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CAPACITY BUILDING WORKSHOP TRADE AND TRADE POLICY ANALYSIS FOR THE POST COVID -19 RECOVERY

TUESDAY, 7 DECEMBER 2021
10:00 - 11:15 AM BKK TIME (UTC+7)

THURSDAY 9 DECEMBER 2021
09:30 AM - 15:45 PM BKK TIME (UTC+7)

FRIDAY 10 DECEMBER 2021
13:30 - 15:15 PM BKK TIME (UTC+7)

VIRTUAL MEETING, MS TEAMS

Narrative on Self-study 2: Trade in Value Added Measurement Issues by Dr. Biswajit Nag

Module-2

Slide-1

Welcome to the lecture on trade in value added with a focus on measurement issues.

Slide-2

In this lecture, we will understand importance of Trade in Value Added and why it should be measured. We will make an attempt to comprehend this through examples that how the input-output trade of a country looks like as it helps to track value addition in production process. The national input-output table can be extended with bringing trade into the picture to make an inter-country input-output table which can accommodate- exports and imports of intermediate and final goods, and also accommodate the return of own exports with a value addition in importing country. Therefore, several indicators of trade in value added- can be extracted such as Domestic Value Added (DVA) in exports, foreign contribution (imported part) embedded in the exports or Foreign Value Added (FVA), and Indirect Value Addition (DVX)- the component exported by the country and used by the third country in its exports. Some part of that can come back to the country-1 resulting in the possibility of double counting. Therefore, through input-output table, we can separate the double counting and calculate the trade in value added . Finally, using these indices, we will eb able to measure GVC Participation and GVC Position.

Slide-3

First, we will explain the Basics- why do we need to measure trade in value-added. Then, we will go to two-country case model to explain the mathematics behind it. And how we can extract various components of gross value of exports- DVA, FVA, DVX and issue of Double Counting. Then we extend this to a generalised model. And, finally we look into GVC participation & position index.

Slide-5

Because of falling transport costs as well as reduction of ICT driven trade cost, have helped unbundle the production process, and countries are specialising not in the final goods but intermediate and components and collection of different tasks. From trade in goods there is a transition towards trade in tasks. And these assembling components can cross the border multiple times, and as a result of that, there is rise of specialised services which can help in binding all the process, which could be logistics, IT, designing and many other processes. We have also noted that there is a significant discourse, that which one is a better measurement to explain globalisation of trade, whether it's a gross trade or a value-added trade. The famous example of Iphone can be referred to. So why we should understand trade in value added. Because every country makes an attempt to improve trade policy in 21st century, then the domestica and foreign content of exports need to be separated. The trade policy may be targeting the domestic value addition, skill and technology of assembling the foreign products with domestic value addition. Trade policy can help firms to move up the value chain. Why is the gross trade can mislead the world in terms of engagement of countries in globalised world? Trade to GDP ratio is the most important criteria to understand the openness of a country, but

GDP is measured on a value-added basis (i.e. invoice price less the cost of intermediate inputs) but trade is usually measured in terms of gross value. So, explaining openness through Trade-GDP ratio does not reflect the right picture. Hence, trade statistics from Customs are not directly compatible with the GDP. Value chains put a further twist on the problem.

Slide-6

How we can find out the value added in gross trade flows? So, by this figure when country A is exporting to country-B, so we can collect the information at the border point. But it is based on the official trade statistics recorded.

Slide-7

To find the value-added part, the total exports are defined as the DVA plus the FVA, these exports could be for the third country as inputs or for the final demand. There is DVA in direct exports, apart from that there could be FVA. FVA refers to values coming from other countries, and is added with DVA to get the total product value. Apart from that, there could be DVA which goes to country B but not for final consumption but as intermediate products, which will help country B to export to country-C. So, if we are able to separate gross exports, then we will be able to understand the exact contribution of country A in the gross export value.

Slide-8

In other way, the gross exports is the summation of three components, the domestic VA that stays overseas, foreign value added embedded in exports, and the domestic value added that will return as imports. But when we look at value-added basis, the contribution of the country is only the DVA that stays overseas. We need to separate the VA, by referring to input-output table where output value is reported as sum of inputs and value added. Similarly, use of the output is separated into intermediate use and final use. Further, international I-O table accommodates exports and imports in the same framework.

Slide-10

We will use little bit of matrix algebra to explain the dynamics, the change of VA. Several global organisations have made effort to create international input-output table popularly known as multi-regional input output (MRIO) table. We will be using UNCTAD's EORA database based on the analysis done by Prof. Koopaman. And we try to separate DVA, FVA, DVX and double counting.

Slide-11

Try to understand the structure of input-output table and similarly the supply and use table. In this table the supply part is production of the domestic goods and these are the possible inputs and how much we are importing. So total supply is the sum of domestic production and inputs. And then, the usage part is how the total goods, what is being produced in the country and the imports could be intermediate goods, so how much of that will go into intermediate, government and household consumptions, and capital formation. Further, how much it goes for exports, the extended version of that is the input-output table where the final demand is divided into personal consumption, gross private investment, government investment and exports. Value added part is added to the inputs, in the form of employee consumption, profit and taxes the government collects from the business.

Slide-12

So, every country is having its own input-output table. In the international input-output table, referring to UNCTAD study, in this example there are two countries, country A and country-B. and there are industries of every country. So, here it is the national input-output table of A extending to trade with B. It includes the intermediate inputs which country A is importing from country B and the export of A that goes to B. So, the domestic inputs, the foreign intermediate inputs, and the value addition sum up the total production of good produced by Country-A. In terms of the usage, some of the goods produced will be used for domestic production and some of them will go to Country B. And then rest be will be domestic final and international final consumption.

Slide-13

Explanation of MRIO example. Three countries with four sectors. Grey colured boxes represent the domestic inputs (vertical) and domestic usage (horizontal). Consider Sector 1 of Country 1. The first column represents domestic inputs (grey part), foreign inputs (from country 2 & 3) and value addition. The total value of the output is 6901. Now turn to the first row which explains how the output of sector 1 by country 1 (value 6901) is being used. The grey part explains the domestic use of the output as inputs to sector 1 to 4. Then it explains intermediate exports (exports to country 2 & 3 as inputs), then how much is the final consumption (domestic plus the foreign). If we separate the domestic consumption of sector 1's output (intermediate & final consumption) from total value, we get the value of gross exports (5316). Value Addition matrix known as V matrix is put in red coloured box. Share of value addition is just the value addition/total value of the output. The national V Matrix is a row matrix.

Slide-15

Explanation of the Two Country Case model: Input-Output Structure with trade and final demand. Suppose there are two countries r and s. The output of country s is X_s

$$x_s = a_{ss}x_s + a_{sr}x_r + y_{ss} + y_{sr}, r,s = 1,2$$

Using the matrix form of two country model, we can solve for two goods and can derive the Leontief Inverse.

Slide-16

Explanation of the Interpretation of Leontief Inverse. The slide shows that Leontief Inverse captures the direct and indirect inputs (imported) used for production of a good. Hence, the component of Leontief Inverse (b Matrix) contains important information about production

Slide-17

Explanation of the Value Added: Two Country Case. The slide explains how value is captured at unit level (v1 and v2) and how V matrix looks like. It is important to note the interaction of value added (which is percentage of total output) with the Leontief Inverse components

provide powerful information such as domestic value added and foreign value added share. Because all value added must be either domestic or foreign, the sum along each column is unity

Slide-18

Explanation of the Value Added and Exports: Two Country Case

This slides provides the basic calculation to separate different components of gross exports. First, gross export is divided into two parts: exports as intermediate goods and exports as final goods.

Then expanding the equation and using the property of sum of values as unity, different components are separated. It is important to note that VB plays important role in segregating the components.

Slide-19

Double Counting: Gross output is written as sum of final consumption, intermediate use and gross exports. Then explain the meaning of $(1-a_{11})^{-1}$. Output is now explained with this term and substitute in the equation (discussed in the last slide)

Slide-20

Explanation of the Sources of Double Counting: Finally, we get the equation where gross exports are explained through only by intermediate exports and final consumption (check there is no x in the equation). Interpretation of different terms are explained on the right hand side. Check components of VB matrix, play an important role.

Slide-21

The gross export of the country is divided into, DVA and FVA. However, DVA may include re-exported items also, so there is direct and indirect value added to exports. So, if we extend this, we may be able to understand the extent of double counting.

Slide-22

The VA export in the direct final goods exports, then intermediate goods and then intermediate export are re-exported to third country and the similar way the domestic returns home. So, in this way, there is doble counting.

Slide-23

In this slide, it is found that almost 27.3% of gross exports of 17 major UNESCAP economies in Asia-Pacific region, as double counting. Total exports in terms of gross value are coming around $4.2 trillion, but once we calculate through the VA basis, the total calculation comes down to $3 trillion. So, the extent of double counting can be seen from this.

Slide-25

Explanation of the generalised model. Note how VB matrix is written

Slide-26

We can basically identify the imported contributions in country-1, which will be FVA. The DVA is the matrix here. But what is not simple is the DVX. As we need to separate the double counting from it. We can do it using VB.

Slide-28

GVC participation and position are actually trying to understand the performance of countries. So, it helps us to know if countries move forward or backward. Backward linkage means how much of the foreign component is added. So, FVA can help us to capture that. And the forward linkage or downstream participation, is created between a supplying industry and a purchasing industry that uses the supplier's output as input. Internationally, it can be understood as the linkages between an exporting economy and an importing economy whose industries use the exports (supply) as inputs to generate output for exports. In other words, the industries of the exporting country provide inputs into exports of the industries in the importing country.

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GVC participation is the sum of the backward and forward linkages divided by gross exports. So, that, how much the part of gross exports is the GVC participation. If exporting $100, how much value is coming through imports and how much value is going to third county as part of the production. Secondly, with GVC position, we understand whether the firm is moving backward or forward. If there is higher FVA than DVX, then the position will be negative.

Slide-30

Here is an example, if we look at country like China, Japan & India, which are having GVC position positive, meaning that DVX is higher than FVA. On other hand, if we look at countries such as South Korea, Thailand, their GVC participation is very high, so these countries are highly participating in GVCs. However, the GVC position of these countries is negative, meaning that they are importing more components and their FVA is very high.

Slide-31

There are different datasets available which participants can directly use. One of the early databases is TIVA database, having 64 countries and 34 industries. Then, UNCTAD EORA Database: based on National Supply-Use and IO tables and IO tables from Eurostat, IDE-JETRO and OECD, having 189 countries and "Rest of the World", having 26 sectors. Them World Input Output database (WIOD) published by consortium of 11 institutions based on national supply use table covering 43 countries and 56 industries. Then, IDE Jetro, Asian International Input-Output Tables (AIIOTs) and Asian Development Bank, multi-regional input-output tables (ADB-MRIO) and EXIOPOL. So, these are the possible available database, form which data can be constructed for trade policy development. Note, the sectoral forward and backward linkages with all countries enabling in knowing the origin of value and how it is traveling from one country to another.

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