

**U. S. International Trade Commission
Report on GTAP Related Activities**

For

The Advisory Board Meeting,
Center for Global Trade Analysis

June 10-12, 2013
Shanghai, China

The United States International Trade Commission (USITC) uses GTAP to analyze global trade issues and to evaluate the potential impacts of prospective trade policy changes, in response to requests from the United States Trade Representative (USTR) and Congress. The following reports outline key aspects of GTAP-related work by different economists at the USITC during July 2012-June 2013:

David Riker, “Government Consumption and Global Value Chains,” Office of Economics Working Paper No. 2013-04A, http://www.usitc.gov/publications/332/working_papers/EC201304A.pdf

Abstract: Imports account for only a small share of government consumption, and this suggests that foreign producers have limited direct participation in markets for public procurement. However, global value chains can provide foreign producers with indirect access to these markets, as they export to downstream producers who then directly serve the markets. This is reflected in much higher import shares in government consumption when the imports are measured as international flows of value added. In this paper, we use the World Input-Output Database (WIOD) and a model of trade in value added to improve estimates of home bias in government consumption. We find that the home bias in government consumption is much larger than the home bias in private consumption, as we would expect, though the home bias in government consumption is smaller when it is calculated from value-added shares. The home bias in government consumption limits the international transmission of changes in fiscal policy. Although there were large changes in the level and composition of government consumption between 2008 and 2009 in many of the WIOD countries, most of the impact of these changes was on domestic shipments of value added. There were only modest aggregate changes in international trade. There were, however, significant bilateral effects for certain country pairs.

William Powers and David Riker, “Exchange Rate Pass-through in Global Value Chains: The Effects of Upstream Suppliers,” Presented at the 2013 Washington Area International Trade Symposium on April 12, 2013, Office of Economics Working Paper No. 2013-02B, http://www.usitc.gov/publications/332/working_papers/EC201302B.pdf

Abstract: In this paper, we estimate the effect of fluctuations in nominal exchange rates on trade in manufactured goods for final use. We estimate an econometric model of international trade that incorporates data on the value-added content of trade flows. Our analysis indicates that the value-added trade data can significantly improve estimates of exchange rate pass-through rates and trade elasticities by more fully accounting for the effects of a reduction in the value of an exporter’s currency on its own costs and the costs of its international competitors.

William Power and David Riker, “The Effect of Exchange Rates on the Costs of Exporters,” Work in progress.

Abstract: Econometric estimates of exchange rate pass-through usually adopt an overly simple model of the exchange rate denomination of the exporter’s costs: they usually assume that one hundred percent of

these costs are denominated in the currency of the exporting country. However, from the literature on trade in value added we know that a country's exports usually include a significant amount of intermediate inputs that represent the value added of other countries with different currencies. Using an international input-output table like those published by WIOD, it is straightforward to calculate the currency denomination of the costs of exporters of final manufactured goods based on the national shares of the value added in these exports. We use these measures to analyze whether unrealistic assumptions about the currency denomination of costs can explain some of the findings of partial pass-through of exchange rate changes in the literature. We find that models of exchange rate pass-through that rely on the standard assumption about costs significantly overstate the adjustment of the exporters' mark-ups to changes in exchange rates.

Robert B. Koopman, Marinos Tsigas, David Riker, and William Powers, "The Implications of Using Value-Added Trade Data for Applied Trade Policy Analysis,"

https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=4188 .

Abstract: This paper aims to examine the implications of using the GTAP database and three databases containing information from trade in value-added (TiVA) datasets for computable general equilibrium (CGE) experiments. A comparison of experiments based on the GTAP data and on USITC research on global value chains (GVC) illustrates that a CGE model specified in such a way as to better reflect the trade linkages found in modern global supply and value chains can produce substantial differences in macro level impacts and also reflect the realities of specific product chain relationships. Our comparison would expand to include TiVA datasets from the WIOD project and OECD/WTO.

