

Search

How do I...

- [Create an account](#)
- [Receive the Weekly Digest email](#)
- [Join a Debate](#)
- [Submit an Event](#)
- [Post Comments](#)
- [Add a tag](#)
- [Send feedback](#)

Founding Contributors

- [Alberto Alesina](#)
- [Richard Baldwin](#)
- [Erik Berglöf](#)
- [Giuseppe Bertola](#)
- [Olivier Blanchard](#)
- [Tito Boeri](#)
- [Willem Buiter](#)
- [Michael Burda](#)
- [Stephen Cecchetti](#)
- [Daniel Cohen](#)
- [Juan Dolado](#)
- [Esther Duflo](#)
- [Barry Eichengreen](#)
- [Jeffrey Frankel](#)
- [Francesco Giavazzi](#)
- [Rachel Griffith](#)
- [Philip Lane](#)
- [Philippe Martin](#)
- [Richard Portes](#)
- [Carmen M Reinhart](#)
- [Anne Sibert](#)
- [Guido Tabellini](#)
- [Shang-Jin Wei](#)
- [Charles Wyplosz](#)

My account

- [Create account](#)
- [Reset password](#)
- [Login](#)

Navigation

- [Debates](#)
- [My Unread](#)
- [Create content](#)



Global value chains, trade, jobs, and environment: The new WIOD database

Hubert Escaith Marcel Timmer
13 May 2012

[Print](#) [Email](#)
[Comment](#) [Republish](#)

Global value chains and the international fragmentation of production challenge well-established trade policy models and raise new issues. Yet research has been hindered by the limited availability of proper statistics. This column introduces the World Input-Output Database (WIOD), a new public data source that offers unique opportunities to study the effects of fragmentation on a range of socioeconomic and environmental issues.

International fragmentation of production has become increasingly prominent since the 1990s and trade in final goods is increasingly replaced by trade in tasks. This challenges many economic convictions in development economics, from the neoclassical understanding of gradual convergence to the structuralist models of North-South dependence and industrialisation through import substitution. It also sheds new light on the outcome of a wide range of Heckscher-Ohlin-Samuelson models. For example, Baldwin and Robert-Nicoud (2010) show that the standard gains from trade do not always hold when intermediate goods and services are incorporated. Politicians and decision makers have also entered the debate on trade, offshoring and jobs, particularly after the 2008-9 crisis. Yet, much of this debate so far has been based on scant empirical evidence.

Providing comprehensive and trustable data on the various dimensions of the internationalisation of production networks is, definitely, a challenge. Issues to be solved include defining a proper measure of intermediate trade between industries or tracking changes in production technology and production factors. Moreover, the database should allow the simultaneous exploration of these dimensions through time and across a large sample of countries. The World Input-Output Database (WIOD) project, initiated in May 2009 and recently completed, rose up to the challenge and gathered the expertise of 11 universities and research centres. The project was financed by the European Commission in its 7th framework and received institutional support from OECD and WTO.

