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The Employment and Productivity Effects of Transitory Firm Demand Shocks

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How persistent are the effects of transitory shocks?

- The lasting effects of permanent economic shocks are well documented in the literature (Schott and Pierce (2016), or Dix-Carneiro and Kovak (2018)).
- How firms adjust to transitory shocks has been largely overlooked in the literature.
- Yet, this is key to answer several prominent economic questions:

  1. Ripple effects and protracted recoveries?
  2. Cleansing effects?
  3. Policy trade-offs: short *versus* long-run effects and worker/firm-level policy interplay.

This paper inquires the "missing middle" of crises

- We use rich microdata for Portugal and
- . . . follow firms and workers from 2004 to 2018 to identify:
  (i) the causal **impacts** of GFC-induced demand shocks,
  (ii) the **channels** of adjustment, and **worker-level incidence**,
  (iii) the associated linked **productivity** dynamics.
- . . . compute the shock at the firm level.

We proxy changes in external demand faced by firms

For each firm j use a weighted average of partner countries' GDP growth.

$$shock_{jt_T} = -\sum_d w_{jT-1}^d \times g_{t_T}^d \tag{1}$$

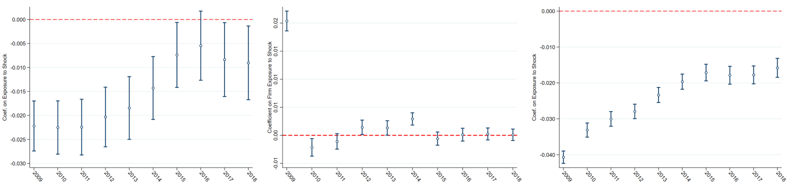
We contrast the labor market and performance outcomes of otherwise similar firms suffering GFC shocks of different intensities.

$$y_{jt} = \beta_t shock_{j2008} + \gamma \mathbf{X}_{j2007} + \nu^{rt} + \iota^{st} + \epsilon_{jt} \tag{2}$$

- X_{j2007}: pre-trend wage bill growth, pre-trend employment growth, importer dummy at baseline, firm size at baseline and pre-trend growth in outcome variable.
- ν_{rt} and ι_{st} are region-year FE and sector-year FE controlling for trends in each firm's baseline region/sector outcomes.
- ϵ_{jt}: orthogonal error term, inference conducted with cluster robust standards errors (clustered at the firm level).

What were the immediate impacts?

Figure 1: Effects of a Transitory Demand Shock on Firms

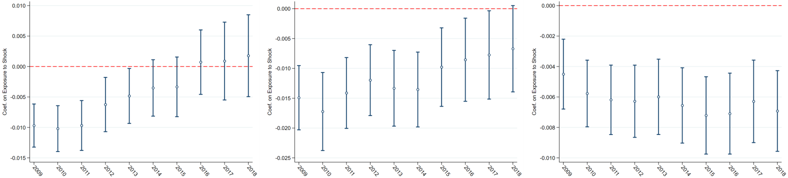


(a) Effect on Revenues (b) Effect on Closure (c) Effect on Export HHI

- GFC-induced demand shock induces firm death, firm shrinking and fosters the exploring of outside options.
- The effects on sales are highly persistent, but the effects on firm closure are short-lived.
- Using Gopinath and Neiman (2014)'s decomposition, firm closures accounted for almost 90 percent of private sector employment contraction in our sample.

Which margins of adjustment?

Figure 2: Labor Micro Margins of Adjustment



(a) Employment (b) Wage Bill (c) Average Wages

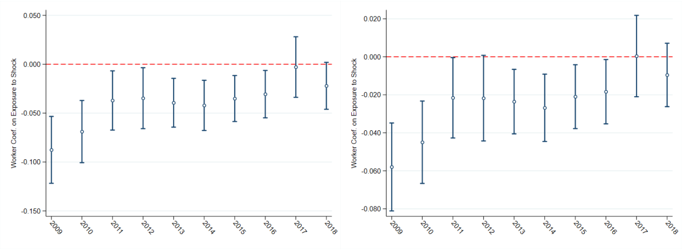
- GFC-induced demand shock induces contraction in employment, wage bill and average wages.
- The effects were also strongly felt in terms of hours worked.
- The effects on wage bill and average wages are felt for over a decade.
- Firm composition changes (skilled *vs.* unskilled labor).

These effects trickle down at the worker-level

- Adapt regression at the worker level. Identification assumption is that individuals are conditionally randomly assigned to firms, as in Yagan (2019).

$$y_{ijt} = \beta_t shock_{2008(i \in j)} + \Gamma \mathbf{X}_{j2007} + \Lambda \mathbf{W}_{i2007} + \nu^{rt} + \iota^{st} + \epsilon_{ijt} \qquad (3)$$

Figure 3: Worker Level Effect of GFC Induced Shocks



(a) Real Monthly Wages (b) Monthly Hours

- Workers employed by a firm experiencing a one-percentage point more adverse shock earn persistently less and work persistently fewer hours ("scarring" at worker-level).

