Price Rigidities and Granular Origins of Aggregate Fluctuations

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Overview

- Paper
  - studies how sector-level shocks can have aggregate outcomes
  - heterogeneity in sector sizes and IO linkages
  - add frictions (nominal rigidities)
- Findings
  - stickiness amplifies both "granular" and "network" effects
  - stickiness distorts size and ranking of granularity and IO heterogeneity
  - rigidities break sales sufficient statistic for aggregate contribution
- Discussion
  - Monopolistic competition setting $\rightarrow$ heterogeneity?
  - Identification/simulation of shocks
  - Estimation of PL

Sector-level heterogeneity

Simplified model

$$\Delta \ln GDP \equiv c_t = \chi' a_t$$

$$\chi \equiv (I - \Lambda)(I - \delta\Omega'(I - \Lambda))^{-1}\Omega_c$$

- What else does imperfect competition and dynamics buy?
  - With flexible prices ($\Lambda = 0$) collapses to Acemoglu et al. (2017)

    $$\chi \equiv (I - \delta\Omega')^{-1}\Omega_c$$

  - sector level, static, perf. comp., Cobb-Douglas preferences/production
- Λ as other source of sector-level heterogeneity?
  - financial frictions (Bigio and La'O (2016))
  - import propensity
  - entry/exit (Baqaee (2017))
  - markups (Grassi (2017))

Within sector heterogeneity

- Model
  - Shocks and parameters of interest are at sector level
  - Firms within sector are homogeneous:
    markups, sourcing patterns
- Empirically
  - strong firm heterogeneity within sectors (e.g. passthrough, input shares,...)
- Does it matter?
  - Some additional simulations/calibrations might be interesting:
    - homogeneous passthrough rate
    - key variables correlation with firm characteristics

Within sector heterogeneity

- Input heterogeneity
  - Large variation in $\omega_{kk'}$ within sectors (Belgium firm-level IO)
  - For each firm pair ij in sector pair kk', calculate ω_{ij} and $\omega_{kk'} \equiv \bar{\omega}_{ij}$
  - CV > 1 for vast majority of sector pairs

			Percentile				
	Mean	SD	$10th$	$25th$	$50th$	$75th$	$90th$
$CV_{kk'}$ (2-digit)	2.6	1.3	1.3	1.7	2.4	3.2	4.2
$CV_{kk'}$ (4-digit)	1.6	0.9	0.7	1.1	1.5	2.0	2.8

Table: Variation of input shares ω_{ij} (2005)

Shocks

- Identification of shocks and propagation

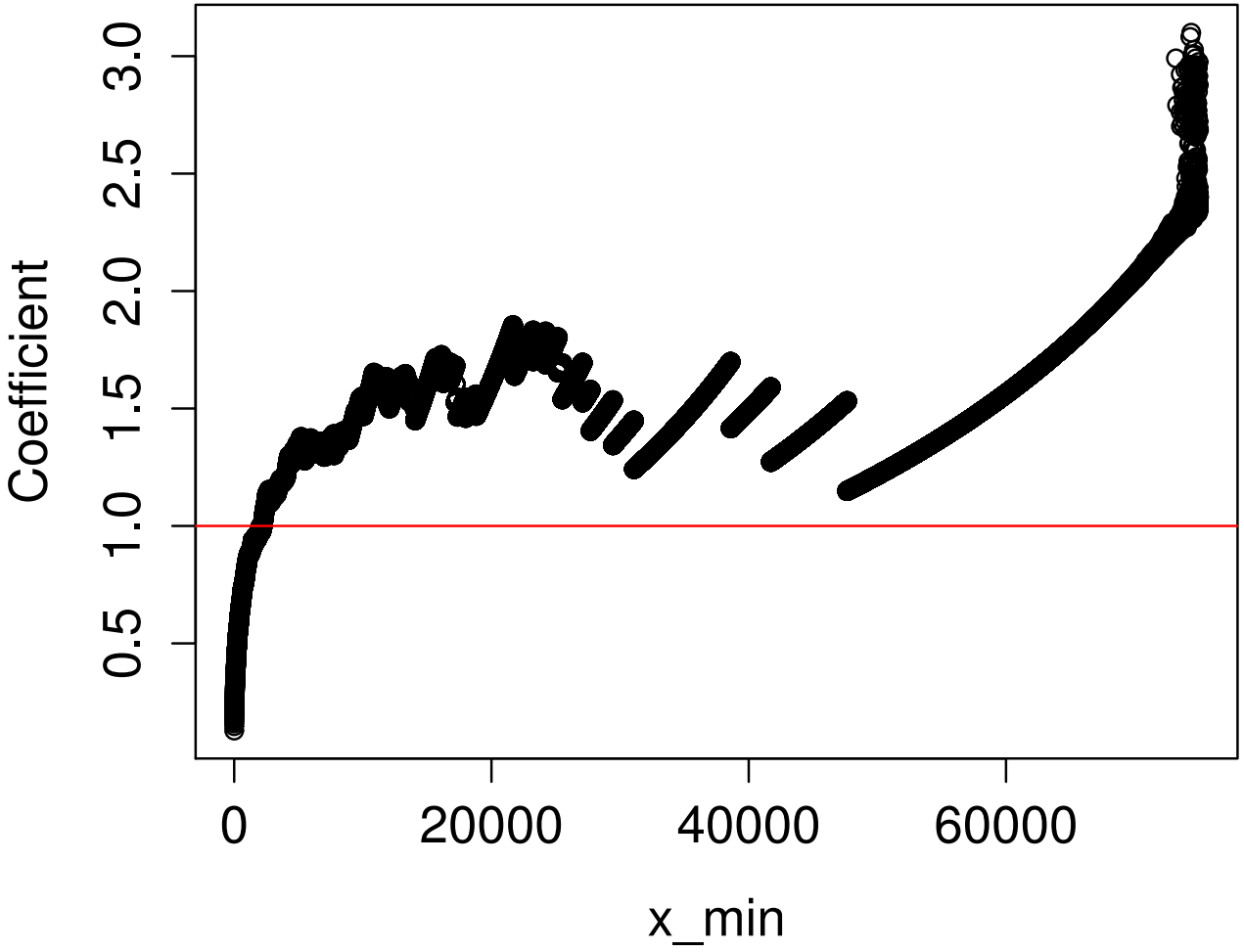
$$\Delta \ln GDP \equiv c_t = \chi' a_t$$

