COVID-19 and SME Failures

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COVID-19 Crisis

- COVID-19 is unprecedented in its complexity, unevenness and severity.
- Small businesses are especially at risk for failure given the shock to their income.
- Governments implemented policies to support firms, together with economy wide fiscal and monetary stimulus

I will mostly present the paper:

1. COVID-19 and SME failures, NBER WP 27877, May 2020

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..with a few results from:

1. COVID-19 and SMEs: A 2021 Time Bomb, **American Economic Review, P&P**, May 2021
2. Fiscal Policy in the age of COVID: Does it get into all of the cracks?, **Jackson Hole Symposium** August 2021

Questions

In this research agenda, we ask:

1. What is the impact of COVID-19 on firm failures in a wide range of countries?
2. What is the cost/effectiveness of government interventions aimed at saving firms?
3. Does COVID-19 SME support policies create a “time bomb” of failures in 2021?
4. Did fiscal stimulus help support aggregate activity?
5. How big are fiscal policy spillovers globally?
6. What are the implications for EMs of a 2-speed recovery with global uneven vaccinations?

Methodology

Outline of Approach

- **Challenge**: To identify a liquidity shortage, need firm cashflow under COVID-19.

$$\text{cash} + CF_{\text{COVID}} < \text{financial expenses}$$

- **Approach**: Combine data with model to estimate CF_{COVID}
  - Representative firm-level financial data (ORBIS) from 17 countries.
  - Firm cost-minimizes over labor and materials given supply and demand shocks calibrated at sectoral level (4-digit).

$$CF_{\text{COVID}} = PY_{2018}\widehat{PY}_{\text{COVID}} - \text{COGS}_{2018}\widehat{COGS}_{\text{COVID}} - \text{Fixed Costs} - \text{Taxes}$$

Literature: Rapidly Growing...

- Labor market, demand, supply, and reallocation (Barrero, Bloom and Davis; Coibion, Gorodnichenko and Weber; Dingel and Neimann; Mongey, Pilossoph and Weinberg; Guerrieri, Lorenzoni, Straub and Werning; Krueger, Uhlig and Xie)
- Business solvency and policy response: (Acharya and Steffen; Brunnermeier and Krishnamurthy; Carletti, Oliviero, Pagano, Pelizzon and Subrahmanyan; Core and De Marco; Elenev, Landvoight and van Nieuwerburgh; Granja, Makridis, Yannelis and Zwick; Greenwald, Hanson, Stein, Sunderam, and Zwick; Joaquim and Netto; Krainer and Paul; Greenwood, Iverson and Thesmar; Jones, Philippon and Venkateswaran; Schivardi and Romano)

Contribution

1. Infer COVID-19 impact from structural model combined with firm-level data.
2. Assess sources of heterogeneity in failure rates and the effects of gov't support.

Methodology

Model Details I: Supply & Demand

- **Supply**: firms produce output (y_{is}) using idiosyncratic productivity (z_{is}), fixed factors (k_{is}), materials (m_{is}), and effective labor ($A_s n_{is}$):

$$y_{is} = z_{is} k_{is}^{\alpha_s} (A_s n_{is})^{\beta_s} m_{is}^{\gamma_s}.$$

- **Demand**: firms within sectors sell differentiated varieties (nested CES demand structure)

$$d_{is} = \xi_s^{\eta} \left(\frac{p_{is}}{P_s} \right)^{-\rho_s} \left(\frac{P_s}{P} \right)^{-\eta} D$$

  - **Hat algebra**: change in demand from normal (d_{is}) to COVID-19 (d'_{is}) times:

$$\hat{d}_{is} \equiv \frac{d'_{is}}{d_{is}} = \frac{\hat{\xi}_s^{\eta}}{\sum_{\sigma} \hat{\xi}_{\sigma}^{\eta} / \mathcal{S}} \widehat{PD} = \tilde{\xi}_s^{\eta} \widehat{PD}, \text{ where } \sum_s \tilde{\xi}_s^{\eta} / \mathcal{S} = 1$$

Model Details II: Firm Decisions

$$\min_{m',n'} \quad wn' + p_m m'$$

$$zk^{\alpha_s}(\hat{A}_s n')^{\beta_s} m'^{\gamma_s} \geq d' \qquad \text{: produce to meet demand}$$

$$n' \leq \hat{x}_s n \qquad \text{: labor constraint}$$

- When labor is not constrained:

$$\frac{n'}{n} = \hat{n} = \hat{m} = \left(\tilde{\xi}_s^{\eta} \widehat{PD}\right)^{1/(\beta_s+\gamma_s)} \hat{A}_s^{-\beta_s/(\beta_s+\gamma_s)} \equiv \hat{x}_s^*$$

