst of the office stress behind us, or still to come?

Stijn Van Nieuwerburgh: We're in the early innings. Only a third of pre-pandemic office leases have come up for renewal so far due to the long-term nature of commercial leases. So, most office tenants have yet to make active choices about their future space demand, and when they do—many in the next three years—I assume they will make similar decisions as previous tenants to either not renew their leases or renew for substantially less space. So, a further deterioration in office occupancy rates, cash flows, and revenues is likely ahead. To quantify the valuation implications, Arpit Gupta, Vrinda Mittal, and I have built an asset pricing model to value the US office stock, finding that it's currently worth around 40-45% less than before the pandemic, largely as a result of the rise of remote work. And we expect long-run office valuations to remain at these depressed levels as remote work is likely to persist. By building quality, we estimate that class A+ buildings, which are currently doing fairly well amid a flight to quality, will decline only around 20% in value, whereas class A-/B/C office values could decline by 60%, or more. Evidence of that is starting to appear—a few lower-quality office buildings in NYC recently traded at 50-65% discounts to their pre-pandemic values, and several in San Francisco traded at 70-80% discounts.

Jenny Grimberg: Doesn't more workers returning to the office mean that past tenancy decisions may not be indicative of what's to come?

Stijn Van Nieuwerburgh: Physical occupancy data doesn't show strong evidence of a return to office. The September 18 turnstile swipe data from Kastle indicates that office occupancy stands at 50.3% of pre-pandemic values, and that figure has remained stable over the last 18 months. Data from XY Sense, which uses sensor data to measure physical office presence, suggests that office use is currently around 30% compared to around 60% pre-pandemic, which is consistent with a roughly 50% drop in occupancy. And even if more workers return to the office, a lot of waste exists in offices, which was true even before the pandemic. Many companies have now learned to work with less office space. Longer term, more progress will likely be made technologically in how we organize our labor force and find new ways of being as effective with less space. So, I see this as a structural shift in the demand for office vs. the cyclical rebound story many people want to tell.

Jenny Grimberg: Who owns the equity and debt in CRE, and how do you expect these investors to be affected by the significant decline in office values that you expect?

Stijn Van Nieuwerburgh: The typical capital structure for a commercial property is around 30-40% equity and 60-70% debt. The equity in CRE is widely dispersed—local owner-occupiers, companies that own their offices, pension funds, sovereign wealth funds, and publicly listed and non-traded real estate investment trusts (REITs). That dispersion is bad in the sense that many people who don't even realize that they have exposure to CRE, through their pension funds for example, may get hurt, but it's also good in that the lack of concentration in a few levered institutions means that de-leveraging probably won't be a big problem on the equity side. The debt is much more concentrated. Banks own around 60% of CRE debt, with two-thirds of that risk held by small and regional banks. CMBS investors own around 12% of the debt, insurance companies own around 15%, and equity and mortgage REITs collectively own another 9%. If office properties on average lose 40% of their value, that means that in the typical office deal, the equity would be completely wiped out. For lower-quality buildings, whose value drops 60%, the debt would take a 30% hit in a 65% LTV situation. That magnitude of loss isn't uncommon in a distressed real estate situation; historically, losses on default of retail CMBS bonds have typically been on the order of 50%. So, CRE debt and equity holders could be in for a lot of pain.

Jenny Grimberg: What risks to investors in the CMBS market most concern you?

Stijn Van Nieuwerburgh: Risks around both the fixed- and floating-rate debt in the CMBS market are concerning. The floating-rate debt is causing short-term cashflow problems as rates have risen sharply in a short amount of time, making it likely that the net cash flows on some properties have turned negative, which will force landlords to make the tough choice between pumping more of their own money into the property or just walking away. The fixed-rate debt, which accounts for the vast majority of the market, also presents issues because a sizable share of fixed-rate CMBS loans are partially or fully interest-only, meaning that most of the principal will need to be refinanced at maturity. The 2013 vintages are now coming up for refinancing, and the borrowers are struggling to refinance amid an environment of much higher rates and lower building values. Even in the best-case scenario in which they can roll over the loan, it would almost certainly be into a much smaller one, forcing the landlord to make the same tough choice of whether to put in more equity or walk away. And in some instances, landlords will choose to strategically default, which could lead to fire sales and, in turn, losses for CMBS investors.

SASB deals, which have increased in prominence since the Global Financial Crisis (GFC), are also concerning. SASB loans have typically been collateralized by higher-quality buildings, but several SASB deals have recently run into the same refinancing issues as the conduit CMBS deals. The losses on those deals could be much larger than on the conduit deals because if it's just one or a few office buildings being securitized and those properties lose 60% of their value, that will wreak havoc with the capital structure of the SASB deals. There is little to no diversification benefit. And it's plausible that some of the AAA-rated tranches will be affected, which is different from the GFC when most AAA tranches of securitized RMBS bonds ultimately recovered their full par values.

Jenny Grimberg: How will banks fare in the face of all this?

Stijn Van Nieuwerburgh: I wouldn't be surprised if a few hundred small banks went under. The closest parallel to the current situation is the 1980s/90s Savings and Loan (S&L) crisis, which was also preceded by a massive real estate boom turned bust and a rapid rise in interest rates. Ultimately, 747 thrifts failed, and the Resolution Trust Corporation was invoked to sell the distressed CRE assets held by these thrifts, which cost taxpayers around $150bn. I've heard the argument that this time is different because, unlike in the 1980s, there's no massive overbuilding of CRE, but fundamentally the problem is the same: too much office. And what many people fail to appreciate is that banks have 3x more CRE exposure today than in the mid-1980s. The failure of a few hundred banks on its own wouldn't necessarily be a problem for the macroeconomy, but if it triggers significant deposit flight and causes people to lose confidence in banks, we could see another round of the regional banking crisis.

Jenny Grimberg: Isn't the risk of contagion from declining CRE values to the financial system and the broader economy limited given that office loans, on average, make up only a small fraction of banks' loan books?

Stijn Van Nieuwerburgh: Not necessarily. Banks' exposure to CRE varies widely, ranging anywhere from the single to mid-double digits. Banks are also highly levered, around 10:1, so, as a fraction of equity, CRE exposures are very large. On average, small banks' CRE exposure amounts to 280% of their Tier 1 equity capital, for medium-sized banks it's 180%, and for the largest banks it's around 55%. So, a 10% loss rate on office debt, based on a 20% probability of default and 50% loss given default—both of which are within the realm of possibility—would wipe out a non-trivial amount of banks' equity. It's also important to remember that the CRE shock is not happening in isolation. On its own, CRE is unlikely to cause a systemic crisis. But other assets on banks' balance sheets, including corporate loans and Treasury and agency holdings, are also repricing. And banks are losing deposits amid the higher rate environment, which should result in a contraction in lending—this is what the Fed is hoping to accomplish by raising rates. The question is, will banks overdo it and tighten lending standards so much that it causes a credit crunch that could tip the economy into recession? According to the Fed's Senior Loan Officer Opinion Survey, credit standards across all loan categories are as tight today as they were during the height of the pandemic and the GFC. So, all these shocks are already affecting the broader economy, even as the risk has yet to fully materialize, and the end result could be a mild recession.

