From hibernation to reallocation: Loan guarantees and their implications for post-COVID-19 productivity

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FROM HIBERNATION TO REALLOCATION: LOAN GUARANTEES AND THEIR IMPLICATIONS FOR POST-COVID-19 PRODUCTIVITY

ECONOMICS DEPARTMENT WORKING PAPERS No. 1687

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ABSTRACT / RESUME

From hibernation to reallocation: loan guarantees and their implications for post-COVID-19 productivity

The paper analyses the role of loan guarantee programmes following the COVID-19 outbreak in alleviating firm distress as well as their broader impacts on productivity via reallocation, relying on a simulation model and econometric estimations. The simulation exercise relies on a simple cash-flow accounting model, a large dataset reporting balance sheets of firms located in 14 countries and granular data on the magnitude of the COVID-19 shock. Our findings suggest that i) the COVID-19 shock had the potential to seriously distort market selection; and ii) policy actions corrected up to 30% of the inefficiency of market selection in the short-term, shielding many high productive firms from distress and supporting zombie firms only to a limited extent. The econometric exercise, based on historical data and standard models of dynamic allocative efficiency, examines how loan guarantees may shape the efficiency through which resources are allocated across firms of different productivity levels over the medium-term. Results suggest that, over the 2007-2018 period, increases in large-scale loan guarantee schemes were associated with weaker reallocation of credit and labour from low to high productivity firms. However, these effects are found to be more benign in intangible-intensive sectors and even positive for smaller scale programmes. Overall, engineering an effective exit strategy from these schemes, preserving their benefits while reducing their drawbacks through a gradual and state contingent phasing out, is critical to foster the recovery of the corporate sector. Further, monitoring debt overhang risks and facilitating firms' entry and digital diffusion are relevant complementary challenges to address once COVID-19 related support is withdrawn.

JEL classification codes: D22, D24, H81, J38, O47

Keywords: COVID-19, liquidity, productivity, reallocation, loan guarantees

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De l'hibernation à la réallocation: les garanties de prêts et leurs conséquences sur la productivité post-COVID

En s'appuyant sur un modèle de micro-simulations et une analyse économétrique, cet article analyse l'impact des programmes de garantie de prêts sur la situation de détresse financière des entreprises durant la crise de la COVID-19 ainsi que sur la productivité globale au travers de leur impact sur la réallocation des ressources. L'exercice de simulations repose sur un modèle simple de comptabilité des flux de trésorerie, des données de bilans d'entreprises couvrant 14 pays et des données granulaires sur l'ampleur du choc COVID-19. Nos résultats suggèrent que la crise s'est traduite par une distorsion significative du mécanisme de sélection de marché et les politiques publiques ont permis de corriger en partie (jusqu'à 30%) l'inefficacité de la sélection du marché à court terme, en protégeant de nombreuses entreprises hautement productives d'une situation de détresse financière et en ne soutenant les entreprises zombies que de façon limitée. L'exercice économétrique, basé sur des données historiques, examine l'influence à moyen terme des garanties de prêts sur l'efficacité avec laquelle les ressources sont allouées entre les entreprises de niveaux différents de productivité. Les résultats suggèrent qu'au cours de la période 2007-2018, l'augmentation à grande échelle des programmes de garantie de prêts a été associée à une moindre efficacité de la réallocation du crédit et de la main-d'œuvre des entreprises à faible productivité vers les entreprises à forte productivité. Cependant, ces effets s'avèrent plus bénins dans les secteurs à forte intensité en actifs immatériels et se révèlent même positifs pour les programmes à plus petite échelle. Finalement, une stratégie de sortie efficace de ces régimes, fondée sur une approche de retrait graduel et contingente à la situation macroéconomique et financière des firmes, permettrait de préserver les bénéfices acquis jusqu'alors tout en réduisant leurs inconvénients. En outre, le suivi des risques de surendettement, le soutien à la création d'entreprises ainsi qu'à la diffusion des outils numérique sont des défis majeurs à relever pour favoriser la reprise du secteur des entreprises, qui apparaissent d'autant plus important avec la sortie des dispositifs de soutien liés à la COVID-19.

Classification JEL: D22, D24, H81, J38, O47

Mots clés : COVID-19, liquidité, productivité, réallocation, garantie de prêts

From hibernation to reallocation: loan guarantees and their implications for post-COVID-19 productivity

By Lilas Demmou and Guido Franco[1]

1. Introduction

1.   The pandemic poses major risks for the corporate sector, spanning a liquidity crisis, a wave of insolvencies and a debt overhang. Large-scale policy intervention has helped to cushion the shock and hibernate firms' productive capacity – keeping a lid on bankruptcies in 2020 – despite the high level of predicted distress (Guerini et al., 2020; Barnes et al., 2021; Ebeke et al., 2021; Gourinchas et al., 2021; Hadjibeyli et al., 2021).

2.   The Finance, Investment and Growth workstream has contributed to a better understanding of corporate vulnerabilities following the COVID-19 outbreak by investigating both firms' liquidity shortfalls at the outset of the crisis (Demmou et al., 2021a; June 2020 WP1 and WP3 meetings) and the long term challenges linked to firms' solvency and debt overhang (Demmou et al., 2021b; October 2020 WP1 meeting). As regards to policies, Job Retention Schemes (JRS) and public loan guarantee schemes have been widely used across countries to bridge liquidity shortages. JRS have received much attention in the literature (OECD, 2020a; Andrews et al., 2021a; Demmou et al., 2021a), but empirical evidence on the role of loan guarantee programmes in alleviating firm distress is scarce.

3.   The objective of the paper is to fill this gap, zooming into the impact of the crisis on firms' productivity distribution and focusing on the effect of loan guarantee programmes. More specifically, it sheds light on three main issues:

- First, it evaluates how loan guarantees have altered the market selection mechanism during the COVID-19 crisis. The crisis may have cleansing or scarring effects on productivity through the extensive margin: depending on the type of firms "saved" over the productivity distribution, loan guarantees modify the market selection process and thereby aggregate productivity performance in the short term. Lacking real-time data on the distribution of guaranteed loans to firms as well as

2020 balance sheet data for SMEs, we investigate the issue by extending and updating the simulation model presented in Demmou et al. (2021a). Based on a large sample of SMEs located in 14 European countries, we compute the share of firms for which loan guarantees might have helped to overcome the sharp reversal in sales associated to the COVID-19 shock and investigate their (pre-crisis) productivity profile (compared to that of the other firms in the sample).

- Second, the paper examines how loan guarantees may shape the efficiency through which credit and resources are allocated across firms of different productivity levels over the medium-term. We explore the historical relationship between the size of loan guarantee programmes and dynamic allocative efficiency in 10 OECD countries for which sufficient data are available. By looking at whether a surge or dip in the envelope of loan guarantee schemes affects the productivity-growth relationship, we can gauge insights on the potential misallocation consequences linked to the widespread use of these programmes during the COVID-19 crisis.

- Third, the paper discusses options for OECD governments to engineer an effective exit strategy from these schemes, maximizing their benefits as long as possible and reducing their drawbacks.

4.   Our main findings imply that loan guarantee programmes are an important tool to help firms bridge liquidity gaps, including a relevant portion of medium-to-high productivity firms. The provision of guaranteed loans worked to re-align the market selection mechanism closer to normal time standards: it strengthened again the link between firms' productivity levels and the risk of facing financial difficulties, while support to zombie firms remained marginal. As a consequence, and over the short term, the productivity gains associated with a quick withdrawing of the support may be too small to offset the cost that would follow a wave of insolvencies. In other words, Tobin's claim that it may "take a heap of Harberger triangles to fill an Okun gap" appears to fit the situation of the corporate sector in the aftermath of the COVID-19 shock.

5.   Yet, loan guarantees do not come without risks for future productivity. Our results hint that they may favour the build-up of misallocation in the medium term, as sizeable programmes seem correlated with a slowdown in the ability of most productive firms to expand. Moreover, too stringent repayment plans may increase the risk of debt overhang, as many firms would need to downsize in order to honour their financial commitments.

6.   Regarding the phase-out of loan guarantee schemes, a gradual and state-contingent move from a hibernation strategy to a reallocation approach could rely on four pillars:

- In the short term, policy makers could continue to provide liquidity to viable firms that are still impacted by the crisis, especially in hard-hit sectors and for SMEs that may not directly benefit from the international recovery. Loan guarantee schemes could be temporarily frozen once liquidity needs diminish, but specific arrangements to ease their reactivation could help to avoid cumbersome legislative processes or sunk operational costs if the scheme needs to be restarted later on (FSB, 2021).

- Governments could fine-tune loan guarantee schemes by further targeting viable firms and by re-designing the main covenants of the loans (e.g., portion of the loan backed by the government guarantee; fee to access the programmes) to reduce the risk of moral hazard and adverse selection (Cusmano, 2018).

- To avoid over-indebtedness of viable firms and debt overhang, while fostering diversification of financing instruments, policy makers should increasingly consider the use of non-debt instruments to support the corporate sector and establish the appropriate conditions for an early and orderly debt restructuring.

- Governments could prioritise structural reforms to foster the recovery, lowering the risk of pro-cyclical effects that may arise from the withdrawal of support; these include policies to boost firms' entry, spur digital diffusion and avoid excessive market concentration.

7.   Section 2 reviews the rationale and use of loan guarantee schemes across countries. Sections 3 and 4 present the empirical analysis, focusing respectively on the short term and long term implications of these programmes. Section 4 discusses policy options for the recovery of the corporate sector.

2. COVID-19, loan guarantees and productivity

8.   Loan guarantee schemes facilitate the (partial) transfer of the risk inherent in lending relationships by providing a mechanism for a third party – typically, a public institution – to pledge to repay some or the entire loan amount to the lender in the event of borrower default (Gozzi and Schmukler, 2015). Public guarantee programmes are usually managed by government related agencies (e.g. public guarantee bank, administrative unit of a ministry) or, in countries with a federal institutional system, by a network of local or regional funds, overseen by a central institution (Cusmano, 2018). Box 1 provides a quick overview of their rationale and risks.

Box 1. Rationale of and risks associated with loan guarantee programmes

Loan guarantees are usually justified on the basis of capital market imperfections, which make banks reluctant to lend to SMEs and young firms, which typically lack a credit history, sophisticated financial statements and tangible assets to be pledged as collateral. In principle, public loan guarantees can alleviate this tension by:

- reducing lender's expected credit losses – even for a given probability of default – and thus lowering the amount of collateral firms need to pledge and/or obtain better credit conditions;
- mitigating information asymmetries and playing a certification role, as eligible firms go through a screening procedure upfront;
- fostering a learning process that could lead banks to revise their risk perception of SMEs and thus helping to start a bank–entrepreneur relationship (Petersen and Rajan, 1994), which may also continue without guarantees going forward (Riding et al., 2007).

Loan guarantee schemes are attractive from a fiscal perspective, as they entail relatively lower initial outlays and tend to strengthen market confidence (Beck et al., 2010), but imply potentially large contingent liabilities that need to be properly accounted for (The World Bank and FIRST Initiative, 2015).

Yet, loan guarantees schemes may be distortionary if they:

- increase moral hazard: with a portion of risk transferred to the government, banks have lower incentives to screen firms and to restructure their debt in case of insolvency, leading to over-liquidation (Benavente, Galetovic and Sanhueza, 2006);
- engender adverse selection: banks may have incentives to induce risky borrowers to apply for loan guarantees (Ono et al., 2013; Saito and Tsuruta, 2014), while guaranteed firms could undertake more risky projects (Lelarge, 2010; D'Ignazio and Menon, 2013);
- lack additionality -- if funds are channelled toward firms that would have been financed even absent the schemes;
- contribute to keep alive inefficient lending relationships, reducing incentives for an orderly restructuring of firms (Acharya et al., 2020) and crowding-out funding to high productivity firms (Andrews et al., 2017; Banerjee and Hoffmann, 2018).

Annex B provides a more detailed overview of the empirical literature on the impact of loan guarantee programmes on firms' financial conditions and performance.

2.1. The use of loan guarantees in OECD countries: from the GFC to the Pandemic

9.   Public loan guarantee schemes have been in use at least since the beginning of the 20th century (Beck et al., 2010), with the first scheme reported in the Netherlands in 1915 (Gozzi and Schmukler, 2015). They have become increasingly relevant over recent decades (Figure 1), forming a key pillar of the policy response to the global financial crisis (GFC) (OECD, 2013). Following the GFC, the countercyclical use of public guarantee schemes to offset SMEs financial distress has implied an extension in their scale and scope, mobilising large amounts of credit for a non-trivial share of firms (Cusmano, 2018). They remain the most widely used instrument for supporting finance for SMEs (OECD, 2020b). The size of loan guarantee programmes varies widely across countries and they account for a non-negligible share of GDP in selected East Asian (e.g. Korea) and Southern European economies (e.g. Italy and Portugal).

Figure 1. Outstanding guaranteed loans as a share of GDP before COVID-19
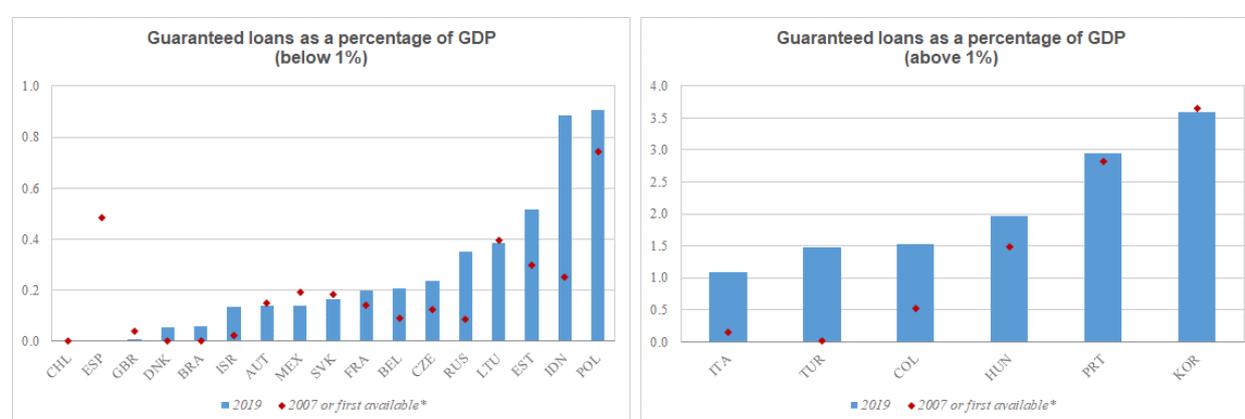
Note: The figure shows the volume of outstanding guaranteed loans as a percentage of GDP in 2019 (blue bars) and 2007 (red rhombus). When 2007 data are not available, the earliest available year is used: 2008 for Belgium and Czech Republic, 2009 for Portugal and United Kingdom, 2010 for Indonesia, 2011 for Denmark and Russia, 2013 for Poland and 2015 for Lithuania. For the sake of clarity, the left (right) panel zooms on countries with relatively low (high) guaranteed loans to GDP ratios.
Source: OECD calculations on OECD Scoreboard on Financing SMEs and Entrepreneurs data.

