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Insolvency and debt overhang following the COVID-19 outbreak: Assessment of risks and policy responses

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By Lilas Demmou, Sara Calligaris, Guido Franco, Dennis Dlugosch, Müge Adalet McGowan and Sahra Sakha

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ABSTRACT/ RESUME

Insolvency and debt overhang following the COVID-19 outbreak: assessment of risks and policy responses

This paper investigates the likelihood of corporate insolvency and the potential implications of debt overhang of non-financial corporations induced by economic shock associated with the outbreak of COVID-19. Based on simple accounting models, it evaluates the extent to which firms deplete their equity buffers and increase their leverage ratios in the course of the COVID-19 crisis. Next, relying on regression analysis and looking at the historical relationship between firms' leverage and investment, it examines the potential impact of higher debt levels on investment during the recovery. Against this background, the discussion outlines a number of policy options to flatten the curve of crisis-related insolvencies, which could potentially affect otherwise viable firms, and to lessen the risk of debt-overhang, which could slow down the speed of recovery.

JEL Classification codes: D22, D24, G33, G34.

Keywords: COVID-19, insolvency, debt, equity, investment

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Insolvabilité et surendettement après l'épidémie de COVID-19: évaluation des risques et réponses politiques

Cet article examine le risque d'insolvabilité des entreprises ainsi que les implications potentielles d'un surendettement des sociétés non financières induits par le choc économique associé à la pandémie du COVID-19. Sur la base d'un modèle comptable simple, nous évaluons la mesure avec laquelle les entreprises sont amenées a épuiser leurs fonds propres et a augmenter leurs ratios d'endettement au cours de la crise du COVID-19. Ensuite, en nous appuyant sur une analyse de régression examinant la relation historique entre endettement des entreprises et l'investissement, nous analysons l'impact potentiel qu'un acroissement de l'endettement pourrait avoir sur l'investissement des entreprises pendant la reprise. Dans ce contexte, le papier discute également des options de politiques publiques qui permettraient d'aplatnr la courbe des défaillances qui pourrait potentiellement affecter des entreprises par ailleurs viables, et de réduire le risque de surendettement qui pourrait ralentir la reprise économique.

Classification: D22, D24, G33, G34.

Mots-clés: insolvabilité, dette, capitaux propres, investissement.

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Insolvency and debt overhang following the COVID-19 outbreak: assessment of risks and policy responses

By Lilas Demmou, Sara Calligaris, Guido Franco, Dennis Dlugosch, Müge Adalet McGowan and Sahra Sakha [1]

1. Introduction[2]

1. A swift and decisive response of policy makers across OECD countries has helped businesses to bridge the short-term liquidity shortfalls induced by the economic shock following the COVID-19 outbreak, avoiding immediate and widespread insolvency crises. Many countries have now entered a second phase of the pandemic and the shock is likely to translate into an enduring risk of a wave of corporate insolvencies as well as in a significant increase in leverage, thereby depressing investment and job creation for long.

2. Building on previous work on corporate liquidity shortfalls during the pandemic (Demmou et al., 2021) this paper assesses two key types of risks in the medium and long-term:

- *Widespread distress and increase in leveraging.* The number of non-financial corporations in distress, i.e. firms that are anticipated to have a negative book value of equity and therefore a high risk of insolvency, is increasing worldwide. At least two channels are at work. First the economic

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[2] This working paper updates and extends the OECD note “Insolvency and Debt Overhang Following the COVID-19 Outbreak: Assessment of Risks and Policy Responses” (Tackling Coronavirus Series) published in November 2020.

shock following the COVID-19 crisis diminished actual and expected sales and profits, thereby putting downward pressure on the value of firms' assets. Second, the injection of liquidity provided in the form of loan guarantees and new lines of credit increased firms' leverage ratios and hence their default risk.[3] To shed light on these challenges, we perform an accounting exercise in the spirit of Carletti et al. (2020) and Guerenni et al. (2020). Based on a sample of almost one million firms located in 14 European countries and in comparison to a business-as-usual counterfactual, we calculate the decline of net profit over a one year period, the associated decline in equity and the increase in leverage ratios.

- *The negative effect of debt overhang on investment.* Higher levels of corporate debt require businesses to reduce investment in the aftermath of economic crises (Kalemli-Ozcan et al., 2019; Barbiero et al., 2020). This can slow down the speed of the recovery. Relying on regression analysis and looking at the historical relationship between investment and the financial leverage ratio at the firm level, we find that higher financial leverage tends to be associated with lower investment and that this negative relationship has been particularly pronounced during and after the global financial crisis (GFC). We then calculate the potential implications of this projected increase in leveraging as compared to normal times for investment ratios in the recovery period following the COVID-19 crisis.

3. Against these risks, the paper discusses options for policy makers to prevent widespread insolvencies and how to support firms' investment without further increasing debt and leverage across firms. An additional layer of complexity concerns identifying the prevalence of non-viable firms, which could further undermine the strength of the recovery by locking-in resources in less productive firms (Adalet et al., 2018). The exceptional magnitude of the crisis and the high levels of uncertainty firms are still facing are likely to make the distinction between viable and non-viable firms more difficult. The risk of supporting potentially non-viable firms needs to be balanced against the risk of forcing viable and productive firms into premature liquidation.[4] This is because insolvency frameworks tend to become less efficient in time of crisis, especially when courts are congested, potentially leading to liquidation of a higher number of viable firms than desirable, with adverse effects on growth (Iverson, 2018).

4. To get around the necessity to identify non-viable firms at an early stage, it is critical to organise policy support under the premise of preserving optionality, i.e., helping firms weather the COVID crisis but regularly re-assessing their viability (e.g. stage-financing approach as suggested by Hanson et al., 2020). More broadly, one potential strategy for governments would be to adopt a multidimensional cascading approach. At first, policy makers could aim at "flattening the curve of insolvencies" by providing additional resources and restoring equity of distressed firms. Next, if those additional resources are not sufficient, they could encourage timely debt restructuring to allow distressed firms to continue operating smoothly. These two first steps are expected to reduce the number of viable firms that would be otherwise liquidated. Finally, to deal with firms that would still be non-viable despite public support and debt restructuring, governments could improve the efficiency of liquidation procedures to unlock potentially productive resources. Indeed, looking forward, policy makers will acquire new information on how the "post-pandemic" normal will look like and policy may need to facilitate the "necessary" reallocations implied by COVID-19.

5. The remainder of the paper is organized as follows. In Section 2, we discuss the methods to assess the potential impact of the COVID-19 outbreak on firms' financial conditions and present the main related

[3] Through a second round effect, the deterioration of assets value could reduce firms' solvency even more, a channel not investigated in this paper.

[4] Some economically inefficient firms may be categorised mistakenly as efficient and allowed to restructure instead of being liquidated (type-I errors). Conversely, type-II errors occur when some economically efficient firms that encounter temporary financial stress are liquidated, either because existing restructuring procedures are too cumbersome or because the existing procedure mistakenly categorises them as inefficient.

findings. Section 3 describes the empirical framework to investigate the relationship between leverage and investment both in normal and crisis time, and discusses the outcome of the regression analysis. In Section 5, we discuss a wide range of policy options that could simultaneously help the recovery and strengthen the resilience of the corporate sector.

Box 1. Main findings and policy implications

Main findings

- The decline in firms' profits due to the COVID-19 shock is estimated to range between 40% and 50% of business-as-usual profits in our sample and will cause the value of equity to decline. Around 7-9% of otherwise viable companies would become distressed, i.e., the book value of their equity becomes negative.
- However, these percentages are heterogeneous across sectors and type of firms. Intangible-intensive sectors are significantly impacted but better positioned to bridge the crisis, while the Hospitality, Entertainment and Transport sectors are the most severely hit. Young, small and low productivity firms are predicted to suffer more compared to their old, large and productive counterparts.
- The reduction in the book value of equity due to the COVID-19 shock would have immediate consequences on firms' leverage ratios, which increase relative to a business-as-usual scenario by between 6.7 and 8 percentage points. The decline in profits also impairs firms' ability to service their debt: between 30% and 36% of firms would not be profitable enough to cover their interest expenses.
- The higher levels of indebtedness and default risk may increase the risk of a large-scale corporate "debt overhang". Based on historical experience, an increase of firms financial leverage ratios of similar magnitude as the predictions of our accounting model is expected to decrease the investment ratio by approximately 2 percentage points.
- The effect of indebtedness on investment appears to be heterogeneous across firms based on the experience from the global financial crisis (GFC). Firms that entered the GFC with a higher financial leverage ratio experienced a sharper decline in investment; on the contrary, the relation can turn positive, and thus an increase in debt could foster investment, for firms with very low initial debt levels.

Policy implications

- The preservation of the corporate landscape still warrants high priority. Yet, policy makers need to strike a balance between the risk of phasing out support too early (thereby leading to liquidation of viable firms) and providing across-the- board support for too long (favouring the persistence of unviable firms) – for instance, by adopting flexible and state contingent support measures that could evolve as the economic situation is improving.
- The design of policy is critical. While debt financing has been decisive in solving immediate liquidity constraints, equity financing could play an important role in recapitalising firms while at the same time mitigating debt overhang. Relevant policy instruments include equity and quasi-equity injections (e.g. preferred stocks), phasing in an allowance for corporate equity and debt-equity swaps.
- Complementarily to equity type of financing, debt restructuring can change both the timing of distressed firms' potential default and their possibility to invest. Policy makers may consider establishing legal conditions favouring new financing for distressed firms (e.g. granting priority over unsecured existing creditors), promoting pre-insolvency frameworks and adopting specific procedures to facilitate SMEs debt restructuring.

2. An empirical assessment of firms financial conditions following the COVID-19 outbreak

6. Using a simple accounting exercise in the spirit of Carletti et al. (2020), we evaluate quantitatively the impact of the pandemic on firms' long-term viability. The economic shock is modelled as a change in firms' operating profits, resulting from the sharp reversal in sales and from firms' limited ability to fully adjust their operating expenses. After calculating the decline in profits, also taking into consideration governments' job support schemes implemented during the first phase of the crisis, the paper sheds light on two different but related issues. First, it assesses the new hypothetical value of net equity (i.e. the difference between the book value of assets and liabilities) one year after the implementation of confinement measures. Firms whose net equity is predicted to be negative are classified in this framework as distressed, and thus at risk of being insolvent. This exercise informs about the amount of equity that would be needed to restore firms' pre-crisis financial structure. Second, the paper assesses the increase in firms' leverage ratios caused by the reduction in equity relative to a "No-COVID" scenario.

2.1. Size and dynamics of the shock

7. The magnitude of the sales shock during confinement months is based on the first-round demand and supply shocks computed at a detailed sectoral level by del Rio-Chanona et al. (2020).[5] To quantify the supply shock, they classified industries as either essential or non-essential and constructed a Remote Labour Index, which measures the ability of different occupations to work from home: the supply shock is not binding for essential industries, while inversely proportional to the capacity to telework for non-essential ones. To quantify the demand shock, del Rio-Chanona et al. drew on a study of the potential impact of a severe influenza epidemic developed by the US Congressional Budget Office. In this paper, we identify the resulting sector-specific – but country invariant – shock as the largest between the supply and the demand shock.[6]

8. The model presents two alternative scenarios with respect to the duration of the shock (Table 1):

- An upside scenario, which foresees a sharp drop in activity lasting two months (the confinement period), followed by progressive but not complete recovery in the remaining part of the year. Activity levels are expected to still fall short of pre-crisis levels one year after the start of the implementation of confinement measures. The recovery path is dependent on the initial shock, so that the most severely hit sectors face a larger absolute decline in revenues also after confinement, but the speed of the recovery is assumed, for simplicity, to be the same across sectors.
- A downside scenario, which overlaps with the upside scenario for the first seven months, but then embeds a second, relatively smaller, outbreak from the eighth month onwards, accompanied by

[5] The full dataset on the confinement shock provided by del Rio-Chanona et al. (2020) can be found here.

