Trade and Development under Imperfect Financial Markets

by

Spiros Bougheas and Rod Falvey

School of Economics and GEP, University of Nottingham

Introduction

- **Globalization Trends:** Industrialized nations 1991-2000 (Source: Evans and Hnatkovska, 2005)
  - Gross capital flows have increased by 300% (FDI and portfolio 600%, bonds 130%)
  - Trade flows have increased by 63%
  - GDP has increased by 26%
- The regional or global spread of recent financial and currency crises - Mexican 1994 and East Asian 1997 twin-crises, Brazilian and Russian 1998 currency crises, and the current global banking crisis - has been, in part, attributed to the increased world wide flows of capital (especially portfolio)

- These events have a great impact on economic development and inequality. However, the **Globalization - Income Inequality** relationship is poorly understood (World vs National): Milanovic (2005)

- These events also suggest that **Financial Market Frictions** are too important to be ignored.

- **Question 1:** How do imperfections in capital markets affect the relationship between trade liberalization and development?

- **Question 2:** How do imperfections in capital markets affect the relationship between financial integration and development?

- **Question 3:** How do imperfections in capital markets affect the two-way relationship between inequality and development?

This Paper

- Technological Choice - Development
- Comparative Advantage - Development
- Heterogeneous Agents - Inequality
- Imperfect Capital Markets
- Trade Liberalization and Financial Integration - Globalization

Building the Model

- Closed Economy -
  - Two-sector Holmstrom and Tirole (2006)
- Trade - Two-Sector Comparative Advanatage with Heterogeneity
  - Davidson and Matusz (2006)
  - Bougheas and Riezman (2007)
- Financial Integration
  - Antras and Caballero (2009)

Autarky

- There are two sectors: *Manufacturing* (X) - numeraire and *Primary* (Y) - price P

- There is a continuum of heterogeneous risk-neutral agents
  - *capital* endowments: $A \sim U[[\mu - x, \mu + x]$

- Every agent is also endowed with one unit of *labour*

- Preferences: homothetic - equal shares

Technologies

- Primary: CRS: one unit of labour yields one unit of output

- Manufacturing
  - *Low-tech*: CRS: one unit of capital yields one unit of output
  - *High-tech*: Increasing returns risky technology (with both fixed and variable inputs)

The Risky Technology (Merging the Holmstrom-Tirole Fixed and Variable Investment Models)

Fixed cost: K units of physical assets; Variable investment: I

Return RI when it succeeds and 0 when it fails.

Probability of success: p_H (exerts effort) or $p_L(< p_H)$ (shirks) - $\Delta p \equiv p_H - p_L$;

Additional benefit BI when shirking

Occupational Choice

- Agents have 3 choices:

1. Use their labor to produce one unit of the primary commodity and invest their assets in the low-tech technology

2. Use their labor to produce one unit of the primary commodity and lend their assets to entrepreneurs

3. Become entrepreneurs and borrow additional assets from lenders

Imperfect Capital Markets (effort is not observable)

Lender's zero profit condition:

$$p_H R_l = (I + K - A)R^E \quad or \quad p_H(RI - R_b) = (I + K - A)R^E$$

Entrepreneur's incentive compatibility constraint

$$p_H R_b \geqslant p_L R_b + BI \quad or \quad (\Delta p)R_b \geqslant BI$$

Equilibrium Investment

$$I = \frac{(A-K)R^E}{R^E - p_H\left(R - \frac{B}{\Delta p}\right)}$$

Closed Economy Equilibria

Optimal Employment Choice

- $p_H \frac{B}{\Delta p} I$: income if entrepreneur (incentive compatibility constraint binds)
- $P + AR^E$: income if employed in primary sector
- If $A > A^*$ entrepreneur; where

$$A^* = \frac{p_H \frac{B}{\Delta p}}{p_H R - R^E} \left(\frac{P}{R^E} + K \right) - \frac{P}{R^E}$$

Financial Market Equilibrium (market clearing interest rate)

$$\int_{\mu-x}^{A^*} A dA = \int_{A^*}^{\mu+x} (I + K - A) dA$$

Goods Market Equilibrium (relative price) - Primary Market

Supply: A producer consumes an amount equal to $\frac{\frac{1}{2}(P+AR^E)}{P}$ and hence offers for sale $1-\frac{\frac{1}{2}(P+AR^E)}{P}=\frac{1}{2}\left(1-\frac{R^E}{P}A\right)$.

