Evidence-based policymaking to facilitate deeper integration of Asia and Latin America and the Caribbean (LAC):
Trade-in-value added analysis, 6-7 October 2020.

Global Value Chains and Trade in Value Added

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Key Takeaways

1. Trade in RVCs/GVCs is characterized by the geographical unbundling of production activities (second) in addition to the geographical unbundling of production and consumption (first). Results in intensive trade in intermediates.

2. RVCs/GVCs offer a new development model: joining and moving up (Viet Nam) rather than constructing a whole supply chain from scratch (South Korea).

3. With the rise of trade through RVCs/GVCs, gross value trade data provide a less and less complete picture of the economic nature of the transactions that create trade.

4. This has created a rationale for trade in value added, which tracks the origin of value added in exports by origin country and sector.

5. Key data sources are supply use tables (based on representative surveys of businesses), which are converted to IO tables, plus trade data.
   - MRIOs for developing countries use a large amount of imputed data, so be extremely careful using them.

6. The magic of MRIOs is in the data work required to assemble them. Hence data quality and completeness determines their usefulness for policy.
Outline

1. The Value Chain Development Model
2. Rationale for Measuring Trade in Value Added
3. Data Requirements for Trade in Value Added
1. The Value Chain Development Model

- South Korea is the most recent country to have moved from middle- to high-income status (excluding special cases like oil).

- How did it do so?

- The basic model was support for national industries based on development of local supply chains, then orientation of output towards exports markets.
  - EG: to develop the automotive sector, it was necessary to have national car companies (Hyundai) and a full range of input suppliers…
  - But the target was never really the domestic market: it was always export sales.

- Even clearer in the case of the (smaller) ”tiger” economies like Singapore, Hong Kong, China, and Taiwan, China: import substitution phase relatively brief; most industrial development took place under outward orientation.
1. The Value Chain Development Model
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- International trade was a core part of development policy in the Asian tigers.
  - Use world market competitiveness to incentivize productivity growth over time.
  - Facilitate access to high quality, reasonably priced inputs from the world market.

- Singapore and Hong Kong, China: Unilateral free trade.

- Korea: Progressive liberalization; still more restricted than main developed markets, but historically relatively liberal by developing country standards.
1. The Value Chain Development Model

![Graph showing Applied Tariff % (Manufactures) for Singapore, Hong Kong SAR, China, and Korea, Rep. over the years from 1988 to 2016. The graph indicates a decrease in tariffs over time.](image-url)
1. The Value Chain Development Model

- So much for historical experience, what about the current development landscape?

- Other economies experiencing rapid growth include India, Bangladesh, China, and Viet Nam.

- What are their models? How do they use trade to support development policy?
  - India: Relatively high tariff levels, traditionally focused on the domestic market, but recently a move to “Make in India”?
  - Others: The model is different from the Tigers’ models in crucial respects, but to different extents…
1. The Value Chain Development Model

Since the time when the Asian Tigers industrialized, the world economy has undergone a fundamental change: Richard Baldwin’s ”Second Unbundling”:

- First unbundling (1820s – 1980s): Falling transport costs made it possible to geographically separate production and consumption.
- Second unbundling (1990s - ): Technological change, specifically the rise of ICTs, makes it possible to geographically separate production activities.

Development in the first unbundling (think: South Korea) is associated with the development of national supply chains.

Development in the second unbundling (think: Viet Nam) seems to be associated with joining RVCs and GVCs.
1. The Value Chain Development Model

How are the two types of development different?

- Narrower patterns of specialization and trade: comparative advantage is defined in terms of “tasks” rather than entire sectors.
- Intensive trade in intermediate goods, which move across borders numerous times during production…
- Which means that countries with low trade costs have an advantage in terms of attracting investment in final processing.
- Deepening of the international division of labor in terms of occupations, not just types (skilled versus unskilled).
- Aim is not development of the full chain, but “moving up” to higher value added activities within the chain.
- Services play a larger role, beyond transport:
  - Services imports necessary to coordinate the value chain.
  - Logistics services can help reduce trade costs and move goods.
  - Technology is making it possible for services sectors to see both unbundlings at the same time.
1. The Value Chain Development Model

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Source: https://www.fastretailing.com/eng/group/strategy/uniqlobusiness.html.
1. The Value Chain Development Model

Figure 6. The Nutella® global value chain

1. The Value Chain Development Model

1. The Value Chain Development Model

- In the value chain development model, the origin of value added is a crucial piece of information:
  - Domestic: value added supplied by producers located within a country (regardless of ownership).
  - Foreign: value added supplied by producers located outside a country (regardless of ownership).