[6] To see why this is the case, consider the following example. Due to confinement measures, a firm is able to produce 50% of its normal time output (e.g. supply shock). If the demand shock, due to changes in consumers' preferences, implies a 60% reduction in demand for the products of the firm, the firm will produce only what it is able to sell – 40% of its normal time output – and the demand shock is binding. On the contrary, if the reduction in consumers' demand is expected to be lower (e.g. 20%), the firm will still produce at its maximum capacity during confinement and the supply shock is binding.

more limited lockdowns.[7] [8]

The current developments of the pandemic, characterised by localised outbreaks and uncertainty on the strength of virus resurgence suggest that the recession may be more deeper than modelled in the upside scenario but not as severe as in the downside one. It follows that the two scenarios could be more generally interpreted as a lower and an upper bound with respect to the magnitude of the shock.

Table 1. Detailed dynamic of the two alternative revenues shock scenarios

Month		Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21
Size of the shock	**Upside** scenario	S	S	S*0.75	S*0.4	S*0.4	S*0.4	S*0.2	S*0.2	S*0.1	S*0.1	S*0.05	S*0.05
	Downside scenario	S	S	S*0.75	S*0.4	S*0.4	S*0.4	S*0.2	S*0.75	S*0.4	S*0.2	S*0.05	S*0.05

Note: The tables shows the detailed dynamic underpinning each of the alternative scenarios. The revenues shock (S) is sector specific and calculated each month with respect to normal time revenues.
Source: OECD calculations.

2.2. Data

9. The analysis relies on the 2018 financial statements of non-financial corporations from the latest vintage of the Orbis database. To ensure firms' comparability across countries and sectors, the data are prepared as in Gal (2013) and very small firms (less than three employees) were excluded to avoid concerns related to the quality of financial statements. After applying cleaning procedures, the final sample consists of 872 648 unique firms, operating in both manufacturing and business non-financial services industries, for 14 relatively well-covered European countries.[9] Reflecting data availability, countries included in the sample are: Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Poland, Portugal, Romania, Spain, Sweden and the United Kingdom. At present, Orbis is the largest cross-country firm-level dataset available and accessible for economic and financial research. However, it does not cover the universe of firms, and the extent of the coverage varies considerably across countries. Indeed, in our sample, Italian and Spanish firms add up to half of the observations, while French, Hungarian, Portuguese, Romanian and Swedish firms account, each separately, for 5% to 11% of the observations; all other countries display lower shares. To deal with those limitations, the analysis purposely avoids in depth cross-country comparisons, as well as the provision of absolute numbers on the aggregate level of the shortfall.

10. Importantly, as the objective of the exercise is to investigate the extent to which solvent firms may turn distressed due to the COVID-19 shock, we exclude from the sample firms that would have been distressed (e.g. firms with negative book value of equity at the end of 2018) and would have experienced negative profits even in normal times. It follows that the findings show an *incremental* – rather than total –

[7] The sectoral implications of the second outbreak characterizing the "double-hit" scenario are assumed to be smaller than those of the initial confinement period (e.g. 75% of the size of the initial confinement shock), taking into consideration for example the increased hospital capacity and implementation of better targeted distancing measures.

[8] As a robustness check, we also computed a more complex structure for the recovery, which is modelled as a combination of the Economic Outlook country-specific projections and sectoral variation obtained from analyst forecasts (IBES data) on the performance of a set of large listed companies. Results are qualitatively unchanged.

[9] More specifically, the analysis covers all economic sectors except the followings (Nace Rev.2 classification): agriculture (VA), mining (VB), financial (VK), public administration (VO), education (VP), human health (VQ) and activities of households and organizations (VT and VU). Table A.1 reports descriptive statistics of the main variables used.

effect following the COVID-19 shock. Moreover, firms in Orbis are on average disproportionately larger, older and more productive than in the population, even within each size class (Bajgar et al., 2020). As these firms are on average healthier than their smaller, younger and often less productive counterparts, the results from this analysis should be interpreted as a lower bound for the impact of the COVID-19 outbreak on firms' solvency and leveraging.

2.3. A stylised accounting framework

11. Operationally, taking as reference year the last available data for each firm (end of 2018) with respect to its revenues, operating expenses, tax payments and the book value of equity, firms' profits during the COVID-19 outbreak are calculated as follows:

$$CovidProfits_i = \sum_{t=1}^{12}[(1 - s_{st}) * Revenues_i - (1 - c * s_{st}) * Intermediates_i - (1 - w * s_{st})\, WageBill_i - (1 - s_{st}) * Taxes_i] \quad (1)$$

where s_{st}, c, w refer, respectively, to the size of the shock in sector s and month t, the sales elasticity of intermediate costs, and the sales elasticity of the wage bill. Firms' sales, intermediate costs, wage bill, and taxes are annual values divided by 12. Consistent with Demmou et al. (2021), the elasticity of intermediate costs to sales is set to 0.8, in order to allow for short-run lower adjustment capacity, especially with respect to the partially fixed share of these costs. The elasticity of the wage bill to sales is also set to 0.8, taking into consideration the widespread job support schemes that reduced staff costs for firms during the pandemic. In line with several wage support programmes, such an elasticity implies that workers are compensated by the government at the constant rate of 80% of the usual wage for any hour not worked, while employers are assumed the bear the full costs of any hours worked and only 20% of the costs of hours not worked.

12. Building on the relationship between profits and equity (i.e. "reference year" equity is the outcome of "reference year" profits), the hypothetical new value of equity is obtained as:

$$PostCovidEquity_i = Equity_i - (Profits_i - CovidProfits_i) \quad (2)$$

This calculation allows us to classify firms as distressed if their pre-crisis equity buffer is not enough to cover the decline in profits, and thus if their "Post-COVID Equity" is negative.

13. Next, we assume that the reduction in equity relative to the reference year that follows the decline in profits translates directly into increases in firms' leverage ratios (i.e. liabilities to total assets ratio). Under this assumption, the post-COVID equity can be directly related to the post-COVID leverage according to the following accounting relationship:

$$PostCovidLiabilities_i = PostCovidAssets_i - PostCovidEquity_i \quad (3)$$

14. In principle, and abstracting from an injection of equity capital by the owners, an increase in the leverage ratio can follow either from an increase in liabilities (for instance benefitting from the widespread liquidity support offered by Governments in the form of new loans or guarantees) or from a decline or sale of assets (for instance depleting their cash reserves) that firms implement to weather the crisis and re-pay their current commitments. In practice, since the two channels cannot be distinguished in the context of our exercise, we assume that firms need to find financing resources equivalent to the decline in profits in order to cover all their financial commitments, such as repaying the principal of debt (i.e. the value of assets

is anchored to normal time and the adjustment occurs on the liabilities side of the balance sheet).[10] Importantly, by calculating the leverage ratio using a reference year, we might overestimate the post-COVID leverage if firms have the opportunity to reduce their financial commitments in some areas compared to this year. At the same time, results may be conservative if firms have taken loans for precautionary savings due to favourable credit conditions and uncertainty on a double hit (OECD, 2020a).

2.4. Simulation results

15. The estimated decline in profits is sizeable, on average between 40% and 50% of normal time profits (depending on the scenario considered).[11] Following this sharp reduction, 7.3% (9.1%) of otherwise viable companies would become distressed in the upside (downside) scenario (Figure 1, top left panel) and, accordingly, 6.2% (7.7%) of previously "safe jobs" are endangered. The highlighted incremental effect following the COVID-19 shock implies that the total number of distressed firms would double compare to "normal times", as we estimate approximately 8% of firms being endangered in a No-COVID scenario.

16. The results are quite heterogeneous across sectors and type of firms. The percentage of otherwise viable companies becoming distressed reaches 26% (32%) in the "Accommodation and food service activities" sector, while it is almost null in the "Information and communication" and "Professional services" ones (Figure 1, top right panel). The "Transports", "Wholesale and retail trade", as well as "Arts, entertainment and recreation" and "Other services activities" sectors are also severely hit by the crisis. The percentage of distressed firms in manufacturing is instead below average.[12]

17. More broadly, and consistent with the diverse ability to rely on innovative technologies and teleworking arrangements, tangible-intensive sectors are relatively more affected than intangible-intensive ones (Figure 1, middle left panel). Similarly, more productive companies are relatively less impacted than low-productivity firms; yet, the estimated percentage of firms in the top quartile of the productivity distribution becoming distressed is not negligible (5.4% and 6.8% in the upside and the downside scenarios, respectively; middle right panel). In addition, old and large firms are better positioned to face the shock compared to their younger and smaller counterparts (Figure 1, bottom panels).

18. The reduction in equity relative to a business-as-usual scenario has immediate consequences on firms' leverage ratios: the ratio of total liabilities to total assets would increase by 6.7percentage points in the upside scenario and 8 percentage points in the downside scenario for the median firm in the sample (Figure 2, left panel).[13] Importantly, while leverage ratios are estimated to substantially increase due to the COVID-19 shock over the whole range of the pre-crisis distribution of leverage, the new distribution of firms according to their leverage ratio shows a larger portion of firms with very high leverage ratios, underlying the likelihood of large-scale over-indebtedness (Figure 2, right panel).

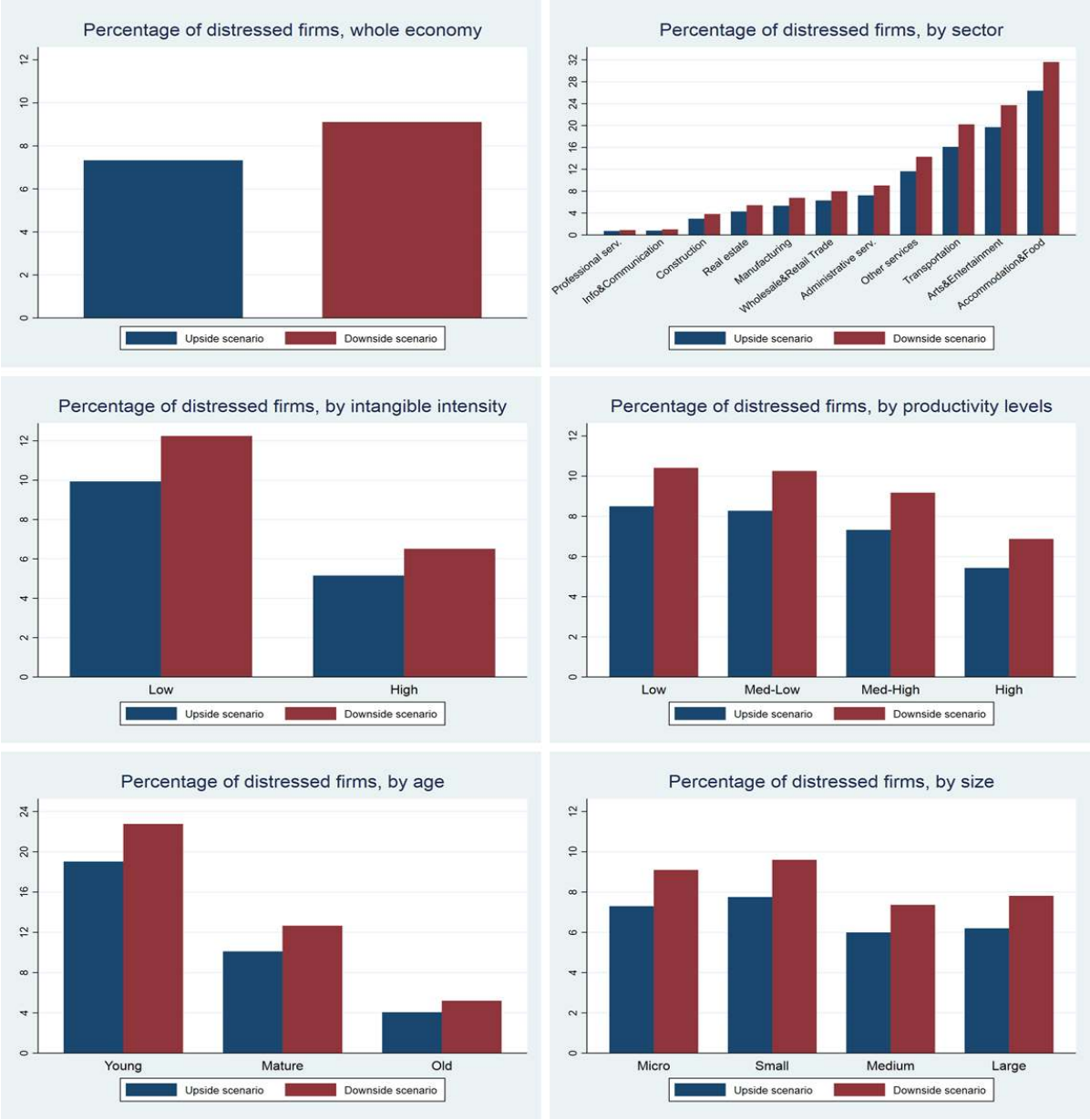
[10] Results are qualitatively unchanged with alternative assumptions with respect to the choice of the adjustment variables -- for instance, if we assume that firms deplete their assets to cover losses and increase their liabilities to cover the remaining portion of the decline in profits. Furthermore, they are robust to the computation of an alternative accounting framework, outline in Annex B.

