S&P Global
Ratings

Global Debt Leverage

If Stagflation Strikes, Still-Recovering Corporate Sectors Hit Hardest

A Stress Test Of 20,000 Unrated Corporates

July 12, 2022

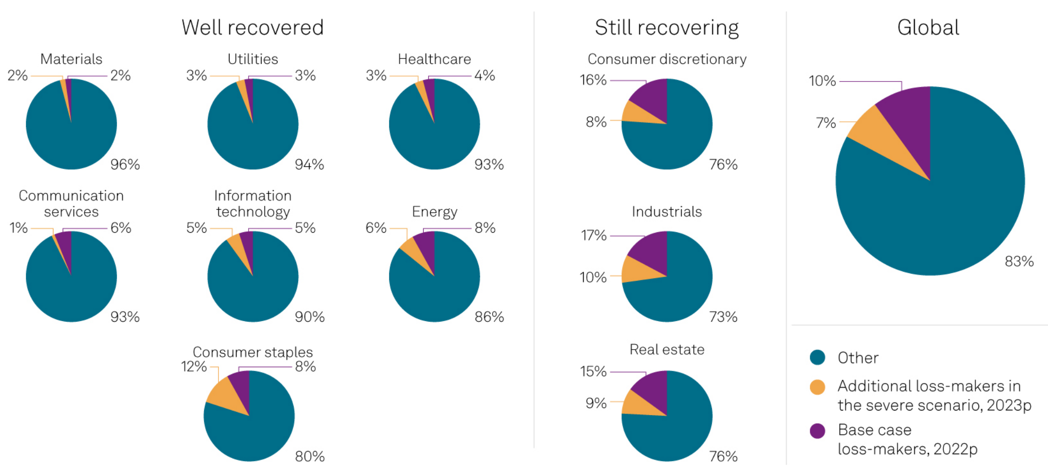
This report does not constitute a rating action

Key Takeaways

- **Global unrated corporate pool.** In our stagflation stress test, we found the most-vulnerable sectors are those not recovered from the COVID crisis, namely consumer discretionary, industrials and real estate. This may vary for our rated issuer pools.
- **U.S. speculative-grade corporate rated pool.** The most at-risk corporate issuers are in real estate, transportation, aerospace and defense, business and consumer services, and metals and mining.
- **Europe speculative-grade corporate rated pool.** Sectors particularly vulnerable to rating pressure are utilities; chemicals; hotels, gaming, and leisure; building materials; aerospace and defense; capital goods; paper and packaging.
- **Asia-Pacific rated corporates.** Stress tests show real estate, capital goods and airport are sectors most at risk.

(This report is part three of three in the Global Debt Leverage July 2022 series)

Unsurprisingly, Still-Recovering Industries Fare Worse In The Stress Test



Sector groupings are based on GICS = Global Industry Classification Standard (GICS®) developed by S&P Dow Jones Indices. p--Projection.
Source: S&P Global Ratings.

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Stress tests on our rated corporates point to cash-flow stress. Our analytical teams have recently stress tested our rated nonfinancial corporate portfolios for higher interest rates and inflation. The portfolios tested were U.S. speculative-grade, European speculative-grade corporates and Asia-Pacific corporates.

Stress testing a wider universe, unrated corporates. To obtain a broad overview of how global companies are doing, we more recently conducted a stagflation scenario stress test on a larger sample of unrated corporates. The sample comprised 20,000 corporates (93% unrated) with debt totaling $37 trillion, representing 41% of total global corporate debt. Each corporate was categorized into four risk tiers: low, moderately low, moderately high, and high; with loss-makers a sub-set of the high category. The stagflation stress comprised slower GDP growth in the U.S., eurozone and China, higher energy, commodity and producer-price inflation, and higher interest spreads. A full description of the stress test can be found in "*Global Debt Leverage: If Stagflation Strikes, Loss-Making Corporates Will Double Globally*," published July 12, 2022.

Well-recovered versus still-recovering. The COVID era has seen industry sectors (GICS definition) bifurcate in terms of general credit quality. The well-recovered are those sectors whose percentage combination of "high indebtedness" and loss-makers is below the global average (see table 3-1). These include communication services, consumer staples, healthcare, information technology, materials and utilities. On the other hand, consumer discretionary, industrials and real estate have higher than average risk. Energy is a special case, being a fallout from the Russia-Ukraine war. We note that these observations may differ from those on the rated issuer pools. For example, rated issuers in luxury and durable goods have shown resilience over the COVID period. Rated issuers involved in capital goods have enjoyed a strong recovery in revenue and demand prospects, well those in residential-related real estate have on average performed well in Europe and North America.

