LECTURE 9

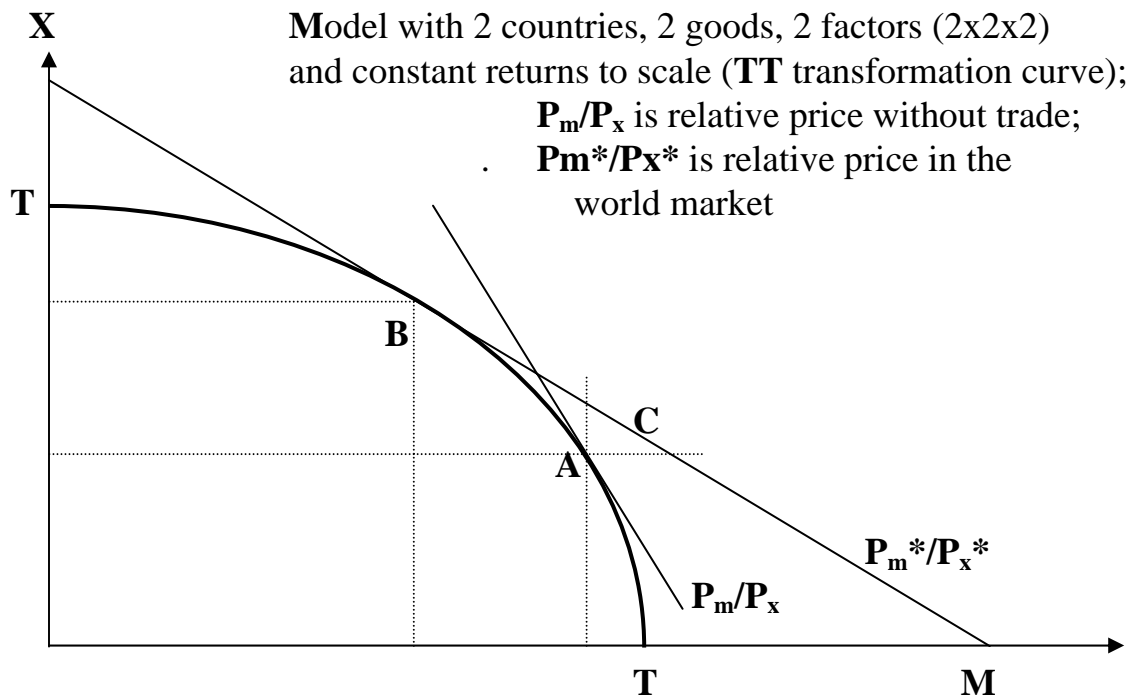## TRADE, AID, GROWTH AND DISTRIBUTION:

THEORY AND EVIDENCE

A. Introduction: Gains from Trade—and Cost of Protection—

in Static Models

B. Trade and Immiserizing Growth

C. Elements of New Trade-cum-Growth Theory

D. Trade Regime and Openness: Measurement Problems

E. World Bank Empirics

F. Trade Regime and Economic Growth: Edward's Model & Results

G. Foreign Aid – A Substitute for Trade?

Literature referred to, see last slide

[9.2] Figure 9.1. The Gains from Trade in the Static Model(s)

Two sources of gain for small countries:

    1) **Specialisation in production** in accordance with comparative advantage (move from **A** to **B**)

   2) Enlargement of the **consumption possibility set** (**C** > **A**)

X

Model with 2 countries, 2 goods, 2 factors (2x2x2) and constant returns to scale (**TT** transformation curve); **P$_m$/P$_x$** is relative price without trade; **Pm*/Px*** is relative price in the world market

T

B

C

A

P_m*/P_x*

P_m/P_x

T

M

The Cost of Protection in the Static 2x2x2 Model :

Protection of the import-competing industry (M) means that production will take place somewhere between **A** and **B** on the transformation curve. Trading on the world market price line means that consumption will be lower than at **C**, the free trade consumption possibility point.

[9.3] Figure 9.2. The Cost of Protection in the Import Competing (Industry) Sector (partial equilibrium)
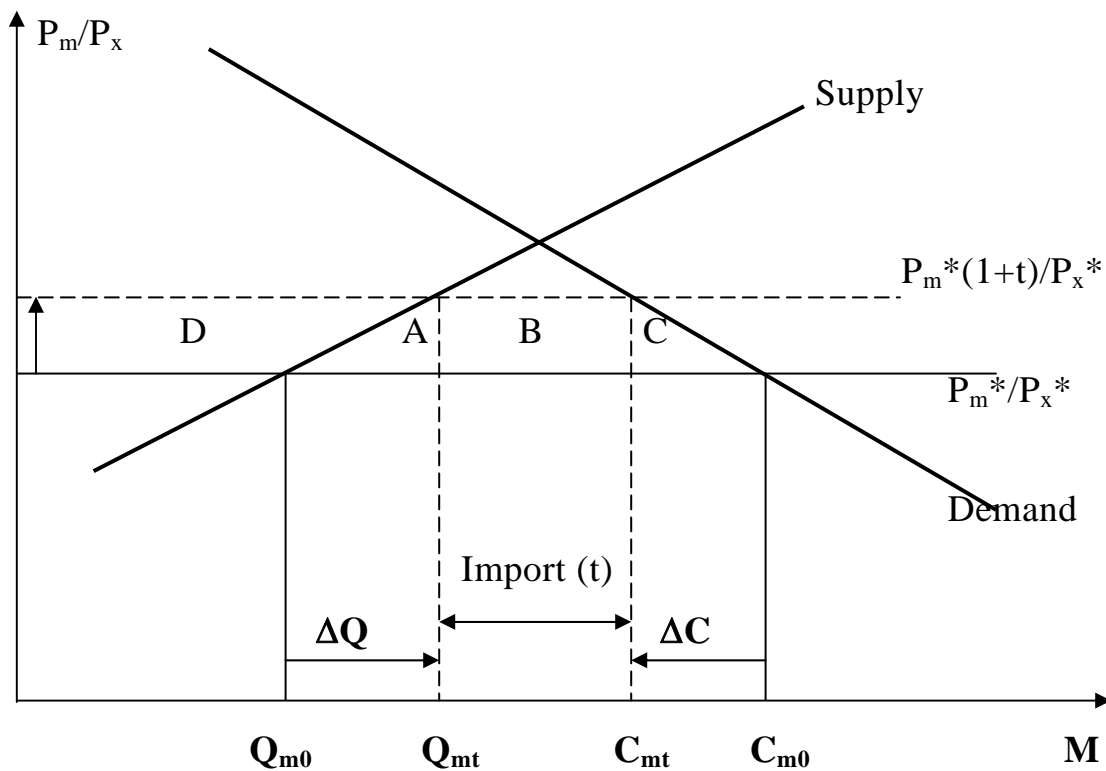
Three effects of a tariff (t) on production and consumption:

1) Imposing a tariff (t) means that the domestic relative price of M increases from the world market price P_m^*/P_x^* to the tariff-inclusive price $P_m^*(1+t)/P_x^*$;

2) Domestic production of the M good increases from Q_{m0} to Q_{mt};

3) Consumption falls from C_{m0} to C_{mt}.

[9.4] The Cost of Protection in the Import Competing (Industry) Sector (partial equilibrium): Empirical Estimates

In partial equilibrium (Figure 9.2) with **constant returns to scale**, two costs of protection arise:

1) There is a loss of **consumer surplus** due to the higher domestic price of M (**areas D, A, B and C**). Some of the loss of consumer surplus, however, is transfers: (1) a transfer (tariff revenue) from consumers to the treasury (rectangle **B**) and (2) from consumers to domestic producers (areas **D and A**). **The net loss of consumer surplus is hence C**.

2) The producers surplus is increased by D. More **resources** have to be used to produce Q_{m0} - Q_{mt} of the **M** good instead of importing this quantity (triangle **A**), which is the second cost of protection.

The total costs of protection (CoP) can be estimated simply as the size of the two "triangles" **A** and **C** as a ratio of GNI.

Almost all empirical attempts to derive estimates of CoP, be it on the basis of partial equilibrium or huge general equilibrium models, come up with estimates of **A** and **C** in the 1-2% range of GNI, because:

- Imports usually small share of GDP

- Tariffs and price increases usually in the 5-50% range

Note that this cost of protections is a once and for all allocation loss and nothing (so far) is said of the effects on **growth** of GNI.

[9.5] Figure 9.3. The Gains from Trade in a Static Model (2): Small Country and Economies of Scale (see Panagariya, 2002)
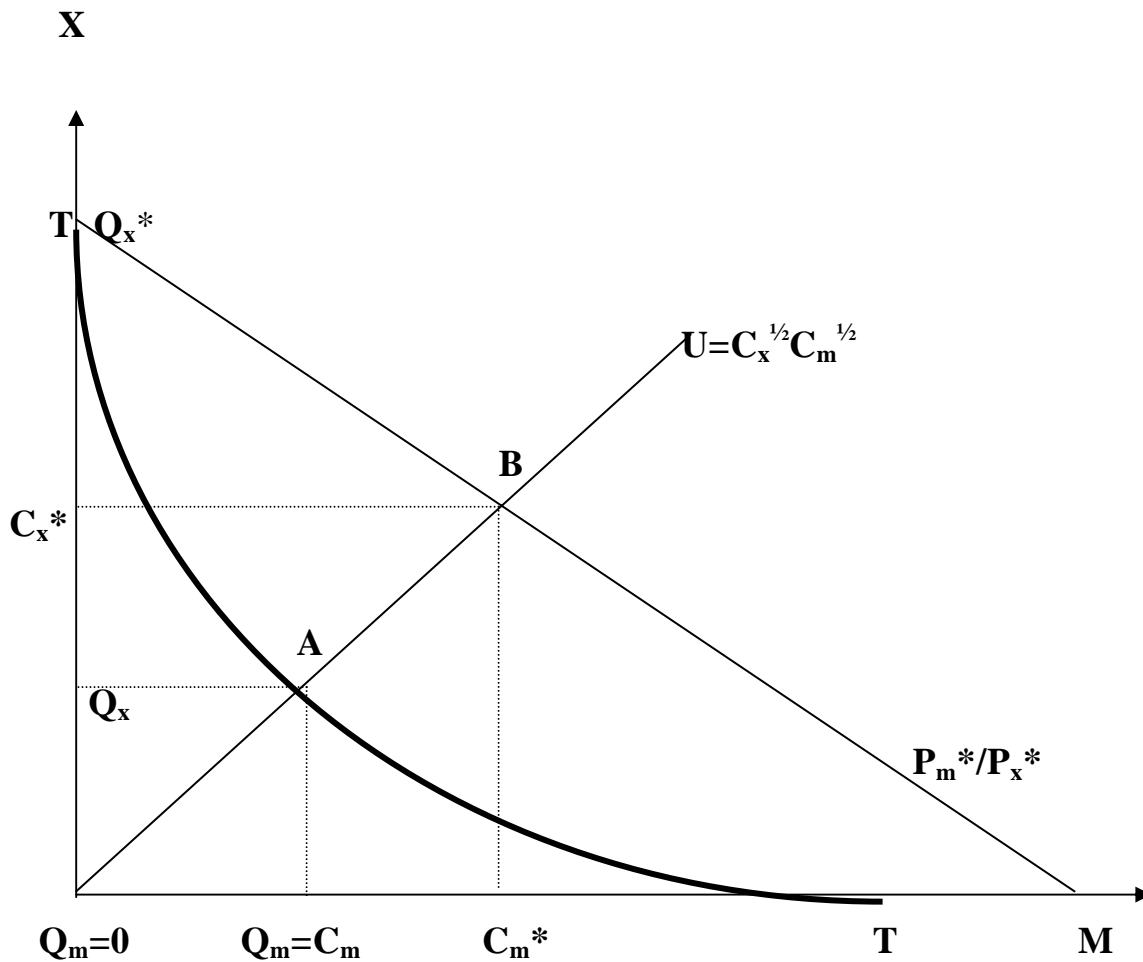
1) The transformation curve in this case is **convex** (economies of scale)
2) In the absence of trade, production = consumption at **A**
3) With trade, **complete specialisation** in production of **X**
4) Trade at world market price P_m*/P_x* and **consumption** at **B**