10.   Amid the COVID-19 crisis, many countries introduced or ramped-up guarantee schemes to avoid a credit crunch and corporate solvency crisis. Governments raised the funding available for guarantee programmes, increased the level of the guarantee on credit, extended the coverage to a wider range of firms and simplified the administrative procedures to access the schemes (OECD, 2020c). The size of the funds made available for COVID-19 related public loan guarantee schemes, as well as the uptake by firms varies significantly across countries (Figure 2, top panel). These differences likely reflect country-specific factors and the wide range of complementary policy tools. Nevertheless, government guaranteed loans grew strongly across the board (Figure 2, bottom panel). Governments continue to adapt these programmes to meet the needs of the corporate sector as the nature of the pandemic evolves (Box 2).

Figure 2. Public loan guarantee programmes during the COVID-19 crisis: size of the envelope, uptake and annual growth
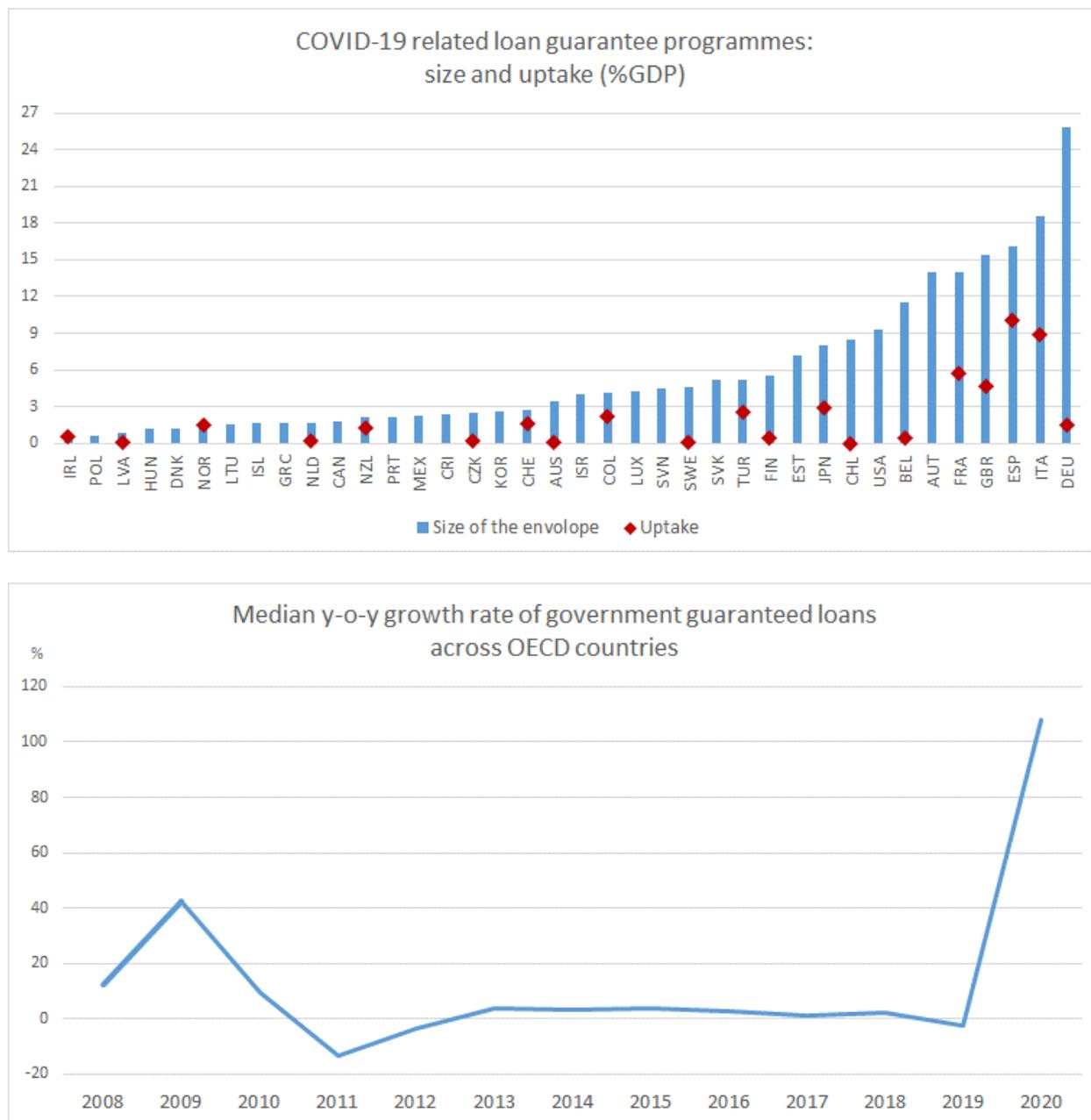
Note: The top panel shows the size of the envelope of loan guarantee programmes (blue bars) and uptake by firms (red rhombus), both as a share of GDP. Due to data availability, uptake is not reported for some countries, while collected at different points in time for the other countries: 02/2021 for DEU, ESP, FRA, GBR and ITA; 04/2021 for AUS, BEL, CHE, CHL, COL, CZK, FIN, JPN, LVA, NLD, NOR; 05/2021 for SWE and TUR; 06/2021 for IRL and NZL. The bottom panel shows the year-over-year median growth rate of government guaranteed loans across OECD countries, as a percentage.

Source: OECD calculations based on data from Anadolu Agency (Turkey), Anderson et al. (2021), DLA Piper, European Commission, European Central Bank, IMF, KPMG, New Zealand Treasury, OECD, Swedish National Dept Office, The Irish Department of Enterprise, Trade and Employment, The Federal Council of Switzerland, The Ministry of Finance and Economic Affairs of Iceland, Vaekstfonden Danish Growth Fund) and the World Bank for the top panel; OECD, forthcoming. *"Financing SMEs and Entrepreneurs 2022: An OECD Scoreboard"* for the bottom panel.

Box 2. The evolution of loan guarantee schemes through the pandemic: some examples

Australia. In March 2021, the government announced the extension and update of the "SME Loan Guarantee Scheme", as part of its commitment to support up to AUD 40 billion in lending to SMEs. First, the portion of the loans covered by the government guarantee increases from 50% to 80%. Second, the size of eligible loans rises from AUD 1 million to AUD 5 million. Third, the eligibility threshold on firms' size is relaxed, increasing from a maximum turnover of AUD 50 million to AUD 250 million. Fourth, the maximum term of the loans rises from 5 to 10 years, granting firms greater flexibility in managing their cash-flows. Importantly, eligible businesses could also use the scheme to refinance their existing loans, hence taking advantage of the favourable interest rates.

Italy. Central Guarantee Fund's maximum coverage is down to 90% as of 1 July 2021 from 100% previously (White & Case, 2021). In May 2021, European Investment Bank (EIB) and UniCredit launch Italy's first Pan-European Guarantee Fund (EGF)-backed initiative to mobilise €2.5bn in business investment. The EIB will use the EGF to guarantee up to €750m (75%) of UniCredit's new loan portfolio. In turn, this will allow UniCredit to make available an additional €750m in loans for SMEs (UniCredit, 2021).

Spain. In November 2020, the authorities extended the maximum grace period of the loans granted to cover liquidity needs from 12 to 24 months and the maximum maturity from 5 to 8 years, contributing to the softening of potential cliff-edge effects. In May 2021, they also extended the deadline to apply for these loans to 31 December 2021. On 12 March 2021, the government adopted new measures amounting to EUR 3 billion to restructure the state-guaranteed loans (European Commission, 2021).

United Kingdom. The Bounce Back and Coronavirus Business Interruption Loan Schemes have been replaced in April 2021 by the "The Recovery Loan Scheme", which is set to last until the end of 2021. The new scheme displays a larger size threshold for loans, reaching GBP 10 million, and it is open to firms of all size classes meeting the eligibility criteria, even if they already obtained guaranteed loans under previous programmes. The guarantee covers 80% of the loan value, the same as in the Coronavirus Business Interruption Loan Scheme, but lower than the 100% envisaged by the Bounce Back programme.

United States. The Paycheck Protection Program (PPP) is currently taking applications for second-round loans, also relying on additional USD 7.25 billion granted by the American Rescue Plan Act of 2021. The coverage of the guarantee is planned to be reduced from 100% to 75% in 2021 for loans larger than USD 150 million.

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11.   Preliminary evidence based on near-real-time data from the ECB Bank Lending Survey suggests that loan guarantees played a potentially stabilising role during 2020. The demand for credit raised considerably for loans or credit lines covered by public guarantees, mainly to cover acute liquidity needs and build precautionary liquidity buffers, while it declined for all other loans (Figure 3, top panels). Similarly, terms and conditions of loans, as well as credit standards, eased for guaranteed loans, lowering overall rejection rates, but tightened for loans without government guarantees (Figure 3, bottom panels).

Figure 3. Loan guarantees spurred SME demand for credit and eased credit conditions in the aftermath of the COVID-19 outbreak
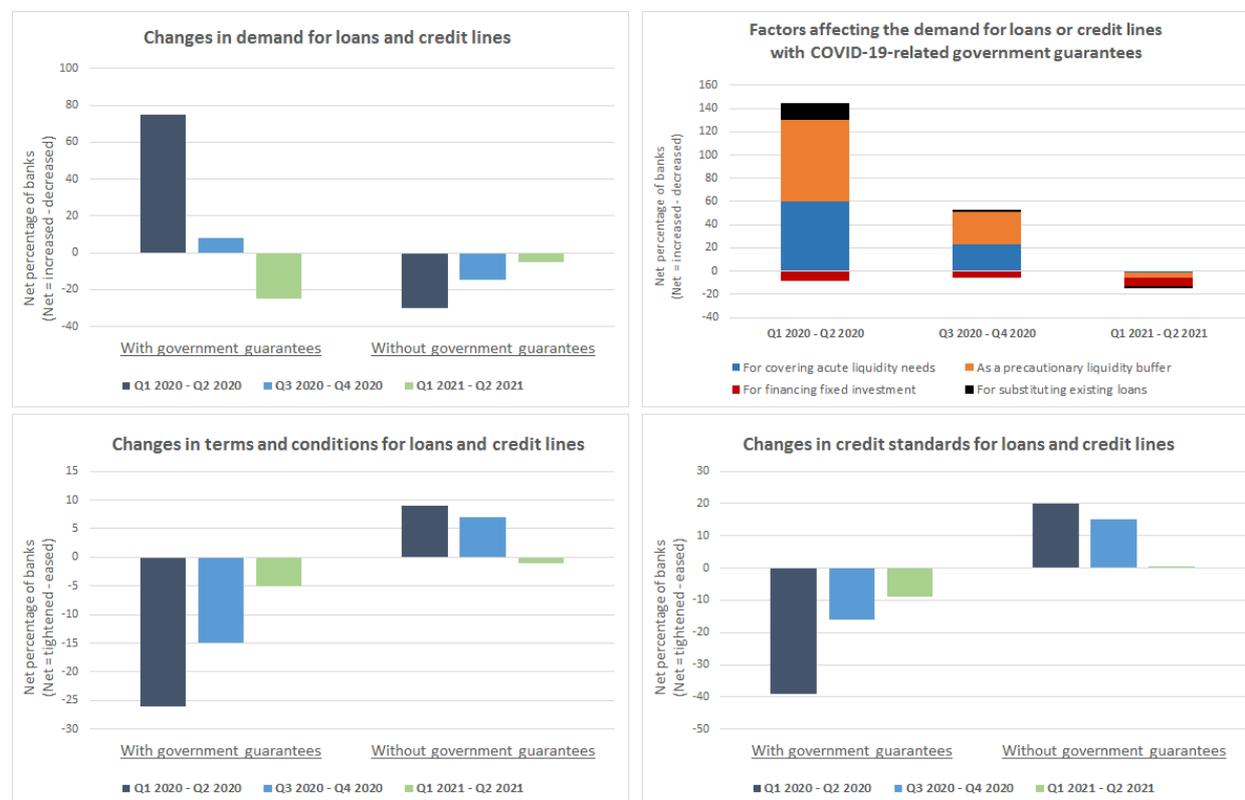
Note: The figure shows the changes in demand for loans and credit lines (top left panel), the factors affecting the demand for credit (top right panel), the changes in either the terms and conditions (bottom left panel) or the changes in credit standards (bottom right panel) for loans and credit lines for SMEs operating in Euro Area countries during the first year following the COVID-19 outbreak. In the top panels, the net percentage refers to the difference between the sum of the percentages for "increased considerably" and "increased somewhat" and the sum of the percentages for "decreased somewhat" and "decreased considerably"; in the bottom panels, it refers to to the difference between the sum of the percentages for "tightened considerably" and "tightened somewhat" and the sum of the percentages for "eased somewhat" and "eased considerably".
Source: Bank Lending Survey (2020, Q4; 2021, Q2), European Central Bank.

2.2. Loan guarantees: potential implications for productivity

12.   The COVID-19 recession can affect aggregate productivity through several channels: *i*) creative-destruction, whereby some firms exit the market and are (partly) replaced by new firms entering the market; *ii*) reallocation of resources across incumbents, which can take place either within and/or across sectors; *iii*) changes in within-firm productivity. Loan guarantees have the potential to directly or indirectly alter the recession-productivity nexus via all these three channels (Figure 4). The paper focuses on the first two channels, leaving aside for future research the within-firm productivity mechanism due to data availability.[2]

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[2] Yet, the literature provides some hints with respect to the potential within-effect of loan guarantees during the crisis. While the COVID-19 crisis may generate an increase in productivity at the firm level due to accelerated digital adoption, the cash-flow crunch could act as a drag on capital investment (Barrero et al., 2020; Fernald, 2021), including on R&D expenditures, which are very sensitive to uncertainty due to high irreversibility and sunk costs (Bansal et al., 2019; Baker et al., 2020). By easing liquidity constraints, loan guarantees could contribute to protect firms' investment (Campello et al., 2011; Joseph et al., 2021) as well as firms' organisational capital, which are costly to build, to develop

Figure 4. COVID-19 and productivity: the role of loan guarantees
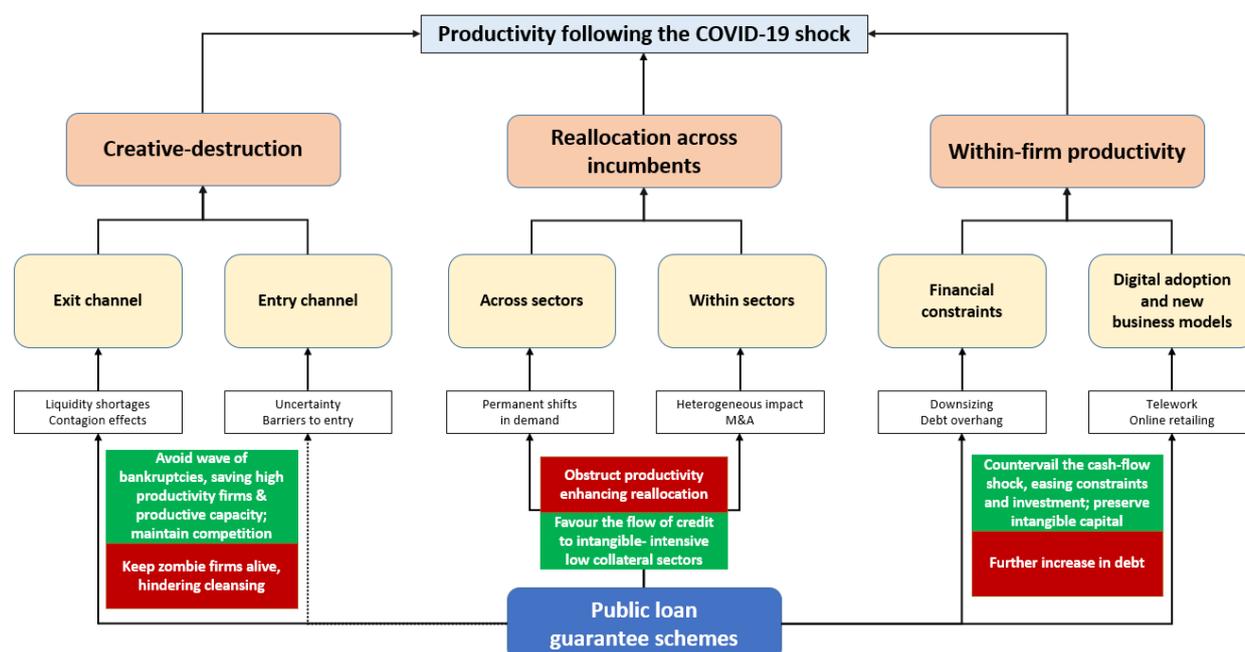
Note: The diagram describes the three channels through which the COVID-19 shock could affect productivity based on standard productivity decompositions (Foster et al., 2001; Melitz and Polanec, 2015) and how loan guarantee schemes could alter each channel. The green (red) boxes signal a positive (negative) effect of loan guarantees on productivity through the associated channel.
Source: OECD.

