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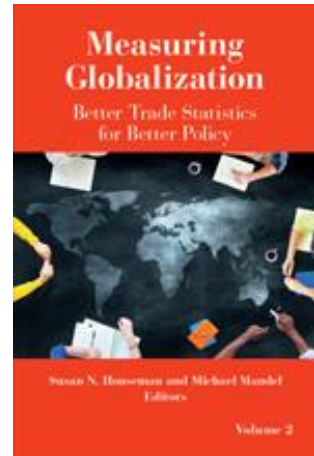
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# Measuring “Factoryless” Manufacturing: Evidence from U.S. Surveys

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# **Measuring Globalization**

## **Better Trade Statistics for Better Policy**

### **Volume 2**

## **Factoryless Manufacturing, Global Supply Chains, and Trade in Intangibles and Data**

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and  
Michael Mandel  
*Editors*

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# 3

## Measuring “Factoryless” Manufacturing

### Evidence from U.S. Surveys

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Globalization has created new opportunities and competitive challenges, forcing producers to seek more efficient ways to make their products. It has become increasingly common for producers seeking more efficient means of production to divide the traditional vertically integrated production model into stages or tasks (known as fragments), thus allowing them to outsource part of their production process. When the resulting production arrangement is interlinked across different countries, the measurement challenges facing national economic statistics programs increase dramatically.

Many economic forces are driving the fragmentation of production to specialized establishments, both foreign and domestic. Improvements in information technology have allowed firms to relocate production to new and often distant locations. International cost differences (such as lower relative wage costs and lower trade and transport costs), improved logistics, and improved intellectual property rights protection and contract enforcement have facilitated the use of global supply chains and global value chains, or GVCs (U.S. International Trade Commission 2011).

A supply chain is a system of organization, technology, activities, information, and resources involved in moving a good or service from supplier to customer. It can be within an enterprise, between enterprises in a local economy, or among a group of countries. The supply chain is a network where the activities involved can be grouped using the traditional broad stages of production—from upstream research and development (R&D) and design, through manufacturing, to downstream logistics, marketing, and sales. The complexity of the supply chain and the business relationship between the various stages can vary by industry and by enterprise. A global supply chain consists of a worldwide network of these activities.

A value chain refers to the value-added activities required to bring a good or service from its conception, design, production, marketing, distribution, and support to final customers.<sup>2</sup> It is the value added to the good or service at each stage of the network. Similar to the supply chain, the complexity of the value chain and the business relationship between the various stages can vary by industry and by enterprise. A value chain can be between enterprises in a local economy or span enterprises across a group of countries.

The fragmentation of production through the use of GVCs raises many issues for economic measurement, including classifying the firms within these chains, measuring and classifying trade in goods and services, and measuring and classifying trade in intermediate inputs. The recently updated international guidelines for compiling national and international accounts include new guidelines to better capture the impacts of GVCs on the economy.<sup>3</sup> The U.S. Census Bureau, the Bureau of Economic Analysis (BEA), and the Bureau of Labor Statistics (BLS) have been studying ways to classify and collect data from entities that are part of GVCs. A key element in identifying the relationship between firms that outsource the fabrication of products—while still controlling the production process—and firms that perform the processing is contract manufacturing services (CMS).

This chapter focuses on efforts to collect data on CMS and the challenges with identifying and collecting data on entities that are part of GVCs. In particular, it identifies data that the BEA and the Census Bureau are already collecting on both producers and users of CMS. In this way, the chapter not only demonstrates that it is feasible to identify and collect data on these activities but also provides a snapshot of

companies that are engaged in these activities. Although the descriptive data presented in this chapter do not provide the full accounting of these activities that is recommended by the latest U.S. and international statistical guidelines, they do provide an indication of the potential scope and magnitude of the measurement task before us. The statistical agencies will use this and other information to guide their efforts to improve the measurement of these activities in order to implement the latest statistical guidelines and provide more useful data on manufacturing value chains. This will enable them to cover both the firms that outsource fabrication services and the CMS producers that provide these services.

The chapter’s remaining sections describe new U.S. and international guidelines and relevant data on CMS activities. Section Two, “Classifying ‘Factoryless’ Manufacturers,” looks at U.S. and international recommendations on the industry classification of “factoryless” manufacturers—units that entirely outsource the fabrication of their products. Section Three, “Data Collection on Contract Manufacturing Services,” describes the BEA and Census Bureau surveys and discusses data collection efforts on CMS. Section Four, “Analysis of Contract Manufacturing Services on the BEA’s BE-10 Survey,” discusses the BEA’s analysis of the CMS data reported in its surveys. Section Five, “Analysis of Contract Manufacturing Services on Census Bureau 2011 COS,” treats the Census Bureau’s analysis of the CMS data reported in the Report of Organization Survey. Section Six, “Future Work,” concludes with a discussion of future data collection endeavors.

## **CLASSIFYING “FACTORYLESS” MANUFACTURERS**

The North American Industry Classification System (NAICS) is an industry classification system for establishments based on a production-oriented conceptual framework in which establishments are grouped together by common production processes. A production process describes any activity in which inputs, including types of labor and related skills, capital equipment, raw and intermediate materials, and, in many cases, intangible inputs such as intellectual property, are used to fabricate a material good or to render a service.<sup>4</sup> Establishments are the smallest operating entity for which records provide information on the

cost of resources—materials, labor, and capital—employed to produce the units of output (OMB 2007, p. 19).

With the rise of global competition, economies are becoming more integrated, and the use of global supply chains is rapidly increasing. This has complicated the application of the production function classification principle to units that control intellectual property and perform underlying entrepreneurial components of arranging the factors of production, but outsource all of the actual transformation activities to other specialized units. The Office of Management and Budget (OMB) calls these units “factoryless” goods producers, or FGPs (OMB 2010).

