# Trade and development

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# Introduction

Voluminous literature highlighting static-welfare gains from trade

Ambiguity on the relationship between trade and growth:

- The old learning-by-doing literature led to an analysis of the theory of the infant industry protection
- Recent models of learning-driven movement up to the quality ladder of goods claims the same argument

We will use a simple comparative-static exercise to illustrate the effect of growth on the terms of trade between a rich and a poor country

We will analyse the pro-competitive effect of trade liberalization on output expansion in the context of imperfect competition and a vertical industrial structure based on Venables (1996)

# A simple model

2 countries: North/rich, $N$ and South/poor, $S$

Complete specialization: $S$ produces and exports a primary commodity, $m$ and $N$ a manufacturing good, $c$ (numeraire)

Trade deficit, $D$ for $S$ is given by

$$D = Lz_c(y, 1/p) - \bar{L}px_m(\bar{y}, p) \geq 0 \tag{1}$$

where, $z_c$ is per capita import of $c$ in $S$
$x_m$ is export of $m$ by the South per person in the rich country
$L$ and $y$ are population and income in $S$
$\bar{L}$ and $\bar{y}$ are population and income in $N$
$p = p_m/p_c$

# A simple model

Denoting a $\wedge$ over a variable to represent percentage change in it, we get

$$\hat{D} = a\hat{p} + b \tag{2}$$

where,

$$a = M\eta - N(1 - \bar{\eta})$$

with $M = Lz_c/D$; $N = \bar{L}px_m/D$; $M \geq N$
$\eta$ is price elasticity of demand for import in $S$
$\bar{\eta}$ is price elasticity of demand for import in $N$ and

$$b = Me_c\hat{y} - N\bar{e_m}\hat{\bar{y}} + M\hat{L} - N\hat{\bar{L}}$$

$e_c$ is the income elasticity of demand for the good $c$ in $S$
$\bar{e_m}$ is the income elasticity of demand for the good $m$ in $N$

# A simple model

With the Marshal-Lerner stability condition for international equilibrium $(\eta + \bar{\eta} > 1)$ $a > 0$
With Engel's law in both countries: $e_m < e_c$ and $\bar{e_m} < \bar{e_c}$
If $\hat{L} > \hat{\bar{L}}$ and
There is a growth objective such as: $\hat{y} > \hat{\bar{y}}$
Then $b > 0$
From (2), if a poor country does not want its trade deficit to grow,

$$\hat{p} \leq -b/a \quad (3)$$

## Liberalization vs import substitution

Hence, terms of trade will decline for the poor country if there is a growth objective and the trade deficit doesn't grow

# Venables' model

Venables(1996)

- Import substitution may hurt the economy in poor countries by blocking the discipline of international markets on domestic production efficiency
- Trade liberalization has a pro-competitive effect impacting on output expansion
- Causal mechanism:
  - More competition put pressure on the managers to cut costs
  - More competition reduce expected market share of the firm, deterring cost-reducing innovations
- In developing countries where imports of inputs are vital, trade liberalization can make a special case for the beneficial pro-competitive effects

# The Model

- Two industries:
  1. Upstream industry X which supplies an intermediate good that is used in the downward industry Y
  2. Downstream industry Y which produce a final output

- Y is a tradable good, under CRS, perfect competition in both output and input markets, $q$ is the price of Y (international price plus taxes or tariffs)
- Let us assume that $q$ is given by

$$q = p^{\mu} w^{1-\mu} \tag{4}$$

where $\mu$ is the share of the intermediate good in the total value of the final output

# The Model

- At output level $Y$, the demand for inputs are given by $X = \mu q Y / p$ and $L = (1 - \mu) q Y / w$
- Supply of X can be provided either from domestic firms at $p$-price or from imports at $\bar{p}$-price
- The domestic X-sector is composed by a number (endogenous) of Cournot-oligopolistic firms each using $(bx + f)$labour units per unit of output (IRS)
- Profits of the representative firm is given by

$$\pi = px - w(bx + f) \tag{5}$$

# Closed economy equilibrium

- $\bar{p}$ is prohibitively high
- $n$ is the number of identical firms producing X ($X = nx$)
- Equilibrium condition (MC=MR):

$$p(1 - \frac{1}{\epsilon n}) = bw \tag{6}$$

where $\epsilon$ is the elasticity of demand for upstream output and depends on the game played by X and Y firms (for simplicity we assume that both determine output simultaneously)

