Market Imperfections, Wealth Inequality, and the Distribution of Trade Gains

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Motivation (I)

Globalization and inequality in LDCs:

- Many less-developed countries (LDCs) experienced strong increases in inequality in the aftermath of significant liberalization steps (see, e.g., Goldberg and Pavcnik, 2007)

- Available evidence suggests that particularly incomes at the top end of the distribution increased disproportionately:
  - India in the early 1990s (Banerjee and Piketty, 2005):
    - top-1.00% share: 7% → 11%
    - top-0.01% share: 0.5% → 2%
  - Mexico in the late 1980s (Lopez-Acevedo and Salinas, 2000):
    - top-1.00% share: 9% → 14%
    - top-0.01% share: 0.9% → 1.9%

- Interestingly, these distributional changes go in the opposite direction from the one suggested by conventional wisdom

“Learning from a decade of reforms”:

- There is substantial empirical evidence on a positive relationship between trade and economic development, at least in the long run (see, e.g., Winters, 2004)
“Learning from · · ·” (continued):

- However, many development economists would probably agree that LDCs would be ill-advised to “rush through” comprehensive import liberalization as prescribed in the 1980s and 1990s

- Instead, it is argued (e.g., Stiglitz and Charlton, 2005; Rodrik, 2008) that trade liberalization should · · ·
  - follow a step-by-step approach that takes into account specific local conditions
  - involve an assessment of complementary reforms
- · · · in order to make (further) liberalization steps more likely to be “successful”

- Given the paramount role of credit market imperfections in development (economics), looking at the interaction between · · ·
  - credit market imperfections
  - trade liberalization
- · · · is of obvious importance
This Paper in a Nutshell (I)

Focus and setting:

- This paper is on the distributional consequences of trade liberalization among firm owners
- We assume an environment that is characterized by · · ·
  - credit market imperfections that tie a firm owner's borrowing capacity to his wealth
  - an uneven distribution of the “productive asset” (capital) among firm owners
  - the fact that integration into the world economy enhances goods-market competition
- These attributes are particularly relevant in less-developed countries:
  - Credit market imperfections are a central feature of poor economies, and there is strong evidence that not only small firms are affected (see, e.g., Banerjee and Duflo, 2010)
  - A fair amount of evidence documents that many low-income countries suffer from high levels of inequality, even within the “entrepreneurial class” (see, e.g., Tybout, 2000)
  - Firms in LDCs might be particularly prone to lose market power because they produce goods that tend to be less innovative (see, e.g., Acemoglu and Zilibotti, 2001)

Main findings:

- Asymmetric impact of trade liberalization on firm owners’ incomes (and welfare):
  - Owners of relatively small firms (borrowers, import-competing) lose
  - Owners large firms (lenders, export-oriented) win
Main findings (continued):

- Owners of the smallest firms lose most (in relative terms) while the owners of the largest firms gain most (in relative terms) – which means that income inequality surges

- The more unequal the distribution of the “productive asset” (capital), and hence the more unequal the firm-size distribution, the larger the number of “losers” of liberalizing trade

Intuition:

- When a country opens up to trade, owners of large firms are no longer restricted to the small domestic market which forced them to charge low relative prices

- Instead, with open markets, large firms can sell any quantity at the prevailing (higher) world market price and hence are induced to increase firm sizes and to become exporters

- This increase in firm sizes leads to an increase in the demand for and hence price of capital – which hurts the owners of small firms since they rely heavily on borrowed capital

- Moreover, the owners of small firms no longer can benefit from relatively high domestic prices since their goods are no longer “scarce” but can be imported from abroad
Outline

Overview of the talk:

- Motivation
- This Paper in a Nutshell
- Basic Assumption and Implications
- Equilibrium in the Closed Economy
- Open Economy – Assumptions
- Adjustments in the Open Economy
- Winners and Losers – Intuition
- Comparative Static Results
- Discussion and Conclusions
Assumptions and Implications (I)

Preferences, technology, industry structure:

- Continuum of individuals $i$ (measure 1) which differ regarding their capital endowment ("wealth") $\omega_i$ and their production possibilities.

- The capital endowments are distributed according to the distribution function $G(\omega)$ which gives the measure of the population with wealth less than $\omega$.