[11] Consistently, between 23% and 29% of previously profitable companies are expected to face losses due to the COVID-19 outbreak. Additional details are provided in Figure A.1 in Annex.

[12] Accordingly, the percentage of jobs at risk reaches 20% (24%) in the "Accommodation and food service activities" sector in the upside (downside) scenario; it is around 16% (20%) for "Transports" and "Arts, entertainment and recreation", and negligible in least impacted sectors.

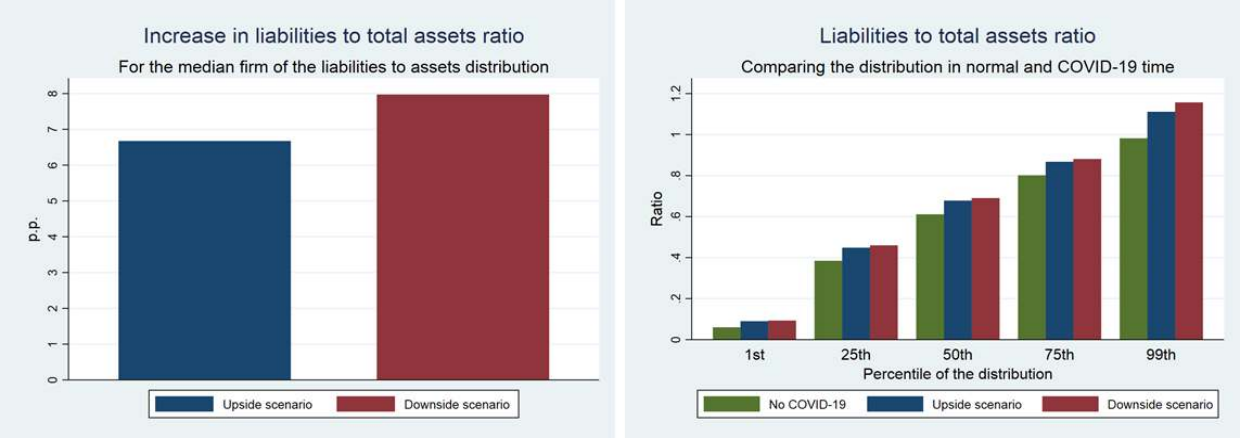
[13] The aggregate reduction in the book value of equity is estimated around 9% (11%) in the upside (downside) scenario.

Figure 1. A substantial portion of otherwise viable firms is predicted to become distressed



Note: The figure shows the percentage of distressed firms in the upside (blue bars) and downside (red bars) scenarios: for the whole economy (top left panel); by 1-Digit Nace Rev2 sectoral classification (top right panel); by sectoral intangible intensity, where intangible intensity is measured, following Demmou et al. (2019), as the median ratio (across firms within industries) of intangible over total assets (middle left panel); by productivity levels, defined according to quartiles within each (2-digits Nace Rev.2) industry of multi-factor productivity computed according to Wooldridge (2009) value added based methodology (middle right panel); by firms' age, where age is defined as the difference between 2018 and the year of incorporation of the company and young firms are those with less than 5 years, mature firms those from 5 to 10 years and old those more than 10 years (bottom left panel); by firms' size, where micro enterprises are those with less than 10 persons employed, small enterprises those with 10 to 49 employees, medium enterprise those with 50 to 249 employees and large enterprise those with 250 or more persons employed (bottom right panel). Firms are defined as distressed if their book value of equity is predicted to be negative one year after the implementation of confinement measures. Notice that the sample is restricted ex-ante to firms having both positive profits and book value of equity in the 2018 reference year and that, for the sake of exposition, the y-axis scale varies among panels.
Source: OECD calculations based on Orbis® data.

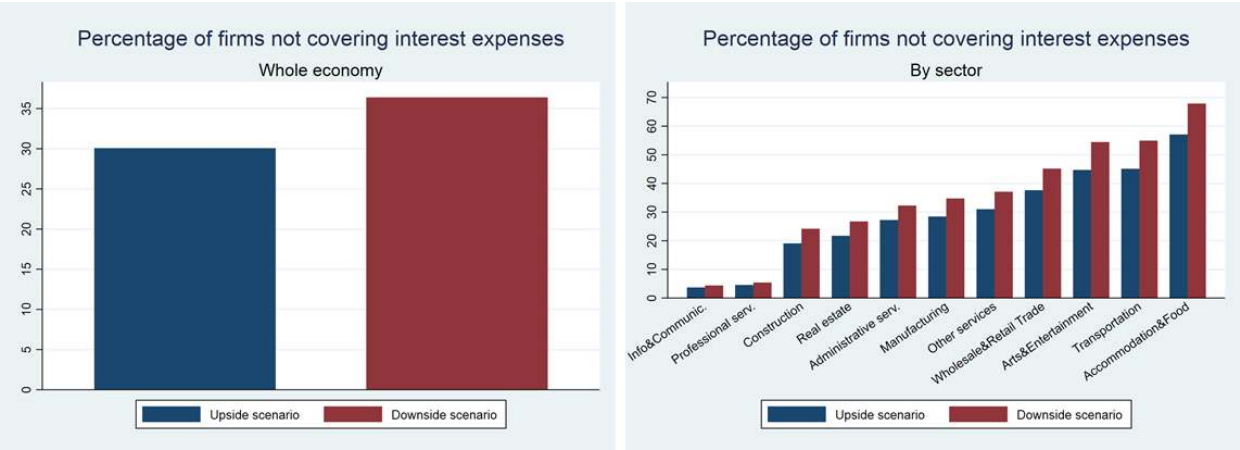
Figure 2. Firms' leverage is expected to increase in the aftermath of the crisis



Note: The left panel shows the percentage points increase in the liabilities to total assets ratio for the median firm of the leverage distribution following the COVID-19 outbreak in the upside (blue bars) and downside (red bars) scenarios. The right panel shows the levels of the liabilities to total assets ratio in the no-COVID (green bars), upside (blue bars) and downside (red bars) scenarios at different points of leverage distribution. Notice that the sample is restricted ex-ante to firms having both positive profits and book value of equity in the 2018 reference year.
Source: OECD calculations based on Orbis® data.

19. Similarly, the sizeable decline in profits relative to business-as-usual may impair firms' ability to service their debt. The left panel of Figure 3 shows that, despite assuming no increase in interest payments compared to normal times, 30% (36%) of the companies are not profitable enough to cover their interest expenses in the upside scenario (downside scenario) – i.e., they have an interest coverage ratio lower than unity. In line with this, the interest coverage ratio is estimated to be approximately halved due the COVID-19 outbreak for the median firm in the sample. The right panel of Figure 3 disaggregates results at the sector level, showing once again large heterogeneity across sectors and pointing out that a consistent portion of firms in the "Accommodation and food service activities", "Arts, entertainment and recreation" and "Transport" sectors will find it difficult to service their debt. Unsurprisingly, young, small and less productive companies are predicted to be hit more severely by the crisis also according to this metric (Figure A.2 in Annex).

Figure 3. A large portion of otherwise viable firms will find it hard to service their debt



Note: The figure shows the percentage of firms whose interest coverage ratio falls below unity due to the COVID-19 outbreak in the upside (blue bars) and downside (red bars) scenarios. The left panel present results for the whole economy, while the right panel shows sector specific (1-Digit Nace Rev2 classification) findings. Notice that the sample is restricted ex-ante to firms having both positive profits and book value of equity in the 2018 reference year and that, for the sake of exposition, the y-axis scale varies among panels.
Source: OECD calculations based on Orbis® data.

3. An empirical assessment of the leverage-investment relationship and the potential debt-overhang following the COVID-19 outbreak

20. The increase in the level of indebtedness and risk of default can push firms towards the so-called "debt overhang" risk. When a firm has a high outstanding debt on which the likelihood of default is significant, the return from any investment tends to disproportionately benefit senior debt-holders compared to shareholders (Myers, 1977).[14] Therefore, the expected return from an investment project needs to be high enough to cover the value of outstanding debt held by senior creditors and to offer an additional return to new investors and equity holders. This implies that debt overhang raises the threshold that determines whether an investment is profitable. As a result, businesses may only realise investment projects with a relatively high expected rate of return as opposed to all projects with a positive net present value (Chatterjee, 2013).

21. Debt overhang comes with a significant risk of default and thus also limits access to new credit. With less options to finance working capital, highly leveraged firms may need to cut costs or downsize to be able to shoulder interest payments in order to avoid a corporate default. Firms that built up significant debt in boom times are particularly exposed to sudden changes in economic conditions and may need to embark in a painful deleveraging process (Dell'Ariccia et al., 2016). Similarly, firms with elevated debt at short durations which find it difficult to roll-over debt in times of crisis, but also large listed firms that intend to avoid insolvency and therefore devote more resources to debt repayments than investment are prone to debt overhang and the subsequent deleveraging (Acharya et al., 2011; Brunnermeier and Krishnamurthy, 2020). Since a large share of firms with high levels of debt can significantly increase the share of non-performing loans and thus undermine the ability of banks to extend lending to healthy firms, debt overhang can also impact the ability to obtain credit by healthy firms (Caballero et al., 2008; Becker and Ivashina, 2014).

22. The deleveraging process often involves cost cutting and downsizing, slowing down the recovery from the current crisis. Recent financial indicators corroborate that the combination of negative pressure on sales, high uncertainty about future sales and profits, and growing debt burdens has increased the risk of default, putting particular downward pressure on corporate credit ratings.[15]

23. A large stream of the literature have examined the impact of debt overhang on investment. For instance, Hennessey et al. (2007) find that a 1 percent increase in leverage for a corporation with a median level of leverage leads to a 1 percent decline in investment. Kalemli- Ozcan et al. (2015) find that debt overhang for European firms contributed to almost half of the decline in the investment-to-capital ratio during the financial crisis. Popov et al. (2018) find that on average, higher debt is associated with lower capital investment. The problem of low investment is mitigated if the firm is facing growth opportunities, however only if leverage is not too high. Further, there is evidence that one-third of credit booms tend to be followed by an extended period of stagnation in economic growth (Dell'Ariccia et al. 2016).

3.1. Empirical approach

24. In order to more formally assess how the rising tide of debt associated with the COVID-19 outbreak would affect investment and to size the potential magnitude of the effect, we investigate empirically the

[14] For example, if the assets of the firm are liquidated, the payment accrues first to senior creditors, next to junior creditors and only lastly to equity holders.

