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Corporate debt stress  
testing: A global analysis  
of non-financial corporations

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# Corporate debt stress testing: A global analysis of non- financial corporations

By  
Caroline Roulet\*

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High-yield corporate and leveraged loans have grown substantially over the past decade. However, the COVID-19 pandemic means downside risks are rising alongside expectations of severe negative impacts on corporate earnings and economic growth. The proportion of leveraged corporate debt exposed to such downside risks has become a key concern. This paper assesses the magnitude of indebtedness of leveraged non-financial companies and identifies the share of debt related to the riskiest firms. A stress test analysis examines the sensitivity of corporate debt to potential macroeconomic and financial shocks. The results show a sharp deterioration in the credit quality of firms, particularly in the United States and Emerging Market Economies (EMEs). Under stressed conditions, all these countries, China included, would experience a sharp rise in the number of firms considered at risk or distressed due to deteriorating cash flows and the inability to make interest payments, thereby becoming more likely to default.

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Authorised for release by Greg Medcraft, Director, OECD Directorate for Financial and Enterprise Affairs

Keywords: International lending, debt sustainability, non-bank financial intermediation, international policy mix.

JEL Codes: F34, G3.

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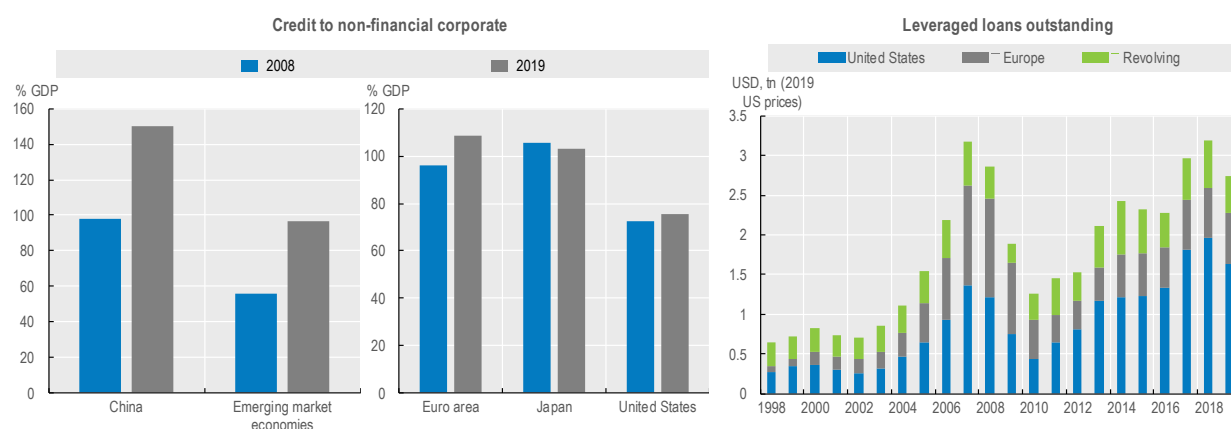
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# 1. Introduction

Credit to non-financial corporations has risen sharply over the past decade both in advanced and emerging market economies (EMEs). Amid an extended period of accommodative monetary policy, the very low cost of borrowing has contributed to unprecedented corporate debt issuance. While creating broader and deeper markets in many countries, this also creates vulnerabilities. Since the global financial crisis, many large corporations around the world have shifted toward leveraged loan and bond financing because commercial bank lending has been subdued (Figure 1). Many corporates have used this debt to pay higher dividends and buy back shares resulting in increased leverage (Figure 2). Therefore, businesses in many countries have become highly indebted, and are now vulnerable to deteriorating economic and market conditions. History has shown that high levels of debt relative to equity in corporate balance sheets could accentuate losses, exacerbate cash flow stress, and heighten debt service obligations. Deteriorating creditworthiness, combined with high debt-rollover risks, could result in higher corporate defaults as a consequence of the impact from COVID-19 including higher credit costs and lower earnings, which in turn would spill over to the financial system.

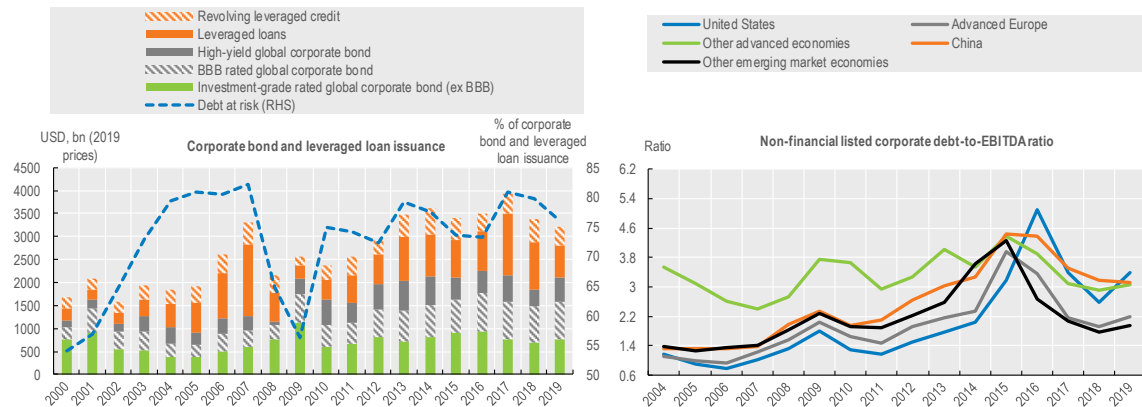
**Figure 1. Credit to non-financial corporates and leveraged loans outstanding**



Note: Credit statistics cover borrowing activity of non-financial corporates, including loans and bonds. Data on leveraged loans outstanding are compiled from leveraged loan deals in the United States and in Europe over the period 1990-2019 including financial and non-financial companies. Outstanding amounts are presented in 2019 USD adjusted by US CPI.

Source: Bank for International Settlements, Refinitiv, OECD calculations. OECD (2020) Structural Developments in Global Financial Intermediation.

