S&P Global
Ratings

Global Debt Leverage

A 1% Financing Contraction Could Push Cashflow Negative Corporates To 13%

Stress Test Scenario Of 20,000 Unrated Corporates

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This report does not constitute a rating action

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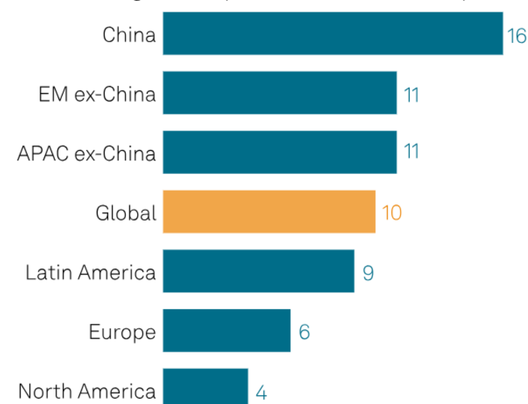
Key Takeaways

- **Challenging conditions ahead.** Amid record-high global leverage, a trifecta of rising defaults, higher return thresholds, and more cautious lending will challenge borrowers over the next two years.
- **Cashflow negative entities recovered slowly.** Of our sample of global corporates (mostly not rated), 9% were cashflow negative in 2022, more than twice the 2019 level, despite the post-pandemic economic rebound. Our base case expects the ratio to creep up to 10% in 2023-2024.
- **The ratio could jump to 13% if financing contracts by 1%.** This result from our stress test reflects vulnerability due to high corporate leverage built up during the pandemic and yet-to-recover cashflows.

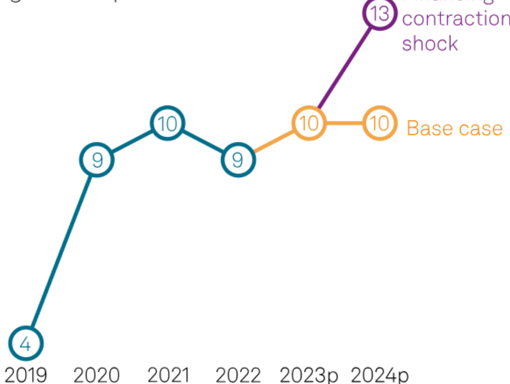
Chart 1

A 1% financing contraction stress could push global cashflow negatives up to 13%

Base case shows still-elevated cashflow negative ratios
Cashflow negative corporates (% of debt), 2023p



Stress tests reveal vulnerability from high leverage and yet-to-recover cashflows
Cashflow negative corporates (% of debt), global sample



Note: Stress factors above pertain to the severe stress test. Cashflow negative corporates are those with either negative funds from operations or negative EBITDA. China here refers to mainland China. p--Projected. *The financing contraction is applied from bottom-up--we assume those with credit scores of '6' would first fail to refinance on a pro rata basis their maturing debt due in 2024, and then those with credit scores of '5'. Source: S&P Global Ratings.

Overview

Against the backdrop of record-high global leverage, a trifecta of rising defaults, higher return thresholds, and a more cautious lending environment points to challenging conditions over the next two years for borrowers who need to refinance or whose fixed interest rates will reset to higher current rates.

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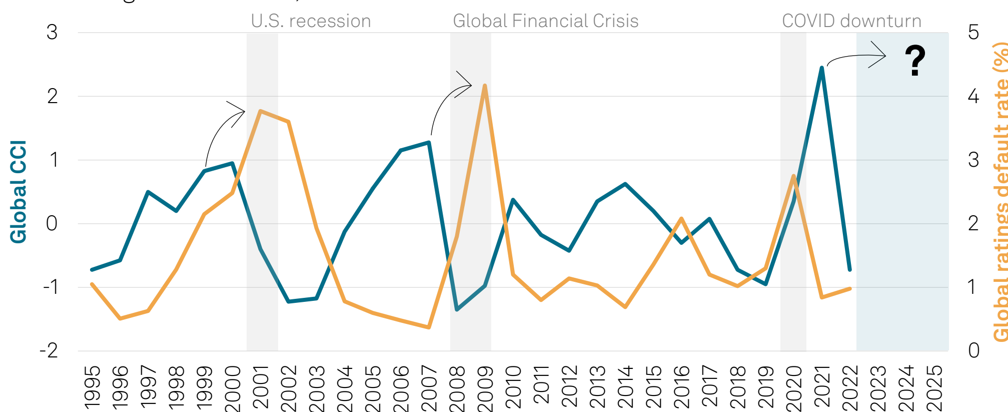
The cycle has turned and we expect more defaults are coming. Our proprietary Credit Cycle Indicator (CCI), an indicator tool that tends to lead negative credit developments by six to 10 quarters, reached a peak in early 2021, signaling heightened credit stress in late 2022 or 2023 (see chart 2). We believe the impact on defaults and nonperforming loans from the buildup of debt leverage and asset prices could linger, and the current credit correction will likely continue into 2024. Indeed, we expect the U.S. and European trailing-12-month speculative-grade corporate default rate to hit 4.5% and 3.75%, respectively, by June 2024, from 3.2% and 3.1% in June 2023.

Chart 2

The severity of credit stress is uncertain

CCI and ratings default rates, 1995 to 2022



Data sources: S&P Global Ratings' articles "Credit Cycle Indicator Q3 2023: Macro Challenges Could Intensify Credit Correction Pains," June 30, 2023, and "2022 Annual Global Corporate Default And Rating Transition Study," April 25, 2023.
Source: S&P Global Ratings.

Higher return thresholds, more selective lending. If we take the Fed funds rate as a proxy for the risk-free rate, then the Fed's own "dot plot" indicates this rate will be at least 2.5% in the long run (see chart 3). The European Central Bank's (ECB's) rate will unlikely be far behind. Combined with the risk-return spreads investors demand of most borrowers above these policy rates, we expect borrowing interest rates to settle higher than the averages seen in 2010-2020. Investments in which returns will no longer exceed expected interest rates won't be financially viable. Meanwhile, amid economic uncertainties, lenders may become more cautious and selective--for example, U.S. banks have been tightening their lending standards (see chart 4). As a result, borrowers will likely be challenged by both higher interest rates and tighter access to financing.

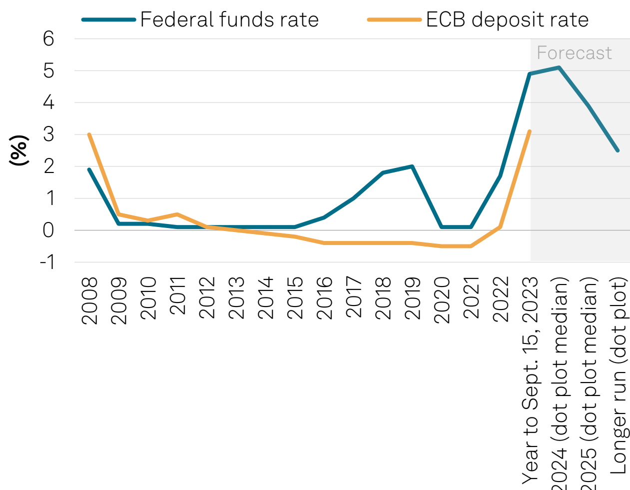
Record-high global leverage exacerbates the strains. Global debt hit a record $307 trillion at June 2023 (equivalent to 336% debt-to-gross domestic product {GDP} ratio). It is a fifth higher than the 280% before the global financial crisis (see chart 5) and works out to $38,000 of debt for every person in the world, compared to a GDP per capita of just $12,600. The Fed funds rate increased five percentage points and ECB four since 2021. This implies an additional annual

interest expense of $4.8 trillion according to our estimates, and less creditworthy governments and corporates and lower-income households are feeling the pinch. Should borrowing costs rise further or financing becomes less available, the liquidity strains and credit deterioration could be more widespread.