Demand: Each entrepreneur demands an amount $\frac{\frac{1}{2}p_H\frac{B}{\Delta p}I}{P}$.

$$\int_{\mu-x}^{A^*}\frac{1}{2}\left(1-\frac{R^E}{P}A\right)dA=\int_{A^*}^{\mu+x}\left(\frac{(\frac{1}{2}p_H\frac{B}{\Delta p}I}{P}\right)dA$$

2 Types of Equilibria

- *Weakly Financially Constrained with Complete Specialization Equilibrium:*
  - All producers of the primary commodity invest their physical assets in the financial market
  - Only entrepreneurs produce the manufacturing good
  - Entrepreneurs would like to borrow more however any additional funds will violate the incentive constraint

2 Types of Equilibria (cont)

- *Strongly Financially Constrained with Partial Specialization Equilibrium*
  - The gross interest rate would have to drop below 1 in order to clear the financial market when all capital is lent to entrepreneurs
  - However, in that case producers of the primary commodity would prefer to invest in the low-tech technology
  - Thus in equilibrium some capital is invested in the low-tech technology
  - A redistribution of physical assets from the poor to the rich can increase welfare by allocating more capital to the high-tech technology
  - Agency costs prevent the market from reaching the same outcome

Proposition 1 *An* **increase in agency costs** *(deterioration in the quality of financial institutions) will cause*

(a) a **decline in the interest rate**, *and*

(b) for sufficiently high K, a **decline in the price of the primary commodity**

International Trade

- P^*: world price of the primary commodity
  - $P > P^*$: the economy will export the manufacturing good
  - $P < P^*$: the economy will export the primary commodity

Proposition 2 *Economies with* **better quality financial institutions** *are more likely to* **export manufacturing products**

Proposition 3 *Under complete specialization an* **increase in the world price of the primary commodity** *results in a* **decline in the equilibrium interest rate**

- An increase in the price of the primary commodity induces some of the agents who before the change where producing the manufacturing good using the high-tech technology and were thus borrowers to enter the primary sector and become lenders

Corollary 1 *Economies that* **export manufacturing products** *are more likely to be* **completely specialized**

Corollary 2 *Economies that* **export manufacturing products** *have a higher degree of* **financial development**

Financial Integration

- r^*: wotld interest rate
  - $r > r^*$: capital inflow
  - $r < r^*$: capital outflow

Proposition 4 *Economies with* **better quality financial institutions** *are more likely to have a* **surplus in their capital account**

Proposition 5 *An* **increase in the world interest rate** *results in a decline in the* **price of the primary commodity**

- An increase in the interest rate induces some agents to quit the manufacturing sector and find employment in the primary sector. The employment switch also implies that production of the primary commodity increases while that of the manufacturing good declines and thus the autarky price declines

Proposition 6 *Financial integration can lead to a change in the patterns of trade*

Globalization

Proposition 7 Trade Flows *and* **Capital Flows** *are comolements*

- Differences in the quality of financial institutions are equivalent to differences in technology

Variations in Endowments

Proposition 8 *Suppose that there is* **freee capital mobility**. *Then either an* **increase in per capita wealth** *or an* **increase in inequality** *will result in an* **increase in the price of the primary commodity**

Proposition 9 *Suppose that there is* **freee trade**. *Then either an* **increase in per capita wealth** *or an* **increase in inequality** *will result in an* **increase in the interest rate**

Globalization and Inequality

Proposition 10 *For countries with* **better quality financial institutions, globalization** *leads to* **higher inequality**

Emerging Economies - BRICs

- Suppose that agency costs are lower in country **A** than country **B** and consider the case where **B** has a lower interest rate but a higher primary commodity price.
  - Country **B** exports the high-tech product and experiences an outflow of capital. The poor gain form financial market integration but lose from trade liberalization. But this presumes that foreign income is fairly distributed. If not inequality will definitely increase.