Harder hit are more likely to separate from employer

Table 1: Job Separation: LPM, Probit and Logit Results

	Dependent variable:		
	Job Separation in 2009		
	OLS	*Logistic*	*Probit*
	(1)	(2)	(3)
β_{2009}	0.011***	0.067***	0.039***
	(0.000)	(0.002)	(0.001)
Firm and Worker Controls	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes
Sector Fixed Effects	Yes	Yes	Yes
Observations	331207	331207	331207

- In 2009, workers working at the time of the GFC in firms 1 percent harder hit by the shock find themselves 1.1 percent more likely to separate from employers relative to their otherwise similar counterparts.
- The displacement penalty persists for almost ten years in terms of wages and hours worked.

Who bears the brunt of the shock?

- Follow the rationale of Harasztosi and Lindner (2019) and Yagan (2019) in determining the burden of the shock.
- Unlike HL (2019) our shock is **revenue** based rather than **cost** based.
- We assess the splitting of the burden of the shock between firm owners and workers.

$$\frac{\Delta R_j}{\Delta shock} = \frac{\Delta \Pi}{\Delta shock} + \frac{\Delta \sum_{i=1}^{N_j} w_i^j}{\Delta shock} \tag{4}$$

Year	Revenue Effect	Wage Bill Effect	Burden on Worker	Burden on Firm
2009	-2.23%	-1.49%	66.63%	33.37%
2010	-2.26%	-1.71%	75.90%	24.10%
2011	-2.24%	-1.40%	62.18%	37.82%
2012	-2.03%	-1.18%	58.19%	41.81%
2013	-1.83%	-1.31%	71.63%	28.37%
2014	-1.42%	-1.34%	93.93%	6.07%

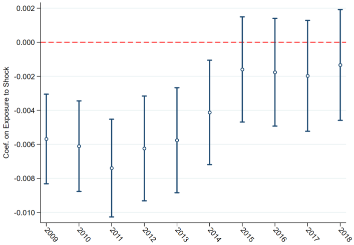
Table 2: Burden of the Shock between Workers and Firms

- Workers bear 2/3 of the burden of the shock.

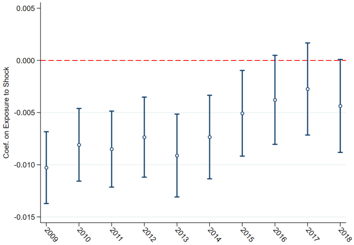
What were the aftermath productivity effects of the crisis?

- At the individual level evaluate effects on:
  1. Labor Productivity (value added per worker);
  2. Factor Productivity (DRS technology with labor and capital).

Figure 4: Effects of Demand Shock on Firms' Productivity



(a) Labor Productivity

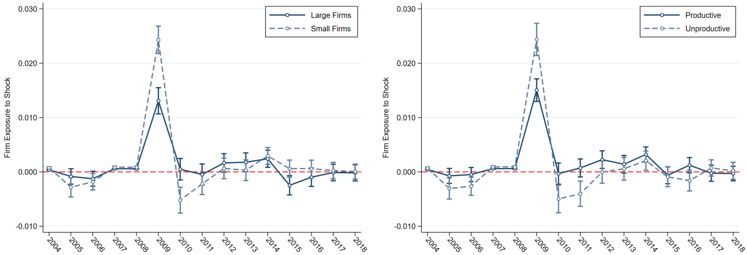


(b) Factor Productivity

Cleansing effects

- **Productivity:** the threshold is defined as the median value for value added per worker at baseline.
- **Firm size:** a firm with less than sixteen employees at baseline (median value) is considered to be ‘small’, and considered ‘large’ otherwise.

Figure 5: Exposure to Shock on Closure by Baseline Characteristics



(a) Size Heterogeneity (b) Productivity Heterogeneity

- Initially smaller, less productive or less skill-intensive firms are more likely to exit. Using the Olley-Pakes decomposition, we show that this effect dominates the scarring effect at the aggregate level.

Conclusion

- Harder hit firms shrink in size and are more likely to perish but they were somewhat able to diversify their external markets to cope with the shock.
- Firms engaged in several margins of adjustment: cost related, labor related, and technological in nature.
- Despite its transitory nature, the GFC external shock was felt persistently several years past its initial incidence. These results challenge the view that the effects of recessions are only felt at business cycle frequency.
- The GFC generated scar tissue for hard hit firms and workers, and led to aggregate cleansing effects via the survival of more productive firms.