CORPORATE SECTOR VULNERABILITIES FOLLOWING THE COVID-19 OUTBREAK: ASSESSMENT OF RISKS AND POLICY RESPONSES

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OECD
BETTER POLICIES FOR BETTER LIVES

COVID-19 and the corporate sector: An overview of our work at the OECD

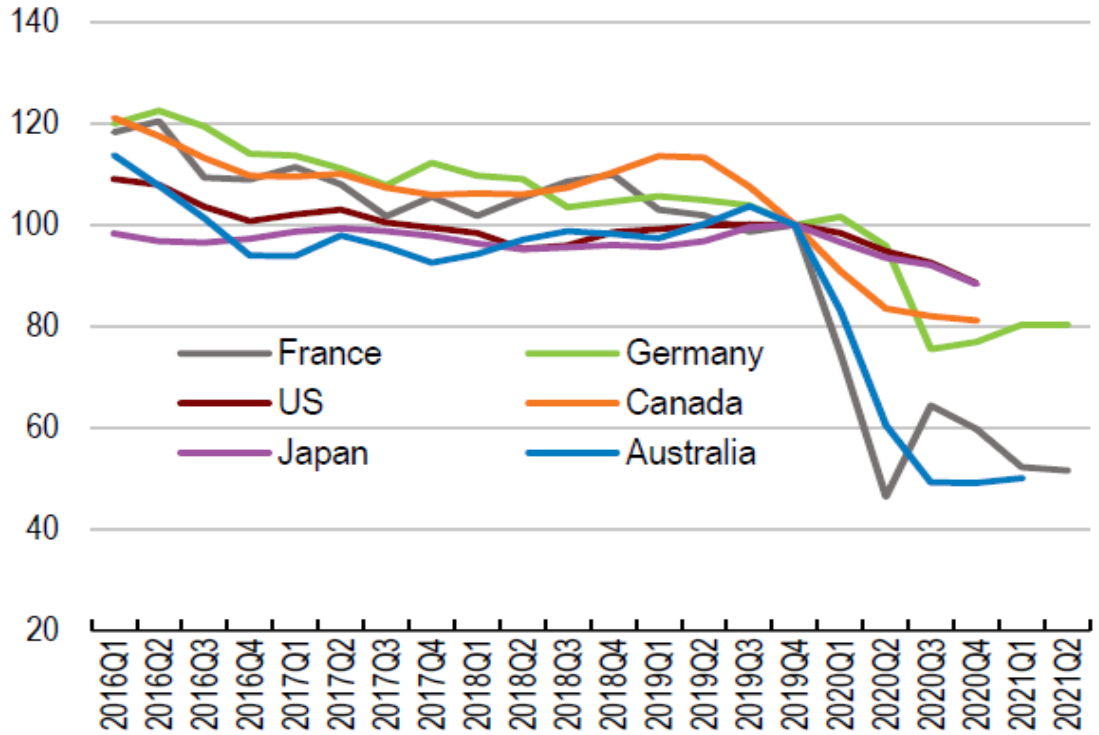
1. **Liquidity shortfalls during the COVID-19 outbreak**
   - Authors: L. Demmou, G. Franco, S. Calligaris and D. Dlugosch.
   - Forthcoming in Economie et Statistique; OECD Economics Department Working Papers No. 1647.

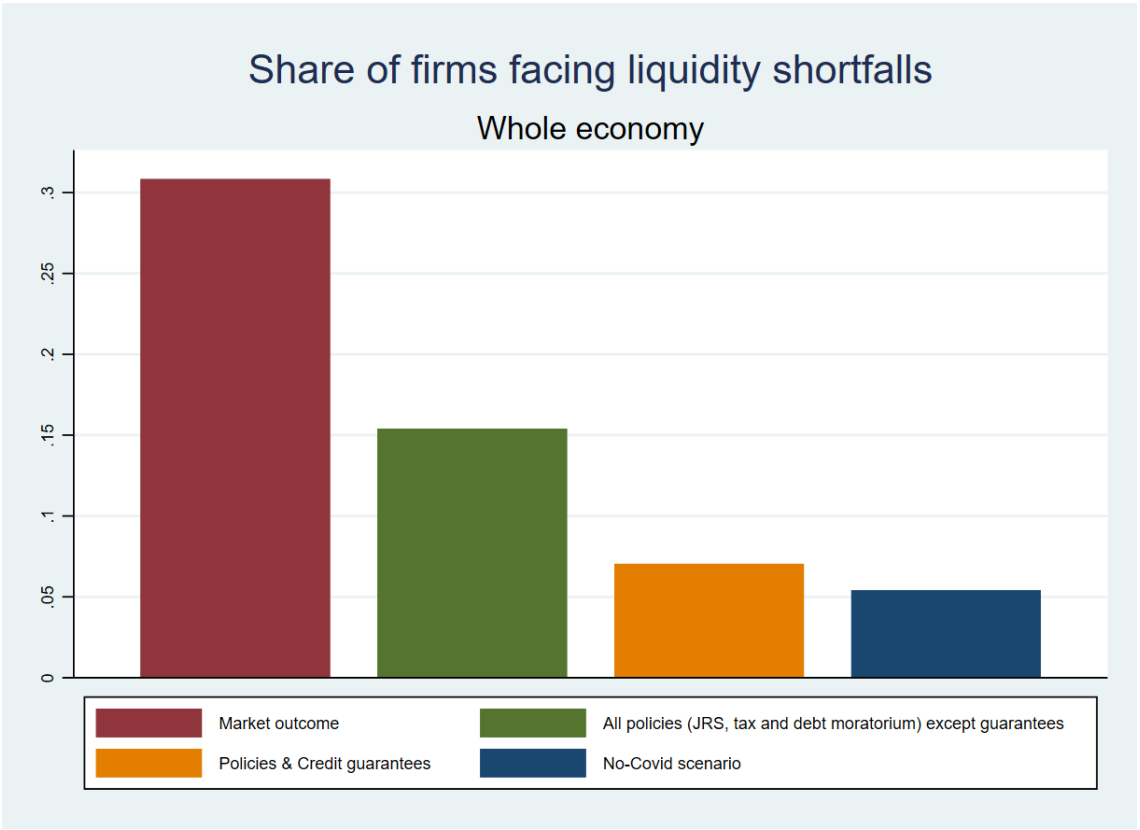
2. **Insolvency and debt overhang following the COVID-19 outbreak**
   - Authors: L. Demmou, S. Calligaris, G. Franco, D. Dlugosch, M. Adalet McGowan and Sahra Sakha.
   - Covid Economics, Issue 69; OECD Economics Department Working Papers No. 1651.

3. **From hibernation to reallocation: Loan guarantees and their implications for post-COVID-19 productivity**
   - Authors: L. Demmou, G. Franco.
   - OECD Economics Department Working Papers No. 1687.

Hibernation of the corporate sector

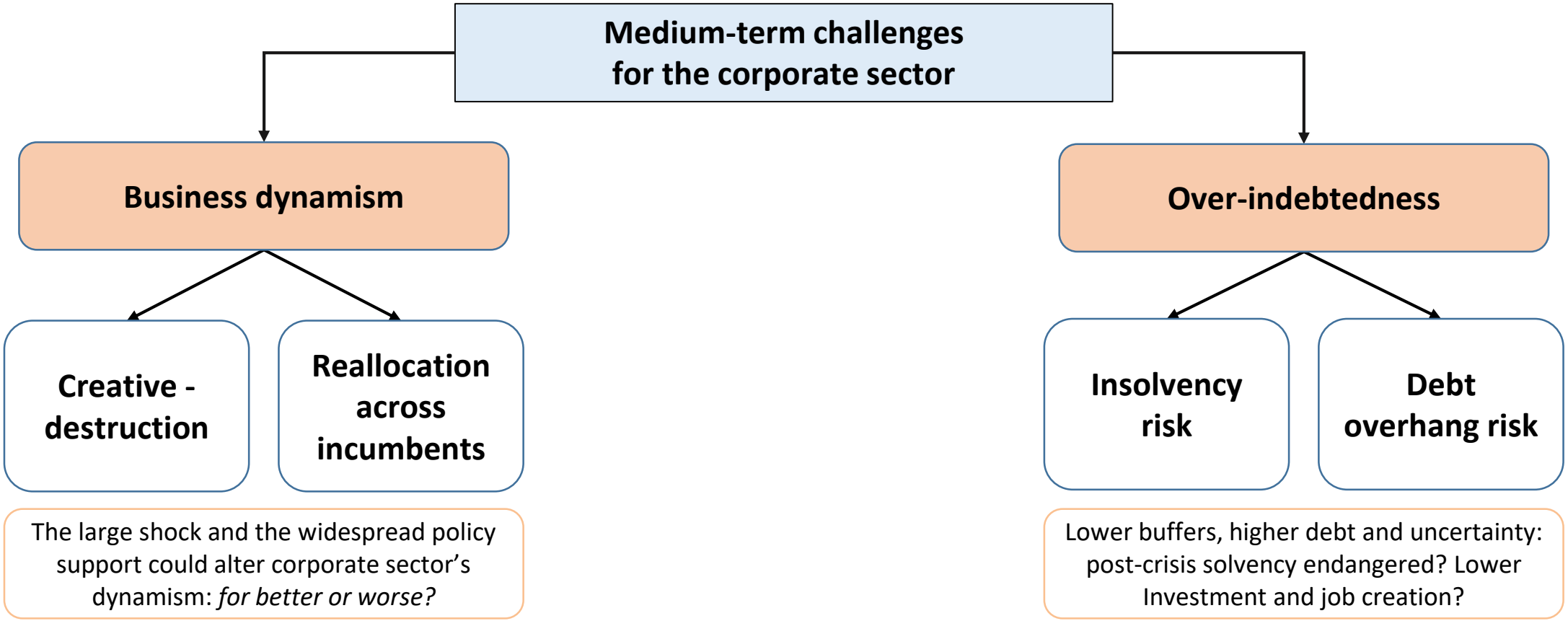
Bankruptcy index (2019Q4 = 100)





A swift response of policy makers has helped businesses to bridge the short-term liquidity shortfalls due to the COVID-19 outbreak and have kept a lid on bankruptcies in 2020.

