Global value chains and the transmission of price shocks

Abstract

The build-up of global production networks during the past decades has increased the interaction among sectors across countries. The growth of GVCs reflects the international integration of geographically fragmented global production processes, made possible by new technologies and lower trade barriers.

In this paper, we document the role of global input-output linkages in transmitting productivity and price shocks in the international economy. More specifically, we study the role of global input-output linkages in transmitting oil prices shocks across economies.

We build on two sectoral datasets, the World Input Output Database (WIOD) and the OECD- ICIO database and take advantage of the temporal dimension of the dataset to document the extent to which the growth in GVCs has changed inflation dynamics over time.

1. Introduction and literature review
2. Data and measurement issues

We use two sectoral datasets for international intput-output tables: the World Input Output Database (WIOD) and the OECD- ICIO database.

The World Input Output Database (WIOD) contains time series of inter-country input-output tables from 2000 to 2014. Input-output tables are designed to measure the interrelationships between the producers of goods and services (including imports) within an economy and the users of these same goods and services (including exports). World Input-Output tables (WIOT) connects national table with international trade flows. WIOD uses supply-use tables (SUT) from individual country’s national accounts as the starting point to integrate with bilateral trade statistics and derive the final symmetric world Input-Output table (WIOT). The WIOTs cover 43 countries, of which a majority belongs to the European Union, as well as the rest of the world, constructed as one economy. These global Input-Output (I-O thereafter) tables cover around 85% of world GDP and contain annual information for 35 industries, comprising primary, manufacturing goods and services sectors. Therefore, for each year a full country-sector input-output matrix allows to trace the importance of a supplying industry in one country for an industry in another country. The values in WIOTs are expressed in millions of U.S. dollars; market exchange rates were used for currency conversion (Timmer et al., 2015). All transactions values are in basic prices, reflecting all costs borne by the producer. These tables are accompanied by Socio-Economic Accounts which contain country sector panel data on employment (number of workers, compensation and share of labor in high, medium and low skilled occupations), capital stocks, gross output and value added).

The OECD ICIO database comes close to WIOD in terms of coverage. It builds on the OECD harmonized individual country I-O tables to provide matrices of inter-industrial flows of goods and services in current prices (USD million), for 64 economies and 34 industries, covering the years 1995 to 2011.

The WIOT and OECD-ICIO databases have a number of distinguishing characteristics (see Timmer et al. 2015 for details). The difference most relevant for our analysis relates to the treatment of imports by use category. From national input–output statistics one can derive the use of products by industries and final consumers, but the country of origin of these products is unknown. Therefore, one has to breakdown product import statistics by category of use in the construction of WIOTs.

The ICIO database relies on the so-called import proportionality assumption. The I-O tables show transactions between domestic industries. As a complement to these tables, supplementary tables break down total imports by user (industry and category of final demand). Some countries provide these import tables in conjunction with their I-O tables, but in other cases they are derived by the OECD. The main assumption used in creating these import matrices is the proportionality assumption, which assumes that the share of imports in any product consumed directly as intermediate consumption or final demand (except exports) is the same for all users. Various studies have found that this assumption can be misleading, as import shares vary significantly across use category. Feenstra and Jensen (2012) find that shares of imported materials may differ substantially across US industries. Based on Asian I-O tables, Puzzello (2012) finds that the use of the standard proportionality assumption understates the use of foreign intermediate inputs. Hence, the import proportionality assumption is likely to be particularly binding for developing countries, as the import content of exports is usually higher than the import content of products destined for domestic consumption. To address this issue, the WIOD database starts with imports as given in the supply tables and uses bilateral trade statistics to derive import shares for three end-use categories (intermediate use, ﬁnal consumption and investment).

1. Methodology

References

Feenstra, R. C. and J. B. Jensen, “Evaluating Estimates of Materials Offshoring from U.S. Manufacturing,”

Economics Letters 117 (2012) 170-173.

Puzzello, L., “A proportionality assumption and measurement biases in the factor content of trade,” Journal of International Economics 87 (2012):105–11.

Timmer, M. P., Dietzenbacher, E., Los, B., Stehrer, R., & Vries, G. J. (2015), “An illustrated user guide to the world input output database: the case of global automotive production”. Review of International Economics, 23(3), 575-605.

<https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2064.en.pdf?316eb4d64f21dfa80fc73d305bd284bd>

<https://www.ecb.europa.eu/pub/pdf/other/eb201602_article01.en.pdf?61d1a10be9740cc92a072a3e3d5c2dbb>

<http://www.oecd.org/sti/ind/49894138.pdf>