

Fragmentation in an Inter-country Input-Output Framework

Topic: Supply chains

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Fragmentation was introduced by Jones and Kierzkowski (1990, 2005) to describe the organization of production processes. More and more, production processes are split into subsequent phases, which are carried out separately and in different countries. As a consequence, the trade of intermediate products becomes more important and vertical trading chains exhibit an increasing interconnectedness of industries across countries. Vertical specialization occurs when each country specializes in certain stages of the sequence of production. In an influential paper, Hummels et al. (2001) narrowed the concept of vertical specialization by focusing on the imported inputs that are necessary for producing the exports. Vertical specialization for a country was measured by the export weighted average direct import coefficient or by the export weighted average import multiplier (including also the indirect import requirements). Essentially, what this measures is the import content of the exports. The empirical results were obtained from applying these measures to national input-output tables.

The present paper extends the analysis by taking inter-country input-output tables as the starting-point. These tables are of the interregional type with countries acting as regions. Inter-country tables provide a detailed description of the interdependencies of industries between countries and thus reflect exactly what we are interested in. It may thus be expected that the results obtained from inter-country tables measure vertical specialization better than national tables do.

In this paper, it is rigorously proven that this is not the case. Distinguishing between intra-country effects, inter-country spillovers and inter-country feedback effects it is shown that vertical specialization when measured with an inter-country table is the same as when measured with a national table.

This result has far-reaching consequences because inter-country input-output tables are not readily available and need to be constructed (which is a painstaking and time-consuming process). In contrast, national input-output tables are now widely available and do not require much additional work if one aims at a comparison of national vertical specialization across countries.