Figure 2. Global corporate bond, leveraged loan issuance and firms' leverage

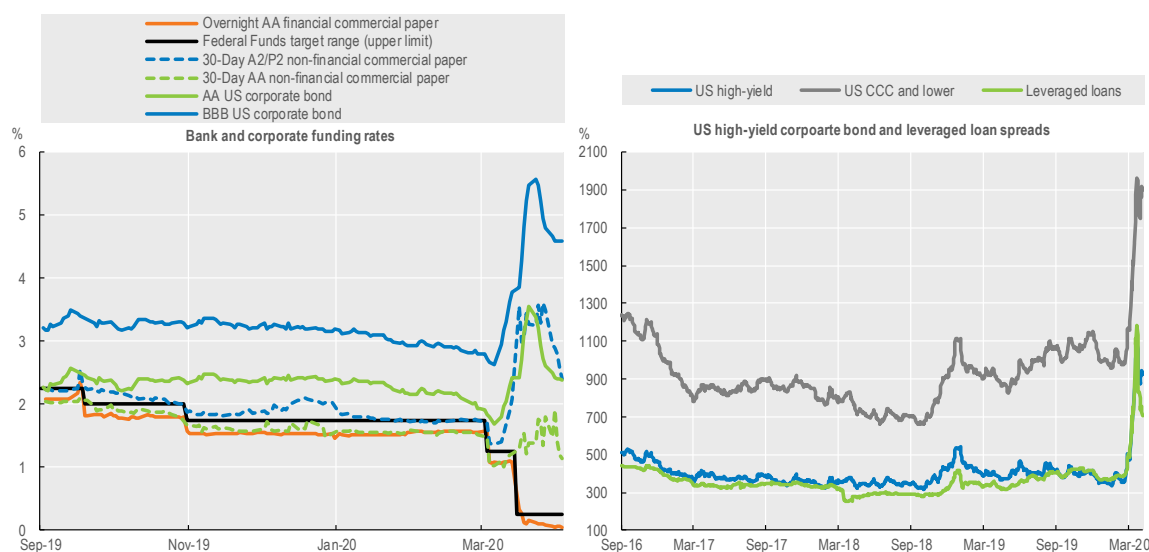


Note: Leveraged loan issuance data are compiled from leveraged loan deals in the United States and in Europe over the period 2000-2019 including non-financial companies only. Issuance amounts are presented in 2019 USD adjusted by US CPI. EBITDA represents income before interest, taxes, depreciation and amortisation. Total debt includes loans and short and long term bonds. Leverage calculations are performed using a global sample of 12,220 listed non-financial companies with available financial statement data in Refinitiv over the period 2004-2019. Annual consolidated financial statements are collected on an annual basis, at the firm level and in current USD. All data are trimmed at the 1st and 99th percentile levels to reduce the effect of outliers. Global corporate bond issuance are calculated including non-financial companies. "Debt-at-risk" is the sum of BBB rated corporate bond, high-yield corporate bond, leveraged loan issued and revolving leveraged credit facilities. It is reported as a share of total corporate bond and leveraged loan (including revolving credits) issuance. Debt at risk refers to debt that is vulnerable to sharp liquidity or credit developments resulting from downgrades or defaults. In contrast, the "at risk" debt in the stress testing analysis focuses on vulnerabilities from credit risk developments and potential defaults.

Source: OECD (2020) Corporate Bond Market Trends, Emerging Risks and Monetary Policy, OECD (2020) Structural Developments in Global Financial Intermediation, Refinitiv, OECD.

COVID-19 has caused major economic shocks globally, including massive disruptions to global supply chains, a collapse in demand for some goods and services, and declines in international tourism and business travel. While a shock of some form was not unexpected, the rapid development of the pandemic and the economic consequences are having an unprecedented effect on many countries globally not experienced for decades. As a result, risk aversion has sharply increased in financial markets, on concerns about rising tail risks on global growth and a plunge in corporate earnings that may trigger financial distress for leveraged firms. Some of these risks have already materialised, leading to a substantial rise in funding costs for non-investment grade rated corporate issuers (Figure 3). If this situation persists, a high number of companies will not be able to repay their debt, resulting in higher corporate defaults.

Figure 3. Bank versus corporate funding rates



Note: Option-adjusted spreads are derived from ICE BofAML US corporate bond indices. Leveraged loan spread is calculated as the difference between yield-to-maturity of S&P/LSTA U.S.

Source: Federal Reserve Bank of Saint Louis, Refinitiv, OECD calculations.

As policy makers consider further measures to prevent the materialisation of tail risks, it is useful to model current and anticipated pressures on corporate debt financing and earnings to better understand the systemic risk of insolvencies. This paper aims to do so by presenting a global analysis of corporate debt and performing a stress testing to assess how deteriorating economic conditions that affect corporates' earnings and cost of credit could subsequently impact their ability to repay their debt. One key concern relates to the proportion of this high level of debt – i.e. the debt of potentially leveraged “at risk” and “distressed” firms – exposed to downside risks in a context of uncertain prospects for global economic growth. To examine the sensitivity of corporate debt to these types of shocks, a “stress testing” analysis is performed on the firms' financial statements, assuming a 20% fall in corporate earnings and a 6.5% rise in the cost of credit, as informed by the 2020 OECD Interim Economic Outlook<sup>1</sup> downside case scenario. The purpose of this exercise is to show that, given the very low cost of debt from prior issuance and at current leverage ratios, the combination of deteriorating earnings and rise in funding cost through refinancing at current elevated spreads, would potentially trigger substantial downgrades and defaults. Section 2 details the sample of corporates considered, the methodology and main trends in vulnerable firms' debt and leverage. Section 3 proceeds to stress test corporate debt and provides detailed results and analysis. Section 4 provides concluding remarks.

## 2. Debt distribution and leverage of vulnerable firms

### Methodology and sample

The purpose of the analysis is to assess the magnitude of indebtedness of leveraged companies and identify the share of debt that is considered vulnerable to default. Financial statement data of leveraged loan borrowers and high-yield bond issuers would provide the most relevant information for this analysis. However, a large share of leveraged loan borrowers are private companies and data are not available in standard databases. Therefore, an alternative methodology has been pursued to provide some relevant empirical evidence using a sample of “leveraged equivalent corporates” among a universe of companies. “Leveraged equivalent corporates” are all potentially “at risk” and “distressed” firms among the subset of corporates that are from a risk perspective equivalent to issuers of leveraged loans.

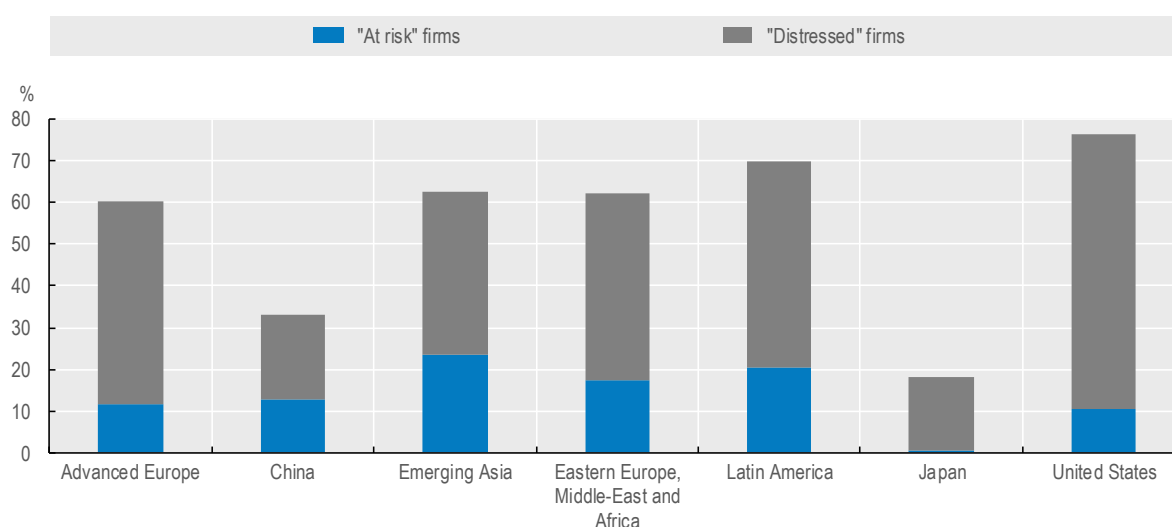
A two-step analysis is performed. The first step consists in identifying a sample of “leveraged equivalent corporates” from a global sample of listed non-financial corporates<sup>2</sup> – for which financial statements are available in Refinitiv – over the period 2004 to 2019. Considering individual company rating information, a leverage threshold has been assessed, including only companies rated less than BBB<sup>3</sup> which are comparable to leveraged loan issuers. The final subsample of leveraged equivalent corporates includes all companies with a leverage ratio higher than 5 and all companies with a negative leverage ratio.<sup>4</sup> In fact, companies with negative EBITDA could be considered as over leveraged because they are actually not able to repay their debt using current internal cash flows. The sample of leveraged equivalent corporates includes 8361 firms.<sup>5</sup>