The hibernation strategy does not come without risks

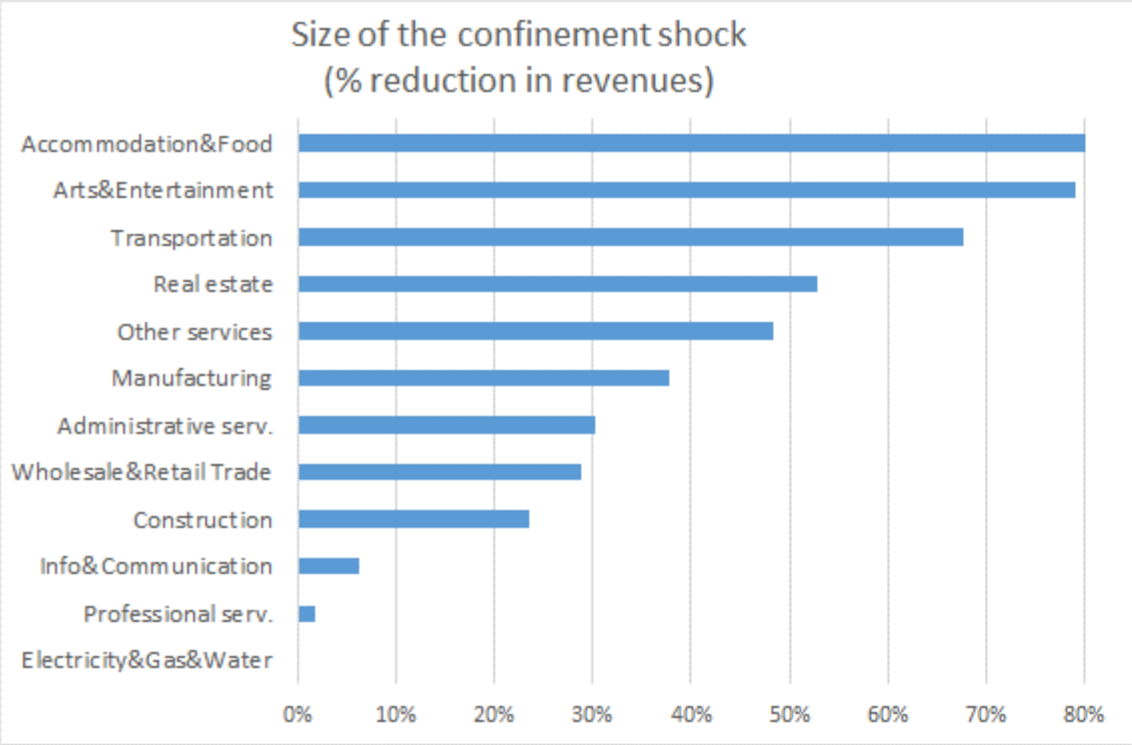


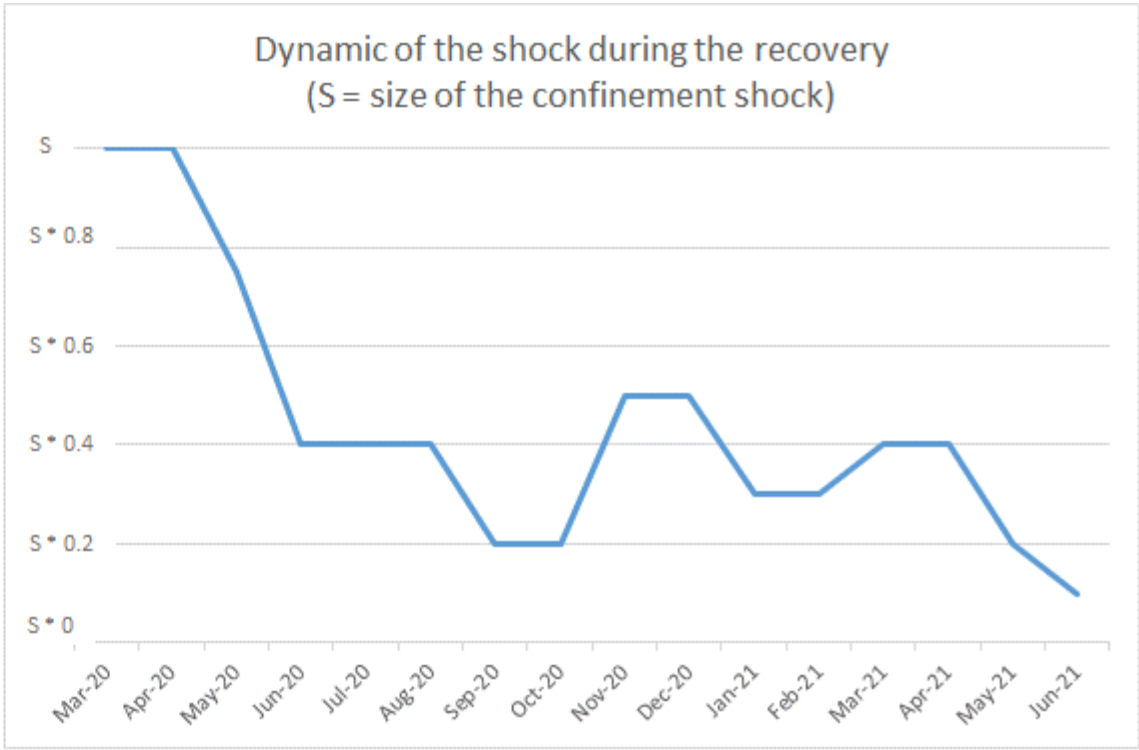
An effective exit strategy should aim at reducing these risks while preserving the benefits achieved so far.

A step back: methodological hints

Ingredient 1: granular shock

- Granular sector-specific demand and supply confinement shock (e.g., 3 to 4 digits).
- Dynamics of the recovery in line with the Economic Outlook.





Source: OECD calculations on del Rio-Chanona et al. (2020) (left panel) and OECD data (right panel).

Ingredient 2: firm level data

- **Orbis database,** the largest cross-country firm-level dataset available and accessible for economic and financial research.
- Around 1 million firms for the last available year (2018).
- Both manufacturing and non-financial market services for 14 well-covered countries.
  - BEL, DEU, DNK, ESP, FIN, FRA, GBR, HUN, IRL, ITA, POL, PRT, ROU, SWE.
- To ensure firms' comparability across countries and sectors, the data are prepared as in Gal (2013) and Kalemli-Ozcan et al. (2015).
  - Noteworthy, very small firms (less than three employees) were excluded to avoid data quality concerns.

Ingredient 3: a simple accounting model

- Simple **accounting exercise** in which the **economic shock** of the firm is modelled as:

Cash Flow Equation

- In turn, the **decline in firms' cash-flows and profits** is used to calculate:

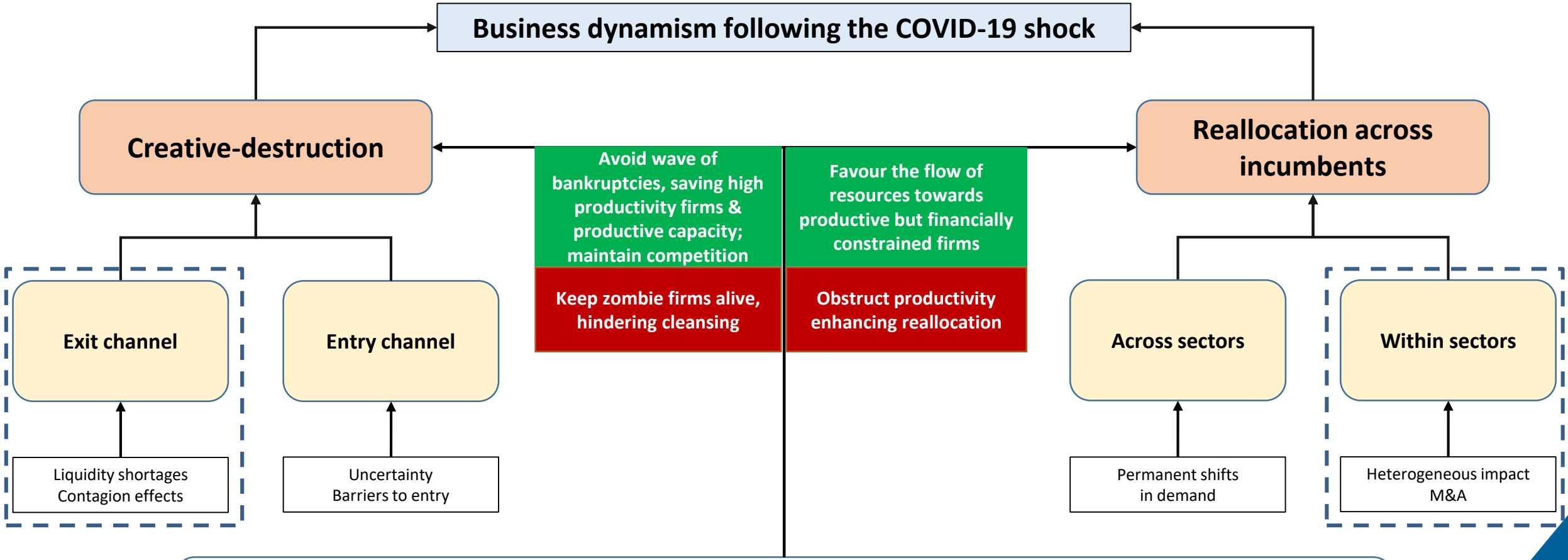
I. the **percentage of illiquid firms**, under different scenarios (i.e., No-COVID, COVID-19 absent policy support, COVID-19 with policies) Liquidity Equation