[9.6] The Cost of Protection in the Static Model with Economies of Scale

1) **Protection** in this model can be depicted by just reversing the comparison with the autarky and free-trade situations. With prohibitive protection (= no trade), consumption would fall from **B** to **A (Figure 9.3)**

2) As can be seen by the "proportions" in the graph, if economies of scale are large (say that costs decline by 1% as production is increased by 1 %), there will be large costs of not exploiting these (*not* pursuing free trade) **(Figure 9.3)**

3) Empirical estimations of the cost of protection in models with **economies of scale** and **many commodities and factors of production**, usually come up with higher estimates than derived from models assuming constant returns to scale. Still rather low, once and for all, costs of protection (or gains from free trade).

There must hence be **dynamic effects on growth** that matter!

(come back to)

[OH 9.7] Perceived gains from protection

<u>Recent</u>

The recent breakdown of the Doha round of trade negotiations signals that few countries are willing to give up remaining protection of certain industries. Why?

a) Protection can be a (second-best) method for redistributing income from consumers in general (who pay higher prices) to producers in certain industries (e.g. agriculture). See [OH 9.3]

b) Avoiding conceived structural unemployment (see [OH 9.2])

c) In many developing countries without ample export earnings from oil or valuable minerals, tariffs and other trade taxes make up a substantial share of total tax revenues. Other tax bases are usually thin and the cost of collecting other taxes higher and require more sophisticated bureaucracies than at hand. See [OH 9.3]

<u>Classical argument</u>**: Learning by doing, infant industry and avoidance of terms of trade losses [OH 9.8-9]**

[9.8] Figure 9.5: Terms of Trade Deterioration and Immiserizing Growth (note the reversal of the axis as compared to [9.2])

Import good

Export good
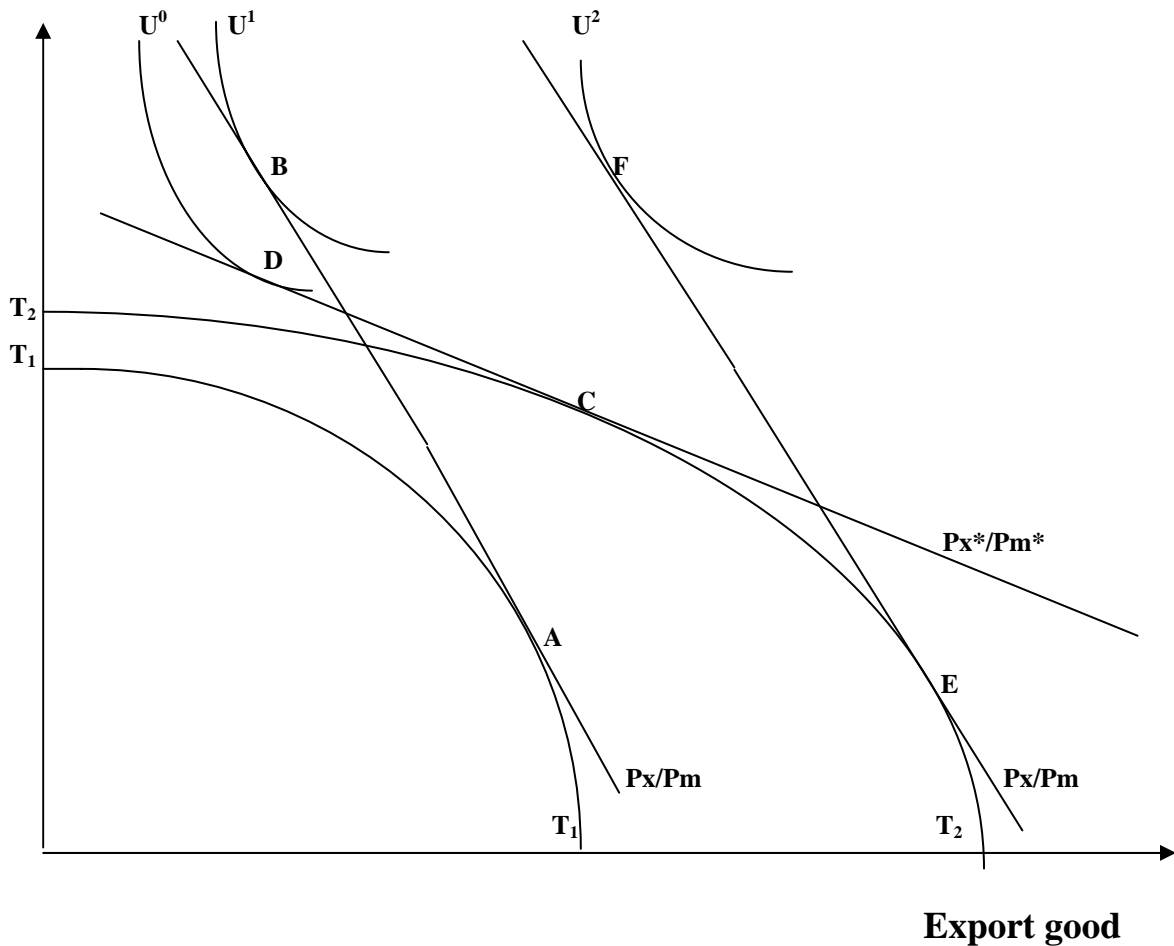
T_1-T_1 is the production transformation curve in period 1.