Table 3-1

Sectors: Industrials And Real Estate Suffer Largest Increase In Loss-Makers

Loss-makers (% of debt) for corporate sample by GICS sector

				Distribution of risk tiers (% of debt), 2022p					Stress scenario shock: Loss-makers, 2023p	
GICS sector	Sample debt	Sample count	Average risk tier	Low (1.5)	Moderately low (3)	Moderately high (4)	High (5.5)	Loss-makers	Intermediate	Severe
Global	$37 tril.	20,000	4.1	7%	15%	34%	34%	10%	14%	17%
Communication services	$3,131 bil.	756	4.1	3%	9%	61%	21%	6%	7%	7%
Consumer discretionary	$4,430 bil.	3,629	4.4	7%	10%	22%	45%	16%	19%	23%
Consumer staples	$2,262 bil.	1,656	4.1	5%	11%	48%	28%	8%	14%	20%
Energy	$2,987 bil.	687	3.6	17%	28%	29%	19%	8%	12%	14%
Healthcare	$1,888 bil.	1,130	3.8	11%	28%	35%	23%	4%	5%	7%
Industrials	$8,960 bil.	4,926	4.5	4%	7%	22%	50%	17%	24%	27%
Information technology	$1,901 bil.	1,831	3.4	20%	38%	24%	13%	5%	8%	10%
Materials	$2,520 bil.	2,492	3.7	12%	25%	39%	22%	2%	3%	4%
Real estate	$3,937 bil.	1,759	4.3	4%	14%	33%	35%	15%	20%	24%
Utilities	$5,190 bil.	1,134	4.1	5%	14%	51%	27%	3%	5%	6%

GICS = Global Industry Classification Standard (GICS®) was developed by S&P Dow Jones Indices. Average risk tier is shown as a numeric equivalent where 1.5 = “low”, 3 = “moderately low”, 4 = “moderately high”, 5.5 = “high”. 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. The loss-making ratio can sometimes exceed the ratio of the highly-indebted risk tier, and thus the risk distribution may not sum up to 1 in all cases. p--Projection. bil.--Billion. tril.--Trillion. Source: S&P Global Market Intelligence, S&P Global Ratings.

If credit headwinds hit. In our severe stress scenario, the loss-maker ratio for consumer discretionary, industrials and real estate leaps to mid-to-high 20% (see table 3-1). Significant variation within sectors presents as well. For example, within the consumer discretionary sector, distributors and hotels, restaurants and leisure industries would have relatively more loss-makers in the severe scenario than other industries in the same sector (see table 3-2). Within the industrials sector, trading companies and distributors and aerospace and defense fare the worse. The airlines industry is already well underwater. As for the real estate sector, it is again the real estate developers industry taking the hit. In the energy sector's case, the higher energy prices are expected to hit downstream players while benefiting upstream.

Caveat. As we dive into the industry level, down from industry groups and sectors, the smaller the sample count becomes. This increases the possibility that the industry sample may not fully reflect the global picture. This is particularly so if the sample contains a few very large players or is concentrated in specific geographies. Industry sample outcomes should thus be treated with caution.

Invasion, inflation and stagflation. Economic slowdowns are materializing from the U.S., eurozone and China, hitting corporate revenues and profit margins. Meanwhile, the Russia-Ukraine conflict is more likely to drag on, increasing the risks of energy and general inflation becoming more elevated and persisting longer than expected. With inflation likely to remain higher for longer, central banks will have to raise rates more aggressively than is currently priced-in, with markets then demanding higher interest spreads to compensate for higher residual inflation. We already estimate a 35% to 45% likelihood of a "technical" U.S. recession within the next 12 months.

