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Globalization and national accounts: accounting for global production

Data collection on factoryless goods producers and global production

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Summary

Recent work by the Task Force on Global Production has focused attention on factoryless goods production and the challenges that result for data collection and economic measurement. This paper describes data collection in the United States and efforts to use surveys to collect information on purchases and sales of contract manufacturing services and to identify factoryless goods producers. The paper also outlines additional work that would be required to fill remaining data gaps and to develop a complete set of accounts for these types of producers.

I. Introduction

1. Globalization is “the process of replacing national economic structures and transactions by international ones.” While the development of multinational enterprises and organization of production at the global level has been underway for more than a century, the growth of these arrangements has accelerated over the last two decades. Globalization and global production arrangements raises challenges for the collection of statistical data and for the compilation of national accounts, which generally is tied to data that are collected at the national level. The recent updates of international guidelines, *System of National Accounts 2008* (SNA08) and *Balance of Payments and International Investment Position Manual*, sixth edition (BPM6), provide new guidance on a number of globalization topics, including goods sent abroad for processing and merchanting. The handbook published in 2011 by UNECE, Eurostat, and OECD, *The Impact of Globalization on National Accounts*, provides an overview of many of the implications of globalization for implementation of SNA08 and BPM6. It describes the problems that arise in compiling national accounts with data from multinational enterprises, addresses global arrangements for production, and gives practical guidance on dealing with these issues.

2. Because there was a need for further guidance on certain aspects of global production, the UNECE and other international organizations established a second task force to prepare a manual, *Guide to Measuring Global Production*, which provides more specific guidance on topics such as global production arrangements, principles of economic ownership within multinational enterprises, and compilation challenges. A draft of the *Guide* has been prepared and is currently undergoing consultation and review.

3. With the increased reliance on global supply chains, enterprises have increasingly relied on outsourcing of the inputs and activities that are associated with production. In the case of manufacturing, SNA08 and BPM6 have provided new guidance for the treatment of goods sent abroad for processing, where an enterprise owns the material inputs and outsources the assembly or processing of the goods to a non-resident manufacturing service provider.

4. In examining actual manufacturing arrangements, however, statistical offices have noted goods sent abroad for processing is not the only type of arrangement for the outsourcing of manufacturing activities. The *Guide* recognizes a relatively new type of producers, called *factoryless goods producers* (FGPs), which specializes in innovation and marketing while outsourcing the material transformation of its products to manufacturing service providers. An FGP typically owns the rights to the intellectual property or design of the final manufactured product, may or may not own the input materials, does not own production facilities and does not perform transformation activities, but does own or acquire ownership of the final products that are produced by its manufacturing service provider partners and sells the final product.

5. In the United States, the Economic Classification Policy Committee has recognized the existence of FGP units and the statistical agencies are attempting to evaluate the feasibility of collecting data to measure their activities. Kamal, Moulton, and Ribarksy (2013) have examined data collected by the US Census Bureau and the US Bureau of Economic Analysis (BEA), which we will summarize below. In addition, Doherty (2013) of the Bureau of Labor Statistics (BLS) has provided an overview of implication for the US statistical system. Bayard, Byrne, and Smith (2013) of the staff of the Federal Reserve Board of Governors have examined economic census microdata to try to ascertain the significance of FGPs within the semiconductor industry. Because these semiconductor companies do not own production plants, which are known in the industry as “fabs,” they are called “fabless” producers. Bayard, Byrne and Smith find that if shipments of FGPs that

are currently classified as wholesale establishments were added to semiconductor manufacturing, the value of shipments would be 24 percent higher than under the current classification. They also find that the fabless portion of the global semiconductor industry increased dramatically, from \$15 billion in 2002 to \$54 billion in 2007, and that US companies accounted for a large share of global fabless revenue.

6. There are several challenges for economic measurement associated with FGP. First, it is necessary to identify the establishments that might be classified as FGPs. This will require surveys to ask questions about production arrangements, ownership of intellectual property associated with production, and the ownership of inputs and final products under contract manufacturing arrangements. Second, it will be necessary to measure the transactions associated with factoryless production, such as separately identifying purchases of inputs into contract manufacturing services (CMS) and purchases of finished products from outsourced producers under factoryless production arrangements. In practice, there is uncertainty whether survey respondents will understand the questions and have the information available to respond.

