he Hidden Hierarchy of Global Value Chains: Capital Endogenization and the Divergence between Function and Location

Topic: Input-Output Accounts (2)
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Abstract
(1) Research Question
Contemporary trade metrics depict a secular decline in advanced economies' manufacturing competitiveness, yet these nations retain strategic control over Global Value Chains (GVCs). This paradox highlights a fundamental flaw in standard Trade in Value-Added (TiVA) accounting: the treatment of fixed capital as an exogenous final demand component rather than a produced intermediate input. This paper investigates how standard Input-Output (IO) models mismeasure the depth of global production fragmentation and obscure the structural vulnerabilities of export value on foreign capital assets. Specifically, we examine how the endogenization of fixed capital reshapes our understanding of comparative advantage and reveals the underlying hierarchy of global production.
(2) Method Used
We operationalize the endogenization of capital within the Inter-Country Input-Output (ICIO) framework by adopting a content-based Consumption of Fixed Capital (CFC) flow matrix method. By transforming CFC data into a full international capital flow matrix, we construct a capital requirement matrix to derive a novel capital-endogenized Leontief inverse. This framework allows us to decompose gross exports into Domestic and Foreign Capital Value-Added. Furthermore, we develop new structural indicators, including Capital Dependency Ratios and a Capital-Endogenized Revealed Comparative Advantage (CRCA) index, to quantify global reliance on capital inputs.
(3) Data Used
The empirical analysis utilizes the 2025 edition of the OECD ICIO tables, focusing on a comparative analysis between the years 2010 and 2022. The core international capital flow matrices are constructed using fixed capital information from the OECD, supplemented by CFC estimates derived from Eurostat and KLEMS databases to bridge data gaps.
(4) Novelty of the Research
This research provides a paradigm shift in GVC analysis by moving from a territorial measure of value creation (location) to an origin-based assessment of productive capability (function). The primary novelty lies in unmasking a "Great Reversal" in global competitiveness: advanced economies like the US and Japan are revealed to hold a "functional hegemony" as exporters of capital services, while emerging manufacturing hubs (e.g., Mexico, Vietnam) are caught in a "dependency trap" where they host production lines largely powered by foreign capital. Additionally, the framework offers a pioneering capital-centric interpretation of US-China geopolitical tensions, quantitatively documenting China's rapid "Capital Deepening" and the transition of the bilateral relationship from vertical complementarity to horizontal substitution. Ultimately, it introduces a new Typology of Capital Power, reclassifying the global economy based on the autonomy of capital structures rather than gross trade balances.