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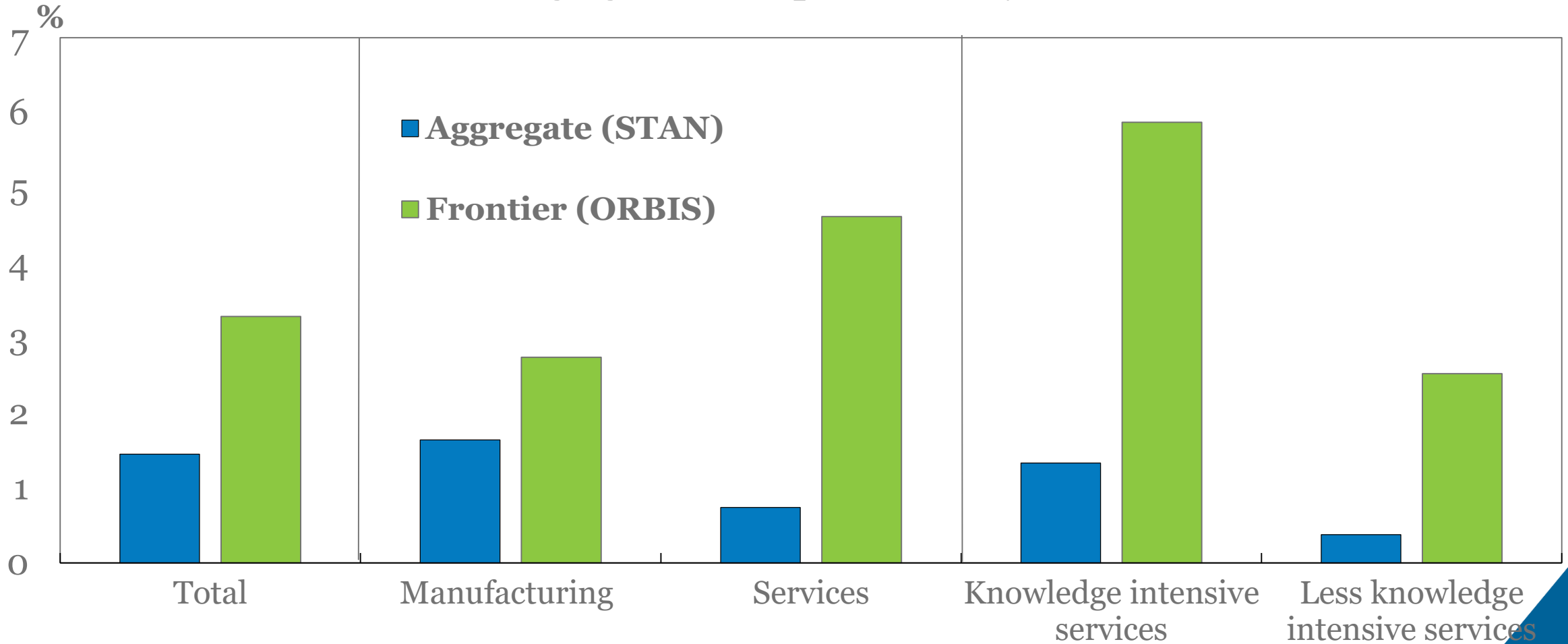
MODELLING TOOLS FOR POLICY SUPPORT IN (REAL) TIME OF CRISIS

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Frontier growth has not prevented weaker *aggregate* growth

Annual average growth of productivity (2007-2018)





COVID-19 impact on the link between reallocation and productivity: Cleansing or scarring?

- **Hypothesis 1: Cleansing effect => Strength of reallocation-productivity link remain intact (or potentially even improves)**
 - COVID-19 forced a wave of experimentations with “novel modes of business, work, consumption and communication” and accelerated digital transformation (Barrero et al 2020; Nadella, 2020)
 - High productivity firms (better managed) more able to accommodate TW and adapt business model to social distancing: Advantage to most efficient firms (Caballero and Hammour, 1998)
- **Hypothesis 2: Scarring effect => COVID-19 shock severely disrupted the typical reallocation process**
 - Exogenous (health) shock and arbitrary lockdowns affected all firms, regardless of productivity
 - **Hibernation**: Broad-based access to JRS severed reallocation-productivity link
 - **Credit frictions**: Productive but financially fragile firms to contract due to liquidity shortages



TIMELY EVIDENCE ON THE STRENGTH OF THE REALLOCATION-PRODUCTIVITY LINK DURING COVID-19 AND THE ROLE OF POLICY SUPPORT:

- **A (SIMPLE) MODEL-SIMULATION APPROACH**
- **REAL TIME DATA ANALYSIS**

Demmou and Franco (2021), “From hibernation to reallocation: loan guarantees and their implications for post-COVID-19 productivity growth” OECD working paper No. 1687

Andrews, Charlton and Moore (2021), COVID-19, productivity and reallocation: Timely evidence from three OECD countries “ OECD Working paper No. 1676



COVID-19 and firms financial fragilities: A model simulation approach

MOTIVATION

- The COVID-19 outbreak has led public authorities to take unprecedented measures to contain the propagation of the virus.
- But a swift and unprecedented policy intervention has led to the preservation of the corporate sector.
- Three main type of policies implemented:
 - Standard policy package (job retention scheme, debt moratorium, tax deferral).
 - Direct grants
 - Loan guarantee programmes



OBJECTIVES

1. Provides quantification of the potential scarring effects
2. Evaluate the extent to which firms may run into a **liquidity crisis**, focusing on the first-round effects of the containment measures.
3. Evaluate the productivity profile of firms saved by credit guarantees.