7. The second section of this paper summarizes some recent efforts by BEA and the Census Bureau to evaluate the feasibility of collecting these data. The third section describes the next steps in research to measure FGPs.

II. Current data collection

A. 2009 BE-10 Survey of US Multinational Enterprises conducted by BEA

8. BEA conducts mandatory benchmark and annual surveys to collect data on the financing and operations of US multinational enterprises. These surveys collect data on the balance sheets, income statements, trade, employment, and research and development (R&D) activities of both US parent companies and their foreign affiliates. Benchmark surveys cover the entire universe of US multinational enterprises in terms of value and are the most comprehensive in terms of subject matter.

9. BEA added a series of checkbox questions on CMS to the 2009 benchmark survey of US multinational enterprises. These questions were added to assess the prevalence of CMS activity among multinational enterprises and to identify a group of firms that engage in CMS that could be used either as a sample frame for a special survey on the topic or as a way to identify firms engaged in CMS activity in a link with data collected by the Census Bureau.

10. Contract manufacturing services were defined as: “process(ing) materials and components, including ... fabricating, assembling, labeling, and packaging materials and components.” The questions asked if the US parent company purchased CMS. If so, the US parent company was then asked if they owned some or all of the materials used by the contract manufacturer, and, if the contract manufacturer was located inside or outside of the United States. It was possible for a US parent to answer yes to all of these questions if they had multiple product lines or if the production process was divided into many steps. The survey then asked if the US parent company performed CMS for others (including their foreign affiliates) outside of the United States. Figure 1 shows the questions.

11. The response rate to the questions was high with only 2 percent of parents surveyed not responding to the question.¹ However, it was difficult to verify the information reported as there were no easily usable sources of information on contract manufacturing.²

12. BEA classifies each US parent by industry using the International Survey Industry (ISI) classification system, which was derived from the 2007 revision to the North American Industry Classification System (NAICS). The ISI classification system is less detailed than NAICS because it is designed for classifying enterprises rather than establishments (or plants). Because many direct investment enterprises are active in several industries, it is not meaningful to classify all their data in a single industry if that industry is defined too narrowly. Each US parent was classified by industry on the basis of its sales in a three-step procedure. First, a given US parent was classified in the NAICS sector that accounted for the largest percentage of its sales. Second, within the sector, the US parent was classified in the three-digit subsector in which its sales were largest; a three-digit subsector consists of all four-digit industries that have the same first three digits in their four-digit ISI code. Third, within its three-digit subsector, the US parent was classified in the four-digit industry in which its sales were largest. This procedure ensured that the US parent was not assigned to a four-digit industry outside the sector or the three-digit subsector that accounted for the largest share of sales.

13. Of the 3,814 US parents that reported on the BE-10 survey, 884, or 23 percent, reported purchasing CMS (table 1). By industry, 73 percent of the companies that purchased CMS were in manufacturing. Wholesale trade was next with 13 percent, followed by information with 5 percent.

14. Within manufacturing, 24 percent of parents that purchased CMS were in computers and electronic products manufacturing. Half of these companies were involved in semiconductor manufacturing. Machinery manufacturing accounted for 13 percent of the manufacturing total. Chemicals manufacturing accounted for 12 percent and was led by pharmaceuticals. “Other” manufacturing (NAICS 339) accounted for 10 percent and was led by medical equipment and supplies manufacturing. Transportation equipment manufacturing accounted for 8 percent and was led by motor vehicle parts manufacturing. US manufacturing parents that purchased CMS accounted for 39 percent of the total number of US manufacturing parents surveyed. By 3-digit subsectors, those parents that purchased CMS accounted for a sizable share of the total number of surveyed parents in their respective industries, ranging from 29 percent in plastics and rubber products manufacturing to almost half in computers and electronic products manufacturing.

15. While there were fewer non-manufacturing parents that purchased CMS, those that did accounted for a sizable portion of the total number of US parents in wholesale trade (30 percent) and retail trade (28 percent). Within wholesale trade, durable goods wholesalers accounted for nearly 60 percent of purchasers of CMS, led by electronics wholesalers. Nondurable wholesalers that purchased CMS were led by apparel wholesalers.

16. An examination of the data for non-manufacturing parents that purchased CMS revealed that they were much more likely to have secondary activities in manufacturing than parents in the same industries. For example, in retail trade, 10 percent of parents that

¹ Almost two-thirds of those that did not respond were classified in “religious, grantmaking, civic, professional, or similar organizations” and, so, were unlikely to have purchased contract manufacturing services.