Table 3-2

Sectors: Industrials And Real Estate Suffer Largest Increase In Loss-Makers

Loss-makers (% of debt) for corporate sample by GICS sector

				Distribution of risk tiers (% of debt), 2022p					Stress scenario shock: Loss-makers, 2023p	
GICS sector	Sample debt	Sample count	Average risk tier	Low (1.5)	Moderately low (3)	Moderately high (4)	High (5.5)	Loss-makers	Intermediate	Severe
Global	$37 tril.	20,000	4.1	7%	15%	34%	34%	10%	14%	17%
Communication services sector	**$3131 bil.**	**756**	**4.1**	**3%**	**9%**	**61%**	**21%**	**6%**	**7%**	**7%**
Media and entertainment	$985 bil.	531	4.0	6%	12%	53%	21%	8%	9%	10%
Telecom services	$2146 bil.	225	4.2	1%	7%	65%	22%	5%	6%	6%
Consumer discretionary sector	**$4430 bil.**	**3,629**	**4.4**	**7%**	**10%**	**22%**	**45%**	**16%**	**19%**	**23%**
Automobiles and components group	**$1858 bil.**	**777**	**4.6**	**7%**	**4%**	**13%**	**68%**	**7%**	**10%**	**16%**
Auto components	$327 bil.	687	3.8	14%	20%	32%	28%	7%	9%	13%
Automobiles	$1531 bil.	90	4.7	6%	1%	9%	77%	7%	10%	17%
Consumer durables and apparels group	**$589 bil.**	**1,074**	**3.7**	**13%**	**34%**	**25%**	**18%**	**10%**	**13%**	**15%**
Household durables	$261 bil.	425	3.7	11%	32%	29%	14%	14%	18%	21%
Leisure products	$30 bil.	88	3.6	15%	33%	29%	18%	5%	5%	6%
Textiles, apparel and luxury goods	$298 bil.	561	3.6	15%	37%	20%	22%	7%	9%	10%
Consumer services group	**$918 bil.**	**885**	**4.7**	**1%**	**3%**	**23%**	**42%**	**32%**	**36%**	**37%**
Diversified consumer services	$79 bil.	170	4.3	6%	9%	33%	32%	20%	23%	24%
Hotels, restaurants and leisure	$839 bil.	715	4.7	1%	2%	22%	43%	33%	38%	39%

Retailing group	**$1065 bil.**	**893**	**4.1**	**8%**	**14%**	**34%**	**24%**	**20%**	**24%**	**29%**
Distributors	$38 bil.	128	4.4	2%	17%	25%	23%	33%	43%	47%
Internet and direct marketing retail	$306 bil.	110	4.1	13%	0%	52%	6%	29%	30%	32%
Multiline retail	$246 bil.	147	4.5	1%	10%	31%	44%	14%	19%	23%
Specialty retail	$475 bil.	508	4.0	9%	25%	25%	25%	16%	22%	29%
Consumer staples sector	**$2262 bil.**	**1,656**	**4.1**	**5%**	**11%**	**48%**	**28%**	**8%**	**14%**	**20%**
Food and staples retailing	$715 bil.	354	4.5	5%	5%	29%	48%	13%	24%	39%
Food, beverage and tobacco	$1360 bil.	1,158	4.1	4%	11%	58%	20%	6%	10%	12%
Household and personal products	$187 bil.	144	3.6	13%	29%	44%	10%	4%	5%	5%
Energy sector	**$2987 bil.**	**687**	**3.6**	**17%**	**28%**	**29%**	**19%**	**8%**	**12%**	**14%**
Energy equipment and services group	**$141 bil.**	**168**	**4.3**	**2%**	**14%**	**35%**	**36%**	**13%**	**18%**	**22%**
Oil and gas drilling	$23 bil.	25	4.6	2%	5%	28%	48%	18%	21%	21%
Oil and gas equipment and services	$118 bil.	143	4.3	2%	16%	36%	33%	13%	17%	22%
Oil, gas and consumable fuels group	**$2846 bil.**	**519**	**3.6**	**18%**	**28%**	**28%**	**18%**	**8%**	**12%**	**14%**
Coal and consumable fuels	$378 bil.	85	3.8	10%	15%	60%	13%	2%	6%	6%
Integrated oil and gas	$1201 bil.	36	2.9	35%	42%	10%	6%	6%	11%	11%
Oil and gas exploration and production	$283 bil.	131	3.3	14%	55%	17%	13%	1%	4%	4%
Oil and gas refining and marketing	$395 bil.	126	4.3	1%	6%	53%	30%	10%	16%	28%
Oil and gas storage and transportation	$589 bil.	141	4.5	0%	10%	34%	39%	17%	18%	20%
Healthcare sector	**$1888 bil.**	**1,130**	**3.8**	**11%**	**28%**	**35%**	**23%**	**4%**	**5%**	**7%**
Health care equipment and services	$859 bil.	587	4.1	6%	14%	45%	29%	5%	7%	9%
Pharmaceuticals, biotechnology and life sciences	$1029 bil.	543	3.5	15%	39%	26%	17%	3%	3%	5%