II. the **percentage of distressed firms** Insolvency Equation

III. the associated **increase in leverage ratios**

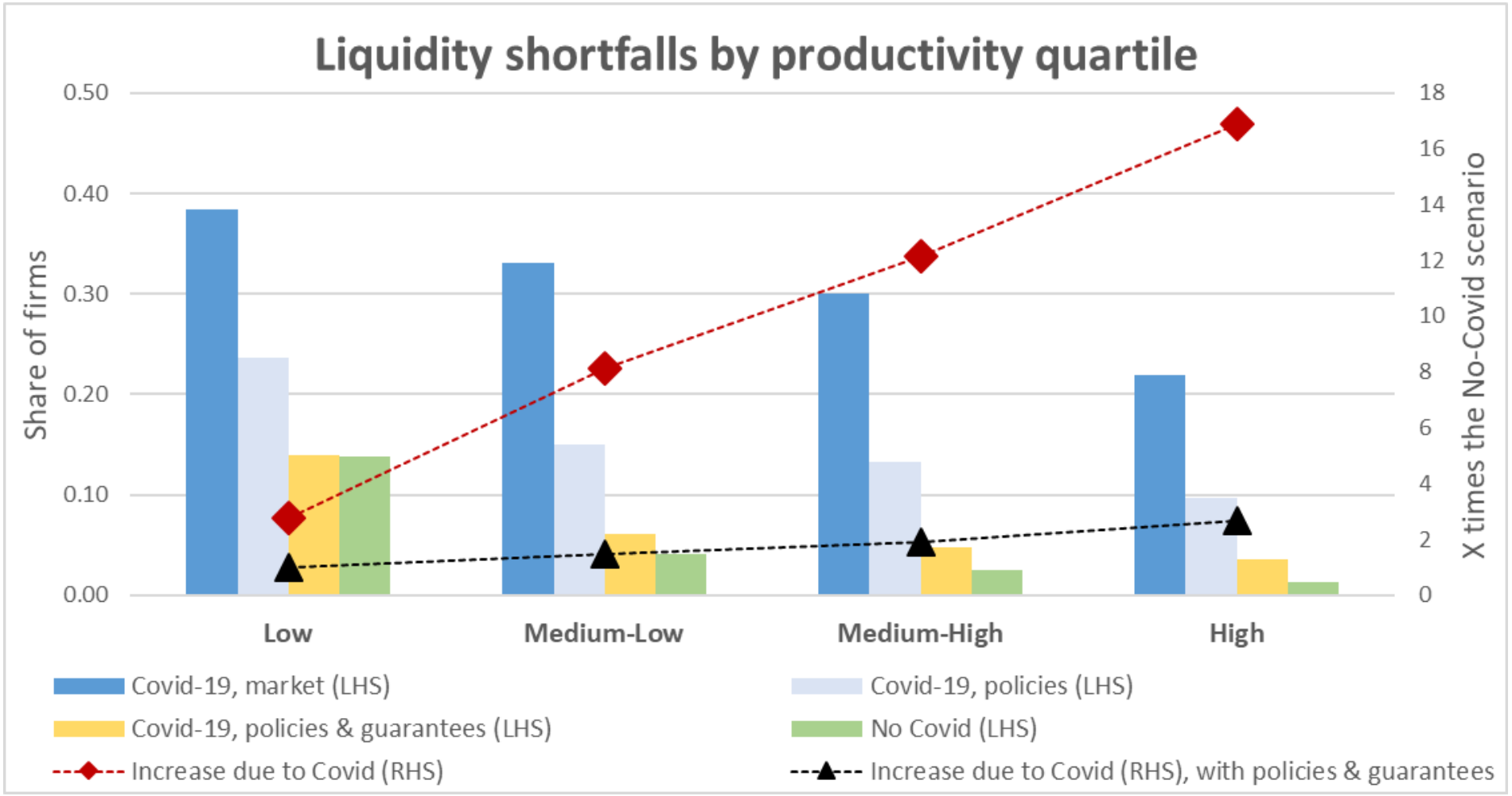
The business dynamism challenge

COVID-19, policies and business dynamism

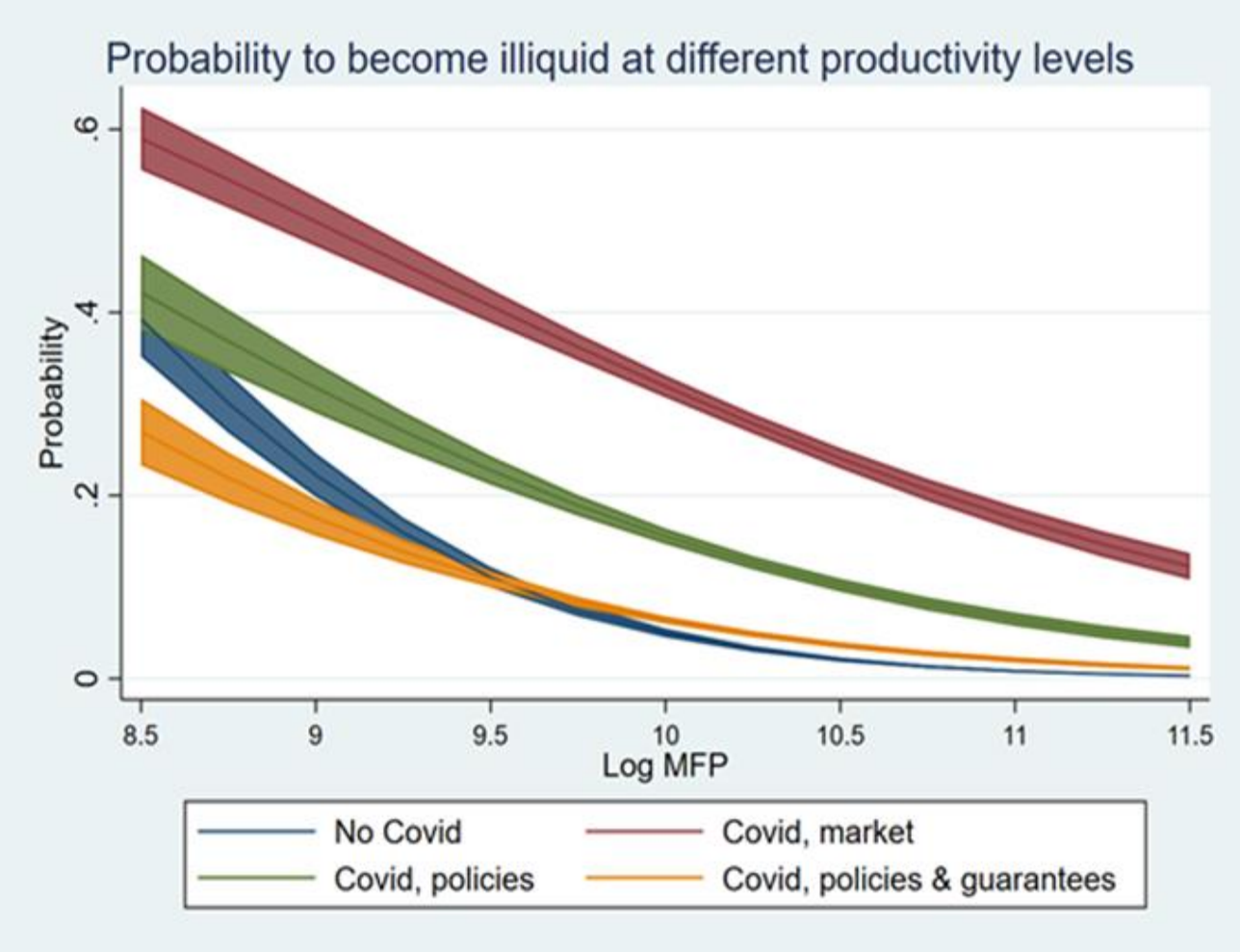


Hibernation strategy: widespread and fast government support -- timing more relevant than targeting (e.g. support to wage payments, tax and debt moratoria, loan guarantees, grants, equity injections)

The impact of the crisis on liquidity shortfalls conditional on firms' productivity