- When labor is constrained:

$$\hat{n} = \hat{x}_s < \hat{x}_s^* \quad ; \quad \hat{m} = \hat{x}_s \left(\frac{\hat{x}_s^*}{\hat{x}_s}\right)^{(\beta_s+\gamma_s)/\gamma_s} > \hat{x}_s^*$$

Model Details III: Failures

- Define operating cashflow:

$$CF_{is} = p_{is} y_{is} - wn_{is} - p_m m_{is} - F_{is} - T_{is}$$

- Construct change in cashflows (predicted minus observed):
  - When labor is not constrained, change in cashflow (COVID/non-COVID):

$$CF_{is}^{\text{covid}} - CF_{is} = p_{is} y_{is} (\tilde{\xi}_s^{\eta} \widehat{PD} - 1) - (wn_{is} + p_m m_{is}) (\hat{x}_s^* - 1)$$

  - When labor is constrained,

$$CF_{is}^{\text{covid}} - CF_{is} = p_{is} y_{is} (\tilde{\xi}_s^{\eta} \widehat{PD} - 1) - wn_{is} (\hat{x}_s - 1) - p_m m_{is} \left(\hat{x}_s^{*(\beta_s+\gamma_s)/\gamma_s} \hat{x}_s^{-\beta_s/\gamma_s} - 1 \right)$$

- Businesses failures defined by liquidity criterion:

$$\text{cash}_{is} + CF_{is}^{\text{covid}} < \text{financial expenses}_{is}$$

Taking the Model to the Data

Methodology – Shocks

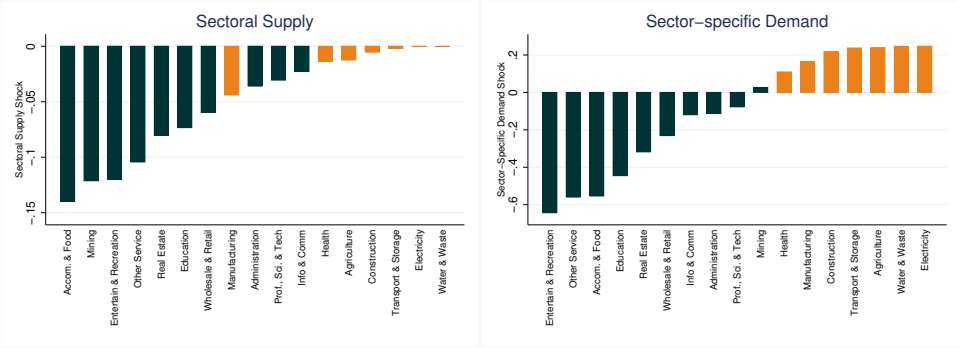
- Labor Utilization Constraint: $n'_{is}/n_{is} \leq \hat{x}_s$
  - Essential sectors: $\hat{x}_s = \infty$.
  - All non-essential workers assumed to be remote workers
  - **Data**: Evaluate feasibility of remote work (Dingel and Neiman 2020, O*NET).

- Productivity shock: Shifting to remote work ($\hat{A}_s \leq 1$)
  - Adjust productivity of remote workers down by 20%
  - **Data**: Use ACS for existing shares of remote workers

- Demand: $d'_{is}/d_{is} = \tilde{\xi}_s^{\eta} \widehat{PD}$
  - Sectoral demand shock: $\tilde{\xi}_s^{\eta}$ (restaurants $\tilde{\xi}_s^{\eta} < 1$ vs. online grocery $\tilde{\xi}_s^{\eta} \geq 1$.
    Data: Evaluate reliance on face-to-face interaction (O*NET)
  - Aggregate demand shock: $\widehat{PD}$
    Data: Use GDP growth forecasts (IMF, WEO).

- All sectoral shocks defined at the 4-digit NACE sector level.

Sectoral Supply & Demand Shocks



- Demand (right) in customer-oriented sectors falls relative to essential sectors (orange).

Why do we assume?

1. **Liquidity, not insolvency, criterion**:
   - SME access to credit markets is limited even in normal times (e.g. Gopinath, Kalemli-Ozcan, Karabarbounis, Villegas-Sanchez, 2017).
   - Insolvency defined as negative equity; difficult to establish for SMEs/private firms.
2. **Assume perfectly rigid prices**: output is demand driven in the short-run.
3. **Static, partial equilibrium exercise**: no state variable; estimate first-round effects.
4. **No input-output network** we relax later, want to understand the role of I-O.
5. **Calibration of shocks:** lack of real time data early in the pandemic.