[15] In line with this, there is large evidence that investment collapsed in the aftermath of the global financial crisis and experienced sluggish growth in the following years (OECD, 2020f).

historical relationship between indebtedness and investment, as well as the specific features characterising the relation during the global financial crisis.[16]

25. The analysis relies again on latest vintage of the Orbis database prepared as in Gal (2013) and covers both manufacturing and business non-financial services industries in the same 14 relatively well represented countries. Differently from previous exercise, we exploit the panel nature of the data tracking firms back in time up to 1995 and, given that some regression specifications exploit exclusively within firm variation, the dataset is restricted to firms reporting for at least three consecutive years. Moreover, the sample excludes again very small firms, but using a higher threshold of five employees to avoid concerns related to the quality of the data with respect to a wider range of variables and to data consistency over time.

26. We test the historical relationship between firms' financial leverage and investment by estimating the following panel fixed effects reduced-form model over the 1995-2018 period:

$$InvestmentRatio_{ics,t} = \beta_0 + \beta_1 FinLeverageRatio_{ics,t-1} + \beta_2 InterestCoverage_{ics,t-1} + \beta_3 \boldsymbol{X_{ics,t-}} + \tau_{cst} + \varepsilon_{icst} \quad (4)$$

where subscripts *i, c, s, t* stand for firm, country, sector and time, respectively; the dependent variable $InvestmentRatio_{ics,t}$ is the ratio between investments (either total, tangible or intangible) at time *t* and total capital (respectively, total, tangible or intangible) at *t-1*; $FinLeverageRatio$ is the ratio between financial debt and total assets of firm *i* in *t-1*; $InterestCoverage$ is the ratio between total profits and interest expenses of firm *i* in *t*-1; the vector $\boldsymbol{X}$ includes a set of firm level controls - namely, the log of age, log of size, cash holdings over total assets and ROA at *t-1*, and sales growth at time *t*; δ_i indicates firm fixed effects and τ_{cst} country by sector by time dummies.

27. The model is closely related to the approaches adopted by Kalemli-Ozcan et al. (2019) and Barbiero et al. (2020). It is estimated by OLS, clustering standard errors at the firm level (e.g. the unit of the panel). The main parameters of interest are the estimates of β_1 and β_2, which we expect to be respectively negative and positive. To diminish concerns of endogeneity resulting from the relationship between investment and financial leverage, we use a rich fixed effects structure (i.e., the model is saturated): firm fixed effects absorb the unobserved firm-specific heterogeneity that might simultaneously affect both variables; the triple interacted country-sector-year fixed effects control for the effects of all time-varying shocks at the country-sector level. To clarify, given our fixed effects structure, identification occurs by exploiting exclusively within firm variation in a given country-sector-year cell. Moreover, we lag all firm level regressors to further reduce the simultaneity bias, and use a large set of firm-level controls to control for the potential omitted variable bias arising from firm time-varying characteristics (e.g. variables to proxy firms' financial conditions and structure that could both affect their leverage ratio or interest coverage ratio and ability to undertake investment). Nonetheless, the simple nature of the model calls for a careful interpretation of the findings in terms of causality.

28. Next, we check whether the relationship presents different features during sharp downturns by estimating the following cross-sectional model, as in Kalemli-Ozcan et al. (2019):

$$\Delta InvestmentRatio_{ics} = \beta_0 + \beta_1 \Delta FinLeverageRatio_{ics} + \beta_2 \Delta InterestCoverage_{ics} + \beta_3 \boldsymbol{\Delta X_{ics}} + \tau_{cs} + \varepsilon_{ics} \quad (5)$$

[16] While this analysis sheds light on the investment-leverage relationship in crisis time, it is worth stressing that the GFC and the COVID-19 shock display very different features (e.g. ranging from the underlying causes to government responses) and thus that results could be interpreted in the light of the current situation only to a limited extent.

where notations are consistent with equation 4 and all variables are expressed as first differences between the average levels in the post-GFC period (2008-2013) and the average pre-GFC (2002-2007) levels. Again, we expect β_1 (β_2) to be negative (positive), hinting that an increase in the financial leverage (interest coverage) ratio reduces (increases) investment during the crisis. The specification in differences implicitly absorbs firm fixed effects with respect to the levels variables and country by sector dummies (τ_{cs}) control for demand effects. Moreover, Equation 5 is further extended to investigate whether the impact of an increase in financial leverage has heterogeneous effects depending on firms' financial leverage levels when entering the GFC. This is done by including as an extra term in equation (5) the interaction between the pre-crisis leverage levels and the change in the leverage ratio. This is of particular interest in the current COVID-19 crisis characterized by both high indebtedness levels and low growth rates.

3.2. Empirical results

29. Consistent with previous studies (e.g. Kalemli-Ozcan et al., 2019; Barbiero et al., 2020), the results from the panel model confirms the existence of a negative and statistically significant relationship between financial leverage and investment. Interpreting results causally, the magnitude of the effect is not negligible. A 19 percentage points (43 percentage points) increase (decrease) in the debt to assets ratio (interest coverage ratio) – e.g. approximately equivalent to a one-standard deviation in our sample – is expected to decrease the investment ratio by 6 percentage points (1 percentage point). In other words, such a change in financial leverage (the interest coverage ratio) would explain 15% (3%) of the observed variation in investment over the period.[17] Results are confirmed when focusing exclusively on tangible or intangible investments, and are consistent with respect to a wide range of robustness checks – for instance, looking separately at the pre- and post-GFC periods or using quartiles of the financial leverage ratio variable, rather than its continuous value, to capture firms' indebtedness levels.

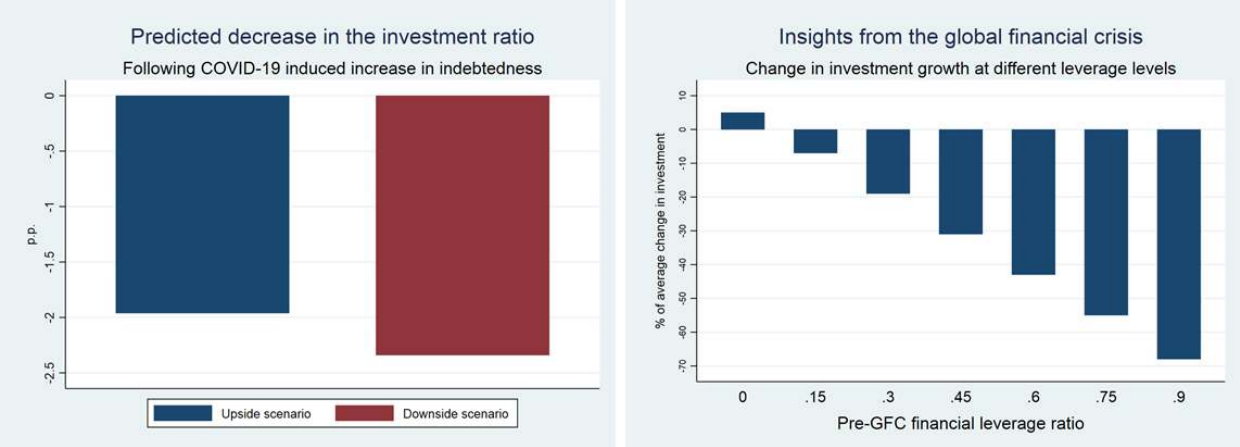
30. The left panel of Figure 4 further explores the implied magnitude of the estimated relationship between investment and financial leverage ratios by assuming an increase in the debt to total assets ratio comparable to that predicted by our accounting model in the post-COVID period.[18] Specifically, it illustrates the inferred decrease in investment to fixed assets under the hypothetical increase in financial leverage as shown in Figure 2 (left panel) for the median firm in the sample. Investments to fixed assets would decrease by 2 percentage points in the single hit-scenario and 2.3 in the double-hit one.

31. The outcome of the cross-sectional model strengthens these findings and shows that the relationship holds in the presence of a large shock such as the GFC (see Table A.4). An increase in firms' financial leverage has on average a significant and negative impact on the growth of investment in the aftermath of the crisis. Similarly, the positive coefficient for the interest coverage ratio implies that a decrease in the ability to service debt is also associated with lower investment growth. However, the effect of a change in debt on investment is heterogeneous across firms and is increasing with initial leverage levels (Figure 4, right panel): firms that entered the GFC with a higher financial leverage ratio experienced a sharper decline in investment; on the contrary, the relation can turn positive, and thus an increase in debt could foster investment, for firms with very low initial indebtedness levels. The effect is economically considerable. For instance, a 15 percentage points increase in the change in financial leverage – approximately equivalent to a one-standard deviation – implies a decrease in the investment rate equivalent to 18% of its average change for firms with a financial leverage ratio around 0.3, while it implies a 5% increase for firms with no previous debt.

[17] See Table A.2 for detailed results from the regressions. Moreover, Table A.3 shows that results are qualitatively unchanged when using the liabilities to total assets ratio rather than financial leverage as the main explanatory variable.

[18] In other words, we assume that the increase in the liabilities to total assets ratio is fully driven by an increase in financial debt as the simple accounting model presented in section 1 and data limitations do not allow to calculate the development of the different components of liabilities following the COVID-19 outbreak.

Figure 4. High financial leverage decreases investment



Note: The left panel shows what would be the increase in the investment to fixed assets ratios under the hypothetical increase in the debt over total asset ratios shown in Figure 2 (left panel) for the median firm. Estimates on the correlation between debt and investment ratios are based on column (7) of Table A.2, i.e. the model including all the controls in the panel regression. The right panel shows the predicted percentage growth in the change in the investment to fixed assets ratio following a one standard deviation increase in the (post- minus pre-GFC) change in financial leverage, at different pre-crisis indebtedness levels. Estimates are based on specification 2 in Table A.4. To interpret the size of the effect, we scale the y-axis by the absolute value of the mean of the change in the investment ratio, hence obtaining the effect of a one standard deviation increase in the explanatory variable of interest on the average value of the dependent variable.
Source: OECD calculations based on Orbis® data.

32. Overall, these results suggest that debt-overhang could hamper investment and impede a fast recovery following the COVID-19 outbreak, given the record-high debt levels at the beginning of 2020 and the ongoing and expected rise in corporate debt to face the economic consequences of the pandemic. Moreover, the analysis hints that looking exclusively at average effects may convey policy makers only a partial picture and that a further increase in debt may not be the appropriate answer for highly indebted firms, both from a viability and an investment perspective.

4. Policy discussion

33. The empirical analysis stresses that the rise of corporate debt could threaten the recovery, suggesting that governments should be careful when designing support packages. In the initial phase of the COVID-19 crisis, temporary deferral or repayments of loans either by private agents (e.g. banks in the Netherlands) or public sources (e.g. loans by the Ministry of Tourism in Spain) played a key role to relieve financially distressed businesses and prevent early insolvency. Loan guarantees also help distressed firms to meet their immediate financial commitments, avoiding widespread defaults (e.g. the Überbrückungskredite – loan guarantees for short-term credits - offered by the Austrian Economic Chamber). However, such support may not address the issue of their long-term viability due to the associated rise in indebtedness. The rest of the policy brief sheds light on various policy options to support distressed firms while not compromising their ability to invest. First, it focuses explicitly on the design of crisis-related measures and on the necessity to favour equity-type of financing over debt to recapitalise distressed firms. Second, it investigates the potential role of debt resolution mechanisms in mitigating debt overhang and in sorting-out viable and non-viable firms.

4.1. Flattening the curve of insolvency while reducing the debt overhang risk

34. Increasing equity capital provides a way to support viable businesses without raising corporate debt. Relative to increases in debt, additional equity improves leverage ratios and reduces interest

coverage ratios, thereby reducing corporate refinancing costs and benefitting a potential recovery. In times of high uncertainty over future sales growth, equity financing may also be desirable from the viewpoint of entrepreneurs, given that equity acts like an automatic stabiliser.