The second step of this analysis consists in identifying potential “at risk” and “distressed” firms among this sub-sample of “leveraged equivalent corporates”. An additional differentiation criterion is considered based on the interest coverage ratio (ICR). The ICR is an indicator of the ability of a company to make interest payments using internal cash flows. As such, numerous studies suggest that the level of the ICR can be an important indicator of financial distress. In this respect, the metric is a key indicator used by credit rating agencies when rating corporate debt. Annual ICRs have been calculated from 2004 to 2019 at firm level for the leveraged equivalent corporates included in the analysis. The ICR of a specific firm in a fiscal year is calculated as the firm’s ratio of earnings before interest, tax, depreciation and amortisation (EBITDA) in that year to its interest expense in the same year. Based on Palomino et al. (2019), a firm is considered “at risk” if its ICR is lower than 2. In addition, Banerjee and Hofmann (2018) suggest that among these firms, the ones with an ICR lower than 1 can be qualified as “distressed” firms.<sup>6</sup> Considering Damodaran (2020) non-financial companies covered interest ratios by rating category, firms with an ICR between 2 and 1 are rated between BB and B- if large firms in Advanced Economies (i.e. firms with market capitalisation higher than USD 5 billion), and between B and CCC if small firms in Advanced Economies or firms in EMEs. Firms with an ICR lower than 1 are rated CCC and lower if large firms in Advanced Economies and CC and lower if small firms in Advanced Economies or firms in EMEs. This suggests that “at risk” firms have limited capacities to meet current interest payments with internal cash flows. Therefore, they are highly vulnerable to an unexpected adverse shock that may shrink their earnings, making them



unable to meet future interest payments using internal cash flows. In this context, these firms will be downgraded and become “distressed” firms. “Distressed” firms, while still alive, are unable to meet current interest payments with internal cash flows. Worsening economic conditions will precipitate these firms into default as investors will stop providing funding for them, with little or even no prospect of recovery. Therefore, the viability of “distressed” firms is at immediate risk. Also, small firms in Advanced Economies and EMEs are more vulnerable to an unexpected adverse shock because related credit ratings of “at risk” and “distressed” firms are lower compared to similar large firms in Advanced Economies. Figure 4 shows the regional distribution of “at risk” and “distressed firms” over the period 2004-2019. The shares of riskiest firms are the lowest in Japan and China, and the highest in the United States, EMEs and Advanced Europe.

**Figure 4. Regional distribution of riskiest firms in total number of leveraged equivalent corporates**



Source: Refinitiv, OECD calculations.

## Main trends of vulnerable firms' debt and leverage

In the United States, low credit-quality debt has increased substantially since 2015 (Figure 5), with the level of debt of the riskiest firms now similar to levels of 2006 and 2007 just before the global financial crisis. Therefore, a substantial share of corporate debt is exposed to a higher risk of default. Furthermore, and also like before the global financial crisis, a much larger share of debt of non-investment grade firms is from “at risk” firms. COVID-19 is testing corporate solvency by worsening earnings prospects and increasing funding costs, which may trigger rating downgrades. In fact, higher defaults may occur as some “at risk” firms may fall into the “distressed” category.

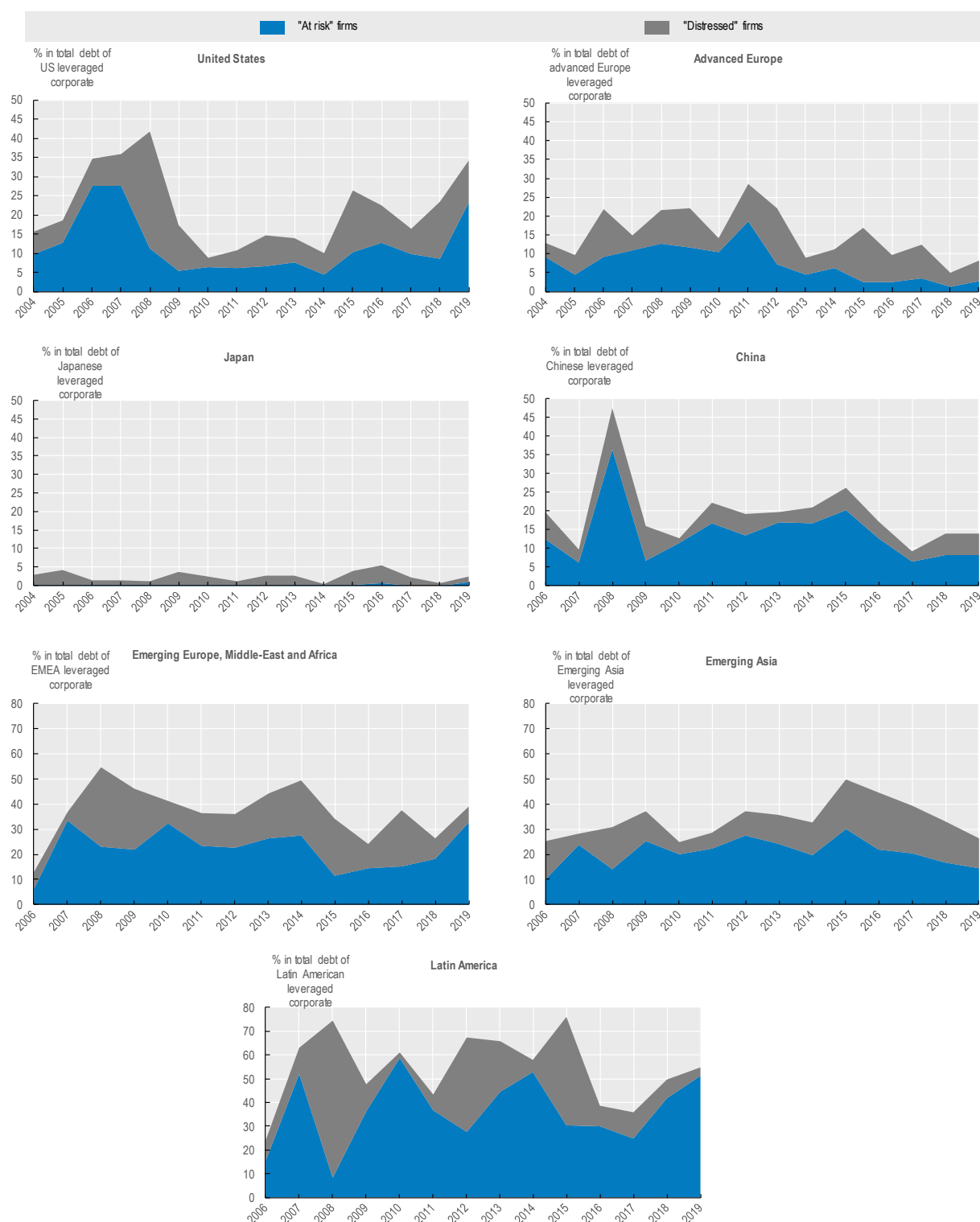
Europe and China experience similar but more moderate trends concerning the deterioration of credit quality of risky corporates. A much larger share of debt of riskiest firms relates to high risk “distressed” firms in advanced European economies, whereas the share of “at risk” firms is the largest in China. It is worth noting that in Japan, the level of debt of “at risk” and “distressed” firms is very low compared to other jurisdictions. While COVID-19 is also testing corporate solvency in China, Advanced Europe and Japan, the shares of corporate debt exposed to a higher risk of default is lower than in the US.