Jenny Grimberg: What other risks should we worry about?

Stijn Van Nieuwerburgh: The stress in the CRE sector risks activating what I've called the "urban doom loop". When the net operating income (NOI) of office buildings declines, that passes through to tax assessments and tax revenues. Some lags exist in that process—in NYC, tax assessments are based on the NOI over the past year, and the reassessment is gradually phased in over a five-year period—but a 40% decline in the value of office buildings will eventually translate into a 40% decline in commercial property tax revenues. The share of overall tax revenue that comes from commercial property is around 12% in NYC—much lower than the 25% in Dallas or 35% in Boston—so a 40% decline in office values would translate into a 5% loss in overall tax revenue. That's a $5bn+ hole in the city's budget that will need to be plugged through higher taxes on households and businesses or cuts to public services. And with the prevalence of remote work today, the migration elasticity to local tax rates and amenities may be higher than in the past. That will kick off a vicious cycle of declining real estate values, lower tax revenues, and out migration that I expect to accelerate in the coming years, especially as the federal government significantly scales back support to state and local governments starting next year.

Jenny Grimberg: What will it take to stabilize the office market, and how long could that process take?

Stijn Van Nieuwerburgh: The fundamental problem is too much office space, so the only way to solve the issue is to reallocate that space for other purposes. While painful, the significant reductions in office values I expect will eventually open up a myriad of alternative uses for office properties that weren't feasible before. Office-to-residential conversion is the big one, although Arpit Gupta, Candy Martinez, and I have found that only around 10-15% of US offices are suitable for residential conversion on the basis of their physical characteristics, residual tenancies, and greenhouse gas emissions profile. The other challenge with this type of conversion is financial feasibility—only a narrow path exists to a profitable conversion, especially if politicians impose affordability mandates. And even when they are physically and financially feasible, conversions can take several years. That, combined with the time it takes for existing office leases to roll off and banks to go through the process of trying to work with borrowers to refinance their loans before ultimately giving up, means that it could easily take several years for the office market to stabilize, which is why I've referred to all this as a trainwreck in slow motion.

Q&A on the CRE financing environment

Miriam Wheeler is Head of the Global Real Estate Financing Group at Goldman Sachs. Below, she discusses the financing environment for commercial real estate (CRE) amid the recent stresses.

The interviewee is an employee of Goldman Sachs Global Banking & Markets and the views stated herein reflect those of the interviewee, not Goldman Sachs Research.

Q: Commercial real estate (CRE) has emerged as a key concern for investors over the last several months. What are you hearing/seeing from the investor base on this front?

A: Our investor clients have significantly pulled back their demand for CRE this year, which accelerated post Silicon Valley Bank's collapse and the regional banking turmoil in March. Looking at new issue demand in the commercial mortgage-backed securities (CMBS) market as a proxy for CRE demand more broadly, banks have pulled back significantly in new issue and are largely absent today. Surveys of bank lending activity also reflect a pullback in loan growth for CRE, which has recently turned negative. Insurance companies continue to play selectively. Money managers are driving the market. They have more liquidity to participate but are also being selective. In general, investors are focused on a limited number of sectors and have gone "up in credit" with a preference to take less risk overall given the incremental yield available today. The market has essentially separated into the "haves" and the "have nots."

Q: Which sectors fall into each of the "haves" and the "have nots" categories?

A: The "haves" are sectors that have performed well over the last few years and have benefited from the high inflation environment—multifamily, industrial, and hotels. Interestingly, we are also seeing more interest in select retail assets given the strong post-Covid performance, both in sales and rents, moving some of this category into the "haves." Data centers is the other emerging "haves" given the AI backdrop and accelerating demand from hyperscale tenants. The most prominent of the "have nots" is, not surprisingly, the office sector, which is facing significant structural and cyclical challenges. In the office sector liquidity is scarce even for higher-quality properties given investor desire to limit incremental exposure to the sector. Today, the baby's getting thrown out with the bathwater in office, but over time I expect the market will likely eventually start to differentiate between high- and low-quality assets, as it has started to do for regional malls. Beyond asset class, we are also seeing investors focus on lower leverage deals with significant emphasis on debt service coverage ratios (DSCRs). Acquisitions are favored given the clarity on valuation that new money provides.

Q: Some observers argue that it's very much a lender's market right now. What's your view?

A: It is a great time to make new loans given resetting valuations and attractive yields, but it is challenging to put money out. Transaction volumes are down significantly—asset sales are down 60-70% while new issue debt is off by roughly the same amount. While there are a lot of maturities, to date many borrowers have held off on refinancing and instead sought short-term extensions. Therefore, there isn't a lot of new loan formation. That lack of deal activity means that fierce competition among lenders exists for the "haves" type of product.

Q: Will enough capital be available to meet the substantial refinancing needs over the next year+ given the pullback in bank lending?

A: It's true that around $1.1tn in maturities are coming due over the next 15 months. Some of those capital needs could be met through the commercial mortgage-backed securities (CMBS) market, which currently accounts for less than 20% of overall CRE debt issuance versus north of 40% prior to the Global Financial Crisis (GFC). Private capital could also increasingly step in as banks continue to pull back. Private equity firms that aim to play a bigger role on the credit side of CRE have raised several debt funds, so a lot of dry powder exists. That said, private credit likely won't fill the void left behind by regional banks making smaller loans in their backyards, particularly construction loans, which will likely have some impact on broader liquidity in the CRE market. And private capital won't be distributed evenly. Capital will be readily available for the top tier of assets—the best assets that have performed well and have reasonable leverage. Capital will be available but expensive for the middle-tier of assets—those that are high-quality but highly levered. And liquidity will remain very limited for the bottom tier of assets that are lower quality and highly levered.

Q: What will happen to the middle/bottom tiers of assets if they can't get the financing they need?

A: For the most part, those assets will eventually get sold—either through sales by owners or distressed sales by lenders—which should help valuations reset. Some of those assets may get redeveloped. But that is a long process. Lenders typically don't want to be in the business of owning and operating assets. So, we often hear from owners that their current lender is their best lender—lenders are often willing to extend loans to avoid taking ownership of the asset if owners are willing to keep a loan current and put some more money into a project.

Q: How concerned are you that CMBS issuance will be constrained given that banks have typically been buyers of AAA-rated tranches?

A: The lack of bank participation has certainly been a constraint on liquidity within the CMBS market this year, and it will likely remain so, at least in the short term. But the bigger constraint has been the negative headlines and investor sentiment around CRE particularly given the backdrop in office. Many of our investors have been under-allocating to CRE versus other credit opportunities, so the CMBS market has underperformed corporate credit and structured products. Short term, the relative value (i.e., wide spreads) offered in the market may attract crossover buyers. Longer term, as investors get more clarity around CRE valuations and rate volatility drops, I expect you will see more capital flow back into the space.

Q: Ultimately, how long will it take to see some stabilization in the CRE market, and what will it require?

A: During the GFC, it took almost four years to reach peak delinquencies. I suspect it will be a quicker process this time around given the tremendous amount of floating-rate debt in the market. Typically, that debt has a five-year term, but the rate is hedged only for the first two years, and borrowers will soon have to decide whether to buy new rate protection or not, which will bring decisions about what to do with the underlying assets to the fore sooner.