Units in the manufacturing sector arrange for and bring together the factors of production necessary to produce a good. They accept the entrepreneurial risk of producing and bringing goods to market. As the Economic Classification Policy Committee (ECPC) states in the 2012 NAICS manual’s supporting documents,

when individual steps in the complete process are outsourced, an establishment should remain classified in the manufacturing sector. For example: 1) a decision to produce or purchase raw materials does not change the classification; 2) a decision to use contractors or a professional employer organization (PEO) rather than a traditional employment contract does not change classification; and 3) a decision to outsource marketing and distribution to a wholesaler does not change classification. In each case, the decision to perform or outsource a function changes the establishment production function but does not change the classification. (ECPC 2010, p. 6)

The ECPC defines the characteristics of FGPs to include the following (OMB 2010, p. 4):<sup>5</sup>

- Owns rights to the intellectual property or design (whether independently developed or otherwise acquired) of the final manufactured product.
- May or may not own the input materials.
- Does not own production facilities.
- Does not perform transformation activities.
- Owns the final product produced by manufacturing service provider partners.
- Sells the final product.

## International Recommendations

The NAICS classification, employed in the United States, does not use ownership of material inputs as a basis for industry classification. However, the International Standard Industrial Classification of All Economic Activities (ISIC), Revision 4, which is promulgated by the United Nations and forms the basis for industrial classification systems used by many other countries, bases classification of units that outsource transformation solely on ownership of material inputs. “A principal who completely outsources the transformation process should be classified into manufacturing if and only if it owns the input materials to the production process—and therefore owns the final output,” the ISIC says (United Nations Statistics Division 2008, p. 30). According to the ISIC, a unit that outsources transformation but owns the material inputs is a manufacturer; a unit that outsources transformation and does not own the material inputs is engaged in wholesale or retail trade.

The ECPC considers a strict adherence to the ownership of materials as impractical because a slight change in how the materials were acquired would change the industry classification. For example, the principal could purchase the inputs and do one of two things: 1) take physical possession of the inputs and ship them to the contract manufacturer or 2) arrange to have the inputs shipped directly to the contract manufacturer from another domestic or foreign location. Under ISIC rules, the contractual arrangement of the case in which the principal purchases the materials directly would result in the principal being classified in the manufacturing sector even if the principal did not take physical possession of the materials. However, rather than purchasing the inputs, the principal may simply approve the input providers from whom the contract manufacturer must buy and monitor the quality of the inputs acquired by the contract manufacturer. Under ISIC rules, this contractual arrangement would most likely result in the principal being classified in a trade sector because the principal did not directly purchase the material inputs. The ECPC considers controlling the production process a more important criterion than owning the material inputs.

The ISIC classification based on ownership of the material inputs is consistent with the treatment recommended in both the *System of National Accounts 2008* (referred to in this chapter as SNA 2008) and the sixth edition of the *Balance of Payments and International Invest-*



*ment Position Manual* (referred to in this chapter as BPM6) for goods sent abroad for processing (European Commission et al. 2009; IMF 2009).<sup>6</sup> According to this treatment, goods sent abroad for processing without a change in ownership should be excluded from goods trade; the processing fee charged by the manufacturing service provider should be recorded as services trade. The fee for this service is related to the difference between the value of the goods exported for processing and the value of the goods returned (imported) after processing.<sup>7</sup> When goods are shipped abroad for processing and subsequently sold abroad, the processed goods should be recorded as U.S. merchandise exports at the time they are sold, and any inputs purchased abroad by the U.S. firm and processed abroad should be recorded as U.S. merchandise imports.<sup>8</sup> The new international guidelines state that the recording of imports and exports of goods should be based on the transfer of economic ownership. For example, if a U.S. shoe company sent soles and leather to a contract manufacturer in another country for assembly of its athletic shoe, the U.S. shoe company—the principal—is importing manufacturing services from the contract manufacturer. Because the U.S. shoe company owns the soles, leather, and assembled athletic shoe, there is no international transaction; therefore, the soles and leather should not be recorded as U.S. exports and the assembled athletic shoe should not be recorded as a U.S. import.

It is important to note that although the NAICS does not base its classification of “factoryless” goods producers strictly on change in ownership, the change-in-ownership principle is still the most relevant criterion for measuring international transactions. It is desirable to define international transactions as transactions between residents and nonresidents, thus focusing on the change in ownership, regardless of whether the establishments engaged in the transactions are classified in manufacturing or in another industry. Thus, adoption of the NAICS recommendation for FGP does not preclude the adoption of the SNA 2008/BPM6 recommendation for the treatment of goods sent abroad for processing.

## **DATA COLLECTION ON CONTRACT MANUFACTURING SERVICES**

Identifying CMS is a key element in identifying the relationship between firms that outsource the fabrication of products—while still controlling the production process—and firms that perform the processing. Through preliminary outreach conducted by the Census Bureau, respondents appear to understand the concept of CMS and the need for U.S. statistical agencies to collect the data. Collecting data, however, could be challenging. Some respondents indicated that they were generally unable to provide CMS data because either accounting or production management systems did not include a searchable characteristic that would distinguish these services.

To determine whether data collection can be robust, the Census Bureau and the BEA have added questions to their respective surveys to determine whether U.S. businesses can accurately report purchases and sales of CMS. See Table 3.1 for a list of all surveys conducted by these two agencies that contain CMS-related questions. This section describes three surveys that include questions about CMS.

### **Bureau of Economic Analysis Surveys**

The first two surveys we cover are conducted by the Bureau of Economic Analysis; the third is done by the Census Bureau.