Industrials sector	**$8960 bil.**	**4,926**	**4.5**	**4%**	**7%**	**22%**	**50%**	**17%**	**24%**	**27%**
Capital goods group	**$5146 bil.**	**3,222**	**4.6**	**3%**	**8%**	**23%**	**56%**	**11%**	**19%**	**24%**
Aerospace and defense	$317 bil.	120	4.0	10%	22%	31%	14%	24%	24%	28%
Building products	$129 bil.	212	3.6	11%	29%	49%	10%	2%	4%	4%
Construction and engineering	$1883 bil.	982	4.8	1%	3%	16%	68%	12%	20%	23%
Electrical equipment	$242 bil.	419	3.9	11%	26%	24%	24%	16%	18%	21%
Industrial conglomerates	$1151 bil.	149	4.8	1%	6%	24%	64%	4%	17%	18%
Machinery	$642 bil.	920	4.0	10%	16%	41%	25%	7%	10%	14%
Trading companies and distributors	$782 bil.	420	4.8	1%	2%	12%	71%	13%	31%	43%
Commercial and professional services group	**$464 bil.**	**705**	**4.3**	**7%**	**9%**	**36%**	**31%**	**18%**	**20%**	**21%**
Commercial and professional services	$464 bil.	705	4.3	7%	9%	36%	31%	18%	20%	21%
Transportation group	**$3350 bil.**	**999**	**4.6**	**4%**	**6%**	**19%**	**45%**	**26%**	**32%**	**33%**
Air freight and logistics	$289 bil.	144	4.1	11%	15%	25%	44%	4%	24%	25%
Airlines	$607 bil.	81	4.9	0%	2%	10%	4%	84%	86%	87%
Marine	$176 bil.	154	3.3	46%	6%	16%	30%	2%	3%	6%
Transportation infrastructure	$2278 bil.	620	4.6	2%	6%	21%	57%	15%	20%	22%
Information technology sector	**$1901 bil.**	**1,831**	**3.4**	**20%**	**38%**	**24%**	**13%**	**5%**	**8%**	**10%**
Semiconductors and semiconductor equipment	$354 bil.	337	2.7	49%	36%	11%	3%	2%	3%	3%
Software and services	$697 bil.	529	3.7	10%	31%	37%	15%	7%	7%	10%
Technology hardware and equipment	$850 bil.	965	3.5	15%	44%	19%	16%	6%	11%	14%
Materials sector	**$2520 bil.**	**2,492**	**3.7**	**12%**	**25%**	**39%**	**22%**	**2%**	**3%**	**4%**
Chemicals group	**$888 bil.**	**981**	**3.6**	**14%**	**30%**	**37%**	**17%**	**2%**	**2%**	**4%**
Commodity chemicals	$415 bil.	499	3.7	10%	26%	43%	19%	2%	3%	7%
Diversified chemicals	$106 bil.	55	3.8	4%	37%	35%	24%	0%	0%	0%

Fertilizers and agricultural chemicals	$102 bil.	140	3.3	22%	36%	36%	3%	2%	3%	3%
Industrial gases	$53 bil.	22	3.3	29%	31%	19%	22%	0%	0%	0%
Specialty chemicals	$212 bil.	265	3.5	19%	31%	33%	16%	1%	2%	3%
Construction materials group	**$259 bil.**	**262**	**4.0**	**6%**	**14%**	**57%**	**20%**	**3%**	**3%**	**3%**
Construction materials	$259 bil.	262	4.0	6%	14%	57%	20%	3%	3%	3%
Containers and packaging group	**$169 bil.**	**215**	**4.2**	**2%**	**15%**	**42%**	**37%**	**5%**	**6%**	**7%**
Metal and glass containers	$82 bil.	94	4.4	3%	12%	23%	54%	8%	9%	9%
Paper packaging	$87 bil.	121	4.0	1%	17%	59%	21%	1%	4%	5%
Metal and mining group	$1056 bil.	849	3.7	15%	26%	32%	24%	2%	3%	4%
Metals and mining upstream	$233 bil.	190	3.5	20%	23%	38%	17%	1%	4%	4%
Metals and mining downstream	$823 bil.	659	3.7	14%	27%	30%	26%	2%	3%	3%
Paper and forest products group	**$148 bil.**	**185**	**4.0**	**5%**	**15%**	**55%**	**24%**	**1%**	**5%**	**9%**
Paper and forest products	$148 bil.	185	4.0	5%	15%	55%	24%	1%	5%	9%
Real estate sector	**$3937 bil.**	**1,759**	**4.3**	**4%**	**14%**	**33%**	**35%**	**15%**	**20%**	**24%**
Real estate investment trusts group	**$825 bil.**	**302**	**3.9**	**4%**	**20%**	**55%**	**18%**	**3%**	**4%**	**4%**
Real estate investment trusts	$825 bil.	302	3.9	4%	20%	55%	18%	3%	4%	4%
Real estate development and management group	**$3112 bil.**	**1,457**	**4.4**	**4%**	**12%**	**27%**	**39%**	**18%**	**25%**	**29%**
Diversified real estate activities	$411 bil.	205	4.4	3%	17%	19%	42%	19%	21%	24%
Real estate development	$1925 bil.	726	4.3	5%	13%	28%	40%	14%	23%	29%
Real estate operating companies	$743 bil.	476	4.6	1%	6%	29%	37%	27%	31%	33%
Real estate services	$33 bil.	50	3.4	28%	35%	5%	7%	25%	27%	27%