- $n$ in equilibrium is determined by free entry and exit in response to profits ($n$ is continuous)
- In equilibrium $p$ has to be the average cost:

$$p = w(b + f/x) \tag{7}$$

# Closed economy equilibrium

- If demand for intermediates is met by domestic supply:

$$nx = \mu q Y / p$$

- Using (6) and (7) to get $n^*$ and $p^*$:

$$n = \left( \frac{\mu q Y}{w f \epsilon)} \right)^{1/2} \tag{8}$$

$$p = wb / \left( 1 - \frac{1}{\epsilon} \left( \frac{w f \epsilon}{\mu q Y)} \right)^{1/2} \right) \tag{9}$$

- These equations capture the *demand linkage* and the *cost linkage* between the X and the Y industries
  1. Rising $qY$ will increase $X$, this attracting entry ($n$) (8)
  2. And this lowering $p$ (9)

# Open economy equilibrium

- Domestic firms cannot charge a price larger than $\bar{p}$: $p \leq \bar{p}$ (price constraint)
- If price constraint is binding, then domestic firms will sell at just less than $\bar{p}$ undercutting imports and taking the entire domestic market
- Now labour demand from Y plus labour demand from X is $L^D$

$$L^D = (1-\mu)qY/w + n(bx + f) = qY/w \qquad (10)$$

- If $\bar{L}$ is labour endowment, $\bar{L} - L^D$ is labour employed in the tradable rest of the economy (used as the numeraire) with diminishing marginal productivity of labour

$$w = MPL(\bar{L} - L^D) = w(qY)w' > 0 \qquad (11)$$

# Open economy equilibrium

Equilibrium: Inverting equation (4) and substituting wages we get the

DD curve which traces out the upstream industry's demand price for intermediates as a function of its output:

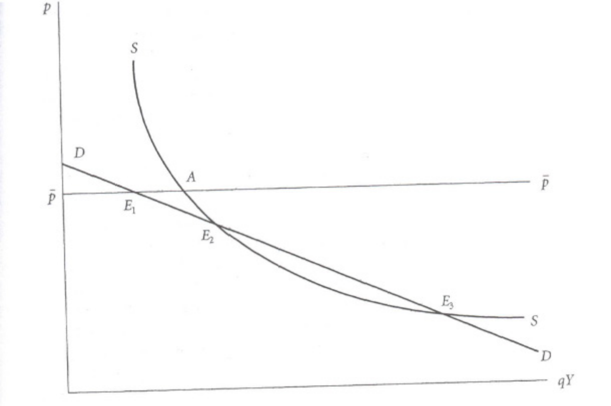
$$DD : p = q^{1-\mu}[w(qY)]^{(\mu-1)/\mu} \tag{12}$$

Substituting wages in (9) we get the SS curve which draws the supply of intermediates from the upstream industry (in the absence of import competition) as a function of downstream output:

$$SS : p = w(qY)b/\left(1 - \frac{1}{\epsilon}\left(\frac{w(qY)f\epsilon}{\mu qY}\right)^{1/2}\right) \tag{13}$$

# Venables's model

Figure: 1. Equilibrium



# Venables's model

3 equilibria:

1. At $E_3$ $p < \bar{p}$ and $qY$ is large (fierce competition)
2. At $E_1$ $p = \bar{p}$ and $qY$ is small (low competition)
3. At $E_2$ the equilibrium is unstable

# Policy

1. Protection policy in X sector: rising $\bar{p}$ contracts the protected industry
2. Trade liberalization in X sector: reducing $\bar{p}$ expands the liberalized industry
3. Protección policy in Y sector: rising $q$ (shift DD upwards):
   - The economy produces a higher $qY$
   - If the economy was at $E_1$ and it moves to $A$, then it will trigger expansion to $E_3$