#### **Benchmark Survey of U.S. Direct Investment Abroad**

Every five years, the BEA conducts the Benchmark Survey of U.S. Direct Investment Abroad (BE-10) to track the economic activity of U.S. multinational companies and their foreign affiliates.<sup>9</sup> The BE-10 benchmark survey covers the entire universe of U.S. direct investment abroad in terms of value and is the BEA’s most comprehensive survey of such investment in terms of subject matter. The survey collects detailed information on the financial structure and operations of U.S. parent companies and their foreign affiliates and on the transactions and positions between the parents and their affiliates.

Any U.S. person that had a foreign affiliate is required to report.<sup>10</sup> If the respondent is a U.S. corporation, the respondent reports transactions

**Table 3.1 List of Surveys Containing CMS-Related Questions**

Form number	Survey name	Year	Sponsoring organization	Used in this chapter?
BE-10A	Benchmark Survey of U.S. Direct Investment Abroad for U.S. Parents	2009	Bureau of Economic Analysis	Y
BE-120	Benchmark Survey of Transactions in Selected Services and Intellectual Property Products with Foreign Persons	2011	Bureau of Economic Analysis	N
NC-99001	Company Organization Survey	2011	Census Bureau	Y
MC31101–MC33975 <sup>a</sup>	Census of Manufactures	2007, 2012	Census Bureau	N
WH42101–WH42237 <sup>a</sup>	Census of Wholesale Trade	2007, 2012	Census Bureau	N

<sup>a</sup>Only industries where the CMS question is applicable.

SOURCE: Authors' compilation.

for the fully consolidated U.S. domestic enterprise, which excludes foreign branches and other foreign affiliates. The BEA defines an entity as a foreign affiliate if it meets the following criteria:

- If it is incorporated abroad, it is always considered a foreign affiliate. Most affiliates meet this criterion.
- If the entity is not incorporated, it is a foreign affiliate if it
  - is subject to a foreign income tax, has a substantial physical presence abroad as evidenced by employees permanently located abroad, etc.;
  - has separate financial records that would allow the preparation of financial statements; or
  - takes title to the goods it sells and receives revenues from the sale, or receives funds from customers for its own account for services it performs.

To understand the activity of U.S. multinationals with respect to manufacturing services, the BEA added questions on purchases and performance of contract manufacturing to the 2009 Benchmark Survey of U.S. Direct Investment Abroad for U.S. parents that are not banks (BE-10A).<sup>11</sup> The questions were added to identify a group of firms engaged in manufacturing services that could be used either as a sample frame for a special survey on that topic or as a way to identify firms engaged in CMS that may be linked to data collected by the Census Bureau. A data link is performed when company identification codes from the BEA files are matched to the corresponding companies in the Census Bureau files. A data link project provides access to additional data items that the BEA did not collect.

The BE-10 survey defines contract manufacturing as “contracting with a firm to process materials and components, including payments for fabricating, assembling, labeling, and packaging materials and components.” Because the BEA was trying to identify a group of firms that engaged in contract manufacturing, only yes/no questions were added to the survey. The BE-10 CMS definition was broader than the international guidelines’ definition of “manufacturing services” as constituting the processing of materials and components owned by others. However, the BEA requested respondents to answer the question of whether they

owned some or all of the materials used by the contract manufacturers or whether they did not own the materials.

### **Benchmark Survey of Transactions in Selected Services and Intellectual Property Products with Foreign Persons**

The BEA conducts the Benchmark Survey of Transactions in Selected Services and Intellectual Property Products with Foreign Persons (BE-120) to track U.S. imports and exports of services and intellectual property products. The BE-120 benchmark survey collects information on U.S. international trade in all types of services and intellectual property for which information is not collected on other BEA surveys and is not available to the BEA from other sources. The major types of services transactions *not* covered by the BE-120 survey are travel, transportation, insurance (except for payments for primary insurance), financial services (except for payments by nonfinancial firms), and expenditures by students and medical patients that are studying or seeking treatment in a country different from their country of residence.

The survey covers U.S. persons that have engaged in services or intellectual property transactions with foreign persons. As with the U.S. direct investment abroad reporting unit, the respondent is required to report transactions for the fully consolidated U.S. domestic enterprise. Questions separately identifying receipts and payments for CMS were added to the 2011 BE-120 survey.<sup>12</sup> Contract manufacturing services, as defined in the BE-120, are “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.”

The BEA is in the process of collecting these data to determine whether respondents can separately identify the costs of the manufacturing service as well as the destination of the goods after processing. Reporting by companies on the contract manufacturing questions is voluntary, and initial review of these questions indicates a low response rate.

### **Census Bureau Surveys**

To date, there are three data sources that cover explicit questions about CMS. Jarmin, Krizan, and Tang (2011) analyze the CMS-specific

questions in the 2007 economic censuses, which include both the Census of Manufactures and the Census of Wholesale Trade. Fort (2013) utilizes the CMS question in the 2007 Census of Manufactures to study the role of communication technology on a firm’s decision to fragment its production process within and outside national boundaries. Bayard, Byrne, and Smith (Chapter 4, this volume) present a case study of “factoryless” goods-producing firms in the semiconductor industry using the 2002 and 2007 Census of Wholesale Trade. A third survey, the 2011 Report of Organization Survey (Form NC-99001, called the Company Organization Survey, or COS), has heretofore been unexplored by researchers. This chapter will focus on analyzing the 2011 COS, which asks detailed questions about both providing and purchasing CMS.<sup>13</sup>

### **2011 Company Organization Survey**

The COS covers all multiunit companies with 250 or more employees and a selection of smaller companies to support other Census Bureau surveys. Companies with fewer than 250 employees are only selected for the COS when administrative records indicate that the company may be undergoing organizational change and is adding or dropping establishments. The COS is conducted annually in the four years between economic censuses.<sup>14</sup> The COS is designed primarily to maintain the Business Register, a current list of business establishments in the United States that is used to conduct establishment-level economic surveys every five years.<sup>15</sup> Therefore, it has heretofore not directly been used to conduct economic research. However, the 2011 COS included a section that asked firms about their activities pertaining to purchasing and providing CMS.<sup>16</sup> These questions are some of the most detailed questions pertaining to the CMS activities of a firm from any survey currently in use. Although not nationally representative, analyzing responses to these questions furthers our understanding of the characteristics of firms engaged in CMS activities.