Utilities sector	**$5190 bil.**	**1,134**	**4.1**	**5%**	**14%**	**51%**	**27%**	**3%**	**5%**	**6%**
Electric utilities	$2921 bil.	416	4.0	5%	18%	52%	24%	1%	3%	4%
Gas utilities	$360 bil.	157	3.9	7%	14%	57%	22%	0%	0%	0%
Independent power and renewable electricity producers	$1034 bil.	343	4.4	2%	5%	46%	38%	9%	12%	15%
Multi-utilities	$572 bil.	65	3.8	11%	11%	67%	7%	4%	6%	6%
Water utilities	$303 bil.	153	4.5	4%	8%	25%	61%	2%	5%	7%

GICS = Global Industry Classification Standard (GICS®) was developed by S&P Dow Jones Indices. Average risk tier is shown as a numeric equivalent where 1.5 = “low”, 3 = “moderately low”, 4 = “moderately high”, 5.5 = “high”. 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. The loss-making ratio can sometimes exceed the ratio of the highly-indebted risk tier, and thus the risk distribution may not sum up to 1 in all cases. p--Projection. bil.--Billion. tril.--Trillion. Source: S&P Global Market Intelligence, S&P Global Ratings.

Stress Test Of U.S. Speculative-Grade Nonfinancial Corporate Pool

Our corporate ratings team published its "Searching For Stress Fractures: Evaluating The Impact Of Interest Rate And EBITDA Stresses On U.S. Speculative-Grade Corporates," on May 25, 2022.

Corporate Ratings

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Key Takeaways.

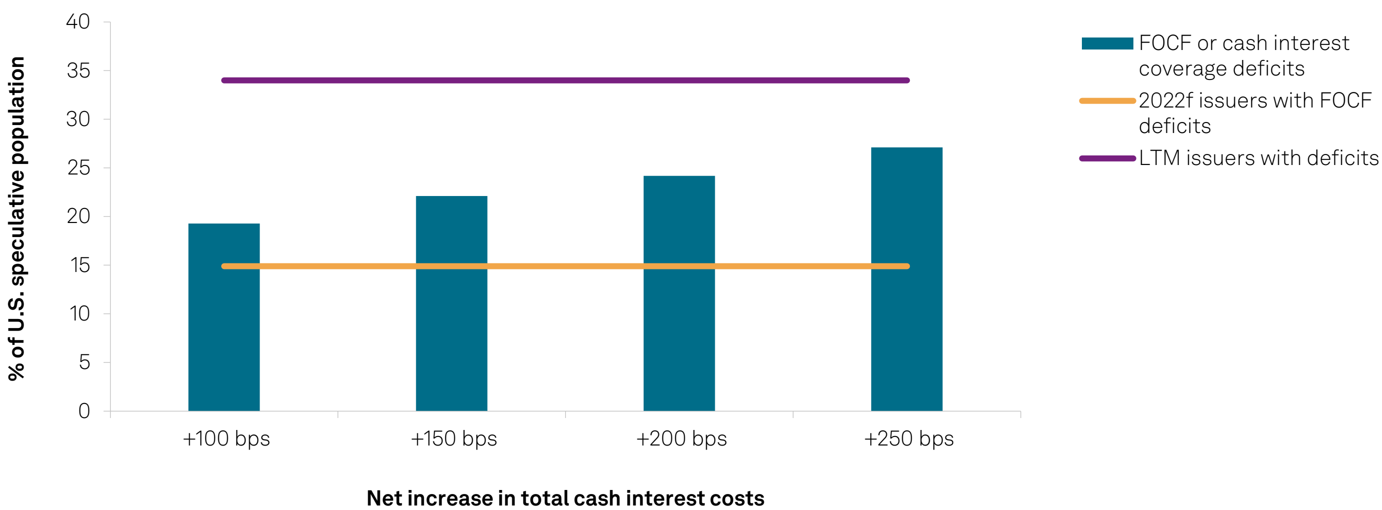
The key takeaways from the report were:

- In 2022, our ratings should be relatively resilient in a moderate stress environment, but we expect the proportion of U.S. speculative-grade issuers with negative outlooks will trend back to historical levels in the 20%-25% area from about 15% today.
- Downgrade risks for 2023 are building as the cumulative effect of rising interest rates and inflation takes an increasingly larger bite out of issuers' profitability and cash flow.
- In our high-stress scenario, the share of issuers generating negative free operating cash flow (FOCF) jumps to around 39%, from about 14.9% under our 2022 base case.
- Nevertheless, the pace of downgrades in our high-stress scenario will largely depend on how persistent we think cash flow deficits will be because most issuers face limited near-term liquidity event risks.
- Outside of the 'CCC' category, default risk is highest for 'B-' rated issuers that now account for about a quarter of our U.S. speculative-grade portfolio.
- For 2022, our EBITDA stresses have a larger impact than our interest rate stresses, although the cumulative interest rate increases will become a more significant burden on cash flows in 2023.