Regarding EMEs, levels of debt of “at risk” and “distressed” firms are currently at their highest levels on record. The largest shares of debt of riskiest firms are recorded in Latin America, Eastern Europe, the Middle East and Africa. In all these regions, as in the US and China, a much larger share of debt of riskiest firms relates to “at risk” firms. Therefore, an unexpected adverse shock may shrink earnings of these “at

risk” firms, making them unable to meet future interest payments using internal cash flows. Therefore, these firms are likely to face sharp rating downgrades and become “distressed” firms. In this context, these firms will face tighter refinancing conditions with a sharp increase in their funding costs as investors require higher risk premium to rollover debt. The firms that are the most exposed to such adverse repricing of debt will face a substantial amount of debt maturing in the short-term and a sharp deterioration of EBITDA as result of COVID-19. “At risk” firms operating in Latin America, Eastern Europe, the Middle East and Africa are particularly exposed to downside risks, due to their dependence on commodity and manufacturing product exports and the impact of COVID-19 on global demand and commodity prices.

While the debt build-up has been accompanied in most jurisdictions by a strong rise in leverage of the riskiest firms over the last decade (Figure 6), the measure of corporate operating earnings to cover interest expenses has improved for the riskiest firms in Advanced Economies and China. However the situation is of particular concern in EMEs as the increase in firms’ leverage has been coupled with firms’ reduced ability to cover their current interest obligations. Overall, firms’ reduced ability to service high levels of debt will challenge corporate debt sustainability, particularly in EMEs.

**Figure 5. Debt of “at risk” and “distressed” firms as a percentage of total debt of leveraged equivalent corporates in major advanced and emerging economies, 2004-2019**



Note: The sample includes 8361 “leveraged equivalent corporates”, i.e. companies with a leverage ratio higher than 5 or with a negative leverage ratio. A firm is considered “at risk” if its interest coverage ratio (ICR) is between 1 and 2. A company is qualified as “distressed” if its ICR is lower than 1.

Source: Refinitiv, OECD calculations.

**Figure 6. Measures of leverage and interest coverage of “at risk” and “distressed” firms in total debt of leveraged equivalent corporates in major advanced and emerging economies, 2019**



Note: The sample includes 8361 “leveraged equivalent corporates”, i.e. companies with a leverage ratio higher than 5 or with a negative leverage ratio. A firm is considered “at risk” if its interest coverage ratio (ICR) is between 1 and 2. A company is qualified as “distressed” if its ICR is lower than 1. Among distressed firms, some are facing negative EBITDA. Therefore, their leverage and interest coverage ratios are negative. Both measures are signals of financial distress. In other words, these distressed firms are indebted but are facing losses that prevents them to service current leverage. Also, they are not able to meet current interest payments with internal cash flows. Therefore, these firms are facing serious debt sustainability issues.

Source: Refinitiv, OECD calculations.

## 3. Corporate debt stress testing analysis

### Purpose and assumptions

While the estimates of debt of “at risk” and “distressed” firms give an indication of corporate vulnerability at a given point in time, they do not show how sensitive firms may be to macroeconomic and financial shocks. Tighter external financing conditions as a result of COVID-19 could lead to a repricing of debt risk premia and a subsequent rise in borrowing costs, and a slowdown in economic growth could reduce earnings. To examine the sensitivity of corporate debt to those types of shocks, a “stress testing” analysis is performed on the firms’ balance sheets<sup>7</sup> using the following shocks, informed by the 2020 OECD Interim Economic Outlook downside case scenario:

- A 650 basis point increase in borrowing costs is applied on the debt maturing in the short term. In fact, since the publication of the 2020 OECD Interim Economic Outlook, actual market stress has by far exceeded expectations of a rise of “50 basis points in investment risk premia in all countries in 2020”. Therefore, the magnitude of the increase in corporates’ cost of funding has been assessed based on the actual increase in leveraged loan spread<sup>8</sup> which has risen by 650 basis points since March 2020 compared to last lows in January 2019. This assumption implies that market participants are expected to require substantially higher risk premia consistent with elevated spread levels to rollover debt. Nevertheless, leveraged loan maturing profile<sup>9</sup> suggests that 50% of the leveraged loan principal would have to be repaid within the next three years. Therefore, the 650 basis point increase in funding cost is applied to 50% of debt that will be rolled over at a higher funding cost within the next three years. The remaining debt is expected to be rolled-over in the long run at normal credit spreads assuming that the risk premia will tighten to average levels in response to economic recovery.
- A 20% decline in earnings is assumed, similar to the actual fall in US corporate profits after tax during the global financial crisis. This is consistent with the 2020 OECD Interim Economic Outlook downside case scenario assumption of “global equity prices and non-food commodity prices declining by 20% in the first nine months of 2020”.
- A currency depreciation against the US dollar of 30% for firms in EMEs is considered, similar to trends observed in late 1990s.<sup>10</sup>

A stress testing analysis is performed using 2019 financial statement data.<sup>11</sup> ICR under the stress scenario is calculated for each company so that firms are re-classified according to their financial soundness into the three groups detailed in Section 1. A breakdown of debt of “at risk” and “distressed” firms by economic sector. Depending on their economic sector, corporates may be more exposed to markets impacted by COVID-19 and subject to substantial stress following the prolonged health crisis and major deterioration of business conditions.