The survey unit in the COS is the company, which is linked to a firm identification code.<sup>17</sup> However, the unique identifier is the survey unit identifier. It would be useful to create a firm-level data set that can be linked to other Census Bureau data sets for further analysis. It is not possible to achieve this simply by aggregating the data by firm identifiers, since CMS activities are indicated by categorical variables. Therefore, “Y” is assigned to a firm in response to a question (that requires “Y” or

“N”—“yes” or “no”) where multiple survey units under that firm identifier responded differently to the question. For example, if survey unit A responds “Y” to question 2 in the 2011 COS under Section 3D while survey unit B responds “N” (or does not respond), then “Y” is assigned to the firm to which both units belong. After the preceding adjustments have been made, the COS contains records for 34,228 unique firms.

Using the firm identifier, the firm-level data set is then linked to the 2010 Longitudinal Business Database (LBD) to identify three key firm characteristics: 1) firm age, 2) total employment, and 3) sector. The LBD is a longitudinally linked data set of all business establishments that operate in the United States except for farms, government-owned or government-operated entities, and private households (Jarmin and Miranda 2002). For multiunits or firms with multiple plants, age is calculated as the difference between the year of interest and the year of establishment of its oldest plant. Since multiunit firms may operate in several sectors of the economy, the firm is considered to be operating in the sector where the largest share of its employment is housed.<sup>18</sup> Since the LBD is an establishment-level data set, employment is first aggregated up to the firm level by sector. The firm is then assigned its “pre-dominant” sector, and its employment is aggregated to the firm level.<sup>19</sup> Finally, the firm-level data, which now include information about firm age, total employment, and sector, are linked to the 2011 COS. Of 34,228 firms in the COS data set, 34,191 firms are linked to the LBD.

The final analysis data set is a firm-level data set that includes information about the firm’s age, total employment, the sector in which it operates, and several indicator variables based on responses to the CMS-related questions.<sup>20</sup> The firms are categorized into four mutually exclusive categories: 1) provides CMS only, 2) purchases CMS only, 3) both provides and purchases CMS, and 4) does none of the aforementioned. Within the category of firms that purchase CMS, the analysis further distinguishes among those that purchase CMS in three ways: 1) within the United States only, 2) outside the United States only, and 3) both within and outside the United States. Among firms that purchase CMS outside the United States, it is possible to further identify whether a firm does so from its foreign affiliates. Analysis of the responses to the second part of Question 2 and Question 3d is done only for survey units that belong to a unique firm identifier, because there is no straight-forward yes-or-no rule that can be implemented in this instance. There are 33,865 such observations.

The 2011 COS is further linked to the 2007 Census of Manufactures (CM) and the 2009 Linked/Longitudinal Foreign Trade Transactions Database (LFTTD) to create two separate data sets: the COS-CM and the COS-LFTTD.<sup>21</sup> The COS-CM provides data on the total value added and the total value of shipments of each firm in the COS that belongs to the manufacturing sector. These firms represent about 27 percent of firms in the final COS analysis data set. The COS-LFTTD provides data on the total value of exports and the total value of imports of each firm in the COS because the LFTTD links the universe of export and import transactions to firms and considers all 10-digit Harmonized Commodity Description and Coding System (commonly called Harmonized System, or HS) products. The Harmonized System is an internationally standardized system of names and numbers for classifying traded products. Approximately 33 percent of the firms in the final COS analysis data set exported in 2009, and 24 percent imported that year.

## **ANALYSIS OF CONTRACT MANUFACTURING SERVICES ON THE BEA’s BE-10 SURVEY**

The results presented in this chapter are based on reported data for 3,830 U.S. parent companies. CMS questions were only included on the parent’s survey form, and no corresponding questions were included on the foreign affiliate’s form. Specific examples of a firm’s purchase or performance of CMS cannot be described, because the data are confidential. However, hypothetical examples of purchases of CMS include the manufacturing of Company A’s computer based on specifications of the design of the computer provided by Company A, and the assembly of Company B’s semiconductor chips by a foundry. In each case, a firm is contracting with another unit to process materials and components based on specifications supplied by the purchasing firm.

Each U.S. parent is classified by industry using the International Survey Industry (ISI) classification system. For the most part, the ISI classifications are equivalent to NAICS four-digit industries; at its most detailed level, the NAICS classifies industries at a six-digit level. The ISI system is less detailed than the NAICS because it is designed for classifying enterprises rather than establishments (or plants). Each U.S.



parent is classified in a sector that accounted for the largest percentage of its sales. The sector classification is chosen first 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.<sup>22</sup>

The first step in the analysis was to analyze how U.S. parents responded to the question of whether they purchased or provided CMS. The respondents were asked to consider CMS activity performed by their foreign affiliates as purchasing CMS from others. As shown in Table 3.2, approximately a quarter of U.S. parents reported purchases of CMS from foreign or domestic contract manufacturers, while three-fourths reported no purchases of CMS. Only 8 percent of U.S. parents reported performing CMS for nonresidents. Not surprisingly, the majority, or 72 percent, of U.S. parents that reported purchases of CMS are classified in the manufacturing sector. As shown in Table 3.3, the other two sectors with significant purchases of CMS are wholesale (13 percent) and information (5 percent).

