“Foreign Shocks as Granular Fluctuations”
di Giovanni, Levchenko, Mejean

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Summary

- How are foreign shocks transmitted to the domestic economy?

- Empirical fact: in response to increase in foreign GDP, value added rises by more in larger firms
  - how does response vary with openness, given size?

- Tractable quantitative model to evaluate role of firm heterogeneity for aggregate impact of foreign shocks
Summary

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- My discussion:
  - what does granular residual capture?
  - why does firm heterogeneity dampen aggregate response of measured TFP?
  - additional dampening from variable markups and heterogeneous firms
Granular residual

\[dy = \sum_{f} \omega_f dy_f\]

\[dy = d\bar{y}_f + \sum_{f} \omega_f (dy_f - d\bar{y}_f) = \varepsilon + \Gamma\]
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- \( \eta_f = \eta \) and \( \varepsilon_f \) i.i.d (Gabaix 2011)
  - \( N \rightarrow \infty \) (continuum of firms) \( \Rightarrow \) \( \Gamma = 0 \)
  - \( N \) large and \( \omega_f \) fat tailed \( \Rightarrow \) \( \Gamma \neq 0 \)
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  - \( \Gamma \neq 0 \) even if \( N \rightarrow \infty \)
  - \( \Gamma \) combines heterogeneity and finite sample
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- Gaubert-Itskhoki (2020) granular residual
  - wght. small sample mean - wght. population mean
Foreign productivity shocks and measured TFP

- $\Delta$ real GDP = $\Delta$ labor supply + $\Delta$ measured TFP
  - suggestion: report separately

- If no distortions, $\Delta$TFP ≈ 0 (Kehoe-Ruhl, Burstein-Cravino)
  - changes in inputs have no first-order effects on measured TFP
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- With distortions (e.g. mkups), \( \Delta \text{TFP} \neq 0 \)
  - “mismeasurement”: contribution of imports to production measured by cost share, but netted-out by GDP share
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- Suppose single sector, single imported intermediate input (generalization in Baqae-Farhi 2020)
  \[ d\text{TFP} = \omega^m (\mu - 1) (dm - d\omega^m) \]
  - \( \omega^m = \)share of imported intermediate inputs in GDP
  - \( \mu = \)constant markup
  - \( dm > 0, \ d\text{TFP} > 0 \)
Heterogeneity and measured TFP

- In response to change in foreign technologies:

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- \( \omega^m \) = share of imported inputs in GDP

- Suppose \( Y_f = Z_f M_f^{\gamma_f} L_f^{1-\gamma_f} \)
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- What is the interaction between heterogeneity and
  - \( \Delta \) factor supply?
  - welfare?
Dampening due to incomplete pass-through

- Suppose markup $\mu_f$ increasing in market share within sector $s_f$

- If all firms within a sector are subject to same cost change, then market shares and markups are constant, $dp_f = dc_f$
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  - as $\alpha$ falls, larger markup change by a firm to own shock exactly offset by larger change in markup, in the opposite direction, of its competitors
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- If $\alpha_f \searrow$ size, $dp$ smaller than under constant mkups iff $s_f > \bar{s}_f$
Dampening due to incomplete pass-through

- Variance of sectoral price assuming iid shocks with variance $\sigma^2$

- Constant markups (Gabaix 2011)
  \[
  \text{Var} [dp] = \sigma^2 \sum_f (s_f)^2 = \sigma^2 \text{HHI}
  \]

- Variable markups (Burstein-Carvalho-Grassi 2020)
  \[
  \text{Var} [dp] = \sigma^2 \sum_f \left( \frac{\alpha_f s_f}{\sum_{f'} \alpha_{f'} s_{f'}} \right)^2
  \]

- If $\alpha_f \downarrow$ in $s_f$, variance is lower under variable markups

- Intuition: pass-through rates are lower for larger firms, effectively reducing weight of large firms in the price index