

The 2023 edition of the OECD Analytical AMNE Database: methodology and new evidence on the role of multinational production in global value chains

Topic: Input-Output Analysis: Trade and Global Value Chains Policies - VIII

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Inter-country input-output (ICIO) tables and trade in value added (TiVA) indicators have become an invaluable part of the international trade toolkit of researchers and policymakers alike. The global Leontief inverse has made it possible to measure international trade flows in value added rather than in gross terms and to identify the contribution of each country and industry to the value of final products.

One aspect that this strand of literature has struggled to shed light on is the role of multinational enterprises (MNEs). MNEs are very important actors in global value chains (GVCs) and, while their foreign affiliates undisputedly contribute to value added in the host countries, they are also likely to retain strong ties with the parent economy. Thus, understanding the relative contribution made by domestic- and foreign-owned firms in global production can be a matter of great interest for policymakers. In this paper, we first discuss the latest update of the OECD Analytical AMNE database which extends the OECD ICIO tables by an ownership dimension for the period of 2000-2019. In a second part, we present empirical evidence on the role of multinational production in global value chains over the past two decades.

Despite recent initiatives to build extended supply-use tables that incorporate an ownership dimension, national accounts generally do not provide separate data on the transactions of domestic-owned and foreign-owned firms. Consequently, the existence and magnitude of those transactions have to be inferred from other sources and in particular official statistics on Activities of Multinational Enterprises (AMNE). Our starting point and benchmark are the OECD ICIO tables, a series of ICIOs of the standard format in which transactions are observed at the level of country-industry pairs (i.e., regardless of ownership). We first estimate a breakdown of gross output, value added, exports and imports of intermediate inputs by ownership status (domestic versus foreign) for every industry, country and year. This breakdown is based on AMNE statistics from the OECD AMNE database and national sources, as well as on Trade by Enterprise Characteristics (TEC) data for trade flows. Additional sources (such as FDI statistics) and a variety of statistical methods are used to fill the data gaps and create a full set of estimates. Ensuring that AMNE data align well with the ICIOs poses a number of methodological challenges, ranging from differences in valuation (basic versus purchasersâ€™ prices) to accounting concepts (gross output versus turnover), survey unit definitions (firm versus establishment), industry classifications and sampling schemes.

Once available, this ownership-split dataset is used to disaggregate the ICIOs via a quadratic optimization approach. To begin with, starting values are generated for the Analytical AMNE table. To this end, each row and column of the ICIO is split into a domestic- and foreign-controlled component in proportion to the estimate of gross output by ownership constructed in the previous step. In essence, for any given country-industry pair, domestic firms and foreign affiliates are initially assumed to the same input and output structure. The Analytical AMNE table is then calculated as the solution to a constrained minimization problem. The objective function is a weighted sum of the square deviations from the starting values as well as the exogenous estimates of value added, import and export by ownership. The main constraints are that the Analytical AMNE aggregate values back to the original ICIO and that output by ownership matches the exogenous estimates in all countries and industries.

The resulting Analytical AMNE tables consist of 41 industries (based on the ISIC Rev. 4 classification) and cover 77 countries over the period 2000-2019. Foreign ownership is determined based on majority: a firm is regarded as foreign if it has at least 50% of foreign ownership. Work is currently ongoing to extend the Analytical AMNE to a three-way ownership split up to the year 2019 in which domestic firms are further distinguished between those that have foreign affiliates (â€˜domestic MNEsâ€™™) and those that do not.

The 2023 edition of the Analytical AMNE database confirms that MNEs play an important role in global output and even more so in global trade. As observed in the case of trade flows and the international fragmentation of production, there is a slowdown in multinational production since the 2008-2009 Financial Crisis. But MNEs still rely on a complex network of foreign affiliates to serve global markets in 2019. Patterns of multinational production in value added terms shed more light on differences across industries as well as the evolution of firmsâ€™™ sourcing strategies in the context of rising uncertainty and geopolitical tensions just before the COVID-19 pandemic.