Table 3.4 presents the characteristics of U.S. parents who are classified within the manufacturing sector by three-digit NAICS-based ISI industry classification and by firm size (measured as total domestic employment of the U.S. parent). Table 3.4 shows that U.S. parents that purchased CMS were large firms with more than 250 employees and

**Table 3.2 U.S. Parents Who Purchased or Performed Contract Manufacturing Services (CMS), 2009**

	No. of respondents	% of respondents
Parents who purchased CMS:		
Yes	888	23
No	2,860	75
No response	82	2
Parents who performed CMS:		
Yes	324	8
No	3,423	89
No response	83	2

NOTE: Percentages may not sum to 100 because of rounding.

SOURCE: BEA's 2009 Benchmark Survey of U.S. Direct Investment Abroad, [http://www.bea.gov/surveys/pdf/2009be10i\\_web.pdf](http://www.bea.gov/surveys/pdf/2009be10i_web.pdf).

**Table 3.3 U.S. Parents Who Purchased Contract Manufacturing Services (CMS), by Sector, 2009 (%)**

Manufacturing	Wholesale	Information	Professional, scientific, technical services	Other
72	13	5	1	9

NOTE: “Manufacturing” includes all two-digit NAICS industries in sectors 31–33; “Wholesale” includes NAICS industries in sector 42; “Professional, scientific, and technical services” includes NAICS industries in sector 54; “Other” includes all other industries.

SOURCE: BEA’s 2009 Benchmark Survey of U.S. Direct Investment Abroad.

**Table 3.4 U.S. Parents Who Purchased Contract Manufacturing Services (CMS), by Manufacturing Subsectors, 2009**

	Total	Small	Med.	Large
All manufacturing industries (NAICS sectors 31–33)	642	93	104	445
Computer and electronic product mfg. (334)	153	30	32	91
Machinery mfg. (333)	82	17	14	51
Chemical mfg. (325)	80	9	13	58
Miscellaneous mfg. (339)	61	10	15	36
Transportation equipment mfg. (336)	54	2	4	48
Food mfg. (311)	36	6	3	27
Electrical equipment, appliance, and component mfg. (335)	33	2	6	25
Fabricated metal product mfg. (332)	31	7	4	20
Plastics and rubber products mfg. (326)	28	2	3	23
Primary metal mfg. (331)	22	2	1	19

NOTE: “Large” includes firms with 250 or more employees, “Medium” includes firms of between 100 and 249 employees, and “Small” includes firms of between 1 and 99 employees.

SOURCE: BEA’s 2009 Benchmark Survey of U.S. Direct Investment Abroad.

were concentrated in industries that are known for outsourcing transformation activities to contract manufacturers. Examples of these industries include computer and electronic product manufacturing, machinery manufacturing, chemical manufacturing (includes pharmaceutical manufacturing), and transportation equipment manufacturing.

Because the international guidelines consider ownership of the materials used by the contract manufacturer in determining whether the contract manufacturer is selling manufacturing services or selling a good, questions were added to the BE-10 survey to determine whether U.S. parents could separately identify such transactions. U.S. parents who purchased CMS were asked to indicate whether they owned the materials used by contract manufacturers and whether the services were purchased from businesses inside or outside the United States. A respondent could answer “yes” to more than one type of arrangement; about 10 percent of U.S. parents that purchased CMS responded “yes” to all four types of arrangements, indicating that they used contract manufacturers located both in the United States and abroad and that they both owned the materials and did not own the materials used by the contract manufacturer. As shown in Table 3.5, U.S. parents were more likely to purchase CMS from U.S. contract manufacturers and to provide the material inputs to them (65 percent) than to purchase CMS from foreigners (about 37 percent). Interestingly, U.S. parents were just as likely to own the material inputs as to not own them when purchasing CMS from foreigners. Of the approximately 325 U.S. parents that reported purchasing CMS from outside the United States, nearly half of the respondents answered “yes” to both owning the material inputs and not owning the material inputs used by the contract manufacturer. This suggests that separately identifying purchases of CMS based on the ownership of the materials used by the contract manufacturer may be difficult to collect on an enterprise survey.

**Table 3.5 U.S. Parents Who Purchased CMS, 2009**

Category	<i>N</i>
U.S. parents who purchased CMS	888
U.S. parents who owned materials used by contract manufacturers located inside U.S.	579
U.S. parents who owned materials used by contract manufacturers located outside U.S.	330
U.S. parents who did not own materials used by contract manufacturers located inside U.S.	369
U.S. parents who did not own materials used by contract manufacturers located outside U.S.	323

SOURCE: BEA's 2009 Benchmark Survey of U.S. Direct Investment Abroad.

**Table 3.6 Selected Statistics for U.S. Parents and for All U.S. Companies, by Sector, 2009**

	Value-added (in \$ millions) <sup>a</sup>	Employees (in thousands) <sup>b</sup>	Value-added per employee (\$)
U.S. parents who purchased CMS <sup>c</sup>			
All industries	585,366	4,112	142,366
Manufacturing	400,369	2,413	165,910
Wholesale trade	44,286	307	144,240
Information	33,338	141	236,555
Other industries	107,374	1,251	85,859
All U.S. parents <sup>c</sup>			
All industries	2,595,776	22,933	113,191
Manufacturing	1,034,139	6,864	150,655
Wholesale trade	124,433	1,065	116,795
Information	287,628	1,712	168,056
Other industries	1,149,576	13,292	86,490
All U.S. companies			
All private industries	12,018,095	112,139	107,171
Manufacturing	1,540,226	11,856	129,911
Wholesale trade	768,548	5,620	136,752
Information	615,445	2,814	218,708
Other industries	9,093,876	91,849	99,009

NOTE: Figures may not sum to total because of rounding.

<sup>a</sup> Statistics on value-added for all U.S. companies are from the BEA's GDP by Industry series, as published in Table 3, p. 55 of Barefoot (2012).