Chart 3-1

The Impact Of Higher Interest Rates

The percentage of issuers with FOCF or EBITDA cash interest coverage deficits based on various interest rate stresses on our 2022 forecasts



f--Forecast. LTM--Last twelve months. Based on median estimates. Data through April 22, 2022. The increase in interest rates was applied to our 2022 forecasts, holding other things constant. On a median basis, 2022 forecasts are from November 2021 and generally do not reflect the shift in interest starting in February 2022. Source: S&P Global Ratings.

Stress Test Of European Speculative-Grade Nonfinancial Corporate Pool

Our corporate ratings team published its "Recession Risk And Ratings: What Recession Could Mean For European Speculative Grade Nonfinancial Corporates," on June 23, 2022.

Corporate Ratings

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Key Takeaways.

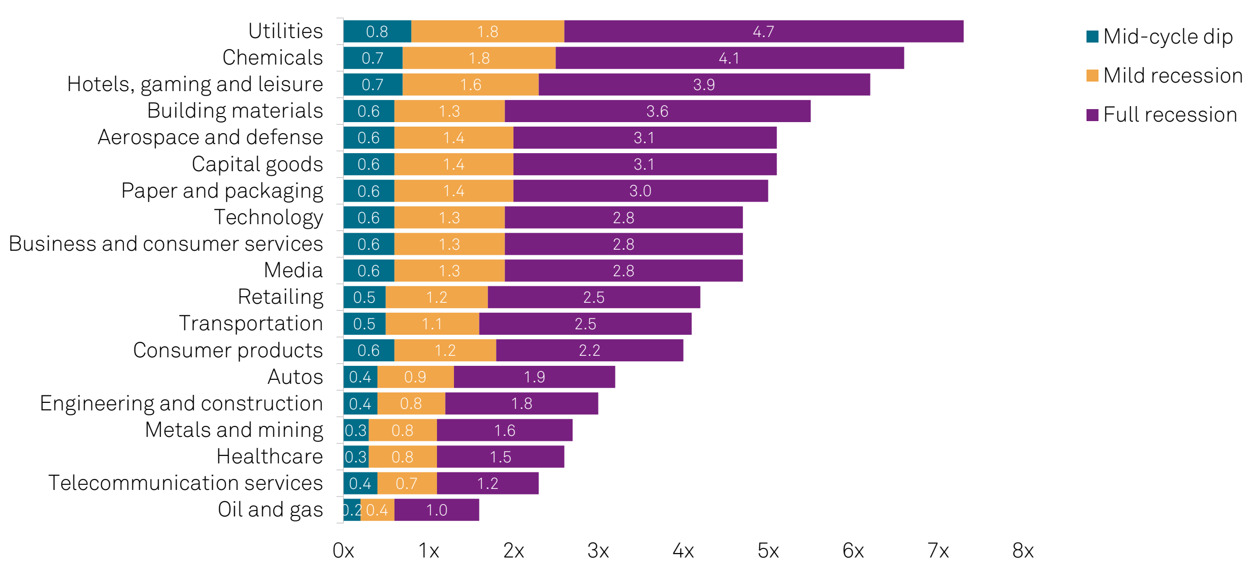
The key takeaways from the report were:

- **Recession risks are rising.** Although not our base case, we have applied three hypothetical downturn scenarios to the European speculative grade nonfinancial entities that we rate to assess the impact of varying degrees of downturn. The most severe would deliver a 20% fall in EBITDA by end-2023, in line with previous cycles. We have tailored the degree of stress to industry and risk characteristics at the company level.
- **European corporates are well positioned to weather milder downturns almost unscathed.** Financial metrics might deteriorate, but not beyond pandemic peaks and pressure would be confined to the most vulnerable issuers. Results for 2021 have been exceptionally strong, bolstering cashflow and reducing leverage.
- **A full recession scenario would stretch financial metrics beyond pandemic levels and further pressure ratings.** This scenario could increase adjusted median 2023 leverage to 7.8x versus a pandemic peak of 6.6x and our base-case assumption of 5.3x. 50% of speculative grade issuers would have negative free operating cash flow versus 30% last year. Median leverage for 'B+' rated issuers would become highly leveraged at 6.8x. Downgrade risk in the 'B' rating category and below would be significant. The impact on sector leverage varies widely (see chart 3-2).