  - empirical measure of sectoral shocks a_t?
  - Uniform?
  - Simulated? $\rightarrow$ heterogeneous shocks (most rigid sector, most central, largest ...)

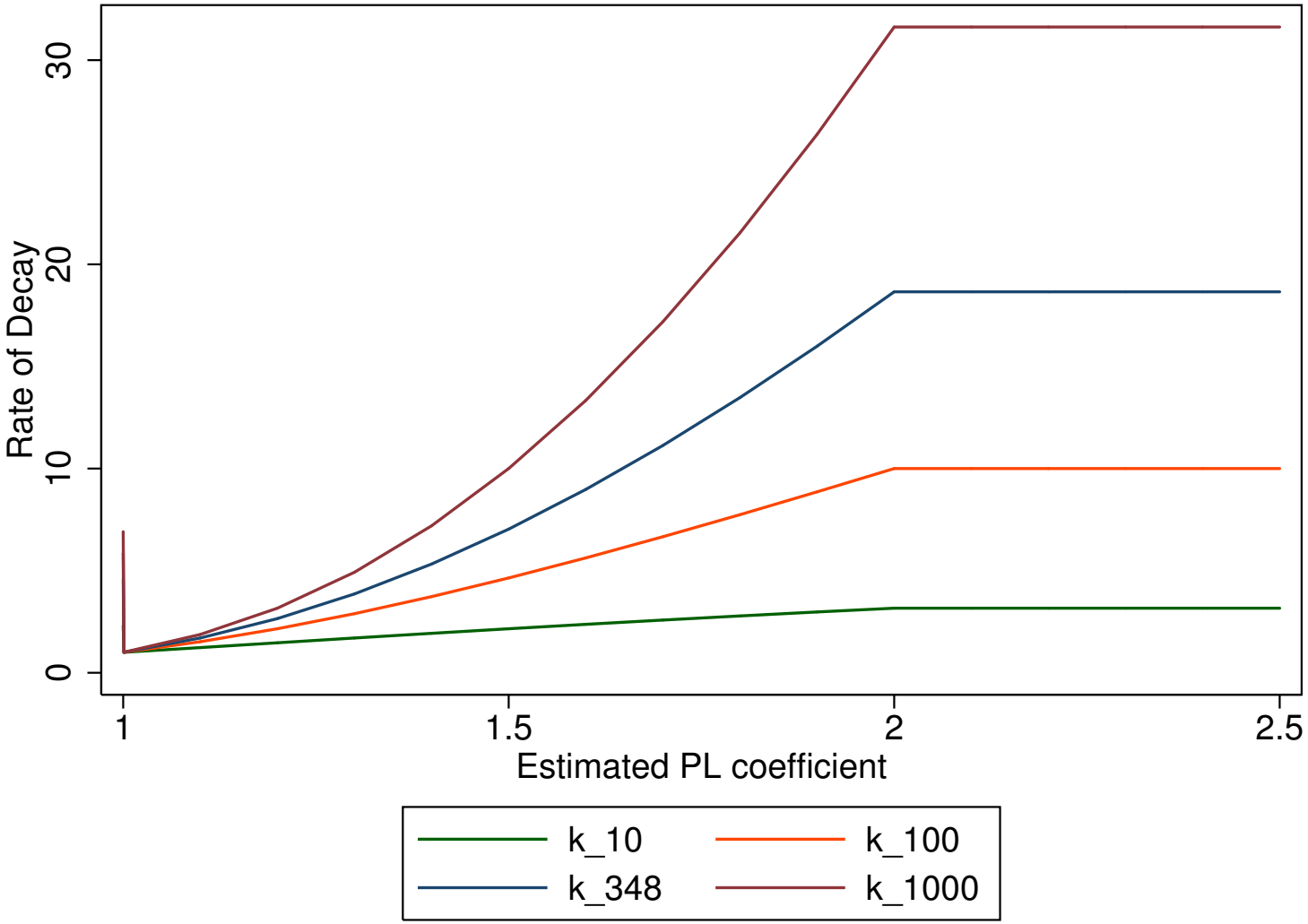
Estimation of PL

- Can fit PL to any distribution
  - Goodness of fit? (Clauset et al. (2009))
  - OLS choice for tail estimation
  - Estimate sensitive to exogenous x_{min}
  - Rate of convergence still indetermined
    - rate of decay for $\beta \in (1, 2)$ varies factor 20 with K=348
  - Stickiness might not be PL distributed ($\hat{\beta} = 2.6$)
  - aggregate effects driven by combinations of PL of sector size or IO linkages

PL fit - sensitivity cutoff



PL fit - rate of decay



Conclusion

- Paper
  - contributes to important and growing literature on "micro" heterogeneity
  - model with sticky prices shows how aggregate impact of stickiness can affect granular and network effects
- From here
  - combine stickiness with across-sector and within-sector heterogeneity
  - counterfactuals