That said, the stabilization process will likely still take a long time to play through. First and foremost, investors need more certainty around where long-term interest rates, and, in turn, valuation, will settle. That certainty appeared in reach in July and August, but the recent surge in 10-year Treasury yields towards 5.0% has injected a fresh round of uncertainty. Second, investors need more visibility on borrowing costs. Contributing to low transaction volumes is the high cost of debt, which can mean negative leverage day one. So, either asset values need to substantially appreciate through cash flow growth, which is a hard bet to make even for high-quality industrial and multi-assets, or debt needs to cheapen, and/or property cap rates need to widen to get positive leverage. So, this will likely be a multi-year-long process.

Q: Why is there so much floating-rate debt in the market when rates were at rock-bottom levels until quite recently?

A: Borrowers turned to floating-rate debt because it comes with prepayment flexibility that they found attractive. Historically, fixed-rate deals in the real estate lending market were locked out until maturity, whereas floaters are freely prepayable after 12-18 months. So, much of the active capital in this space wanted the flexibility to sell assets if need be. But the overreliance on floating-rate debt left a vulnerability to rising rates that's now playing out. The boat to lock in long-term rates has obviously sailed for now. Almost no 10-year fixed-rate loans are currently being originated, and investors are only committing to 5-year fixed-rate deals on the hope of being able to refinance at lower rates or spreads in the coming months/years. The lesson learned is that the market needs to seriously consider longer-term hedging strategies.

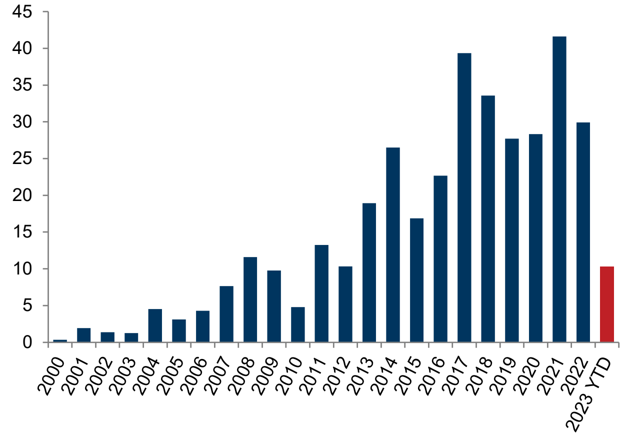
Q: What are the main risks around the CRE market at this point?

A: Interest rates are a major risk for real estate. Cap rates have historically run a few hundred basis points above Treasuries (with some variation by asset class), so the recent move higher in Treasuries is putting added pressure on valuations despite the robust cash flow growth that was experienced in certain sectors—particularly multi, industrial, and hotel—over the last few years. Uncertainty around where rates will stabilize and consequently where cap rates will land is really dampening sales activity. The disconnect between prices in the private and public markets is also a risk to watch and highlights valuation uncertainty. Publicly traded REITs have seen a reset in implied cap rates while many private funds have not substantially marked down the value of their assets. This disconnect is partly due to a lack of trades, so the appraisals that are being used to value assets don't have a lot of comparable sales to evidence value movement. Eventually, private and public marks will likely converge, and so investors in the private markets could be in for some pain ahead as assets get marked over time.

What's going on in private RE?

Private real estate funds have seen steady growth in assets since the Global Financial Crisis (GFC)…

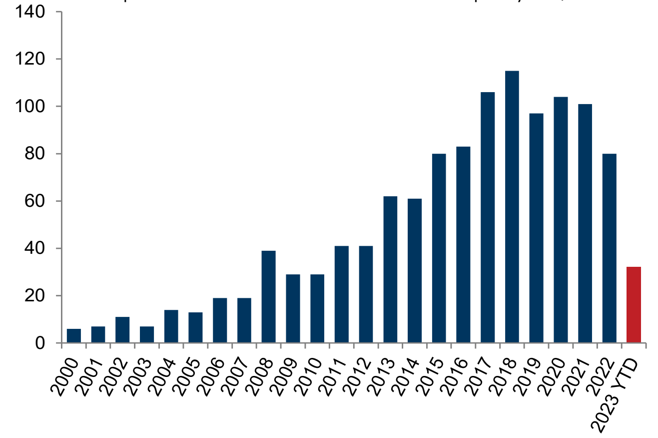
Aggregate capital raised by private real estate funds, $bn



Source: Preqin, Goldman Sachs GIR.

…and the number of private real estate funds created annually has grown, although the rate has decelerated more recently

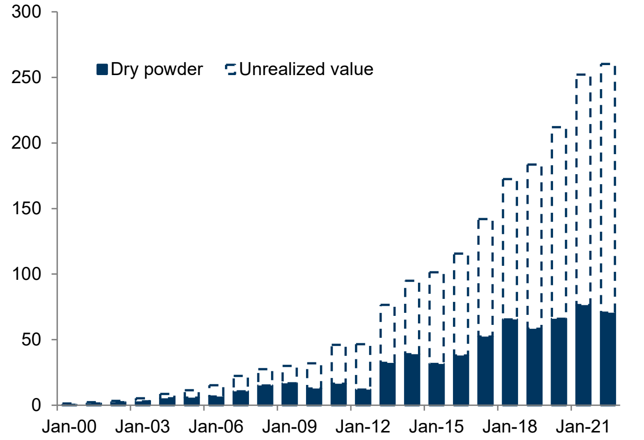
Number of private real estate funds created per year, count



Source: Preqin, Goldman Sachs GIR.

As such, a large amount of dry powder exists among private real estate debt, fueling a narrative that these funds may help fill the gap left by the retreat of traditional bank lenders

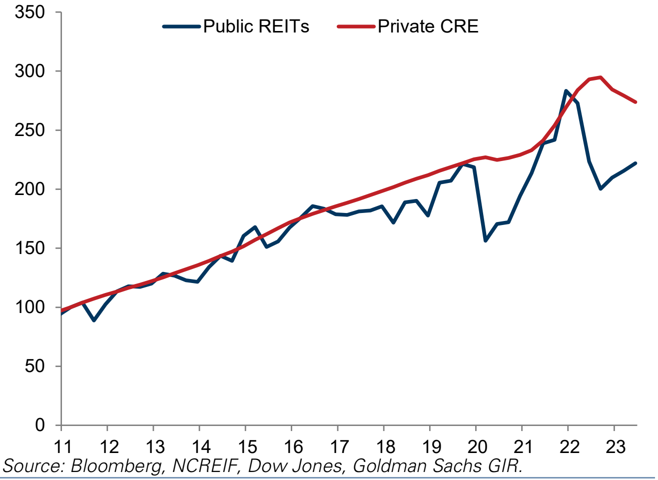
Assets under management, $bn



Note: Unrealized value is what investors have already invested and has been deployed, while dry powder is capital that has been raised but not deployed.
Source: Preqin, Goldman Sachs GIR.