Chart 3-2

Incremental European Nonfinancial Spec. Grade Median 2023 Adjusted Debt/EBITDA Under Different Scenarios

Difference with base case assumptions



Source: S&P Global Ratings.

Stress Test Of Asia-Pacific Rated Nonfinancial Corporate Pool

Corporate Ratings

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Our corporate ratings team published its "APAC Corporates: Inflation, Rate Strains Set In," on June 21, 2022.

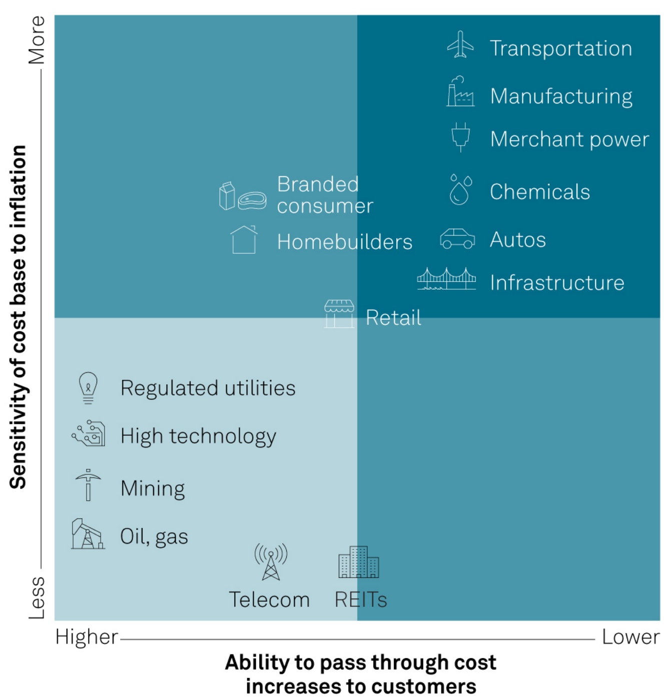
Key Takeaways.

The key takeaways from the report were:

- **Compressing margins, rising financing costs.** Main risks eroding the rating headroom restored in 2021, potentially leading to credit downside.
- **Between 16% and 25%.** Companies risk breaching credit downside financial triggers under different sensitivities and stress scenarios for cost inflation and funding costs.
- **Real estate, capital goods and airport sectors most at risk.** Due to higher leverage and sensitivity to cost inflation. Commodities, branded consumables, regulated utilities are less exposed.
- **Pacific, China and India.** Companies in those countries face larger downside risks due to a higher proportion of asset-heavy sectors and/or more rapid increase in domestic interest rates.
- **'BBB' to 'CCC' categories.** Increased cost inflation and interest rates well into 2023 would hit credit broadly. This is because higher debt, rising capex and margin compression has reduced rating headroom, even for higher rated issuers.

Chart 3-3

Asia-Pacific Corporates: Inflation Sensitivity And Cost Pass-Through Ability



Source: S&P Global Ratings.

Related Research

- Global Debt Leverage: If Stagflation Strikes, China Corporates Are Most Vulnerable, July 12, 2022
- Global Debt Leverage: If Stagflation Strikes, Loss-Making Corporates Will Double Globally, July 12, 2022
- Global Credit Conditions: Resurfacing Credit Headwinds, June 30, 2022
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Appendix: Data And Approach

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 for fiscal year 2021.

The sample comprises 20,000 corporates, of which 93% are unrated and 74% are listed. The sample total debt of US$37 trillion is equivalent to 41% of estimated global corporate debt at end-December 2021 (as reported by the Institute of International Finance).

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.

As this exercise in in US$ equivalent, it does not account for foreign exchange rate changes, which may benefit entities whose debt is largely in domestic currency.

Sample industry coverage

The global sample contains 74 industry sectors: aerospace and defense; air freight and logistics; airlines; aluminum; auto components; automobiles; building products; coal and consumable fuels; commercial and professional services; commodity chemicals; construction and engineering; construction materials; 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 and staples retailing; food, beverage and tobacco; gas utilities, gold; 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; internet and direct marketing retail; leisure products; machinery; marine; media and entertainment; metal and glass containers; multiline retail; 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; paper and forest products; paper packaging; pharmaceuticals, biotechnology and life sciences; precious metals and minerals; real estate development; real estate operating companies; real estate services; residential REITs; retail REITs; road and rail; semiconductors and semiconductor equipment; silver; software and services; specialized REITs; specialty chemicals; specialty retail; steel; technology hardware and equipment; telecommunication services; textiles, apparel and luxury goods; trading companies and distributors; transportation infrastructure; water utilities.

The engineering and construction sector includes commercial construction and engineering, construction support services, heavy construction, prefabricated buildings and components and specialty contract work subsectors.