Chart 3

The Fed projects longer-term rate above 2009-2020 levels

Fed funds and ECB average deposit rates, 2008 to YTD 2023

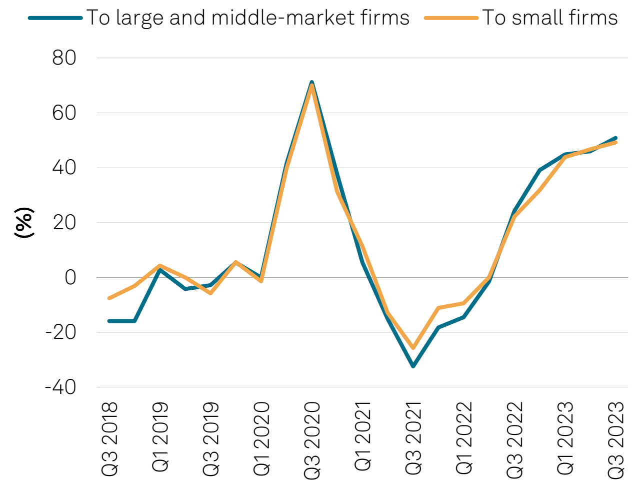


Data sources: Board of Governors of the Federal Reserve System (US), Federal Funds Effective Rate [DFF] and European Central Bank, ECB Deposit Facility Rate for Euro Area [ECBDFR] - both retrieved from FRED, Federal Reserve Bank of St. Louis on Sept. 26, 2023; and Federal Reserve's Summary of Economic Projections, Sept. 20, 2023.
Source: S&P Global Ratings.

Chart 4

U.S. banks have been tightening lending standards

Net percentage of domestic banks tightening standards for commercial and industrial loans, Q3 2018 to Q3 2023

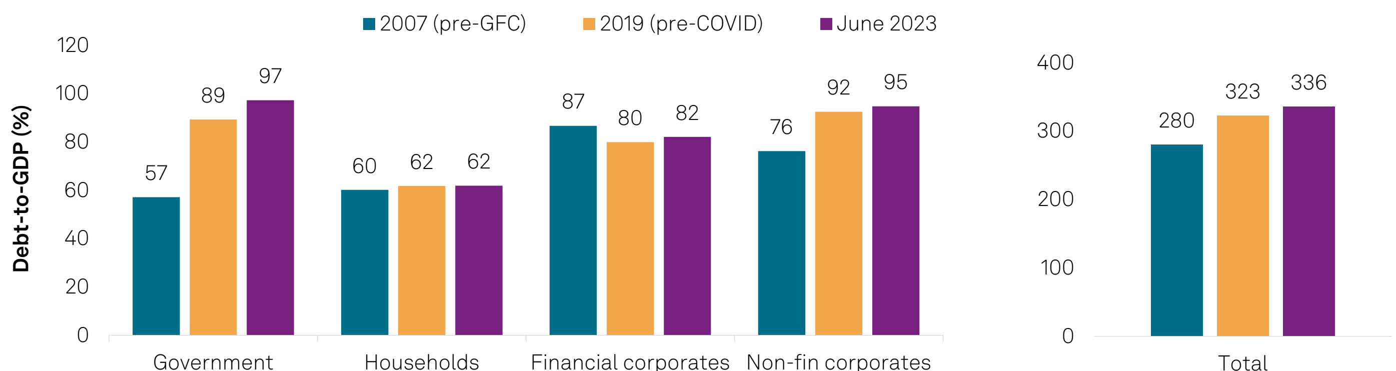


Source: Board of Governors of the Federal Reserve System (US), retrieved from FRED, Federal Reserve Bank of St. Louis on Sept. 26, 2023.

Chart 5

Overall leverage is higher than pre-pandemic

Governments, households, financial, and nonfinancial corporates debt-to-GDP, 2007, 2019, and June 2023



GFC --Global Financial Crisis. Non-fin--Nonfinancial. Data source: IIF's Global Debt Monitor, Sept. 20, 2023. Source: S&P Global Ratings.

Stress test. We stress tested a sample of 20,000 nonfinancial corporates (96% not rated), which represents 32% of global corporate debt. Our sample's financials show the cashflow negative ratio remains high at 9% in 2022, more than twice the pre-pandemic level in 2019 (4%), despite the economic rebound. Under combined stress of 300-basis-point (bp) higher interest spreads and 1% contraction in financing, the cashflow negative ratio would rise to 14% in 2024.

Scenario Sample

Sampling 6% of global corporates. For our stress test, we drew a sample of 20,000 nonfinancial corporate entities from the S&P Global Market Intelligence's Capital IQ database. We estimate the sample is 6% of total global corporates (those with more than 250 employees; 351,520) as estimated by statista.com for year 2021. The sample's $29 trillion of gross debt is 32% of the global nonfinancial corporate debt of $90.2 trillion at June 2023 as estimated by IIF (see chart 6). We caveat the sample tends to overrepresent larger corporates whose financial information is publicly available. For our purposes, we go along with this limitation given that the credit exposures of most institutional investors are to such corporates.

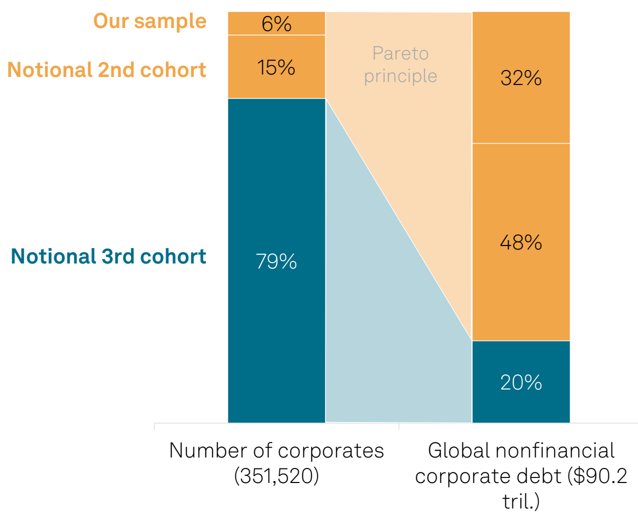
(In chart 6, the notional cohorts are for illustrative purposes only--they merely reflect the Pareto idea that about 20% of corporates carry about 80% of debt).

A further caveat is the sample debt mix, on a geographic region basis, underweighs Asia-Pacific and overweighs North America when compared against the IIF global numbers (see chart 7). We compensate for this in our global ratios by reweighing the underlying country debt to reflect the proportion of debt by country per the IIF database.

Chart 6

Our sample of 20,000 corporates represents 6% of global corporate count and 32% of debt

% of global corporate count and debt amount

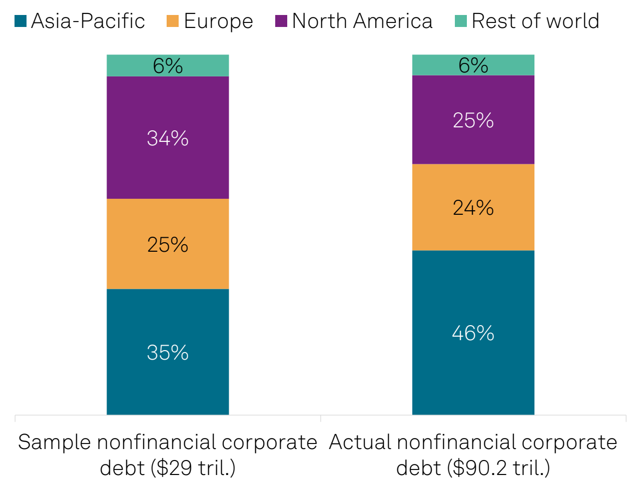


Data sources: statista.com for number of global corporates with above 250 employees, Institute of International Finance for global corporate debt data.
Source: S&P Global Ratings.

