

The Composition and Driving Mechanism of China's Intangible Asset Returns from the Perspective of Dual Circulation: Based on Input-Output Method and Structural Decomposition Analysis)

Topic: Input-Output Analysis: Trade and Global Value Chains policies (3)

Author: Kaiyao Wu

Co-Authors: Xinyu Wang

(1) The research question

Under China's "dual circulation" development paradigm (with the domestic cycle as the mainstay and mutual reinforcement between domestic and international cycles), what are:

the composition and changing patterns of China's intangible asset returns, their asymmetric distribution between domestic and international cycles ("input stronger than output"), the main driving mechanisms behind their growth (especially in forward and backward linkages), their dynamic evolution and position within global value chains (GVCs), and how do these patterns and drivers inform strategies for improving innovation autonomy, GVC upgrading, and high-quality development?

(2) The method used

Input-output analysis → to construct a dual-circulation accounting framework for intangible asset returns (separating domestic vs. international cycles, and further decomposing international into traditional trade, simple GVC, and complex GVC activities)

Structural Decomposition Analysis (SDA) combined with Logarithmic Mean Divisia Index (LMDI) → to decompose changes in intangible asset returns into key driving effects:

allocation efficiency effect

production structure effect (domestic multiplier, feedback, spillover)

final demand/final product effect

Separate decompositions are conducted for: total cycle, domestic cycle only, international cycle only, forward linkages, and backward linkages

Residual method correction/adjustment → ex-post calibration of biases coming from Cobb-Douglas assumptions, depreciation rate inconsistencies, synergistic effects in knowledge-intensive sectors, etc.

(3) The data used

Core database: World Input-Output Database (WIOT), 2000–2014, covering 43 countries and 56 industries

Supplementary sources:

SEA (Socio-Economic Accounts) data → for capital stocks, gross fixed capital formation, labor compensation, output, etc.

EU KLEMS database → mainly for tangible capital stock data of major economies (used to improve cross-country comparability)

Time segmentation: 2000–2007 (rapid globalization), 2008–2010 (financial crisis), 2011–2014 (post-crisis recovery)

Industry re-classification: regrouped into primary, labor-/capital-/knowledge-intensive manufacturing, labor-/capital-/knowledge-intensive services, and public services

(4) The novelty of the research

First (or among the earliest) systematic study that explicitly constructs a dual-circulation accounting framework for intangible asset returns, clearly separating and comparing domestic vs. international cycle contributions within the post-2020 Chinese "dual circulation" policy context.

Integrates GVC participation modes (traditional trade + simple GVC + complex GVC) into the dual-circulation decomposition of intangible returns – rare in previous literature.

Applies SDA-LMDI to decompose intangible asset returns specifically from both forward and backward perspectives under dual circulation, revealing asymmetric driver patterns (e.g., dominant final demand effect + persistently negative allocation efficiency effect).

Explicitly identifies and quantitatively corrects residual-method biases (Cobb-Douglas underestimation of synergies in knowledge-intensive services ~40%, depreciation rate inconsistencies between countries, etc.), showing that technological diffusion benefits were previously underestimated and some "allocation deterioration" was actually statistical artifact.

Links findings to very recent trends (WIPO 2025 digital intangible growth, Made in China 2025 upgrading) and provides concrete, quantified policy targets for 2030.

In short, the paper bridges Chinese dual-circulation policy discourse with state-of-the-art GVC/intangible capital measurement techniques, while offering both empirical correction of biases and forward-looking policy implications.