Methodology (1): modelling the economic shock

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, 2016) divided by 12.
- s_{st} : **size of the sales shock (based on del Rio-Chanona et al., 2020)**
 - *Sector specific, but country constant. It varies over time, depending on the scenario.*
 - Between 50% and 100% in the most hit sectors (see OECD, 2020), while 15% (or 30%) in most other sectors.
- 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.



Methodology (2): Calculate firms liquidity positions

- 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, **the share of firms that may enter a liquidity crisis following the introduction of confinement measures is evaluated.**
 - 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.



Methodology (3): Looking at the productivity profile of firms “saved” by policies

To investigate the potential productivity impact of the crisis, we explore the extent to which productivity is a predictor of firms’ liquidity status in normal times and COVID-19 times (without and with policy intervention):

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

$Illiquid_{ics}$: 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 (Wooldridge (2009) approach)

X : denotes a set of firm level controls, including firms’ size and age classes

δ_c and δ_s stand for country and sector fixed effects.

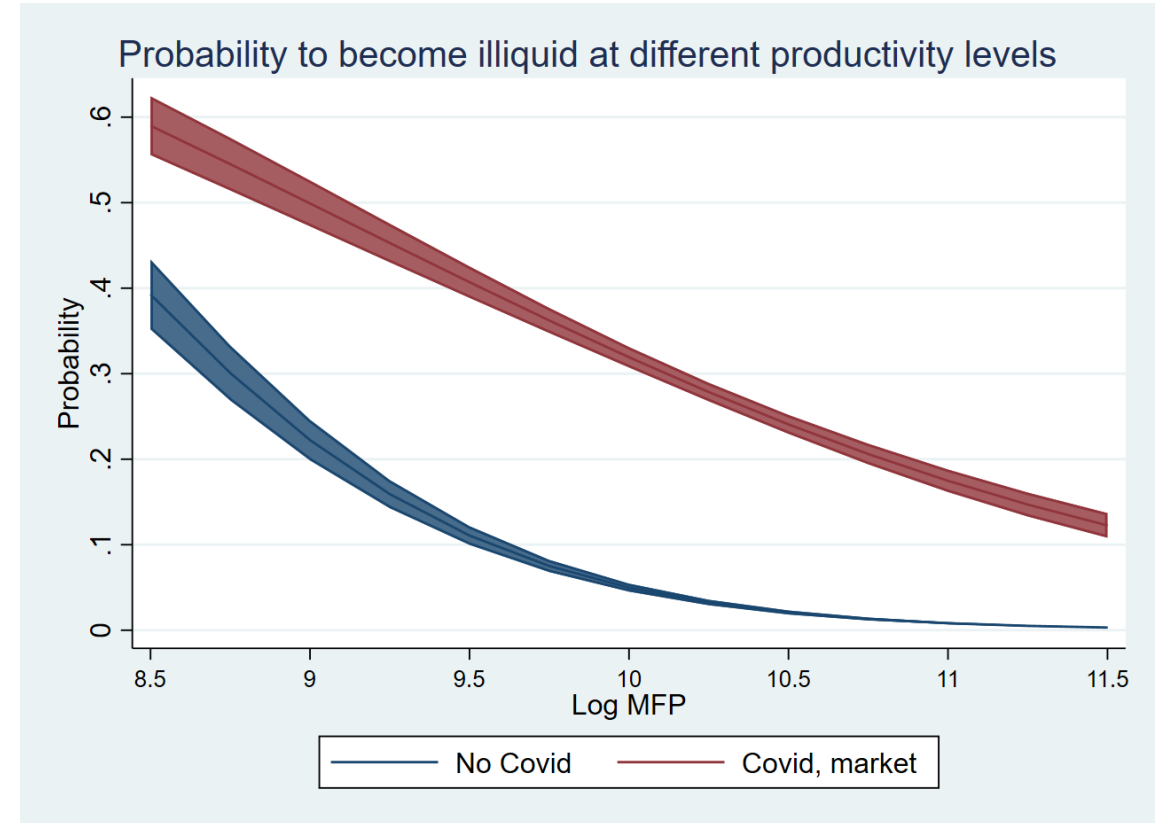
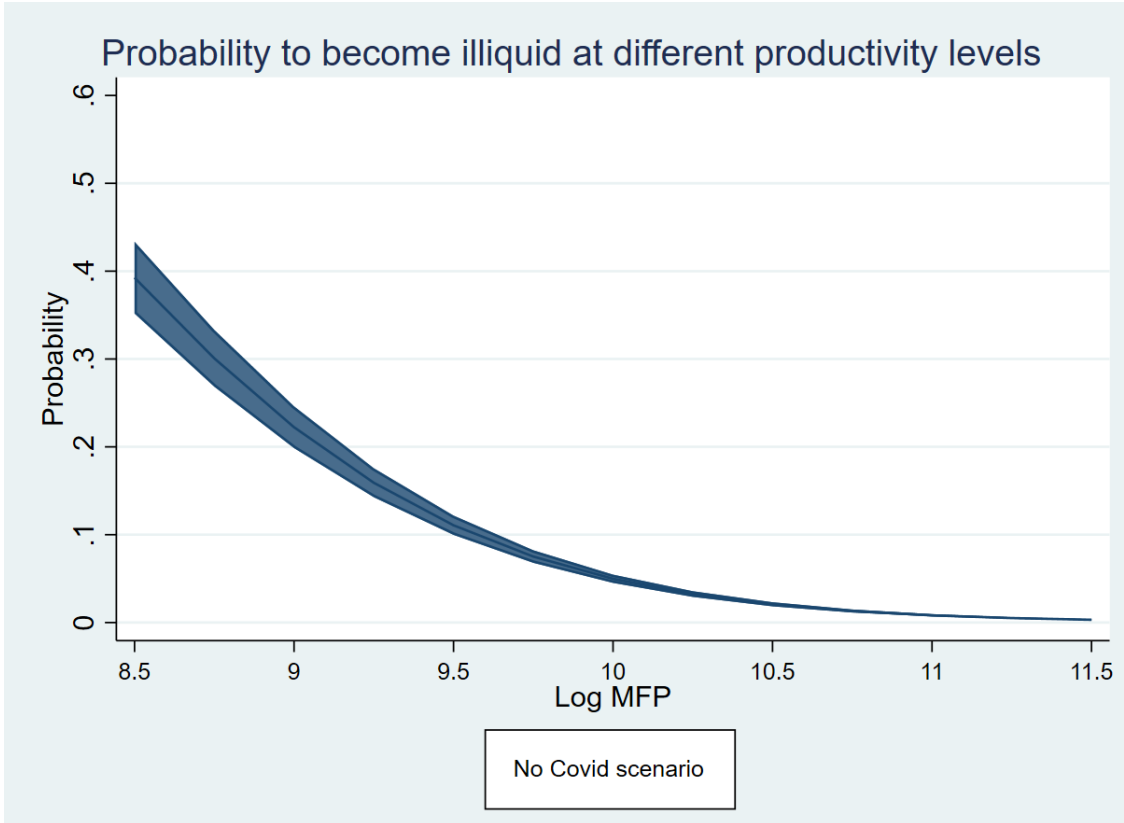


