Stylized environment in Hsieh and Klenow (2009)

CES preferences

\[ Y = \left[ \sum_i (Q_i Y_i)^{1-1/\sigma} \right]^{\sigma/(\sigma-1)} \]

Cobb-Douglas production with CRS

\[ Y_i = A_i L_i \]

Monopolistic competition with a mysterious distortion

\[ \pi_i = \frac{P_i Y_i}{\tau_i} - wL_i \implies P_i = \frac{\sigma}{\sigma - 1} \cdot \tau_i \cdot \frac{w}{A_i} \]

\( Y \) increases if \( \tau_i \) is eliminated
non-CES preferences

- Elasticity of demand depends on a product’s relative quantity
- Let’s call this endogenous elasticity $\sigma_i$ for short

non-CRS production

$$Y_i = A_i L_i^\gamma$$

monopolistic competition (still)

$$P_i = \frac{\sigma_i}{\sigma_i - 1} \cdot \tau_i \cdot \frac{w}{\gamma A_i L_i^{\gamma-1}}$$
TFPR and TFPQ

Hsieh and Klenow (2009)

\[
\text{TFPR}^*_{i} \equiv \frac{P_i Y_i}{L_i} \propto \tau_i
\]

\[
\text{TFPQ}^*_{i} \equiv \frac{(P_i Y_i)^{\sigma}}{L_i^{\sigma - 1}} \propto A_i \cdot Q_i
\]

Haltiwanger, Kulick and Syverson (2018)

\[
\text{TFPR}_i \equiv \frac{P_i Y_i}{L_i^\gamma} \propto \frac{\sigma_i}{\sigma_i - 1} \cdot \frac{\tau_i}{L_i^{\gamma - 1}}
\]

\[
\text{TFPQ}_i \equiv \frac{Y_i}{L_i^\gamma} \propto A_i
\]
Why do we care?

- **non-CRS**
  - \( \text{TFPR}^* \propto \text{VMP} \text{ even when } \gamma \neq 1 \)
  - Must deviate from isoelastic production (e.g. via overhead labor) to drive a wedge between TFPR* and VMP
  - But matters for aggregate productivity gains/losses!

- **non-CES**
  - Can matter for aggregate productivity losses/gains!
  - Implications for policy and innovation (e.g. Peters, 2017)

- **Quality vs. process efficiency**
  - Matters for modeling (Hottman, Redding & Weinstein, 2016)
HKS data and key findings

11 detailed Census of Manufacturing NAICS

Crucially, data on quantities ⇒ can infer average unit prices

Key findings:

- $$\hat{\gamma} = 1.00$$ (not even overhead costs?)

- $$\hat{\sigma}_i \downarrow$$ with quantity ⇒ markups $$\uparrow$$ with TFPQ*

- dispersion in $$\hat{\sigma}_i$$ accounts for 21% of TFPR dispersion

- the bulk of TFPQ* dispersion comes from $$Q_i$$ (not $$A_i$$)
No theorem says markup dispersion always leads to misallocation.

But it does lead to misallocation in these environments:

- Baqee and Farhi (2017)
  - isomorphic to $\tau_i$ under CES
  - estimate 50% productivity loss

- Peters (2017)
  - Bertrand competition with innovation

- Haltiwanger, Kulick and Syverson (2018)

Used in Gopinath and Itskhoki (2011) and Klenow and Willis (2016)

Features a “superelasticity” (the elasticity of the elasticity).

I set this superelasticity to -2/3 to mimic HKS estimates.

Get 25% of TFPR* dispersion from markups (close to their 21%).

**RESULT:** Only 34% aggregate productivity gain from eliminating TFPR* dispersion in Kimball economy vs. 44% in CES economy.
Margins of misallocation

- “Static” misallocation
  - Inputs misallocated among existing producers
  - Focus of Hsieh and Klenow (2009)

- Extensive margin misallocation
  - The wrong producers enter and/or exit
  - Atkeson and Burstein (2010), Fattal-Jaef (2010)

- Dynamic misallocation
  - Producers do not make the right productivity investments
Remaining dispersion in $\tau_i$

- Misallocation
  - financing frictions (e.g., Midrigan and Xu, 2014)
  - taxes and subsidies (Fajgelbaum et al., 2016)
  - ...

- Misspecification
  - adjustment costs (Asker, Collard-Wexler and De Loecker, 2014)
  - overhead costs that differ by $i$
  - ...

- Mismeasurement
Distortions may be endogenous to TFPQ

Two more HKS (2018) facts:

- $\hat{\tau}_i$ is $\uparrow$ in TFPQ*

- Exit is $\uparrow$ in $\hat{\tau}_i$ conditional on TFPQ*

Not surprising if financing constraints and firing costs.

Why? Expect $\text{corr}$(TFPQ*, growth of TFPQ*) $> 0$
Indian formal manufacturing plants, 1983–2013

Contains quantities (and therefore average unit prices)

Find the HKS facts on steroids:

- TFPR* is strongly ↑ in TFPQ*

- corr(TFPQ*, growth of TFPQ*) ⪆ 0

- Exit is strongly ↑ in TFPR* conditional on TFPQ*

- TFPQ* reflects quality much more than process efficiency

- Exit ↓ with quality, but not process efficiency
Measurement error in India

*Misallocation or Mismeasurement?*

- 2017 working paper with Mark Bils and Cian Ruane
- Additive measurement error (or overhead costs)
- Manufacturing plants in India, 1985–2011
- After correcting for measurement error:
  - TFPR dispersion is cut by 50%
  - Misallocation is reduced by 40%
Recap on Haltiwanger, Kulick and Syverson

- Provide evidence of markups ↑ in TFPQ*

- Show that TFPQ* reflects quality more than process efficiency

- Estimate RTS close to 1

- These estimates are useful for:
  - Quantifying the role of markup dispersion in misallocation
  - Gauging productivity losses from TFPR* dispersion
  - Modeling firm heterogeneity and growth