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GLOBAL VALUE CHAINS, TRADE AND GROWTH: REVISITING DEMAND AND SUPPLY DYNAMICS IN THE G-20

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Motivation and Outline

Trade and Growth: New modalities?

- Global Manufacturing and International Supply Chains changed the way trade and international economics are understood today.
- The presentation builds on recent statistical advances to suggest new ways of looking at the demand and supply side contribution to Growth when Global Value Chains (GVCs) articulating supply and demand chains from an international perspective—are taken into consideration.
- Outline
 - The Demand Side (short and long run perspectives)
 - The Supply Side (comparative advantages, upgrading, spillovers)



Demand Side and Short Term Dynamics Revisiting the Growth Accounting Framework

The traditional formulation of the GDP identity:

$GDP \equiv C + I + (X-M) \qquad [2.1]$

GDP: Gross Domestic Product as the sum of sectoral value-added, at current price.C: Private and public consumptionI: Gross Investment (fixed capital and changes in inventories)X-M: net exports of goods and services

$\Delta GDP \equiv \Delta C + \Delta I + \Delta (X-M) \quad [2.2]$

Growth accounting identity [2.2] used to look at the *short term evolution* of the economy.

In [2.2], trade enters the GDP growth decomposition through the **net exports** of goods and services (X-M): **balance of payments' trade balance**.

The accounting elegance comes at an analytical cost:

<u>At best</u>: Imports *as if* they were independent of the rest of the economy **<u>At worst</u>**: Mercantilists' message that *Exports are Good, Imports are Bad*

Revisiting the Growth Accounting Framework (cont.)

Imports are endogenous

and driven by the dynamic of *each individual component* of the final demand

Following Kranendonk and Verbruggen (2008), we allocate imports to expenditure categories.

 $GDP \equiv (C-M_c) + (G-M_a) + (I-M_I) + (X-M_X)$ [2.3]

With M_{c} , M_{a} , M_{I} and M_{x} the import content of, respectively, public and private consumptions, investment and exports.

 $M = M_c + M_a + M_T + M_X$ [2.4]

The 'import-adjusted method' [2.3] :

1. Better understanding of the short-term demand drivers of GDP growth

2. Well rooted into:

- (i) 20th Century development (disequilibrium) economics theory (e.g., BoP constraints)
- (ii) 21st Century trade in tasks models

Thanks to **Trade in Value-Added**, for each component of Final Demand, the **import content is disaggregated into**:

1) Imports of Final Goods and Services (*direct imports*)

2) Imports of Foreign Inputs embodied into final the Final Goods and Services produced by the national industries (*indirect imports*)

The GDP identity is decomposed into three components:

- 1. Share of domestic absorption satisfied from purely domestic value-added,
- 2. Imports of Final goods to satisfy directly the final demand (direct imports),
- 3. Foreign inputs required for producing the domestic outputs which will be domestically consumed.

Equation [2.3] becomes:

$$GDP = (C - M_{C}^{d} - M_{C}^{i}) + (G - M_{G}^{d} - M_{G}^{i}) + (I - M_{I}^{d} - M_{I}^{i}) + (X - M_{X})$$
[2.5]

Where superscripts (d, i) indicate that the imports are, respectively, direct or indirect.

 $M^{d}_{C} + M^{i}_{C} = M_{C}$ $M^{d}_{G} + M^{i}_{G} = M_{G}$ $M^{d}_{I} + M^{i}_{I} = M_{I}$ $M = M_{C} + M_{G} + M_{I} + M_{X}$

Note that, by definition, M_X has no direct imported component as all imports of final goods and services are absorbed for consumption or investment.

Net Effects Resize the Contributions to GDP Growth (1995-2011)



Variation 1995-2011 (USD)	Investment	Public Cons.	Private Cons.	Exports	Total Dom.	Imports
Gross (USD)	6,919	5,652	15,182	5,179	32,932	•••
Domestic VA (USD)	4,162	4,224	10,039	4,103	22,529	0
Imported (Foreign VA)	2,757	1,428	5,143	1,075		-10,403
Gross (%)	21.0	17.2	46.1	15.7	100.0	-31.6
Domestic VA (%)	12.6	12.8	30.5	12.5	68.4	0.0
				Source Ba	sad on OECC	LTiV/A Data

Source: Based on OECD-TiVA Database

Evolution of direct and indirect imported content, 1995-2011

- Next slides shows the evolution of the import contents over the 1995-2011 period for the G-20 group.
- Three panels: total imports, direct and indirect import contents in % by final demand aggregate
- Each panel is subdivided in *two time series*:
 - three *benchmark years* 1995, 2000 and 2005
 - Annual values from 2008 to 2011 (crisis and postcrisis)

Total import content (direct and indirect) Simple Average of G-20, 1995->2011



Highest (34%) for investment (as expected by the two-gap school)Household consumption follows at about 30%Public consumption and exports stand at about 20%.Source: OECD-WTO TiVA

Direct import content Simple Average of G-20, 1995->2011



Great heterogeneity in terms of direct import content.

By definition, it is nil for exports, but almost zero for public consumption and declining 2008 without showing any sign of recuperation:

in 2011, administration import only 0.4% of their needs, less than in 1995 (0.5%) *Source: OECD-WTO TiVA*

Direct import content Simple Average of G-20, 1995->2011



Indirect imported content of public spending is : (i) the highest with exports, and (ii) increasing over the 1995-2011 period.

Through indirect imports, additional public demand filters out to other countries.

It's apparent low import intensity seems "selfish" counter-cyclical policy.