13.　The cross-cutting nature of the shock has led to the characterisation of COVID-19 as a reallocation shock, both on the extensive and the intensive margins (Barrero et al., 2020a; Bloom et al., 2020; Barrero et al., 2021).[3] Pandemic-induced creative destruction and reallocation across incumbents may emerge as the result of: *i*) a heterogeneous impact on firms' balance sheets, due to differences in firms' sector of activity, financial health, size and age; *ii*) contagion effect through input-output linkages (Baqaee and Farhi, 2020); *iii*) a permanent change in consumers habits; and *iv*) an increasing reliance on teleworking practices in the post-COVID-19 environment (Barrero et al., 2020b).

14.　This reallocation process could have cleansing or scarring effects. Under the cleansing hypothesis, recessions foster productivity by accelerating the Schumpeterian process of creative-destruction and by granting an advantage to the most efficient firms (see Davis and Haltiwanger, 1990; Gali and Hammour, 1991, Caballero and Hammour, 1998). However, the existence of credit frictions may reduce the efficiency of the cleansing mechanism or even reverse it. Indeed, a key concern is that market selection is distorted if financial constraints, rather than productivity, becomes the main determinant of firms' growth and firm exit, generating potentially a "counterproductive destruction".[4]

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and maintain (Hamermesh and Pfann, 1996; Barrot and Sauvagnat, 2016; Kahn and Wagner, 2021), though at the cost of increasing indebtedness (see Figure 4).

[3] The magnitude of inter-industry reallocation needs remains still uncertain in the medium-term and reallocation may prevently occur within industry (David, 2021a; David 2021b).

[4] First, high productivity firms often invest in larger projects, which are more difficult to finance in crisis times (Barlevy, 2003; Eslava et al., 2010). Second, disproportionately higher bankruptcies rates among start-ups could also undermine future productivity growth, by preventing young firms from reaching their full potential (Ouyang et al., 2009). Third, the

15.   The extent to which the crisis would have been cleansing or scarring is still debated. The shock may have favoured (new) firms that, for instance due to their superior managerial ability (Bloom and Van Reenen, 2007) or/and higher use of digital technologies, have been able to capitalise on new growth opportunities thanks to adaptation of their business models and more effective teleworking adoption (Andrews et al., 2021a). At the same time, early evidence on real time data suggest that high productivity firms – and especially financially constrained ones – were initially more likely to tap policy support to go through the crisis, suggesting some potential scarring effects (Andrews et al., 2021b).

16.   Loan guarantees alter both the creative-destruction process by improving the odds of firms' survival during crisis times and the efficiency of reallocation across incumbents by affecting how bank credit is distributed.[5] The direction of the impact of guarantees is uncertain, as it depends on the type of firms that are hardest hit by the shock and whether the crisis would have been cleansing or scarring in the absence of policy support. On the one hand, loan guarantees could reduce the scarring effect of the crisis if they: *i*) help to fix an impaired market selection mechanism which would force many viable firms to exit; or *ii*) dampen the tyranny of collateral which impedes financially constrained but innovative firms to grow larger (Demmou and Franco, 2021). On the other hand, they could hinder the natural cleansing process and increase the risk of persistent scars on the productivity of the corporate sector by: *i*) preventing the liquidation of the least productive firms; or *ii*) providing them a cost advantage to grow (or to not downsize).[6]

3. Loan guarantees in the crisis phase: COVID-19 and distorted market selection

17.   The first objective of loan guarantee programmes during a crisis is to bridge firms' liquidity gaps. In doing so, they enable the continued operation of a host of firms that would have otherwise faced a high risk of exit, thereby altering the market selection mechanism. The productivity impact of this policy tool remains so far largely unexplored and, in the next subsections, we fill this gap by analysing the effect of the COVID-19 shock on firms' productivity distribution both with and without policies.

3.1. Empirical approach

18.   To analyse the impact of loan guarantees on firms' liquidity shortfalls, we exploit: *i*) a large cross-country firm-level dataset, providing balance sheet data on firms worldwide (Box 3); *ii*) a detailed sectoral shock to proxy for the decline in economic activity associated to the COVID-19 outbreak; *iii*) a simple accounting model (Demmou et al., 2021a), which has been updated to account for the new outbreaks of the virus and more timely information on the recovery. The empirical approach focuses on liquidity needs rather than insolvency, as loan guarantees have the potential to affect only the former in the short term and, at the same time, liquidity shortages are a reasonable proxy for insolvency risk of SMEs during a sharp downturn.

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magnitude of the cleansing effect following an adverse shock may also be dampened if credit frictions compress the productivity distribution of firms in good economic times (Kehrig, 2015; Osotimehin and Pappada, 2015).

[5] While a large literature analyses the within-firm effect of loan guarantees, evidence on the impact of loan guarantees on reallocation is scarce. Notable exceptions are Barrot et al. (2019) on French loan guarantees and Gropp et al. (2020) on the German bank guarantee scheme.

[6] Loan guarantees could also alter overall productivity through other indirect channels: i) competitive environment, by shielding viable SMEs from the crisis and M&A, and ii) entry effect, by lowering the productivity threshold at which firms can be profitable.

> **Box 3. Firm-level data**
>
> The firm-level data underpinning the empirical analyses in the paper are gathered from the latest vintage of the Orbis database, provided by Bureau Van Dijk. Orbis is currently the largest cross-country firm-level dataset available and accessible for economic and financial research.[7] To ensure firms' comparability across countries and sectors, the data are prepared as in Gal (2013), following a number of common procedures such as keeping accounts that refer to entire calendar year, using harmonized consolidation level of accounts, dropping observations with missing information on key variables as well as outliers identified as implausible changes or ratios. Very small firms (less than three employees) were excluded to avoid concerns related to the quality of financial statements, while large firms (more than 250 employees) are also omitted since SMEs are the main focus of the loan guarantee programmes considered.
>
> **Analysis on COVID-19 and distorted market selection**
>
> The investigation assumes that the last available data for each firm (end of 2018) represents its financial situation in normal times with respect to its average revenue, operating expenses, debt payment and taxes. After applying cleaning procedures, the final sample consists of 693,769 unique firms, operating in both manufacturing and non-financial business services industries, for 14 relatively well-covered European countries, including those with relatively sizeable loan guarantee programmes and high take-up rates (e.g. France, Italy, Spain and the United Kingdom; see Figure 2).[8]
>
> **Analysis on loan guarantees and medium term resource allocation**
>
> The analysis covers both manufacturing and non-financial business services industries in 10 countries – the countries included are relatively well represented in Orbis and have available data on the amount of guaranteed loans.[9] This exercise exploits the panel nature of the data tracking firms back in time up to 2007 (the starting point of the series on loan guarantees); for consistency, the dataset is restricted to firms reporting relevant information for at least three consecutive years and the main variables of interest are winsorized to deal with potential remaining outliers.

3.1.1. Size and dynamics of the economic shock

19.   Measures on social distancing and mobility restrictions dramatically affect services involving close physical contact among workers and customers. The magnitude of the sales shock during confinement months is based on the first-round demand and supply shocks computed at a very detailed sectoral level (3 to 4 digits) by del Rio-Chanona et al. (2020). To quantify the:

- Supply shock: the authors classify industries as essential or non-essential and construct a *Remote Labour Index*, which measures the ability of different occupations to work from home. The supply shock is not binding for essential industries (i.e., not affected by lock-down measures), while is inversely proportional to the capacity to telework for non-essential ones.

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[7] However, it should be noted that Orbis does not cover the universe of firms, and the extent of the coverage varies considerably across countries, impeding in depth cross-country comparison at the aggregate level (Bajgar et al., 2020).

[8] 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.

[9] Countries included are: Belgium, Denmark, Estonia, France, Hungary, Italy, Korea, Portugal, Spain and the United Kingdom.

- Demand shock: they exploit a study of the potential impact of a severe influenza epidemic developed by the US Congressional Budget Office. The resulting sector-specific – but country invariant – shock is defined as the largest between the supply and the demand shock (Figure 5, left panel).[10]

20.   The detailed sectoral confinement shock is used as a starting point to model the recovery and the impact of new outbreaks of the virus (Figure 5, right panel). The speed of the recovery is proportional to the initial sector-specific shock to account for the heterogeneous ability of sectors to return to pre-pandemic levels of activity. The shock associated with each wave of infections is declining over time, consistent with the increased ability to adapt and work remotely as well as with the spread of vaccines, which allowed softer restriction measures. In line with the projections for the Euro area provided in the OECD Economic Outlook, vol. 2021/Issue 1, the economic activity is modelled to remain below its pre-pandemic level by the end of 2020.

Figure 5. Size of the confinement shock by sector and the dynamic of the recovery
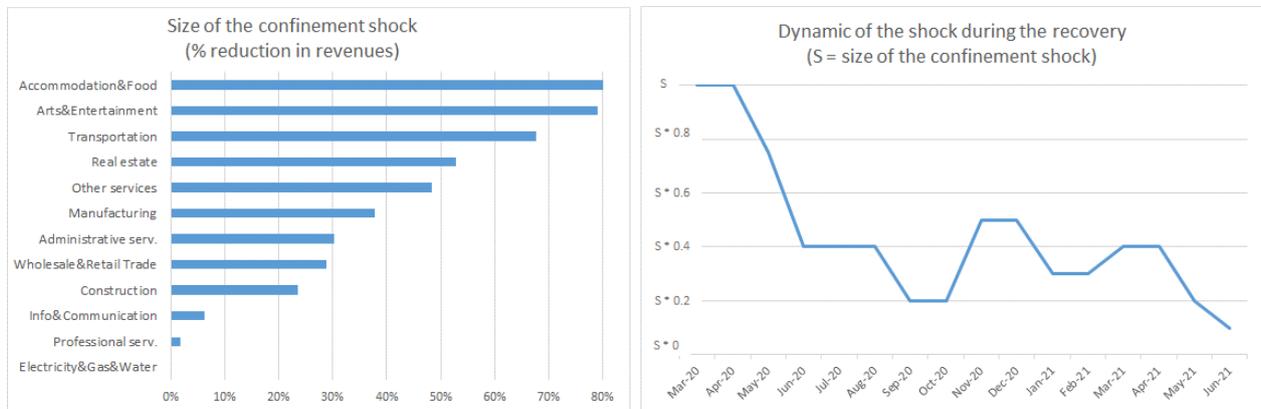
Source: OECD calculations on del Rio-Chanona et al. (2020) and OECD data.

3.1.2. Accounting framework and econometric analysis

21.   The economic shock from measures of social distancing is modelled as a change in firms operating cash-flow, resulting from the sharp reversal in sales and from firms' limited ability to fully adjust their operating expenses. Each month, firms' shock-adjusted cash-flow is determined as follows:

$$CashFlow_{it} = (1 - s_{st}) * Revenues_i - (1 - c * s_{st}) * Intermediates_i \\ - (1 - w * s_{st}) WageBill_i - Taxes_i - DebtPayments_i \quad \textbf{(1)}$$

where firms' revenues, intermediate costs, wage bill, taxes and debt payments are "normal times" annual values divided by 12 in order to obtain average monthly values, while s_{st}, c, w refer, respectively, to the size of the shock in sector s in month t, the elasticity of intermediates cost to sales, and the elasticity of

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

wage bill to sales. These elasticities reflect firms' adjustment capacity and are assumed, for simplicity, to be identical and constant across countries and sectors.[11] The counterfactual scenario where COVID-19 would not have happened is simulated by setting the revenue shock (s_{st},) to zero and thus using 2018 data as representative of normal times.[12]

22. The liquidity available to each firm is then calculated month by month as the sum of the liquidity buffer held at the beginning of the period and the shock-adjusted cash-flow, assuming zero investment spending:

$$Liquidity_{it} = Liquidity_{i,(t-1)} + CashFlow_{it}$$

(2)

where $Liquidity_{i,(t-1)}$ refers to the liquidity remaining from the previous month and is equal to a firm's cash holdings in the first period.

23. In this setting, policies reduce the immediate liquidity needs of firms by reducing the wage bill (job retention schemes) or delaying payments (tax and debt moratoria) and are modelled again as in Demmou et al. (2021a). More specifically, government programmes aimed at relaxing firms' financial commitments vis-à-vis their employees are modelled as a support to the payment of wages adjusted to the sectoral size of the shock through an increase (from 0.2) to 0.8 of the elasticity of wage bill to sales (e.g. short-term work scheme). The tax deferral is modelled as the moratorium of the (hypothetical) monthly tax payments for the entire period considered; similarly, the debt moratorium is modelled as a moratorium on short-term debt over the whole period in all sectors facing an initial sales shock larger than 20% during the first months of confinement.