<sup>b</sup> Statistics on employees for all U.S. companies are from the BEA's National Income and Product Accounts (NIPA) Table 6.4D, “Full-Time and Part-Time Employees by Industry,” [http://www.econstats.com/nipa/NIPA6\\_6\\_4D\\_.htm](http://www.econstats.com/nipa/NIPA6_6_4D_.htm).

<sup>c</sup> Statistics for U.S. parents are from the BEA's 2009 Benchmark Survey of U.S. Direct Investment Abroad, as published in Table 3, p. 55 of Barefoot (2012).

SOURCE: See table notes a, b, and c.

Table 3.6 compares selected statistics of U.S. parents who purchased CMS with those of all U.S. parents and all U.S. companies. Table 3.6 shows that U.S. parents classified in manufacturing, wholesale trade, and information that purchased CMS had a higher value-added per employee compared to the value-added per employee of all U.S. parents and of all U.S. companies. This finding suggests that firms

**Table 3.7 U.S. Trade in Goods (in \$ millions) Associated with U.S. Parents, 2009**

	U.S. parents who purchased CMS	All U.S. parents
Exports of goods to all foreigners	204,467	535,409
To foreign affiliates	102,768	207,479
For further manufacture	63,747	117,624
For resale without further manufacture	31,027	66,632
Other	7,993	23,223
To other foreigners	101,699	327,930
Imports of goods from all foreigners	194,879	679,521
From foreign affiliates	97,659	233,578
From other foreigners	97,220	445,943

SOURCE: BEA's 2009 Benchmark Survey of U.S. Direct Investment Abroad.

that use contract manufacturers to make their products may be more productive than firms that do not use contract manufacturers, though it is also possible that firms that use contract manufacturers have high value-added per employee by contracting out low value-added tasks, without any difference in output per quality-adjusted unit of inputs.

As was stated earlier, no corresponding CMS questions were included on the foreign affiliate's survey forms. Thus, a direct linkage cannot be made as to whether the U.S. parent purchased CMS from its foreign affiliate or from an unaffiliated foreigner. Table 3.7 shows that U.S. parents that purchased CMS exported a higher share of their total exports to their foreign affiliates (50 percent) than did all U.S. parents to their foreign affiliates (39 percent). In addition, U.S. parents that purchased CMS had a slightly higher share of export of goods sent for further processing to foreign affiliates (62 percent) than did all U.S. parents (57 percent).

## **ANALYSIS OF CONTRACT MANUFACTURING SERVICES ON CENSUS BUREAU 2011 COS**

Table 3.8 presents the distribution of firms by various CMS activity categories in the linked COS-LBD data set. Panel A of Table 3.8 shows

**Table 3.8 Percentage Distribution of Firms by CMS Activity**

Panel A: All firms	
No CMS activity	92
Provide CMS only	3
Purchase CMS only	4
Provide and purchase CMS	1
Panel B: Firms that purchase CMS	
Inside U.S. only	39
Outside U.S. only	20
Inside and outside U.S.	37
Panel C: Firms that purchase CMS outside U.S.	
From affiliates	53

NOTE: This table provides the percentage share of the count of firms within each CMS activity category. Panel A is computed as a share of the total number of unique firms in the data; Panel B is computed as a share of the total number of unique firms that purchase CMS (the rows “Purchase CMS only” and “Provide and purchase CMS” from Panel A); and Panel C is computed as a share of the total number of unique firms that purchase CMS outside the United States (the rows “Outside U.S. only” and “Inside and outside U.S.” from Panel B). Panel B does not add up to 100 percent because some firms did not respond and so could not be categorized.

SOURCE: Linked COS-LBD data set.

that 92 percent of the firms in the survey do not engage in any CMS activity. Among the remaining firms, there is an almost even share that either provide or purchase CMS, and only 1 percent that both provide and purchase CMS. Panel B shows that within the group of firms that purchase CMS, about 39 percent do so within the United States only, 20 percent do so outside the United States only, and 37 percent purchase CMS both inside and outside the United States. Finally, Panel C shows that of the firms that purchase CMS outside the United States, more than half of these firms do so from their foreign affiliates. Overall, a small share of firms engage in CMS activities, and among those that purchase CMS, a larger share purchase domestically. These observations are consistent with those made in Fort (2013) using the 2007 Census of Manufactures.

Table 3.9 presents two key firm characteristics associated with firms engaged in various CMS activities: size (measured as total employ-

**Table 3.9 Average Firm Size and Age by CMS Activity**

	Employment	Age
Panel A: All firms		
No CMS activity	1,366	23
Provide CMS only	761	26
Purchase CMS only	1,871	25
Provide and purchase CMS	4,315	25
Panel B: Firms that purchase CMS		
Inside U.S. only	1,065	25
Outside U.S. only	1,817	25
Inside and outside U.S.	4,427	24
Panel C: Firms that purchase CMS outside U.S.		
From affiliates	5,054	25

NOTE: This table provides the average employment and age of firms within each CMS activity category; Panel A is computed for the total number of unique firms in the data; Panel B is computed for the firms that purchase CMS (the rows “Purchase CMS only” and “Provide and purchase CMS” from Panel A); and Panel C is computed for firms that purchase CMS outside the United States (the rows “Outside U.S. only” and “Inside and outside U.S.” from Panel B).

SOURCE: Linked COS-LBD data set.

ment) and age. Panel A of Table 3.9 reports the average employment and age at firms within each CMS category. Firms that both provide and purchase CMS are the largest in terms of average employment, while those that provide CMS only are the smallest. Panel B shows that firms that purchase CMS both inside and outside the United States are much larger than those that purchase CMS either inside or outside the United States only. Finally, Panel C shows that firms that purchase CMS from their affiliates located abroad are the largest. An average firm in the survey is about 24 years old, and the average firm age does not vary greatly by CMS activity. The overwhelming majority of firms in the COS have been in existence for 10 or more years.

