From Micro to Macro: Entry Barriers, Resource Misallocation, and Aggregate Productivity

Roberto N. Fattal Jaef

World Bank
Development Research Group, Macroeconomics and Growth (DECMG)

May 7th, 2021

Disclaimer: the views expressed in this presentation are my own and do not necessarily represent those of the World Bank or its member countries
Income per Worker Relative to USA

Source: Penn World Tables v10.0 year 2019

- Argentina 36%, Brazil 28%, Chile 44%, Colombia 26%, Mexico 36%
Development Accounting: The Role of TFP

GDP per worker = $TFP \times F(\text{Physical Capital, Human Capital})$

Factors
What Drives Productivity Differences Across Countries?
Micro to Macro

\[ Z_1 \ast F(k_1, h_1) \quad Z_3 \ast F(k_3, h_3) \]
\[ Z_2 \ast F(k_2, h_2) \quad Z_4 \ast F(k_4, h_4) \]
From Micro To Macro

- Allocation of K,H to maximize output?
- Barriers to this allocation?
- Useful to understand TFP
Efficient Allocation and Free-Entry

\[ MRP_1 = MRP_2 \]

Entry Cost = Net Present Value Profits

Production Possibilities Frontier

Size Distribution of Firms

USA
Idiosyncratic Distortions and Barriers to Entry

Idiosyncratic Distortion:
* Financial Frictions
* Labor Regulation

Entry Barrier
* Entry Regulation
* Incumbents blocking access to inputs

\[ MRP_1 \times Distortion_1 = MRP_2 \times Distortion_2 \]

\[ Entry Cost \times Barrier = Net Present Value Profits \]
• Interaction between firms, frictions, policies → theory of TFP
• Frictions and policies manifest on firm size distribution

Are there differences in size distribution across countries? Can we use these to infer entry and allocative distortions?
Firm-Level Data

- Representative firm-level data, manufacturing formal firms

- Manufacturing Censuses of 10+ worker firms
  - Chile, Colombia, El Salvador, Peru
  - Ghana, Ethiopia, Kenya
  - Bangladesh, India, Malaysia, Pakistan

- Amadeus: countries with representative size distribution
  - Belgium, Bulgaria, Finland, France, Hungary, Italy, Latvia, Portugal, Romania, Spain
Cross-Country Differences in Average Size?

- Smaller firms in poorer countries
- Promising starting point for distortions as theory of TFP

How large is each type of distortion?
How much of TFP difference they account for?
Inferring Distortions: A Theory Based Approach

Firm size distribution contains information about distortions

1. Propose model of size distribution calibrated to USA
2. Use micro data to identify distortions

\[ MRP_i \times Distortion_i = MRP_j \times Distortion_j \]

\[ Entry \ \text{Cost} \times Barrier = Net \ \text{Present Value Profit} \]

Identify distortion pair that matches size distribution in data
• Evidence of resource misallocation from high to low productivity firms in developing countries?
• Evidence of entry barriers in developing countries?
Evidence on Misallocation and Entry Barriers

![Graph showing misallocation and entry barriers across countries, with a scatter plot of log GDP per capita versus various economic distortions and barriers.]

- **Misallocation**
  - Countries: Bangladesh, Belarus, Bulgaria, Chile, Ethiopia, Finland, France, Ghana, Hungary, India, Italy, Kenya, Latvia, Malaysia, Pakistan, Peru, Portugal, Romania, Salvador, Spain, Colombia, Bangladesh, and India.

- **Entry Barriers**
  - Countries: Kenya, Australia, Belgium, France, Finland, Italy, Spain, and Belgium.