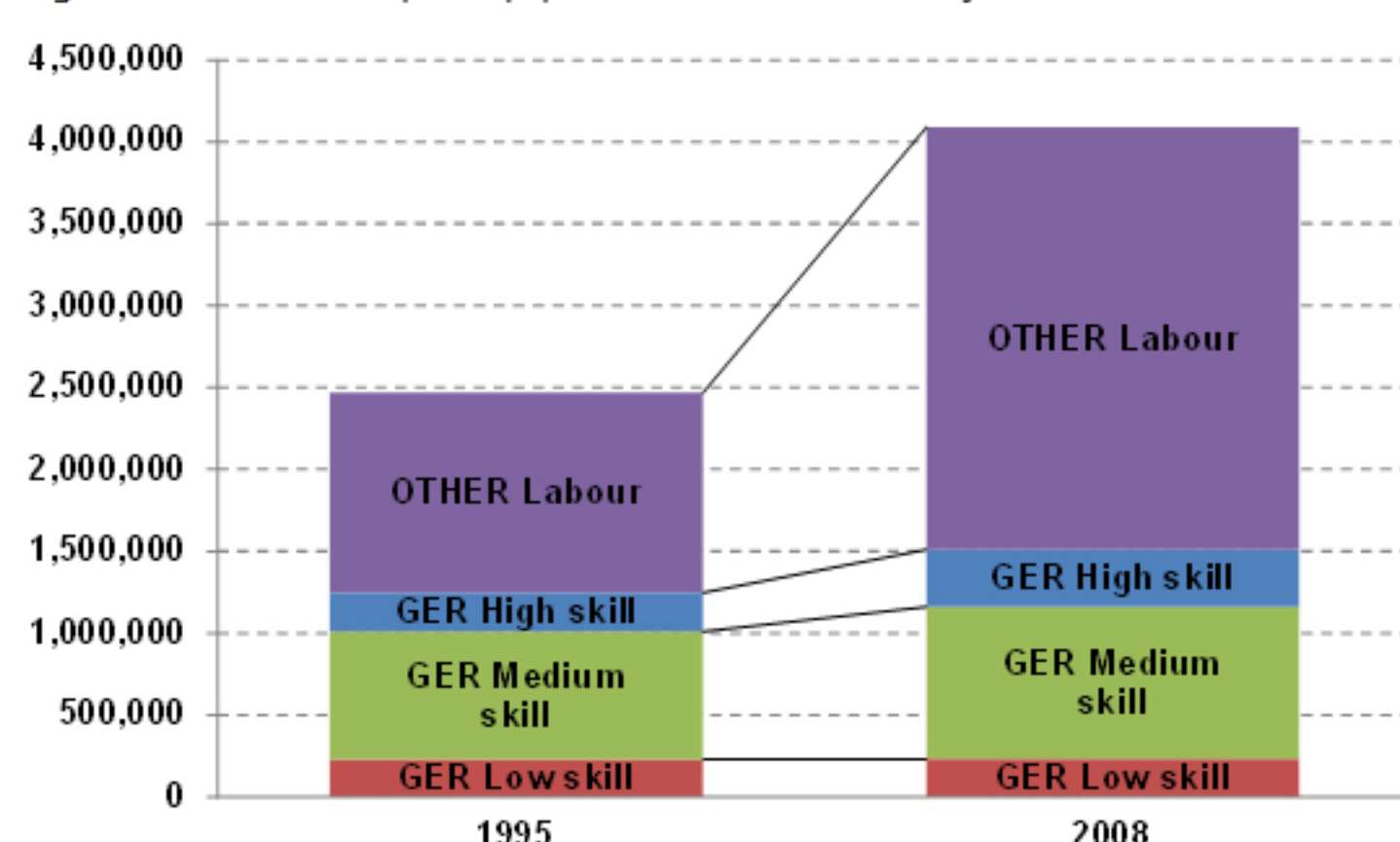
The WIOD database

The core of the database is a set of harmonised national supply and use tables, linked together with bilateral trade data in goods and services. These two sets of data are integrated into a world input-output table. National tables are typically available only for benchmark years and often not comparable over time. WIOD started from consistent national accounts series on output, final demand and international trade to insure meaningful comparisons over time. The results provide international tables at current and previous year prices, with use split into domestic and import by country (35 industries by 59 products) for 41 regions in the world. Based on this, annual world input-output tables are derived for the period from 1995 to 2009.

Additional environmental and socioeconomic indicators provide other necessary input required by modellers. The Socioeconomic Accounts include industry-level data on capital stock, investment, wages, and employment by skill type. It has been used, for example, for slicing up global value chains and derive new measures of competitiveness (Timmer et al. 2012) and trade in value added (Stehrer et al 2012). The data allow examining, for example, the link between international outsourcing and labour demand and inequality, and study the emergence of global value chains.

Figure 1 gives an example on changes in the number and geographical location of direct and indirect jobs related to the production of German transport equipment. Real demand for German cars almost doubled over the period from 1995 to 2008 and the number of related jobs increased from 2.5 to 4 million. The large majority of the additional jobs were created outside Germany, in particular in Eastern Europe. In Germany, medium-skilled jobs increased only slowly while low-skilled jobs slightly decreased.

Figure 1. German transport equipment: Direct and indirect jobs



Source: WIOD

The Environmental Accounts include industry-level data on gross and emission-relevant energy use, other air pollutants, as well as land, materials and water uses. This allows, for example, assessing the displacement of CO2 emitting activities towards developing countries, quantifying CO2 emissions embodied in trade (Boitier 2012).

The [database](#) is freely available and contents, sources and methods are described in Timmer (2012). For practical applications, see the papers presented at the [final WIOD conference](#).

Trade in value added

From a trade statistics perspective, one of the main outcomes of the WIOD project is its contribution to a measure of international trade flows in value-added, not only by providing the underlying data, but also by enriching the stock of methodological knowledge on the measurement issues themselves. Most international initiatives, such as the recent OECD-WTO project (2012), deduct the domestic value-added content of exports by tracking direct and indirect imports of intermediate goods and services, applying modified versions of the vertical-specialisation index defined by Hummel et al. (2001), such as in Koopman et al. (2012). Alternatively, one can start from the national accounting identity stating that, at the global level, the sum of value-added is equal to final demand (consumption plus investment). Here, value-added is traced directly where it was generated in the global value chain, along the lines of Johnson and Noguera (2011). The difference in the two approaches is explained in Los et al. (2012).