Good candidate for coordinated macro-policies, when "economics is global but policy making is l Source: OECD-WTO TiVA

LONG TERM DETERMINANTS OF THE DEMAND-SIDE DYNAMICS

Statistical modelling of import semi-elasticity for:

- 1. Household income and consumer goods imports
- 2. Investment in fixed capital and imports of capital goods
- 3. Domestic output (export or domestic absorption) and imports of intermediate goods (Vertical Specialization)

Using April 2015 version of the Penn Tables 8.1, on a selection of G-20 countries (data availability criteria).

Income, purchasing power and nonhomothetic preferences

- Households Preferences (marginal utility) change with income level: Engel's Law
- Demand for imports is affected by exchange rate. Real Exchange Rate in the Long Term is expected to follow PPP\$
- Long term evolution of the real exchange rate in an open economy is expected to be determined by Income via the Balassa-Samuelson law -> Purchasing Power Parity.
- Income and PPP effects can be captured by the relative prices of tradable (approximated by the deflator for imports) and nontradable products (services being used here as a proxy).

The prior effect of the non-tradable price index is complex:

- It reflects the long term increase in real income (Balassa-Samuelson effect: with a positive income effect on the demand for services)
- Also the increase in the relative price of (labour intensive) services (a negative price effect).

Exploratory regressions, all countries 1980-2011 (OLS)

	Fixed effects ^a		Random effect	Random effects ^a		
Variable	Coefficient ^b	Std. Error	Coefficient ^b	Std. Error		
С	-1.67	0.47	-0.25	0.1		
LOG M(-1)	0.52	0.03	0.76	0.02		
LOG(Y_C)	0.07	0.05	0.04	0.02		
LOG(Y_I)	0.14	0.03	0.05	0.02		
LOG(Y_G)	0.12	0.03	0.01	0.02		
LOG(X)	0.29	0.03	0.14	0.02		
LOG(P_SER)	0.28	0.03	0.08	0.02		
LOG(P_M)	-0.32	0.06	-0.13	0.05		
TREND	0.00	0.00	0.00	0.00		
R-squared	0.99		0.99			
Durbin-Watson stat	1.35		1.57			

Significant coefficients in bold (at alpha=0.05 or lower), based on t tests. The validity of t test is highly questionable: results are exploratory only Lagged dependent variable:

- Included for statistical reasons (missing variables, autocorrelation, etc.)
- Significant in both fixed and random specifications.
- Partial adjustment mechanism or evidence of excluded variables (especially --but not exclusively-- when effects are random)

- Household consumption (the larger component of aggregated demand) is not significantly influencing total imports at fixed effects. Significant in random effects but low semi-elasticity.
- **Government consumption** is significant when fixed effects but non-significant when random. Lower than for other demand components.
- **Investment** is a clear driver of imports, higher semi-elasticity than household and government consumption. High import intensity of fixed capital formation (machinery and equipment).
- Very high semi elasticity attached to exports:
- <u>Surprising</u>: vertical specialization became globally significant in the mid-1990s and only for some countries.
 - Additional pro-cyclical effect most probable: Higher exports (i) do relax the balance of payments constraint, and (ii) boost domestic demand.

• The price elasticity has the expected negative coefficient.

The positive coefficient associated to the price of non-tradable (services) is to be expected:

- Price effect: if relative prices of non-tradable products increase, HH demand will privilege tradable goods, and therefore boost imports.
- Balassa-Samuelson effect: the price of services in PPP\$ reflects the increase in households' per capita income.

Splitting developed and developing countries



Import-elasticity of Exports higher in industrialised countries, contradicting the expected balance of payment constraint effect (as in Two-Gap models). **Due to different Trade in Value Added Profiles:**

- *Advanced economies* rely more on imported inputs for the production of their manufactured exports,

- Many *developing countries* exports a higher content of domestic value added per unit (natural resources based exports)

Splitting developed and developing countries



Imports rise when the cost of non-tradable increases (income effect) and drop when their own cost rises.

Developing countries are more sensitive to price developments:

- financial constraints are more binding.
- relative price of services in PPP\$ captures also higher Balassa-Samuelson effect

THE SUPPLY SIDE DYNAMICS: TiVA and Revealed Comparative Advantages (RCA)

- "RCAs" indicate the competitiveness position of a country by comparing its export structure with the global market structure
 - countries are expected to specialize in products where they have comparative advantages
- In GVC trade, RCAs that actually look at domestic capabilities should be based on Value-Added trade flows: Gross Exports minus all Intermediate Imports (direct and indirect)
- With *TiVA, exports of domestic value-added are split into*:
 - 1. **Direct VA** generated by the exporting sector
 - 2. *Indirect domestic VA* embodied into the intermediate consumption of domestic inputs required to produce the export

Upgrading and stylised patterns of changes in the domestic value-added content of exports



(Δ Sectoral VA/Domestic VA)

Example of Computer, Electronic and Optical

China is alone in the N-W quadrant starting from a very low domestic content in 1995, almost exclusively direct

Indonesia, Saudi Arabia and the USA in the positive North-East quadrant, with *UK* on the limit.

 USA (and the UK) able to specialize in high & dynamic value-added segments of the industry?

Few countries above the **45° line** in the South-West quadrant:

- Rate of sectoral value added dropped relatively to the rest of the economy (lower wage or profits), and/or
- Increase in *inter-industrial linkages* (domestic outsourcing).



All other S-W countries except Russia and South-Africa are below the 45° line (sectoral content increased in a situation of overall decrease in domestic content): Foreign *outsourcing* of non-core activity and/or *increase in sectoral VA* (wages and profit).

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