The market selection mechanism is hindered and policies contribute to repair it

	<i>Dependent variable: Dummy for illiquidity</i>			
	(1) No-Covid	(2) Covid, market	(3) Covid, policies	(4) Covid, policies & guarantees
MFP	-1.952*** (-25.3)	-0.946*** (-16.4)	-1.074*** (-16.2)	-1.238*** (-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

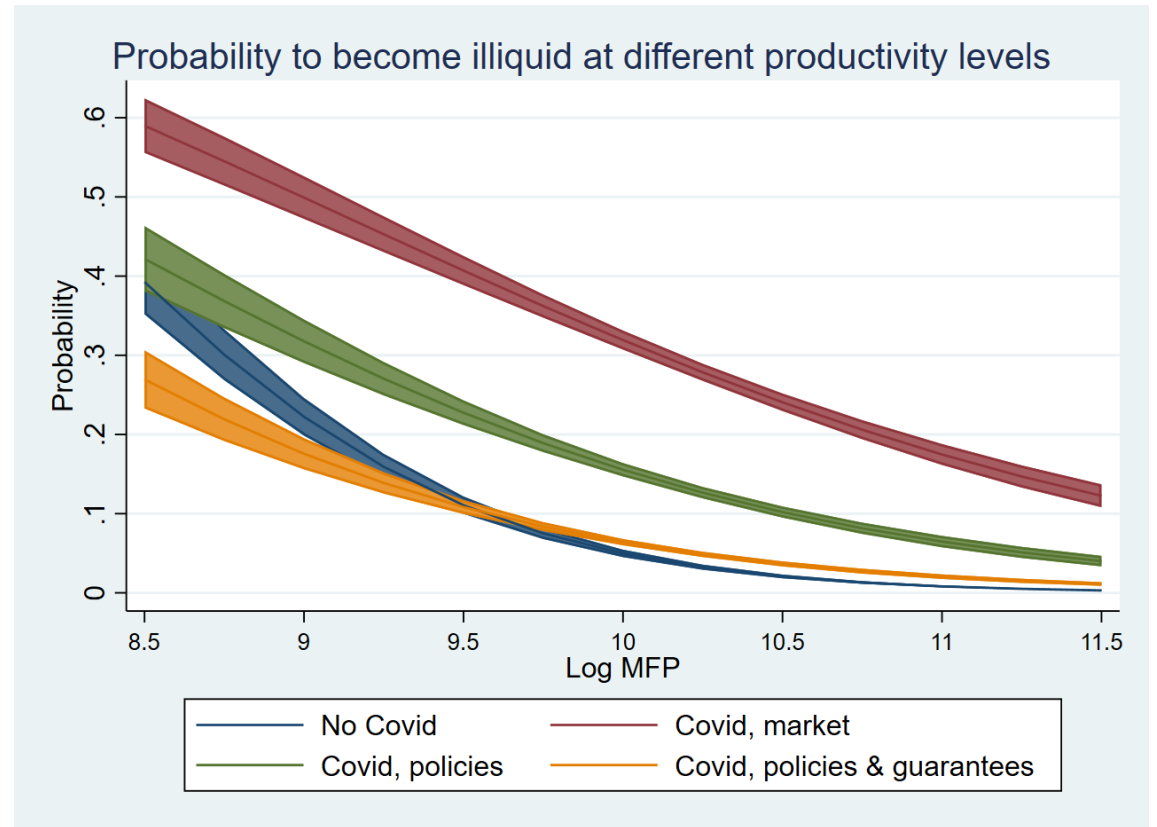
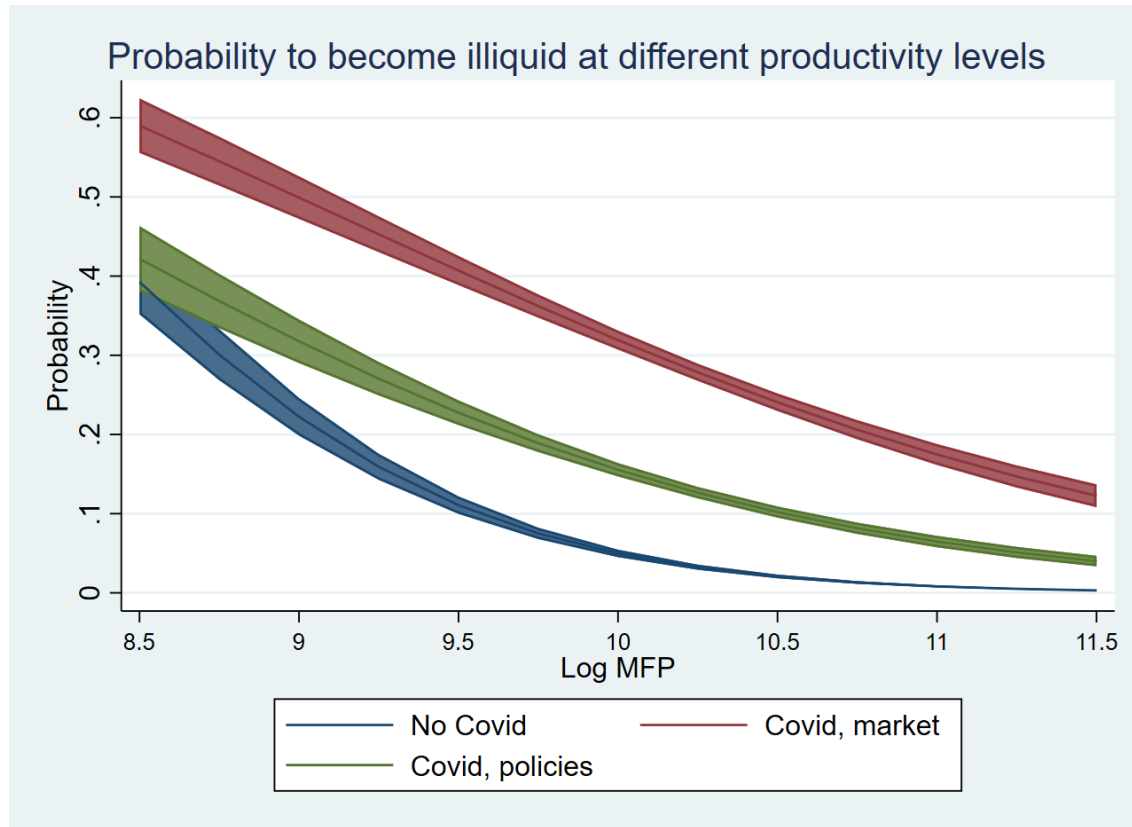