Chart 7

For global ratios, we reweigh sample country debt based on the proportions of actual geographic mix

Regional mix of global corporate debt, sample vs. actual



Data sources: S&P Global Market Intelligence for sample corporate debt, Institute of International Finance for actual corporate debt data. Source: S&P Global Ratings.

Scenario Assumptions

In this stress test exercise, we apply base case, intermediate stress, and severe stress scenarios on the financials of the sample of 20,000 nonfinancial corporates. In the intermediate scenario, we apply an additional average 150 bps to interest spreads and assume 0.5% of debt cannot be refinanced. In the severe scenario, we apply 300 bps and 1%, respectively. A summary of our scenario assumptions is shown in chart 8.

Chart 8

Summary of scenario assumptions

Credit scoring

We assign:

- **Credit scores** from '1' (best) to '6' (worst) for a sample corporate depending on country, industry, and financial risks, and group the scores into four risk tiers.
- A special **cashflow negative** category for corporates with negative EBITDA or FFO.

Score	Risk tier
1-2	Low indebtedness
3	Moderately low indebtedness
4	Moderately high indebtedness
5-6	High indebtedness
	Cashflow negative

Base case

Our base case incorporates:

- **Economic metrics:** GDP growth and policy interest rates projected by our economists.
- **Financial metrics:** Debt growth and EBITDA growth projected by our rating analytical teams. EBITDA assumptions implicitly include inflation expectations.

In our base case, we expect inflation to moderate, and policy interest rates to peak in 2023.

Risk trends

We believe:

- **Inflation** could persist, but the probability of higher inflation has decreased.
- **Policy interest rates** are likely to decline but investors may seek higher spreads.
- **Financing access** could tighten even more at the lower end of the credit scale. This could occur because of higher return thresholds demanded by investors.

Stress test scenarios

Consequently, we stress test the sample for:

- **Increased interest spreads:** on average +150 bps in the intermediate scenario. +300 bps in the severe scenario.
- **Failure to refinance:** 0.5% of debt in the intermediate scenario. 1.0% in the severe scenario.

EBITDA is earnings before interest, tax and depreciation and amortization expenses. FFO is funds from operations, which is calculated by deducting net interest expense and tax expense from EBITDA. Source: S&P Global Ratings.

Credit scoring

As part of our assessment of the sample, we assign notional credit risk scores ranging from '1' (best) to '6' (worst) based on each corporate's country, industry, and financial risk characteristics (see Appendix 1 for detailed explanation of notional credit risk scores).

- We arrive at the tiers by applying parts of our corporate ratings methodology (see "Corporate Methodology," published Nov. 19, 2013; information limitations of the sample do not permit full application of the described methodology).
- A special category we call "**cashflow negative**", which are corporates whose funds from operations (FFO) and/or earnings before interest, tax and depreciation and amortization expense (EBITDA) are negative. (Note: In the financing contraction shock detailed below, we further subtract any debt repayment amount from FFO to proxy the additional pressure on companies' liquidity. We don't factor in companies' cash holdings in the calculation as they may not be available or accessible when debt repayment needs arise.)

Base-case projections

Our base-case projections incorporate metrics:

- **Economics**. Our economists project GDP growth and policy interest rates. In our base case, we expect inflation to moderate, and policy interest rates to peak in 2023.
- **Corporate financials**. Our rating analytical teams project debt growth and EBITDA growth. EBITDA assumptions implicitly include inflation expectations.

Risk trends

Examining the global business environment, we hold the view that:

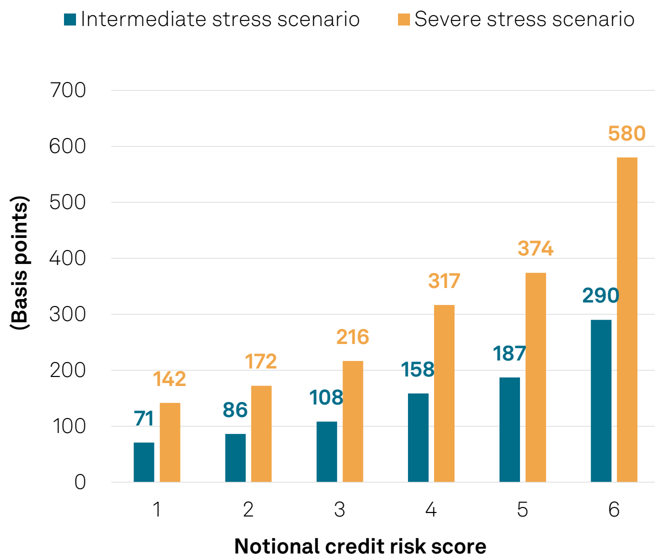
- **Inflation**. Inflation could persist, but the probability of higher inflation has decreased.
- **Interest rates**. Policy interest rates may decline but investors may demand higher interest spreads in their search for yield.
- **Financing access**. Funding access could tighten further, particularly at the lower end of the credit spectrum. This phenomenon could be driven by higher return thresholds required by investors and/or more selective lending.

For more details on our assessment and views on the risk environment, please see our "Global Credit Conditions Q4 2023: Resilience Under Pressure," published Sept. 28, 2023.

Chart 9

Interest spread shock

Interest spread on top of 2022 levels, 2024p

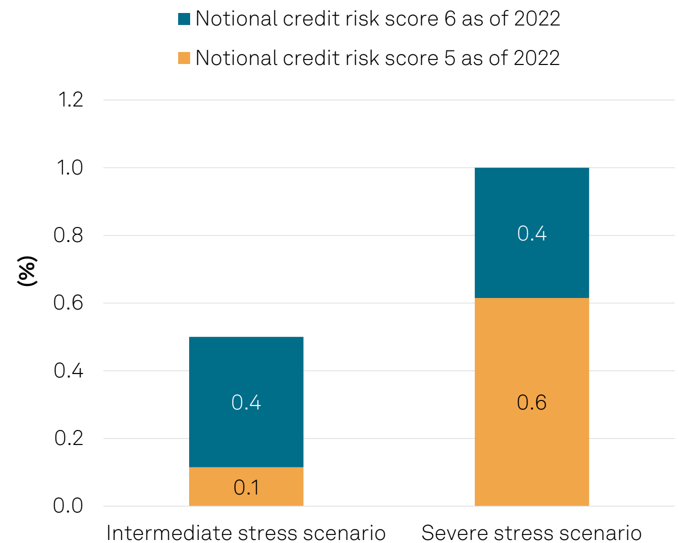


p--Projected. These projections are only for this scenario exercise, not for rating assessments. Source: S&P Global Ratings.

Chart 10

Financing contraction shock

Percentage of total sample debt outstanding unable to be refinanced, 2024p



p--Projected. Data sources: S&P Global Market Intelligence for sample corporate debt. Source: S&P Global Ratings.

Intermediate and severe stress scenarios

Consequently, we elected to stress test the sample pool for:

- **Increased interest spreads**. We apply additional average spreads of 150 bps in the intermediate stress scenario and 300 bps in the severe scenario (these levels are roughly in line with our previous years' *Global Debt Leverage* stress test exercises).
  - The additional spread shock is only applied on refinancing and new debt in 2024.
  - The 300 bps would push spreads closer to levels prevailing during the 2008-2009 Global Financial Crisis.

The 150-bp and 300-bp figures above are averages with the specific spread shock differing based on the corporate credit score. Applied spreads range from 71 bps for a score of '1' and to 290 bps for a score of '6' in the intermediate stress scenario, and 142 bps to 580 bps in the severe stress one (see chart 9). The shock is applied only on floating rate, maturing debt (assuming all can be refinanced after accounting for the funding access shock), and new borrowing.

- **Failure to refinance**. Failure to refinance essentially means the net cash outflow for a corporate worsens. This can drive a corporate into the "cashflow negative" category. In our stress scenarios, we assume:
  - **Intermediate stress scenario**. We apply a contraction of 0.5% of total sample debt in 2024. We contract the financing from the bottom up--we assume those with credit scores of '6' would first fail to refinance on a pro rata basis their maturing debt due in 2024, and then those with credit scores of '5'.
  - **Severe stress scenario**. We apply a contraction of 1% of total sample debt in 2024 and similarly contract the financing from the bottom up (see chart 10).