Private CRE has generated higher returns than public REITs, although the performance gap has begun to narrow, and we expect this to continue as private real estate converges to public market valuations and weakening fundamentals

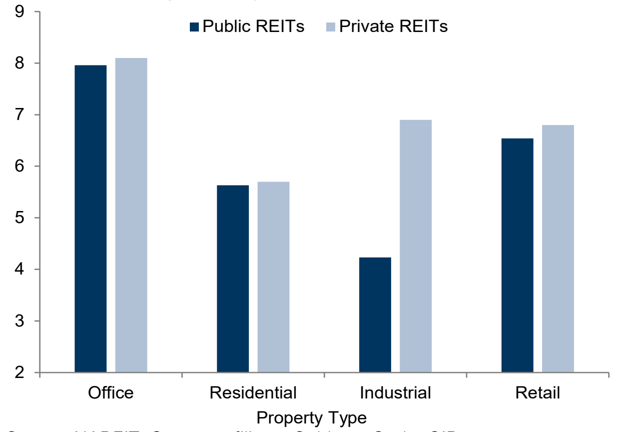
Cumulative total return since 2011 for private CRE and public REITs, 1Q2011=100



Source: Bloomberg, NCREIF, Dow Jones, Goldman Sachs GIR.

Capitalization rates for private REITs suggest slightly more attractive valuations relative to public REITs for now, though given the more backward-looking nature of private marks, this could change as more transactions take place

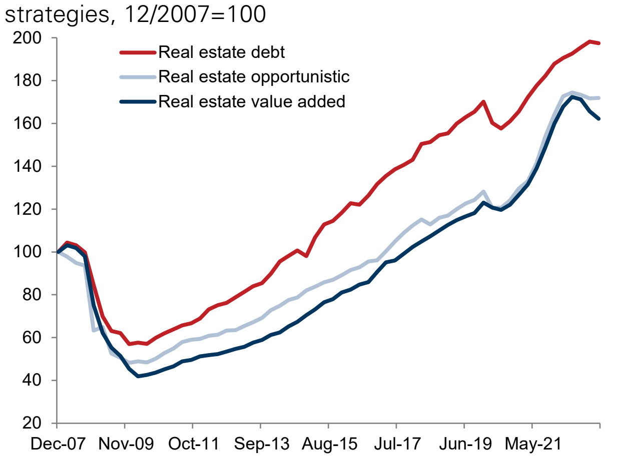
Implied cap rates on public REITs & stated exit cap rates from 2Q23 filings of large non-traded REITs, %



Source: NAREIT, Company filings, Goldman Sachs GIR.

Among private real estate strategies, debt has outperformed opportunistic and value-added strategies, with the gap widening this year

Indexed performance of different private real estate strategies, 12/2007=100



Note: Data as of Q1 2023.
Source: Preqin, Goldman Sachs GIR.

Note: Transaction volumes in private real estate have been very low, so valuations are often based on backward-looking data. As such, we expect private marks to eventually converge to public valuations as more transaction data is gathered.

Special thanks to GS Credit Strategist Sienna Mori and GS Structured Products Strategist Vinay Viswanathan for charts.

Market signals of CRE stress

Roger Ashworth explores what markets are indicating about the amount of stress in commercial real estate (CRE), finding that public debt and equity markets are signaling distress, while private markets largely aren't… yet

Amid the fundamental challenges facing the US commercial real estate (CRE) sector, we turn to capital markets to gauge the current degree of stress, and how much worse it may get.

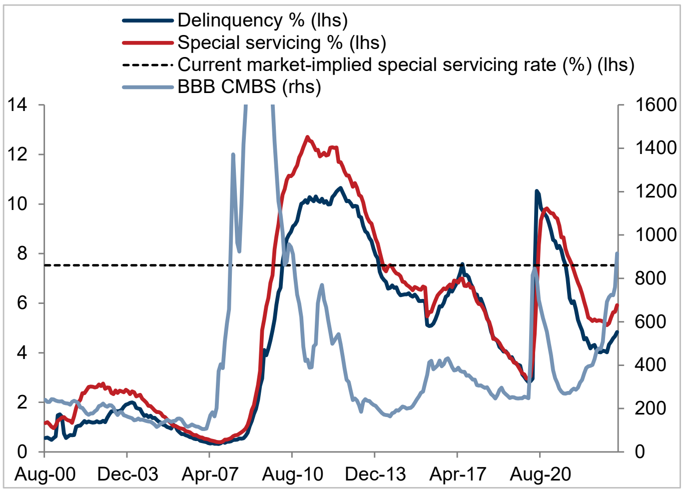
Public debt markets: flashing distress signals

The commercial mortgage-backed securities (CMBS) market is signaling stress in three ways. First, the number of delinquent borrowers and those placed in special servicing in order to determine a loan workout/path forward has risen. Given that special servicing rates tend to lead total delinquency rates, this suggests further stress ahead. To put this into context, the special servicing rate rose from 2.95% to 9.83% during the pandemic and recovered to 5.28% in 3Q22. Market stress is on the rise again, with the special servicing rate now registering 5.92%.

Second, CMBS pricing—a leading indicator of future market stress as investors price in expectations well ahead of realized defaults/losses—has also deteriorated sharply; the BBB CMBS cash index has widened by roughly 700bp in spread terms since mid-2021 and now sits above 900bp. We estimate that this widening is consistent with a rise in the special servicing rate to around 7.5-8%, a clear signal that the market is expecting more distress ahead.

CMBS spreads imply 7.5-8% special servicing rates

Total delinquency and special servicing rates in CMBS (lhs, %) vs. BBB CMBS cash index spread (rhs, bp)

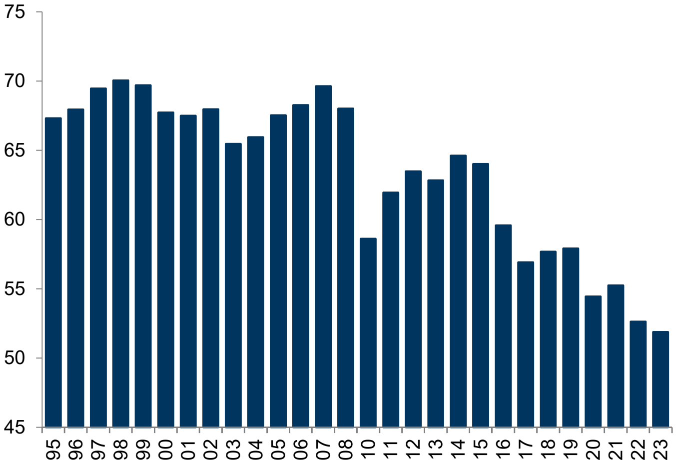


Source: Trepp, Bloomberg, Goldman Sachs GIR.

Third, underwriting standards currently demanded by lenders and CMBS investors have also tightened significantly, suggesting more concern about CRE stress. The loan-to-value (LTV) ratio—the balance of the loan relative to the value of the property (the inverse of which is the down payment for a property buyer)—has declined to around 53%, the lowest level in 23 years and well below historical averages of around 65%. These tight underwriting standards suggest that we are currently in a lender's market and are one of the reasons why we prefer new issue CMBS (see pgs. 4-5).

