The Causes and Costs of Misallocation

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Why do living standards differ so much across countries?

Main cause: large differences in productivity.

- **Slow diffusion** of technologies and best practices.
  - Examples: out-dated machines or methods in agriculture, manufacturing or services.

- **Misallocation**: low-income countries are less effective in allocating their factors of production to their most efficient use.
  - Examples: Corruption, regulation, direct government involvement distorting the allocation of resources.


Outline

1. What are the main causes of misallocation?
   - Statutory provisions, corruption, market imperfections.

2. How important is misallocation as a source of productivity differences across countries?
   - Indirect approach.

3. What are the costs associated to misallocation?
   - Direct approach.
What are the main causes of misallocation?
Let’s start with an easy example.

- N heterogeneous producers of an homogeneous good.

\[ y_i = A_i f(l_i, k_i) \]  

- Fixed cost of producing c.

**Channels affecting aggregate output and productivity.**

- **Technology channel:** Reflects differences in \( A_i \).

- **Selection channel:** Threshold rule \( A_i > \bar{A} \).

- **Misallocation channel:** Equalization of \( MPK_i \) and \( MPL_i \) across producers.
What is misallocation?
Factors that interfere with the equalization of marginal products.

- **Tax code and Regulations.**
  - Size/age dependent provisions of taxes, tariffs to certain goods, employment protection measures, etc.
- **Crony capitalism or Corruption.**
  - Subsidies, tax breaks, unfair bidding process, etc.
- **Market Imperfections.**
  - Monopoly power, market frictions, enforcement of property rights, etc.
- **Other**
  - *Talent misallocation:* Discrimination, culture, social norms, etc.
Measuring Misallocation

- **Direct Approach.** Focus on a specific source of misallocation and assess their consequences → **Cost of misallocation.**
  - **Pros:** Reach concrete and specific conclusions of practical policy relevance.
  - **Cons:** Very sensitive to the modelling choice; need for quantitative measures of the underlying source of misallocation.

- **Indirect Approach.** Identify the extent of misallocation without identifying the underlying source of misallocation → **Importance of misallocation.**
  - **Pros:** No full model required; easy to compute with cross-sectional data.
  - **Cons:** Doesn’t address selection; sensitive to measurement errors; existence of adjustment costs or delayed learning of productivity.
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How important is misallocation?
How important is misallocation? - Results using Indirect Approach

Hsieh and Klenow (2009)

- Standard model of monopolistic competition with heterogeneous firms.

\[
\pi_{si} = \max \left\{ P_{si}, K_{si}, L_{si} \right\} (1-\tau Y_{si}) P_{si} A_{si} K_{si}^{\alpha_s} L_{si}^{1-\alpha_s} - w L_{si} - (1-\tau K_{si}) R K_{si}
\]

- Each firm produces one differentiated good valued by consumers according to a CES aggregator

\[
Y_s = \left( \sum_{i=1}^{M_s} Y_{si}^{\sigma-1} \right)^{\frac{\sigma}{\sigma-1}} ; \quad Y = \prod_{s=1}^{S} Y_s^{\theta_s}
\]
How important is misallocation? - Results using Indirect Approach

Hsieh and Klenow (2009)

- Marginal Revenue Product of Labor:

\[ MRPL_{si} = (1 - \alpha_s) \frac{\sigma - 1}{\sigma} \frac{P_{si} Y_{si}}{L_{si}} = \frac{w}{1} \frac{1}{1 - \tau Y_{si}} \]

- Marginal Revenue Product of Capital:

\[ MRPK_{si} = \alpha_s \frac{\sigma - 1}{\sigma} \frac{P_{si} Y_{si}}{K_{si}} = \frac{R}{1 - \tau Y_{si}} \]
How important is misallocation? - Results using Indirect Approach

Hsieh and Klenow (2009)

- **Revenue Total Factor Productivity (TFPR):**
  \[
  \text{TFPR}_{si} = P_{si} A_{si} = \frac{P_{si} Y_{si}}{K_{si}^{\alpha_s} L_{si}^{1-\alpha_s}}
  \]

- **Physical Total Factor Productivity (TFPQ):**
  \[
  \text{TFPQ}_{si} = A_s = \frac{Y_{si}}{K_{si}^{\alpha_s} L_{si}^{1-\alpha_s}}
  \]
How important is misallocation? - Results using Indirect Approach