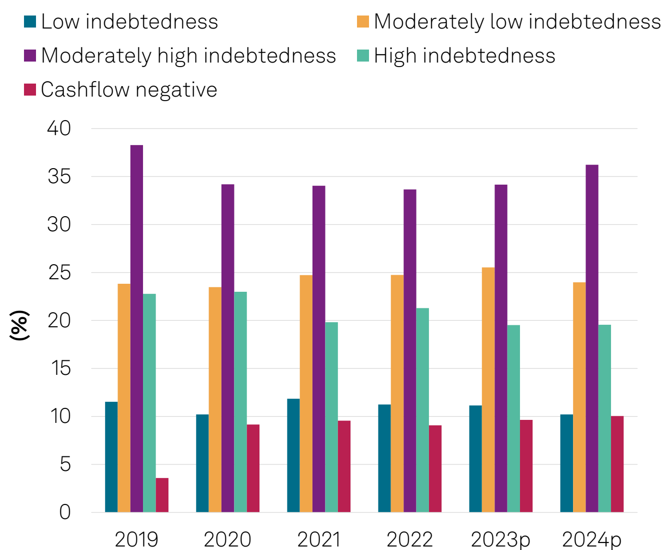
Scenario Outcomes

The cashflow negative ratio remains high. Our sample's financials show that the debt-weighted percentage of cashflow negative corporates in 2022 remained at the COVID-hit ratio of 9% in 2020 (see chart 11). This is more than double the pre-pandemic level of 4% in 2019. Our base-case projections assume corporate revenue and earnings growth to ebb in this and coming years owing to more muted economic growth trajectories. Consequently, we expect the cashflow negative ratio to hover around 10% in 2023 and 2024.

Chart 11

Cashflow negatives are still twice the pre-COVID level of 2019

Global corporate sample (% of debt)

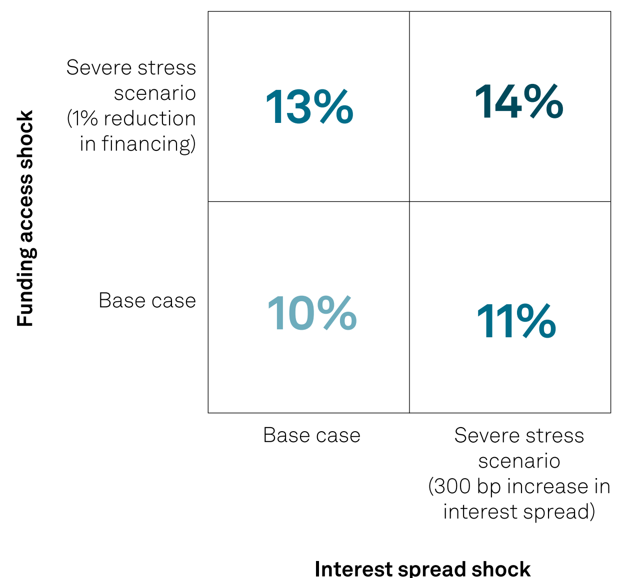


p--Projected. Data sources: S&P Global Market Intelligence for sample corporate debt. Source: S&P Global Ratings.

Chart 12

Cashflow negatives jump almost half in the combined severe stress scenario

Scenario outcome in cashflow negative (% of debt), 2024p



p--Projected. Data sources: S&P Global Market Intelligence for sample corporate debt. Source: S&P Global Ratings.

Contradicting market signals. The high cashflow negative ratio does not easily reconcile with global banking nonperforming loan (NPL) ratios. This is because not all cashflow negative corporates become nonperforming, not all corporates are funded by banks (e.g., private credit in the U.S.) and the denominator of the banks' NPL ratio frequently includes noncorporate loans (e.g., household loans). In respect to S&P Global Ratings' portfolio of corporate ratings, many rated non-U.S. corporates tend to be market-leading corporates. The cashflow positions of such leading corporates may be improving while their laggard competitors (cashflow negatives) tread water. So, the cohorts may be at opposite ends of the credit distribution curve.

Stress Test Outcomes: Global

Interest rate stress only. In the intermediate scenario of our stress test exercise, we applied higher interest spreads averaging 150 bps and 300 bps in the severe scenario. The cashflow negative ratio in 2024 would hover at 10% in the intermediate scenario and rise to 11% in the severe scenario (see chart 12). These figures compare to the base-case ratio of 10%.

Financing contraction stress only. In the intermediate scenario, we applied a reduction in financing equal to 0.5% of total debt and 1% in the severe scenario. The cashflow negative ratio in 2024 would rise to 11% in the intermediate scenario and 13% in the severe scenario.

Combined stress. For the combined intermediate scenario, we applied higher spreads of 150 bps and 0.5% reduction in financing. In the severe scenario, it is 300 bps and 1%. The cashflow negative ratio in 2024 would jump to 11% in the intermediate scenario and 14% in the severe scenario.

Geographies

Asia-Pacific corporates are the most vulnerable. The Asia-Pacific (ex-China) and China subsamples see the largest percentage point rise in cashflow negative ratios under the combined severe stress scenario in 2024 to 18% (2023: 11%) and 22% (2023: 16%), respectively (see table 1). In contrast, Europe's ratios move up to 12% (2023: 6%), Latin America's to 10% (2023: 9%), and North America's to 5% (2023: 4%). The emerging markets' (ex-China) outcome of 17% (2023: 11%) combines some Asia-Pacific, Latin America, and Middle East, and Africa country subsamples (not shown).

Table 1

Asia-Pacific corporates are more sensitive

Distribution of risk tiers (% of debt) by region

Geography	Sample debt (tril. $)	Sample count	Average risk tier, 2022	Distribution of risk tiers (% of debt), 2023p					Combined stress, 2024p
				Low	Moderately low	Moderately high	High	Cashflow negatives	Cash flow negatives (%)
Global	29	20,000	4.1	11	26	34	20	10	14
Asia-Pacific ex-China	7	10,770	4.3	7	18	42	22	11	18
China	3	1,618	4.4	8	24	29	23	16	22
EM ex-China	3	3,642	4.1	8	29	34	19	11	17
Europe	7	4,037	3.9	14	24	38	17	6	12
Latin America	1	814	4.0	11	29	36	15	9	10
North America	10	2,197	3.7	14	33	33	15	4	5

Average risk tier is shown as a numeric equivalent where 1.5 = "low", 3 = "moderately low", 4 = "moderately high", 5.5 = "high", 7 = "cash flow negative". This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. EM ex-China--17 emerging markets, namely Argentina, Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Saudi Arabia, South Africa, Thailand, Turkey, and Vietnam. China here refers to mainland China, which we examine separately due to the vastness of its debt volume. Combined stress outcomes relate to the severe stress. tril.--Trillion. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Industries

Tighter credit exacerbates ongoing pains. Homebuilders and developers, which have been facing liquidity challenges in regions like Asia-Pacific, along with transportation cyclical and leisure and sports, two sectors showing positive momentum but are still climbing out of the Covid slump, will fare worse if credit access becomes more restrictive and interest spread further

increases. Under the combined severe shocks, their cashflow negative ratios will rise to 42% (from 26% in 2023), 39% (24%) and 33% (29%) in 2024 (see table 2). Aerospace and defense and retail and restaurants will have a cashflow negative ratio of around 20% in 2024.

Caveat. We caution the industry sample may not fully reflect the global picture, particularly if the sample contains few very large players or is concentrated in specific geographies. Industry sample outcomes should thus be treated with caution.