² While it would have been possible to search each company’s 10-K report for information on contract manufacturing, this would have been time consuming. Also, not all 10-Ks contain information on contract manufacturing, and not all U.S. parents file 10-Ks.

purchased CMS had secondary activities in manufacturing compared to 3 percent of all US parents in retail trade.

17. US manufacturing parents that purchased CMS accounted for \$400 billion, or 39 percent of value added for all manufacturing parents (table 2). Manufacturing parents that purchased CMS accounted for about two-fifths of value added and a larger percentage of sales to foreign affiliates (44 percent), exports to all affiliates (52 percent), and imports by all affiliates (43 percent). The higher share of trade with affiliates could be capturing the movement of raw materials and inputs for processing and final goods after processing. They accounted for a lower percentage of exports to unaffiliated foreigners (34 percent) and of imports from unaffiliated foreigners (26 percent) indicating that more of their trade is within the firm than parents that did not purchase CMS.

18. US wholesale trade parents that purchased CMS accounted for 36 percent of total value added by the wholesale trade industry, but they accounted for a lower share of sales to foreign affiliates (15 percent) and exports to all affiliates (14 percent). Unlike parents in manufacturing, parents in wholesale trade that purchased CMS focused on selling in the US market more than those parents that did not purchase CMS.

19. As discussed above, companies could answer yes to more than one of the questions on ownership of materials and location of the contract manufacturer. It was more common for US parents to purchase CMS from contract manufacturers located in the United States, with more indicating they provided the material inputs than did not (table 3). Nevertheless, a substantial number of US parents indicated that they purchased CMS from contract manufacturers outside of the United States. Interestingly, US parents were just as likely to own the material inputs as not when purchasing CMS from contract manufacturers located outside of the United States.

B. 2011 BE-120 Survey of Transactions in Selected Services and Intellectual Property Products with Foreign Persons

20. BEA conducts quarterly and benchmark surveys of international transactions in selected services and intellectual property products to collect data for compiling the official US statistics on international trade in services. The survey covers US persons that have transactions in a variety of business services—such as advertising, legal services, or research and development services—or in intellectual property products with foreign persons. BEA sends the benchmark surveys to a relatively large number of potential respondents in an effort to collect complete data and to identify as many transactors as possible. As a result, benchmark surveys capture virtually the entire universe of transactions in the covered services. Respondents are asked to report for the fully consolidated US domestic enterprise.

21. BEA added several voluntary questions on CMS to the 2011 benchmark survey (figure 2). CMS were defined on the survey as “manufacturing services on materials and components owned by others and covers processing, assembly, labeling, packing and so forth undertaken by businesses that do not own the goods concerned.” Perhaps because the questions were voluntary, the response rate was very low, with only about one-quarter of respondents answering the questions of whether they purchased or performed CMS. Of those that did respond, 88 percent said that they did not purchase CMS and 96 percent said that they did not perform CMS. The majority of respondents indicated that they could report the fees associated with their CMS activities and able to identify the final destination of the goods produced.

22. BEA is continuing to analyze the responses to the questions on the BE-120 survey to determine if the questions should be made mandatory in the future. BEA will also work to improve its coverage of firms that are purchasers or performers of CMS.

C. Census Bureau Surveys

23. To date, three Census Bureau surveys include explicit questions about CMS. The 2007 economic census included CMS-specific questions in both the census of manufactures and of wholesale trade; these questions have been analyzed by Jarmin, Krizan, and Tang (2011), Fort (2013), and Bayard, Byrne, and Smith (2013). A third survey, the company organization survey, was studied by Kamal, Ribarsky, and Moulton (2013).

24. In contrast to the economic census, which is an establishment survey, the company organization survey covers all multiunit companies with 250 or more employees and a selection of smaller companies. The survey shows that of US firms that purchase CMS, 39 percent do so within the US only, 20 percent do so outside the US only, and 37 percent purchase CMS both inside and outside the US. Of the firms that purchase CMS outside the US, more than half do so from their foreign affiliates. A small share of US firms engage in CMS activities. Large firms are more likely to engage in CMS activity than small firms, and most firms that purchase CMS also operate manufacturing facilities.

