

Optimality, relative factor endowments and distortions from trade

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Classical questions

- Compare market outcome and social optimum;
- Source of distortions;
- Gains from trade.

Motivation and objectives

- There is a huge number of positive analyses of trade in the literature.
- However, only few authors studied optimality of free trade equilibria (Dhingra and Morrow, 2013; Behrens and Murata, 2012).
- In addition, the impact of technological structure on optimality and gains from trade has hardly ever been studied.

What we do

- Develop a two-factor general equilibrium model with variable mark-ups;
- Study how market integration affects the market outcome and welfare;
- Provide a characterization of social optima.

The model

Assumptions

- Economy involves **two countries** (H and F), **two factors** (labor and capital) and **one sector**
- L is a number of agents in each country.
- K_H and K_F are capital endowments, $K_H > K_F$.
- Each consumer in country i owns one unit of **labor** and K_i/L units of **capital**.

Consumers

Follow Krugman (1979), Vives (1999) and Zhelobodko et al. (2012) we assume non-specific additive utility function:

$$U_i = \int_0^{N^i} u(x_k^{ii}) dk + \int_0^{N^j} u(x_k^{ji}) dk, \quad i = H, F,$$

Each consumer maximizes utility under the budget constraint:

$$\int_0^{N^i} p_k^{ii} x_k^{ii} dk + \int_0^{N^j} p_k^{ji} x_k^{ji} dk \leq E.$$

Technology

- Total **production cost** of each firm located in country i :

$$C_i = C_i(w, \pi, y),$$

where π is the capital price, w is wage, while y is output.

- We study two special cases:
 - **Substitutability** of factors: technology is of Cobb-Douglas type:

$$C_i = (F + cy) \cdot w^\alpha \cdot \pi^{1-\alpha}, \quad 0 < \alpha < 1.$$

- **Perfect complementarity** of factors: each manufacturing firm has a fixed requirement of F **unit of capital** and a marginal requirement of c **units of labor**.

Results: Optimum and gains from trade

Substitutable factors

Proposition 1

The market outcome in closed economy yields lower (higher) output and over-(under) provision of varieties compared to the social optimum if and only if $\varepsilon_v(x)$ is decreasing (increasing) in x .

Note, market outcome is **optimal** only under CES preferences.

Complementary factors

Proposition 2

Equilibrium in a closed economy is **always socially optimal**.

Two types of distortions:

- 1 Equilibrium price is above marginal cost.
- 2 Positive capital price.

These two distortions cancel out each other.

Why equilibrium is optimal?

- Common belief is that distortions in monopolistic competition models arise due to **increasing returns** to scale.
- However, under **complementarity of factors** there is no room for distortion since the number of firms is pinned down by capital stock.
- As a result, the degree of substitutability of factors **matters**.

Gains from trade opening

Proposition 3

Trade opening always **increases** global welfare.

Unlike in the CES models, there are **two channels** that change global welfare when economy switches **from autarky to free trade**:

- 1 Increase in the number of varieties which leads to increasing global welfare;
- 2 Changes in prices and incomes.

Free trade patterns

Proposition 4

In the capital-abundant country, the price of capital is lower, and wages are higher independent of substitutability or complementarity of factors, i.e.

$$w > 1, \pi^H < \pi^F.$$

- Free trade per se is not enough for factor prices equalization.
- Recall individual incomes in Home and Foreign

$$E_H = w + \frac{K^H}{L} \cdot \pi^H, \quad E_F = 1 + \frac{K^F}{L} \cdot \pi^F.$$

Whether income is **higher** in Home or in Foreign depends on **capital endowments differential** across countries.

Optimum under free trade: complementary factors

- The optimum levels of outputs are equal to the equilibrium ones.
- However, the levels of individual consumption are not equal.
- Despite the fact that trade opening increases global welfare, **equilibrium is not social optimum**. Moreover,

Proposition 5

Market outcome is optimal if and only if incomes are equal across countries.

- Thus, individual incomes' inequality creates a **new distortion**.

Concluding remarks

- **Proposition 5** does not hold under substitutable factors: in addition, we need CES.
- Since opening trade increases global welfare **at least one country gains from trade**.

TBD

- Compare welfare in each country in closed economy case and in free trade equilibrium.
- Study two-sector economy.
- The impact of non-additive preferences.

Thank you for your attention!