Christophe Degain, Lin Jones, Zhi Wang, Li Xin, "The Similarities and Differences among the Three Major Global Inter-Country Input-output Database and their Implications for Trade in Value-added Estimates,"

Abstract: This paper compares three publicly accessible global inter-country Input-output (ICIO) databases constructed by WIOD, GTAP and OECD. We 1) aggregate the three databases into the same dimension, with the same country and sector classifications, 2) check their consistence with each country's GDP by expenditure accounts, and 3) compute the differences between the three databases in major economic variables, including gross outputs, direct value-added, domestic and imported intermediate inputs and final demand, and bilateral gross trade flows. Then we 4) estimate major trade in value-added indicators, 5) decompose each country's gross exports into various value-added and double counted components, using the method proposed by Koopman, Wang and Wei (2012), and 6) discuss the similarities and differences of these estimates between the three databases. We conclude the paper by a discussion of directions of further improvement of such type global ICIO database.

Robert Koopman, Zhi Wang, and Shang-Jin Wei, TRACING VALUE-ADDED AND DOUBLE COUNTING IN GROSS EXPORTS, Forthcoming in American Economic Review.

Abstract: This paper proposes a framework for gross exports accounting that breaks up a country's gross exports into various value-added components by source and additional double counted terms. By identifying which parts of the official trade data are double counted and the sources of the double counting, it bridges official trade (in gross value terms) and national accounts statistics (in value added terms). Our parsimonious framework integrates all previous measures of vertical specialization and value-added trade in the literature into a unified framework. To illustrate the potential of such a method, we

present a number of applications including re-computing revealed comparative advantages and the magnifying impact of multi-stage production on trade costs.

Heiwai Tang, Fei Wang, and Zhi Wang, *The Domestic Segment of Global Supply Chain in China under State Capitalism*, Preliminary draft available, Accepted for presentation at “International Conference on Global Value Chains and Structural Adjustments”, to be held in Tsinghua University, Beijing, China, from June 24 to 26, March, 2013

Abstract: This paper quantifies domestic value added (both direct and indirect) in Chinese exports by ownership type and firm size, using conventional I/O tables, firm census data for both manufacturing and service sectors, and constrained optimization techniques. We find that both state-owned enterprises (SOEs) and small and medium domestic private enterprises (SMEs) have much higher share of indirect exports and ratio of value-added exports to gross exports (VAX), compared to foreign-invested enterprises and large domestic private firms. By extending the method proposed by Antras et al. (2012), we measure industry upstreamness by firm type and find that SOEs are consistently more upstream while SMEs are consistently more downstream within industries. These results suggest different determinants of the high VAX and indirect export ratio for these two types of firms. Our findings about the dominance of SOEs in the upstream sectors suggest that SOEs still play an important role in shaping China’s downstream export performance, indirectly through the domestic segment of global supply chains.

Hong Ma, Zhi Wang, Kunfu Zhu, “Domestic Value-added in China's Exports and its Distribution by Firm Ownership,” Accepted for presentation at “International Conference on Global Value Chains and Structural Adjustments”, to be held in Tsinghua University, Beijing, China, from June 24 to 26, 2013

Abstract: Processing trade and foreign-invested enterprises (wholly foreign-owned firms and Sino-foreign joint ventures, FIEs) played significant roles in China’s economic growth in recent decades; FIEs currently account for about 20% of China’s total economic output and about 60% of its exports. However, because of their ownership, FIEs complicate the measurement of domestic value-added generated from exports and the distribution of gains from trade. In this paper, we extend the method developed by Koopman, Wang and Wei (2012) to further separate Chinese exports into those by FIEs and by Chinese owned domestic enterprises (COEs), in addition to processing and normal exports. We propose an accounting framework and a detailed estimation procedure that accounts for the production and trade activities of FIEs and COEs separately. We first estimate the value-added contributions from each type of firms and decompose gross exports into domestic and foreign content by firm types; then we estimate factor ownerships by firm types based on enterprises survey data and compute the distribution of domestic value-added by factor ownership thus the distribution of gains from trade to related parties. Empirical estimation is based on China’s 2007 benchmark input-output tables with detailed trade and Balance of payment statistics. Firm heterogeneities within each IO industry are identified by linking the NBS enterprises surveys and the Customs’ firm transaction level data. Preliminary results indicate that in 2007 FIEs operating in China created nearly 45% Chinese value-added in Chinese exports, while Chinese processing firms only contributed less than 5%. About 52% of the value of Chinese exports was captured by foreign factor owners (including factors owned by Taiwan, and Hong Kong).