III. Next steps

25. The US Interagency FGP Subcommittee has requested proposals from the Census Bureau, BEA, and the Bureau of Labor Statistics for research projects to enable the implementation of the new industrial classification of FGPs. The goal of these research projects is, first, to analyze the adequacy of data from Census, BEA, and other sources to ensure the consistent and accurate classification of FGPs starting in 2017. The second goal is to evaluate whether the data collected is adequate to produce economic statistics that accurately capture the activities of FGPs and that will provide data users, including policy makers and researchers, with more relevant information on the global nature of US manufacturing.

A. Project 1: 2012 Economic Census

26. The Census Bureau added Special Inquiry questions about CMS to the 2012 Economic Census. In contrast the enterprise-level surveys discussed above, the Economic Census is collected at the establishment level. The goal of this project is to evaluate the effectiveness of these Special Inquiry questions at identifying single establishment firms that are FGPs. The analysis will use answers to 2007 Special Inquiry questions along with answers to other selected Economic Census questions that alone or in combination with other questions might be indicative of FGP activity and identify cases where indications of FGP activity are inconsistent. Then, establishments with inconsistencies will be further evaluated using the other available data to decide whether or not the establishment appears to be an FGP and to identify potential causes for inconsistent answers.

B. Project 2: Linking Census and BEA data on FGPs

27. This research project will examine the implications of FGPs and CMS for measuring economic activity through a data link combining data collected at the US Census Bureau on US business activities with data collected at the US Bureau of Economic Analysis (BEA)

on the operations of multinational companies and on trade in services. The linked data will be used to assess the quality of the data being reported to Census and BEA, to develop methods to use these data in implementing the new standards, to identify any remaining data gaps preventing the full implementation of the new standards, and to recommend how best to fill these gaps.

28. The research will use data from the 2007 Economic Census that have been linked to the foreign trade transactions data by the US Census Bureau's Foreign Trade Division. From the 2007 Economic Census, the researchers will use the product detail, the revenues from and expenses for contract work, and the responses to the special inquiries that ask whether CMS were purchased within the United States or from outside, and whether the establishment designed, engineered, or formulated the product being produced or sold. These data will be used to identify firms that likely purchased manufacturing services from foreign firms. Then, the researchers will use the product and country detail in the foreign transactions data to identify types of products and patterns of trade consistent with the purchase of such CMS. The data could also be used to identify US firms that provided manufacturing services to foreign firms and the associated products and patterns of trade.

29. The linked 2007 Economic Census and foreign trade data will also be linked to data on the operations of multinational enterprises collected by the BEA. The addition of the MNE data is critical to this project because many global value chains are organized by multinational enterprises. BEA's data on the operations of US multinational enterprises will allow the activities and locations of foreign affiliates that provide manufacturing services to their parents to be identified. Using the data on foreign affiliates' sales to their US parents could also shed light on the fees that US parents pay for these activities. Comparing the Census Bureau and BEA data is important in assessing the quality of the data currently being collected by both agencies.

30. The major output of this project will be a report that 1) assesses the state of current data collections by the US Census Bureau and BEA for capturing the activities of FGPs and 2) recommends any additional data collection that may be needed. In addition, this project will seek to develop methods that the committee can use to implement the recommended treatment of FGPs in the various accounts affected by the new standards.

IV. References

Bayard, Kimberly, Byrne, David, and Smith, Dominic (2013), "The Scope of US Factoryless Manufacturing," presented at conference on Measuring the Effects of Globalization, WE Upjohn Institute, Washington DC, February 28–March 1, <http://www.upjohn.org/MEG/papers/baybyrsmi.pdf>.

Doherty, Maureen (2013), "Reflecting Factoryless Goods Production in the US Statistical System," presented at conference on Measuring the Effects of Globalization, WE Upjohn Institute, Washington DC, February 28–March 1, http://www.upjohn.org/MEG/papers/Doherty_Reflecting%20Factoryless%20GoodsProduction.pdf.

European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, and World Bank (2009), *System of National Accounts 2008* (New York).

Fort, Teresa C. (2013), "Breaking Up Is Hard to Do: Why Firms Fragment Production across Locations," CES Paper No. 13-35.

International Monetary Fund (2009), *Balance of Payments and International Investment Position Manual*, 6th edition, (Washington DC: International Monetary Fund).