Table 2

Homebuilders and developers, leisure and sports, and transportation cyclical sectors have the highest cash negatives under the combined severe shocks

Distribution of risk tiers (% of debt) by sector

				Distribution of risk tiers (% of debt), 2023p					Combined stress, 2024p
Sector	Sample debt (bil. $)	Sample count	Average risk tier, 2022	Low	Moderately low	Moderately high	High	Cash flow negatives	Cash flow negatives (%)
Global	28,964	20,000	4.1	11	26	34	20	10	14
Aerospace and defense	286	121	4.2	12	44	7	14	24	23
Agribusiness and commodity foods	1,161	1,168	3.9	4	16	64	14	1	8
Auto OEM	1,295	80	5.1	0	8	48	41	3	5
Auto suppliers	283	685	4.0	0	36	51	10	3	7
Building materials	368	514	3.8	15	29	26	28	1	8
Business and consumer services	1,395	1,105	4.7	5	19	29	39	9	11
Capital goods	896	1,482	3.7	16	31	34	14	5	8
Commodity chemicals	502	674	4.1	0	26	48	22	4	11
Consumer durables	1,130	1,884	3.6	29	27	18	18	7	11
Containers and packaging	82	128	3.7	2	26	60	12	1	1
Engineering and construction	756	770	4.6	0	7	48	39	6	11
Forest and paper products	123	183	4.3	0	23	52	23	2	10
Health care services	799	659	3.9	10	40	28	19	4	5
Homebuilders and developers	1,811	1,299	5.0	0	9	32	33	26	42
Leisure and sports	734	862	5.3	5	7	23	36	29	33
Media and entertainment	905	546	4.1	8	15	45	26	6	7
Metals production and processing	641	773	3.7	0	44	46	7	3	6

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Sector	Sample debt (bil. $)	Sample count	Average risk tier, 2022	Distribution of risk tiers (% of debt), 2023p					Combined stress, 2024p
				Low	Moderately low	Moderately high	High	Cash flow negatives	Cash flow negatives (%)
Mining	137	144	3.5	0	64	31	3	2	2
Oil and gas drilling, equipment and services	117	159	4.6	0	38	27	26	9	13
Oil and gas integrated, exploration and production	1,787	282	3.7	0	54	27	18	0	1
Oil and gas refining and marketing	364	110	4.0	0	24	58	14	3	5
Pharmaceuticals	929	564	2.5	46	37	13	0	4	4
Real estate investment trusts (REITs)	627	253	3.3	6	61	31	0	2	3
Regulated utilities	4,031	932	3.1	34	32	24	0	10	11
Retail and restaurants	1,680	1,242	4.2	11	22	32	27	8	18
Specialty chemicals	212	266	3.0	23	46	28	1	1	2
Technology hardware and semiconductors	1,081	1,434	3.7	0	59	25	13	2	5
Technology software and services	479	499	3.5	32	11	43	9	6	7
Telecommunications and cable	2,002	223	4.2	5	11	61	21	2	2
Transportation cyclical	975	398	5.4	0	0	31	45	24	39
Transportation infrastructure	1,378	561	4.0	5	14	68	8	6	12

Average risk tier is shown as a numeric equivalent where 1.5 = “low”, 3 = “moderately low”, 4 = “moderately high”, 5.5 = “high”, 7 = "cash flow negative". This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. Combined stress outcomes relate to the severe stress. p--Projection. Bil.--Billion. Source: S&P Global Market Intelligence, S&P Global Ratings.

A "Great Reset" May Be Needed

Amid record debt leverage, more challenging debt servicing conditions are imminent as low interest rates and easy money have dissipated. Our study of 20,000 global corporates points to vulnerabilities that could persist through 2024 even in the base case. Such vulnerabilities leave corporates sensitive to interest spread and financing contraction shocks, albeit at varying degrees. These results lead us to believe a "great reset" of policymaker mindset and community acceptance will be necessary.

Obviously, not all debt is bad. There are good reasons to take on additional debt. Emerging markets are still climbing the economic development ladder. Many governments may help more vulnerable people and businesses to cope with surging food and energy prices. Governments, corporates, and households will have to pay for more frequent extreme weather events and climate change mitigation. Countries will need to develop new infrastructure to adapt to a low-carbon and digital economy. However, high debt-to-GDP leverage implies less than ideal productivity. It will not be easy to reduce leverage. Tradeoffs include more cautious lending, reduced overspending, restructuring weaker enterprises and writing down less-productive debt.

Related Research

S&P Global Ratings Research

- Global Credit Conditions Q4 2023: Resilience Under Pressure, Sept. 28, 2023
- Credit Cycle Indicator Q4 2023: Risks Could Intensify Before The Cycle Turns, Sept. 28, 2023
- Global Economic Outlook Q4 2023: Nearing The Rate Plateau, Sept. 27, 2023
- Default, Transition, and Recovery: The U.S. Speculative-Grade Corporate Default Rate Could Rise To 4.5% By June 2024, Aug. 17, 2023
- Default, Transition, and Recovery: The European Speculative-Grade Corporate Default Rate Could Rise To 3.75% By June 2024, Aug. 18, 2023
- 2022 Annual Global Corporate Default And Rating Transition Study, April 25, 2023
- Global Debt Leverage: Is a Great Reset Coming?, March 20, 2023
- White Paper: Introducing Our Credit Cycle Indicator, June 27, 2022

Other Research

- Institute of International Finance. (2023). Global Debt Monitor: In Search of Sustainability, Sept. 19, 2023.

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Appendix 1: Sample And Stress Test Methodology

This appendix discusses the assumptions, data sources, and approach adopted in the article.

Corporate financials data source and sample

We drew our global sample of nonfinancial corporate financial data from S&P Global Market Intelligence's Capital IQ database. Financials are through to fiscal year 2022.

The sample comprises 20,000 corporates, of which 96% are unrated and 73% are listed. The sample total debt of US$29 trillion is equivalent to 32% of estimated global nonfinancial corporate debt as of June 2023 (as reported by IIF).

Caveats

The data have a statistical bias toward nonfinancial corporates that are listed and had reported their latest financials at the date of sample extraction. Consequently, some industry sectors or geographies may be over or underrepresented, on a debt-weighted basis, in the sample compared with the actual global population.

This exercise is in US$ equivalent, and it does not account for foreign exchange rate changes. Parent companies and their subsidiaries are treated separately in this exercise.

Sample industry coverage

The global sample contains 73 industry sectors: aerospace and defense; air freight and logistics; aluminum; auto components; automobiles; broadline retail; building products; coal and consumable fuels; commercial and professional services; commodity chemicals; construction and engineering; construction materials; consumer staples distribution and retail; copper; distributors; diversified chemicals; diversified consumer services; diversified metals and mining; diversified real estate activities; diversified REITs; electric utilities; electrical equipment; fertilizers and agricultural chemicals; food, beverage and tobacco; gas utilities; gold; ground transportation; health care equipment and services; health care REITs; hotel and resort REITs; hotels, restaurants and leisure; household and personal products; household durables; independent power and renewable electricity producers; industrial conglomerates; industrial gases; industrial REITs; integrated oil and gas; leisure products; machinery; marine transportation; media and entertainment; metal, glass and plastic containers; multi-family residential REITs; multi-utilities; office REITs; oil and gas drilling; oil and gas equipment and services; oil and gas exploration and production; oil and gas refining and marketing; oil and gas storage and transportation; other specialized REIT; paper and forest products; paper and plastic packaging products and materials; passenger airlines; pharmaceuticals, biotechnology and life sciences; precious metals and minerals; real estate development; real estate operating companies; real estate services; retail REITs; semiconductors and semiconductor equipment; silver; software and services; specialty chemicals; specialty retail; steel; technology hardware and equipment; telecommunication services; textiles, apparel and luxury goods; trading companies and distributors; transportation infrastructure; water utilities.