The market selection mechanism is hindered and policies contribute to repair it





The market selection mechanism is hindered by the shock and policies contribute to repair in part

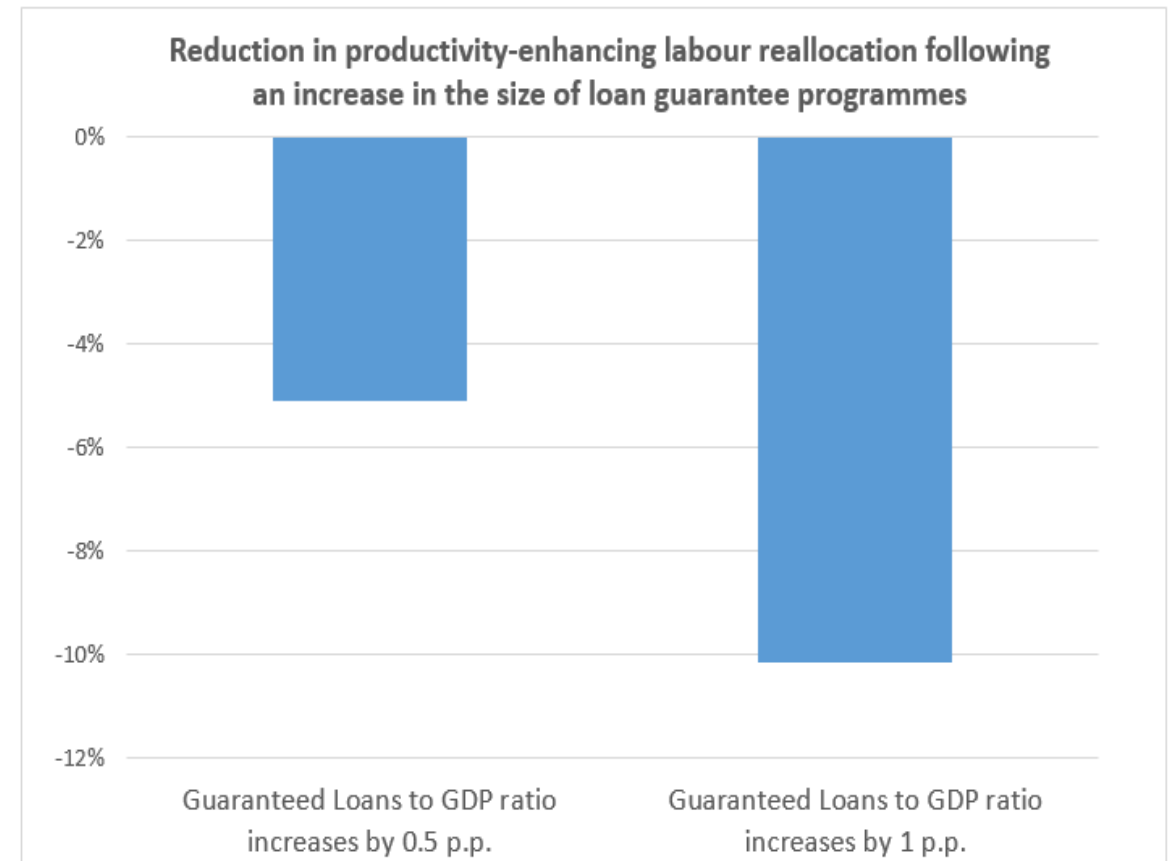
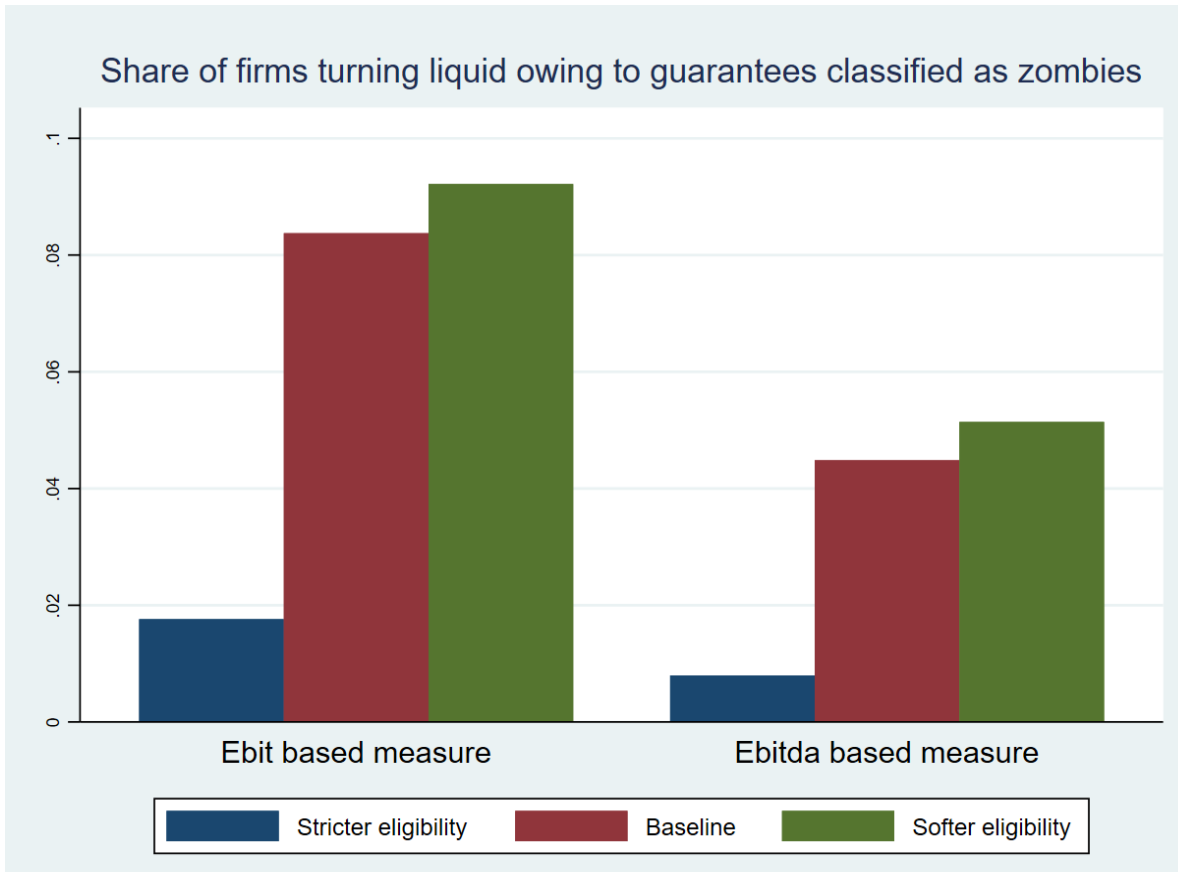




Risks of distortions from loan guarantee programmes: Evidence from the post-GFC experience

Loan guarantees have benefited zombies only to a limited extent...

...But larger programmes lead to a reduction in the productivity-enhancing effect of reallocation





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Real-Time Cloud Data from Xero Small Business Insights: Evidence from 3 countries

Objective: Explore impact of COVID-19 on the extent of reallocation and link to productivity.