CMBS loan-to-value ratios are among the lowest on record

Origination LTV of CMBS conduit issuance (weighted average by balance), %



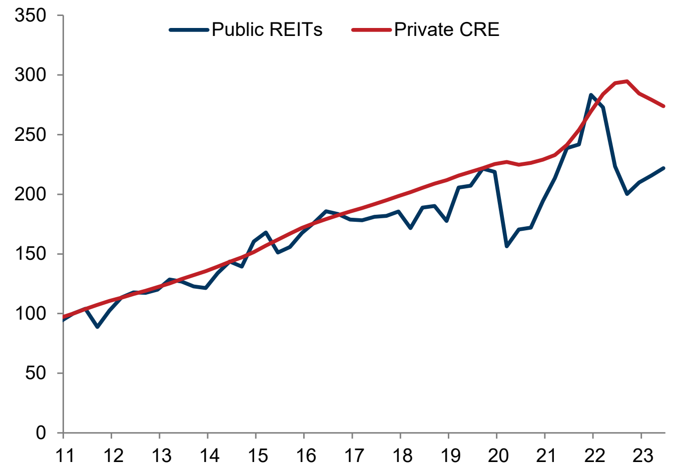
Source: Trepp, Bloomberg, Goldman Sachs GIR.

Public equity markets also signaling distress, private equity markets less so

Public REIT equity valuations have similarly corrected, with total public REIT returns falling by roughly 22% since their 4Q21 peak. On the other hand, private capital has responded less to the CRE stresses so far, returning 2% over the same period. Private marks have recently started to come down, and as risks in private real estate capital persist, we expect returns to normalize closer to public market valuations, in line with weakening fundamentals. As such, the value gap between private and public markets is likely to converge eventually.

The dislocation between private CRE and public REIT returns is narrowing

Cumulative total returns for private CRE and public REITs since 2011, 1Q11=100



Source: NCREIF, Dow Jones, Bloomberg, Goldman Sachs GIR.

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Banks: manageable risks from CRE

Ryan Nash, Robert Galante, and Christian DeGrasse argue that stress in commercial real estate (CRE) should be a manageable risk for the US banking industry given banks' relatively limited overall exposure to office loans and strong capital and reserve positions

The US banking industry endured considerable stress in the spring of this year on the back of concerns around the impact of rising rates on bank capital and liquidity, resulting in the second, third, and fourth largest bank failures of all time. While the turbulence has subsided over the past few months, the banking industry still faces sizable risks from rising long-term interest rates and, more recently, stress in the US commercial real estate (CRE) sector. That said, we expect the impact of CRE stress—and office stress in particular—to be a manageable risk for the banking industry given banks' relatively limited overall exposure to office loans and their strong capital and reserve positions.

Relatively limited exposures to problematic loans

The amount of outstanding commercial real estate loans in the US stands at around $5.6tn, $2.8tn of which sits on bank balance sheets and around 75% of that on the balance sheets of small (<$100bn in assets) and mid-sized banks (<$250bn in assets), with small banks accounting for around 65% of total CRE bank debt. While CRE represents around 18% of banks' total loans (on average), it's a diversified asset class that includes multifamily (MF), retail, industrial/ warehouse, hotel, and office. Banks' exposure to the higher-risk sectors—namely, office that's now in the crosshairs, retail that is just emerging from them, and multifamily, which some observers argue is a potential incremental risk—is relatively limited, with these three sectors accounting for only around 11% of total bank loans and office loans in particular accounting for only around 3%. Within office, small/regional bank lending is skewed toward smaller suburban and medical office loans in secondary and tertiary markets rather than the larger central business district (CBD) office loans in major markets that sit at the center of the current stress in the sector. Such loans are more the domain of CMBS, investor groups, and insurance companies, who have accounted for an average of 74% of large office loans since 2015 and 65% of loans in major markets and 71% of CBD loans since 2019.

Small and mid-sized banks account for the bulk of CRE bank lending

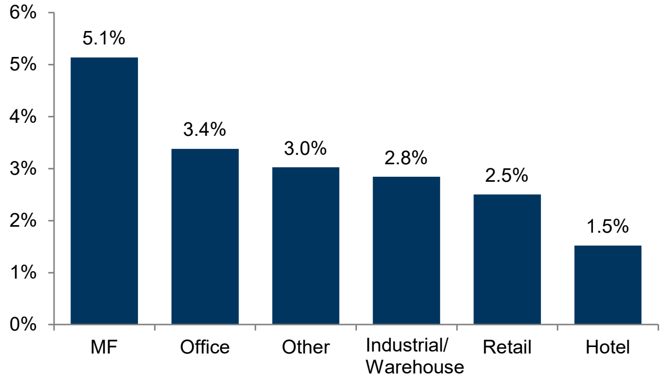
Loan mix by bank size

Bank size	# of banks	CRE debt		Multifamily loans	
		Total ($bn)	Share of total CRE bank debt	Total ($bn)	Share of total MF bank loans
>$700bn assets	6	447	16%	146	26%
$250-700bn assets	9	250	9%	50	9%
$180-250bn assets	11	179	6%	32	6%
$100-180bn assets	9	152	5%	32	6%
<$100bn assets	840	1,789	64%	292	53%
Total	875	2,816	-	552	-

Note: As of Q2 2023.
Source: SNL Financial, Goldman Sachs GIR.

Banks' exposure to higher-risk CRE sectors is relatively limited

Exposure as a share of total bank loans by CRE sector, %



Source: Company data, Goldman Sachs GIR.

Healthy credit metrics and strong capital and reserve positions: a manageable combination

While delinquencies in CMBS office loans have increased substantially recently—up 51bp month-over-month to 5.58% versus a trough of 1.6%—CRE credit metrics for banks remain relatively healthy by historical standards, with net charge-offs (NCOs) of only 24bp and delinquencies of only around 21bp on average (versus 72bp historically). In addition, reported loan-to-value (LTV) ratios for regional banks are in the mid-to-high 50% range (refreshed LTVs, which are based on current property appraisal values, are likely in the high-70% range given lower values), and only around 15% of office loans on banks' balance sheets are set to mature annually over the next couple of years, which should spread out potential losses.

Banks have also strengthened their reserves for CRE (particularly office) over the last several quarters, and CRE reserves now stand at around 1.69% compared to around 1.38% reserves for the total loan book. Of the banks that have disclosed their reserve profiles, reserves for office loans average roughly 5.3%, with a handful of banks having reserve rates in the high-single digits, while banks with less exposure to problematic CBD offices have a lower reserve rate.

History suggests that losses on delinquent CRE loans typically follow a multi-year process, and we find that banks are preparing for 10% cumulative losses over the next several years (losses during the height of the Global Financial Crisis peaked at ~1.4%). Given that fundamentals in other CRE subsectors such as industrial properties are healthy, and the banking system has strong capital positions and reserves in addition to relatively low exposure to problematic CRE loans, we believe potential losses from CRE should be manageable, leaving us comfortable with our view that the risk of systemic shock stemming from the CRE market is low.