24. Loan guarantees are included in the framework as a tool allowing firms to cover (a portion of) the residual liquidity needs, after all other policies have been taken into account. As provided for in the State aid Temporary Framework adopted by the EU during the pandemic, a firm could cover fully the residual liquidity gap if it was financially healthy before the pandemic and the required guaranteed loan is not larger than 25% of turnover (see Annex A). In line with the screening that banks are supposed to perform in the implementation of the programmes, it follows that firms that were unviable pre-COVID-19 could not access the guarantee facilities, while firms with excessively large shortages will not be able to remain liquid exclusively thanks to guarantees. Non-eligible firms are defined as those showing *both* negative profits and negative book value of equity. To consider the heterogeneous design of loan guarantee programmes across countries, sensitivity analyses are carried allowing for stricter or softer eligibility criteria. Stricter eligibility implies that it suffices to display negative profits for not being eligible. The softer eligibility scenario overlaps with the baseline setting (i.e., firms displaying both negative profits and negative book value of

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[11] The elasticities of intermediate inputs to sales and of the wage bill to sales are estimated through a panel regression analysis based on yearly data. The former is close to unity, while the latter is estimated around 0.4. As expected, these calculations suggest that firms have a higher ability to adjust intermediates consumption than the labour input. To take into account the fact that the ability to adjust is lower when looking at monthly rather than annual figures, in the spirit of Schivardi and Romano (2020), both elasticities are conservatively reduced to 0.8 and 0.2, respectively.

[12] Model simulations are qualitatively unchanged if using 2017 instead of 2018 as the benchmark normal time year. Further, we test the sensitivity of our results to changes of the main assumptions of the simulation model. First, using (sector invariant) higher or lower elasticities of costs to revenues provides findings in the same ballpark. Second, we re-estimate elasticities of costs to sales allowing them to vary at the sectoral level (2-digits NACE Rev.2) and obtain very similar outcomes. Third, the share of illiquid firms is reduced when assuming that firms can use their inventories as liquid assets -- proportionally to the monthly shock -- and clear their trade credits and debits; however, the main message of the analysis is qualitatively unchanged.

equity are excluded) but it assumes in addition that relatively small amounts (25 thousands euro) are made available without scrutiny to all firms.

25.　Noteworthy, the model is not fully able to account for the heterogeneity across countries and firms with respect to the policy support and its uptake. First, it could not be ruled out that some firms would have managed to access new loans also in the absence of guarantees. However, it is reasonable to assume that loan guarantees prevented a credit crunch, which would have dried-up credit lines for all firms, including the most productive ones. Moreover, their favourable conditions, for both banks and firms, spurred the demand for guaranteed loans compared to other types of loans (see Figure 3). Second, the relative weight of loan guarantees compared to direct support in complementing the residual liquidity needs (not satisfied by standard policy packages) varies across countries and firms. The model is not calibrated to account for these differences in the policy mix due to data limitations and does not consider explicitly direct transfers to firms (beyond job retention schemes) such as grants. However, from a liquidity perspective and with the aim to investigate the productivity impact via reallocation of filling the remaining liquidity gap, it is indifferent if credit guarantees or grants are used.[13] Therefore, in countries where direct support has been prevalent, our results on the productivity impact of credit guarantees could be extended to the one of grants.

26.　The accounting model described above allows to identify – along the productivity distribution – firms facing liquidity shortages in a set of different scenarios: No-COVID-19, COVID-19 without government intervention, COVID-19 with "standard" policies (e.g. job retention schemes, tax and debt moratoria); COVID-19 with standard policies and loan guarantees. To investigate more formally the potential productivity impact of the crisis, we also complement the outcome of the simulations by exploring the extent to which productivity is a predictor of firms' liquidity status in normal times and COVID-19 times (without and with policy intervention) through the following logit model:

$$Illiquid_{ics} = \ \beta_0 + \beta_1 MFP_{ics} + \beta_2 \ X_{ics} \ + \delta_c + \ \delta_s + \epsilon_{ics}$$

(3)

where the dependent variable $Illiquid_{ics}$ is a dummy taking value 1 if the firm turns illiquid under a given scenario according to our simulation model, while zero otherwise; the main regressor of interest is MFP_{ics}, that is a measure of firm-level multi-factor productivity, estimated through the GMM Wooldridge (2009) value added based procedure.[14]　X denotes a set of firm level controls, including firms' size and age classes, while　δ_c and δ_s stand for country and sector fixed effects respectively and control for all time invariant country and sector specific characteristics; standard errors are clustered at the country-industry level. The main advantage of this econometric exercise – over and above the unconditional descriptive statistics stemming from the accounting model – is that it allows us to control for a range of covariates as well address potential differences in data coverage in Orbis according to firm size and age.

3.2.　Results

3.2.1.　Loan guarantees helped firms to bridge their liquidity gaps

27.　Loan guarantees played a critical role in bridging the large liquidity gaps that firms have been facing since the start of the pandemic. Even after taking into account the wide range of alternative liquidity support policies implemented in OECD countries (i.e., job retention schemes, debt moratorium and tax

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[13] On the contrary, if our objective was to analyse the consequences of loan guarantees on firms' indebtedness and medium-term performance, the distinction would have been critical.

[14] Results are qualitatively unchanged when using labour productivity.

deferrals; see Demmou et al. 2021a), liquidity needs remain sizeable. In this regard, our baseline estimates imply that public guarantee programmes allowed 8% of firms to remain liquid, filling the liquidity gap of about one-quarter of firms which would had been distressed absent policy support (Figure 6).[15] It is important to note that eligibility criteria to access guaranteed loans are a prominent feature of these schemes and tend to vary across countries (Anderson et al., 2021). Our simulation model predicts that the percentage of firms circumventing liquidity shortages could reach 9% with softer eligibility rules and fall towards 5% when stricter requirements to access these schemes are set.

28.   The relevance of loan guarantees has been highly heterogeneous across sectors, with hard-hit sectors benefitting relatively more from the possibility to access guaranteed loans. For instance, more than 15% of the firms in the Accommodation and Food sector would have struggled to repay their short-term financial commitments absent these programs. Similarly high percentages characterize the Transportation and Arts & Entertainment sectors.[16]

Figure 6. A relevant portion of firms remained liquid owing to loan guarantees, especially in hard-hit sectors
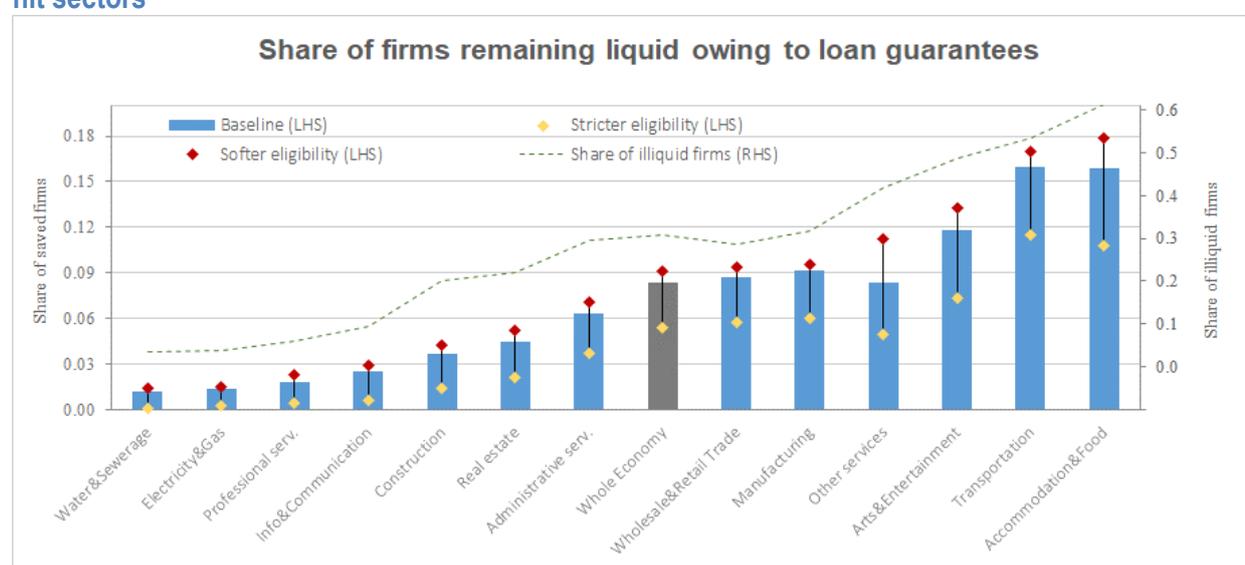
Note: The figure shows the share of firms (over the total number of firms) that are *not* facing liquidity shortfalls owing to loan guarantee schemes on the left y-axis and the share of illiquid firms without any government intervention on the right y-axis, by 1-digit Nace Rev.2 sector and one year after the COVID-19 outbreak. In all scenarios, the amount of the guaranteed loan is capped at 25% of each firm turnover. In the baseline scenario, firms are non eligible if they show *both* negative profits and a -negative book value of equity. Stricter eligibility criteria entail that firms displaying negative profits are excluded, while the softer eligibility scenario overlaps with the baseline but allows for a small amount (25 thousands euro) to be available to all firms without scrutiny.
Source: OECD calculations based on Orbis® data.

3.2.2. The COVID-19 shock altered the market selection mechanism and loan guarantees have been critical to help a relevant portion of high productivity firms

29.   Due to its very nature, the COVID-19 shock may have altered the market selection mechanism, whereby competitive markets tend to reward (scrap) the best (worst) performing companies. Figure 7

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[15] Results are very similar when focusing on countries with the highest uptake and better coverage in Orbis (i.e., France, Italy and Spain) – see Figure C.1.

[16] Our results displaying strong heterogeneity across sectors in the impact of COVID-19 are also in line with the survey-based analysis reported in OECD (2021d) showing that the likelihood of business closure is higher in Accommodation and Food, Transportation and Other services sectors.

delivers some preliminary insights into this issue by comparing the (pre-crisis) productivity profile of firms facing financial difficulties to the one of the other firms in the sample.

30.   High productivity firms appear better positioned to weather the shock: without any policy intervention (blue bars, left y-axis), the share of firms experiencing liquidity shortfalls in the top quartile of the productivity distribution is half of the share in the bottom quartile of the distribution.[17] Even so, the percentages of high and medium-high productivity firms endangered are still sizeable, reaching respectively 22% and 30%, and are even larger in the hard-hit sectors (Figure C.3).[18] Compared to a no-COVID-19 scenario, however, the most productive firms – which have a much lower baseline rate of shortfall – are disproportionately more affected. The red rhombus shows that the share of firms facing liquidity shortages is multiplied by three for firms in the bottom quartile of the productivity distribution and by 16 for those in the top quartile.

31.   The results are suggestive of the potential for crisis policy measures to work against pandemic-induced distortions to market selection. Loan guarantees, together with job retention schemes and moratoria on debt and taxes, contribute decisively to bring the share of illiquid firms back to normal time figures in all quartiles of the productivity distribution. Importantly, they countervailed the disproportionate effect on high productivity firms – as shown by the lower level and change across quartiles of the black triangles compared to the red rhombi.

Figure 7. Loan guarantees, together with job retention schemes and moratoria on debt and taxes, contribute to bring illiquidity risks back to normal time standards
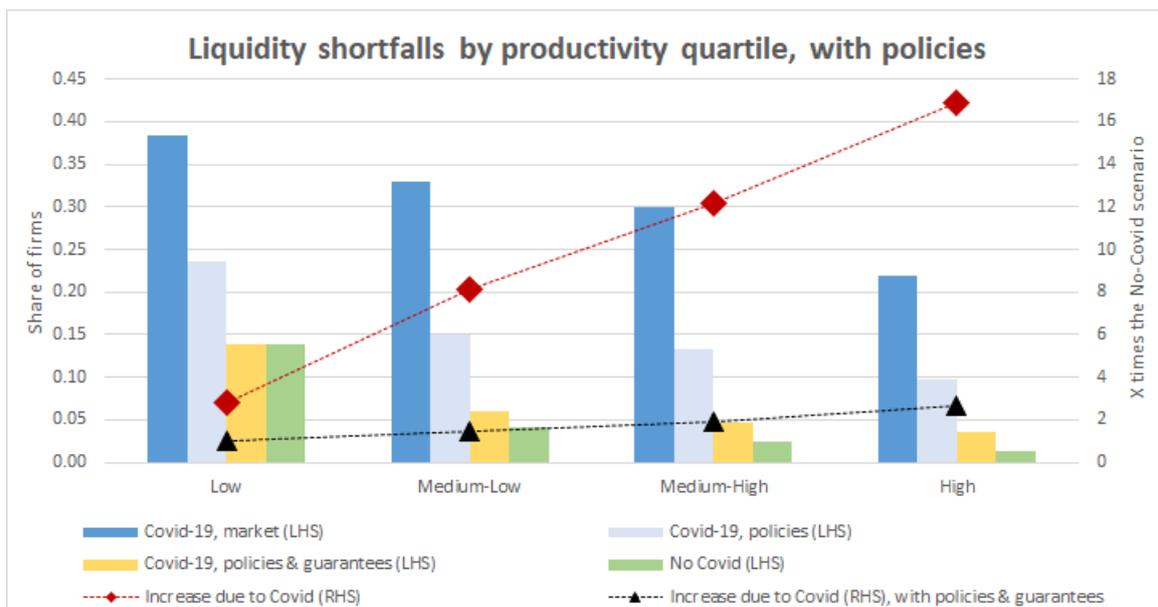
Note: The figure shows the share of firms facing liquidity shortfalls by productivity levels, defined according to quartiles within each (2-digits Nace Rev.2) industry of multi-factor productivity computed according to Wooldridge (2009) value added based methodology, in: the COVID-19 and no policy intervention scenario (blue bars; left y-axis), the COVID-19 scenario with basic policies (tax and debt moratorium, job retention schemes) (light blue bars; left y-axis), the COVID-19 scenario with basic policies and loan guarantee schemes (yellow bars; left y-axis); the no-COVID-19 scenario (green bars; left y-axis). The figure also shows the increase in the share of illiquid firms in each productivity quartile when moving from normal times to COVID-19 times without any policy intervention (red rhombus; right y-axis) and when moving from normal times to COVID-19 with both basic policies and loan guarantee schemes (black triangle; right y-axis).
Source: OECD calculations based on Orbis® data.

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[17] This is the case as high productivity firms tend to display larger cash holdings and larger profit streams (Figure C.2).

[18] In line with this, the productivity of firms facing financial difficulties is higher than that of firms remaining liquid in almost 40% of cases in our sample.

32.   The disproportionate impact of COVID-19 on higher-productivity firms is corroborated by the logit regression analysis aimed at evaluating the impact of the COVID-19 shock and related policies on the correlation between liquidity and productivity. Consistent with the descriptive evidence presented in Figure 7, the results show that productivity and illiquidity are inversely related in normal time, but the strength of the relationship strongly decreases (i.e., almost halves) in COVID-19 times without government intervention. The combination of job retention schemes, debt and tax moratoria and loan guarantees partly increases the correlation again, though remaining at lower levels than in normal time. Indeed, policy action corrects about 30% of the efficiency of market selection lost due to the pandemic.

33.   Figure 8 shows that COVID-19 substantially raised the probability of financial difficulties across the distribution of firm-level productivity. The red line largely above the blue one for all productivity values suggests that the COVID-19 crisis was damaging to efficient market selection mechanisms. Moreover, it delivers two relevant insights on the role of policies and loan guarantees. First, they work to bring the probability of illiquidity for medium and high productivity firms (top 75% of the productivity distribution) back to normal time standards – undoubtedly a desirable effect on the majority of firms. Second, loan guarantees "over-reduce" the probability of illiquidity of low productivity firms (bottom 25% of the productivity distribution), as reflected by the fact that the orange line is below the blue line in the left part of the graph – a potentially undesirable effect from an allocative efficiency point of view. Finally, these findings are corroborated by a complementary exercise, which – inspired by Hadjibeyli et al. (2021) and developed in Box 4 – looks at the productivity distribution of illiquid firms under different scenarios.