Sample geographic coverage

The global corporate sample covers 60 geographies, which represent 91% of world GDP (current US$) as of 2022:

- **Asia-Pacific:** Australia, China (mainland), Hong Kong, India, Indonesia, Japan, Korea, Malaysia, New Zealand, Pakistan, Philippines, Singapore, Taiwan, Thailand, Vietnam.
- **Emerging markets (ex-China):** Argentina, Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Saudi Arabia, South Africa, Thailand, Turkey, Vietnam.
- **Europe:** Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom.
- **Latin America:** Argentina, Brazil, Chile, Colombia, Mexico, Peru.
- **Middle-East, Africa:** Egypt, Ghana, Israel, Kenya, Nigeria, Saudi Arabia, South Africa, United Arab Emirates.
- **North America:** Canada, United States of America.

Growth assumptions

- **Debt growth projections:** We applied corporate debt growth rates estimated by our analytical teams for 2023-2024 by region and sector.
- **EBITDA growth projections:** We applied corporate EBITDA growth rates estimated by our analytical teams for 2023-2024 by region and sector.

Notional credit risk scores and tiers

For this exercise, we determined notional credit risk score ranging from '1' (best) to '6' (worst) for each corporate in the sample based on its country, industry, and financial risk characteristics. Our evaluation method is partially, but incompletely, borrowed from our Corporate Ratings methodology (see "*Criteria/ Corporates/ General/ Corporate Methodology*," Nov. 19, 2013). It is important to note that information limitations do not permit full application of such methodology.

We further categorized the corporates into four notional credit risk tiers--"low indebtedness", "moderately low indebtedness", "moderately high indebtedness", and "high indebtedness".

There is also a special category we call "cashflow negative", which are corporates whose FFO and/or EBITDA are negative. In the financing contraction shock, we further subtract any debt repayment amount from FFO to proxy the additional pressure on companies' liquidity. We don't factor in companies' cash holdings in the calculation as they may not be available or accessible when debt repayment needs arise.

The distribution of notional credit risk tiers by geography and sector presented in this article are all debt weighted. In addition, the distribution by region (which includes multiple geographies) is further reweighted according to each geography's total corporate debt amount reported by IIF.

Key ratios and thresholds

In this exercise, we assess financial risk based on the following ratios: debt-to-EBITDA and FFO-to-debt.

- EBITDA is earnings before interest, tax and depreciation and amortization expenses.
- FFO is funds from operations, which is calculated by deducting net interest expense and tax expense from EBITDA.
- Debt here is adjusted debt, for which we deduct 75% of cash equivalents from gross debt.

All sectors except for real estate and utilities

Tier	FFO to debt (%)	Debt to EBITDA (x)
Low indebtedness	Greater than 45	Less than 2
Moderately low indebtedness	30-45	2-3
Moderately high indebtedness	20-30	3-4
High indebtedness	Less than 20	Greater than 4

Real estate

Tier	FFO to debt (%)	Debt to EBITDA (x)
Low indebtedness	Greater than 15	Less than 4.5
Moderately low indebtedness	> 9-15	> 4.5-7.5
Moderately high indebtedness	> 7-9	> 7.5-9.5
High indebtedness	Less than 7	Greater than 9.5

Utilities

Tier	FFO to debt (%)	Debt to EBITDA (x)
Low indebtedness	Greater than 23	Less than 3
Moderately low indebtedness	13-23	3-4
Moderately high indebtedness	9-13	4-5
High indebtedness	Less than 9	Greater than 5

Scenario assumptions

We shock the sample financials for rises in interest spread (on floating rate, refinancing, and new debt) and decreases in funding access in 2024 only. Our framework attempts to test the extent of the generalized presumption that higher borrowing costs and limited access to funding are detrimental to corporate credit quality.

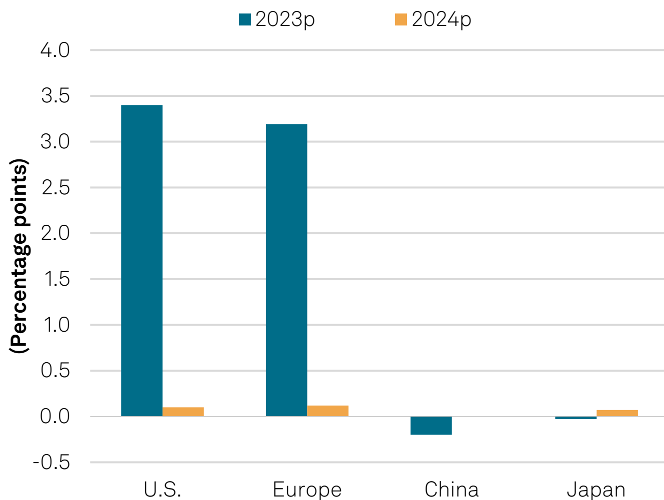
Interest rate scenarios

- **Base interest rates.** We factor in base interest rates (akin to central bank policy rates) in 2023-2024, as projected by our economists for geographies including the U.S., Europe, China and Japan (see chart A1-1). For the U.S. and Europe, our assumptions reflect our view that policy interest rates will peak in 2023 and central banks will ease them slightly in 2024 as the momentum of inflation abates. On the other hand, China's monetary policy is likely to remain accommodative until the recovery is entrenched. For Japan, we expect the Bank of Japan to remain very careful, tightening monetary policy meaningfully only if it sees signs that the rise in inflation will endure. For the rest of the geographies, we apply the same assumptions as the U.S.

Chart A1-1

Base interest rates assumptions

Average base interest rates on top of prior year levels, 2023p-2024p

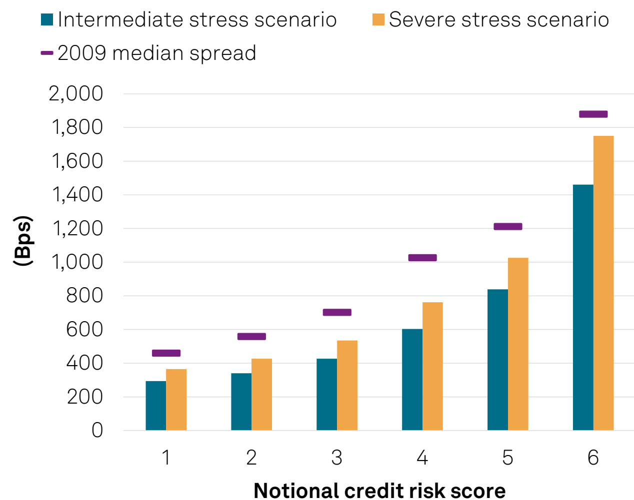


p--Projected. These projections are only for this scenario exercise, not for rating assessments. China here refers to mainland China. Source: S&P Global Ratings.

Chart A1-2

Severe stress pushes interest spreads closer to GFC levels

Interest spreads by notional credit risk score, 2024p



p--Projected. These projections are only for this scenario exercise, not for rating assessments. Only for reference purposes, we compare the 2009 median level of ICE BofA 'AA', 'A', 'BBB', 'BB', 'B' and 'CCC' US Corporate Index to assumed interest yields for notional credit risk score of 1-6. Sources: FRED, Federal Reserve Bank of St. Louis; S&P Global Ratings.

- **Interest spread scenarios.** Our base case assumes interest spread levels stay flat in 2022-2024. Our severe stress scenario in 2024 entails an upward shift of the interest spread curve, averaging 300 bp across credit risk scores on top of the base case, applying larger increments towards the riskier categories. Such a scenario would push spreads closer to levels prevailing during the Global Financial Crisis (see chart A1-2). For the intermediate stress scenario, our interest spread shock averages 150 bp.

The shock is applied on floating rate and maturing debt. We assume that the additional risk premium demanded by investors for a given credit risk score is the same regardless of sector, geography, or currency of debt.