August 2021 Jackson Hole paper: flexible prices, I-O network, Google mobility + lockdown stringency data

Baseline Failure Rates

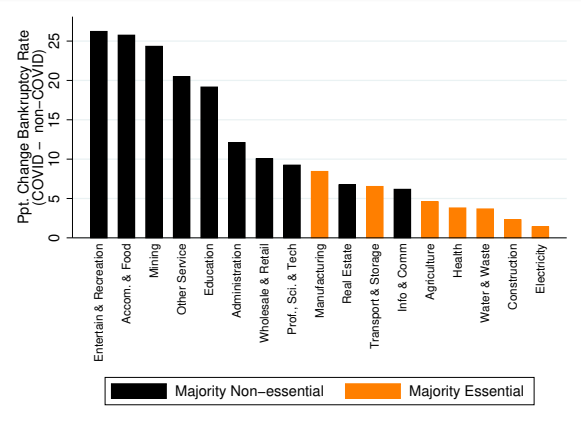
Aggregate SME Failure Rate (%)

	(1) Non-COVID	(2) COVID	(3) Δ
High coverage	9.61	18.66	9.06
All	9.43	18.41	8.98

Baseline scenario: Single 8 week lockdown—17 countries

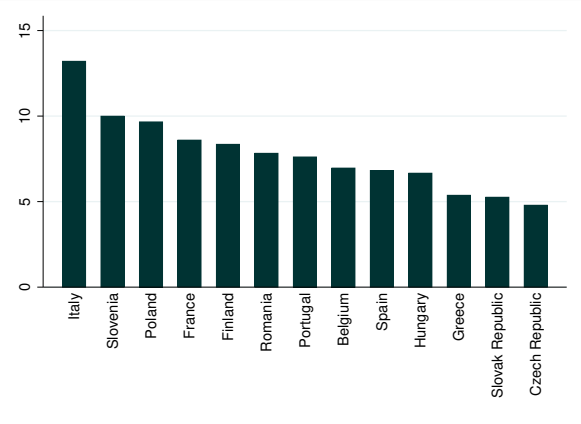
- No government intervention.
- The table reports the cumulative failure rate at the end of 2020.
- Aggregate failure rates mask heterogeneity across sectors and countries.

Sectoral Heterogeneity in Failure Rates (COVID - non-COVID)



- COVID impact ranges from 2 pct. pt. (Electricity) to 25 pct. pt. (Accommodation & Food Service) difference in failure rates.

Country Heterogeneity in Failure Rates (COVID - non-COVID)



- COVID impact ranges from 4.8 pct. pt. (Czech Republic) to 13.2 pct pt. (Italy) difference in failure rates.

I-O Linkages, Flexible Prices, Reallocation of Firm Demand

Aggregate SME Failure Rate (%)

	(1) Non-COVID	(2) COVID	(3) Δ (pp)
All	9.80	18.80	**9.00**
Advanced	7.88	13.53	5.65
Emerging	11.82	24.35	12.53

Baseline scenario: Real life lockdowns—27 countries

- 18 AE, 9 EM.
- No government intervention.
- The table reports the cumulative failure rate at the end of 2020.
- Aggregate failure rates mask heterogeneity across sectors and countries.
- Extensive margin *reduces* failure rates;
- I-O structure accounts for AEs-EMs difference in failure rate (sourcing concentration).

Policy Support: Pandemic Loans, Grants, Waivers

Policy Support was Effective...

	No Policy Support		With Policy Support	
	(1) Δ (pp)	(2) Hypothetical Costs (%, GDP)	(3) Δ (pp)	(4) Actual Funds Disbursed (%, GDP)
All	9.00	0.80	4.30	4.05
Advanced	5.65	0.13	-0.43	6.08
Emerging	12.53	1.50	9.28	1.91

- Targeted Bailouts are cheap: 0.8% of GDP

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- Targeted Bailouts are cheap: 0.8% of GDP
- Full offset in AEs, due to size of fiscal support

Poorly targeted... but no 'Zombification'

Policy Targeting (excl. China)

	Funds (%, GDP)	Firms Saved (% of at risk)	Jobs Saved (% of at risk)
All Firms	**5.10**	36.0	46.8
Survive without Policy	4.53	0.00	0.00
Survive because of Policy	**0.29**	**36.0**	46.8
Of which, zombie firms	**0.10**	**13.0**	15.4

- Zombies account for 2% of the funds and 13% of firms at risk (i.e. fail in 2020 without support)

A Time Bomb?