35. Governments have various policy options to leverage on equity financing to support viable businesses. On the one hand, authorities can directly provide equity capital through public equity injections in firms (e.g. Alitalia and Lufthansa by the Italian and German governments). Indirect options, such as convertible bonds or state guaranteed loans against higher profit tax rates in the future, are also possible. On the other hand, policymakers can incentivise the uptake and provision of equity capital from private investors to firms through structural reforms, e.g. of corporate tax systems, and acting as a catalyst of private resources by developing equity co-funds. An overview of currently existing equity programmes across OECD countries is provided in OECD (2020b; Table 1 on page 21).

36. Equity injections can help firms, which suffer from financial difficulties solely due to COVID-19 but are likely to return to profitability afterwards, to raise much-needed cash to finance their working capital while keeping assets free for raising debt in the future. Authorities would, however, need to ensure that losses for taxpayers are minimised and that the government does not intervene in management. Moreover, it is important to ensure that such support is state-contingent and includes mechanisms to incentivise all parties to wind down support when economic conditions improve (OECD, 2020c; OECD, 2020d).

37. Hybrid instruments like preferred equity appear well-adapted (OECD, 2020b). Preferred equity provides a senior claim to dividends and assets in case of liquidation as compared to common equity. Consequently, the owners of common shares, i.e. the owners with voting rights, have an incentive to manage the company relatively prudently, given that they only receive a dividend once the dividend payments on preferred shares are paid. Since preferred shares entail no voting rights, companies can raise funds without diluting control. Moreover, taxpayer could potentially profit from these investments: if the share of firms facing losses in the medium and long-term remains below a certain threshold, public equity injections may even lead to a higher return on investments than compared to debt injections (OECD, 2020b). Temporary forms of preferred equity, e.g. retractable preferred equity, would help to formulate an exit strategy in advance, thus further reducing risks for taxpayers.

38. Public equity injections come not without disadvantages. Given that preferred equity is subordinate to debt, equity injections can entail potentially larger losses than debt. The magnitude of these losses depends on whether the government can realise a positive return on investment and whether the number of firms in high distress remain below a certain threshold (OECD, 2020b). Furthermore, equity injections require agreement on the market value of equity and the required return for investors. Retractable preferred equity further needs agreement on maturity and exit conditions. While valuation and pricing may be much less of a problem for relatively large companies, smaller companies with no shareholders other than the owner are difficult to value. The government could team up with private investors, e.g. private equity and venture capital investors, to ensure a quick and efficient valuation. Valuation at the sector-level may help as well. Crucially, governments need to ensure that competition on markets is not overly distorted and that equity injections do not crowd out other investors. In order to avoid such risks, international coordination, for instance within the EU, is key in designing rescue packages for hardly hit cross-country industries (e.g. airlines).

39. Supporting SMEs and start-ups financing needs may require a different and more comprehensive approach, as equity markets for small and medium-sized, as well as young, firms are thinner and often lacking altogether (see Box 2 for some recent examples of non-debt creating instruments for SMEs).[19] This makes the valuation of equity capital and thus the design of the injection more difficult. Besides direct equity injections, policymakers could revert to more indirect measures. For instance, according to the Business Continuity Insurance framework proposed by Hanson et al. (2020), repayment could be linked to

[19] For a recent discussion on start-ups during the COVID-19 see OECD (2020g).

businesses' returns: firms that recover most robustly would pay back more, in the form of future taxes, while those that struggle longer would pay back less. Such support would have several advantages. It could contribute to flattening the curve of bankruptcies while limiting the risk of costly defaults. In addition, agreements to pay higher taxes in the future against guaranteed credits would be easier to monitor for authorities, than a potentially large number of equity injections in a large number of single entities.

40. While subject to the existence of sufficient fiscal space, another useful measure to address SME funding needs without raising debt consists in converting government (crisis related) loans into grants. For instance, in the United States, loans obtained through the "Paycheck Protection Program" could be turned into grants conditional on the firm spending at least three-quarters of the money on payroll expenses and the rest on rent and utility bills. Similarly, the German government launched the "Immediate Assistance Programme" (Soforthilfeprogramm) to provide grants to small businesses, self-employed individuals and freelancers, under the conditions of using the funds to mainly cover rental and leasing expenses; applications should be filed directly with the government of the Land of residence, and the maximum amount of the grant is set proportional to firms' size.

41. Debt-equity swaps constitute another tool to address high leverage. They involve the conversion of outstanding debt that cannot be repaid into equity of an otherwise viable company. Debt-equity swaps may appear attractive in theory, but raise some implementation issues. A debt-equity conversion requires the estimation of the market value of debt and equity and an agreement between shareholders and the debtholder on an exchange ratio. The lack of equity markets for SMEs, in particular smaller ones, impedes a cost-efficient estimation of the market value of equity. Consequently, debt-equity swaps appear more appropriate to address elevated leverage in circumstances where agreements on underlying terms are more likely to be reached, e.g. subsidiaries of a larger firm, than as a more general policy tool.

42. Governments have additional policy tools to stimulate the uptake and provision of equity capital. One way for policymakers to leverage on the need for equity in the post-COVID-19 world would be to grant an allowance for corporate equity (ACE). Such an allowance would partially or totally offset the tax benefits of using debt financing and make equity financing more attractive. Their design should however ensure that multinationals do not exploit ACE for tax-planning and that their fiscal cost is acceptable, for instance by granting them to new equity capital only. In the OECD area, a few countries (such as Italy and Belgium) have already introduced ACE or experimented with it in the past and their experience can serve as example (Zangari et al., 2014; Hebous and Ruf, 2017).[20] Moreover, deductions on income taxes and reliefs on the taxation of capital gains for eligible investments can foster the provision of private equity capital. Such tax incentives are often used to stimulate investments in high-risk, early-stage businesses, e.g. as in the UK's Enterprise Investment and Seed Enterprise Investment scheme, but could potentially be extended also to a wider set of firms, e.g. smaller companies facing tight financing frictions.

43. Besides immediate short-term measures aimed at dealing with the economic consequences of COVID-19, there are options to ensure that equity markets continue to develop, including by widening access to equity markets for smaller firms, e.g. through reducing costs and streamlining listing requirements (Wehinger, 2014). For instance, COVID related equity programmes could speed up the implementation of the Capital Market Union in European countries, which in turn could help to address intra-European segmentation along national boundaries. Similarly, policy makers can improve the development and attractiveness of equity markets by using financial literacy as a tool to boost stock market participation and financial knowledge of entrepreneurs.

[20] Evaluations of existing systems suggest that ACE systems, if well-designed, reduce leverage at the firm level. In the case of Belgium, the introduction of ACE was associated with a significant decrease in financial leverage (Princenc, 2012, Panier et al., 2013) across larger firms, but no significant changes in the capital structure were found in SMEs (Campenhout and Caneghem, 2013). Empirical results for Italy (Branzoli and Caiumo, 2018), Austria (Frühwirth and Kobialka, 2011) and Turkey (Ozdamar, Tanyeri and Akdeniz, 2020) further support the view of a decrease in leverage.

Box 2. Non-debt creating instruments for SMEs: Some examples

Equity funds/convertible bonds: BPIFrance launched its Strengthening Fund FDPME (for its acronym in French - Fonds de reinforcement des PME) with an endowment of close to EUR 100 million in March 2020. Firms with a turnover of at least EUR 5 million can get development capital under this scheme. In addition, the government established the French Tech Bridge, which provides convertible bonds to firms that were expected to raise funds through venture capital investments but were unable to do so due to the COVID-19 crisis. This scheme required co-investments from private actors and is aimed at high-potential start-ups (Caisse des Dépots, 2020). Further, a new fund, BPIFrance Entreprises 1, was launched on 1 October. It enables non-professional investors to invest in a group of 1 500 SMEs and young firms for a period of six years and thus constitutes a new source of equity funding to these businesses.

Convertible loans: A convertible loan can be converted to a claim to equity capital if a borrower cannot to repaythe loan. The Future Fund in the United Kingdom has set up such convertible for SMEs. To be eligible, SMEs need to meet some conditions, including a minimum of GBP 250 000 previously raised in equity capital (British Business Bank, 2020).

Equity crowdfunding: In the United States, the Securities and Exchange Commission (SEC) announced temporary rules to provide more flexibility for issuers that meet specific eligibility criteria to accelerate the offering process and get faster access to funds through Crowdfunding. In addition, the rules also exempt issuers offering between USD 107 000 and USD 250 000 in securities, from specific financial statement review requirements (US Securities and Exchange Commission, 2020).

Tax policies to strengthen SME equity: Governments can also incentivise private investment in SMEs through tax policies. In Belgium, tax incentives have been implemented to attract private investment for start-ups and SMEs affected by the COVID-19 pandemic. For instance, individuals can obtain a tax reduction in the personal income tax of 20% if they acquire new shares of small companies based in the region of Flanders, whose turnover has decreased by at least 30% from March to April 2020 (Agentschap Innoveren & Ondernemen, 2020). They may also benefit from an income tax reduction of 30% to 45% if they acquire new shares directly from a start-up or via crowdfunding (Agentschap Innoveren & Ondernemen, 2020).

Source: Boschmans, and Pissareva (2017); Boschmans and Raes (Forthcoming).

4.2. Ensuring the restructuring of viable firms in temporary distress and liquidation of unviable ones

44. Equity and quasi-equity injections might prove insufficient to allow firms to operate normally if leverage ratios and risk of default remain high. For those firms, reducing the debt burden through debt restructuring can change both the timing of the potential default and their possibility to invest (Frantz and Instefjord, 2019). Most countries have already modified their insolvency framework to give insolvent firms a chance to survive in the short-run, for instance by relaxing the obligation for directors to file for bankruptcy once insolvent (e.g. France, Germany, Luxembourg, Portugal and Spain) or by relaxing creditors' right to initiate insolvency proceedings as done in Italy, Spain, Switzerland and Turkey (OECD, 2020e; INSOL International-World Bank Group, 2020). Examples of recent temporary insolvency measures in response to COVID-19 are presented in Box 3.

45. However, more structural changes to features of insolvency regimes, which can be a barrier to successful restructuring, could help to coordinate creditors' claims in a manner that is consistent with preserving the viability of the firm. This crisis can provide an opportunity for reforms which are often hard

to implement and take time to design.[21] Policy actions in these areas could rely on several pillars. First, establishing legal conditions that would increase incentives for investors to provide new financing to financially distressed firms. Second, favouring pre-insolvency procedures that are associated with a higher rate of success. Third, establishing specific procedures for SMEs, including promoting informal debt restructuring as they run a higher risk to be liquidated in formal insolvency processes. Fourth, establishing specific out-of-court procedures that have proven to be effective in time of systemic crisis. Finally, ensuring an efficient liquidation process and providing the institutional conditions for a fresh start to unlock productive resources is key.

Box 3. Examples of temporary insolvency measures in response to COVID-19

Australia: The threshold for a bankruptcy notice being issued against a debtor, and for a creditor's petition being presented to the court, has been increased from AUD 5 000 to AUD 20 000. If a bankruptcy notice is served, the time for a debtor to comply and the stay on assets that a debtor can obtain against creditor recovery action is increased from 21 days to 6 months. The minimum debt threshold to commence liquidation proceedings by way of a "winding up demand" has been increased from AUD 2 000 to AUD 20 000. The director's duty to prevent insolvent trading by company is also temporarily suspended (Murray, 2020).

Italy: Applications for the declaration of bankruptcy filed between 9 March to 30 June 2020 have been frozen. Regarding ongoing proceedings, moratorium on the fulfilment of the reorganisation plan or extension to amend the plan are possible. The "recapitalise or liquidate" rule, which required to either recapitalise a corporation or to liquidate it in case of substantial losses that reduce the capital, is suspended for losses incurred until 31 December 2020 (Vattermoli, 2020).