Table 3.10 provides further detail on the size distribution of firms in the survey by CMS activity. Firms with 250 or more employees are considered to be large, those with 100 to 249 employees to be medium, and those with one to 99 employees to be small. Since the COS primarily

**Table 3.10 Distribution of Firm Size by CMS Activity**

	Large	Medium	Small
Panel A: All firms	60	18	22
No CMS activity	61	18	22
Provide CMS only	41	34	25
Purchase CMS only	58	22	20
Provide and purchase CMS	55	24	21
Panel B: Firms that purchase CMS			
Inside U.S. only	45	27	28
Outside U.S. only	64	19	17
Inside and outside U.S.	66	20	14
Panel C: Firms that purchase CMS outside U.S.			
From affiliates	74	17	9

NOTE: This table provides the percentage share of firms in three size categories within each CMS activity category. “Large” includes firms with 250 or more employees, “Medium” includes firms of between 100 and 249 employees, and “Small” includes firms of between 1 and 99 employees.

SOURCE: Linked COS-LBD data set.

surveys large firms, the results in this table are not directly comparable to those in Table 3.4 and should be interpreted with the COS survey frame in mind. Within the group of firms that do not engage in any CMS activity, well over half the firms are large, and the remainder can be almost evenly divided between small and medium-sized firms. This pattern also holds for those that purchase CMS only or both provide and purchase CMS. Three-quarters of firms that provide CMS only are large or medium, and a quarter are small. Among firms that purchase CMS, those that do so outside the United States only and those that purchase CMS both outside and inside the United States exhibit similar firm-size distributions. As shown in Table 3.9, an overwhelming share of firms that purchase CMS from their foreign affiliates are large. However, of the firms that provide CMS only, about 40 percent are large and 30 percent are medium-sized. Firms that purchase CMS inside the United States only have a similar size distribution.

Tables 3.10 and 3.11 show the sectoral distribution of firms engaged in various CMS activities. The COS asked firms whether they operated



**Table 3.11 Distribution of Firm Response to Operating a Manufacturing Facility, by CMS Activity**

	% that answered "Yes"
Panel A: All firms	
No CMS activity	22
Provide CMS only	97
Purchase CMS only	77
Provide and purchase CMS	97
Panel B: Firms that purchase CMS	
Inside U.S. only	85
Outside U.S. only	77
Inside and outside U.S.	81
Panel C: Firms that purchase CMS outside U.S.	
From affiliates	85

NOTE: This table provides the percentage share of firms that responded "Yes" to Question 1 under Section 3D of the 2011 Company Organization Survey (COS) within each CMS activity category. The left-out category is "No," except for under "No CMS activity." Four percent of the responses are missing.

SOURCE: Linked COS-LBD data set.

a manufacturing facility where products are completed or partially produced. Table 3.11 reports the share of firms within various categories that responded "Y" or "N" or had missing data. Table 3.12 shows the distribution of firms within one of three broad sectors: 1) manufacturing, 2) wholesale and retail, or 3) all remaining sectors of the economy. Panel A in Table 3.11 and Panel A in Table 3.12 show that an overwhelming majority of firms that report engaging in some CMS activity also operate a manufacturing facility. Seventy-four percent of the firms that do not engage in any CMS activity report not operating a manufacturing facility; this finding is corroborated by the finding that 76 percent of these firms operate in sectors other than manufacturing, wholesale, or retail. In addition, 97 percent of the firms that provide CMS only or both provide and purchase CMS reported operating a manufacturing facility, and over 80 percent of them operate in the manufacturing, wholesale, or retail sectors. However, within the group of firms that purchase CMS only, 77 percent report operating a manufacturing

**Table 3.12 Distribution of Sectors by CMS Activity**

	Manu- facturing	Wholesale/ retail	Other
Panel A: All firms			
No CMS activity	18	16	76
Provide CMS only	76	7	17
Purchase CMS only	58	16	16
Provide and purchase CMS	75	7	18
Panel B: Firms that purchase CMS			
Inside U.S. only	66	10	24
Outside U.S. only	56	22	22
Inside and outside U.S.	62	15	23
Panel C: Firms that purchase CMS outside U.S.			
From affiliates	64	15	21

NOTE: This table provides the percentage share of firms in three broad sectors of the economy within each CMS activity category. “Manufacturing” includes all two-digit NAICS industries in sectors 31–33; “Wholesale/retail” includes two-digit NAICS industries in sectors 42, 44, and 45; and “Other” includes all other industries. SOURCE: Linked COS-LBD data set.

facility and operate in the manufacturing, wholesale, or retail sectors; the share is smaller compared with firms only providing CMS or both providing and purchasing CMS.

Table 3.13 is based only on responses of survey units that have a one-to-one link to a firm identifier.<sup>23</sup> It shows the percentage share of revenues (costs) generated (incurred) from providing (purchasing) CMS as a share of total revenues and net sales (cost of sales from expenses). Three-quarters of the firms providing CMS report less than a quarter of total revenues and net sales originating from providing CMS. A little over three-quarters of firms purchasing CMS also report less than a quarter of the total cost of sales from expenses originating from purchasing CMS. This suggests that for most firms engaged in some CMS activity, the activity constitutes a relatively small share of total revenues or total costs.

**Table 3.13 Distribution of Percentage Share of Revenue and Costs by CMS Activity**

% of operating revenues and net sales (cost of sales from expenses) from (for) CMS	Provide CMS	Purchase CMS
Less than 25	75	79
25 to 49	5	9
50 to 74	4	5
75 to 99	8	5
100	8	2

NOTE: This table provides the percentage share of firms in five mutually exclusive categories in response to Questions 2 and 3d from the 2011 COS form (see Appendix 3A, Illustration 3A.1). The second column shows the percentage share of firms that receive  $x$  percent of operating revenues and sales from providing CMS; the third column shows the percentage share of firms that incur  $x$  percent of cost of sales from expenses for purchasing CMS.