T_2-T_2 is the transformation curve in period 2, assuming that growth has been biased towards the export sector (in accordance with **static** comparative advantage).

(cont'd on next page)

[OH 9.9.] Terms of Trade Deterioration and Immiserizing Growth (comments to Figure 9.5):

Given the world market export/import price (P_x/P_m) in the first period, the country produces at **A** and consumes at **B**, enjoying utility level U^1. With *unaltered* relative price in period 2, the country would produce at **E** and consume at **F**, reaching utility level U^2.

If the price of the export good falls relative to the import good (the terms of trade deteriorate) to P_x/P_m*, the country will produce at **C** and consume at **D**, enjoying only utility level U^0. That is, despite growth in production capacity (from T_1T_1 to T_2T_2), the country has experienced a decline in welfare from U^1 to U^0 because of deteriorating terms of trade.

This was in essence the argument for protection of industry (so called import substitution), advanced by Singer (1950) and Prebisch (1952, 1956), to speed up the migration of labour from agriculture to industry a la Lewis.
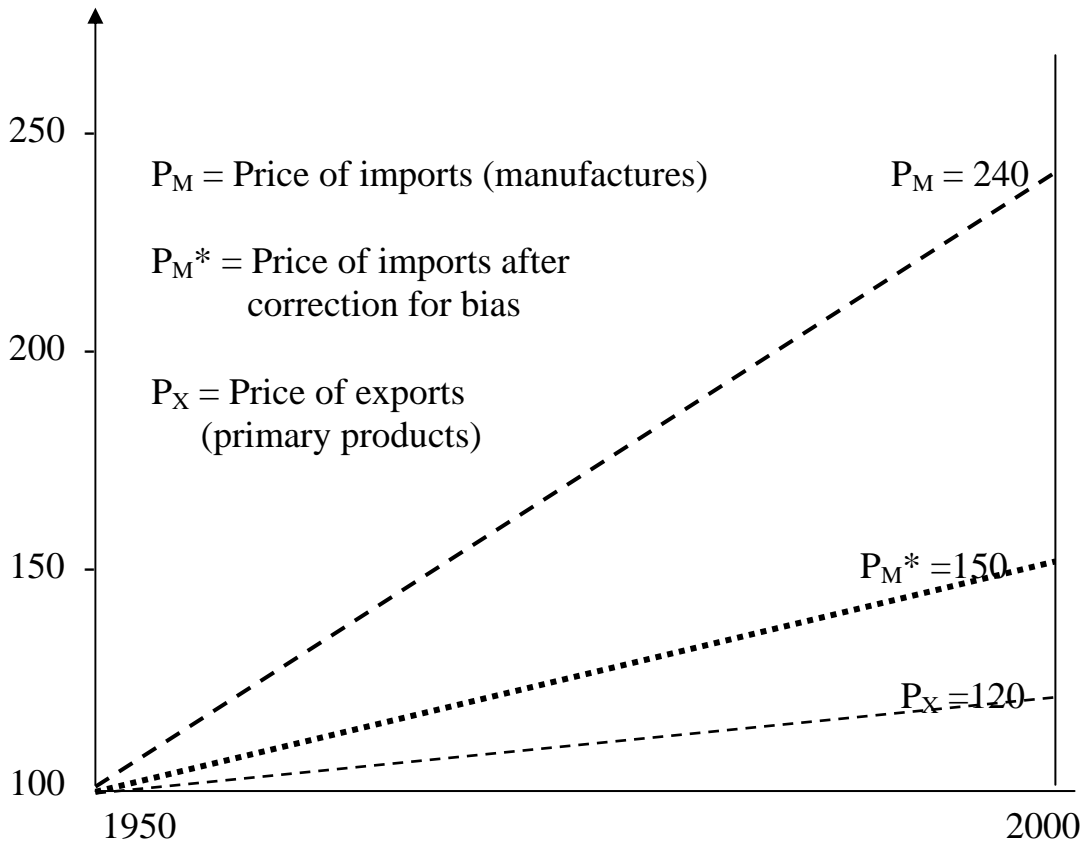
With practically no exception, all developing countries opted for protection of industry (inward-oriented industrialization) during the 1950s, 1960s and 1970s. Some still do. We will return to the empirical evidence.

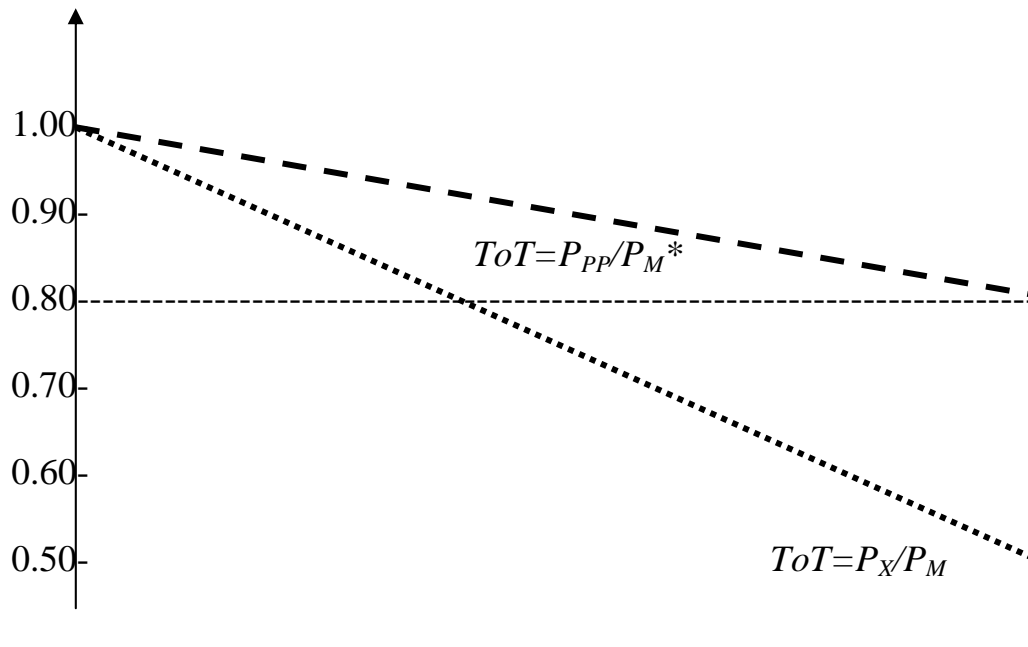What has actually happened to terms of trade?
Suggestion: Master thesis on estimating terms of trade with adjustment for inflation-bias?