Spain: The obligation of the debtor to file for bankruptcy within two months of becoming insolvent is suspended and courts will not process involuntary bankruptcy applications during the state of emergency. There is also a stay on on-going on insolvency proceedings.

United Kingdom: The wrongful trading provisions whereby directors can be personally liable if there is no reasonable prospect of avoiding insolvent liquidation/administration and they do not take every step to minimize losses to creditors, is suspended.

These examples are not exhaustive, but provide some highlights of temporary crisis-related insolvency reforms. A number of sources can provide more detailed information on the policy response of different countries in this area (Allen & Overy, 2020; Squire Patton Boggs, 2020; Gurrea-Martínez, 2020; Bird and Bird, 2020; Dentons, 2020).

4.2.1. Favouring new financing

46. Continuity of firm operations during restructuring increases the chances of a successful restructuring but often requires firms to have access to bridge financing. However, access to new funds may be difficult when the debt levels are already high and the risk of default is significant, leading to debt overhang. Across the OECD, new financing can have either no priority at all over existing creditors or priority over only unsecured creditors or priority over both secured and unsecured creditors. In normal

[21] For instance, insolvency reforms were more prevalent in countries more severely impacted by the global financial crisis. More recently, in 2020, the UK published a Corporate Insolvency and Governance Bill, which provides new rescue opportunities for struggling companies and to introduce greater flexibility into the insolvency regime, and the Netherlands adopted the Act on Confirmation of Private Plan, which modernises the Dutch insolvency law and introduces fast and flexible restructuring options.

times, insolvency regimes have to balance incentives for debtors to invest and take risks with incentives for creditors to supply funds. Therefore, new financing should be granted priority ahead of unsecured creditors but not over existing secured creditors since this would adversely affect the long-term availability of credit and legal certainty (Adalet McGowan and Andrews, 2018). Yet, several OECD countries currently do not offer any priority to new financing, so granting it over unsecured creditors would be beneficial. Further, in the context of the current crisis and assuming that the extensive guarantees and liquidity injections reach the right firms, the blocking of the "credit channel" might not be the main concern. An alternative but more controversial option to improve access to new financing is to temporarily suspend also the priority enjoyed by secured creditors in favour of new investors when they invest in distressed firms (Gurrea-Martínez, 2020).

4.2.2. Promoting pre-insolvency frameworks

47. Efficient pre-insolvency frameworks and debt restructuring could help to address debt overhang by lowering the negative impact of deleveraging on GDP growth and quickening the resolution of non-performing loans (Carcea et al., 2015; Bricongne et al., 2017). While a majority of OECD countries has some type of pre-insolvency legislation, until recently they were generally missing in non-European OECD countries (Adalet McGowan and Andrews, 2018). A number of countries has strengthened out-of-court procedures in recent years. For example, in 2018, Belgium, granted the courts the ability to endorse a settlement between a debtor and two or more of its creditors to make it enforceable. Lithuania overhauled the insolvency regime in 2020, accelerating timely initiation and resolution of personal and corporate insolvency proceedings and increasing returns for creditors, bringing them among the countries with the most efficient insolvency regimes according to the OECD indicator (OECD, forthcoming).22 In addition, several countries have encouraged lenders to reach out-of-court agreements with debtors materially affected by COVID-19, especially when these agreements just involve a deferral of loan repayments (Australia, China, India, Malaysia, and Singapore). More generally, introducing preventative restructuring or pre-insolvency frameworks, for instance as in the EU Directive on Preventive Restructuring Frameworks and Second *Chanc*e, could be accompanied by other incentives for private creditors to restructure debt, such as tax incentives (e.g. tax exemption for creditors who forgive part of debt). Effective design of such policies can be based on existing guidelines, such as the World Bank's *Toolkit for Out-of-Court Restructuring* (World Bank, 2016).

4.2.3. Establishing specific procedures for SMEs

48. Small and medium-sized enterprises (SMEs) may warrant different treatment from other firms in a debt restructuring strategy, as complex, lengthy and rigid procedures, required expertise and high costs of insolvency can be demanding for this category of firms. Indeed, SMEs are more likely to be liquidated than restructured, since they have to bear costs that are disproportionately higher than those faced by larger enterprises. For instance, the costs of bankruptcy for small and medium-sized businesses in the U.S. are often estimated at 30% of the value of the business and two-thirds of them are liquidated rather than reorganised (Skeel, 2020). In the current juncture with a high risk of insolvency among SMEs, the social cost of an inefficient debt restructuring for SMEs could be very large.

49. Against this background, formal procedures can be simplified for SMEs (see Box 4) and informal procedures, which typically avoid the procedural complexities and timelines of court proceedings and are often associated with better outcomes for SMEs, can be adopted relatively quickly (World Bank, 2020). In that respect, there are three major challenges specific to SMEs. First, while negotiation requires the participation and leadership of an honest broker, public authorities might not be the best informed to take

[22] In particular, the new regime encourages the parties to look for dialogue and out-of-court solutions; provides business with more options for restructuring rather than exit; speeds up court procedures; improves accountability of insolvency administrators; and establishes new supervision rules implying stronger self-regulation.

decision on very small companies as they lack the detailed information and the administrative capacity to use this information. Second, as the amount of loans is often small and bound by different covenants, it is more difficult to pool and securitise them. Third, reaching an agreement among different creditors might be difficult, leading to a higher probability to liquidate the firm instead of restructuring.

50. To provide incentives for private creditors to restructure SMEs debt, Blanchard et al. (2020) suggest for instance the following ad-hoc process. If the different private creditors reach an agreement and agree on debt restructuring, the government would accept a haircut equivalent to private creditors of the same rank and offer a fixed continuation premium. This continuation premium would provide incentives for banks to make the right social decision and addresses the difference between the social and the private value of the firm. By contrast, if creditors do not reach a consensus and liquidate the firm, the government would take its full claim on its rights.

Box 4. Implementing simplified formal procedure for SMEs: best practices and COVID-19 related actions

In recent years, there has been a rising awareness of the need to better address the insolvency needs of SMEs (World Bank, 2017; World Bank, 2018). The *EU Directive on Insolvency and Second Chance* also suggests that in order to help SMEs restructure at low cost, comprehensive check-lists for restructuring plans, adapted to the needs and specificities of SMEs, should be developed at national level and made available online and early warning tools be put in place to warn debtors of the urgent need to act, taking into account the limited resources of SMEs for hiring experts (European Commission, 2019). The OECD has advocated the adoption of special insolvency procedures for SMEs, such as simplified or pre-packaged in-court proceedings targeting SMEs or the possibility to pay administrative expenses related to the insolvency proceedings in instalments (Adalet McGowan et al., 2017a).

According to the OECD insolvency indicator, in 2016, 25 OECD countries did not have any special procedures for SMEs (Adalet McGowan and Andrews, 2018). However, a number of countries have taken measures to simplify insolvency procedures for SMEs in response to the COVID-19 pandemic. The new COVID-19 moratorium in Switzerland provides SMEs with a simple procedure to obtain a temporary stay of their payment obligations. Brazil has proposed to implement simplified insolvency rules for SMEs (during judicial restructuring plans, they can be allowed to pay debt in up to 60 monthly instalments instead of 36 months, as is currently the case). In the United States, the threshold required to access the simplified insolvency rules of the Small Business Reorganisation Act of 2019 has been increased to allow more companies access to simplified proceedings. Introduction of such simplified rules and flexibility with payment plans could increase the likelihood that non-viable SMEs exit and viable ones in temporary distress are restructured immediately.

4.2.4. Dealing with systemic debt restructuring of large companies

51. In-court debt restructuring for large firms appears broadly efficient in normal times, but during systemic crises case-by-case restructuring can become difficult, private capital is limited and co-ordination problems become more serious. In these conditions, court-supervised restructuring can be too time-consuming. Against this background, government agencies could prioritise out-of-court renegotiations whenever possible, a strategy that proved to be successful after the global financial crisis (Bernstein, Lerner, and Mezzanotti, 2019; Hotchkiss, Smith, and Strömberg, 2012). When out-of-court restructuring is difficult due to too many creditors, a centralised out-of-court approach might be desirable (Box 5).

Box 5. Example of systemic approach for debt restructuring of large companies

A centralised out-of-court debt restructuring approach (the so-called "London approach") was developed by the Bank of England in the 1990s. The main features of the "London approach" are such that different lenders (often banks) agree to not appoint receivers to the debtor in distress (a stand-still), share information (one bank is appointed as the lead creditor), decide together on whether and on what terms a firm should be given a lifeline and set rules on the voting power of minority creditors (Kent, 1993; Woo, 2000). In theory, only viable firms in temporary distress and whose problems are related to liquidity should be candidates to participate. Throughout the whole process, the workout intermediary can take a passive or active role, depending on circumstances and tends to be either the central bank or another government agency.

Another approach to deal with systemic crises could be the so-called "super Chapter 11" (Miller and Stiglitz, 2010) which overrides the normal restructuring procedures that are designed to handle small, idiosyncratic shocks rather than macro shocks hitting the whole economy. In particular, while courts cannot take account of externalities imposed by "fire-sales" of the assets involved in individual cases, making outright liquidation much more likely, the "super" Chapter 11 internalises those price effects in the midst of a macro-economic crisis. Three kinds of restructuring are considered in that context: a debt-equity swap, a temporary capital injection, and a debt write-down. Some of these policies have been discussed in depth in a recent OECD policy brief (OECD, 2020d).

4.2.5. Strengthening the efficiency of the liquidation framework to improve resource allocation

52. Providing equity support for distressed firms and ensuring debt restructuring should reduce a build-up of undesirable bankruptcies, but some firms will still remain un-viable in the post-COVID world (e.g. due to their business model, their financial situation or their product specialisation). Against this risk, policy makers need to address several challenges to ensure that the liquidation process of those firms is efficient and provide the institutional conditions for a fresh start by removing barriers that might push debtors to delay liquidation, easing the reallocation that the potentially permanent shifts in the nature of economic activity might induce in the longer term.[23]

53. *Ensuring the highest possible recovery rate for creditors.* When the number of distressed firms is too large, the courts become overwhelmed, standard insolvency procedures work less effectively, and the recovery rates for creditors can be reduced, potentially at fire-sale prices.[24] Any reforms that can simplify and speed up in-court processes would help in this respect. In the short term, a strategy aiming at flattening the curve of insolvencies combined with increased resources for the court system, for instance by adding new temporary judges on insolvency procedures or reallocating judges depending on the busiest jurisdictions, would contribute to increase the recovery rate of creditors.

54. Ensuring that liquidation is established by an independent broker. Public agencies such as public development banks in charge of loan guarantees may not be well placed to negotiate liquidation – with their own balance sheets exposed, they may be inclined to "extend-and-pretend" distortions in their actions (Bertay, Demirguc-Kunt and Huizinga, 2015).Therefore, one challenge for policy makers is to establish an

[23] For instance, the persistence of such barriers contributed to the increase in the share of zombie firms in the aftermath of the GFC, with negative aggregate productivity effects (Adalet McGowan et al., 2017b).