### Main findings

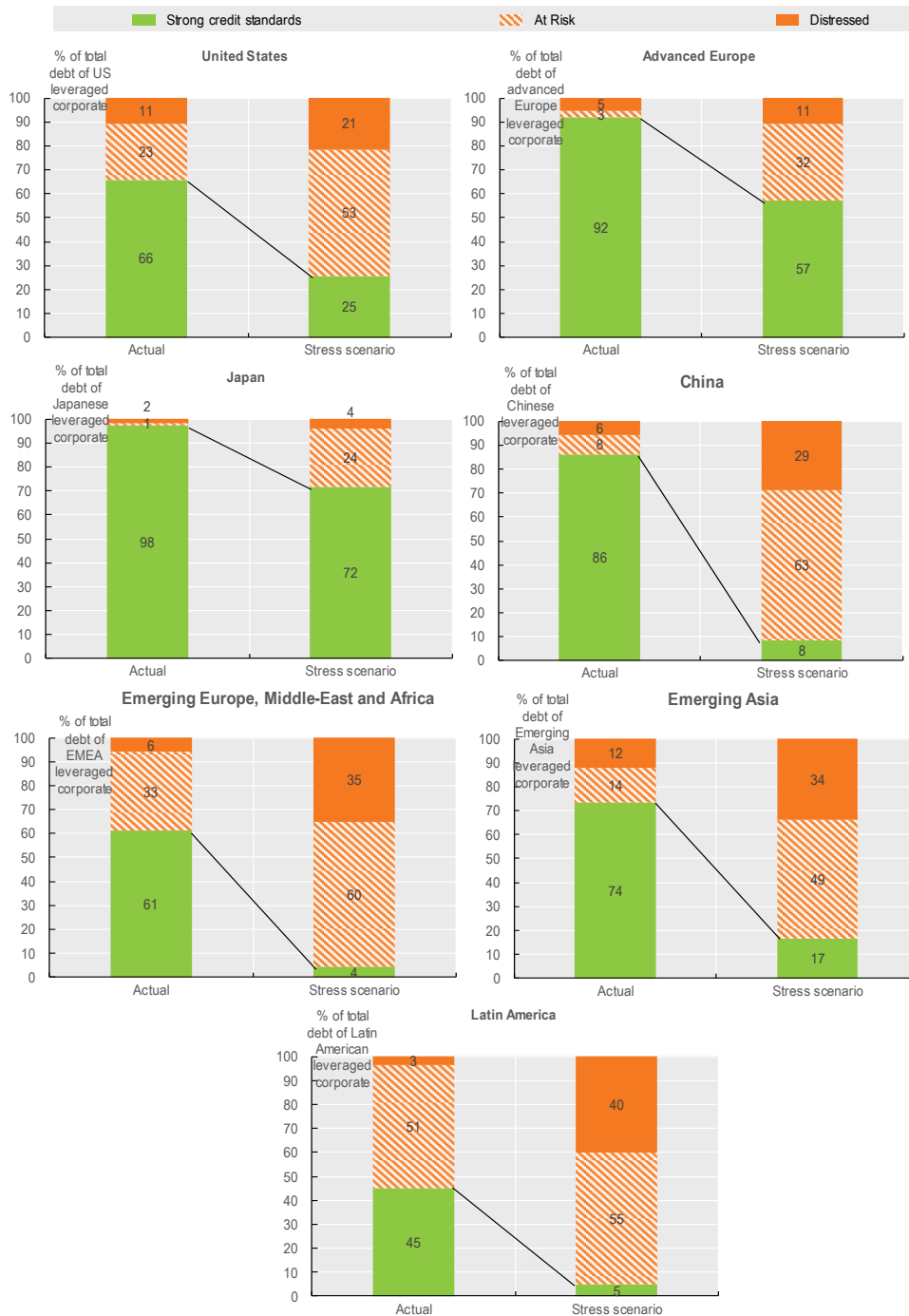
Results from the corporate debt stress testing based on a downside case scenario show that the share of debt of riskiest firms (i.e. “at risk” and “distressed” firms) in total debt of leveraged equivalent corporate

would substantially increase in the United States, China and other EMEs (Figure 7). European and Japanese corporates would experience a more moderate increase. In all jurisdictions, this increase in debt is substantially higher for “at risk” firms than for “distressed” firms. Nevertheless, the share of debt of “distressed” firms in total leveraged equivalent corporate debt increases substantially under the stress scenario in the United States, China and other EMEs, in particular in Latin America. These results suggest that firms that are currently classified as financially sound firms fall into the “at risk” group under stressed conditions, leading to a substantial increase in firms’ solvency risk with more debt exposed to potential downside risks. The situation is of particular concern in EMEs, in particular Latin America, China and the United States, as firms that are currently classified as “at risk” fall into the “distressed” group under stressed conditions. Therefore, high levels of default are likely to materialise, as the debt of “distressed” firms is not sustainable based on their extremely high leverage and deteriorated actual earnings.

The implications of these results regarding a potential increase in corporate default probability suggest that following an adverse shock, a substantial number of corporates are likely to be downgraded. According to S&P estimates of global corporate annual default rates by rating category<sup>12</sup> (Figure 8), historical default probability of high and medium investment grade rated corporates is below 1%, even during the last three major crisis episodes (1991, 2001 and 2009). For non-investment grade speculative rated corporates, the historical default probability jumped to 1.8% on average for BB rated firms and to 12% on average for B rated firms during these major crisis episodes. In addition, the historical default probability of extremely speculative, quasi defaulted or defaulted rated corporates (i.e. firms rated CCC and lower) jumped to 43% on average. As mentioned in section 2, small firms in Advanced Economies and EMEs are more vulnerable to an unexpected adverse shock because related credit ratings of “at risk” and “distressed” firms are lower compared to similar large firms in Advanced Economies. Therefore, in Advanced Economies, firms classified in the “at risk” group under the stress scenario are likely to face peak average default probability ranging between 1.8% and 12% for large firms (i.e. rated between BB and B-) and between 12% and 43% for small firms (i.e. rated between B and CCC). It is worth noting that because quoted default probabilities are peak averages by rating, firms within a given rating category may face a wide range of experiences. This downside risk mostly prevails in the United States as the share of debt of “at risk” firms in total US leveraged equivalent corporate debt has risen substantially under the stress scenario. Also, US leveraged equivalent corporates tend to be small.<sup>13</sup> Therefore, most “at risk” US firms are likely to face substantially high default probabilities similar to those for highly speculative rated firms during major crisis episodes. As the increase in the share of debt of “at risk” firms in total leveraged equivalent corporate debt has been more moderate in Europe and Japan, a lower portion of debt exposed to downside risk is likely to default.<sup>14</sup>

As a comparison, Fitch Ratings estimates<sup>15</sup> suggest that cumulative two-year US default rates for leveraged term loans and high yield bonds will be close to 15% in 2020 and 2021 due to the COVID-19 crisis. This is due to the severe reduction in business and consumer activities through mid-year followed by the economic impact of this shock on the global economy. Fitch Ratings forecasts a leveraged loan default volume of USD 80 billion in 2020 and more than USD 120 billion by year-end 2021, surpassing the previous high of USD 78 billion in 2009. The 2020 US leveraged loan default rate forecast has been raised from 3% to 5%<sup>16</sup>, and 6% leveraged loan default rate are initiated for 2021. Similar revisions have been made for European leveraged finance but default rate estimates remain lower than for US firms. Fitch Ratings has revised the 2020 forecasts for European high-yield corporate default rates to 5%<sup>17</sup> for bonds and 4% for loans<sup>18</sup>, up from its initial forecast of 2.5% for both.<sup>19</sup>

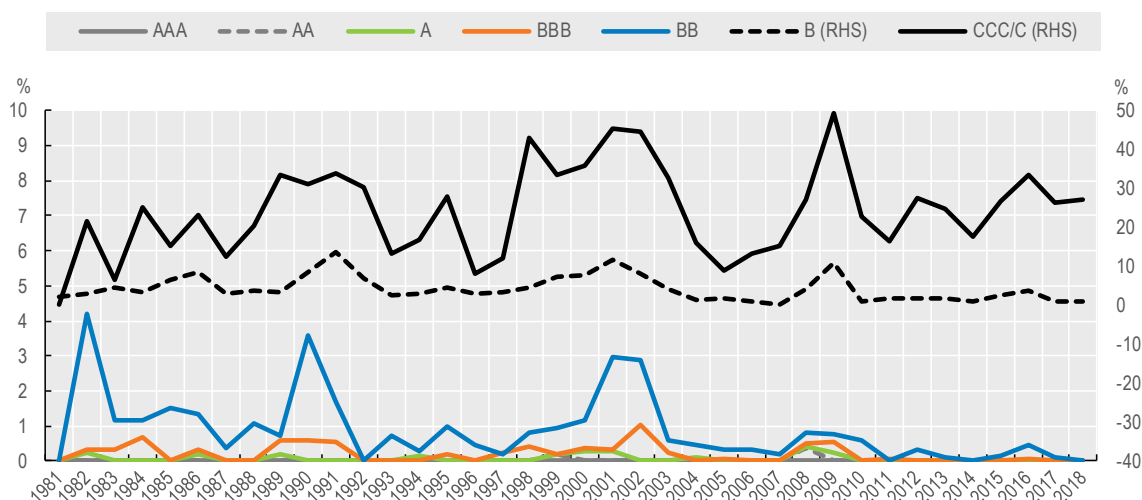
**Figure 7. Corporate debt stress testing of leveraged equivalent corporates in major advanced and emerging economies, 2019**



