Decomposition of Value-Added in Gross Exports: Unresolved Issues and Possible Solutions

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The rise of global value chains (GVCs) has significantly transformed the structure of international trade, with implications for the generation of income across countries. To better understand trade in the context of GVCs, it is important to have a full and explicit decomposition of value-added in exports. While the decomposition proposed by Koopman, Wang and Wei (KWW, 2014) is a first step in this direction, there are still three outstanding issues that need to be further addressed: (1) the nature of double counting in gross exports and the meaning of the â€œpure double counting termsâ€• identified by KWW; (2) the calculation of the foreign value-added in gross exports consistent with GDP and net of any double counting; and (3) the decomposition of gross exports at the industry level (the industry where exports take place).

In this paper, we propose a new accounting framework that addresses these different issues and clarifies the definition of exports in inter-country input-output (ICIO) tables. This mathematical framework allows the decomposition of gross exports into domestic value-added, foreign value-added and double-counted value-added (which can be domestic or foreign). It contributes to the literature: (i) by refining the definition of double-counted value-added in gross exports; (ii) by providing new expressions for the foreign value-added and double-counted terms; and (iii) by indicating how the new framework can be used to decompose exports at the industry level.

The novelty of our approach is that we decompose gross exports in a consistent input-output framework starting from world GDP and analysing exports from the point of view of the destination country (where final consumption takes place). We show that our results can be obtained both through the Leontief model and the Ghosh approach. We rely on the Ghosh approach to provide a consistent definition of double-counting and how value-added in exports is generated through an initial round (corresponding to domestic value-added), a first round (where foreign value-added can be identified) and later rounds that only include value-added already measured in the initial and first rounds (and thus corresponding to double counting).

Our new approach confirms the results of KWW on the domestic value-added side (domestic value-added and domestic double counting) but provides different results for the foreign value-added and foreign double counting. Our results for the domestic value-added in exports are also fully consistent with the hypothetical extraction method from Los, Timmer and de Vries (2016). We illustrate this with the decomposition of gross exports in selected countries using the WIOD dataset. Moreover, we provide a 10-term decomposition of gross exports (that can also be done at the industry level) with terms similar to the 9 terms described in KWW, but with a full symmetry between the domestic and foreign value-added terms. We explain how our approach leads to different results.