Findings:

- Large effects of misallocation on TFP. If misallocation were eliminated, TFP in manufacturing would increase by 86–110% in China, 100–128% in India, and 30–43% in the United States.
  - Might be overestimated!
- Misallocation is correlated with various observables.
- High-productivity producers are too small in all three economies.
## Indirect Approach - Limitations

1. **Heterogeneity in production functions across producers.**

2. **Existence of adjustment costs and transitory firm-specific shocks.**

3. **Measurement errors.**
Indirect Approach - Limitations

1. **Heterogeneity in production functions across producers.**
   - All producers in same sector use same Cobb-Douglas prod. function.
     - They could be using different production methods!
   - Hsieh and Klenow (2009) shown this implies less misallocation, but the remaining still implies large productivity losses.
Indirect Approach - Limitations

2.- Existence of adjustment costs and transitory firm-specific shocks.

- Assume their level is constant across countries → Compare differences in misallocation.

- Asker et al. (2014) → Observed dispersion in MRP can be due to: adj. cost on $k +$ transitory firm-level shocks more variable in poorer countries.

- David and Venkateswaran (2017) → Use panel data for China, with convex adjustment costs, find most of cross-sectional variation in MRP is due to policy distortions.
Indirect Approach - Limitations

   - Hsieh and Klenow carry out robustness tests → While not conclusive, they do not support this interpretation.
   - Bils et al. (2017) → After accounting for measurement error, productivity differences between India and US are very similar to what Hsieh and Klenow found.
What are the costs of misallocation?
What are the costs of misallocation? - Using Direct Approach

1.- Regulation.

- Duality and Informality.
  - *Busso, Fazzio and Levy* (2012). Find informal firms are less productive than formal ones.
  - *Leal Ordoñez* (2014). Increasing enforcement would increase TFP by 4%.
- Reallocation across space.
What are the costs of misallocation? - Using Direct Approach

2.- Property Rights and Land Reforms.
   • Adamopoulos and Restuccia (2015). Reform in Philippines imposing farm size cap → Reduced farm size (34%) and agricultural productivity (17%).

3.- Trade and Competition.
   • Pavcnik (2002). Reduction in trade-barriers in Chile increased productivity by 19%.
   • Edmond et al. (2015). Taiwanese manufacturing data: moving from autarky to free trade decreases mark-up heterogeneity and increases TFP by 12%.
What are the costs of misallocation? - Using Direct Approach

4.- Financial Frictions.

- *Midrigan and Xu (2014)*. Small losses from misallocation, but potentially sizable losses from inefficiently low levels of entry and technology adoption.
- *Gopinath et al. (2015)*. 3% drop of TFP in Mediterranean countries after 1999 is accounted for by financial frictions.

5.- Imperfect Information, Imperfect Insurance and Imperfect Enforcement.

- David, Hopenhayn, and Venkateswaran (2016).
- Caselli and Gennaioli (2013)
Discussion

- Indirect approach estimates much larger effects of misallocation as compared with direct approach, even taken together.
  - Indirect approach overestimates misallocation.
  - Impossible to isolate a single dominant factor driving misallocation → Interaction and amplification?.
  - Direct approach models may no capture well potential sources of misallocation.
Additional Consequences of Misallocation
Factors causing misallocation may also influence **selection** and **technology adoption** → Not captured by the simple indirect method!

**Some papers**

- **Trade liberalizations.** Technology investment- *Bustos (2011).*
- **Financial Frictions.** Distorted occupational decision- *Buera et al. (2011)*; technology investment- *Midrigan and Xu (2014).*
- **Firing costs.** Endogenous choice of innovation- *Da-Rocha, Tavares, Restuccia (2016).*
- **Indirect method.** Life-cycle investment in productivity improvements - *Hsieh and Klenow (2014).*
Summing up
Summing up

- Misallocation is an **important channel** accounting for productivity differences across countries → Measured magnitude depends on the approach!
  - Indirect approach measured misallocation is more than an order of magnitude greater than losses associated with specific policies or institutions using the direct approach.
- There are **many specific factors** contributing to misallocation.
- Dynamic effects of misallocation are key: interaction with **selection** and **technology adoption**.
Thank you!