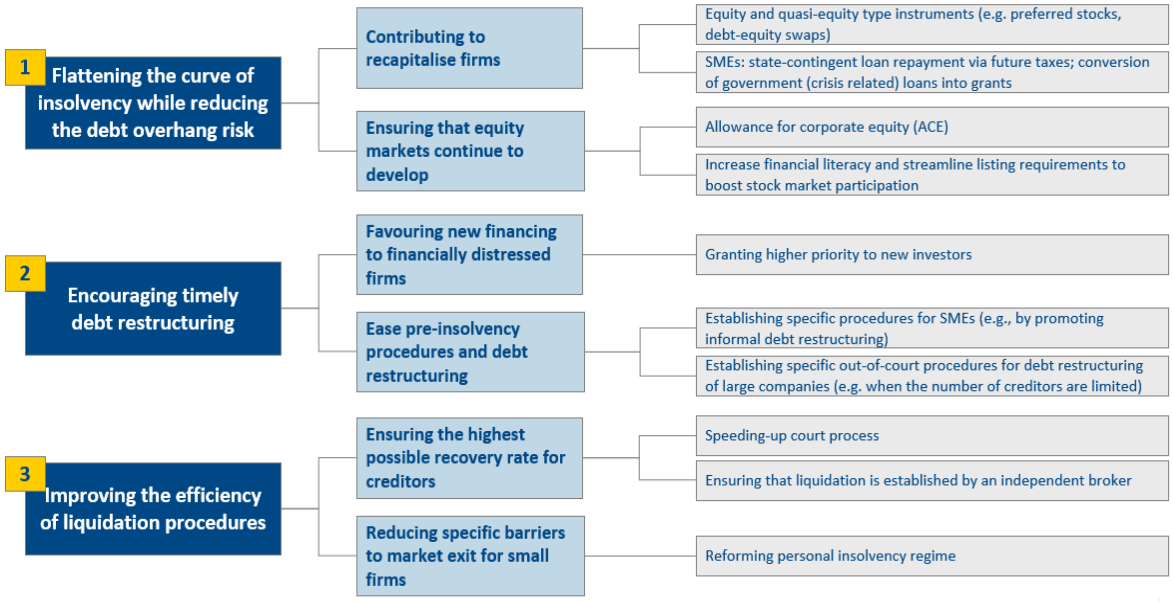
[24] Although implications are not quite as dire for large corporations, it takes longer for these companies to restructure and costs are substantially higher if the court is congested.

independent organisation to ensure that decisions with respect to liquidation and debt restructuring are not distorted (Hege, 2020).

55. *Reducing specific barriers to market exit for small firms*. The corporate *versus* personal distinction in assets and liabilities is often blurred for small firms, either because lenders require personal guarantees or security – e.g. a second mortgage on the owner's home – or because prior to incorporating and obtaining limited liability protection, entrepreneurs typically use personal finances (Berkowitz and White, 2004; Cumming, 2012). As a result, corporate insolvency may lead to personal insolvency once a business fails, even where the business is a separate legal entity. In that context, the type of personal insolvency regime matters to reduce the scars from the crisis, in particular by enabling a post-insolvency second chance for entrepreneurs and the availability of a "fresh start" – i.e. the exemption of future earnings from obligations to repay past debt due to liquidation bankruptcy. This could reduce the costs and the stigma of failure associated with insolvency, which is one of the commonly cited barriers to entrepreneurship and to firm dynamism. 25 Despite the importance of personal insolvency regimes, previous OECD research has shown that between 2010 and 2016, reform in this area was very limited, only five countries in the OECD (Chile, Greece, Lithuania, Latvia and Spain) lowered personal costs to failed entrepreneurs (Adalet McGowan and Andrews, 2018). Many European countries are already lowering time to discharge to 3 years to be in line with the EU Directive on Insolvency and Second Chance (e.g. Germany), but they could try to expedite this part of the reform, which can facilitate reallocation (e.g. Spain is considering this option).

56. To conclude, Figure 5 summarizes the main challenges for policy makers and the surveyed instruments to address them.

Figure 5. Policy options: a multi-dimensional cascading approach



Source: OECD.

25 The availability of a "fresh start" has been found to foster productivity growth via higher incentives for entrepreneurship and experimentation by: *i)* increasing firm entry; *ii)* providing failed entrepreneurs with a second chance to apply their experience and lessons learnt to ensure their new businesses grow; and *iii)* attracting better quality workers – i.e. individuals with higher observed human capital (Adalet McGowan et al., 2017a).

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Annex A. Additional tables and figures

Table A.1. Descriptive statistics

Variable	p5	p25	p50	mean	p75	p95
Simulation exercise (2018 data)						
Number of employees	3	5	8	36	19	100
Gross revenues	105,230	365,610	942,714	10,000,000	2,962,000	24,600,000
Wage bill	22,999	81,090	197,778	831,422	540,683	3,452,000
Intermediates	39,060	194,487	568,505	7,750,000	1,989,000	18,100,000
Profits	4,621	21,628	62,818	365,920	204,780	1,522,000
Total assets	59,812	235,996	683,120	4,223,000	2,294,000	17,500,000
Equity (book value)	12,699	65,389	215,972	1,687,000	829,020	7,238,000
Total liabilities	20,270	113,742	369,761	2,369,000	1,291,000	9,774,000
Current liabilities	13,286	78,079	258,662	1,690,000	919,982	7,207,000
Equity to total assets ratio	0.0525	0.198	0.388	0.416	0.616	0.867
Total liabilities to total assets ratio	0.133	0.384	0.612	0.584	0.802	0.947
Interest coverage ratio	2.225	6.819	19.95	321.8	77.43	1123
Debt overhang empirical analysis, 1995-2018 panel data						
Investment ratio	-0.040	0.023	0.109	0.244	0.309	1.021
Financial leverage ratio	0.009	0.073	0.191	0.232	0.354	0.598
Interest coverage ratio	-1.42	2.52	6.10	19.43	16.84	84.85
Debt overhang empirical analysis, cross-sectional analysis over GFC						
Change in investment ratio	-0.551	-0.221	-0.0612	-0.0845	0.0539	0.331
Pre-crisis financial leverage ratio	0.018	0.085	0.184	0.222	0.327	0.550
Change in financial leverage ratio	-0.19	-0.0536	0.0131	0.0306	0.105	0.304
Change in interest coverage ratio	-41.57	-5.983	-0.945	1.034	3.715	56.21

Note: In the simulation exercise, the sample is restricted to firms with available financial data, non-negative equity buffers and positive profits in normal time; monetary values in EUR current (2018) prices. By contrast, the only constraint imposed on the sample for the empirical analysis is data availability for the variables of interest.
Source: OECD calculations based on Orbis® data.

Table A.2. High leverage decreases investment

	Dependent variable: Investment ratio						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Debt to total assets(i,t-1)	-0.348***	-0.351***	-0.346***	-0.356***	-0.314***	-0.314***	-0.294***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Interest coverage ratio (I,t-1)	0.053***	0.053***	0.054***	0.056***	0.039***	0.033***	0.025***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls	none	age	size	sales growth	cash holdings over total asset	ROA	age, size, sales growth, cash holdings over total assets, ROA
Observations	4,409,819	4,404,870	4,409,819	4,409,819	4,269,554	4,408,432	4,263,327
R-squared	0.298	0.299	0.299	0.304	0.307	0.301	0.317
Firm FE	YES	YES	YES	YES	YES	YES	YES
Country * Sector * Year FE	YES	YES	YES	YES	YES	YES	YES

Note: The dependent variable is the ratio between total investments a time *t* and total capital at *t-1*; "debt to total assets" is the ratio between total financial debts and total assets of firm *i* at t-*1*; "interest coverage ratio" is the ratio between profits and interest expenses of firm *i* at t-*1*. Controls: log age at *t*, log of size in *t-1*, cash holdings over total assets and ROA at *t-1*, and sales growth at time *t*. Firm fixed effects and country by sector by time dummies, as well as the constant, are included. Standard errors clustered at the firm level.
Source: OECD calculations based on Orbis® data.

Table A.3. High liabilities decreases investment, robustness check

	Dependent variable: Investment ratio						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Liabilities to total assets(i,t-1)	-0.156***	-0.168***	-0.155***	-0.167***	-0.105***	-0.086***	-0.059***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Interest coverage ratio (I,t-1)	0.062***	0.062***	0.063***	0.065***	0.049***	0.042***	0.033***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Controls	none	age	size	sales growth	cash holdings over total asset	ROA	age, size, sales growth, cash holdings over total assets, ROA
Observations	4,415,735	4,410,744	4,415,735	4,415,735	4,275,518	4,414,319	4,269,223
R-squared	0.292	0.293	0.294	0.298	0.302	0.296	0.312
Firm FE	YES	YES	YES	YES	YES	YES	YES
Country * Sector * Year FE	YES	YES	YES	YES	YES	YES	YES

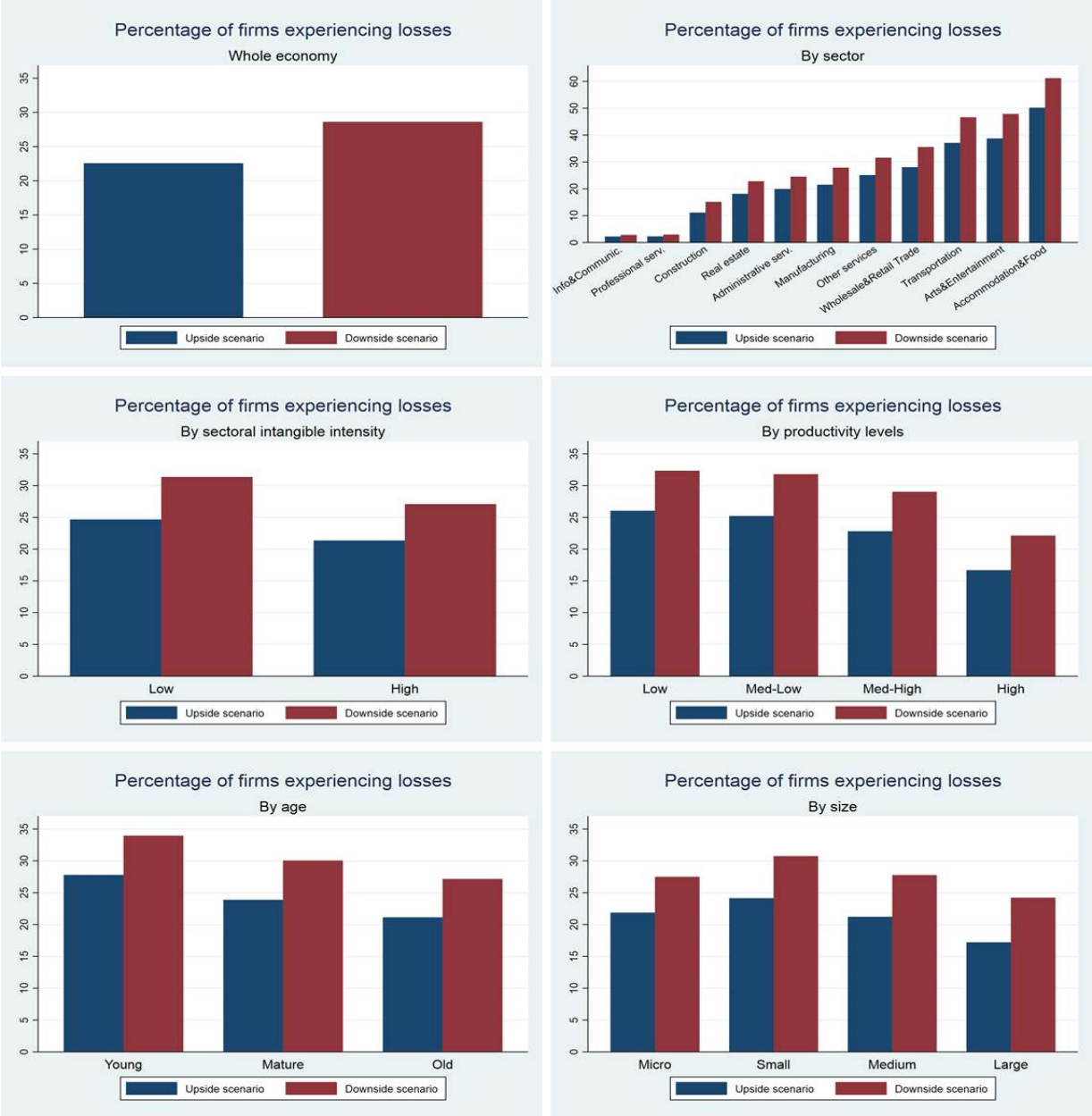
Note: The dependent variable is the ratio between total investments a time *t* and total capital at *t-1*; "liabilities to total assets" is the ratio between total liabilities and total assets of firm *i* at t-*1*; "interest coverage ratio" is the ratio between profits and interest expenses of firm *i* at t-*1*. Controls: log age at *t*, log of size in *t-1*, cash holdings over total assets and ROA at *t-1*, and sales growth at time *t*. Firm fixed effects and country by sector by time dummies, as well as the constant, are included. Standard errors clustered at the firm level.
Source: OECD calculations based on Orbis® data.