- Each individual is a monopoly supplier of a differentiated good $j$ and has access to a simple linear technology (which requires only capital, $k$):
  
  \[ \text{output of good } j = k(\omega_j) \]

- The individuals' utility function has the familiar CES-form:
  
  \[ U = \left[ \int_0^1 \left( \theta_j^1 \omega_j^{(\sigma-1)} c_j^{(\sigma-1)\sigma} dj \right)^{\sigma/(\sigma-1)} \right]^{(\sigma-1)/\sigma}, \text{ where } \sigma > 1 \text{ (and here } \theta_j = 1 \text{ } \forall j ) \]

Implications (given the size-distribution of firms):

- Equilibrium goods prices (with the CES price index normalized to 1):
  
  \[ p_j = Y^{1/\sigma} k(\omega_j)^{-1/\sigma} \]
Assumptions and Implications (II)

Implications · · · (continued):

- Equilibrium aggregate output:
  \[ Y = \left[ \int_0^1 k(\omega_j)^{\sigma-1}/\sigma \, dj \right]^{\sigma/(\sigma-1)} \]

Credit market:

- Individuals may lend and borrow in an economy-wide credit market
- The credit market is · · ·
  - competitive in the sense that the individuals take the borrowing rate \( \rho \) as given
  - imperfect in the sense that borrowing at the equilibrium rate may be limited
- The credit rationing arises because of imperfect enforcement of credit contracts:
  In the event of default, borrower \( j \) loses only a fraction \( 0 \leq \lambda \leq 1 \) of the revenue \( p_j(k_j)k_j \)
- Polar cases:
  - \( \lambda = 0 \): nonexistent credit market
  - \( \lambda = 1 \): perfect credit market
Assumptions and Implications (III)

Implications:

- Default does not occur in equilibrium (→ lenders will provide finance only up to the point where the borrower just pays back)

- Maximum firm size (max. amount of credit) \( \bar{k}(\omega, \rho, Y) \) is strictly increasing and concave in \( \omega \):
  
  \[
  \frac{\partial \bar{k}(\omega, \cdot)}{\partial \omega} > 0 \quad \text{and} \quad \frac{\partial^2 \bar{k}(\omega, \cdot)}{\partial \omega^2} < 0
  \]

- The fact that \( \bar{k} \) is increasing and concave in \( \omega \) is an implication of the credit market imperfection:
  - Since punishment is a fraction of total output (which is produced from borrowed and own capital), richer individuals can offer a higher collateral and therefore borrow more
  - Since the marginal return falls with the size of the investment, the positive impact of an additional endowment unit on the borrowing capacity decreases
Equilibrium in the Closed Economy with Imperfect Capital Markets (I)

Firm sizes: In equilibrium (→ Figure 1) · · ·

➢ firm sizes are given by:

\[
k(\omega) = \begin{cases} 
\tilde{k}(\omega) & : \omega < \tilde{\omega} \\
\tilde{k} & : \omega \geq \tilde{\omega}
\end{cases}
\]

where \( d[p(\tilde{k})] / dk = \rho \)

➢ there are credit-rationed entrepreneurs if:

\[
\lambda < \frac{\sigma - 1}{\sigma}
\]

The credit market equilibrium: The interest rate adjusts such that (→ Figure 2):

\[
K^D(\rho) \equiv \int_0^\infty k(\omega, \rho) dG(\omega) = \int_0^\infty \omega dG(\omega) \equiv K^S
\]

Equilibrium incomes are given by (→ Figure 3):

\[
y'(\omega) = \begin{cases} 
(1 - \lambda)p(\tilde{k}(\omega))k(\omega) & : \omega < \tilde{\omega} \\
\rho(\tilde{k})\tilde{k} + (\omega - \tilde{k})\rho & : \omega \geq \tilde{\omega}
\end{cases}
\]
Equilibrium in the Closed Economy with Imperfect Capital Markets (II)

Figure 1 – Borrowers, lenders, and firm sizes

a. Borrowers and lenders

\[ g(\omega) \]

- Credit-rationed
- Unconstrained

b. Firm sizes

\[ k(\omega) \]

- Credit-rationed
- Unconstrained
Equilibrium in the Closed Economy with Imperfect Capital Markets (III)

Figure 2 – Credit market equilibrium
Figure 3 – Equilibrium incomes
The Open Economy – Assumptions

Central question:

Distributional consequences (in the South) of an integration into the North’s competitive goods markets

Assumptions:

- South produces a subset of the continuum \( n \geq 1 \) of goods that is competitively produced in the North (\( \rightarrow \) North has more variety and is able to produce all the goods the South can produce)