Table 1. The COVID-19 shock reduces the strength of the relation between firms' productivity and liquidity status

	Dependent variable: Dummy for illiquidity			
	(1)	(2)	(3)	(4)
	No-Covid	Covid, market	Covid, policies	Covid, policies & guarantees
MFP	**-1.952*****	**-0.946*****	**-1.074*****	**-1.238*****
	(-25.3)	(-16.4)	(-16.2)	(-16.9)
Observations	682,931	682,931	682,931	682,931
Constant	YES	YES	YES	YES
Size&Age controls	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Sector FE	YES	YES	YES	YES

Note: T-statistics in parentheses; standard errors clustered at the country-industry level. Significance Level: *10%, **5%, ***1%. The dependent variable is a dummy that equals 1 if the firm turns illiquid and zero if it remains liquid, on the basis of the simulation model described in Section 3. Each specification refers to a different scenario: model (1) looks at normal times; model (2) at COVID-19 times without policy intervention; model (3) at COVID-19 times with job retention schemes, debt moratorium and tax moratorium; model (4) at COVID-19 times with loan guarantees in addition to the basic policies included in model (3). MFP is the log of pre-crisis firm-level multi-factor productivity, estimated according the GMM Wooldridge (2009) approach. The constant, controls for size and age classes, country fixed effects and sector fixed effects are included in all specifications.
Source: OECD calculations based on Orbis® data.

Figure 8. The market selection mechanism is hindered and policies contribute to repair it
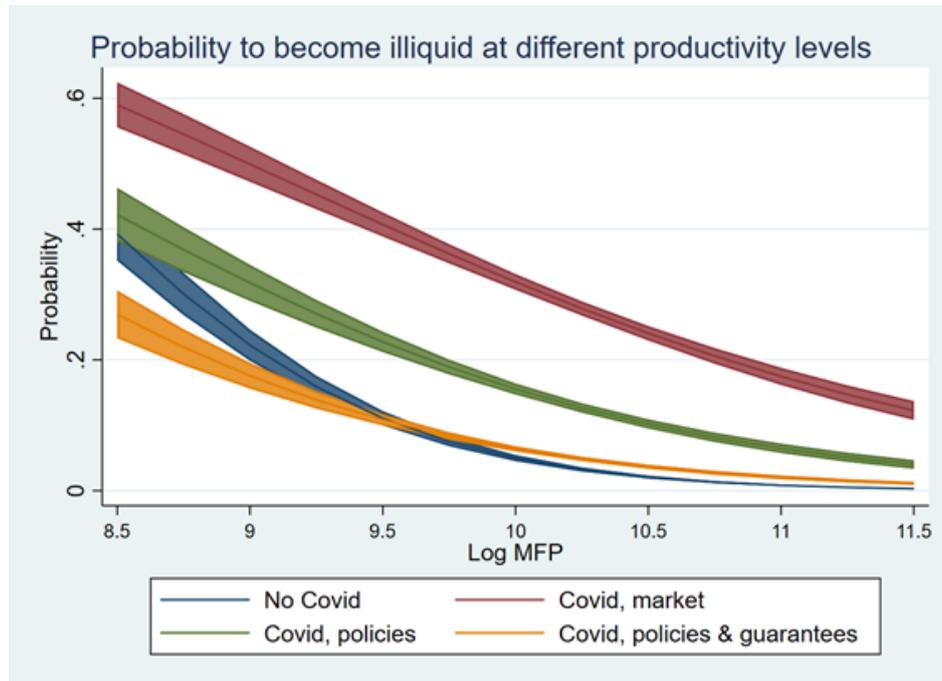
Note: The figure shows the predicted probability to turn illiquid at different productivity levels according to the estimates reported in Table 1 in four different scenarios: No-COVID (blue line); COVID-19 without policy intervention (red line); COVID-19 with job retention schemes, debt moratorium and tax moratorium (green line); COVID-19 with loan guarantees in addition to the other policies (orange line). The shaded areas around the lines represent 95% confidence intervals. Productivity is measured as the log of pre-crisis firm-level multi-factor productivity, estimated according the GMM Wooldridge (2009) approach.
Source: OECD calculations based on Orbis® data.

Box 4. Productivity distribution of illiquid firms under different scenarios

The left panel of figure 9 illustrates a distorted market selection mechanism: firms turning illiquid due to the COVID absent government support are consistently more productive than firms which are illiquid in normal times. The average productivity of illiquid firms decreases progressively once taking into account policy intervention, suggesting that relatively medium-to-low productivity firms are supported to some extent, as their average productivity remains substantially higher than the one observed in the no-COVID-19 scenario.

The right panel of Figure 9 directly compares the distribution of firms kept liquid owing to loan guarantees and the distribution of firms remaining illiquid despite the guarantees. Firms "saved" by loan guarantee programmes are significantly more productive than those remaining illiquid, implying that policy-related distortions are potentially limited.[19]

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[19] Recent evidence on French data confirms that policies have had limited distortive effects (Hadjibeyli et al., 2021) and that, despite widespread government support, the main drivers of firm failures (i.e. productivity and indebtedness) were unchanged in 2020 compared to 2019 (Cros et al., 2021).

Figure 9. Loan guarantee programmes entail only limited distortions
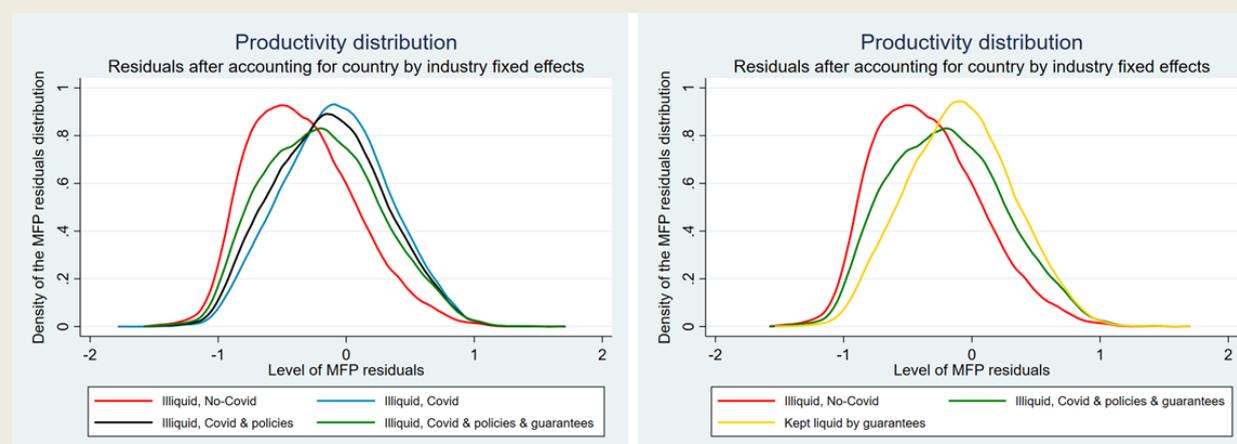
Note: The left panel shows the distribution of firms' multi-factor productivity, after having accounted for country-industry specific characteristics, of five different firms groupings: firms that are illiquid in normal time (red line), firms that are illiquid following the COVID-19 outbreak without policy intervention (light blue line); firms that are illiquid following the COVID-19 outbreak, but with job retention schemes, debt moratorium and tax moratorium (black line); firms that are illiquid following the COVID-19 outbreak, but with loan guarantee programmes in addition to the other policies (green line). The right panel shows the distribution of firms' multi-factor productivity, after having accounted for country- industry specific characteristics, of three different firms groupings: firms that are illiquid in normal time (red line); firms that are illiquid following the COVID-19 outbreak, but with loan guarantee programmes in addition to the other policies (green line); firms that would have been illiquid without loan guarantees and that turned liquid thanks to guarantee programmes (yellow line). In both panels, MFP is the log of pre-crisis firm-level multi-factor productivity, estimated according the GMM Wooldridge (2009) approach; to account for country-industry characteristics, MFP is regressed over country by industry dummies and the residuals of the regression are used in the plots.
Source: OECD calculations based on Orbis® data.

3.2.3. The risk of zombie lending seems contained

34.   A general concern relates to the risk that loan guarantees have kept artificially alive firms, which were already fragile prior to the COVID-19 shock, a phenomenon known as zombie lending. According to our simulations (Figure 10), under the conditions set by the European framework on state aid, only a small share of the firms turning liquid owing to loan guarantees could be classified as zombies. This figure ranges from 4% to 8%, depending on the profitability metrics used to define the zombie firm status. This is consistent with recent findings in the literature (Laeven et al., 2020; Schivardi et al., 2020; ECB, 2021) and suggests that zombie lending has potentially been limited during the first year of the pandemic.[20]

35.   This result may reflect the eligibility criteria of loan guarantee schemes, which restricted the access to this facility to firms which were not in financial difficulty at the end of 2019. Authorities also required lenders to undertake some screening, which banks have an incentive to perform as they still retain a significant portion of the risk (between 10 and 20% depending on the country and firm's size).[21] A second explanation relates to the nature of the shock, which has been cross-cutting within sectors. This implies

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[20] A firm is defined as a zombie if its ebitda or ebit to interest payments ratio is lower than one for three consecutive years, conditional on the firms being at least 10 years old.

[21] For instance, in France, the investment bank Bpifrance clarifies that lenders may deny credit to firms with bad credit scores; in Italy, lenders are subject to the usual legal requirement to check customers' creditworthiness; in Germany, lenders must check that beneficiaries are structurally sound and competitive in the long term; in the UK, lenders are required to assess the viability of the borrower's business proposition (Anderson et al., 2021). However, it is worth noticing that the high volume of applications and the need for speed may have generated frictions in screening procedures -- frictions that could not be captured by our model and would entail a less efficient targeting of the support.

that firms benefitting from public support, including loan guarantees, are financially fragile but not due to excessive risk taking (Brunnermeier and Krishnamurthy, 2020, Laeven et al., 2020).

Figure 10. Loan guarantees benefited zombie firms only to a negligible extent
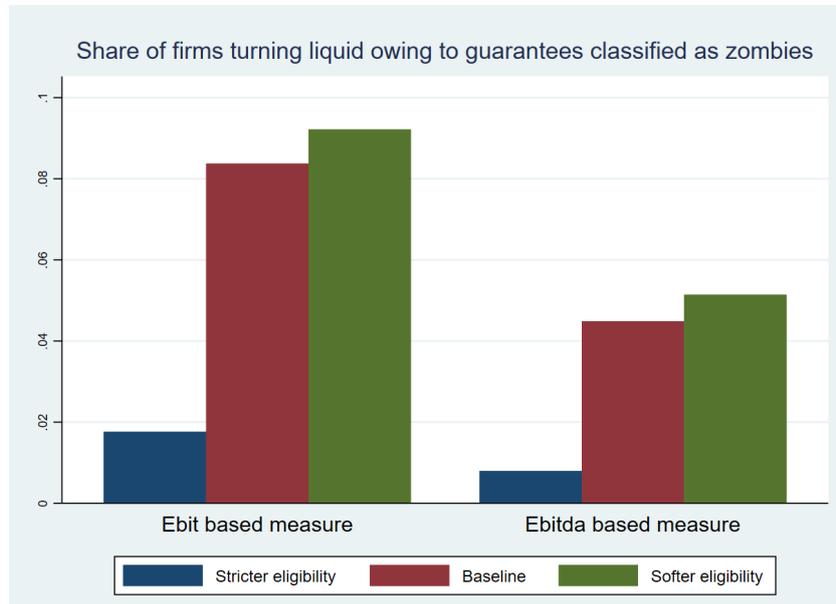
Note: The figure shows the share of zombies over the group of firms that remained liquid owing to loan guarantees following the COVID-19 outbreak. Zombie firms are those with an ebitda or ebit to interest payments ratio lower than one for three consecutive years, while being at least 10 years old. In the baseline scenario, firms are non eligible if they show *both* negative profits and a -negative book value of equity. Stricter eligibility criteria entail that firms displaying negative profits are excluded, while the softer eligibility scenario overlaps with the baseline but allows for a small amount (25 thousands euro) to be available to all firms without scrutiny.
Source: OECD calculations based on Orbis® data.

36.   Overall, the COVID-19 outbreak steadily increases the risk of facing financial difficulties for high productivity firms. Allowing the market selection mechanism to operate freely during such a sharp downturn would come at the cost of pushing out of the market a disproportionate share of efficient firms (Guerini et al., 2020; Hadjibeyli et al., 2021). In this context, rather than spurring misallocation, policies – including loan guarantee schemes – could have been an efficient tool to limit the scars from the crisis also from a productivity standpoint.

4. The role of loan guarantees in shaping reallocation in the medium-term

4.1. Empirical approach

37.   To study the link between public loan guarantee schemes and productivity-enhancing labour reallocation, we apply standard models of dynamic allocative efficiency (Foster et al., 2016; Decker et al., 2017) to cross-country firm-level data (see Box 1). These models predict that firms with higher productivity should attract more labour and grow, if there are no impediments to market forces allocating resources optimally. Following Adalet McGowan et al. (2017), we augment the canonical model and estimate the following equation over the 2007-2019 period:

$$GrEmpl_{icst} = \beta_0 + \beta_1 MFP_{ics,(t-1)} + \beta_2 \ (MFP_{ics,(t-1)} * GuarToGDP_{c,(t-1)})$$
$$+ \ \beta_4 \ \boldsymbol{X}_{ics,(t-1)} + \delta_{cst} + \epsilon_{icst}$$

(4)

where $GrEmpl$ stands for employment growth, computed as the yearly difference in log employment; $MFP_{ics,(t-1)}$ is the log of lagged firm-level multi-factor productivity, estimated through the GMM Wooldridge (2009) value added based procedure. $GuarToGDP$ is the ratio of guaranteed loans to GDP (see Figure 1) and is included with a one year lag, as it takes time for new funding to translate into firm growth. X are firm level controls, namely firms' profitability (proxied by the profit to turnover ratio), total assets, leverage ratio (total liabilities over total assets), age and firm size classes (3-10, 11-19, 20-49, 50-99, 100-249). The triple interacted country-sector-year fixed effects control for the effects of all time varying shocks at the country-sector level and restrict the comparison of productivity levels within each country-sector-year cell. The model is estimated by OLS, clustering standard errors at the firm (e.g., the unit of the panel) and at the country by year level (e.g., the level of the policy treatment). β_2 is the coefficient of interest, which we expect to be negative (positive) if larger public loan guarantee programmes is associated with lower (higher) allocative efficiency.

