The Hidden Structure of ICT Value Chains: Integrating Firm Size and Export Status in Japan-Taiwan Production Networks

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Research on Global Value Chains (GVCs) has made significant progress in recent years; however, the production network structure in East Asia, characterized by close collaboration between large enterprises and SMEs, has not been sufficiently analyzed. This study uses originally constructed Japan-Taiwan international Input-Output tables with 87 sectors and three specialized 22-sector tables: (1) firm size-specific tables, (2) export/non-export sector-specific tables, and (3) combined tables integrating both firm size and export status dimensions (all for 2016). Through these multi-dimensional tables, we analyze the GVC participation structure of the ICT industry in Japan and Taiwan from the perspectives of value-added trade and employment structure. The objective is to comprehensively understand how different types of firms participate in GVCs and their respective economic and employment impacts, providing insights that cannot be obtained through conventional analysis.

In this study, we leverage three extended types of 22-sector input-output tablesâ€”by firm size, by export status, and by their combinationâ€”alongside the detailed 87-sector Japan-Taiwan international Input-Output tables and employment data to conduct the following analyses:

1. Elucidation of value-added trade structures by firm size in the ICT industry
2. Analysis of the relationship between value-added and employment: international comparison of labor productivity by firm size and evaluation of employment creation efficiency
3. Relationship between GVCs and employment structure: examination of differences in firm size-specific employment structures between export-oriented and domestic-oriented sectors
4. Cross-analysis of firm size and export status: analysis of value-added creation patterns and productivity gaps across four categoriesâ€”exporting SMEs, non-exporting SMEs, exporting large enterprises, and non-exporting large enterprises

The table disaggregation for both Japan and Taiwan was implemented using official census data from both economies, providing a robust statistical foundation for our multi-dimensional analysis. The detailed 87-sector classification tables are used to understand the fine-grained structure of ICT-related industries, while the three extended 22-sector tables allow for direct analysis of specific dimensions: the firm size-specific tables reveal interactions between large enterprises and SMEs; the export/non-export tables highlight differences between internationally engaged and domestically focused sectors; and the combined tables enable the four-category analysis that simultaneously considers both firm size and export orientation. In particular, we apply Koopman et al. (2014)'s value-added trade decomposition framework across these multiple dimensions to clarify differences in value-added creation and employment contribution based on firm characteristics. This multi-table approach allows for a comprehensive examination of how different types of firms participate in GVCs and contribute to employment generation.

The originality of this research lies in its multi-dimensional analysis utilizing three distinct but interconnected specialized Input-Output tables that capture firm size differences, export orientation, and their combined effects. This methodological innovation allows for a comprehensive analysis of GVC participation impacts on both value-added creation and employment generation. By evaluating the value-added creation patterns and employment impacts through these multiple lensesâ€”which cannot be captured by the OECD's ICIO tables or AAMNE databaseâ€”we can develop a more three-dimensional understanding of the economic and social impacts of GVC participation. In particular, the combined firm size and export status tables enable us to clarify the characteristics of exporting SMEs versus non-exporting SMEs, as well as their relationships with large enterprises, providing concrete policy implications for strengthening the international competitiveness of SMEs.