Jarmin, Ron S., Krizan, C.J., and Tang, John (2010), “Outsourcing, Offshoring, and Trade: Identifying Foreign Activity across Census Data Products,” *Measurement Issues Arising from the Growth of Globalization*, conference papers, November 6–7, 2009, (Washington DC: WE Upjohn Institute and National Academy of Public Administration), pp. 121–139.

Kamal, Fariha, Moulton, Brent R., and Ribarsky, Jennifer (2013), “Measuring ‘Factoryless Manufacturing: Evidence from US Surveys,’ presented at conference on Measuring the Effects of Globalization, WE Upjohn Institute, Washington DC, February 28–March 1, http://www.bea.gov/about/pdf/Kamal_Moulton_Ribarsky_MAR2013.pdf.

United Nations Economic Commission for Europe, Eurostat, and Organisation for Economic Co-operation and Development (2011), *The Impact of Globalization on National Accounts*, (New York and Geneva: United Nations).

United Nations Economic Commission for Europe, Task Force on Global Production (2014), *Guide to Measuring Global Production* (draft).

Annex

Table 1
US Parents that Purchased Contract Manufacturing Services³

Industry	Number that purchased CMS	Percent of total that purchased CMS	Total number of US parents*	Percent of CMS purchasers in total number of US parents
Total	884	100	3,814	23
Manufacturing	642	73	1,658	39
<i>of which:</i>				
Computers and electronic products	153	17	311	49
Machinery	82	9	206	40
Chemicals	80	9	214	37
“Other” manufacturing	61	7	148	41
Transportation equipment	54	6	134	40
Food	36	4	80	45
Electrical equipment, appliances, and components	33	4	87	38
Fabricated metals	31	4	93	33
Plastics and rubber products	28	3	97	29
Primary metals	22	2	67	33
Wholesale trade	117	13	389	30
<i>of which:</i>				
Durables	75	8	248	30
Nondurables	41	5	137	30
Information	48	5	356	13
Retail trade	25	3	90	28
Professional, scientific, and technical services	12	1	434	3
“Other” industries	40	5	887	5

Source: BEA's 2009 Benchmark Survey of US Direct Investment Abroad

³The number of US parents shown here does not match that in the published statistics from the BE-10 survey because those statistics exclude parents whose affiliates were all reported on the BE-10D survey.

“Other” industries includes finance and insurance; real estate and rental and leasing; mining; utilities; construction; transportation and warehousing; administration, support, and waste management; health care and social assistance; accommodation and food services; agriculture, forestry, fishing, and hunting; management of nonbank companies and enterprises; and miscellaneous services.

Table 2
Selected Statistics of US Parents that Purchased Contract Manufacturing Services (CMS)⁴
(Billions of dollars)

Industry	Number*	Value added	Sales				US exports shipped by US parents		US imports shipped to US parents		Employment (thousands)	R&D performed
			Total	To US persons	To foreign affiliates	To other foreign persons	207.5	327.9	233.6	445.9	22,932.7	207.3
Total	3,814	2,559.8	9,208.8	8,028.3	601.3	579.2	185.1	261.9	213.3	253.7	6,864.3	157.7
Manufacturing	1,658	1,034.1	3,656.7	2,974.6	375.9	306.2						
Wholesale trade	389	124.4	1,109.8	981.8	36.2	91.8	10.2	48.7	12.1	127.9	1,065.4	6.4
US parents that purchased CMS												
Manufacturing	642	400.4	1,294.0	1,008.1	165.6	120.3	97.0	90.3	92.5	65.7	2,413.2	61.7
Wholesale trade	117	44.3	262.0	244.0	5.4	12.7	1.4	8.4	2.9	17.2	307.0	2.0
US parents that purchased as a share of total US parents (percentage)												
Manufacturing	39	39	35	34	44	39	52	34	43	26	35	39
Wholesale trade	30	36	24	25	15	14	14	17	24	13	29	31

Source: BEA's 2009 Benchmark Survey of US Direct Investment Abroad

⁴ The number of US parents shown here does not match that in the published statistics from the BE-10 survey because those statistics exclude parents whose affiliates were all reported on the BE-10D survey.

Table 3
Location of Contract Manufacturing Services Purchased by US Parents

	Number
All sources	884
US parents owned materials used by contract manufacturers who are located inside the United States	579
US parents owned materials used by contract manufacturers who are located outside the United States	330
US parents did not own materials used by contract manufacturers who are located inside the United States	369
US parents did not own materials used by contract manufacturers who are located outside the United States	323