[OH.9.9.a] Terms of Trade corrected for price bias

<u>Nominal</u> price index

P_M = Price of imports (manufactures)

P_M^* = Price of imports after correction for bias

P_X = Price of exports (primary products)

$P_M = 240$

$P_M^* = 150$

$P_X = 120$

250 –

200 –

150 –

100

1950   2000

Terms of trade deterioration (P_X/P_M)

1.00

0.90 –

0.80

0.70 –

0.60 –

0.50 –

ToT=P_{PP}/P_M^*

ToT=P_X/P_M

[9.10]   Elements of "New" Trade Theory

As the empirical evidence on small static gains from trade show, large gains — if any — must stem from "dynamic factors", e.g:

      * Boosts savings and investments

      * Stimulates the creation of human capita

      * Stimulates technological innovations and applications

Newer developments: alternative <u>static</u> models and <u>dynamic trade-cum-growth</u> models

a) Alternative static models

- Monopolistic competition and economies of scale

- Strategic trade and rent acquisition (Svedberg 1979)

b) Trade-cum-growth models (Edwards 1998)

- Enlargement of market size and economies of scale

   (factor accumulation, savings, investment, human capital)

- International competition and technology innovation

- International technology transfers and spillovers, imitation

Most of these "new" models predict (dynamic) gains from trade, but some points at mechanisms that brings gains from some degree of protection (see OH 9.8).

Empirical issue to find out the net effect!

[9.11] Main Empirical Problem: measuring protection or outward orientation (openness).

In recent articles Edwards (1998), Pritchett (1996), and Dollar and Kraay (2000b) list the following proxies for "openness":

1. **Average Tariff (AVGT)**

2. **Non-Tariff Barrier Frequency (NTBF)**

3. **Black Market Primium (Black)**

4. **Collected Trade Tax Ratio (CTR)**

5. **Structure Adjusted Trade Intensity (SATI)**

6. **Leamer's Openness Index (LOPX)**

7. **Leamer's Trade Distortion Index (LTDI)**

8. **Price Distortion (PRDS) (Dollar 1992)**

9. **Changes in trade shares of GDP (Dollar and Kraay 2000)**

10. **World Development Report Index**

11. **Sachs and Werner Index (dummy 0 or 1 for each year with "open" trade regime), based on five different indicators.**

[9.12] Measuring of outward orientation (openness) or degree of liberal trade regime (cont'd)

a) The first four are "simple" calculations of **tariff rates**, frequency distributions, discrepancy between official and black market price of dollars, different sources of tax revenue, etc

b) The next five measures (5-9) are derived from different models of factors "naturally" explaining openness - population, size of country, transport costs, etc). Openness is measured as the **residual** from the regression line:

OPEN = a + b POP + c Country Size + ... + x YYY + e

Figure 9.6. Estimated Openness (X + M)/GDP)
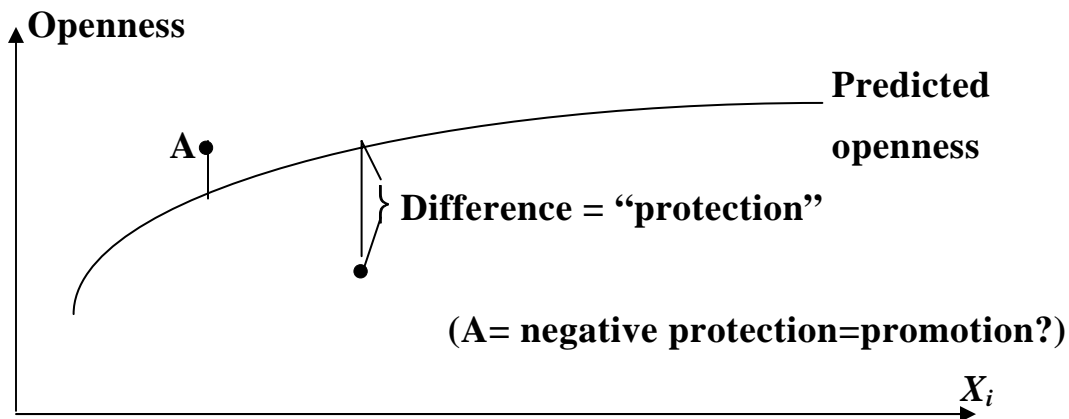
c) The last two (10-11) are **weighted averages** of different indicators of "protection".