Note: These figures show the share of debt of firms with strong credit standards, “at risk” and “distressed” firms in total debt of leveraged equivalent corporates under normal and stress scenario by region. The sample includes 8361 “leveraged equivalent corporates”, i.e. companies with a leverage ratio higher than 5 or with a negative leverage ratio. A firm is considered “at risk” if its interest coverage ratio (ICR) is between 1 and 2. A company is qualified as “distressed” if its ICR is lower than 1. A stress testing analysis is performed on corporate debt assuming a 650 basis point increase in cost of debt in borrowing costs for the portion of debt (equivalent to 50% of total debt) maturing within the next three years and a 20% fall in EBITDA. ICR under stress scenario is calculated for each company so that firms are re-classified according to their financial soundness possibly falling to “at risk” or “distressed” groups.

Source: Refinitiv, OECD calculations.

Figure 8. Global corporate annual default rates by rating category, 1981-2018



Source: S&P Ratings, “2018 Annual Global Corporate Default And Rating Transition Study”, April 2019.

EME firms classified in the “at risk” group under the stress scenario are likely to experience default probabilities prevailing for highly speculative rated firms during major crisis episodes. All emerging market economies, including China, are likely to be exposed to such acute downside risks as the share of debt of “at risk” firms in total leveraged equivalent corporate debt has risen substantially under the stress scenario. As documented by Fitch Ratings,<sup>20</sup> corporate default risk is rising in China, notably for state-owned enterprises (SOEs).<sup>21</sup> While default risks ranged across economic sectors, the majority of cases was in commercialised sectors, many of which suffer from oversupply. Firms in sectors of strategic or policy importance appear less likely to experience financial distress. Therefore, Chinese SOEs are likely to face adverse conditions in the current economic context, and firms operating in commercialised sectors would be the most exposed. In fact, growth sensitive sectors are the most affected by the COVID-19 crisis.

Additionally, re-classification from “at risk” to “distressed” under stressed conditions implies that negative effects of worsening economic conditions may lead to substantial rating downgrades of highly speculative to quasi defaulted or defaulted rated corporates, with little prospects of recovery. Therefore, downgrades to the lowest rating levels imply an increase of corporate default probability to very high values. These downside risks are particularly prevalent for firms in EMEs, the United States and China as the share of debt of “distressed” firms in total leveraged equivalent corporate debt has risen substantially under the stress scenario.

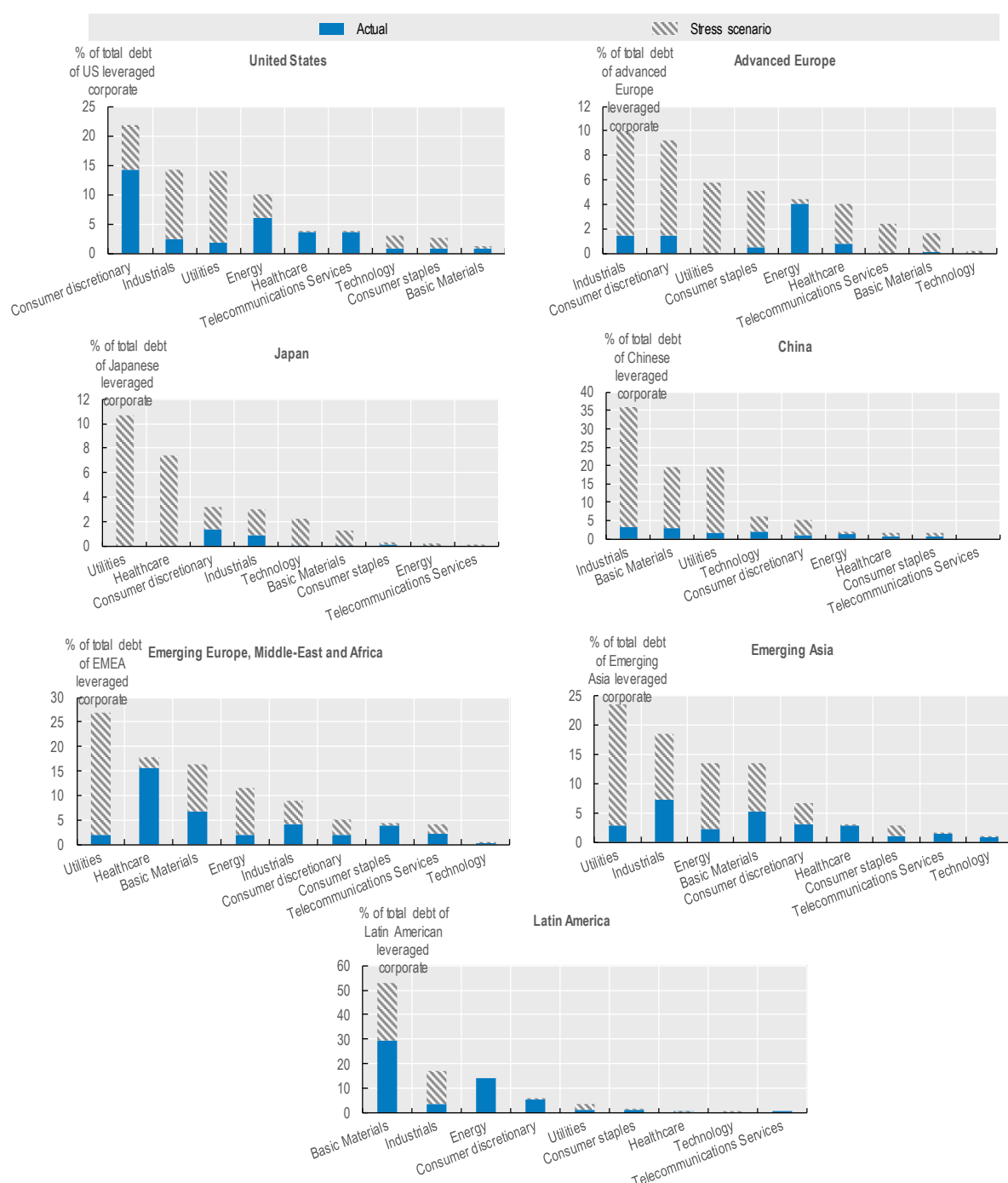
**Overall, the consequences of an adverse shock may be significantly damaging. In fact, “at risk” and “distressed” firms in the United States and EMEs are likely to experience default probabilities prevailing for highly speculative and defaulted rated firms during major crisis episodes.**