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Europe CRE risks: mostly contained

Jonathan Kownator argues that commercial real estate (CRE) risks in Europe are largely contained for now, but a funding gap will likely need to be filled over time

The growing stress within the US commercial real estate (CRE) sector has sparked questions about whether similar stresses could play out in the European CRE market and what risks that could pose. While CRE in Europe has also faced increased pressure, we find that risks are largely contained, for now. Indeed, while CRE lending in Europe is more concentrated in banks than in the US, banks still have a relatively small exposure to CRE. That said, potential capital erosion and losses from non-performing loans (NPLs) could become areas of concern, along with a growing funding gap, real estate obsolescence, and a more troubled Swedish CRE market.

Some stress, but green shoots too

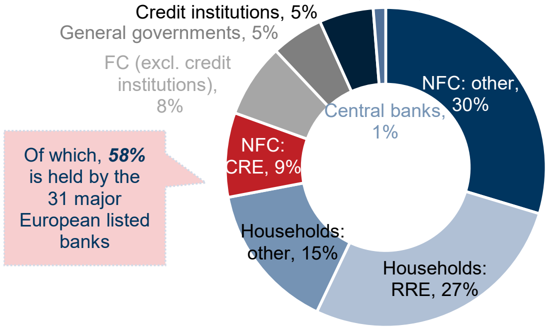
Transaction liquidity remains low within European CRE, particularly for office, which, like the US, faces structural and cyclical challenges. Transaction volumes in the London office market have totaled £2.9bn year-to-date versus £18bn in 2018. However, following the rate hike pauses by the Fed, ECB, and BoE, transaction activity has picked up for asset classes with strong fundamentals and the decline in property valuations has slowed, particularly for logistics and residential properties.

Concentrated but low bank exposure…

In Europe, banks drive the vast majority of the roughly €1.8tn (as of Sept 2021) of CRE lending compared to the more-omnichannel US market, though CRE debt remains a relatively small portion of bank loan exposure (<10%) and the maturity structure of these loans is more favorable than in the US. In the US, the debt maturity wall for commercial mortgages is nearer, with roughly $1.1tn in maturities coming due in 2023/24, while in Europe, the largest quantum of debt maturities will not arise until 2025-26, leaving more time for resolution. For now, banks are largely willing to extend maturities, with additional equity/higher coupons on a case-by-case basis, provided that underlying operating cash flow (and debt ratios, including interest coverage ratios) remains healthy, and instances of stress remain limited. Additionally, differences in loan structuring (recourse vs. non-recourse) as well as cultural differences in dealing with loans between the US and Europe, help in finding private restructuring solutions ahead of defaults.

CRE constitutes only around 9% of European bank loans

Share of total loans and advances by counterparty, 1H22



Note: NFC stands for Non-Financial Corporations; RRE stands for Residential Real Estate; FC stands for Financial Corporations.
Source: European Banking Authority, Goldman Sachs GIR.

…but still some bank risk

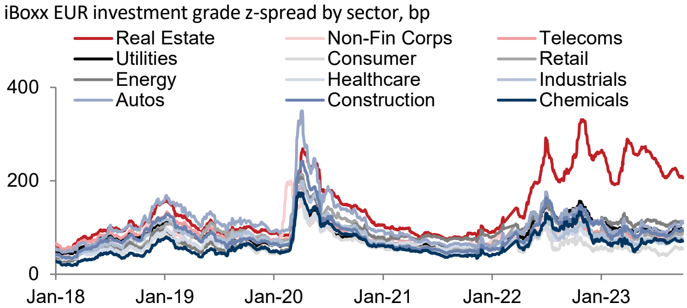
That said, CRE exposure for banks represents roughly 1x tangible book value according to our Banks team, so any significant loan loss could erode bank capital. As of March 2023, the CRE NPL ratio across Europe (ex-UK) was only 3.8%, with a 37% coverage ratio, but with offices typically representing the highest loan exposure (e.g. 28% in 2022 in the UK), this ratio may increase among secondary assets as vacancies rise and demand weakens, although work-from-home is not as prevalent in Europe as it is in the US.

Credit spreads remain elevated; potential for a funding gap

On the public CRE bond side, credit spreads remain elevated versus other sectors, though have declined to a 15-month low.

Credit spreads for real estate remain elevated

iBoxx EUR investment grade z-spread by sector, bp



Source: European Commission, Goldman Sachs GIR.

While bond markets are not shut, bond issuance this year has been marginal, with banks partly bridging the gap through secured loans backed by covered bond programs. And credit conditions remain challenging for some, with S&P assigning 25% of its European REITs coverage a negative outlook, and very few a positive outlook. Given generally lower property valuations and tighter lending standards, should interest rates remain elevated, a funding gap could emerge, which would need to be bridged through junior/high-yield debt, structured solutions, or equity. Absent another significant increase in bond yields, the risk of equity capital increases in Europe remains relatively contained given the quality of the assets and operators of larger European-listed REITs and their relative success in selling assets. We nonetheless expect some public, but mostly private, operators with higher loan-to-value ratios or lower interest coverage ratios, to require additional equity to bridge this gap.

Other areas of concern

Increasing obsolescence is also a major risk for secondary assets with weakening supply and demand fundamentals (e.g. office), where the economics of spending capex may not be justified, especially amid a greater need for sustainable features from a tenant or due to regulations. And Swedish CRE is an additional area of concern given its shorter debt maturities, higher proportion of variable debt, and weakening macro fundamentals. More generally, a persistently elevated cost of capital will likely require real estate operators to refocus on accretive value creation as opposed to the more passive, leveraged yield business model of the last decade.

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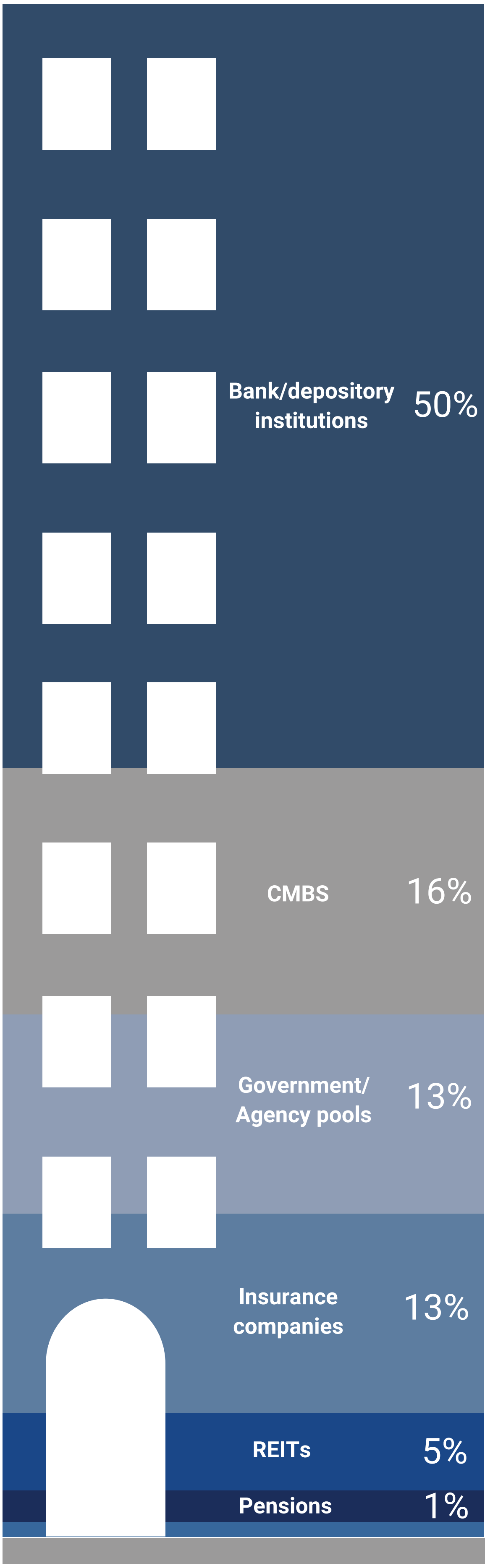
Who owns the debt in US CRE?



