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factor behind the decline in business insolvencies last year, compared with the significant spike in early 2009 (Graph 1, left-hand panel).

Credit extension has been particularly generous for loss-making firms in sectors most exposed to the pandemic shock (Graph 2, right-hand panel, orange dots and fitted curve). In particular, credit on average has exceeded operating losses over the entire support of the distribution of losses, shown by the fitted orange curve lying above the 45 degree line across the entire upper left quadrant.

Liquidity to solvency: transition postponed or cancelled

The extension of credit to loss-making firms has clearly helped prevent the initial liquidity crunch from quickly morphing into widespread solvency problems. However, it remains uncertain whether this transition has been cancelled or postponed. Ample credit has resulted in sharp increases in firm indebtedness over the past year (Graph 3, left-hand panel). For example, in the airline and hotel, restaurant and leisure sectors, the median leverage in loss-making firms has increased by nearly 20 and 15 percentage points respectively. Going forward, the path of future cash flows will be a key factor in determining whether higher debt ultimately makes firms vulnerable to insolvency.

Loss-making firms[1] Graph 3

Increase in debt to assets, Q4 2019–Q3 2020 | EBITDA/debt counterfactual[2]

Percentage points | Ratio

• Median ■ 25th–75th percentile | ■ pre-Covid-19 ▲ 100% recovery ■ 2021 forecasts for EBITDA

[1] Based on public and large private companies in all non-financial sectors across AU, CA, DE, ES, FR, GB, IT, JP and US that have negative cumulative operating profits from Q1 2020 to Q3 2020. [2] Vertical dashed lines show debt to EBITDA ratios at 3, 4, and 6. Forecasts are based on 2021 EBITDA consensus estimates from S&P Capital IQ as of February 2021.

Sources: S&P Capital IQ; authors' calculations.

To assess insolvency risk arising from increased indebtedness, we examine two scenarios for firms' cash flows that made operating losses in 2020. First, a scenario where firm earnings return to pre-Covid-19 levels, which might be consistent with a swift vaccine roll out and broad-based recovery in economic activity. A second scenario examines the case where earnings reach their current, more depressed, consensus forecasts for 2021.

Under the first scenario, most sectors see a decrease in their earnings-to-debt ratio (Graph 3, right-hand panel, blue triangles), due to the greater indebtedness they have acquired during the pandemic. This is particularly pronounced in consumer-facing sectors such as airlines, where debt would increase from below three to over four times earnings before interest, taxes, depreciation and amortisation (EBITDA) and the hotel, restaurant and leisure sector, where debt would increase to over six times EBITDA. In other sectors, a return to 2019 earnings would not prevent an increase in already stretched leverage levels.

That said, even if existing firms cannot sustain higher debt levels, bankruptcies are just a reallocation of claims. So while ownership of firms may change, the firms could still continue to operate if cash flows recover. Bankruptcies may rise somewhat in this optimistic scenario; however, the risk of a significant rise in zombification is low.[3]

More worrying is the second scenario under which earnings reach their current consensus forecasts for 2021. Under this scenario, firms in the airline, hotels, restaurants and leisure sectors see a much more pronounced fall in their ratio of earnings-to-debt (Graph 3, right-hand panel, black dots), as would firms in the entertainment, industrial and textile and apparel sectors. Loss-making firms in these sectors are likely to remain highly dependent on continued support if bankruptcies are to be avoided over the coming year. In such a scenario, zombification risks in these sectors could be higher. Moreover, continued weakness in these sectors could spill over into the more leveraged real-estate sector. That said, consensus earnings forecasts appear more optimistic for loss-making firms in other sectors. For example, private sector forecasters currently expect a bumper increase in earnings that could materially reduce leverage relative to 2019 levels in the materials, metals and mining, consumer staples and aerospace and defence sectors.

Higher leverage, the uncertain outlook for cash flows and the role of credit in suppressing bankruptcies to date all shine a spotlight on banking sector buffers (Araujo, Cohen and Pogliani (2021), Hardy (2021)). As the economic outlook improved in the second half of 2020, banks reduced their quarterly provisions, and some even took negative provisions. That said, these reductions remained substantially smaller than the amount of loan loss reserves added during the previous three quarters. The spotlight also falls on financial conditions, which affects a firm's ability to refinance higher debt loads, and government loan guarantees. Businesses that can succeed may need help as they undergo debt restructuring and repair their balance sheets. More broadly, policymakers must encourage and enable businesses in the most severely damaged sectors to reallocate their resources toward those sectors that are more likely to thrive in the post-pandemic economy (Carstens (2020)).

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Exposure to Covid-19 shock and existing vulnerabilities concentrated in a few sectors — Table 1

Sectors	Exposure to Covid-19 shock: Revenue change[1]	Exposure to Covid-19 shock: Recoupability[2]	Liquidity risk: Liquidity[3] Level[6]	Liquidity risk: Liquidity[3] Change[7]	Liquidity risk: Credit lines[4] Level	Liquidity risk: Credit lines[4] Change	Balance sheet risk: Debt[5] Level	Balance sheet risk: Debt[5] Change
Airlines								
Hotels, restaurants and leisure								
Real estate								
Construction								
Energy								
Entertainment								
Textiles, apparel and luxury goods								
Consumer discretionary								
Metals and mining								
Aerospace and defence								
Utilities								
Industrials								
Consumer staples								
Diversified consumer services								
Materials								
Commercial services and supplies								
Technology								
Machinery								
Healthcare								

Red/white/blue cells indicate sectors in which exposure to Covid-19 shock (vulnerabilities of non-financial firms risks) are large/medium/low. The ranking is relative to each column. Each indicator is scaled from 0 to 100 to make the indicators comparable. Cash-flow and balance-sheet risk indicators are based on G20 countries and Spain. The ratios represent the median value across all the firms within each sector.

[1] Purchase Managers Index; average March–September 2020. [2] MSCI Sectoral equity indices. Percentage change as of end-September 2020 compared with end-2019. [3] Ratio of cash to debt service. [4] Ratio of undrawn credit to debt service. [5] EBITDA to debt ratio. [6] At end-2019. [7] Percentage change as of Q3 2020 compared with end-2019.

Sources: Bloomberg; IHS Markit; Datastream; S&P Capital IQ; authors' calculations.

The highly asymmetric nature of the Covid-19 shock as well as pre-existing vulnerabilities across sectors is clearly evident across the range of indicators presented in Table 1. The heat map shows that although consumer-facing firms have been hit exceptionally hard, the impact on firms in other sectors has been relatively more muted (revenue change column).

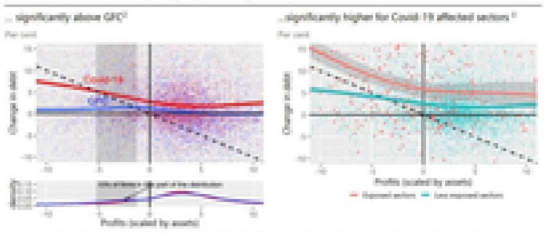
Sectors suffering smaller initial revenue reductions also benefitted from having more recoupable earnings (ie when sales are merely postponed rather than cancelled), further easing insolvency pressures (Table 1, recoupability column). Indeed, equity markets priced in lower insolvency risks in the consumer durable sector even though firms in this sector experienced a strong initial hit to revenues. Insolvency risk has also been mitigated by generally higher levels of liquidity and lower leverage in sectors less exposed to the pandemic shock (liquidity and balance-sheet risk columns). Instead, sectors harder hit by the Covid-19 crisis were less indebted (Mojon, Rees and Schmieder (2021)), while so far, the more leveraged real estate and construction sectors have been less exposed to revenue reductions.

However, these explanations alone are insufficient to explain why bankruptcies have fallen in many economies. As the centre and right-hand panels of Graph 1 show, the initial Covid-19 shock was at least as large as the initial GFC shock. To answer this puzzle, we turn to the dynamics of credit.

Ample credit to struggling firms

Ample credit has plugged the cash-flow gap for many firms. This appears to be an important determinant of the bankruptcy gap: after all, firms ultimately go bust when they cannot pay their bills (Banerjee and Kharroubi (2020)). Ample credit to loss-making firms over the past year stands in sharp contrast to tight credit conditions during the GFC (Graph 2, left-hand panel). The red dots in the upper left-hand panel plot accumulated operating profits over the first three quarters of 2020 against the increase in debt over the same period, for more than 11,000 firms across nine advanced economies. We fit a curve through the dots to visualise the non-linear relationship between profits and increases in debt (red line). The rising slope of the red line in the upper-left quadrant shows that debt has increased strongly in loss-making firms.

Credit provision to loss-making firms during Covid-19...[1] — Graph 2



[1] The smooth line is estimated using a generalised additive model, which fits penalised basis splines through the individual firm-level observations. [2] Based on public and large private companies in all non-financial sectors across AU, CA, DE, ES, FR, GB, IT, JP and US. GFC between Q3 2008 and Q2 2009 where change in debt is the change between Q3 2008 and Q2 2009 divided by total assets in Q3 2008, in percent. Profits is the sum of the profits from Q4 2008 to Q2 2009 divided by total assets in Q3 2008. Covid-19 between Q4 2019 and Q3 2020 where change in debt is the change between Q4 2019 and Q3 2020 divided by total assets in Q4 2019, in percent. Profits is the sum of the profits from Q1 2020 to Q3 2020 divided by total assets in Q4 2019. [3] Based on public and private companies in AU, CA, DE, ES, FR, GB, IT, JP and US. Covid-19 exposed sectors: airlines, hotel, restaurants and leisure, entertainment, textiles, apparel and luxury goods.

Sources: S&P Capital IQ; authors' calculations.

Strikingly, borrowing for many loss-making firms has exceeded their accumulated losses. This is shown by the red line in the left-hand panel of Graph 2 lying above the dotted 45 degree line for much of the upper-left quadrant. Even for heavily loss-making firms, debt has increased significantly on average.

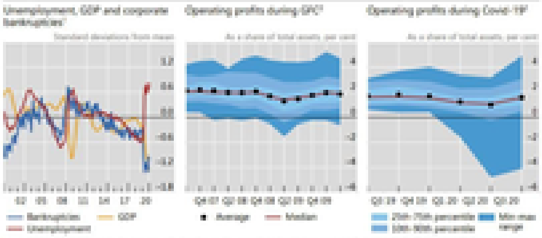
on additional support to avoid insolvency. These risks could be compounded if vaccines are less successful in containing the spread of Covid-19. Prolonged weakness in these sectors could in turn spill over into the more leveraged commercial real estate sector.

The uncertain outlook for firms' cash flow and the role of credit in containing bankruptcies to date shines a spotlight on banks' loss-absorbing buffers and provisioning strategies, as well as on accommodative financial conditions and government guarantees that have sustained credit to struggling firms.

Bankruptcy gap

Despite the unprecedented shock to the global economy, corporate insolvencies remain exceptionally low and have even fallen in many jurisdictions over 2020 (Banerjee, Cornelli and Zakrajšek (2020), IMF (2021)). A sharp divergence has emerged between predicted measures of bankruptcies based on economic activity and the level of realised bankruptcies globally (the Covid-19 bankruptcy gap). This gap is illustrated by the left-hand panel of Graph 1, which shows that bankruptcies (blue line) tend to increase when unemployment (red line) is high and when GDP growth is weak (yellow line) – as was the case during the GFC. This stands in sharp contrast to 2020, when bankruptcies declined as unemployment spiked and GDP growth collapsed.

A bankruptcy gap has opened up as sectors have been hit asymmetrically by the Covid-19 shock — Graph 1



[1] The mean and standard deviations are calculated over the period 2000–2019 on an individual country basis. The graph shows the average of the standard deviations from the mean across countries, where data are available. [2] The shaded areas and lines show moments of asset weighted operating profits by sector based on public and large private companies in all non-financial sectors in: AU, CA, DE, ES, FR, GB, IT, JP and US.

Sources: BIS; IMF; Datastream; national statistical agencies; S&P Capital IQ; authors' calculations.

Exposure to the pandemic shock and pre-existing vulnerabilities

One potential driver of this gap is the highly asymmetric exposure to the shock across sectors. Indeed, the divergence in operating profitability across sectors since the start of the pandemic in early 2020 (Graph 1, right-hand panel) is considerably greater than that during the 2008–09 financial crisis (centre panel). Furthermore, the strong recovery in Q3 2020 is likely to have alleviated insolvency stress in some sectors.

Exposure to Covid-19 shock and existing vulnerabilities concentrated in a few sectors — Table 1

Sectors	Exposure to Covid-19 shock		Liquidity risk				Balance sheet risk	
	Revenue change[1]	Recoupability[2]	Liquidity[3]		Credit lines[4]		Debt[5]	
			Level[6]	Change[7]	Level	Change	Level	Change
Airlines								
Hotels, restaurants and leisure								
Real estate								
Construction								
Energy								
Entertainment								
Textiles, apparel and luxury goods								
Consumer discretionary								
Metals and mining								
Aerospace and defence								
Utilities								
Industrials								
Consumer staples								
Diversified consumer services								
Materials								
Commercial services and supplies								
Technology								
Machinery								
Healthcare								

Red/white/blue cells indicate sectors in which exposure to Covid-19 shock /vulnerabilities of non-financial firms risks are large/medium/low. The ranking is relative to each column. Each indicator is scaled from 0 to 100 to make the indicators comparable. Cash flow and balance sheet risk indicators are based on G20 countries and Spain. The ratios represent the median value across all the firms within each sector.

[1] Purchase Managers Index, average March–September 2020. [2] MSCI Sectoral equity indices. Percentage change as of end-September 2020 compared with end-2019. [3] Ratio of cash to debt service. [4] Ratio of undrawn credit to debt service. [5] EBITDA to debt ratio. [6] As at end-2019. [7] Percentage change as of Q3 2020 compared with end-2019.

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The highly asymmetric nature of the Covid-19 shock as well as pre-existing vulnerabilities across sectors is clearly evident across the range of indicators presented in Table 1. The heat map shows that

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Liquidity to solvency: transition cancelled or postponed?

Ryan Banerjee, Joseph Noss and Jose Maria Vidal Pastor

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Liquidity to solvency: transition cancelled or postponed?

Key takeaways

- *Since the start of the Covid-19 pandemic, a "bankruptcy gap" has emerged between measures of expected and realised bankruptcies globally.*
- *The ample supply of credit to make up for short-term losses has been an important factor decoupling bankruptcies from the sharp reduction in firms' cash flows.*
- *Firms' reliance on credit suggests that it may be too early to dismiss future solvency risk. Significant increases in leverage and weak earnings forecasts in some sectors suggest that for some firms, greater credit extension may have only postponed, rather than cancelled, their insolvency.*

Not too long ago it was conventional wisdom that the global economy would transition from the "liquidity phase" to the "solvency phase" of the Covid-19 economic crisis. A large wave of insolvencies was expected. So far, however, insolvencies have remained very low, and even fell in many jurisdictions during 2020 (Banerjee, Cornelli and Zakrajšek (2020), IMF (2021)). As a result, a gap has opened between previously reliable predictors of bankruptcy rates based on economic activity and actual realised bankruptcies. We refer to this phenomenon as the "Covid-19 bankruptcy gap".

This bulletin aims to shed light on the drivers of this bankruptcy gap and identifies two important determinants. First, the impact of the pandemic has been highly asymmetric. Although it has hit consumer-facing sectors exceptionally hard, other sectors less affected by the pandemic (and its associated containment measures) experienced a strong recovery in Q3 2020. Moreover, the ability to recoup missed revenues has alleviated insolvency stresses, particularly in the durable goods sector. That said, this falls short of a satisfactory explanation of why bankruptcies have been so low, even falling in some economies.

The second and, arguably, more important factor suppressing bankruptcies has been the ample supply of credit, facilitated by unprecedented monetary and fiscal support. This has been pivotal in preventing insolvencies, because it is ultimately insufficient cash flows that give rise to bankruptcies (Banerjee and Kharroubi (2020)). After all, firms go bust when they cannot pay their bills. Ample credit during 2020 stands in sharp contrast to the Great Financial Crisis (GFC) when credit conditions were exceptionally tight.