What About 2021?— Most saved firms are viable, no future zombification

Policy Targeting (excl. China)

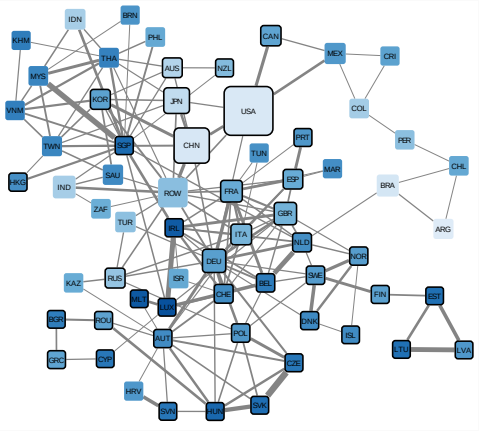
	All	Advanced	Emerging
Survive until end 2021	70.2	73.1	60.5
of which, zombie firms	22.6	22.9	21.6
Fail 2021	29.8	26.9	39.5
of which, zombie firms	13.3	13.5	12.7

- In 2021: failure rate increases only by 2.6pp (relative to normal) even if firms have to repay pandemic loans.
- 70.2% of firms that survived to the end of 2020 because of policy support also survive until 2021
- Of all the firms that survive 2020 because of policy support, 22.6% are zombies that also survive to the end of 2021 and 13.3% are zombies that fail by the end of 2021

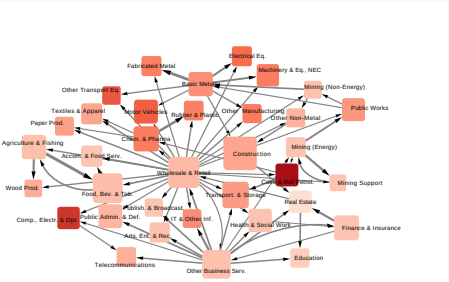
Fiscal Spillovers with I-O Linkages and Global Model

Global Production Network: Data from OECD, Figure from Cakmakli et al. 2021

(a) Countries

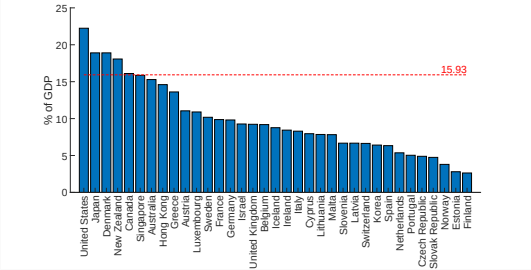


(b) Industries

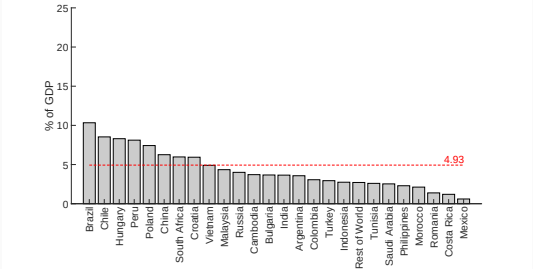


35 industries in 65 countries, giving us a matrix of 2275 $\times$ 2275 entries

Fiscal Spending (% of GDP)



(a) Advanced Economies



(b) Emerging Markets

Fiscal Multiplier and Demand Reallocation

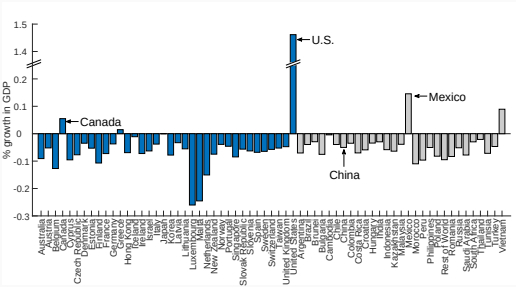
(relative to no fiscal policy)

	Δ Real GDP %	Δ Share Demand Constrained (pp)	Δ Keynesian Unemployment (pp)
All Country Stimulus	**0.67**	**-10.66**	**-1.27**

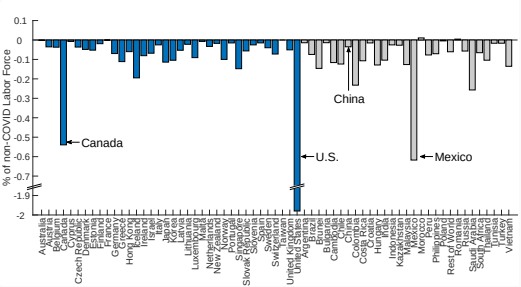
- Fiscal impulse of 11.3% of GDP raises output by only 0.67%. **Very low multiplier: 0.06**. *Misleading*:
  - Transfers work through $MPC = 0.29$. Textbook transfer multiplier is $0.29/(1 - 0.29) = 0.41$.
  - COVID creates bottlenecks. Only 31% of GDP is demand-constrained. Reduces multiplier to $0.41 \times 0.31 = 0.13$.
  - I-O structure matters: $\downarrow$ slack, $\uparrow$ prices in demand-constrained sectors, $\downarrow$ demand in downstream supply-constrained sectors. Reduces multiplier from 0.13 to 0.06.
- *Support Employment*: Policy reallocates spending towards demand-constrained sectors. 'Keynesian unemployment' decreases from 2.67% to 1.40%.