Focusing on a breakdown by economic sector, the highest shares and major increases of leveraged equivalent corporate debt exposed to potential downside risks are recorded in most jurisdictions by firms operating in the consumer, industrials, basic materials, utilities and energy sectors (Figure 9). These results may be particularly concerning for these firms as they operate in growth sensitive sectors. Therefore, these firms are likely to experience a substantial deterioration in earnings and potential debt sustainability issues following the shutdown of many corporate and retail businesses and the fall in demand for utilities as a result of the COVID-19 crisis. The situation is particularly concerning in Latin America. As documented above, a substantial share of firms are likely to fall into the “distressed” group under stressed conditions. In this region, the highest increase of the share of leveraged equivalent corporate debt exposed to potential



downside risks is recorded by firms operating in the basic materials, industrials and energy sectors. Slowing global demand and weak commodity prices caused by COVID-19 crisis are likely to boost firms' exposure to downside risks and trigger massive waves of defaults due to high commodity and manufacturing product export dependence. The Latin American bond market has been closed for most of the first quarter of 2020 due to heightened uncertainty related to COVID-19. Subsequent refinancing risk has increased for Latin American corporates with debt due this year, particularly for speculative-grade issuers with poor liquidity that operate in sectors at high risk from the effects of the pandemic (i.e. mainly energy, metals and mining, airline and tourism sectors). According to Fitch Ratings,<sup>22</sup> the corporate bond market shutdown combined with tightening economic conditions is likely to raise default risk for USD 2.5 billion of USD 11 billion of bonds in 2020. Refinancing risk is manageable for certain companies benefiting from substantial government ownership, notably in Chile and Mexico. However, Argentinian issuers are under more pressure as capital controls and market volatility impair their ability to access international capital markets, execute liability management processes and service debt.

**Figure 9. Corporate debt stress testing of leveraged equivalent corporates by economic sector in major advanced and emerging economies, 2019**



Note: These figures show the share of debt of “at risk” and “distressed” firms in total debt of leveraged equivalent corporates under normal (dark blue bars) and stress scenario (grey hatched bars) by region and economic sector. The sample includes 8361 “leveraged equivalent corporates”, i.e. companies with a leverage ratio higher than 5 or with a negative leverage ratio. A firm is considered “at risk” if its interest coverage ratio (ICR) is between 1 and 2. A company is qualified as “distressed” if its ICR is lower than 1. A stress testing analysis is performed on corporate debt assuming a 650 basis point increase in cost of debt in borrowing costs for the portion of debt (equivalent to 50% of total debt) maturing within the next three years and a 20% fall in EBITDA. ICR under stress scenario is calculated for each company so that firms are re-classified according to their financial soundness possibly falling to “at risk” or “distressed” groups.

Source: Refinitiv, OECD calculations.

## 4. Summary and conclusions

Global corporate debt has risen substantially over the past decade both in advanced and EMEs, supported by low interest rates and easy access to global capital markets. While creating broader and deeper markets, high levels of leverage could render firms vulnerable to shocks, especially in an environment of weak economic growth.

This paper uses financial statement data of a global sample of non-financial corporates to investigate this issue. The analysis suggests that corporates are vulnerable to shocks implying weaker-than-expected earnings and higher borrowing costs. Results show a substantial deterioration of credit quality of US firms since 2015, with the level of debt of the riskiest leveraged firms being similar to levels prevailing in 2006-2007 just before the global financial crisis. A particular concern relates to EMEs, notably in Latin America, Eastern Europe, the Middle East and Africa, as levels of debt of “at risk” and “distressed” firms are currently at their highest levels on record. The trends in Europe, Japan and China regarding the deterioration of credit quality of risky corporates are more moderate. These results suggest that corporate solvency is being tested by n COVID-19 as a result of worsening earnings prospects and an increase in funding costs that may trigger rating downgrades and defaults, in particular in the United States and in EMEs.

Based on 2019 corporate balance financial statement information, the stress test exercise shows that a combination of these shocks could significantly erode firms’ interest coverage ratios, and imply a substantial rise in the share of debt of the riskiest firms in total debt of leveraged equivalent corporate, in particular in the United States, China and other EMEs. “At risk” and “distressed” firms in the United States and EMEs are likely to experience default probabilities prevailing for highly speculative and defaulted rated firms during major crisis episodes.

Corporate sector stress will affect the banking sector through increases in non-performing loans as well as other investors in high-yield corporate bonds like insurance companies, pension funds and asset managers. Structured product markets such as collateralised loan obligations (CLOs) may also be impacted. Keeping advanced and emerging markets resilient calls for focusing on these vulnerabilities. Policy makers should carefully monitor and help address vulnerabilities from combined high corporate debt and leverage through a combination of macro- and micro-prudential policies.

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## Annex A. List of previously published working papers

The full series is listed below in chronological order. Prior to March 2010, the series was named *OECD Working Papers on Insurance and Private Pensions*. All working papers can be accessed online at: [www.oecd.org/daf/fin/wp](http://www.oecd.org/daf/fin/wp).

### **2020**

- WP.45: The changing structure of financial intermediation in Asia: Benefits and risks
- WP.44: Structural developments in global financial intermediation - The rise of debt and non-bank credit intermediation

### **2017**

- WP.43: Financial Education for MSMEs and Potential Entrepreneurs
- WP.42: Behavioural Economics and Financial Consumer Protection

### **2016**

- WP.41: Unleashing the Export Potential of SMEs in Greece
- WP.40: Financial Education Policies in Asia and the Pacific

### **2015**

- WP39: Financial Education for Long-term Savings and Investments: A Review of Research and Literature
- WP38: Financial Education for Migrants and their Families
- WP37: The Bitcoin Question: Currency versus Trust-less Transfer Technology

### **2013**

- WP36: Institutional Investors and Infrastructure Financing
- WP35: Institutional Investors and Green Infrastructure Investments: selected case studies
- WP34: Promoting Financial Inclusion through Financial Education
- WP33: Financial Education in Latin America and the Caribbean
- WP32: Pension Fund Investment in Infrastructure: A Comparison between Australia and Canada
- WP31: Policyholder Protection Schemes: Selected Considerations

### **2012**

- WP30: The Effect of Solvency Regulations and Accounting Standards on Long-Term Investing
- WP29: Trends in Large Pension Fund Investment in Infrastructure

- WP28: Communicating Pension Risk to DC Plan Members: The Chilean Case of a Pension Risk Simulator
- WP27: The Role of Funded Pensions in Retirement Income Systems: Issues for the Russian Federation
- WP26: Infrastructure Investment in New Markets: Challenges and Opportunities for Pension Funds
- WP25: The Status of Financial Education in Africa
- WP24: Defining and Measuring Green Investments: Implications for Institutional Investors' Asset Allocations
- WP23: The Role of Institutional Investors in Financing Clean Energy
- WP22: Financial Education, Savings and Investments
- WP21: Identification and Assessment of Publicly Available Data Sources to Calculate Indicators of Private Pensions
- WP20: Coverage of Private Pensions Systems: Evidence and Policy Options
- WP19: Annual DC Pension Statements and the Communications Challenge
- WP18: Lessons from National Pensions Communication Campaigns
- WP17: Review of the Swedish National Pension Funds
- WP16: Current Status of National Strategies for Financial Education
- WP15: Measuring Financial Literacy: Results of the OECD International Network on Financial Education Pilot Study
- WP14: Empowering Women through Financial Awareness and Education
- WP13: Pension Fund Investment in Infrastructure: Policy Actions
- WP12: Designing Optimal Risk Mitigation and Risk Transfer Mechanisms to Improve the Management of Earthquake Risk in Chile