38.   If loan guarantees affect dynamic allocative efficiency, then a key mechanism will be the reallocation of bank credit from relatively more or less productive firms. Accordingly, we replace employment growth with financial debt growth as a dependent variable in Equation 4. The ratio of guaranteed loans to GDP enters contemporaneously since firm-level debt rises simultaneously with the loan subscription, while a proxy for firms' financial demand is also included.[22] If this mechanism is relevant, the new β_2 coefficient is expected to have the same sign as in the baseline model.

39.   We test the robustness of our baseline findings by i) using labour productivity (i.e. value added per worker) in place of MFP, ii) replacing GDP with the stock of outstanding loans to SMEs to normalise the amount of guaranteed loans, iii) excluding the GFC period from the estimation sample (i.e. sample restricted from 2011 onwards), and/or iv) by including interaction terms between:

- MFP and country fixed effects, to test whether within country changes in loan guarantees to GDP over time shape allocative efficiency in a similar fashion to between-country differences.
- Firm-level controls and the guarantees to GDP ratio, to rule out the possibility that firm-specific features other than productivity are driving the reallocation process;
- MFP and other country-year level variables (i.e., financial development, trade openness, GDP growth, credit and labour markets regulatory burden), to ensure that the loan guarantees to GDP ratio does not capture other institutional and economic features.

4.2. Results

40.   The estimated coefficient on MFP is positive and statistically significant (Table 2, Column 1), suggesting that labour reallocation is on average productivity-enhancing in our sample. But the strength of this relationship appears to weaken as the level of public guarantee schemes to GDP increases (Table 2, Column 2), consistent with the idea that such schemes may amplify misallocation in normal times. While the results do *not* imply causation, simulating the impact of an increase in the loan guarantees to GDP ratio of 1 p.p. (equivalent, for instance, to the large increase observed in Italy in the last decade) is associated with a reduction in productivity-enhancing labour reallocation of one-tenth (Figure 11).

41.   But this average relationship conceals important heterogeneity with respect to the size of the loan guarantee envelope. While the negative link is confirmed for large programmes (i.e. for values above sample median), the opposite holds in countries displaying relatively small programmes (i.e. for values below sample median). These findings raise the prospect that delimited guaranteed credit programmes may help foster the growth of productive firms, while a wider range of firms, including less productive ones,

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[22] In line with Di Mauro et al. (2018), we isolate the supply effect by using the following proxy for firms demand for external financing:

$$FinDemand_{icst} = 1 - Maximum\ rate\ of\ internally\ financed\ growth = 1 - \left(\frac{ROA}{1-ROA}\right).$$

are reached once the scope of the programmes is broader. Noteworthy, large programmes may also be performance-enhancing through channels other than reallocation which are not investigated in this paper (e.g. within firm channel, see Figure 4 and Annex B). Furthermore, the reallocation process appears less obstructed by loan guarantees in intangible-intensive industries (Column 5). One interpretation is that loan guarantee schemes may help innovative firms to obtain the credit they need to underpin their expansion in sectors where financing frictions are high (Barrot et al., 2019), given that intangibles are notoriously difficult to collateralise.[23]

42.   Table 2 further explores the baseline results:

* First, credit misallocation emerges as a potentially relevant underlying mechanism: while credit is more likely to flow to high productivity firms (Column 6), this process weakens as public loan guarantee schemes become more pervasive (Column 7).

* Second, increases in the size of loan guarantees (to GDP) within countries over time is also associated with weaker allocative efficiency (Column 8 which includes MFP*country fixed effects). This suggests that a strong build-up of loan guarantee programmes may hamper reallocation in the longer term. It also rules out the idea that the baseline results reflect an unobserved country-specific factor that is associated with a higher use of loan guarantees and misallocation.

Table 2. Large loan guarantee programmes could hamper allocative efficiency

	Dependent Variable: Employment Growth or Debt Growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable: growth of	Empl	Empl	Empl	Empl	Empl	FinDebt	FinDebt	Empl
Model	\	Baseline	Small Prog	Large Prog	Intang	\	Baseline	WithinVar
Lag MFP	0.049***	0.059***	0.029***	0.063***	0.063***	0.094***	0.109***	
	(251.9)	(12.9)	(9.5)	(10.8)	(11.4)	(82.6)	(12.1)	
Lag MFP * Lag Guarloan		-0.005***	0.047***	-0.007***	-0.006***		-0.015***	-0.013*
		(-4.2)	(4.7)	(-4.1)	(-4.3)		(-4.7)	(-1.8)
Lag MFP * Lag Guarloan * IntangIntens					0.001*			
					(1.9)			
Lag MFP * IntangIntens					-0.005***			
					(-3.2)			
Observations	10,141,786	7,600,381	1,273,550	6,326,831	7,019,634	5,693,523	4,716,344	7,600,381
R-squared	0.058	0.058	0.041	0.061	0.059	0.026	0.025	0.058
Firm Controls (Size, Age, Profitability, Assets, Leverage)	YES	YES	YES	YES	YES	YES	YES	YES
Control for Financial Demand	NO	NO	NO	NO	NO	YES	YES	NO
Country * Sector * Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Productivity * Country Fixed Effects	NO	NO	NO	NO	NO	NO	NO	YES

Note: T-statistics in parentheses; standard errors clustered at the firm and country by year level in all specifications but (1) and (6), where they are clustered at the firm level only. Significance Level: *10%, **5%, ***1%. The dependent variable is employment growth, computed as the yearly difference in log employment, in specifications (1) to (5) and (8), while financial debt growth in specifications (6) and (7). Lag MFP is the lag of log firm-level multi-factor productivity, estimated according the GMM Wooldridge (2009) approach. Lag Guarloan is the lag of the guaranteed loans to GDP ratio; notably, however, contemporaneous rather than lagged values are used in specifications (6) and (7). IntangIntens is a sectoral variable to proxy for industries intangible intensity, computed as in Demmou et al. (2019). All specifications include country by sector by year fixed effects, as well as the constant and the following firm level controls: size classes, age, profit to turnover ratio, total assets, leverage ratio. Specifications (6) and (7) include a control for financial demand, proxied as in Di Mauro et al. (2018). Specification (8) adds productivity by country fixed effects interactions to the baseline. In the third (fourth) specification, only firms operating in countries with an average level of the guaranteed loans to GDP ratio below (above) the median country are included. The analysis covers the 2007-2018 period.
Source: OECD calculations based on Orbis® and OECD data.

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[23] In particular, loan guarantee programmes can play a role in supporting banks during the learning period necessary to build knowledge on the use of IP-backed loans. For instance, in 2015 Austria introduced guarantee programmes for loans collateralised by intangibles as a way to improve the capacity of lenders to assess firms growth potential in intangible-intensive sectors (OECD, 2016).

Figure 11. The correlation between productivity and employment growth varies with the level of guaranteed loans
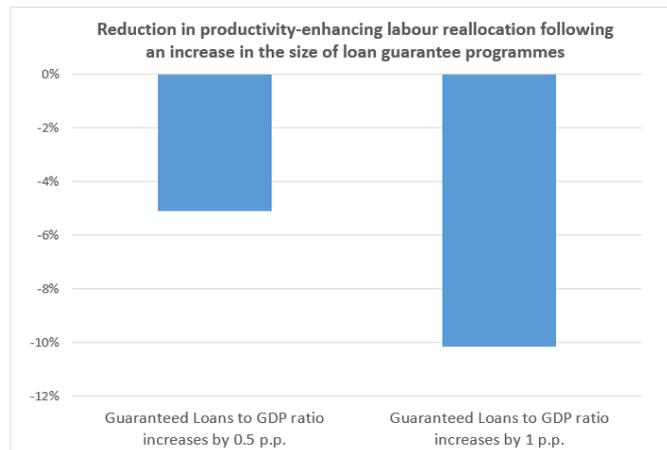
Note: The figure is based on specification 2 in Table 2, and shows the impact of an increase of the guaranteed loans to GDP ratio on the correlation between productivity and employment growth.
Source: OECD calculations based on Orbis® and OECD data.

43.   Finally, as shown in Table C.1, the baseline estimates are also robust to the use of labour productivity rather than MFP, the normalisation of the amount of guaranteed loans with the stock of outstanding loans to SMEs in place of GDP, the exclusion of the GFC period from the sample and to the inclusion of interactions between: *i*) each firm level control and loan guarantees to GDP; and *ii*) MFP and other country-specific economic and institutional features.

5. Policy discussion

44.   At a glance, the empirical analysis shows that the cost of withdrawing support may outweigh the benefits in the short-term, while the reverse may hold when the economy will turn back to its pre-crisis levels. This section explores the role that policy could play during the transition period by evaluating the pros and cons of the several (non-exclusive) options available to policy makers, summarized in Figure 12.

Figure 12. Policy options to foster the recovery of the corporate sector
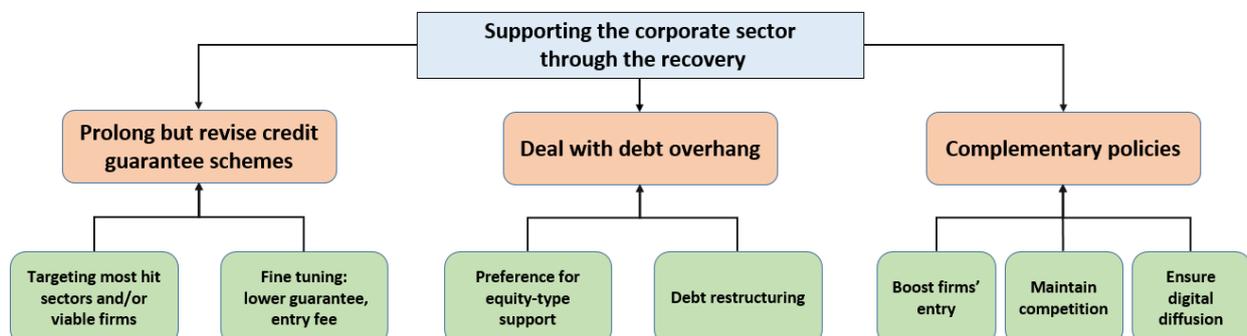
Source: OECD.

5.1. If and how to phase-out loan guarantee schemes

5.1.1. During the recovery phase some liquidity needs may persist, calling for continued support...

45.   While firms may have already gone through the hardest part of the crisis, liquidity shortages may persist as: i) social distancing measures in hard-hit sectors may still apply as long as uncertainty on the evolution of the pandemic remains (e.g. surge of new variants); *ii)* it may take time for firms to generate again the stream of profits needed to meet their financial commitments, as the crisis may have affected their production network, consumers' habits and payment deadlines for trade credit; *iii)* SMEs, which have been the most hit during the crisis, may not be able to exploit fully the international recovery, as for instance their larger competitors are doing (FSB, 2021); and *iv*) the high uptake of guarantees itself may have created a trade-off between firms' current and future access to credit (Gobbi et al., 2021).[24]

46.   One concern is that a premature withdrawal of loan guarantee schemes may induce a collapse of credit flows. This scenario could play out if banks were to issue new loans on the sole basis of their pre-existing screening procedures, which many firms would not satisfy due to the deterioration of their solvency profile. In this context, loan guarantees could provide the time needed for banks and firms to increase their knowledge on the new post-crisis environment – especially in the face of structural changes (e.g. change in consumer habits) – and to allow viable firms to roll-over their new debt.

5.1.2. …yet, targeting and fine-tuning of policies are essential during the recovery phase

47.   Policies will need to evolve to ensure that a focus on short-term preservation does not induce a material misallocation of resources over the medium-to-longer run:

- *Stronger targeting.* Support should be directed towards viable firms operating in hard-hit sectors (OECD, 2021a), which still need to cope with restrictions related to social distancing measures, as banks are now in a better position to undertake a comprehensive evaluation of firms conditions and potential. Co-ordinated screening procedures from national administrations could also be helpful, when sufficient administrative capacity is available. Overall, such targeting would reduce fiscal costs and support medium-term productivity growth.

- *Fine-tuning.* The transfer of a larger portion of risk to the lender could help to reduce moral hazard and adverse selection concerns (Allison et al., 2013), as banks would have higher incentives to screen and monitor, thus aiding allocative efficiency (Barrot et al., 2019; Gropp et al., 2020).
  - ○ Government typically bear around 80-90% of the risk on COVID-19 related debt but a convergence towards more standard rates (in the 50-80% range) would be desirable.
  - ○ Progressively increasing the cost of the guarantees (e.g. by imposing a programme access fee) would reduce the incentives for firms to opt-in when they are able to get finance otherwise and ensure that the support is directed towards financially constrained but viable firms.[25]

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[24] Indeed, public loan-guarantees increase the collateral value of the loan above its stand-alone value; hence they may generate incentives for banks to foreclose loans close to the removal of the guarantee and to not rollover the debt, if the expected recovery value of the loan is lower than the amount of the guarantee.

[25] For instance, in France during the 1990s, the SOFARIs programme combined a high upfront fee with a high level of guarantee, thus making low- risk and collateral rich firms that do not need to be subsidized reluctant to apply, while allowing riskier or less wealthy entrepreneurs to obtain more external financing (Lelarge et al., 2010). Similarly, when enrolling the US SBA's Loan Program, firms have to prove that they were unable to obtain credit on the regular market.

48.   Importantly, the phase-out of loan guarantees should be sequenced and combined with other policies. As discussed below, much depends upon: *i*) dealing with debt restructuring, in order to allow viable firms to operate normally; *ii*) establishing the appropriate set of complementary policies in order to ease the process of creative-destruction, reaping its benefits, and foster the recovery.

5.2. Dealing with over-indebtedness

49.   Public loan guarantee schemes have been critical in addressing firms short-term liquidity needs. However, like all debt instruments, they increase firms' future liabilities which may weigh on the recovery, potentially undermining future investment and productivity growth (Demmou et al., 2021b).[26] Furthermore, while firms may need additional funds to restart their activity, the private sector may be unwilling to lend money to firms already burdened with large repayment commitments. Thus, it is essential to ensure that repayment plans for the newly contracted debt will be sustainable once the emergency ends. But many firms operating in hard-hit sectors may face difficulties repaying pandemic-induced debt, even assuming "normal time" profits (Box 5). The more firms relied on loan guarantees to fill their liquidity gaps, the more likely over-indebtedness will impact their future operations and investment rate. Hence, the phase-out of loan guarantee programmes should be accompanied by a comprehensive strategy to deal with the risk of debt overhang and of the liquidity crisis turning into a solvency crisis. [27]

Box 5. Debt sustainability in the post-COVID-19 environment

To shed light on firms' ability to reimburse the pandemic-induced debt under the conditions implied by EU State Aid rules[1], we perform a stylized exercise based on Orbis firm-level data. This entails:

- Assuming that firms are not downsizing and/or selling assets to repay COVID-19 related debt. So pandemic-induced debt could be reimbursed exclusively with what remains after all other (previously contracted) financial commitments have been honoured, and thus via accumulated net income (e.g., retained earnings).
- Proxying the future streams of profits that firms could use to repay debt by taking the average of firms net income over the 2017-2019 period, which should be a representative estimate of firms profitability in normal times.
- Defining several potential values for the increase in debt, ranging from 5% to a maximum of 25% of revenues and compute the number of years it would take for the median profitability firm to reimburse debt.