In both approaches, some caution should be exercised. Any "measurement" of trade in value-added should be treated as an "estimate", rather than a "measurement", as most flows are not directly observable. Indeed, the construction of any world input-output table is a statistical estimate in itself. Large discrepancies between the values recorded in national accounts and in international trade statistics have to be reconciled, as well as between importers' and exporters' reports. Some of the issues are due to well-known classification and data collection procedures; others are more conceptual and cannot be resolved without formalising an a priori preference for a particular source (Guo et al 2009). Similarly, the breakdown of the use table into domestic and imported origin is crucial, but empirically complex. Proportionality is often used, based on a common import proportion for all cells in a use row, but WIOD found that import proportions differ widely across use categories and importantly, within each use category they differ also by country of origin.

Because firms active in trade differ from those producing for the domestic market, the import content of exports might be underestimated. This aggregation bias is particularly important when exports are very intensive in the use of imports, such as in the export-processing zones found in many developing countries. When additional data on such activities are available, as in the case for China, it is possible to reduce the bias (Degain and Maurer 2010). But ideally one would like to have additional information based on firm surveys to split the IO table in export-oriented and domestic-oriented firms.

The way ahead

WIOD's results complement and, in many aspects, go beyond the pioneering contributions of IDE-JETRO and OECD, providing not only the means to measure trade in value-added, but also to link these data to a series of environment and socioeconomic satellite accounts. The database is to be counted as one of the important public goods available to the community of trade economists. It is hoped that the statistical momentum created by WIOD will be sustained by a series of initiatives involving international agencies, such as the OECD-WTO project and the community of official statisticians at EUROSTAT and the UN. 2013 should be the year when trade in value-added enters formally in the domain of official statistics, first in February as the annual UN Statistical Commission in New York, and then in August at the International Statistical Institute 59th World Statistics Congress, held in Hong Kong.

References

- Baldwin, R and F Robert-Nicoud (2010) "Trade-in-goods and trade-in-tasks: An Integrating Framework", CEPR Discussion Paper 7775
- Boitier, B (2012) "CO2 emissions production-based accounting vs consumption: Insights from the WIOD databases", WIOD Conference Paper, April.
- Degain, Ch and A Maurer (2010) "Globalization and trade flows: what you see is not what you get!" WTO Staff Working Paper.
- Guo, D, C Webb and N Yamano (2009), "Towards Harmonised Bilateral Trade Data for Inter-Country Input- Output Analyses: Statistical Issues", OECD Working Papers, 2009/04.
- Hummels, D, J Ishii and K M Yi (2001) "The nature and growth of vertical specialization in world trade", *Journal of International Economics* 54(1), 75-96
- Johnson, R C and G Noguera (2012), "Accounting for intermediates: Production sharing and trade in value added", *Journal of International Economics*, In Press.
- Koopman, R,W Powers, Z Wang, and S-J Wei (2010), "Give credit where credit is due: Tracing value added in global production chains", NBER Working Paper 16426.
- Los, B, E Dietzenbacher, R Stehrer, M P Timmer and G de Vries, (2012), "Trade Working in Internationally Fragmented Production Networks: Concepts and Measures", WIOD Working Paper Nr. 11
- OECD-WTO (2012), "Trade in Value Added: Concepts, Methodologies and Challenges", Mimeo, OECD.
- Stehrer, R, N Foster and G de Vries (2012), "Value Added and Factors in Trade: A Comprehensive Approach", WIOD Working Paper 7
- Timmer, M P, A Erumban, B Los, R Stehrer and G de Vries (2012), "New measures of European Competitiveness: A Global Value Chain Perspective", WIOD Working Paper 9.
- Timmer, M P (2012, ed), "The World Input-Output Database (WIOD): Contents, Sources and Methods", WIOD Working Paper 10.

This article may be reproduced with appropriate attribution. See Copyright (below).

Topics: [International trade](#)

Tags: [fragmentation](#) [input-output tables](#) [value chains](#)

Bookmark this: [del.icio.us](#) | [Digg it](#) | [Tailrank](#) | [Reddit](#) | [Newsvine](#) | [Furl](#) | [Connotea](#) | [Technorati](#)

Print this | Email this | Republish this | 7759 reads

Comments

Comments (0) | [Login to post comments](#)