## **2011**

- WP11: The Role of Guarantees in Defined Contribution Pensions
- WP10: The Role of Pension Funds in Financing Green Growth Initiatives
- WP9: Catastrophe Financing for Governments
- WP8: Funding in Public Sector Pension Plans - International Evidence
- WP7: Reform on Pension Fund Governance and Management: The 1998 Reform of Korea National Pension Fund

## **2010**

- WP6: Options to Improve the Governance and Investment of Japan's Government Pension Investment Fund
- WP5: The New IAS 19 Exposure Draft
- WP4: The EU Stress Test and Sovereign Debt Exposures
- WP3: The Impact of the Financial Crisis on Defined Benefit Plans and the Need for Counter-Cyclical Funding Regulations

WP2: Assessing Default Investment Strategies in Defined Contribution Pension Plans

WP1: Framework for the Development of Financial Literacy Baseline Surveys: A First International Comparative Analysis

***OECD Working Papers on Insurance and Private Pensions***

**2010**

WP41: Policy Action in Private Occupational Pensions in Japan since the Economic Crisis of the 1990s

WP40: Pension Funds' Risk-management Framework: Regulation and Supervisory Oversight

WP38: Managing Investment Risk in Defined Benefit Pension Funds

**2009**

WP37: Investment Regulations and Defined Contribution Pensions

WP36: Private Pensions and Policy Responses to the Financial and Economic Crisis

WP35: Defined-contribution (DC) arrangements in Anglo-Saxon Countries

WP34: Evaluating the Design of Private Pension Plans

WP33: Licensing Regulation and the Supervisory Structure of Private Pensions

WP32: Pension Fund Investment in Infrastructure

# Notes

<sup>1</sup> OECD (2020), *OECD Economic Outlook, Interim Report March 2020*, OECD Publishing, Paris, <https://doi.org/10.1787/7969896b-en>.

<sup>2</sup> The sample includes 13458 listed non-financial corporates. 2699 non-financial corporates are located in the United States, 2437 in Advanced European economies, 2660 in Japan, 1239 in China, 2687 in Emerging Asia, 1328 in Emerging Europe, Middle-East and Africa and 408 in Latin America.

<sup>3</sup> This means all companies rated less than BBB or that have been downgraded to rating levels below BBB during the period 2004-2019.

<sup>4</sup> Considering individual company rating information, a leverage threshold has been assessed including only companies rated less than BBB which may be potentially leveraged loan issuers. Median and ninetieth percentile leverage – measured using the ratio of total debt to EBITDA – of companies rated less than BBB (which are non-investment grade) are ranging between 3.3 and 7.9 over the past 5 years. As a comparison, median leverage ratio of high-yield leveraged loan issuers is ranging between 3.5 and 7.9 depending on the high-yield rating bucket; according to 2017 U.S. Leveraged Loan Chart Book released by Fitch Ratings. Therefore, an intermediate threshold of 5 – that is value of the third quartile – has been considered for the leverage ratio to discriminate leveraged equivalent corporates included in the final sample from other companies. All companies with negative leverage have been excluded for leverage threshold calibration.

<sup>5</sup> The sample of leveraged equivalent corporates includes 4670 firms in Advanced Economies and 3691 firms in EMEs.

<sup>6</sup> “Distressed” firms aligns with the term “zombie” firm used in academic studies.

<sup>7</sup> The relationship between corporate vulnerability and key balance sheet ratios has been analysed in several studies, usually using regression analysis. For example, Claessens et al. (2000) found that firm specific characteristics, both financial and nonfinancial, were most significant in explaining post crisis performance. Gapen et al. (2004) uses contingent claims approach to identify corporate sector vulnerabilities. Based on Chow (2015), this corporate balance sheet stress test exercise complements these analyses.

<sup>8</sup> Leveraged loan spread is the difference between yield to maturity of S&P/LSTA U.S. Leveraged Loan 100 Index and US Dollar 3-month LIBOR rate.

<sup>9</sup> S&P Global Market Intelligence, “US Leveraged Loan Maturity Wall - Nothing to See Here (until 2023)”, January 2019.



<sup>10</sup> This assumptions is based on the study by Chow (2015) focused on corporate debt stress testing for firms in EMEs. To account for “natural” and financial hedges that could mitigate the corporate exposure to exchange rate risk, two assumptions are postulated:

i) “Natural” hedges from foreign currency earnings are proxied by the share of foreign sales to total sales. The currency breakdown for these “natural” hedges was derived from the trade weights. Therefore, the EBITDA considered for the calculation of the dollar amount decrease in EBITDA is the sum of EBITDA generated from domestic sales and EBITDA generated from foreign sales, including the decrease in EBITDA due to the shock from national currency depreciation against the US Dollar

ii) 50% of foreign currency debt interest expenses are effectively hedged through derivative contracts. The share of foreign currency-denominated corporate debt is proxied at country level by the ratio of external debt of private to total corporate debt. Total corporate debt is the sum of external debt, loans from banks and bonds of non-financial corporations. Therefore, the debt considered for the calculation of the dollar amount increase in interest payment is the sum of domestic and foreign debt, including the increase in foreign debt due to the shock from national currency depreciation against the US Dollar.

<sup>11</sup> Total interest expense under stress scenario is the sum of US dollar amount increase in cost of debt – calculated as a share of total debt – and actual interest expense. The value of EBITDA under stress condition is actual value of EBITDA less the 20% value fall in earnings.

<sup>12</sup> S&P Ratings, “2018 Annual Global Corporate Default and Rating Transition Study”, April 2019.

<sup>13</sup> Sample of leveraged equivalent corporates includes mostly small firms. Over the period 2004-2019, market capitalisation exceeds USD 5 billion for only 9% of leveraged US firms, 11% of “at risk” firms and 4% of distressed firms.

<sup>14</sup> Similarly to US sample, samples of Advanced European and Japanese leveraged equivalent corporates include mostly small firms. Over the period 2004-2019, market capitalisation exceeds USD 5 billion for only 8% of leveraged European and Japanese firms, 4% of “at risk” firms and 2% of distressed firms.

<sup>15</sup> Fitch Ratings, “Cumulative 20/21 US Loan, HY Default Rates Near 15% on Coronavirus”, March 2020.

<sup>16</sup> Fitch Ratings, “Fitch U.S. Leveraged Loan Default Insight”, July 2020.

<sup>17</sup> Fitch Ratings, “Defaults and Issuance Rise in European High-Yield Bonds”, July 2020.

<sup>18</sup> Fitch Ratings, “European Loan Issuance Increases, Defaults Steady”, July 2020.

<sup>19</sup> Fitch Ratings, “Fitch Ratings 2020 Outlook: European High-Yield and Leveraged Credit”, January 2020.

<sup>20</sup> Fitch Ratings, “Defaults Among Chinese State-Owned Enterprises”, March 2020.

<sup>21</sup> Fitch Ratings has reviewed the 26 defaults by Chinese SOEs between the start of 2015 and the end of February 2020, in both onshore and offshore corporate bonds. Financial pressure on China's SOEs has risen as the authorities seek to reduce risks in the financial sector and limit the moral hazard associated with implicit support for SOEs.

<sup>22</sup> Fitch Ratings, “Coronavirus Raises Risk on 2020 Latin America Bond Refinancings”, March 2020.