Financing contraction scenarios

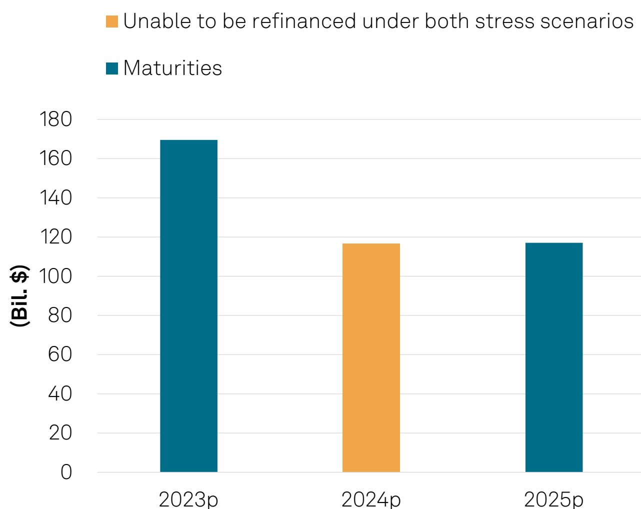
In the severe stress scenario, we assume 1) corporates with a notional credit risk score of 6 as of 2022 would fail to refinance all of their maturities in 2024, and 2) corporates with a notional credit risk score of 5 as of 2022 would fail to refinance 13.4% of their maturities in 2024, which amounts to 1% of the sample's total debt outstanding in 2024.

In the intermediate stress scenario, we assume 1) corporates with a notional credit risk score of 6 as of 2022 would fail to refinance all of their maturities in 2024, and 2) corporates with a notional credit risk score of 5 as of 2022 would fail to refinance 2.5% of their maturities in 2024, which amounts to 0.5% of the sample's total debt outstanding in 2024 (see chart A1-3).

Chart A1-3

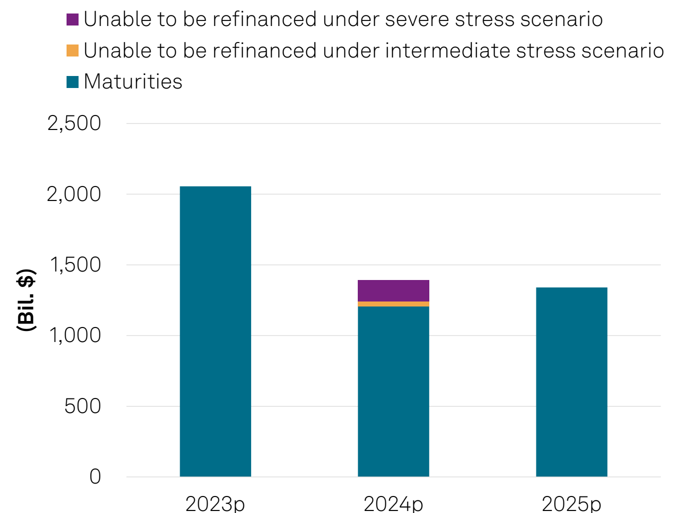
Funding access contracts from the bottom up

Entities with notional credit score of 6 fail to refinance all their 2024 maturities



p--Projected. These projections are only for this scenario exercise, not for rating assessments. Data sources: S&P Global Market Intelligence for sample corporate debt. Source: S&P Global Ratings.

Entities with notional credit score of 5 fail to refinance some of their 2024 maturities



p--Projected. These projections are only for this scenario exercise, not for rating assessments. Data sources: S&P Global Market Intelligence for sample corporate debt. Source: S&P Global Ratings.

Appendix 2: Detailed Scenario Outcomes

Table A2-1

Stress test outcomes: Global

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	10	24	36	20	10
Intermediate stress					
Interest spread shock only	10	24	36	20	10
Funding access shock only	10	24	36	19	11
Combined interest spread and funding access shock	10	24	36	19	11
Severe stress					
Interest spread shock only	10	24	36	20	11
Funding access shock only	10	24	36	16	13
Combined interest spread and funding access shock	10	24	35	16	14

This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-2

Stress test outcomes: Asia-Pacific ex-China

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	7	17	40	24	11
Intermediate stress					
Interest spread shock only	7	17	40	24	12
Funding access shock only	7	17	40	23	13
Combined interest spread and funding access shock	7	17	40	23	13
Severe stress					
Interest spread shock only	7	17	40	24	12
Funding access shock only	7	17	40	19	17
Combined interest spread and funding access shock	7	17	40	18	18

China here refers to mainland China. This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-3

Stress test outcomes: China

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	8	20	33	23	16
Intermediate stress					
Interest spread shock only	8	20	33	24	16
Funding access shock only	8	20	33	23	16
Combined interest spread and funding access shock	8	20	33	23	17
Severe stress					
Interest spread shock only	8	20	32	24	16
Funding access shock only	8	20	33	18	21
Combined interest spread and funding access shock	8	20	31	19	22

China here refers to mainland China. This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-4

Stress test outcomes: EM ex-China

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	6	30	36	17	11
Intermediate stress					
Interest spread shock only	6	30	35	16	13
Funding access shock only	6	30	35	15	14
Combined interest spread and funding access shock	6	30	35	15	14
Severe stress					
Interest spread shock only	6	30	35	16	13
Funding access shock only	6	30	35	14	16
Combined interest spread and funding access shock	6	30	34	13	17

EM ex-China--17 emerging markets, namely Argentina, Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Peru, Philippines, Poland, Saudi Arabia, South Africa, Thailand, Turkey, and Vietnam. China here refers to mainland China. This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-5

Stress test outcomes: Europe

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	14	21	40	17	8
Intermediate stress					
Interest spread shock only	14	21	40	17	8
Funding access shock only	14	21	40	16	9
Combined interest spread and funding access shock	14	21	40	16	9
Severe stress					
Interest spread shock only	14	21	40	16	9
Funding access shock only	14	21	40	15	10
Combined interest spread and funding access shock	14	21	40	14	12

This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-6

Stress test outcomes: Latin America

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	9	31	38	12	9
Intermediate stress					
Interest spread shock only	9	31	38	12	9
Funding access shock only	9	31	38	12	9
Combined interest spread and funding access shock	9	31	38	12	9
Severe stress					
Interest spread shock only	9	31	38	12	9
Funding access shock only	9	31	37	13	9
Combined interest spread and funding access shock	9	31	37	12	10

This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-7

Stress test outcomes: North America

Distribution of risk tiers (% of debt), 2024p

	Distribution of risk tiers (% of debt), 2024p				
	Low	Moderately low	Moderately high	High	Cashflow negatives
Base case	12	35	34	15	4
Intermediate stress					
Interest spread shock only	12	35	34	15	4
Funding access shock only	12	35	34	14	4
Combined interest spread and funding access shock	12	35	34	14	4
Severe stress					
Interest spread shock only	12	35	35	15	4
Funding access shock only	12	35	34	15	4
Combined interest spread and funding access shock	12	35	34	15	5

This calculation is a rough ranking of credit risk that references an entity's debt-to-EBITDA and ratio of funds from operations to debt. Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Table A2-8

Stress test outcomes: Industries

Cash flow negatives (% of debt), 2024p

		Intermediate stress			Severe stress		
	Base case	Interest spread shock only	Funding access shock only	Combined shock	Interest spread shock only	Funding access shock only	Combined shock
Global	10	10	11	11	11	13	14
Aerospace and defense	23	23	23	23	23	23	23
Agribusiness and commodity foods	1	2	2	2	2	6	8
Auto OEM	3	4	5	5	5	5	5
Auto suppliers	3	4	4	4	4	6	7
Building materials	1	1	1	1	1	7	8
Business and consumer services	9	9	9	9	9	10	11
Capital goods	5	5	6	6	6	7	8
Commodity chemicals	4	4	5	5	4	11	11
Consumer durables	8	8	8	8	8	10	11
Containers and packaging	1	1	1	1	1	1	1
Engineering and construction	6	6	6	7	7	11	11
Forest and paper products	2	2	2	4	2	10	10