- The integration into the Northern goods market is perfect (\( \rightarrow \) trade barriers are cut back to zero and no other obstacle such as tariffs or transportation costs exist so that the law of one price holds)

- Capital is immobile across the two regions (but the credit market in the North is “perfect” and the capital endowment is “large” relative to that in the South)

- North has access to the same technology

- Moreover, also under free trade, we normalize the CES price index to 1:

\[
P \equiv \left[ \int_0^n \left( \phi^j (j) \right)^{1-\sigma} \, dj \right]^{1/(1-\sigma)} = 1
\]
Adjustments in the Open Economy (I)

Adjustment of production and prices:

- Due to the symmetric preferences, worldwide production (and hence worldwide investment in the production) of each good must equalize in equilibrium.

- Relatedly, in the South, the prices of all goods must equalize so that all relative prices adjust to 1 (→ since \( P = 1 \) and the number of varieties is \( n \), the uniform goods price is \( p^I = n^{1/(\sigma - 1)} \)).

Adjustment of firm sizes and the interest rate (in the South):

- The big firms, which faced “low” domestic prices under autarky, can now sell any quantity they like at the higher prevailing world market price.

- The owners of the big firms cut back on their lending to poorer entrepreneurs, increase their firm sizes, and export parts of their production.

- The interest rate in the South rises from \( \rho^* < 1 \) to \( p^I = n^{1/(\sigma - 1)} > 1 \).

- The owners of small firms have to reduce their investments so that part of the demand for their products has to be imported.

Individual incomes: As a result of these adjustments, individual incomes in the South are now given by:

\[
y^I(\omega) = n^{1/(\sigma - 1)}\omega
\]
Figure 4 – Winners and losers of a trade liberalization

Adjustments in the Open Economy (II)
Winners and Losers – Intuition (I)

Under autarky (→ Figure 9):

- Owners of big firms (i.e., capital-rich monopolists) · · ·
  - face low domestic prices
  - act as lenders
  · · · because they are large relative to the home market

- Owners of small firms (i.e., poorly capitalized and credit-rationed monopolists) · · ·
  - face high domestic prices
  - are borrowers
  · · · because they are small relative to the home market

- Uneven supply of the different varieties

Impact of the integration:

- Owners of big firms are no longer restricted to the small home market which forced them to charge “low” prices and to lend at “low” rates (→ instead, they can now sell at the higher world-market price)

- Owners of small firms experience a drop in their prices (→ because their goods are no longer “scarce”) and simultaneously the cost of borrowing increases
Winners and Losers – Intuition (II)

Figure 5 – Prices and quantities under autarky
Comparative Static Results

Figure 4 – Wealth distribution and the gains from international trade

a. Two wealth distributions

b. Two income functions

\[ g(\omega) = \frac{1}{1 - \sigma} \omega \]

Initial wealth, \( \omega \)

Distribution A (more equal)

Distribution B (more unequal)
Summary and Conclusions (I)

Broad perspective:

- Existing work on trade and inequality in LDCs primarily focuses on the impact of trade on relative factor rewards and the wage distribution.

- This paper looks at the distributive consequences of economic integration within the group of firm owners (which make up a significant fraction of the labor force in poor economies).

A move from autarky to free trade divides the class of firm owners into two groups:

- Owners of big firms (capital-rich agents) win because free trade means:
  - large demand at constant and higher world market prices
  - more even supply of goods than under autarky

- Owners of small firms lose because free trade means (besides a better supply of goods):
  - lower prices for their own products
  - higher borrowing costs

A more unequal distribution of wealth means:

- a larger number of losers
Summary and Conclusions (II)

A more unequal distribution means · · · (continued)

- a stronger impact on the income distribution:
  - The poorest firm owners lose more (in relative terms)
  - The richest firm owners win more (in relative terms)

The model’s implications may provide insights into some empirical findings:

- The model predicts a strong increase in income inequality among firm owners – and in particular a surge in top incomes
- The model predicts that a large fraction of the firm owners face a reduction in income and welfare – so that LDC-governments might be reluctant to liberalize trade

The road ahead:

- New paper on the impact of trade liberalization on firms’ technology choices (a liberalization-induced decrease in mark-ups may worsen small firms’ access to technology)
- Informing the debate within the WTO on which developing countries deserve “special and differential treatment” (i.e., lighter market access obligations)