Our simulations show that:

- Depending on the extent of the debt increase, the median firm would need from 2 to 12 years to repay it without downsizing (Figure 13).
- The median firm may struggle to reimburse pandemic-induced debt within the 6 years limit of the duration of the guarantees if the increase in debt is larger than 15% of turnover.
- Hard-hit sectors (e.g. Accommodation and Food, Arts and Entertainment, Other Services) display on average lower profitability and have experienced higher increases in debt: their ability to repay within the 6-years time frame is hence expected to be further impaired.
- The outlook is weaker for young and small companies (Figure C.4).

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[26] According to the latest BIS data, the rise in indebtedness has been non-negligible: credit to non-financial corporations as a share of GDP increased by 8.8 and 9.6 percentage points from 2019Q4 to 2020Q4 for the US and the EU respectively; similarly, the outstanding amount of credit has grown by 9% in the US and 12% in the EU.

[27] See Demmou et al. (2021b) for a more in depth discussion on the policy options to ease debt overhang risks.

Figure 13. Firms experiencing a large increase in debt following the COVID-19 outbreak may struggle to reimburse it in time
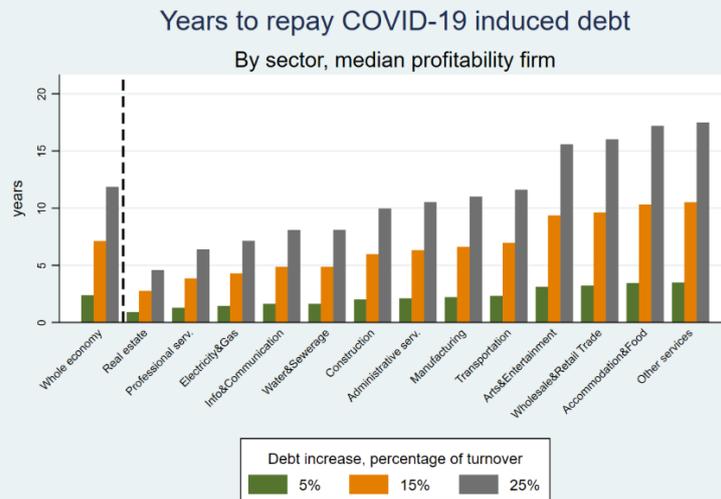
Note: The figure shows the number of years that the median profitability firm in each 1-digit Nace Rev.2 sector would need to repay COVID-19 induced debt relying exclusively on retained earnings, for different levels of debt increase.
Source: OECD calculations based on Orbis® data.
1. All programs implemented by European governments were required to comply with EU Commission State Aid rules – notably setting limits on the duration of the guarantees (6 years), the maximum amount guaranteed (25% of revenues or two times the wage bill) and eligibility (Annex A).

5.2.1. Privilege grants and quasi-equity type of instruments to recapitalise viable firms

50.   Raising equity capital strengthens the financial sustainability of firms that increased debt during the pandemic. But equity and quasi-equity injections confront a number of practical issues *vis-a-vis* SMEs, as bank lending is their most common source of financing and it would be difficult for governments to manage a large number of small equity claims.

51.   Policymakers could revert to more indirect measures. For instance:

- Loans repayment could be linked to businesses' returns - in the form of future taxes. These instruments would allow the repayment to be state-contingent, mimicking equity injections.[28]
- The conversion of government (crisis related) loans into grants.[29] The European Commission's Temporary State Aid Framework was modified in January 2021 to allow governments to convert repayable instruments (e.g. public loans and guarantees) into grants (up to a certain ceiling). Targeting viable firms and conditioning the funds to certain specific operational costs (e.g. rents) should reduce the associated fiscal costs.

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[28] This type of scheme is currently under study to be implemented at the EU level through the European Pandemic Equity Fund (OECD, 2021a).

[29] From this perspective, interesting government support programmes are the "Immediate Assistance Programme" (Soforthilfeprogramm) in Germany, which provides grants to small businesses, self-employed individuals and freelancers, under the conditions of using the funds to mainly cover rental and leasing expenses, and the conversion of loans into grants envisaged by the U.S. "Paycheck Protection Program", which is conditional on the firm spending at least three-quarters of the money on payroll expenses and the rest on rent and utility bills.

5.2.2. Promote early debt restructuring

52.   Early debt restructuring significantly increases the odds of firms' survival (Epaulard and Zapha, 2021). This requires the swift identification of firms with viable business models but experiencing financial distress exclusively due to the large shock implied by the COVID-19 outbreak. A reinforced network of consultations relying on private and public stakeholders could strengthen the capacity to diagnose firms' financial difficulties ahead of formal insolvency procedures – before firms enter in suspension of payment phase.[30] Importantly, the current design of loan guarantees may create a disincentive for debt restructuring as banks would lose the guarantee from the public government if loans maturity is extended beyond the limit set in the current legislations. For instance, the six-years limit set in the Temporary Framework for state aids rules may be reconsidered to ease restructuring (Senat, 2021). Another potential solution is to provide banks the appropriate incentives through subsidies, conditioning a partial discount on the debt held by the government – which has priority in case of liquidation – to the effort of banks to reach an agreement on restructuring plans (Blanchard et al., 2020).

53.   More generally, insolvency regimes may be adapted to the needs of SMEs, as complex, lengthy and rigid procedures, required expertise and high costs of insolvency can be demanding for this category of firms. For instance, comprehensive check-lists for restructuring plans 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 (European Commission, 2019). Similarly, pre-packaged in-court proceedings or the possibility to pay administrative expenses related to the insolvency proceedings in instalments could also help overcoming SMEs' capacity constraints. Moreover, access to new funds may be difficult when the debt levels are already high and the risk of default is significant. Assigning priority to new financing ahead of unsecured creditors would be beneficial to mobilise additional funds (OECD, 2021b). Finally, dealing efficiently with SMEs insolvency procedures could reduce the fiscal cost arising from the realization of the contingent liabilities related to government backed guaranteed loans – e.g. the higher the recovery value, the lower government disbursement.

5.3. Complementary policies to strengthen the recovery

54.   As pandemic-related support is phased-out, dynamism-enhancing structural reforms – which do not depress short-term demand – should be prioritised.

5.3.1. Boosting firms' entry

55.   Boosting firms' entry is a major challenge for absorbing displaced workers from upcoming bankruptcies and foster inclusive growth. During the initial phase of the crisis, the uncertain economic environment has strongly reduced entry rates, hinting at the risk of a potential "lost generation" of companies (Calvino et al., 2020).[31] A missing generation of new firms prevents the creative-destruction mechanism from working efficiently, resulting instead in a process of productive destruction (Bloom et al., 2020) with a long lasting impact on employment, given the disproportionate contribution of start-ups to job creation (Calvino et al., 2020; Sedláček and Strek, 2020). At the same time, the COVID-19 shock

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[30] This network could involve accountants, banks, fiscal authorities, national investment banks and local development agencies, as recently implemented in France (French Government, 2021).

[31] For instance, firm creation in March and April 2020 dropped by 70% in Portugal, 46% in Hungary, 54% in France and 57% in Turkey compared to the same months of the previous year (Calvino et al., 2020).

generated new business opportunities.[32] For instance, certain industries (e.g. IT intensive) faced an even higher path of business formation than during the previous years and some countries are already experiencing a strong rebound in firms birth (Bighelli et al., 2021; OECD, 2021c; OECD, 2021d).[33]

56.   Policy intervention is essential to avoid a double-dip recession due to declining business dynamism. As more extensively discussed in Box 6, reducing regulatory barriers, facilitating access to finance, supporting innovation, and increasing human capital are all measures that could contribute to establish an environment favourable to entrepreneurship.

Box 6. Boosting business creation in COVID-19 times

In the context of the COVID-19 crisis, governments could pay specific attention to the following policy areas in order to boost business creation and avoid the premature exit of existing start-ups:

- *Ensuring available funding for start-up creation*. Some countries have already taken actions to countervail the observed decline in angel investors and venture capital activity (Paunov and Planes-Satorra, 2020). For example, France set-up a EUR 4 billion fund to support start-up liquidity, Germany a tailored start-up aid programme that expands and facilitates venture capital financing, and the United Kingdom a co-financing fund for innovative companies in difficulty (Calvino et al., 2020). Other potential policy options include increasing tax deductions for individuals investing in start-ups as well as creating official platforms where start-ups can find centralised information on these support programmes.

- *Reducing legal barriers to entrepreneurship*. Simplifying regulatory procedures and minimising regulatory uncertainty exacerbated by the COVID-19 shock would help foster new start-ups (Calvino et al., 2020). For instance, health protocols that firms will need to follow during the transition period need to be transparent and clear. Similarly, while the surge in telehealth offerings during the COVID-19 pandemic has created several regulatory challenges (e.g. linked to consumer privacy and the proper usage of confidential health information), the implementation of a regulatory sandbox, as the one recently adopted in Singapore, could help to balance innovation and protection (Wlash, 2021),

- *Boosting entrepreneurial potential*. (un)employment-to-entrepreneurship transitions could be facilitated by enhancing lifelong learning and the portability of social protection. Evidence from a reform in this direction implemented in France in 2002 suggests that there has been an effect on firms' creation and that a significant fraction of these new firms grew larger after two years (Hombert, 2020).

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[32] There are also numerous examples of successful start-ups emerging during downturns, reflecting the ability of young firms to respond to changing market conditions. For instance, Dropbox, Airbnb, WhatsApp, Groupon, and Pinterest were all founded during or just after the Global Financial Crisis (Calvino et al., 2020b).

[33] Some countries (such as Australia, Canada, Norway, the United Kingdom, the United States and Singapore) are experiencing a V-shaped recovery in entry rates, while other countries (including Spain, Italy, and Portugal) seem to struggle with a U-shaped recovery. Other countries for which data are available (Belgium, France, Germany, Hungary and Iceland) lie in between these two groups (OECD, 2021c).

5.3.2. Ensuring digital diffusion across all firms

57.   With physical interactions being impossible or risky, digitalisation became a matter of survival for many firms, forcing people to adopt new ways of working and abandon entrenched habits (OECD, 2021e). At the same time, the acceleration in digital adoption may have been strongly heterogeneous across firms, SMEs and young companies often lack the capability to purchase digital technologies and undertake the range of complementary investments (e.g., in workers and managerial skills, intangible assets) that are needed to fully harness the benefits from digitalisation, thus widening the gap between frontier and laggard firms (Gal et al., 2019; OECD, 2021f).[34] Hence, to ensure the diffusion and uptake of digital technologies across all layers of the corporate sector, governments could consider the multi-pronged approach developed by the OECD and outlined in Box 7.

Box 7. An OECD policy framework to foster digitalisation

Recent OECD work proposes a policy framework to durably accelerate diffusion and uptake of digital technologies based on the following building blocks (OECD, 2021e):

- *Lifelong learning for all*. Increase the participation in adult learning programmes and on-the-job training schemes, as well as their quality, with a specific focus on low-skilled workers, in order to provide people and firms with the skills needed to succeed in a digital world.
- *Intangible finance for the knowledge economy*. Ease the financing frictions that hold back complementary intangible investments, notably by fostering the development of equity markets, increasing intangibles pledgeability to unlock bank financing for these assets and fine-tuning direct and indirect government support for innovation.
- *Framework market conditions for the digital economy*. Fine tune competition, taxation and digital security policies to secure a level-playing field and the trust in the digital economy.
- *Technology access via digital infrastructure*. Incentivize private investment and/or directly invest in digital infrastructure, in order to improve and widen access to communication networks.

Source: OECD (2021e)

5.3.3. Preserving competitive markets

58.   Finally, the disruptive impact of the COVID-19 crisis on the corporate sector may entail relevant consequences with respect to market power and industry concentration. Large old firms, already better positioned before the COVID-19 outbreak, have been more resilient to the shock due their larger cash buffers, more favourable conditions to access external financing and higher ability to invest in and exploit digital technologies potential (Demmou et al., 2021b). In line with this, stock market data also show that large high mark-up firms performed better than their competitors, displaying higher flexibility to adjust when facing an adverse shock and thus increasing further their market shares (Hyun et al., 2020). Moreover, the market power of well-established firms may further rise during the recovery, when the withdrawal of public support may force many small distressed companies to exit the market or to be the target of a takeover;[35]

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[34] Recent surveys covering business owners and managers show that, while smaller firms recognize the importance of digital technologies, their digital adoption has increased to a much lower extent than for large firms since the start of the pandemic, mostly due to the cost of purchasing digital technologies and a lack of awareness and adequate skills (OECD, 2021e).

[35] For instance, Bajgar et al. (2018) shows that the rise of M&A activity have strengthened established corporations and increased concentration, especially in the aftermath of the global financial crisis.

these trends are magnified in digital sectors, where big tech companies managed to leverage their network effects and the volume of M&A transactions already started to increase (Calligaris et al., 2021).

59.   The implications of rising M&A and concentration on competition and productivity are still debated. On the one hand, rising concentration could reflect that most productive firms gain market shares due to their higher efficiency, hence a desirable outcome; on the other hand, it could reflect that larger firms are taking advantage of their dominant position to impose higher mark-ups, reducing competition and business dynamism. Against this background, it is crucial to understand the drivers and consequences of rising concentration, in order to assess properly the implications of M&A deals and set the appropriate framework conditions to preserve a competitive market environment (Georgieva et al., 2021; OECD, 2020d).

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Annex A. Design of loan guarantee schemes during the COVID-19 crisis in Europe

1.   The European Commission has adopted a temporary framework of state aid rules, regulating the design and use of public loan guarantees during the pandemic.

2.   Guarantee schemes aim at supporting firms and self-employed people that have been affected by the COVID-19 crisis but had not been in financial difficulties at the end of 2019. The schemes generally apply to new lending and typically to medium and long-term loans (with an average maturity of five years). The duration of the guarantee is limited to a maximum of six years.

3.   For loans with a maturity beyond 31 December 2020, the amount of the loan principal should not exceed:

- The double of the annual wage bill of the beneficiary for 2019, or for the last year available, or
- 25% of total turnover of the beneficiary in 2019.

4.   The public guarantee should not exceed:

- 90% of the loan principal, where losses are sustained proportionally and under the same conditions by the credit institution and the State;
- 35% of the loan principal, where losses are first attributed to the State and only then to credit institutions (i.e. a first-loss guarantee);
- In both of the above cases, the guaranteed amount has to decrease proportionally when the size of the loan gets reduced over time, for instance because the loan starts to be reimbursed.

5.   In practice, the size of the guarantee ranges between 70% and 90% of the loan principal, although 100% guarantee schemes are also available in a few countries, including Italy and Germany, especially for smaller loans to small and medium-sized enterprises (SMEs) and the self-employed. Moreover, the loan must reflect the guarantee: the interest rate must be lower than in absence of guarantee.