The different proxy variables for "openness" are not well correlated (Table from Pritchett 1996 to be shown in class)

[9.13] World Bank's "Evidence" on *Trade and Growth* **(Dollar and Kraay 2000b)** (see www.globkom.net)

Investigation method: Comparing the **growth performance** 1980-1998 of "globalisers" since 1980 with other set of countries.
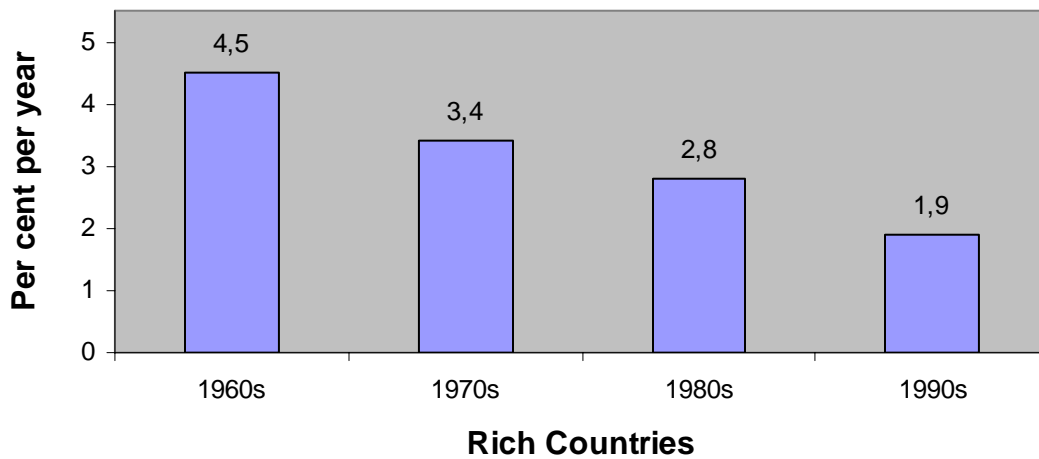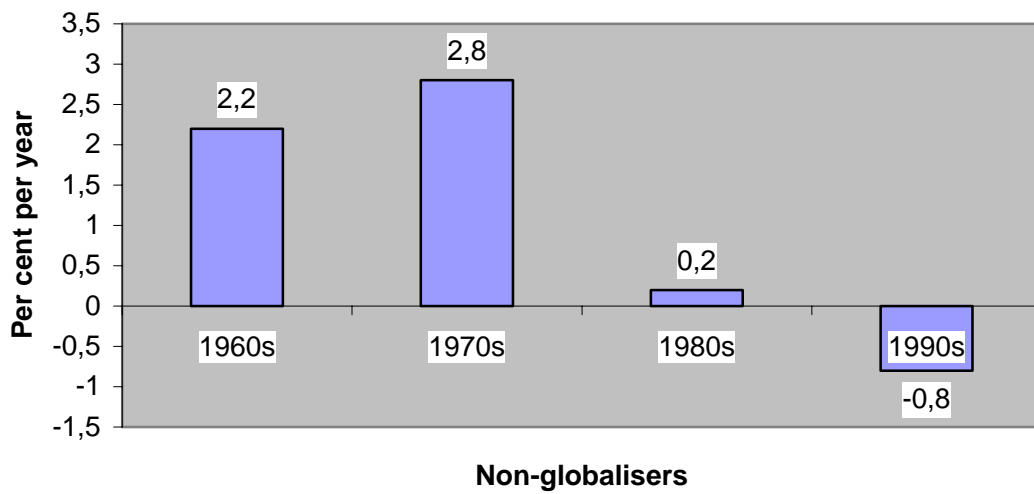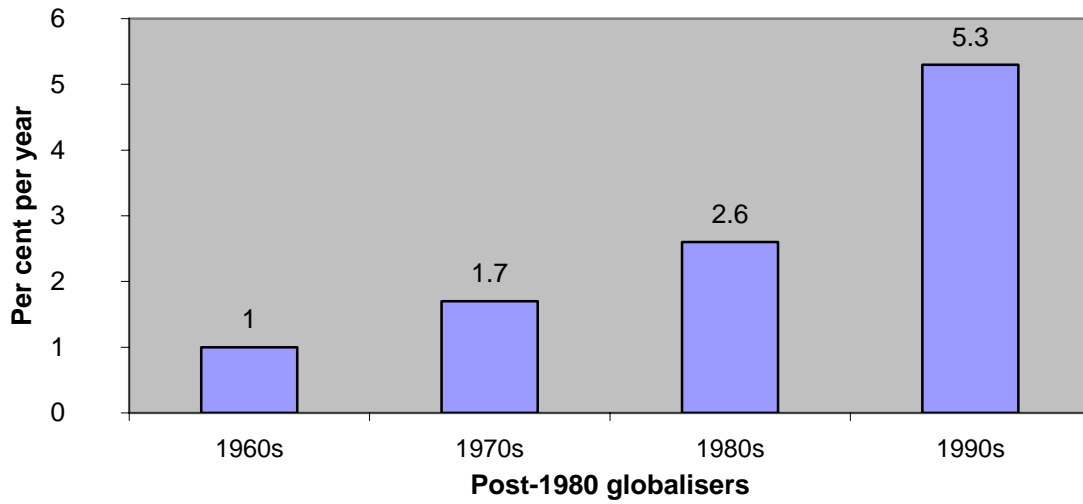
The globalisers are identified by two criterion:
a) Largest reduction of tariffs since 1980.
b) Largest increase in the share of trade (X+M) to GDP in same period.

Of the 40 countries that were found at the top of respective lists, the 18 countries that were on both lists, were classified as "globalisers".

Average growth rates for the "globalisers" (during four 10-year average periods) are compared with two sets of other countries: "non-globalisers" and the "rich" countries.

[9.14] Figure 9.7. Per Capita GDP Growth Rates by Decade **Three figures from D&K (2000b) depicting Main Results**

Post-1980 globalisers

Non-globalisers

Rich Countries

[9.15]   Objections to the D&K study (Dani Rodrik's, mine and, in all fairness, the qualifications made by D&K themselves)

a) Globalisers are identified by a mixture of **"input"** indicators of trade liberalisation (tariff reduction) and **"output"** indicators (change in the share of trade in GDP). *Ad hoc.*

b) **Omitted variable bias.** The test is simply $Y = f(\text{"globalisation"})$. Lots of **other reforms** than trade liberalisation were undertaken by the "globalisers", which are **not** taken into consideration.

c) Effects from the **demand side are ignored** (important for countries with a large share of world exports in a commodity).

d) The average growth for globalisers is **weighted** by the size of the population. This means that the weighted average will be completely dominated by two large countries: **China and India**.

e) Careful time-series investigation suggests the following **sequencing** in both China and India (according to Rodriguez and Rodrik 2000):
 multi-dimensional reforms $\Rightarrow$ growth $\Rightarrow$ trade share increases.

f) No correlation between relative **tariff reduction only and growth** across countries according to tests by Rodrik (2000).