- Foreign value added, either goods or services, can be embodied in a country’s gross exports and shipped elsewhere (backward linkages).

- Similarly, domestic value added can be shipped overseas to be combined with other inputs, then re-shipped elsewhere (forward linkages).

- Concepts apply equally to goods and services.

- Key insight: domestic and foreign value added are complements not substitutes.
1. The Value Chain Development Model

Thai Auto Equipment (Shares)

Thai Auto Equipment (Values)

1. The Value Chain Development Model

VA growth rates (Viet Nam)
1. The Value Chain Development Model

- Even relatively populous developing countries still have small markets compared with the world market, so an outward focus necessarily allows for greater economies of scale in production.

- Reducing intra-regional trade costs is very positive, as it allows for access to a larger market. But it should be part of an overall strategy to increase integration with foreign markets, both near and far.
  - In the value chain model, producers need to be especially wary of FTAs generating trade diversion effects in input markets: final goods producers across the whole region will be made less competitive.

- The value chain development model offers a new perspective on outward-oriented growth, i.e. leveraging international markets to support national development objectives.

- It is already supporting rapid income growth and poverty reduction in countries like Viet Nam and Bangladesh.
3. Rationale for Measuring Trade in Value Added

- How is it possible for trade to be greater than 100% GDP?
- Hint: it’s not just because trade = X+M, but GDP = C+I+G+(X-M)!
2. Rationale for Measuring Trade in Value Added

- Trade is measured on a gross shipments basis, i.e. invoice price (or potentially a reference price).

- GDP is measured on a value added basis, i.e. invoice price less the cost of intermediate inputs.

- Hence, trade statistics from Customs are not directly compatible with the national accounts (GDP).

- Value chains put a further twist on the problem...
2. Rationale for Measuring Trade in Value Added

Country A 50

Country B 50

Country C -100

Total = 100
2. Rationale for Measuring Trade in Value Added

Country A 50+50

Country B 50

Country C -100

Total = 150
2. Rationale for Measuring Trade in Value Added

- In this example, B ships 50 units of intermediates to A, which adds 50 units of value itself, before shipping to C.

- Gross value trade statistics show:
  - World trade of 150 units.
  - Exports from B to A of 50 units.
  - Exports from A to C of 100 units.
  - Exports from B to C of 0 units.

- The deeper the RVC/GVC model proceeds, the more of a disconnect there is between GDP, world trade, and bilateral trade.

- Measuring trade in value added tries to untangle this picture by identifying:
  - Value added of 50 units originating in A.
  - Value added of 50 units originating in B.
  - Total world trade in value added of 100 units.
2. Rationale for Measuring Trade in Value Added

**Gross Value of iPhone Imported into USA**

**Value Added Breakdown of iPhone Imported into USA**

Source: https://bit.ly/2PwTrHO
2. Rationale for Measuring Trade in Value Added

- Trade in value added allows us to decompose exports in gross shipments terms into value added components by source.
  - Source is typically a sector-country pair.
  - Includes the importing country as a source!

- Has a profound effect on bilateral trade balances for country pairs with substantial trade in intermediate goods and services.
2. Rationale for Measuring Trade in Value Added

- Trade balance in gross shipments terms = exports – imports.
- Taking proper account of trade in intermediates and embodied VA reduces the size of the bilateral deficit by 35%
- NB: No suggestion that bilateral balances “matter” for other than political reasons!

Source: OECD-WTO TiVA.
3. Data Requirements for Measuring Trade in Value Added

- The breakdown of value added in the iPhone example is intuitive.
  - We could, in theory, go to Apple and track the origin of all the components in the iPhone, and the components of the components, and so on...
  - Until we have a full breakdown.

- Intuitive for one product, but how do we do it for aggregate sectors, or even the economy as a whole?

- In other words, how do we systematize this breakdown approach?
  - Basic math provides a helping hand – more in the next session.