# Annex B. The impact of loan guarantees in normal times

6.   The impact of loan guarantees on both firms' financial conditions (e.g. the amount and the cost of credit, the structure of the debt) and economic performance (e.g., employment, investment, survival) has been widely investigated empirically in the literature. Overall, the effect depends importantly on the design of loan guarantee programmes as well as on the business cycle, so that the evidence on the economic benefits of loan guarantees remains inconclusive (OECD, 2017). Yet, this strands of literature delivers interesting takeaways:

- *Access to credit*. Loan guarantees appear effective at channelling funds to eligible firms. For instance, De Blasio et al. (2018) provides evidence that the Italian scheme Fondo di Garanzia has been effective in enhancing credit flows. Similarly, Lelarge et al. (2010) shows that the Oseo guarantee scheme generated credit additionality on the intensive margin and improved access to finance of young financially constrained companies.

- *Cost of credit and structure of debt*. Loan guarantees tend to reduce the cost of credit for eligible firms. Columba, Gambacorta and Mistrulli (2009), Zecchini and Ventura (2009) and Calcagnini, Farabullini, and Giombini (2014) for Italian firms and Lelarge et al. (2010) for French firms provide evidence in this direction. However, De Blasio et al. (2018) shows that the reduction may be limited to the subset of firms that easily go through eligibility criteria. Moreover, loan guarantees are also found to increase debt maturity, as documented by D'Ignazio and Menon (2013).

- *Firms' survival.* The impact of loan guarantees on firms' survival is unclear. On the one hand, Lelarge et al. (2010) find an increase in the risk of default of beneficiary firms. On the other hand, Farinha et al. (2016) and Bertoni et al. (2019) unveil a decline in the probability to exit the market and of loan default. The time horizon under consideration might be important: Kang and Heshmati (2008) document a decline in the probability of default in the medium term, but an increase in the long term.

- *Employment.* Loan guarantees may spur employment. Bertoni et al. (2018) provide evidence on a positive effect of on employment and growth based on French data; the effect is larger for small and young firms, in line with the idea that they are more financially constrained. Oh et al. (2009) show that the provision of guaranteed loans in Korea helped beneficiary firms to increase or maintain their size both in terms of sales and employment, as well as to hire more skilled employees. Akcigit et al. (2021) find that credit guarantee support in Turkey leads on average to an increase of employment by 17 percent and sales by 70 percent for eligible firms. In line with this, Barrot et al. (2019) shows that the loan guarantee programmes launched during the global financial crisis have been a cost-effective instrument to support employment and earnings trajectories – government expenditures for loan guarantees were lower than the ones implied by the cost of additional unemployment (e.g., unemployment benefits) absent the scheme. Gonzales and Wang (2021) provide also evidence that the UK loan guarantee scheme played a key role during the global financial crisis at supporting employment of financially constrained firms.

- *Investment and Productivity*. The evidence on the impact of loan guarantees on investment and productivity is scarce. Arraiz et al. (2014), D' Ignazio and Menon (2013) and De Blasio et al. (2018) do not find significant effects on investment; rather, the schemes are found to be mostly used to

ease working capital constraints. Oh et al. (2009) find that loan guarantees did not help Korean firms to increase their R&D and capital investment as well as productivity growth. Asdrubali and Signore (2015) provide evidence of a negative impact on investment in the short run, followed by a negligible positive effect in the medium run. Bertoni et al. (2018) show that French firms that benefited from EU-guaranteed loans displayed a short-run dip in productivity, accompanied by a medium-run recovery and a long-run positive effect.

Annex C. Additional figures and tables

Figure C.1. A relevant portion of firms remained liquid owing to loan guarantees, especially in hard-hit sectors – robustness check focusing on countries with the highest uptake and better coverage in Orbis
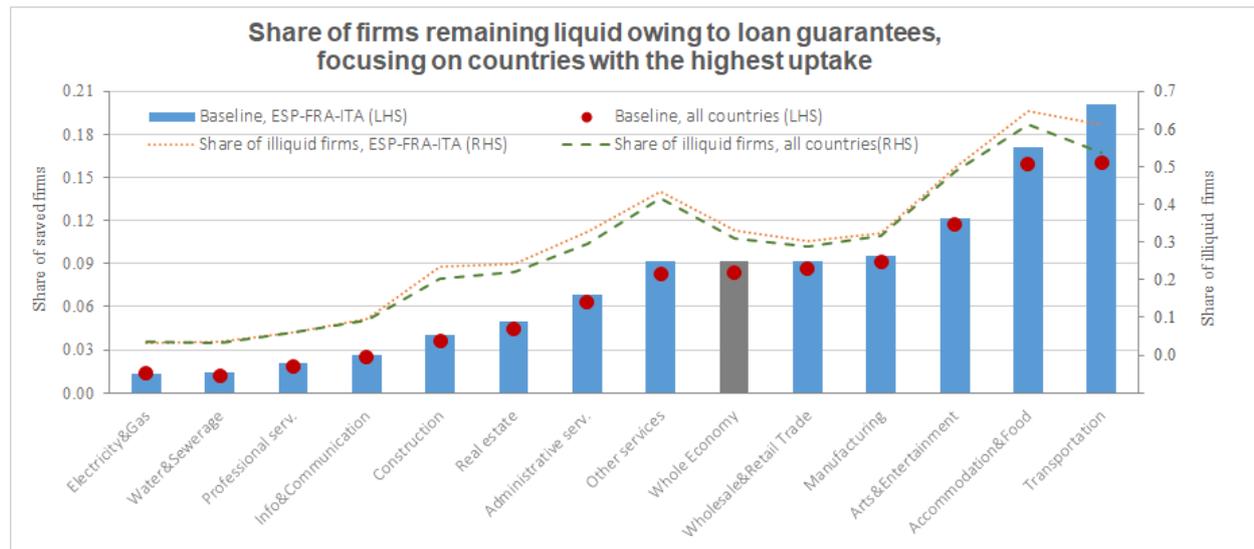

Note: The figure shows the share of firms (over the total number of firms) that are not facing liquidity shortfalls owing to loan guarantee schemes (baseline eligibility criteria) on the left y-axis and the share of illiquid firms absent government intervention on the right y-axis, by 1-digit Nace Rev.2 sector and one year after the COVID-19 outbreak. The series labelled as "all countries" reflect the main findings reported in Figure 6.
Source: OECD calculations based on Orbis® data.

Figure C.2. High productivity firms tend to display larger profit streams and larger cash holdings
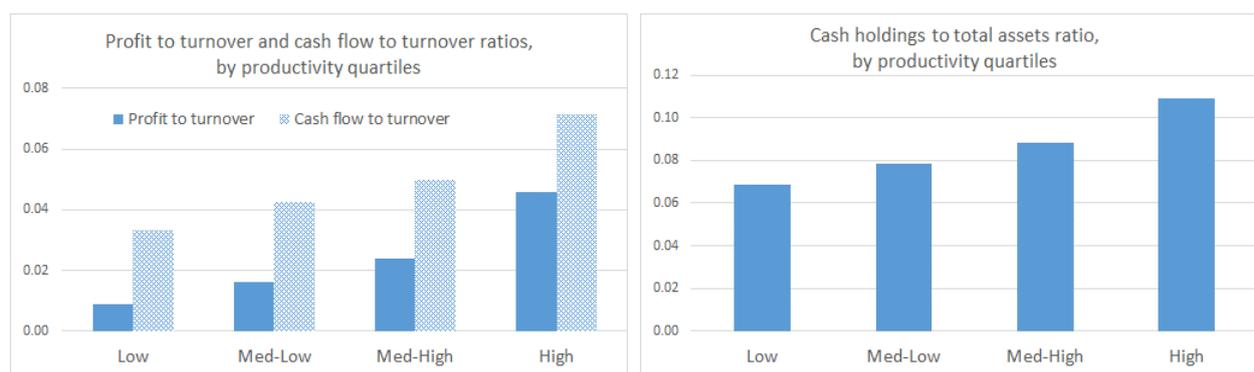
Note: The left panel shows the profit to turnover and the cash flow to turnover ratios by productivity quartiles. The right panel displays the cash holdings to turnover ratio by productivity quartiles.
Source: OECD calculations based on Orbis® data.

Figure C.3. Loan guarantees are essential to meet the liquidity needs of a large portion of high productivity firms in hard-hit sectors
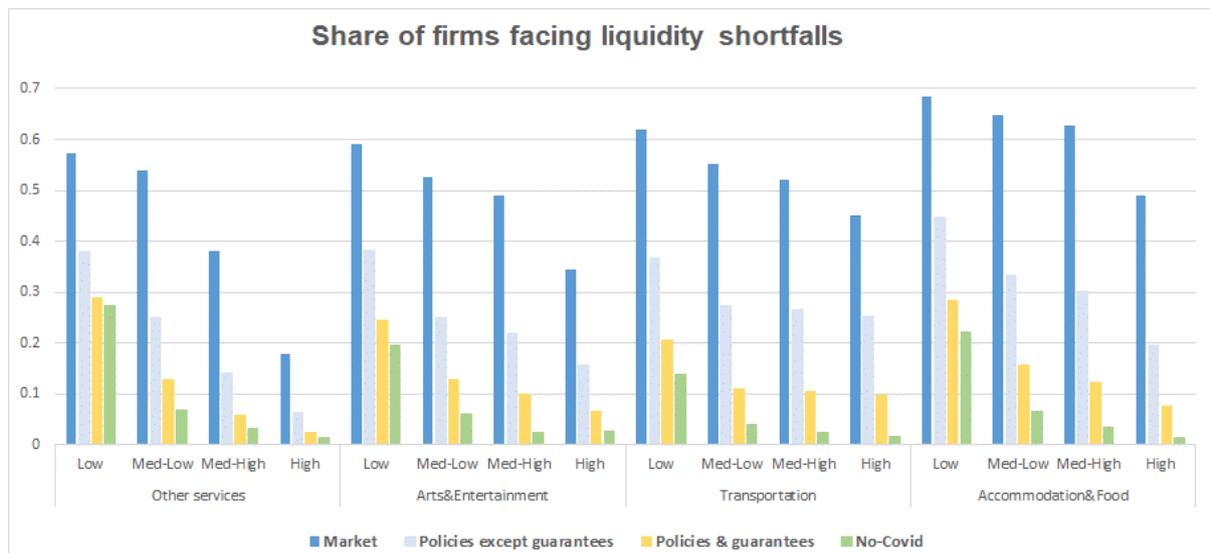
Note: The figure shows the share of firms facing liquidity shortages in the most hit sectors by productivity quartiles in: the COVID-19 and no policy intervention scenario (blue bars), the COVID-19 scenario with basic policies (tax and debt moratorium, job retention schemes) (light blue bars), the COVID-19 scenario with basic policies and loan guarantee schemes (yellow bars); the no-COVID-19 scenario (green bars).
Source: OECD calculations based on Orbis® data.

Figure C.4. Young and small firms may face higher difficulties to reimburse COVID-19 induced debt
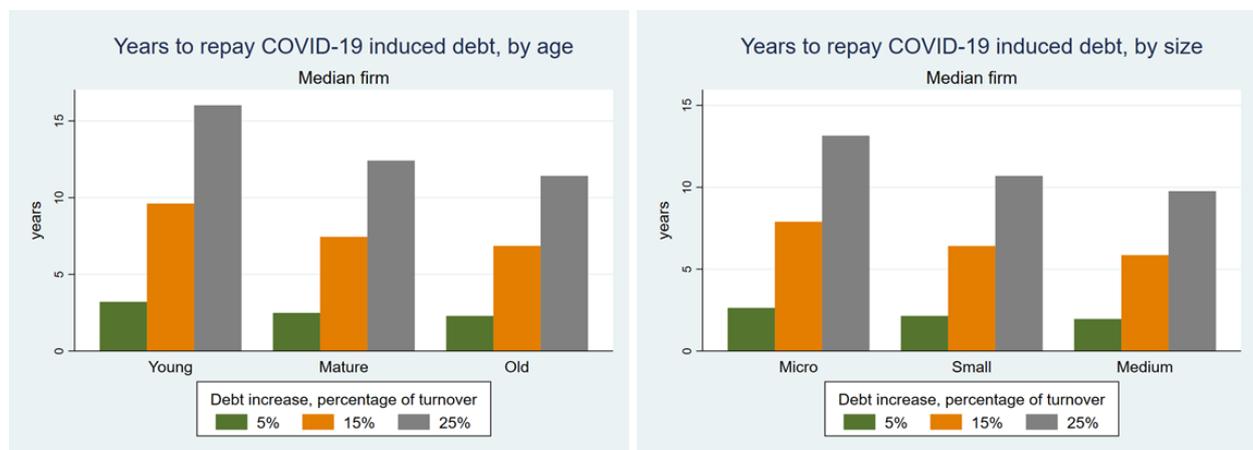
Note: The figure shows the number of years that the median profitability firm would need to repay COVID-19 induced debt relying exclusively on retained earnings, for different levels of debt increase. The left panel distinguishes firms by age, defined as the difference between 2018 and the year of incorporation of the company -- 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). The right panel classifies firms by size groups, 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.
Source: OECD calculations based on Orbis® data.

Table C.1. Large loan guarantee programmes could hamper allocative efficiency -- robustness

	(1)	(2)	(3)	(4)	(5)
Dependent Variable: Employment Growth					
Productivity variable	MFP	MFP	MFP	LP	MFP
Model	FirmInt	MacroInt	T>=2011	Baseline	GuarloanStock
Lag Productivity	0.060***	0.057**	0.052***	0.085***	0.057***
	(11.9)	(15.9)	(11.5)	(14.0)	(8.8)
Lag Productivity * Lag Guarloan	**-0.007***	**-0.007***	**-0.004***	**-0.008***	**-0.001**
	(-3.9)	**(-4.7)**	**(-2.8)**	**(-4.5)**	**(-2.1)**
Observations	7,600,381	7,600,381	5,875,986	7,600,381	5,926,764
R-squared	0.058	0.058	0.049	0.068	0.047
Firm Controls (Size, Age, Profitability, Assets, Leverage)	YES	YES	YES	YES	YES
Firm Controls * Lag Guarloan	YES	NO	NO	NO	NO
Lag MFP * Macro Controls	NO	YES	NO	NO	NO
Country * Sector * Year Fixed Effects	YES	YES	YES	YES	YES

Note: T-statistics in parentheses; standard errors clustered at the firm and country by year level. Significance Level: *10%, **5%, ***1%. The dependent variable is employment growth, computed as the yearly difference in log employment. Lag productivity is the lag of log firm-level multi-factor productivity, estimated according the GMM Wooldridge (2009) approach, in specifications (1), (2) (3) and (5), while lag value added per worker in specification (4). Lag Guarloan is the lag of the guaranteed loans to GDP ratio in all specifications except that in model (5), where the amount of guaranteed loans is normalised with the stock of outstanding loans to SMEs. All specifications include country by sector by year fixed effects, as well as the constant and the following firm level controls: size classes, age, profit to turnover ratio, total assets, leverage ratio. Compared to the baseline estimates in the text, specification (1) includes the interactions of each firm level control with the lag guaranteed loans to GDP ratio, while specification (2) the interactions of productivity with financial development, trade openness, GDP growth, and a proxy for credit and labour markets regulatory burden – these macro controls are demeaned to ease the interpretation of the coefficients of interest. The analysis covers the 2007-2018 period in all models except model (3), in which the GFC period is excluded (i.e. sample from 2011 onwards).
Source: OECD calculations based on Orbis® data and OECD data.