Omitted variable bias and ignoring simultaneity mean little relevance of the World Bank study! Other methods are called for (next)

[9.16] Example of a Growth-cum-Trade Model: Edwards, 1998

Edwards (1998) starts out with an aggregate production function similar to that in some of the (new) growth models:

$$Y_t = B_t f(K_t, L_t),$$

* B_t is the stock of **human capital**.

The growth of **B** is determined by two components:

$$\Delta B/B = \delta + \theta (W - B)/B$$

1) The rate at which **domestic** innovation grows (δ) is **exogenous**.

2) The second is **imitation of knowledge from abroad**, which is determined by two entities.

> ***** One is **(W- B)/B,** which is the relative "gap" between the follower country and the lead country in terms of technological advancement. The larger this gap, the higher the growth rate of **B**.

> * The other, θ, is the **speed** at which the follower country "catches up" with the lead country (given the distance between **W** and **B**), which is determined by the degree of trade "openness".

> (**Notable that "trade" does not enter explicitly!**)

[9.17] Empirical results

Edward's results are more reliable than most earlier ones since he uses **nine different** proxies for "openness" and finds most to be significant (and robust).

(Table from Edwards 1998 to be shown in class)

The main snags with Edward's test are:
1) **weighted** least square!
2) No control for **simultaneity**

Most recent evidence: Lee et al. 2004. Many attractive properties:
* New or improved methods for controlling **simultaneity** and omitted variable **bias**, and they use 4 different **proxies** for "openness" and **panel data** for eight 5-year sub-periods (40 years!)
(econometrically too technical to use as course material)

Results: Small positive effect of "openness", as measured by one of the proxy variables (black market premium), on growth, but the reverse effect (growth effect on openness is stronger and more robust!)

Overall conclusion: Amazing that no stronger evidence for beneficial effects of open trade on growth has materialised over the years! That "free trade" is good for growth is at the heart of most economists, but the empirical estimation problems are indeed difficult to resolve.

[OH 9.18] Foreign Aid – A Substitute for trade?

Theory: The Harrod-Domar growth model

Evidence: Third generation empirical aid-growth studies

1) **Other factors** than aid that have an effect on growth are included in the regressions in accordance with modern empirical growth studies.

2) Interdependence between explanatory variables is controlled (**multi-colinearity**)

3) **Simultaneity** is controlled, i.e. the possibility that growth affects the allocation of aid.

4) The tests allow for the possibility that aid has different effects in **different recipient country** environments.

5) **Robustness** tests are carried out (checks of whether the results are sensitive to small changes in the estimation specification, variable definitions, proxy variables used, countries included, time period covered, etc.)

[OH 9.19]   In the paper, Finn restates what he and his co-authors have argued in previous publications, viz that:

> *"Overall, the view that aid works in promoting growth and development has gained ground in recent years in the academic literature...."* (p.4)

and that:

> *"[T]he single most common result in modern aid-growth literature is that aid has a positive impact on per-capita growth"* (p.25).

My interpretation of the evidence is quite to the contrary

Theory in this field is very underdeveloped.

According to Bill Easterly, one on the leading and very sceptical analysts of foreign aid, is the old Harrod-Domar growth model still the (often implicit) theory behind the claim that aid fosters growth and poverty alleviation

Let us repeat the basic features of the H-D model (from lecture 2)

[OH 9.20] Selected third-generation empirical investigations of the aid-growth link, with a brief summary of the main result(s) and objections expressed by others.

Author, Year (pub)	Main results	Main objections by others
Tarp et al. 2001 (JDE); 2004 (EJ)	Aid affects growth positively, although with a declining impact as aid gets larger (2001); no effect of aid in the "tropics" (2004)	Results not robust; What does the "tropics" stand for? (R & S 2005b)
Burnside and Dollar 2000 (AER)	Aid has a positive effect on growth, but only in countries with "good policies"	Results hold only when five outliers are excluded and the measure of "good policies" is not exogenous (Tarp et al., Easterly)
Collier and Dollar 2004 (EJ)	Same as above, but other proxy variable for "good policies" (CPIA index from World Bank)	The CPIA index, based on 20 indicators, is *ad hoc;* many "indicators" are not exogenous; trade-offs between indicators.
Easterly 2003 (JEP)	No growth effects of aid: "perverse incentives"	Fails to distinguish between aid and inappropriate de-velopment policies (Tarp)
Rajan and Subramanian 2005b (IMF WP)	No robust effects of aid in either direction; estimates very sensitive to estimation method, proxy variables, measurements and data	In my view the most technically proficient and reliable aid-growth study to date. *Participants here will probably come up with objections?*

Overall conclusion:

"If you torture the numbers for sufficiently long, they will confess to anything"

[OH 9.21] Aid and Economic Growth

Figure 1. Correlation between growth of GDP per capita and aid-intensity across 81 developing countries in the 1990s
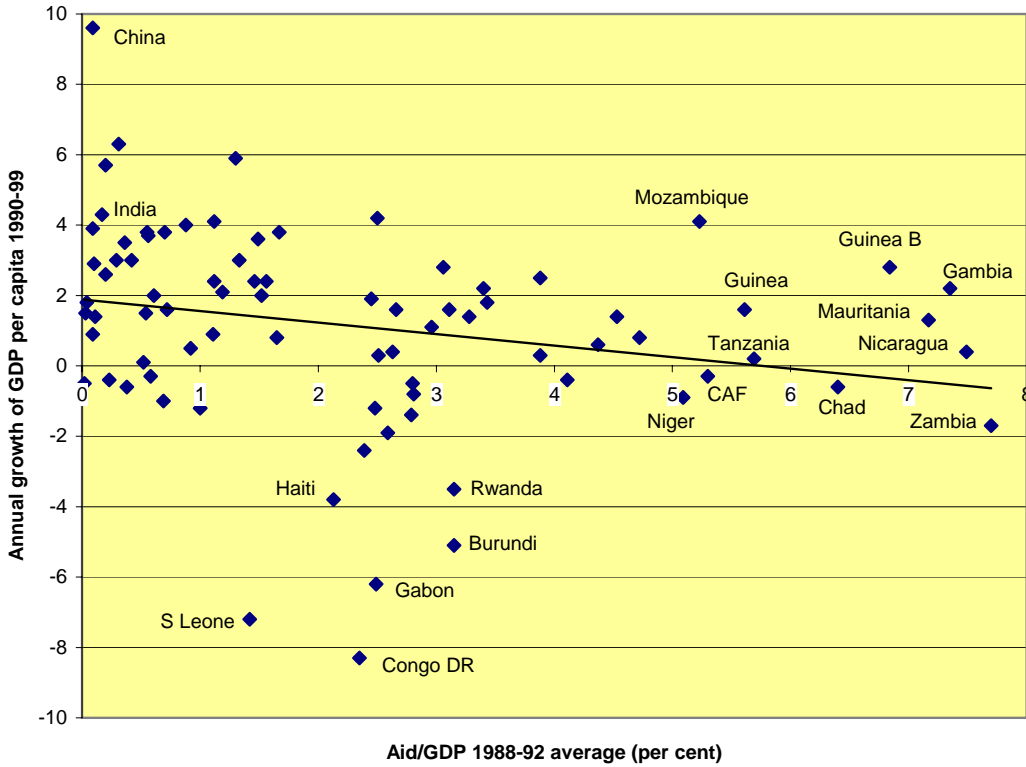
Sources: Aid data from OECD/DAC online; growth of per capita GDP from World Bank (2003); per capita GDP ($PPP) in 1990 from Maddison 2003

[OH 9.22] Possible Growth-hindering Macro-level Effects of Aid

1) **Largest proportion of aid is given to poor and miss-managed countries with low growth (reverse causality)**

2) Aid goes to **consumption** (fungibility) rather than investment

3) **Bad governance**. The hypothesis is that aid in many cases have helped kleptocratic and/or incompetent governments to stay in power and hence prolonged growth-stifling policies.

4) **Encouraging corruption**. Foreign aid brings windfall money that recipient governments are not accountable for to the population. This broadens the scope for corruption with adverse consequences for investment and efficiency.

5) **Dutch disease**. Aid appreciates the recipient's exchange rate which discriminates the trade sectors (exporting and import competing), with the highest growth prospects.

[OH 9.23] Evidence of Dutch Disease (Rajan and Subramanian 2005a). They show on the basis of cross-country and/or cross industry observations that:

1) Aid leads to appreciation of the recipient's exchange rate

2) Aid and over-valued exchange rates lead to slower growth of value added in labour intensive sectors [see their table 7]

3) Overall economic growth is positively correlated to the concentration of value added in labour-intensive sectors [Chart]

   All these results are subjected to a whole battery of checks and robustness tests and they survive.

   Conclusion: Little evidence that aid fosters growth, but could be motivated for other purposes (humanitarian)

Recommended readings:

Bhagwati, J. and T.N. Srinivasan (2002), "Trade and Poverty in the Poor Countries", *American Economic Review* 92(2): 180-83.

Edwards, S. (1998); "Openness, Productivity and Growth: What do We Really Know?", *Economic Journal* 108(2): 383-98.

Panagariya, A. (2002), "Cost of Protection: Where do We Stand?", *American Economic Review* 92(2): 175-79.

Svedberg, P. (2006), "Aid and Economic Growth: An Alternative Interpretation of the Evidence", *Swedish Economic Policy Review* 13: 63-74.(also see references therein for additional interesting work

Literature referred to in lecture:

Dollar and Kraay 2000b; "Free Trade *Is* Good for the Poor",

(www.globkom.net.se)

Easterly, W (2003), "Can foreign aid buy growth?", *Journal of Economic Perspectives* 17, 23-48.

Lee, H.Y. et al (2004), "Once Again, is Openness Good for Growth?", *Journal of Development Economics* 75: 451

Pritchett, L. (1996), "Measuring Outward Orientation in LDCs: Can it be Done?", *Journal of Development Economics* 49: 307-35.

Rajan, R G and A Subramanian (2006), What undermines aid's impact on growth?, IMF Working Paper 05/127, IMF, Washington DC.

Rodriguez, F. and D. Rodrik (2000), "Trade Policy and Economic Growth": A Sceptic's Guide to the Cross-National Evidence", *NBER Macroeconomics Annual*, 261-325.

Rodrik, D. (2000), "Comments on 'Free Trade *Is* Good for the Poor' (www.globkom.net.se).

Tarp, F (2006), "Aid and development", *Swedish Economic Policy Review* 13: 9-62

Other relevant articles and books:

Antweiler, W. et al. (2001), "Is Free Trade Good for the Environment?", *American Economic Review* 91(4): 877-908.

Frankel, J.A. and D. Romer (1999), "Does Trade Cause Growth?", *American Economic Review* 89(3): 379-99.

Bhagwati, J. (2004), *In Defence of Globalisation*, Oxford University Press.

Stiglitz, J.E. (2006), *Globalisation and its Discontents*, Norton.

Wolf, M. (2005), *Why Globalisation Works*, Yale University Press.