Banks/depository institutions include US-chartered depository institutions, foreign banking offices in the US, banks in US-affiliated areas, and credit unions. They own **50%** of all CRE debt (see pg. 16 for breakdown by bank size).

Commercial mortgage-backed securities (CMBS) include asset-backed securities (ABS) and agency and GSE-backed mortgage pools.

They own **16%** of all CRE debt.

CMBS loans are secured by a first-position mortgage on a commercial property. They are typically offered by commercial banks, conduit lenders, and investment banks, and once they are issued are packaged and sold to other investors, including asset managers, banks, hedge funds, and private equity firms.

Several different types of CMBS loans exist: (1) **Conduit,** which are diversified pools of mortgages on commercial properties; (2) **Single-asset, single-borrower** (SASB), which are secured by one large loan or a portfolio of assets owned by the same borrower; (3) **Agency,** which are CMBS and pass-through securities issued primarily by Fannie Mae or Freddie Mac and backed by multifamily mortgages; and (4) **CRE collateralized loan obligations** (CLOs), which are pools of mortgages typically secured by transitional properties in need of short-term bridge financing. CRE CLOs are actively managed, and asset managers can add or remove loans from the portfolio during the reinvestment period.

Government/Agency pools include federal, state, and local governments, as well as government sponsored enterprises (GSEs). They own **13%** of all CRE debt. Federal, state, and local governments own 4%, and GSEs (who own only multifamily residential) own the remaining 9%.

Insurance companies include property-casualty and life insurance companies.

They own **13%** of all CRE debt.

Commercial mortgages represent a significant portion of US insurers' investment portfolios, with life insurance companies owning the bulk of commercial mortgage loans held by insurance companies.

Real Estate Investment Trusts (REITs) own **5%** of all CRE debt.

A REIT is a company that owns and, typically, operates income-producing real estate or related assets. A REIT does not develop real estate properties to resell them, but rather buys and develops properties primarily to operate them as part of its investment portfolio. Two main types of REITs exist: (1) **equity REITs**, which invest in commercial properties and whose incomes are mainly generated from the rental incomes on their holdings; and (2) **mortgage REITs,** which provide financing for income-producing real estate by purchasing or originating mortgages and earning income from the interest on these.

REITs registered with the SEC and publicly traded on an exchange are known as **publicly traded REITs**. SEC-registered but not publicly traded REITS are known as **non-traded REITs**. **Private REITs** are real estate funds or companies that are exempt from SEC registration and whose shares don't trade on exchanges.

Pensions includes private pension funds and state and local government employee retirement funds. They own **1%** of all CRE debt.

Note: Debt ownership shares calculated based on Federal Reserve Flow of Funds data by summing commercial mortgages and multifamily residential mortgages for each category; other category (not shown) makes up 1% of CRE debt; data as of Q2 2023; debt ownership figures in Stijn Van Nieuwerburgh's interview (pg. 10) are calculated based on commercial mortgage figures only.
Source: Federal Reserve Board, Haver Analytics, various research sources, Goldman Sachs GIR.

REITs: gauging the risks from CRE stress

Caitlin Burrows assesses the risks to REITs from CRE stress, finding that pressure on some office REITs will likely persist but that REITs in other sectors should hold up better

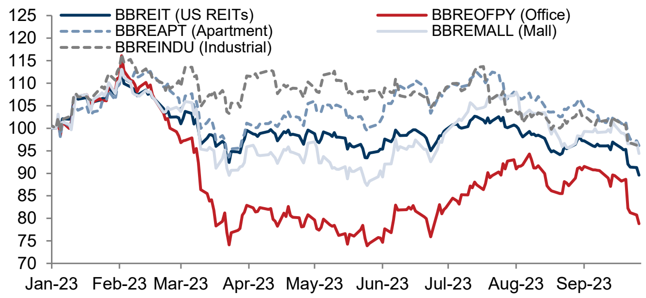
Real estate investment trusts (REITs), which invest in a wide variety of property types and provide a way for institutional and retail investors to express views on the real estate sector via equities, are in focus as investors grapple with the implications of rising stress in the US commercial real estate (CRE) sector. The performance of REITs will largely depend on two factors: fundamentals and balance sheet health. On these metrics, we believe some pressure on office REITs will persist, but REITs that invest in other property types and have healthier balance sheets should hold up.

Where we're coming from: Office has underperformed; industrial has been better insulated

Since the beginning of 2023, REIT share prices have generally declined, with office REITs notable underperformers given concerns about weaker fundamentals and a tougher lending environment. Though office REIT performance rebounded in July, likely as a result of SL Green's—New York City's largest office landlord—sale of its 245 Park Avenue building, the pressure on office REITs has recently reemerged. Meanwhile, industrial REITs have outperformed REITs broadly, as fundamentals have remained robust, and estimate revisions have outpaced other sectors YTD (+1.5 for industrial REITs versus -4.1% for REITs overall, simple average).

REIT share prices have declined since the beginning of 2023, with office REITs notable underperformers

Share price performance of REIT sector overall and by property type, last price, indexed



Source: Bloomberg, Goldman Sachs GIR.

What's ahead: Focus on fundamentals and balance sheets

Different property type fundamentals and balance sheet metrics leave some REIT companies better-positioned than others to weather the ongoing stress in CRE:

- **Fundamentals matter.** Some property types have much better demand and relative supply dynamics than others. For example, in the industrial sector, we find that the most significant driver of demand is e-commerce growth. Strong e-commerce growth over the last few years led to strong market rent growth in the industrial space in 2020-2022, which in turn has helped same-store net operating income (NOI) and EBITDA grow meaningfully. This growth has helped offset the effects of higher interest expenses on cashflows and higher cap rates on valuations. On the other hand, in the office sector, leasing volumes—particularly in Manhattan and San Francisco, where office REITs are most exposed—are much lower today, vacancies higher, and net effective rents lower than before the pandemic (though differences exist, especially by property quality). As a result, NOI is under pressure at the same time as higher interest costs further weigh on property-level cashflows and higher cap rates further pressure valuations.
- **So do leverage and credit ratings.** Lower leverage (net debt/EBITDA, including preferreds) and investment-grade credit ratings improve companies' ability to regularly access debt and secure refinancings. Some property types like industrial have generally lower leverage due to organic growth and earnings multiples: strength in share prices of some industrial REITs (owing to strong fundamentals) has motivated regular issuance of equity, further limiting leverage. However, important differences in balance sheet metrics exist within property types, particularly among office and mall REITs. Each of these subsectors has companies with investment-grade ratings and leverage around the REIT average of 6x, and other companies without investment-grade ratings, with higher leverage, and that rely more heavily on secured debt to raise money.