- A good starting point for thinking about how to solve the problem is to consider the types of data that might be helpful.
3. Data Requirements for Measuring Trade in Value Added

   - Goods
   - Services

2. Input-Output table: measure of how each sector uses the output of each other sector. Needs to combine:
   - Goods
   - Services
   - All countries of interest.
3. Data Requirements for Measuring Trade in Value Added

- Data on bilateral trade in goods are readily available.
  - WB WITS server provides a convenient interface for accessing UN Comtrade.
  - Internationally harmonized data available at the HS 6-digit level (more detailed data available from national Customs).
  - Typically need to aggregate data using a concordance to another classification, such as ISIC.
- Accounting for re-exports in small open economies is a problem.
- Non-agreement of bilateral data is a problem:
  - A’s reports of exports to B does not typically equal B’s reports of imports from A.
  - Technical solutions exist to balance the trade matrix, as in the BACI database.
  - More of an issue in countries where governance is weak, and/or there are problems of mis-classification and mis-invoicing at the border.
3. Data Requirements for Measuring Trade in Value Added

- Data on bilateral trade in services are much less readily available.
  - Most countries only report a limited number of sectors (EBOPS) to UN Comtrade, and many do not disaggregate by partner country.
  - Mirroring can fill in the blanks in South-North trade, but no simple method for South-South trade.
  - OECD-WTO BATIS: experimental dataset that uses mirroring and statistical techniques to ”fill in” and balance the bilateral trade in services matrix. Best available data.
  - Still need a concordance to map services trade data to ISIC sectors.
  - Many countries in all regions have incomplete trade in services data: strong need for capacity building with NSAs in this area.
3. Data Requirements for Measuring Trade in Value Added

- Intuitively, an input output table relates:
  - Final demand
  - Gross output
  - Value added
  - Input use

- In developed countries, IO tables are typically prepared as part of the national accounts exercise, but preparation is expensive and requires considerable expertise.

- Most countries prepare them less than annually and with a substantial lag.

- We will look at the mathematical representation of an IO table in detail in the next section; here, focus on intuition and use.
3. Data Requirements for Measuring Trade in Value Added

- A national IO table tells us, for each sector, how much of its output:
  - Is used by other sectors as an intermediate input.
  - Enters into final consumption.

- At the same time, it also tells us, for each sector, how much of the total value of its output:
  - Is made up of intermediate inputs from other sectors.
  - Is value added.

- Some countries also apportion outputs across export destinations, and inputs across import sources.
  - If not, we apply the “proportionality assumption” to trade data: products are used by importing sectors in the same proportions in which they are imported.
3. Data Requirements for Measuring Trade in Value Added

- The fundamental ingredient of an IO table for analytical purposes is a Supply Use Table.
  - Building block is a statistically rigorous survey of businesses. Use a sampling frame (business register, tax IDs, etc.) to identify a representative sample.
  - In practice, surveys are burdensome, so tend to focus on larger firms that account for the bulk of production and intermediate consumption, then use statistical methods to complete.

- Together, the supply table and the use table show how outputs are used, and how inputs are sourced.

- To move to an IO table, statisticians perform a number of operations including:
  - Balancing supply and use.
  - Taking account of trade margins and taxes.
  - Moving from producer prices to basic prices.
  - Applying technology assumptions and sales structure assumptions.

- NSAs are the experts in actually doing this. Key for present purposes is to have a sense of where the data come from.
3. Data Requirements for Measuring Trade in Value Added

- Extending an IO table to a multinational framework (MRIO) is an extremely complicated undertaking:
  - Harmonization of IO tables by sector.
  - Harmonization of trade data with harmonized IO tables.
  - Balancing bilateral and sectoral flows.

- Data lag is a major issue, so TiVA data can only typically be prepared with some years’ delay, unless extrapolation techniques are used.

- All of these issues are serious for the largest developed countries. So they are all the more so for developing countries, particularly small countries and low income countries / LDCs.
3. Data Requirements for Measuring Trade in Value Added

- There are essentially four commonly used data sources on trade in value added:
  - Eora: 190 countries, 26 sectors (harmonized version). Data to 2015. Raw data + indicators prepared by UNCTAD.
    - Smaller dataset available for more years: 63 countries, 35 sectors; 2000 then 2007-2019 annually.

- However, there are some important caveats:
  - Most of the trade in services data is estimated or imputed.
  - IO tables are computed infrequently, so there is again a strong role for imputation.
  - Eora has been little used in published research, unlike the other two datasets, and so has not fully passed peer review.
  - One view is that aggregate results are likely fairly reliable, but that sectoral data are less so.
  - By all means work with these data, but important to acknowledge the huge uncertainty that exists around estimates, even very high quality efforts like ADB, WIOD, and TiVA.
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Additional Resources

Data:
- UNCTAD Eora GVC indicators: http://worldmrio.com/unctadgvc/.
- ADB MRIO: https://mrio.adbx.online/.

Reading: