

Value added Trade Revisited

Topic: International trade 1

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In this paper, we provide a basic analysis of the value added trade which is now the core concept of considerations of the world trade developed by WTO, IDE and USITC. We first show that the concept of value added trade within a country-specific input-output table is simply a traditional one which is defined as value added induced by foreign trade. The value added exports (“net exports”), E_{va} is defined as value added induced by usual exports (“gross exports”), E : $E_{va} = VBE$, where V is the diagonal matrix whose diagonal elements are sectoral value added ratios, and B is the domestic Leontief inverse. We can also define imports induced by exports as follows: $m(E) = HmBE$, where $m(E)$ is the import vector induced by exports and Hm is the import coefficient matrix. On the macro level the following identity equation can be formulated:

$\sum u E_{va} + \sum u m(E) = \sum u E$, where u is a summation vector. This identity is a part of the general macroeconomic identity: value added + imports = gross final demand. The total value added export is less than the total export by the total import induced by exports. This relation is true irrespective of a type of B whereas this is not valid by sector. B has several variants. One is $B_1 = (I - A_d)^{-1}$ and another is $B_2 = (I - (I - M)A)^{-1}$, where A is the conventional input coefficient matrix, A_d is the domestic input coefficient matrix and M is the diagonal matrix whose elements are the ratios of imports to the sum of the intermediate inputs plus the domestic final demand. In use of B_1 , the import coefficient matrix is defined as $Hm = A - A_d$. In use of B_2 , $Hm = MA$. The complete generalization of these country-specific equations for the static international input-output table (Isard type) is provided by Koopman, Powers, Wang and Wei (2010).

We provide results of value added trade, using country-specific input-output tables of the US, Japan, China and Russia and international input-output tables. The value added trade heavily suffers effects of the selected data. Also the value added trade of the capital-intensive sectors such as oil and gas does not reflect the importance of imported technology. Nevertheless, the use of value added trade may provide the better understanding of foreign trade in lens of value added.