The market selection mechanism is hindered and policies contribute to repair it

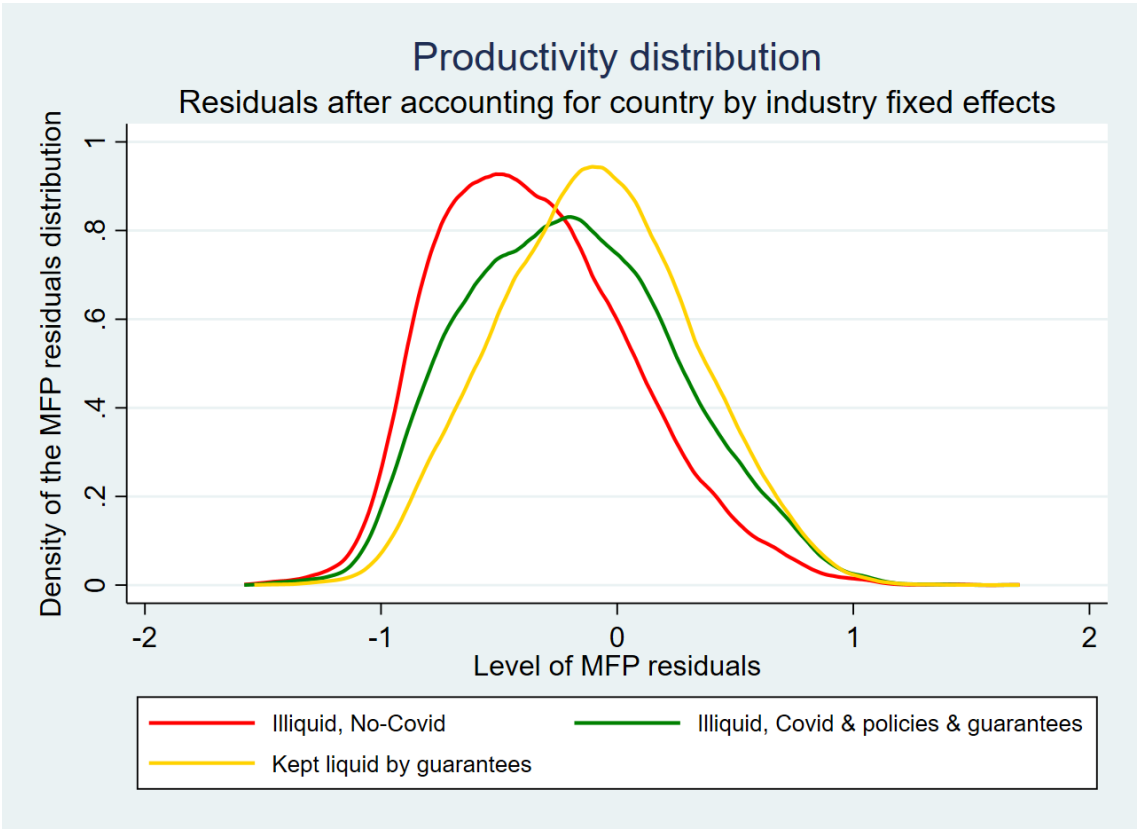


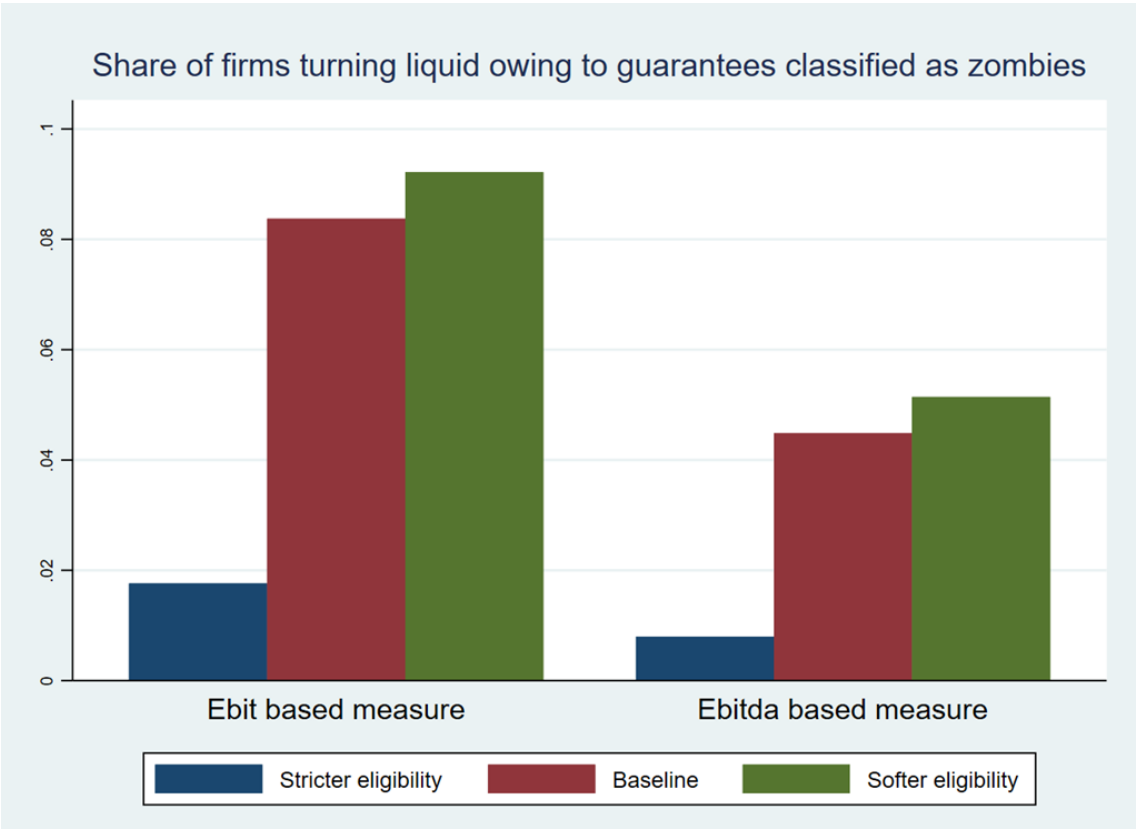
How did COVID-19 and related policies affect market selection mechanism?

1) The COVID-19 shock had the potential to seriously **distort market selection**.
2) Swift **policy actions corrected** part of the **inefficiency of market selection** in the short-term by
   - shielding many high productive firms from distress;
   - supporting zombie firms only to a limited extent.

Methods Reg Table

The short-term impact via the “business dynamism channel” The case of loan guarantees





Loan guarantees entail limited distortions in the short-term: hibernation rather than zombification

Misallocation risks over the medium-long run
The case of loan guarantees

Dependent Variable: Employment Growth or Debt Growth						
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable: growth of	Empl	Empl	Empl	Empl	Empl	FinDebt
Model	\	*Baseline*	*Small Prog*	*Large Prog*	*Intang*	*Baseline*
Lag MFP	0.049***	0.059***	0.029***	0.063***	0.063***	0.109***
	(251.9)	(12.9)	(9.5)	(10.8)	(11.4)	(12.1)
Lag MFP * Lag Guarloan		**-0.005*** **	**0.047*** **	**-0.007*** **	**-0.006*** **	**-0.015*** **
		(-4.2)	**(4.7)**	**(-4.1)**	**(-4.3)**	**(-4.7)**
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	4,716,344
R-squared	0.058	0.058	0.041	0.061	0.059	0.025
Firm Controls (Size, Age, Profitability, Assets, Leverage)	YES	YES	YES	YES	YES	YES
Control for Financial Demand	NO	NO	NO	NO	NO	YES
Country * Sector * Year Fixed Effects	YES	YES	YES	YES	YES	YES
Productivity * Country Fixed Effects	NO	NO	NO	NO	NO	NO

Overall, they could weaken the reallocation of resources from low to high productivity firms.

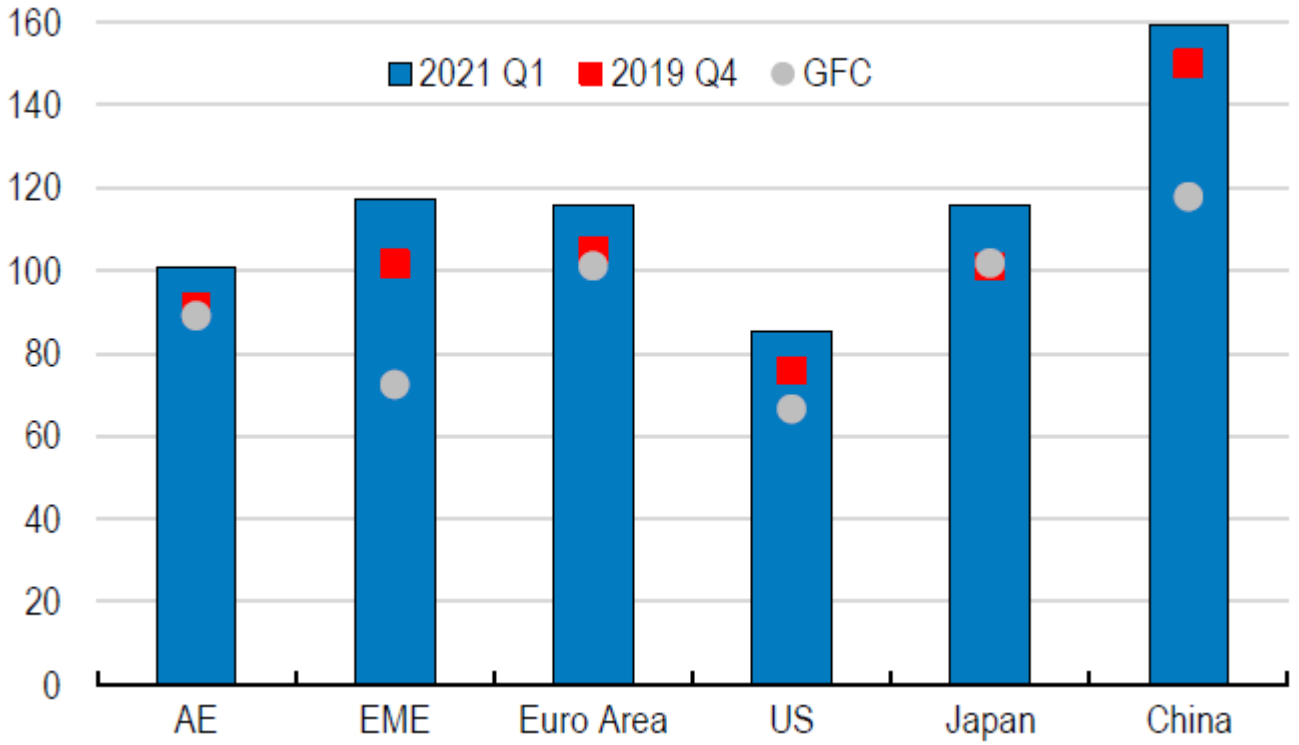
Note: T-statistics in parentheses; standard errors clustered at the firm and country-year level. Significance Level: *10%, **5%, ***1%.

Methods
Robustness

The over-indebtedness challenge

Rise in firms' indebtedness – *macro evidence*

Debt of non-financial corporations (%GDP)



Source: BIS data.

Why?

- Firms used credit lines to **cover liquidity needs** and/or **build** liquidity **buffers** for precautionary reasons.
- Many **policy packages featured debt instruments** – e.g. loan guarantee schemes.

Rise in firms' indebtedness – *our analysis*

Rise in indebtedness

Challenge 1

Enduring risk of a wave of insolvencies

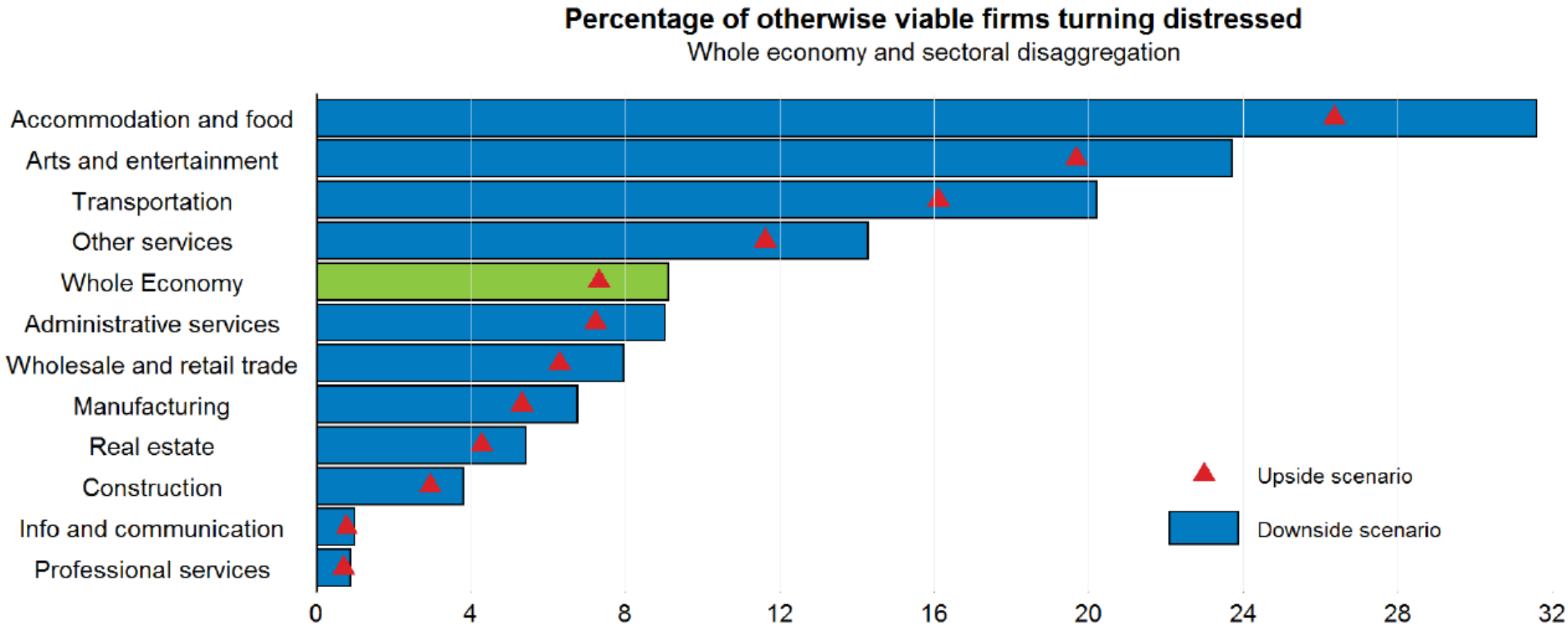
- Through the previously discussed simulation model, we show :
- **The evolution of profits** following the COVID-19 shock,
- and its consequences for firms **indebtedness and long-term solvency**;
- **Potential heterogeneities** across sectors and type of firms.