Cross-border Spillovers

Counterfactual: US fiscal policy only (relative to no fiscal policy)



(a) % Output Spillovers



(b) Unemployment Spillovers

- Output spillovers small (and mostly negative)
- Employment spillovers small (and mostly positive)

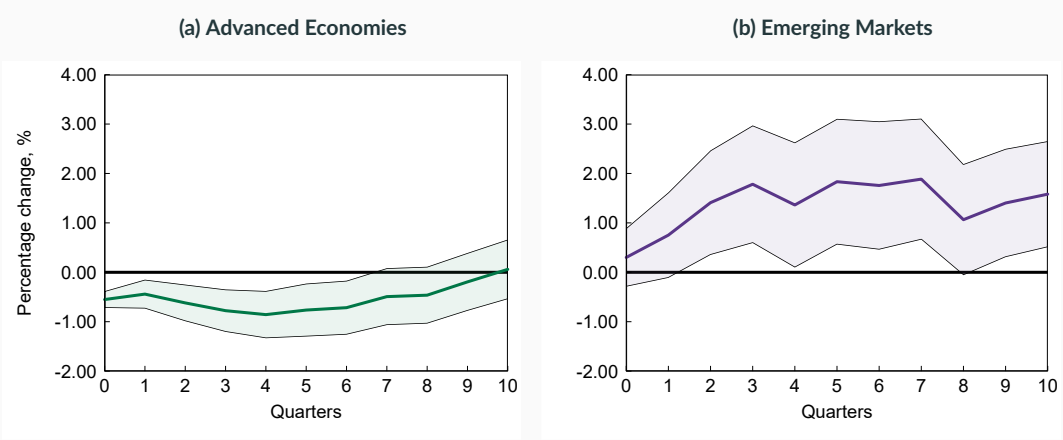
Two-speed recovery (relative to 2020)

	Trade Balance (% GDP)		Δ Real GDP (%)		Interest Rate (%)
	AE	EM	AE	EM	
Scenarios	(1)	(2)	(3)	(4)	(5)
AE Recovery	**-0.76**	**1.12**	8.68	**-0.47**	**2.62**
+Fiscal Policy	-1.09	1.61	8.81	**-1.03**	5.92

- AEs private savings decrease
- Global interest rate rises
- Despite larger trade surpluses, EMs real output declines: higher global rates + terms of trade.

Differential Risk Premia—updated from, Kalemli-Ozcan, 2019 Jackson Hole

Figure 4: U.S. Monetary Policy Surprise Shocks and Government Bond Spreads



Conclusion

Takeaways

- Policies prevented firm failures and did not create zombies, however there is waste as most funds went to firms who did not need it
- SMEs fundamentals are strong and don't need additional support
- The multiplier from fiscal transfers is small due to supply constraints + I-O linkages
- Cross border spillovers are small and beggar-thy-neighbour.
- Vaccination gap and different size fiscal packages lead to two-speed recovery $\Rightarrow$ creates headwinds for EMS, due to rising global rates and differential risk premia.

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In 2021-2022, key risk to manage: financial market panic.

- U.S. Regulatory Y-14 data: During COVID-19, large firms can access credit markets and draw from credit lines, SMEs cannot
  $\Rightarrow$ (e.g Chodorow-Reich, Darmouni, Luck, Plosser; Darst, Caglio, Kalemli-Ozcan, 2021)
- Policy 'filled-in' for credit markets for SMEs

Fast fiscal tapering, slow and clearly communicated monetary tapering

Appendix

Country-level COVID Risk to the Banking Sector

	CET1 ratio (risk-weighted)	Δ CET1R
Average	14.14%	-2.12 pct. pts.

- Data availability limits analysis to Belgium, Finland, France, Germany, Greece, Spain.
- **Little systemic risk from SME failures under COVID**:
  - CET1 ratio declines 2.12 pct. pts. from initial level of 14.1%
  - Initial level in 2018 more than double what it was in 2009.
  - EBA's 2018 adverse scenario stress test generated a 4 pct. pt. decline in CET1 ratio.