Trade Verticality and Structural Change in Industries: The Cases of Taiwan and South Korea

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Abstract

This paper documents that a significant portion of trade for Taiwan and Korea follows the trend of world trade in moving toward a pattern of vertical specialization (VS). Noteworthy is the manufacturing sector, whose VS shares of exports has been steadily increasing and has accounted for more than 90% of the total VS shares of manufactured exports. For Taiwan, nearly 57% of the growth in exports is contributed by the growth in VS-based trade; for Korea, it is as high as 64%. In the analysis, we compare VS shares of exports with or without input-output circulation among domestic industries in an open economy. Using Taiwan as a case study, we further discuss the implications of trade liberalization through tariff reductions for trade verticality.

The last two decades have witnessed a significant portion of world trade moving towards a pattern of “vertical specialization” or “global production sharing” in which trading countries share different stages of manufacturing (see, e.g., Krugman, 1995; Yeats, 1998; Feenstra, 1998; Hummels et al., 2001; Yi, 2003). Meanwhile, trade liberalization that lowers tariffs and technological improvements in transportation that reduce transaction costs have contributed to the growth of world trade, on the one hand, and have modified the pattern of international production and trade toward vertical specialization, on the other. The economies of outward-oriented countries are deeply integrated through international trade with the rest of the world. Also, production activities are increasingly disintegrated or fragmented in that they involve sequential connections of production stages from one to another with each of trading countries specializing in certain stages of production in a vertical relationship.

Vertical specialization in trade arises when the production of an exportable good requires imported intermediate inputs. This type of vertically connected production process involves two or more stages. The seminal work of
Dornbusch et al. (1977) discussed the specialization of trade model with a continuum of final goods. The contributions by Sanyal and Jones (1982), Dixit and Grossman (1982), and Sanyal (1983) further examined issues concerning trade and vertical specialization with multistage production.\textsuperscript{1} In earlier 1990s and the decade during which increased globalization and liberalization in trade and investment became prominently important issues in world trade, economists looked at trade issues from the perspective of vertical specialization, outsourcing, or foreign direct investment. The prominent studies include, among others, Krugman (1995), Barry and Bradley (1997), Yeats (1998), Hummels et al. (2001), Görg (2000), Deardorff (2001), Arndt and Kierzkowski (2001), Egger and Egger (2002), and Yi (2003).

Economic integration of a country with the world markets through trade has traditionally been measured by the country’s growth in exports and imports as shares of its GDP. However, Hummels et al. (2001) are among the first to analyze empirically economic integration of an export-oriented country with the global markets through the pattern of vertical specialization (VS) in trade. One important feature of this type of vertically connected production processes is that it involves the use of imported intermediate inputs, which are combined with local raw or other intermediate inputs, to produce goods for export. In other words, the degree of trade verticality in a sequential production process can be measured by the imported input content of exports.

The sustained and extreme rare type of high-level economic growth experienced by Taiwan and South Korea (hereafter Korea) after WWII has received a great attention of many scholars interested in economic development. The Taiwanese and Korean governments, like those of other developing countries, both adopted an import-substitution policy along with an export-promotion policy in the 1950s and 1960s.\textsuperscript{2} The export-led industrialization facilitates industrial takeoff and promotes rapid industrial growth. Both Taiwan and Korea relied heavily on international trade during their growth miracle periods. A large fraction of their exports was produced heavily from imported inputs. From the perspective of VS trade, we attempt to investigate the extent of the vertical linkages in trade and the accompanying changes in the structure of industries in Taiwan and Korea. What were those industries characterized by the highest vertical specialization and also experienced the fastest export growth? Did those industries with the highest vertical specialization levels and/or growth have the fastest output growth? How would trade verticality affect the growth of trade for the two countries? What would be the relationship between changes in the vertically specialized trade and the resulting changes in industrial structures? What would be the relationship between tariff reductions and the degree of vertical specialization?

The empirical results of this paper indicate that vertical specialization in trade plays an important role in the growth of trade for Taiwan and Korea. This suggests that a significant portion of international trade for the two countries in the last two decades has been following the trend of world trade in moving toward the pattern of global production sharing. VS shares of manufacturing