Challenge 2

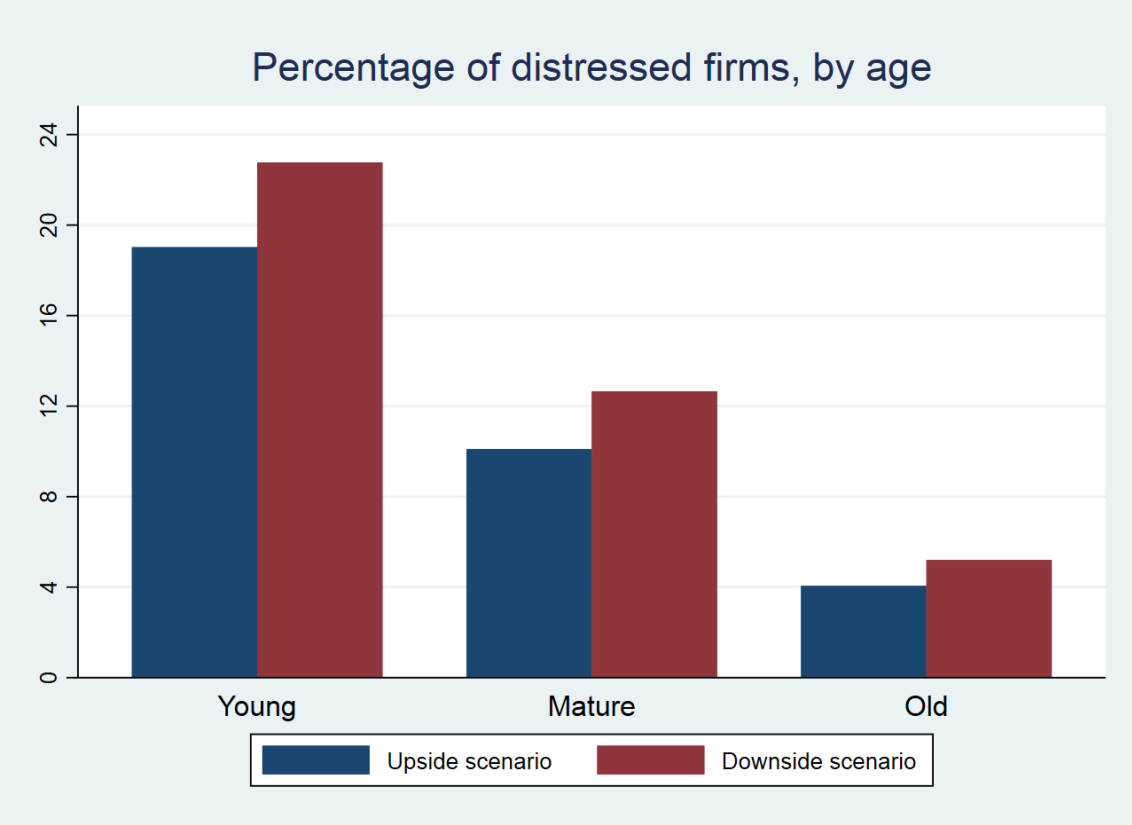
Debt overhang

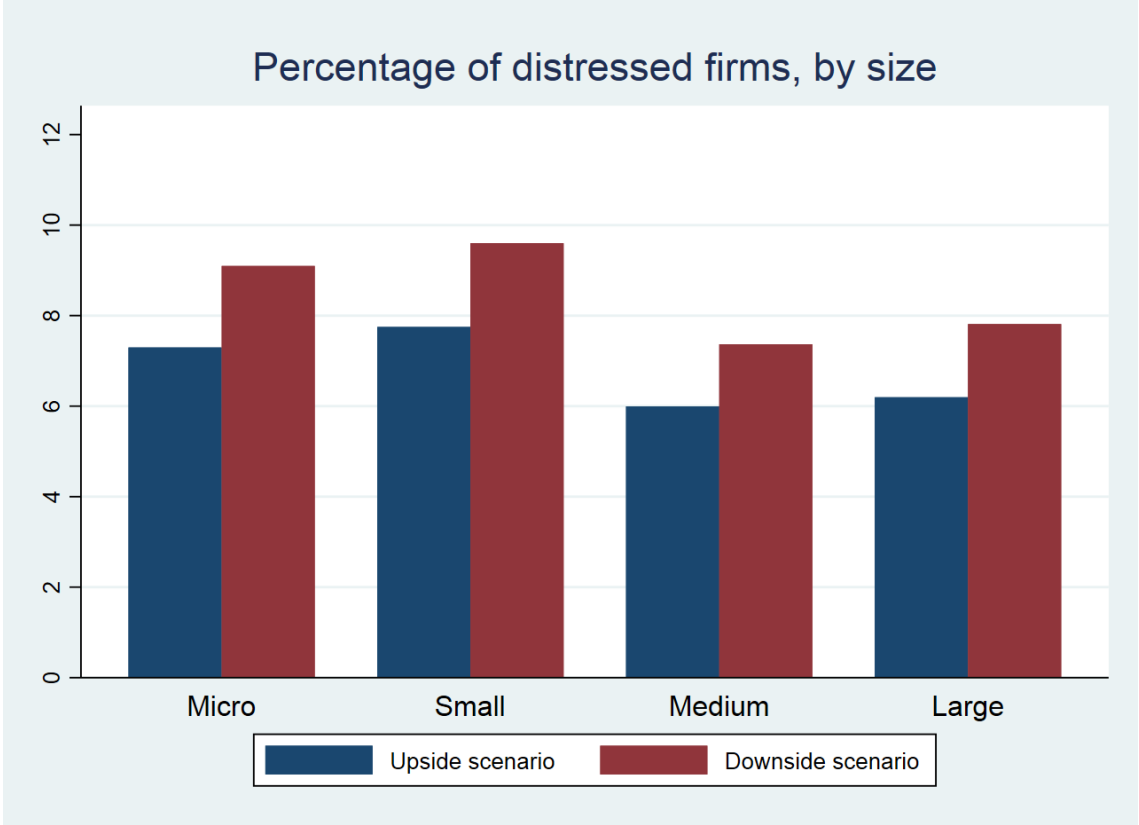
- **Insights on the potential impact of increased leverage on investment** following the COVID-19 outbreak from an empirical analysis of:
- The **historical relationship between firms' financial leverage and investment**; and
- The r**elationship** between firms' financial leverage and investment **during sharp downturns (GFC).**

Challenge 1: Insolvency risk
The solvency profile of many firms may deteriorate



Challenge 1: Insolvency risk
Old and large firms are less impacted

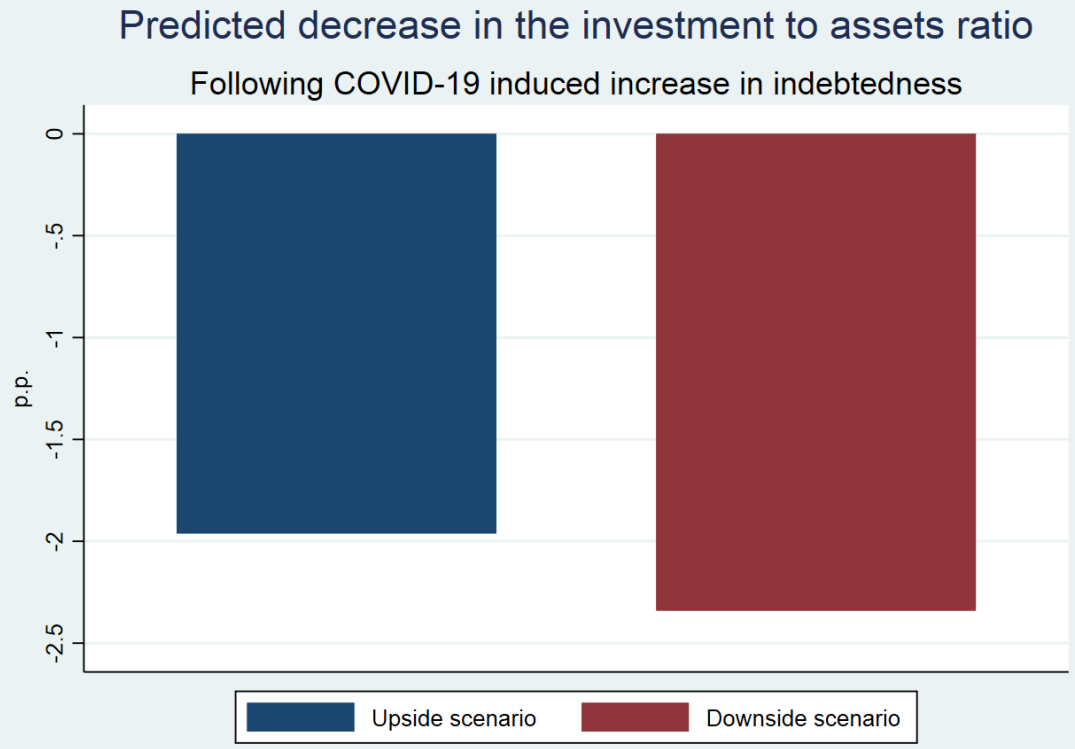




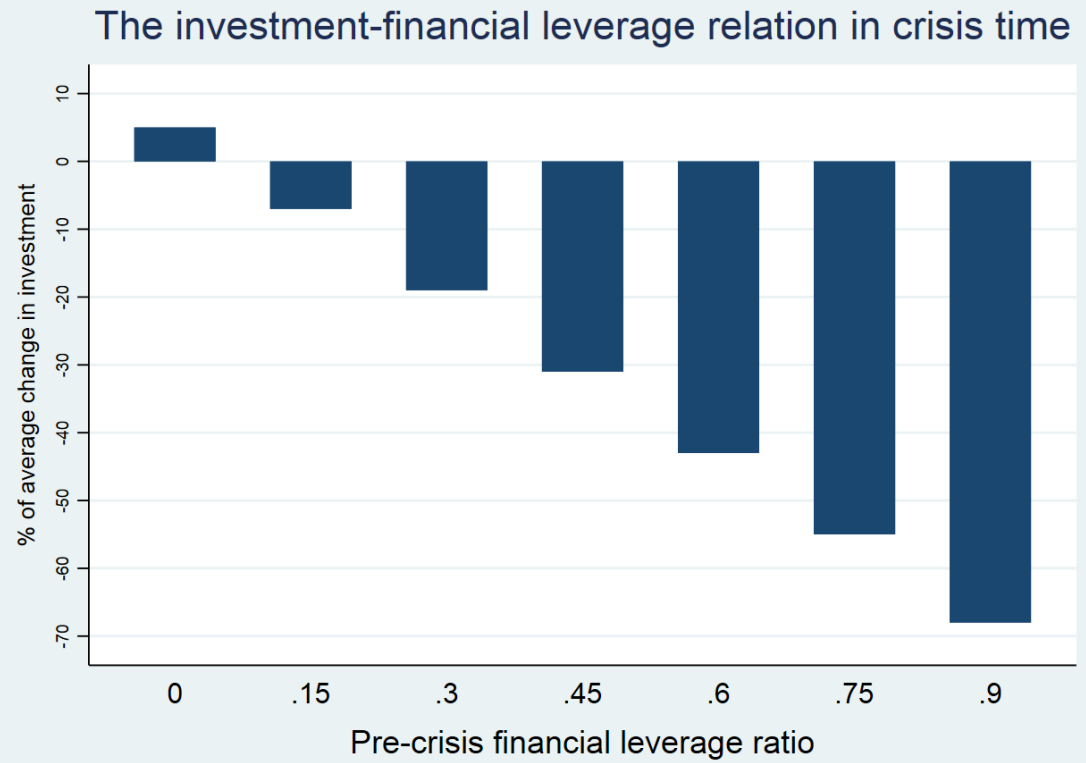
Why? Larger cash buffers, more favourable conditions to access external financing, higher ability to invest in and exploit digital technologies potential…

Challenge 2: Debt overhang
Insights from the historical debt-investment relation

- The COVID-19 shock is predicted to induce a significant increase in leverage, with the risk of depressing investment and job creation for long.



Methods 1



Methods 2

Policy discussion

Update COVID-19 related support

Deal with debt overhang

Complementary structural policies

Updating and phasing out COVID-19 related support

1 ***Preserve what has been achieved***

- **Uncertainty remains high**: new waves, GVC disruptions, post-crisis financial situation of firms, structural changes…
- Difficulties to **roll-over debt** in case of an inefficient exit strategy.

⇩

- Continue supporting firms in sectors which do not operate normally yet.
- Adopt specific arrangements to **ease reactivation** of support schemes if needed.

2 ***Reduce the risk of misallocation***

- **Limited targeting** may have benefited / continue to benefit **non viable firms.**
- Risk of **moral hazard** associated to generous support schemes.

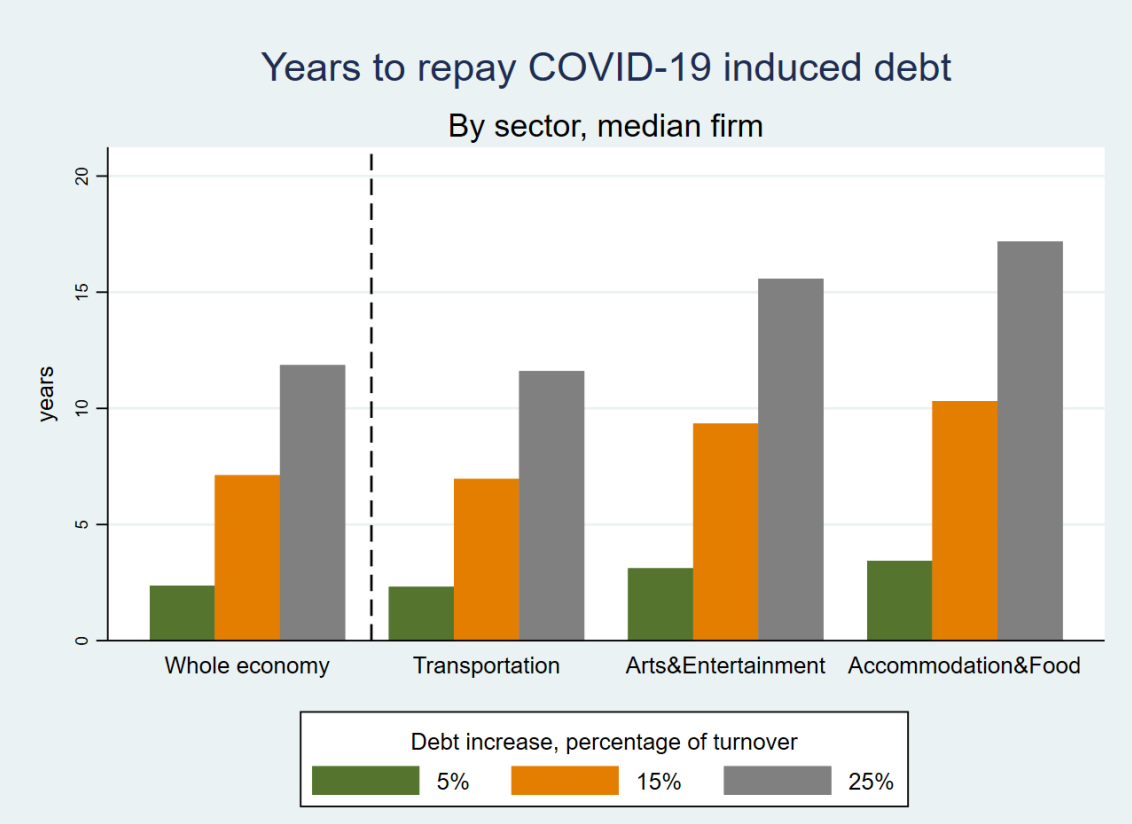
⇩

- **Target viable** firms and **hard-hit** sectors.
- Moral hazard/adverse selection**: transfer** of a **larger portion of risk** to the lender in credit guarantee schemes; progressively **increase the cost to access support schemes**.

Dealing with debt overhang

Challenges:

- Many firms may face **difficulties to repay** pandemic-induced **debt**.
- How to ensure **debt sustainability** in the medium to long term?



Policy options

Strengthen firms' equity

- **Turn loans into grants** (DEU, USA).
- **Repayment linked to business returns** (via future tax payments) (GBR).
- **Ensure equity markets continue to develop:** ACE, financial literacy, streamline listing requirements, Capital Market Union.

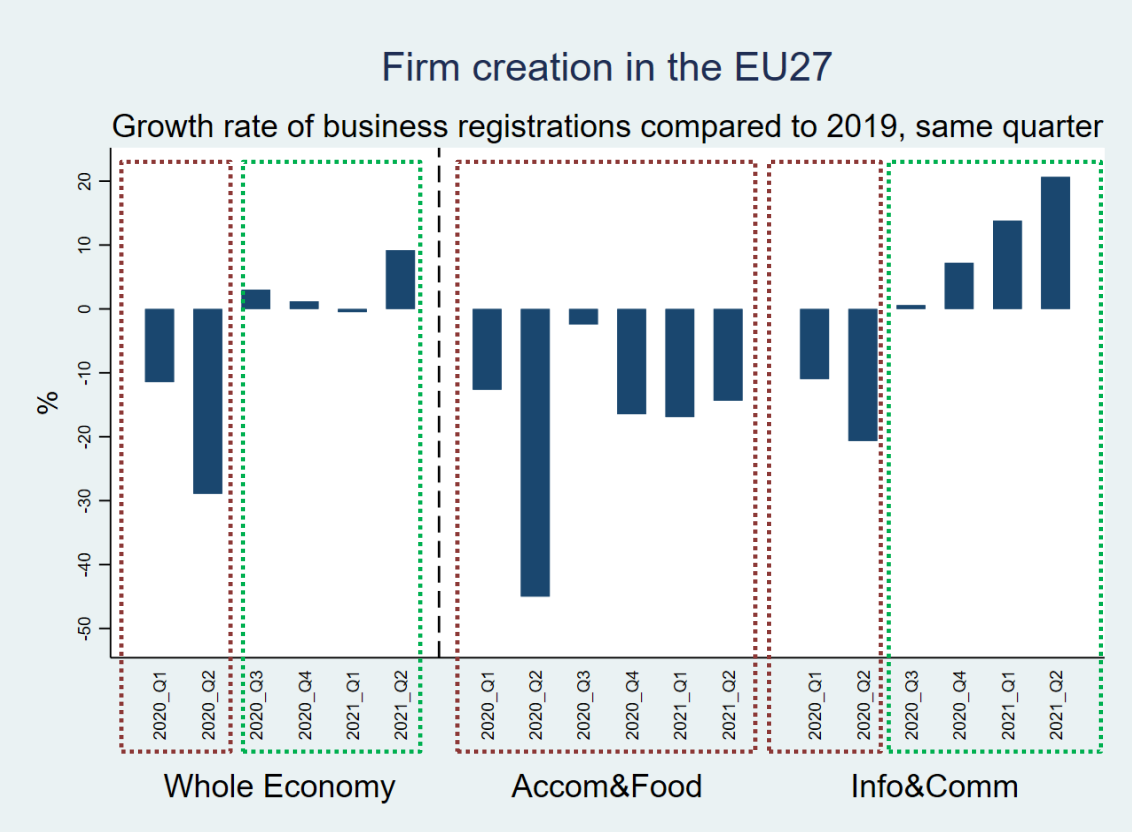
Early debt restructuring

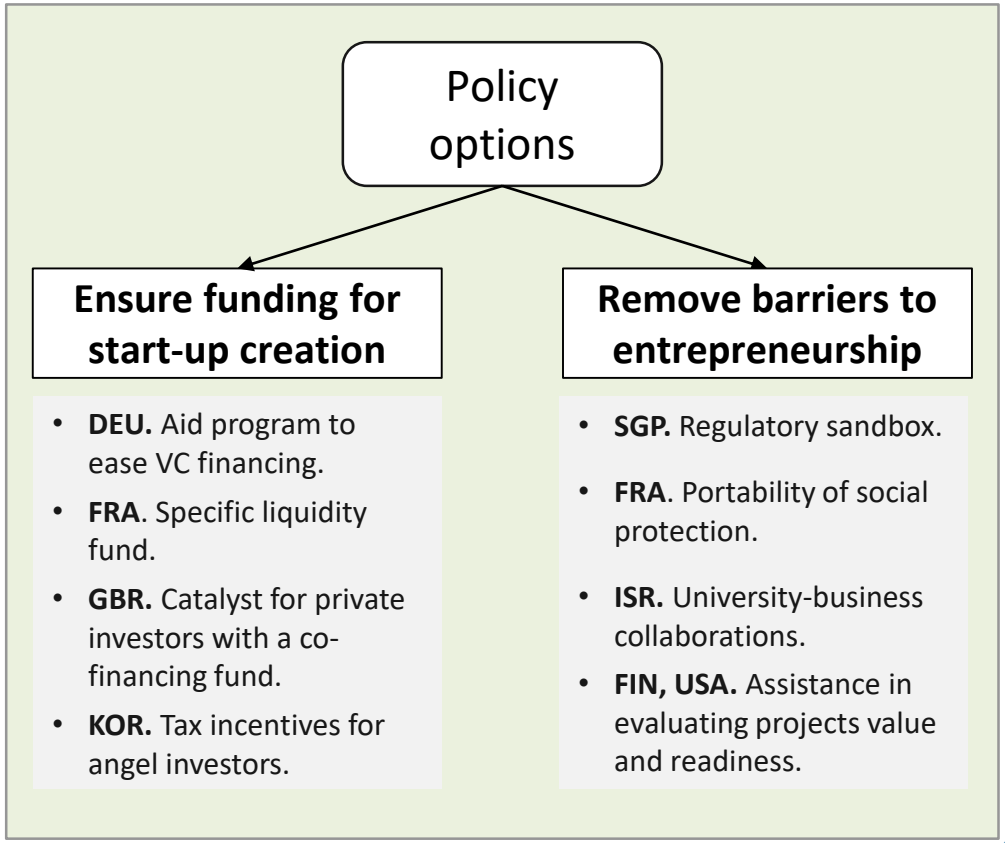
- **Reinforced network of consultations** to identify distressed firms (FRA).
- **Incentives for banks.**
- **Simplified** procedures and **out-of-court** agreements.
- **Efficient liquidation** procedures (EU).

Dynamism-enhancing structural policies: Boosting firms' entry

Challenges:

- Harness the **benefits of creative-destruction** while reducing its social costs.
- Rebound in entry rates: **new business opportunities**.



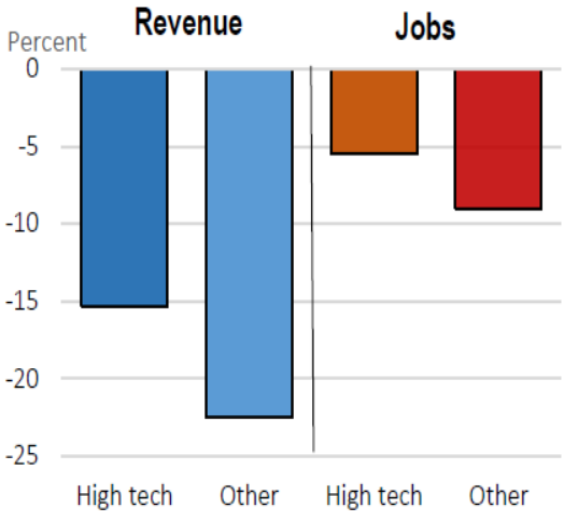


Complementary structural policies: Ensuring digital diffusion across all firms

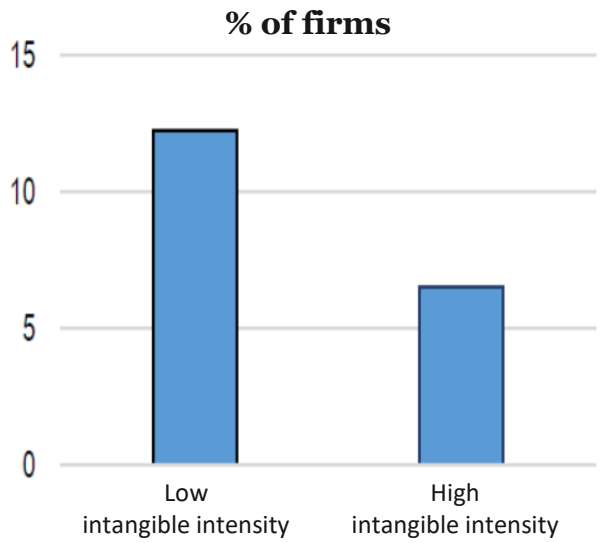
Challenges:

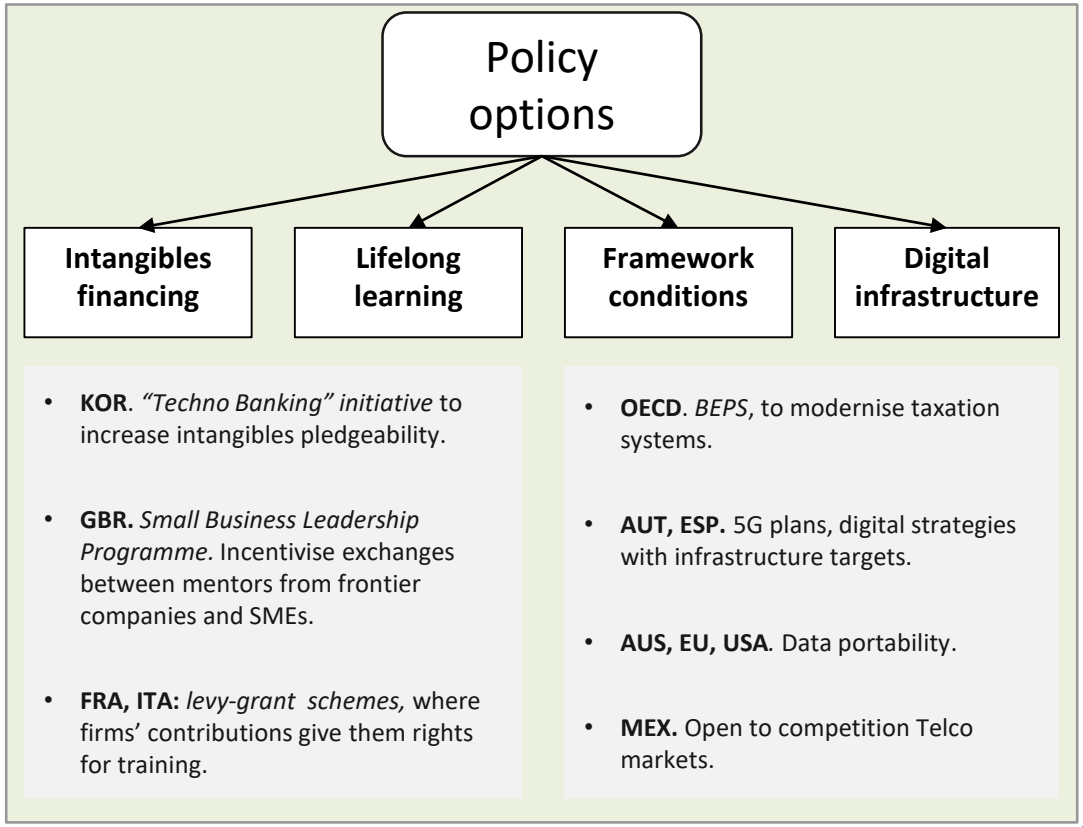
Digitalisation became a **matter of survival** for many firms, *but* **heterogeneity across firms** in the ability to access new technologies.

Change in firm performance high-tech vs non high-tech
February-May 2020



Percentage of otherwise viable firms turning distressed following the COVID-19 outbreak





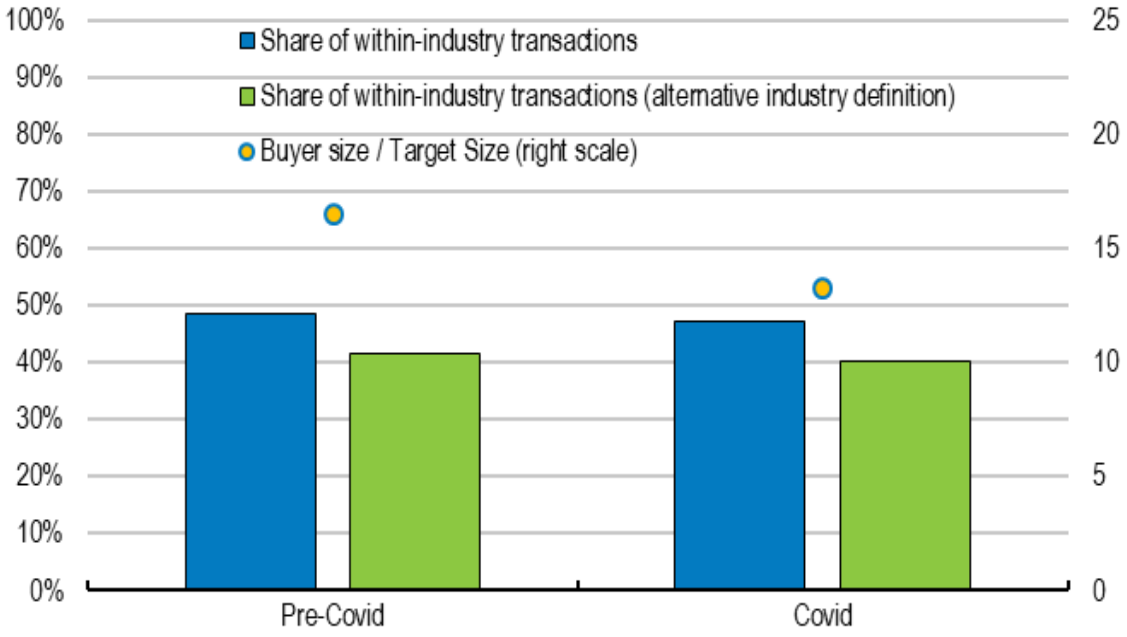
Source: OECD (2021), "Spurring growth and closing gaps through digitalization in a post-COVID world: Policies to LIFT all boats", OECD Publishing, Paris.

Complementary structural policies: Preserving competitive markets

Challenges:

- **Dominant firms more resilient** due to higher cash buffers and digital capacity.
- **Bankruptcies** of small firms and **distressed M&As** could hamper the competitive environment.

Within-industry M&A activity and median size difference



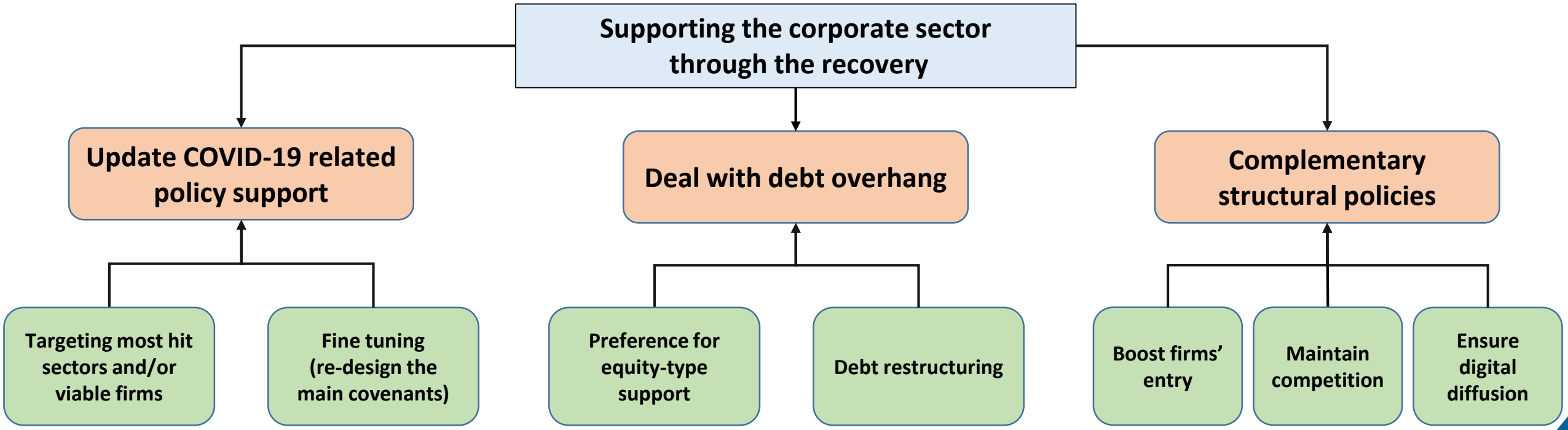
Implications of rising M&A and concentration are still debated: higher efficiency or lower competition?

Monitoring and understanding developments is critical

- M&A activity
- Market power
- Evolving regulations
- International coordination

- **USA.** Executive Order on Promoting Competition in the American Economy. Whole of government effort, coordinating 72 initiatives.
- **EU.** Digital Markets Act and the Digital Services Act, to level the playing field.

Pandemic policy: from hibernation to reallocation



Thank you!

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Annex

Ingredient 3: a simple accounting model
Details on cash flow calculations

The firm (*i*) and month (*t*) specific **shock-adjusted cash flow** is calculated as:

$$(1 - s_{st}) * Revenues_i - (1 - c * s_{st}) * Intermediates_i - (1 - w * s_{st}) WageBill_i - Taxes_i - DebtPayments_i$$

- Revenues, intermediates costs, wage bill, debt payments and taxation are annual values from "normal time" balance sheets (Orbis, 2018) divided by 12.

- s_{st}: **size of the sales shock**
  - *Sector specific, but country constant*. It *varies over time*, depending on the scenario.

- c: **elasticity of intermediates cost to sales**
  - Estimation on annual data close to unity; conservatively reduced to *0.8*.

- w: **elasticity of wage bill to sales**
  - Estimation on annual data around 0.4; conservatively reduced to *0.2*.

BACK

Ingredient 3: a simple accounting model
Details on liquidity calculations

- The **liquidity available** to each firm is 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:

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

- Firms face liquidity shortages when they run out of cash and are unable to cover operating expenses, taxes due and costs of existing debt.

- By running this exercise month by month, **we evaluate the share of firms that may enter a liquidity crisis following the introduction of confinement measures.**
  - Firms are assumed not to be able to tap into external sources of working capital (e.g. short-term bank loans, trade credit) when facing a liquidity shortfall.

BACK

Ingredient 3: a simple accounting model
Details on distressed firms calculations

- More specifically, the **hypothetical new value of equity** is obtained as:

$$PostCovidEquity_i = Equity_i - (Profits_i - CovidProfits_i)$$

  - Firms are **distressed** if their pre-crisis equity buffer is not enough to cover the decline in profits, i.e. **if their "Post-COVID Equity" is negative.**

- The post-COVID equity is directly related to the post-COVID leverage according to the following accounting relationship:

$$PostCovidLiabilities_i = PostCovidAssets_i - PostCovidEquity_i$$

  - Several assumptions could be made on whether the adjustment occurs on assets or liabilities. Results are **robust across specifications**.
  - *Most intuitive setting*: **firms deplete assets to cover losses, while increase liabilities to cover the remaining portion of the decline in profits.**

BACK

The productivity-liquidity relationship -- *methodology*

- Comparison of the **extent to which productivity is a predictor of firms' liquidity status in normal times and COVID-19 times** (without and with policy intervention)
- We estimate the following **logit model**:

$$Illiquid_{ics} = \beta_0 + \beta_1 MFP_{ics} + \beta_2 \boldsymbol{X}_{ics} + \delta_c + \delta_s + \epsilon_{ics}$$

- $Illiquid_{ics}$: dummy taking value 1 if the firm turns illiquid under a given scenario according to our simulation model, while zero otherwise.
- MFP_{ics}: measure of firm-level multi-factor productivity, computed as in Wooldridge (2009)
- $\boldsymbol{X}_{ics}$: set of firm level controls, including firms' size and age classes
- δ_c and δ_s stand for country and sector fixed effects.

BACK

The productivity-liquidity relationship -- *results*

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

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.

	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%.

BACK

Misallocation risks over the medium-long run
The case of loan guarantees -- *methodology*

- We augment the **canonical models of dynamic allocative efficiency** (Foster et al., 2016; Decker et al., 2017) and estimate the following equation over the 2007-2019 period:

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

  - $GrEmpl_{icst}$: employment growth.
  - MFP_{ics}: measure of firm-level multi-factor productivity, computed as in Wooldridge (2009).
  - $GuarToGDP_{c,(t-1)}$*:* ratio of guaranteed loans over GDP
  - $\boldsymbol{X}_{ics}$: set of firm level controls, including firms' size classes, age, total assets, leverage ratio and profitability.
  - δ_{cst} stand for country by sector by year fixed effects, controlling for any shock at the country-sector level.

- Consistency of the baseline tested through a wide range of robustness checks.

BACK

Misallocation risks over the medium-long run
The case of loan guarantees -- *methodology*

We test the robustness of our baseline findings by:

- Using *labour productivity* (i.e. value added per worker) in place of MFP;
- Replacing GDP with the *stock of outstanding loans to SMEs* to normalise the amount of guaranteed loans;
- *Excluding the GFC period* from the estimation sample (i.e. sample restricted from 2011 onwards);
- 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.

BACK

Misallocation risks over the medium-long run
The case of loan guarantees -- *robustness*

Dependent Variable: Employment Growth						
	(1)	(2)	(3)	(4)	(5)	(6)
Productivity variable	MFP	MFP	MFP	LP	MFP	MFP
Model	*FirmInt*	*MacroInt*	*T>=2011*	*Baseline*	*GuarloanStock*	*WithinVar*
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** **	**-0.013***
	(-3.9)	**(-4.7)**	**(-2.8)**	**(-4.5)**	**(-2.1)**	**(-1.8)**
Observations	7,600,381	7,600,381	5,875,986	7,600,381	5,926,764	7,600,381
R-squared	0.058	0.058	0.049	0.068	0.047	0.058
Firm Controls (Size, Age, Profitability, Assets, Leverage)	YES	YES	YES	YES	YES	YES
Firm Controls * Lag Guarloan	YES	NO	NO	NO	NO	NO
Lag MFP * Macro Controls	NO	YES	NO	NO	NO	NO
Country * Sector * Year Fixed Effects	YES	YES	YES	YES	YES	YES
Productivity * Country Fixed Effects	NO	NO	NO	NO	NO	YES

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The leverage-investment relationship -- *methodology*

- We investigate the historical relationship between firms' financial leverage and investment estimating a panel fixed effects model over the 1995-2018 period:

$$InvestmentRatio_{ics,t} = \beta_0 + \beta_1 FinLeverageRatio_{ics,t-1} + \beta_2 InterestCoverageRatio_{ics,t-1} + \boldsymbol{\beta_3 X_{ics,t-1}} + \delta_i + \tau_{cst} + \varepsilon_{icst}$$

where:

- *i, c, s, t* stand for firm, country, sector and time, respectively.
- $InvestmentRatio$ is the ratio between investments at time *t* and total fixed assets at *t-1.*
- $FinLeverageRatio$ is the ratio between financial debt and total assets of firm *i* in *t-1.*
- $InterestCoverage$ is the ratio between total profits and interest expenses of firm *i* in *t*-1.
- The vector $\boldsymbol{X}$ includes a set of firm level controls: log of age, log of size, cash holdings over total assets and ROA at *t-1*, and sales growth at time *t.*
- δ_i are firm fixed effects, while τ_{cst} are country by sector by time dummies.

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The leverage-investment relationship – *methodology (cont'd)*

- We investigate the **relationship between firms' financial leverage and investment during sharp downturns** estimating a cross-sectional model comparing the pre and post GFC period:

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

where:

- Notations are consistent with the previous equation.
- All variables are expressed as **first differences between the average levels in the post GFC period** (2008-2013**) and the average pre-GFC** (2002-2007) **levels.**
- τ_{cst} are country by sector dummies.

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