Whilst the increase in credit has prevented business firms' insolvency in the short term, it has also increased their indebtedness. In an optimistic scenario, with the global vaccine roll-out being successful, business models of the vast majority of firms in the hardest hit sectors will continue to be fundamentally sound and cash flows will recover to pre-Covid-19 levels. The risk of a significant rise in "zombification" will be low under this scenario. However, firms' indebtedness will be higher, and this might result in changes of firm ownership from equity holders to creditors.

Perhaps the more worrying scenario is the combination of higher debt levels and depressed earnings for credit dependent firms in some sectors, as suggested by consensus forecast estimates for 2021. Under this scenario, firms in the airline, hotels, restaurants and leisure sectors would remain highly dependent

Hardy (2021)). As the economic outlook improved in the second half of 2020, banks reduced their quarterly provisions, and some even took negative provisions. That said, these reductions remained substantially smaller than the amount of loan loss reserves added during the previous three quarters. The spotlight also falls on financial conditions, which affects a firm's ability to refinance higher debt loads, and government loan guarantees. Businesses that can succeed may need help as they undergo debt restructuring and repair their balance sheets. More broadly, policymakers must encourage and enable businesses in the most severely damaged sectors to reallocate their resources toward those sectors that are more likely to thrive in the post-pandemic economy (Carstens (2020)).

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Banerjee and Hofmann (2020) show that zombie firms experience persistent as opposed to temporary declines in cash flow.

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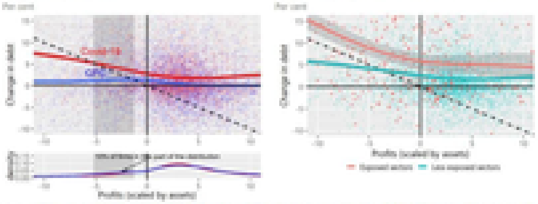
Credit provision to loss-making firms during Covid-19...[1] Graph 2

... significantly above GFC[2] ...significantly higher for Covid-19 affected sectors[3]

Per cent Per cent



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Sources: S&P Capital IQ; authors' calculations.

Strikingly, borrowing for many loss-making firms has exceeded their accumulated losses. This is shown by the red line in the left-hand panel of Graph 2 lying above the dotted 45 degree line for much of the upper-left quadrant. Even for heavily loss-making firms, debt has increased significantly on average. This borrowing has clearly been quantitatively important in plugging the gap left by negative cash flows in these firms.

By contrast, credit was far harder to come by during the GFC. The blue dots plot accumulated operating profits over the three quarters following the collapse of Lehman Brothers at the height of the GFC. On average, the blue line shows that loss-making firms managed to borrow. However, for many loss-making firms, the amounts were significantly less than their operating losses (blue line below the dotted line in the upper-left quadrant). This inability to cover losses with credit is likely to have driven many firms into insolvency.

Quantitatively, the impact of ample credit is large. The grey shaded band in the bottom-left panel of Graph 2 shows that around 10% of firms lie in the region where on average they received credit more than one-for-one with losses during 2020, but were unable to do so during the GFC. Thus the ability to cover operating losses with new borrowing across a significant mass of firms is likely to have been a significant

factor behind the decline in business insolvencies last year, compared with the significant spike in early 2009 (Graph 1, left-hand panel).

Credit extension has been particularly generous for loss-making firms in sectors most exposed to the pandemic shock (Graph 2, right-hand panel, orange dots and fitted curve). In particular, credit on average has exceeded operating losses over the entire support of the distribution of losses, shown by the fitted orange curve lying above the 45 degree line across the entire upper-left quadrant.

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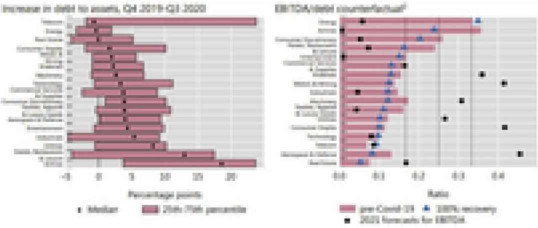
Increase in debt to assets, Q4 2019–Q3 2020 EBITDA/debt counterfactual[2]



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