A 1% Financing Contraction Could Push Cashflow Negative Corporates To 13%

		Intermediate stress			Severe stress		
	Base case	Interest spread shock only	Funding access shock only	Combined shock	Interest spread shock only	Funding access shock only	Combined shock
Health care services	4	4	4	4	4	5	5
Homebuilders and developers	27	2	29	31	30	40	42
Leisure and sports	29	30	30	31	30	32	33
Media and entertainment	7	7	7	7	7	7	7
Metals production and processing	3	3	3	3	3	6	6
Mining	2	2	2	2	2	2	2
Oil and gas drilling, equipment and services	11	11	11	12	11	13	13
Oil and gas integrated, exploration and production	0	0	0	0	0	0	1
Oil and gas refining and marketing	3	3	3	3	3	4	5
Pharmaceuticals	4	4	4	4	4	4	4
Real estate investment trusts (REITs)	3	3	3	3	3	3	3
Regulated utilities	11	11	11	11	11	11	11
Retail and restaurants	8	8	8	9	9	15	18
Specialty chemicals	1	1	1	1	2	2	2
Technology hardware and semiconductors	2	2	2	3	3	5	5
Technology software and services	6	6	6	6	6	7	7
Telecommunications and cable	2	2	2	2	2	2	2
Transportation cyclical	24	24	39	39	26	39	39
Transportation infrastructure	10	11	11	11	11	11	12

Ratios are debt weighted. p--Projection. Original data source: S&P Global Market Intelligence. Source: S&P Global Ratings.

Appendix 3: Sample Mix

Table A3-1

Global sample debt overweighs North America and underweighs Asia-Pacific

Comparing global debt mix by region: sample versus population

	Sample of corporates			Global population of corporates*	
Geography	**Entity count**	**Debt (tril. US$)**	**% of sample debt**	**Debt (tril. US$)**	**% of global debt**
Asia-Pacific	12,388	10.1	35	41.2	46
Europe	4,037	7.2	25	21.6	24
North America	2,197	9.9	34	22.2	25
Rest of world	1,378	1.8	6	3.7	4
Total global	**20,000**	**29.0**	**100**	**88.8**	**100**

*Population data source: Institute of International Finance. The global population data pertains to geographies covered in our sample. Source: S&P Global Ratings.

Table A3-2

Asia-Pacific sample debt overweighs Japan and underweighs China

Comparing Asia-Pacific debt mix by geography: sample versus population

	Sample of corporates			Regional population of corporates *	
Geography	**Entity count**	**Debt (tril. US$)**	**% of sample debt**	**Debt (tril. US$)**	**% of regional debt**
Australia	516	0.4	4.4	1.0	2.5
China	1,618	2.8	27.8	28.2	68.3
Hong Kong	626	1.1	11.0	1.0	2.4
India	1,007	0.6	5.5	1.9	4.6
Indonesia	287	0.1	1.1	0.3	0.8
Japan	2,108	2.6	25.8	4.8	11.7
Korea, South	3,689	1.0	9.8	2.0	4.9
Malaysia	403	0.2	1.7	0.2	0.5
New Zealand	128	0.0	0.4	0.2	0.4
Pakistan	131	0.0	0.2	0.0	0.1
Philippines	100	0.1	1.5	0.1	0.3
Singapore	259	0.3	3.3	0.6	1.5
Taiwan	989	0.4	4.4	0.0	0.0
Thailand	366	0.3	2.6	0.4	1.0
Vietnam	161	0.0	0.4	0.5	1.1
Total Asia-Pacific	**12,388**	**10.1**	**100.0**	**41.2**	**100.0**

*Population data source: Institute of International Finance. China here refers to mainland China. Source: S&P Global Ratings.

Table A3-3

Emerging markets sample debt overweighs Mexico and underweighs India

Comparing emerging markets debt mix by country: sample versus population

	Sample of corporates			Regional population of corporates *	
Geography	**Entity count**	**Debt (tril. US$)**	**% of sample debt**	**Debt (tril. US$)**	**% of regional debt**
Argentina	59	0.0	1.1	0.1	1.3
Brazil	388	0.5	15.7	1.1	15.4
Chile	173	0.2	6.6	0.3	4.5
Colombia	24	0.1	2.0	0.1	1.6
Hungary	11	0.0	0.2	0.2	2.2
India	1,007	0.6	19.2	1.9	25.8
Indonesia	287	0.1	4.0	0.3	4.4
Malaysia	403	0.2	6.0	0.2	3.1
Mexico	100	0.3	11.7	0.4	5.7
Peru	70	0.0	1.0	0.1	1.6
Philippines	100	0.1	5.1	0.1	1.7
Poland	83	0.0	1.1	0.3	4.2
Saudi Arabia	106	0.2	7.7	0.7	9.1
South Africa	129	0.1	5.0	0.1	1.6
Thailand	366	0.3	8.9	0.4	5.8
Turkey	175	0.1	3.2	0.4	5.5
Vietnam	161	0.0	1.4	0.5	6.5
Total emerging markets	**3,642**	**2.9**	**100.0**	**7.3**	**100.0**

*Population data source: Institute of International Finance. Source: S&P Global Ratings.

Table A3-4

Europe sample debt overweighs United Kingdom

Comparing Europe debt mix by country: sample versus population

	Sample of corporates			Regional population of corporates *	
Geography	**Entity count**	**Debt (tril. US$)**	**% of sample debt**	**Debt (tril. US$)**	**% of regional debt**
Austria	51	0.1	0.8	0.5	2.2
Belgium	82	0.2	2.3	0.8	3.8
Cyprus	12	0.0	0.1	0.0	0.2
Czech Republic	7	0.0	0.2	0.2	0.8
Denmark	95	0.1	1.6	0.5	2.5
Estonia	12	0.0	0.0	0.0	0.1
Finland	110	0.1	1.1	0.3	1.4
France	475	1.4	19.9	4.7	21.7
Germany	282	1.2	17.2	3.1	14.4
Greece	29	0.0	0.4	0.1	0.6

Geography	Sample of corporates			Regional population of corporates *	
	Entity count	Debt (tril. US$)	% of sample debt	Debt (tril. US$)	% of regional debt
Hungary	11	0.0	0.1	0.2	0.7
Ireland	77	0.2	3.3	0.8	3.6
Italy	256	0.4	4.9	1.4	6.5
Latvia	2	0.0	0.0	0.0	0.1
Lithuania	19	0.0	0.1	0.0	0.1
Luxembourg	44	0.2	2.2	0.3	1.2
Malta	14	0.0	0.0	0.0	0.1
Netherlands	87	0.3	4.2	1.4	6.4
Norway	134	0.2	2.2	0.6	2.9
Poland	83	0.0	0.4	0.3	1.4
Portugal	23	0.1	0.7	0.2	1.1
Slovakia	2	0.0	0.0	0.1	0.3
Slovenia	4	0.0	0.0	0.0	0.1
Spain	113	0.4	5.2	1.3	6.2
Sweden	282	0.3	4.4	0.9	4.3
Switzerland	158	0.4	6.3	1.3	5.8
Turkey	175	0.1	1.3	0.4	1.9
Ukraine	2	0.0	0.1	0.0	0.0
United Kingdom	1,396	1.5	20.9	2.1	9.7
Total Europe	**4,037**	**7.2**	**100.0**	**21.6**	**100.0**

*Population data source: Institute of International Finance. Source: S&P Global Ratings.

Table A3-5

North America sample debt's country mix is roughly appropriate

Comparing North America debt mix by country: sample versus population

Geography	Sample of corporates			Regional population of corporates *	
	Entity count	Debt (tril. US$)	% of sample debt	Debt (tril. US$)	% of regional debt
Canada	341	0.8	8.2	2.4	10.8
United States	1,856	9.1	91.8	19.8	89.2
Total North America	**2,197**	**9.9**	**100.0**	**22.2**	**100.0**

*Population data source: Institute of International Finance. Source: S&P Global Ratings.

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