Sample geographic coverage

The global corporate sample covers 61 geographies, which represent over 95% of world GDP:

- **Asia-Pacific:** Australia (AU), mainland China (CN), Hong Kong (HK), India (IN), Indonesia (ID), Japan (JP), Kazakhstan (KZ), Korea (KR), Malaysia (MY), New Zealand (NZ), Pakistan (PK), Philippines (PH), Singapore (SG), Taiwan (TW), Thailand (TH), Vietnam (VN).
- **Europe:** Austria (AT), Belgium (BE), Cyprus (CY), Czech Republic (CH), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (GR), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Malta (MT), Netherlands (NL), Norway (NO), Poland (PL), Portugal (PT), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE), Switzerland (CH), Turkey (TR), Ukraine (UA), United Kingdom (UK).
- **Latin America:** Argentina (AR), Brazil (BR), Chile (CL), Colombia (CO), Mexico (MX), Peru (PE).
- **Middle-East, Africa:** Egypt (EG), Ghana (GH), Israel (IL), Kenya (KE), Nigeria (NG), Saudi Arabia (SA), South Africa (ZA), United Arab Emirates (AE).
- **North America:** Canada (CA), United States of America (US).

Growth assumptions

Debt growth projections

We applied corporate debt growth rates estimated by our analytical teams for 2022-2024.

Revenue growth projections

For each corporate, we project revenue growth for 2022-2024 using a 1-to-1 mapping with nominal GDP growth across geographies.

Notional credit risk tiers

For this exercise, we determined notional credit risk tiers for each corporate in the sample. In this respect, our evaluation of the country, industry, and financial risks of the corporate sample 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 categorized the corporates into four notional credit risk tiers--"low indebtedness", "moderately low indebtedness", "moderately high indebtedness" and "high indebtedness" as a proxy for credit risk. The sub-tier of "loss-makers" (entities returning negative EBITDA or negative FFO) is extracted from the "high indebtedness" tier.

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 Institute of International Finance.

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

Stress scenarios

We shock the sample financials for rises in input cost-inflation and interest rates (on floating rate and refinancing debt) for 2022 to 2024.

Our framework attempts to test the extent of the generalized presumption that input cost inflation and higher interest yields are detrimental to corporate credit quality. Essentially, this study considers the effects of such shocks on the financial risk profiles of corporates, taking account of their presumed debt-maturity profiles.

Scenario trigger

The slowdown in growth among the major economies of the U.S., eurozone, and China is our scenario trigger, cascading into a sequence of repercussions on revenue, prices and interest rates. The growth slowdown assumptions are linked to S&P Global Ratings' June 2022 macroeconomic forecasts (see tables below) using the Global Link Model (GLM) to produce a reasonable set of consistent downside projections for the U.S., eurozone, and China over the period 2022-2024. Based on those, we further apply an intermediate scenario and a severe scenario related to energy and commodities prices, general inflation (particularly producer price index [PPI]), and interest rates, on company financials as detailed below. All told, our scenario endpoint implies stagflation conditions.

Input inflation shock

We use PPI as a proxy for input cost.

We assume an input cost pass-through rate of about 80% to arrive at net inflation at both geography- and sector-level, and any increase in cost of goods sold (COGS, inclusive of labor cost) absorbed by each corporate is the simple average of the two. In addition, sector-level inflation captures both the change in energy/commodities prices and general inflation, taking into account the cost breakdown by sector.

As aforementioned, each corporate's revenue growth is assumed to move in tandem with nominal GDP growth. For a few upstream sectors related to energy and commodities, we assume an additional increase in revenue as they tend to benefit from higher energy/commodities prices.

For the intermediate and severe scenarios, respectively, we reference the corresponding energy/commodities prices, PPI, and nominal GDP growth for 2022-2024 in the calculations.

Interest rate shock

Our severe interest rate shock in 2023 entails an upward shift of the interest spread curve, averaging 300bp across credit risk tiers on top of the base case, applying larger increments towards the riskier categories. For the intermediate scenario, our interest spread shock averages 150bp.

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 tier is the same regardless of industry sector, geography, or currency of debt.

Tier	Incremental spreads vs. 2021 median levels Intermediate scenario			Incremental spreads vs. 2021 median levels Severe scenario		
	2022	2023	2024	2022	2023	2024
Low indebtedness	82 to 105	134 to 171	72 to 93	89 to 112	140 to 177	72 to 93
Moderately low indebtedness	147	238	111	176	278	111
Moderately high indebtedness	246	394	126	358	566	126
High indebtedness	386 to 738	620 to 1189	192 to 449	569 to 1001	900 to 1583	192 to 449