The graph plots countries on the horizontal and vertical axes, showing their log GDP per capita against productivity-dependence distortions and model-based entry barriers, respectively.
From Micro to Macro

Aggregate Effects of Entry Barriers and Misallocation
Aggregate Productivity Gains from Removing Distortions

![Graph showing productivity gains from removing distortions across various countries](image)

- Countries: Belgium, Bulgaria, Chile, Ethiopia, Ghana, Hungary, Italy, Kenya, Latvia, Peru, Portugal, Romania, Salvador, Spain, Colombia, Portugal, Bangladesh, India, Pakistan, Bangladesh, Bulgaria, Hungary, Malaysia, Pakistan, Portugal, Romania, Salvador, Colombia, Portugal, Belgium, Finland, Italy, France.

- Metrics: log GDPpc, TFP-efficient / TFP-distorted.

Aggregate Productivity Gains from Removing Distortions

![Graph showing productivity gains for various countries](image-url)

- Countries: Belgium, Portugal, Belgium, Bulgaria, Chile, Colombia, Ethiopia, Finland, France, Ghana, Hungary, India, Italy, Kenya, Latvia, Malaysia, Pakistan, Peru, Portugal, Romania, Salvador, Spain, Portugal, China, Ethiopia.

- The graph plots the fraction of the TFP gap closed against the ratio of TFP(USA) to TFP(i) minus 1.

- The countries are represented by red points on the graph.
What is behind the Model-Based Entry Barriers and the Idiosyncratic Distortions?

- Natural reactions: “all very nice, but....”
  1. What’s behind all these distortions?
  2. How to fix them?
- A discussion coming, but pause to appreciate the progress
  - Development accounting only recently feasible, still improving
  - Opening “black-box” of TFP not trivial:
    - integrate industry dynamics in general equilibrium
    - firm-level data
    - numerical methods
Model-Based Entry Barriers and Idiosyncratic Distortions: Connection with actual policies and frictions?
Model-Based Barriers and Entry Regulation

- Model’s entry barriers vs WB’s Doing Business’ entry cost
Model-Based Barriers and Entry Regulation

- Model’s entry barriers vs WB’s Doing Business’ entry cost
TFP Gains from Removing Model-Based Barriers vs Entry Regulation

- Differential TFP gains model-based barriers vs regulation?
Idiosyncratic Distortions and Specific Policies and Frictions

- Extensive literature on causes of idiosyncratic distortions
- Labor regulations (firing costs, size-dependent labor costs)
  - Hopenhayn and Rogerson (1993), Garicano, Lelarge and Van Reenen (2013)
  - Accounts for little misallocation, small aggregate effects
- Size-dependent taxation
  - Bachas, Fattal-Jaef, Jensen (2019)
  - Small productivity losses from size-dependent tax enforcement
- Financial Frictions
  - Small effects on misallocation, large effects on TFP when interacted with technology adoption

Misallocation combines multiple sources, country specific
Useful diagnostic to rank reforms and prioritize
BACK-UP SLIDES
Decomposition TFP Gains: Misallocation vs Entry Barriers
Validation 1: Implications for Life-Cycle Dynamics

Employment relative to Age=1

- USA
- France
- Ghana
- India
Validation 2: Implications for Top of Size Distribution

Share of firms with more than 250 workers

Model vs. Data

Belgium, Bulgaria, Chile, Ethiopia, Finland, France, Ghana, Hungary, Kenya, Latvia, Peru, Portugal, Romania, Salvador, Spain, Bangladesh, Colombia, India, Indonesia, Pakistan, etc.

0.0 0.1 0.2 0.3

Model

Data

Share of firms with more than 250 workers

0.0

0.1

0.2

0.3

gains
Measurement of Average Size: Controlling for Production Structure

- Need to control for differences in production structures within manufacturing

\[ AvSize = \sum_{s=1}^{S} AvSize_s \times \frac{M_s}{M} \]

- Theory is silent about cross-country differences in \( \frac{M_s}{M} \)

Strategy: aggregate according to the U.S.’ distribution of firms

\[ AvSize^{FD} = \sum_{s=1}^{S} AvSize_s \times \left( \frac{M_s}{M} \right)^{US} \]