Bo MENG, Zhi WANG, and Robert KOOPMAN, “How Does a Country’s Firm or Domestic Region Engage Global Value Chains?: A measuring framework based on embedded international Input-Output tables,” Accepted for presentation at “International Conference on Global Value Chains and Structural Adjustments”, to be held in Tsinghua University, Beijing, China, from June 24 to 26, 2013.

Abstract: Global value chains (GVCs) are supported not only by domestic regions or firms who export goods and services to the world market directly, but also by other domestic regions or firms who take part in the global economy indirectly through providing parts, components and intermediate services to the export oriented regions or exporting firms. In order to reveal the nature and significance of a country’s position and its degree of participation in global value chains, we need a framework to evaluate this domestic-regional and firm-level perspectives in addition to the cross country perspective that dominates current trade in value-added literature. This paper proposes a new measuring framework, in which a country’s domestic interregional Input-Output (IO) table or a national IO table with firm heterogeneity information is embedded in an international IO model endogenously. We further make an extension of KWW’s gross export decomposition technique to distinguish the domestic segment and international segment in GVCs. Applying the extended KWW decomposition technique to the embedded international IO tables, we can understand how global production is fragmented and extended across a country’s domestic regions or how different type of firms engage GVCs in different industries, as well as how value added is created and distributed in both domestic and international segments of the global value chains. In order to test the validity and usefulness of this new approach, preliminary numerical results are discussed based on Chinese 2007 interregional IO table, Chinese micro data from the 2008 Economic Census, the World Input-output Database (WIOD) and Chinese provincial level customs statistics. The main results show that using the embedded IO framework, the estimation reliability of a country’s bilateral trade balance in value added term can be further improved comparing with the conventional IO based approaches. In addition, the heterogeneity and ownership information of can provide additional important information about “who produce what for whom” as well as a proxy indicator of “trade in income”.

Nadim AHMAD, Norihiko YAMANO, Zhi Wang, “A Three Stage Reconciliation Method to Construct Time Series International Input-output Database,” chapter 10 in World Bank/CEPR Book “Trade in Value-Added, Developing New Measures of Cross Border Trade”

Abstract: International trade statistics do not balance at the global level; giving rise to the humorous anecdote of Earth trading with Mars or the Moon. At the national level this can generally be ignored; the perspective being that the inconsistencies are in some other country's accounts. But when considering global accounts, and in particular in relation to analyses of global value chains and trade in value-added, these inconsistencies create significant problems. Analyses such as those related to trade in value-added require globally consistent input-output and supply-use tables. This paper therefore develops a three stage optimization method to reconcile the official national accounts and detailed bilateral goods and services trade statistics, to produce a consistent global input-output database. At the first stage, the procedure reconciles total goods and services exports and imports recorded in each country’s GDP by expenditure accounts with trade statistics at the product group level recorded in each country’s supply and use tables. It results in a consistent time series of country and product group level total exports and imports, which satisfy the condition that world total exports plus a shipping (c.i.f.) margin equals world total imports. At the second stage, the procedure benchmark each country's supply and use tables with each country’s GDP by expenditure account, using the global consistent exports supply and import demand estimates from the first stage as controls. At the final stage, the procedure allocates bilateral trade flows to producing/using industries and final users in each country based on international bilateral trade statistics broken down by end-use, resulting in a time series of bilateral trade statistics within a global supply-use table that records bilateral positions consistent with global control totals estimated in the first stage. Mirrored trade statistics

are used as interval constraints in the final stage with a quality based reliability index for each bilateral trade flow by product group, to arrive at a final balanced global table that is consistent with the major components in each country's GDP by expenditure account.

Xuepeng Liu, Aaditya Mattoo, Zhi Wang, Shang-Jin Wei, "Embodied Services and Manufacture Export Performance," Paper presented at "National Competitiveness, Scalability of International Value Chains and Location of Production" ECB/CompNet-PIIE-World Bank, 16-17 April 2013, Washington, DC, April 14, 2013.

Abstract: Many manufacturing activities use inputs from modern finance, business, and other service sectors. We examine the connections between financial and other business service infrastructure development and the export competitiveness of manufacture sectors. We find that service infrastructure development enhances the competitiveness of manufacture sectors especially when the manufacture sectors use intensively service inputs as measured by a high share of embodied services.