Table A.4. Firms experiencing an increase in leverage in the aftermath of the GFC decreased their investment, and especially so if highly indebted at the beginning of the crisis

Dependent Variable: Change in the investment ratio			
	(1)	(2)	(3)
Pre-crisis financial leverage levels		-0.1251***	-0.2091***
		(0.0080)	(0.0080)
Change in financial leverage	-0.0490***	0.0298***	0.0648***
	(0.0066)	(0.0105)	(0.0111)
Pre-crisis leverage levels * Change in leverage		-0.4663***	-0.4882***
		(0.0325)	(0.0310)
Change in interest coverage ratio	0.0001***	0.0001***	0.0001***
	(0.0000)	(0.0000)	(0.0000)
Observations	111,753	111,753	100,948
R-squared	0.0885	0.0944	0.1164
Control variables	YES	YES	YES
Country * Sector FE	YES	YES	YES

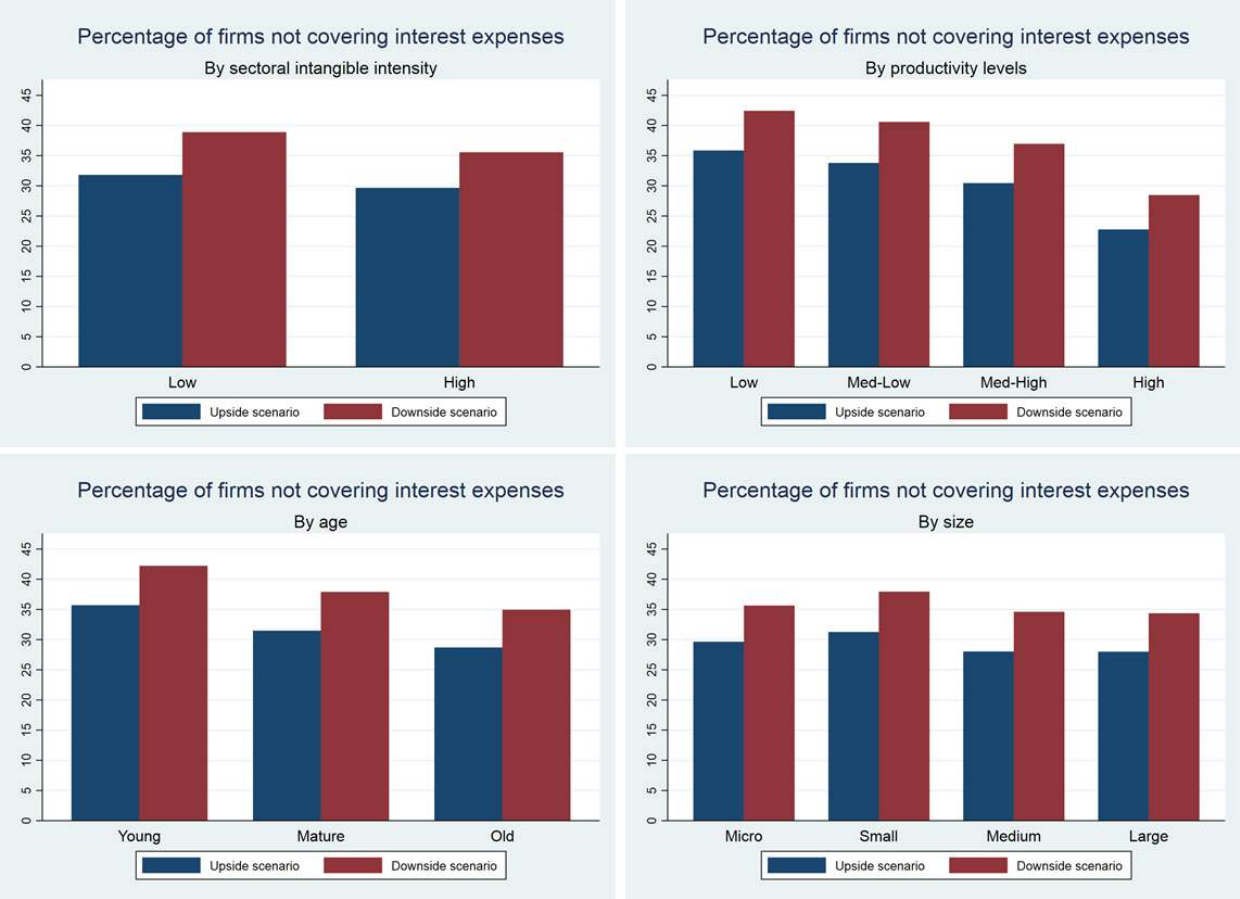
Note: The dependent variable is the difference between the average of the yearly post-crisis (2008-2013) and the average of the yearly pre-crisis (2002-2007) investment ratio; the investment ratio is defined as the ratio between total investments a time *t* and total capital at *t-1*. The main explanatory variables are the difference between the post- and the pre-crisis average financial leverage ratios, the difference between the post- and the pre-crisis average interest coverage ratios and the pre-crisis levels (the average in model 2 and the 2007 value in model 3) of financial leverage. "Financial leverage" is the ratio between total financial debts and total assets of firm; the "interest coverage ratio" is the ratio between profits and interest expenses. Controls included are: the pre-crisis age level, the change in size, the change in the holdings over total assets ratio and in the ROA, as well as the change in sales growth; all changes are computed as the difference between the post- and the pre-crisis yearly averages. Country by sector fixed effects, as well as the constant, are included. In parentheses, standard errors clustered at the country-sector level.
Source: OECD calculations based on Orbis® data.

Figure A.1. A large portion of otherwise viable firms will experience losses



Note: The figure shows the percentage of firms experiencing losses (e.g. negative profits) one year after the implementation of confinement measures in the upside (blue bars) and downside (red bars) scenarios: for the whole economy (top left panel); by 1-Digit Nace Rev2 sectoral classification (top right panel); by sectoral intangible intensity, where intangible intensity is measured, following Demmou et al. (2019), as the median ratio (across firms within industries) of intangible over total assets (middle left panel); by productivity levels, defined according to quartiles within each (2-digits Nace Rev.2) industry of multi-factor productivity computed according to Wooldridge (2009) value added based methodology (middle right panel); by firms' age, where age is defined as the difference between 2018 and the year of incorporation of the company and young firms are those with less than 5 years, mature firms those from 5 to 10 years and old those more than 10 years (bottom left panel); by firms' size, where micro enterprises are those with less than 10 persons employed, small enterprises those with 10 to 49 employees, medium enterprise those with 50 to 249 employees and large enterprise those with 250 or more persons employed (bottom right panel). Notice that the sample is restricted ex-ante to firms having both positive profits and book value of equity in the 2018 reference year and that, for the sake of exposition, the y-axis scale varies among panels.
Source: OECD calculations based on Orbis® data.

Figure A.2. The ability to service debt is heterogeneous across types of sectors and firms



Note: The figure shows the percentage of firms whose interest coverage ratio falls below unity due to the COVID-19 outbreak in the upside (blue bars) and downside (red bars) scenarios: by sectoral intangible intensity, where intangible intensity is measured, following Demmou et al. (2019), as the median ratio (across firms within industries) of intangible over total assets (top left panel); by productivity levels, defined according to quartiles within each (2-digits Nace Rev.2) industry of multi-factor productivity computed according to Wooldridge (2009) value added based methodology (top right panel); by firms' age, where age is defined as the difference between 2018 and the year of incorporation of the company and young firms are those with less than 5 years, mature firms those from 5 to 10 years and old those more than 10 years (bottom left panel); by firms' size, where micro enterprises are those with less than 10 persons employed, small enterprises those with 10 to 49 employees, medium enterprise those with 50 to 249 employees and large enterprise those with 250 or more persons employed (bottom right panel). Notice that the sample is restricted ex-ante to firms having both positive profits and book value of equity in the 2018 reference year.
Source: OECD calculations based on Orbis® data.

Annex B. Alternative accounting framework

As for the baseline framework outlined in the text, the model assumes that the last available data for each firm (end of 2018) represent its financial situation in normal times and obtains firms' profits during the COVID-19 outbreak according to Equation 1. At this point, rather than using Equation 2 to compute the hypothetical new value of equity based on the decline in profits, it attempts to model explicitly the evolution of both assets and liabilities. More specifically:

- *Assets side.* We assume that firms are forced to sell assets and/or use their cash buffers to cover losses induced by the pandemic when they experience negative profits, while "*Covid Total Assets*" are unchanged for firms still displaying positive profits. Analytically:

$$CovidAssets_i = NormalTimeAssets + CovidProfits_i \text{ if } CovidProfits_i < 0 \quad (6)$$

$$CovidAssets_i = NormalTimeAssets \text{ if } CovidProfits_i \geq 0$$

- *Liabilities side.* We assume that firms are able to only partially repay their current liabilities during confinement months and hence are modelled to raise new debt to cover a share of current liabilities proportional to the length of confinement measures and the size of the sectoral confinement shock. Analytically:

$$CovidLiabilities_i = NormalTimeLiabilities + \left[\left(\frac{CurrentLiabilities}{N}\right) * Shock\right] \quad (7)$$

where N is equal to six (four) in the upside (downside) scenario. In other words, if the confinement lasted two (three) months as in the upside (downside) scenario, firms total liabilities are expected to increase by one sixth (one fourth) of their current liabilities, weighted by the size of the shock.

Table B.1 reports the main results obtained using the above alternative accounting framework and shows that findings are consistent with the baseline model.

Table B.1. Percentage of distressed firms, alternative model

Percentage of distressed firms, alternative model					Difference between baseline and alternative model in the percentage of distressed firms (p.p.)	
		Upside	*Downside*		*Upside*	*Downside*
Overall	Whole economy	6.7%	9.8%		0.6	-0.7
By Sector	Professional serv.	0.8%	1.2%		0.0	-0.3
	Info&Communication	0.8%	1.2%		0.0	-0.2
	Construction	3.1%	4.9%		-0.2	-1.1
	Real estate	5.0%	7.5%		-0.7	-2.1
	Wholesale&Retail Trade	5.9%	9.0%		0.4	-1.0
	Manufacturing	6.0%	9.0%		-0.6	-2.2
	Administrative serv.	7.0%	10.0%		0.3	-1.0
	Other services	9.4%	13.5%		2.2	0.8
	Transportation	14.0%	20.0%		2.2	0.3
	Arts&Entertainment	17.4%	23.3%		2.3	0.4
	Accommodation&Food	20.4%	27.4%		6.0	4.1
By Size	Micro	6.7%	9.8%		0.6	-0.7
	Small	7.0%	10.2%		0.7	-0.6
	Medium	5.6%	8.0%		0.4	-0.7
	Large	5.7%	8.6%		0.5	-0.8
By Age	Young	16.5%	22.1%		2.5	0.7
	Mature	9.0%	13.2%		1.1	-0.6
	Old	4.0%	6.2%		0.1	-1.0
By Productivity	Low	8.3%	11.7%		0.2	-1.3
	Med-Low	7.6%	11.1%		0.7	-0.8
	Med-High	6.6%	9.7%		0.7	-0.6
	High	4.5%	6.9%		0.9	0.0
By Intangible Intensity	Low	8.7%	12.4%		1.2	-0.2
	High	5.0%	7.6%		0.1	-1.1

Source: OECD calculations based on Orbis® data.