Discussion of

# The Sources of Capital Misallocation

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# Capital misallocation

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- In the data, Hseih and Klenow (2009) wedges:

$$\tau_{it}^{K} \equiv \log \frac{VA_{it}}{K_{it}}$$

are hugely dispersed across plants within industry-time periods seemingly indicating **misallocation and aggregate TFP loss**

# This paper

- This paper argues that the bulk of Hsieh and Klenow (2009) **capital misallocation wedges**:
  1. **cannot** be explained by adjustment costs
  2. are due to “other” firm-specific factors
  3. this is true for both China and the US

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- I agree with the authors!

## General environment

- Planner's static allocation goal:

$$\max U(\mathbf{Q}; \xi) \qquad \text{s.t.} \qquad Q_i = \mathcal{Q}_i(K_i, L_i, M_i; A_i)$$

- First order condition

$$\lambda_i \frac{\partial \mathcal{Q}_i}{\partial K_i} = \lambda_K$$

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- Note that, in general, $t_i^K$ is not the same as $\tau_i^K$, that is:

$$\frac{VA_i}{K_i} \qquad \neq \qquad \frac{\lambda_i}{\lambda_K}\frac{\partial \mathcal{Q}_i}{\partial K_i}$$

## General environment

- Reasons for

$$\frac{VA_i}{K_i} \quad \neq \quad \frac{\lambda_i}{\lambda_K}\frac{\partial \mathcal{Q}_i}{\partial K_i}$$

1. Output elasticities $\varepsilon_i^K$ and $\varepsilon_i^M$ differ across plants
   - differences in technologies and returns to scale
   - non-constant-elasticity technologies

2. Prices that do not reflect marginal values ($P_i/\lambda_i$, $P_{Ki}/\lambda_K$, $P_{Mi}/\lambda_M$), e.g. due to markups or non-CES aggregation

3. Measurement error, including more broadly:
   - mismeasurement of capital due to depreciation, capacity utilization, quality
   - fixed costs and non-variable inputs
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- How did empirical misallocation literature take off?!

# Non-structural look at the data

- Assume value-added production in logs:

$$y_{it} = a_{it} + \gamma[\alpha k_{it} + (1-\alpha)\ell_{it}]$$

and capital and labor wedges

$$\tau^k_{it} = y_{it} - k_{it} \qquad \text{and} \qquad \tau^\ell_{it} = y_{it} - \ell_{it}$$

1. "First-best" benchmark (both in level and in changes)

$$y_{it}, k_{it}, \ell_{it} \;\propto\; a_{it} \qquad \text{and} \qquad \tau^k_{it} = \tau^\ell_{it} = 0,$$

2. No adjustment benchmark:

$$\Delta k_{it} = \Delta \ell_{it} = 0 \qquad \text{and} \qquad y_{it}, \tau^k_{it}, \tau^\ell_{it} \;\propto\; a_{it}$$

# Non-structural look at the data

## US Compustat

1. Variation in levels (panel):

| | $y_{it}$ | $k_{it}$ | $\ell_{it}$ | $\tau^k_{it}$ | $\tau^\ell_{it}$ |
|---|---|---|---|---|---|
| $\mathrm{var}(\cdot)$ | 5.91 | 5.55 | 4.40 | 1.13 | 0.81 |
| $\mathrm{corr}(y_{it}, \cdot)$ | | **0.90** | **0.93** | **0.28** | **0.52** |

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2. Contribution of fixed effects:

| $\bar{y}_i$ | $\bar{\tau}^k_i$ | $\bar{\tau}^\ell_i$ |
|---|---|---|
| 81% | **59%** | **58%** |

3. Correlated wedges $\mathrm{corr}(\tau^k_{it}, \tau^\ell_{it}) = 0.61$ and $\mathrm{corr}(\bar{\tau}^k_i, \bar{\tau}^\ell_i) = 0.60$

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4. Variation in changes (time-series):

| | $\Delta y_{it}$ | $\Delta k_{it}$ | $\Delta \ell_{it}$ | $\Delta \tau^k_{it}$ | $\Delta \tau^\ell_{it}$ |
|---|---|---|---|---|---|
| $\mathrm{var}(\cdot)$ | 0.25 | 0.12 | 0.10 | 0.21 | 0.23 |
| $\mathrm{corr}(y_{it}, \cdot)$ | | **0.12** | **0.41** | **0.77** | **0.82** |

# More specific comments for the authors

1. Test directly the Euler equation for investment
2. More general productivity process:

$$a_{it} = \bar{\mathbf{a}}_{\mathbf{i}} + \rho a_{i,t-1} + \mu_{it}$$

3. Hard-to-interpret decomposition:

$$\tau_{it} = \gamma \mathbf{a}_{\mathbf{it}} + \chi_{\mathbf{i}} + \varepsilon_{it}$$

4. Markup measurement assumes no misallocation of inputs
5. Technology differences limited to relative capital-labor intensity