Risk ahead, but also opportunities

The most at-risk REITs are the ones with weaker property fundamentals and balance sheets, including non-investment-grade credit ratings, as these companies will likely suffer from relatively weak earnings growth and cashflow outlooks, which could ultimately impact shareholder returns and valuations. Some office REITs fall into this most at-risk category. But many office loans are non-recourse, meaning that the REIT or other borrower could choose to walk away from the property when the loan matures. While this is not necessarily an attractive position for the borrower (versus one where cashflows and valuations are growing), we believe it mitigates the risk to the REIT. Lenders have also pointed out that their current borrower is often their best borrower, suggesting that the lender may be willing to extend the existing loan for a short time (e.g., one to three years) in the hopes that over that period fundamentals and interest rates become more attractive. While this doesn't address the ongoing risk from near-term debt maturities for office REITs, we believe it limits more significant near-term downside risk.

More broadly, we believe that some subsectors of the REIT market provide good opportunities for investors. Retail REITs are benefiting from robust sales and traffic trends, which are leading to robust pricing power. Industrial REITs continue to benefit from the strongest fundamentals within the REIT sector. And even within office, we believe that REITs having high exposures to new buildings should be better insulated from the structural challenges facing the subsector.

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Summary of our key forecasts

GS GIR: Macro at a glance

Watching

- **Globally,** we expect real GDP growth of 2.6% yoy in 2023, reflecting a diminishing drag from monetary policy tightening and resilient consumer demand, although softer China growth is likely weighing on global activity. We expect global core inflation to fall back below 3% in 2024, reflecting supply chain improvements and slower wage growth.
- **In the US,** despite a likely temporary growth slowdown in Q4, we expect solidly positive real GDP growth of 2.2% this year on a Q4/Q4 basis, reflecting a reduced drag from monetary tightening and continued strength in real disposable income growth. We see a below-consensus 15% probability of entering a recession over the next year as we think taming inflation will not require a recession. 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 non-housing services inflation as wage growth continues to moderate. We expect the unemployment rate to end the year at 3.6% and remain there for the next few years.
- **We believe the Fed's** hiking cycle is complete and that the Fed will remain on hold at the current Fed funds rate range of 5.25-5.5% into 2024. We expect the first rate cut to only come in 4Q24 as the resiliency of the economy and a growing view that the neutral rate could be higher than Fed officials previously thought weakens the case for rate cuts next year.
- **In the Euro area,** we expect a period of stagnation in 2H23 reflecting a larger and more persistent credit drag following the ECB hiking cycle and weak data momentum, bringing our full-year GDP growth forecast to a modest 0.5% in 2023. We expect core inflation to slow to 3.7% yoy by the end of 2023, reflecting indirect pass-through from lower energy prices faced by consumers and easing supply chain pressures, as well as moderating wage pressures.
- **We believe the ECB's** hiking cycle is complete and that the ECB will remain on hold at 4.00% into 2024. We expect the first rate cut to come in 4Q24, although continued growth weakness or a larger-than-expected deterioration in the labor market next year could prompt earlier rate cuts.
- **In China,** we expect a modest improvement in sequential growth in H2 from Q2 owing to a diminishing drag from inventory destocking, step up in policy easing measures, and stabilizing exports, bringing our full-year GDP growth forecast to 5.4% yoy in 2023. That said, we continue to see the ongoing property downturn as the biggest risk to the economy with other risks including potential trade barriers and capital outflows.
- **WATCH CHINA JAPANIFICATION RISK, US GOVERNMENT SHUTDOWN, AND A HIGHER DM RATE REGIME.** In China, while risks of "Japanification" have emerged off the back of its sluggish growth, nearly non-existent inflation, and low nominal interest rates, we think that China may be able to avoid a sharper slowdown if concerted policy responses can stop further deterioration in longer-term growth expectations. In the US, we think the leadership vacuum in the House raises the odds of a shutdown later this year, which we continue to view as the base case, likely when the current funding extension expires on Nov 17. And across DM economies, while the transition to a higher rate regime could lead to a prolonged drag on growth, we think higher rates will be a manageable headwind to growth, not a recessionary shock.

Goldman Sachs Global Investment Research.

Growth

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

Forecasts

Economics

GDP growth (%)	2023 GS (Q4/Q4)	2023 GS (CY)	2023 Cons. (CY)	2024 GS (CY)	2024 Cons. (CY)
Global	2.6	2.6	2.8	2.5	2.6
US	2.2	2.2	2.1	1.9	1.0
China	5.7	5.4	5.0	4.5	4.5
Euro area	0.3	0.5	0.5	1.0	0.8

Policy rates (%)	2023 GS	2023 Mkt.	2024 GS	2024 Mkt.
US	5.38	5.20	5.13	4.55
Euro area	4.00	3.74	3.75	3.26
China	1.70	1.91	1.70	2.06
Japan	-0.10	0.17	-0.10	0.36

Markets

Interest rates 10Yr (%)	Last	E2023	E2024
US	4.78	4.30	4.30
Germany	2.90	2.75	2.25
Japan	0.81	0.80	0.90
UK	4.50	4.40	4.00

Commodities	Last	3m	12m
Crude Oil, Brent ($/bbl)	85	93	100
Nat Gas ($/mmBtu)	3.34	2.95	2.85
Copper ($/mt)	7,973	8,500	10,000
Gold ($/troy oz)	1,820	2,050	2,050

FX	Last	3m	12m
EUR/$	1.06	1.07	1.12
GBP/$	1.23	1.18	1.25
$/JPY	149	150	150
$/CNY	7.28	7.30	7.00

Credit (bp)		Last	4Q23	
USD	IG	125	118	-
	HY	422	355	-
EUR	IG	175	157	-
	HY	474	435	-

Equities

S&P 500	E2023 GS	E2023 Cons.	E2024 GS	E2024 Cons.
Price	4,500	–	–	–
EPS	$224	$222	$237	$246
Growth	1%	0%	5%	11%

Returns (%)	12m	YTD	E2023 P/E
S&P500	9.0	12.2	19.8x
MXAPJ	14.0	-3.9	14.3x
Topix	17.0	19.7	15.7x
STOXX 600	8.0	4.3	12.4x

Consumer	2023 CPI (%, yoy)	2023 Unemp. Rate*	2024 CPI (%, yoy)	2024 Unemp. Rate*
US	4.1	3.6	2.8	3.6
Euro area	5.6	6.5	2.9	6.6
China	0.4	–	1.7	–

Wage Tracker 2023 (%)	Q1	Q2	Q3	Q4
US	5.0	4.8	4.3	–
Euro area	–	–	–	–
China	–	–	–	–

*Denotes end of period.
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 October 6, 2023

Glossary of GS proprietary indices

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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)

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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.

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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.

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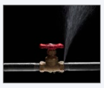

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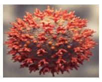

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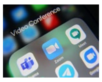

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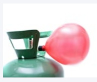

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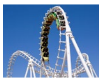

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