Xero

- Cloud-based accounting software platform
- More than 2.7 million small business subscribers globally
- High market share in Australia, New Zealand and UK

Rich employer-employee dataset

- Accounting data on firm outcomes (e.g. revenue) at monthly frequency
- Payslip-level data for firms that use Xero to manage payroll (wages, hours, worker characteristics, employment basis)
- Other Xero-specific data – such as use of ecommerce apps
- Data are anonymised and (partly) aggregated to ensure customer confidentiality

Data cleaning

- Remove firms with little activity or non-economic entities (e.g. trusts)
- Winsorise labour productivity at 1%

Representativeness

- Broadly representative by size and industry
- Does select towards younger and more technology-enabled firms

Earlier evidence from recessionary episodes in the US from the 1940s to early 2000s is supportive of cleansing hypothesis

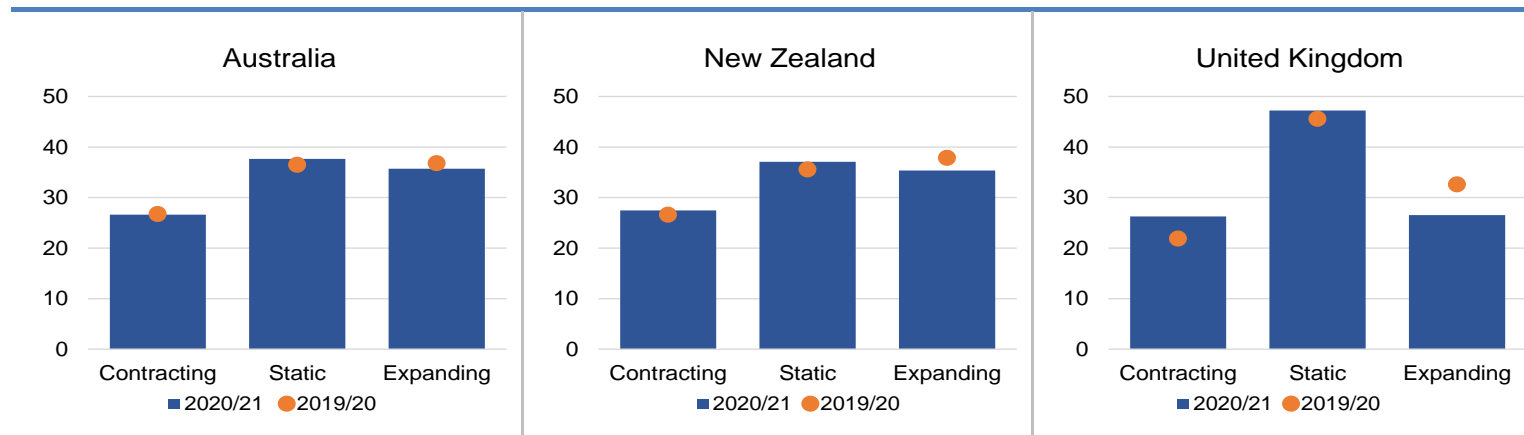
But evidence from GFC less so: reallocation fell with the decline in job creation outweighing rise in job destruction and link to productivity was weaker, especially for young firms.



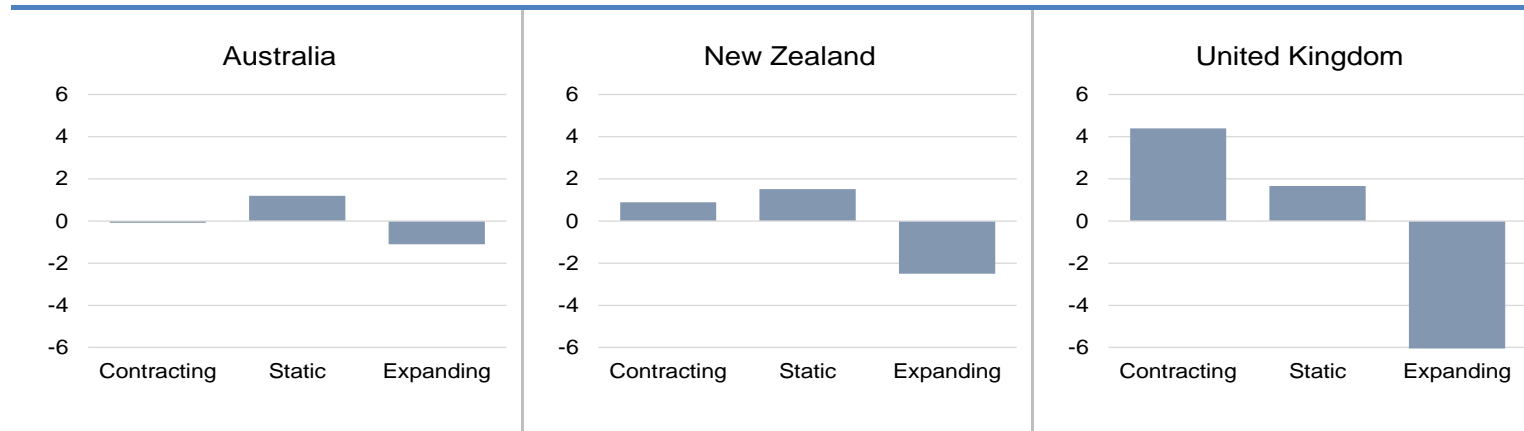
Impact of COVID-19 and policy measures: Signs of hibernation but still some reallocation

Distribution of within-firm employment growth: pre vs post-pandemic

A: February to February, 2020/21 and 2019/20



B: 2020/21 minus 2019/20



Policy measures focusing on the preservation of job matches have led to a decline in reallocation during 2020

The decline in job creation relative to 2019 exceeded the (limited) increase in job destruction

Also visible in the rise in the share of firms that have seen no change in employment



Impact of COVID-19 and policy measures on link to aggregate productivity: the evidence

$$\Delta E_{irsc} = \alpha + \beta LP_{irsc} + FE + \varepsilon_{irsc}$$

Firm-level employment growth responsiveness to lagged productivity since the pandemic

February 2020 to:

	A: February 2021			B: May 2020		
	(1)	(2)	(3)	(4)	(5)	(6)
Productivity	0.0423*** (0.00190)	0.0416*** (0.00199)	0.0410*** (0.00217)	0.0520*** (0.00324)	0.0488*** (0.00341)	0.0609*** (0.00446)
Productivity x Hard-hit industries		0.00696 (0.00592)			0.0340*** (0.00699)	
Productivity x New Zealand			-0.00456 (0.00608)			-0.0444*** (0.00584)
Productivity x United Kingdom			0.0129** (0.00501)			-0.0380*** (0.00522)
Fixed effects						
Ind, Reg, Cty, Size	YES	YES	YES	YES	YES	YES
Observations	148977	148977	148977	163139	163139	163139
Adj R2	0.060	0.060	0.060	0.159	0.159	0.16

Reallocation remained productivity-enhancing throughout the period (columns 1 and 4)

Link initially stronger in hard-hit industries (columns 2 and 5)

Link initially weaker in NZL and UK than AUS (columns 3 and 6)

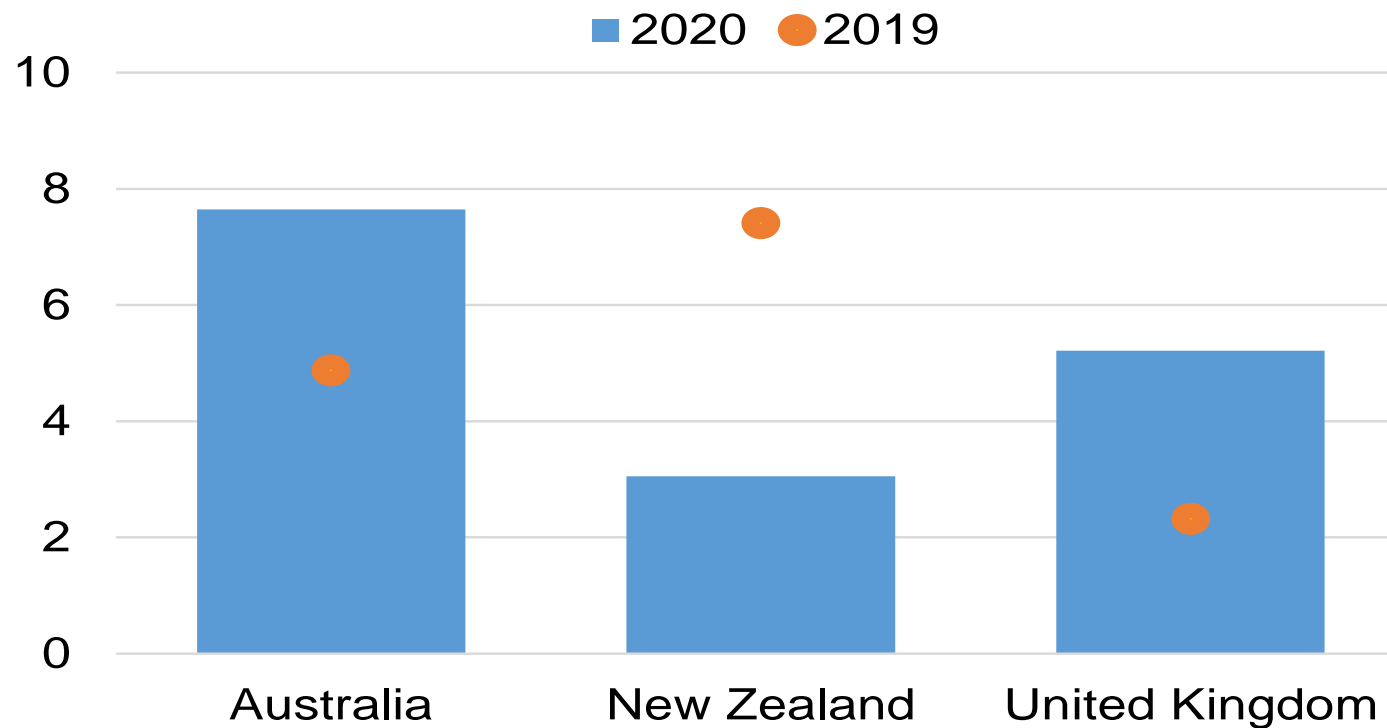
Stronger employment growth in high-tech firms even controlling for productivity

Churn and productivity remained connected following COVID-19



Reallocation and link to aggregate productivity pre- and post-pandemic

Implied difference in employment growth (February to September)
between a high and a low productivity firm



Reallocation more productivity-enhancing over 2020 than 2019 in AUS and UK but less in NZL (though from higher level)

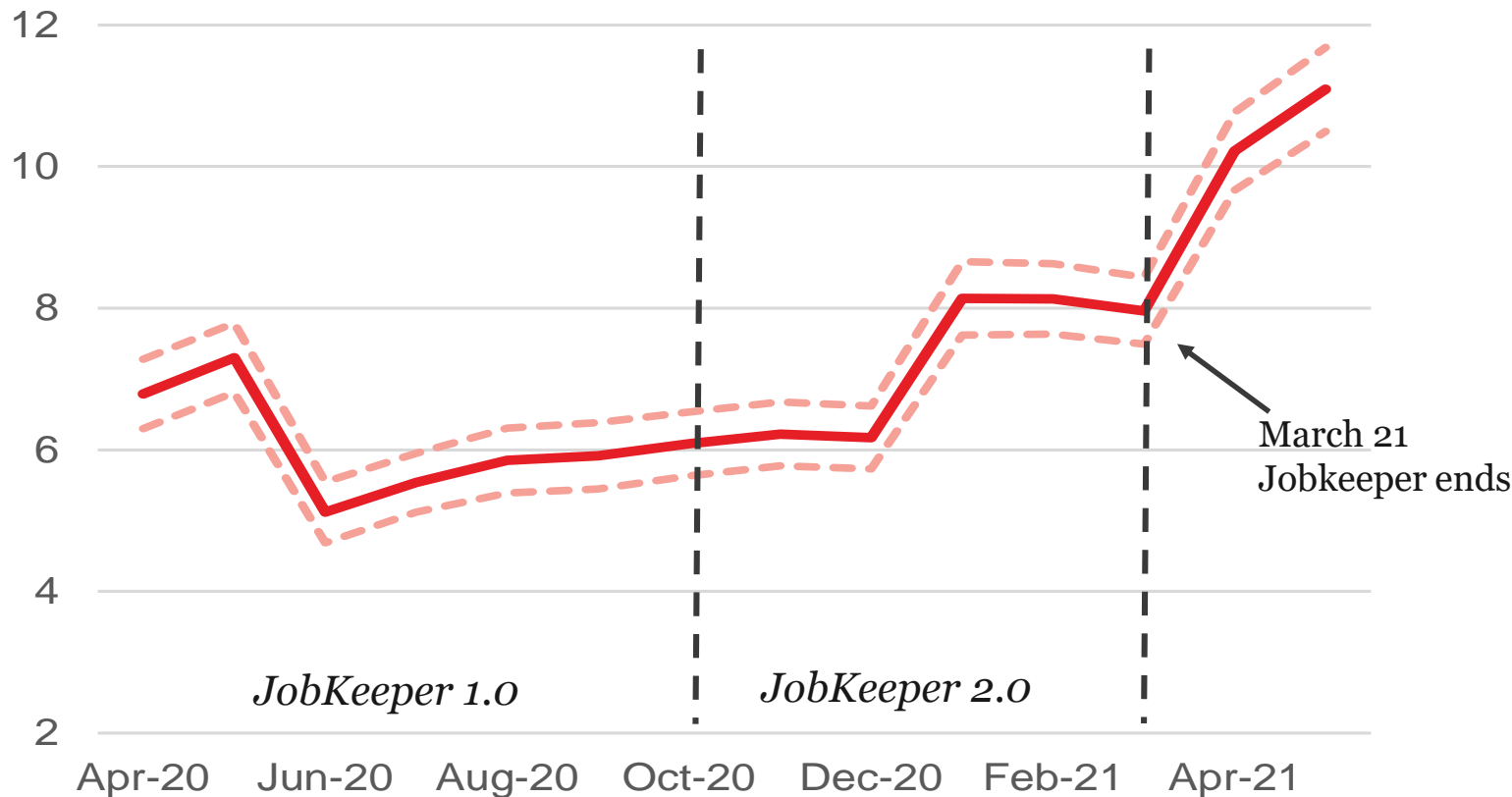
AUS and UK results consistent with cleansing hypothesis, which is surprising given policy response

Why did workforce adjustment remain connected to productivity at firm-level despite a crisis policy response that prioritised preservation over reallocation?



Productivity-enhancing reallocation surges after JobKeeper scheme in Australia is wound-up

Difference in employment growth between high and low productivity firms
Estimated monthly profile: March 2020 to May 2021



During the first phase of the job retention scheme, reallocation was found to be more productivity-enhancing relative to the pre-COVID period.

Suggest that the scheme achieved its goal of disproportionately shielding productive but financially fragile firms.

However, as time went by and as eligibility criteria were adjusted, the scheme became more distortive



Main upshots

- **Potential scarring effects from COVID-19 important**
 - Significant weakening of reallocation-productivity link without policy measures, with shock affecting medium-to-high productivity firms disproportionately
 - Loan guarantee programme effective tool to help bridge liquidity gaps, in particular for medium-to-high productivity firms (with positive short-term effects on market selection)
 - Risk of misallocation if maintained for too long or if programme gets too large
- **Evidence from real-time data indicate that reallocation-productivity link has essentially been maintained so far (on average)**
 - Initially stronger in AUS and UK (despite policies slowing reallocation) but weaker in NZL
 - Timing and design of job-retention scheme may have played a role in the case of AUS
 - Technology angle of the shock played to the strengths of high-productivity and app-using firms
- **Overall productivity impacts will become clearer over time**
 - Tech adoption (+), global knowledge spillovers (-), human capital (-)



Limitations / Future directions

- **Limitations:**
 - **Simulation approach:** Does not take into account different capacities across firms to adapt to changing conditions and be resilient. Firms treated as entities operating independently.
 - **Real-time data analysis:** Not possible to assess separately the role of public policies from the shock itself. We do not know the counter-factual of no policies.
- **Future directions:**
 - **Real-time data analysis:** Going one step further and explore the possibility to combine data from administrative sources (tax records) providing high-frequency information on employment at firm level (e.g. single-touch payroll in AUS) with productivity data from business registries.
 - **Simulation approach:** Integrating network analysis in the approach through input-output linkages to better assess vulnerabilities and illustrate risks of more severe downturns
 - **Network centrality measures in production chains:** Barba-Navaretti et al. “In and out of lockdowns: Identifying the centrality of economic activities, June 2020
 - **Agent-based modelling:** Barnes, Hillman, Wharf and McDonald “The impact of Covid-19 on corporate fragility in the UK: Insights from a new calibrated firm-level corporate sector agent based model