SOURCE: Linked COS-LBD data set.

Finally, Table 3.14 shows the average output per employee as well as export and import values of firms by various CMS activities. The first column shows the log of value-added per employee (VA/L), and the second column shows the log of total value of shipments per employee (TVS/L). Firms that engage in some type of CMS activity exhibit both higher (VA/L) and (TVS/L) than those that do not. Among firms that purchase CMS, those that purchase both inside and outside the United States exhibit the highest average output per employee, using both measures.

The last two columns show the average export and import values, in millions of dollars, respectively. Focusing on the third column, firms that both provide and purchase CMS have higher average export value compared to all other firms in the sample. Firms that do not engage in any CMS activity and firms that provide only CMS have very similar average export values. Firms that purchase CMS inside and outside the United States have the highest average export values among firms that purchase CMS. Focusing on the last column, firms engaged in some CMS activity display much higher average firm import values compared to those that do not, and, of these, firms that both purchase and provide CMS have the highest value. Firms that purchase CMS inside and outside the United States have the highest average import value among firms that purchase CMS. Among firms that purchase CMS outside the

**Table 3.14 Output per Employee and Trade Value by CMS Activity**

	Log (value added/ employment)	Log (total value of shipments/ employment)	Export value (in \$ millions)	Import value (in \$ millions)
Panel A: All firms				
No CMS activity	4.23	4.98	29	82
Provide CMS only	4.45	5.19	30	232
Purchase CMS only	4.63	5.31	113	190
Provide and purchase CMS	4.61	5.30	241	289
Panel B: Firms that purchase CMS				
Inside U.S. only	4.58	5.27	32	104
Outside U.S. only	4.53	5.22	68	144
Inside and outside U.S.	4.73	5.40	284	327
Panel C: Firms that purchase CMS outside U.S.				
From affiliates	4.75	5.44	334	417

NOTE: The above statistics are calculated for manufacturing firms only.

SOURCE: Linked COS-CM and COS-LFTTD data sets.

United States, those that do so from their affiliates are larger traders and have higher value-added per employee than those that do not.

## **FUTURE WORK**

This chapter analyzes existing data on firms' activities relating to providing or purchasing CMS as a means to measure "factoryless" manufacturing, where the manufacturer undertakes the entrepreneurial steps in the global supply chain but does not transform any of the material inputs. Our primary goal was to analyze the characteristics of firms that report engaging in various CMS activities to provide a preliminary glimpse into factoryless goods producers. However, comprehensive work is needed, and indeed is underway, as described below, to do three things: 1) quantify the scope of FGP activity, 2) look at how the CMS data discussed in this chapter compare to CMS data in other existing surveys, and 3) evaluate the feasibility of the proposed changes in the definitions to the manufacturing sector and import and export flows.

The recently updated international guidelines for services on physical inputs owned by others (goods for processing) are designed to better capture the impacts of GVCs on the economy. The BEA is evaluating whether implementation of the new guidelines is feasible. Successful implementation of this recommendation requires detailed information on not only the processing fees received and paid by U.S. firms for CMS but also the underlying goods transactions. Data for these transactions are currently either not available in the U.S. statistical system or not separately identifiable. Despite these data challenges, the BEA continues to investigate options for implementing this new treatment of manufacturing services.

The results from the BEA BE-120 survey will be available soon. Once the results are available, the BEA can evaluate whether the value of receipts and payments for CMS can be reported along with the destination of the goods after processing. To determine the feasibility of adjusting the merchandise trade statistics to remove goods that cross the border without a change in ownership, the BEA is also continuing to work with the Census Bureau to explore options for identifying the merchandise trade transactions of U.S. firms that purchased manufac-

turing services from overseas contractors or that provided manufacturing services to foreigners.

The CMS questions on the enterprise-level COS discussed in this chapter represent initial steps in determining whether further data collection is likely to be robust and whether the Census Bureau can identify “factoryless” manufacturers in its surveys. As a next step, the Census Bureau added special inquiries to the 2012 Economic Census to collect information at the establishment level that will better identify “factoryless” manufacturers and assess whether sufficient data can be collected on the value of the manufacturing service and the associated revenue on sales of products produced by contract manufacturers.<sup>24</sup>

An interagency effort across the Census Bureau, the BEA, and the BLS is underway to analyze census microdata in support of consistent and accurate implementation of the decision to classify FGPs in the manufacturing sector as soon as the agencies can perform the research, testing, and evaluation necessary to do so. One of the main goals of this effort is to estimate the number of establishments, the total value of shipments, and the total employment that will be moved across various sectors with the eventual implementation of the FGP concept in the Economic Census. Furthermore, comparisons will be made between the results from the special inquiry questions in the economic censuses and the COS in order to refine the questions that will be used by agencies and programs to identify FGPs on data collection instruments. The agencies must take care that as changes are made in the measurement of manufacturing activities, whether in the production of services or in the shipments of goods, these changes are implemented in a way that consistently and correctly allocates manufacturing value-added to the domestic and nonresident producers, in order to avoid overstating or understating U.S. gross domestic product.

## Notes

Any opinions and conclusions expressed herein are those of the authors and do not necessarily represent the views of the U.S. Census Bureau or the Bureau of Economic Analysis. All results have been reviewed to ensure that no confidential information is disclosed. We thank Susan Houseman for helpful comments on an earlier version. We also thank Mai-Chi Hoang for preparing the BEA data tables and providing valuable feedback, Raymond Mataloni for providing guidance on the BEA data, and Anthony Caruso, C.J. Krizan, Shawn Klimek, and William Powers for helpful comments.

1. The research in this chapter was undertaken while this author was at the U.S. Bureau of Economic Analysis.
2. For more information on GVCs, see APEC Policy Support Unit (2012).
3. The *System of National Accounts 2008* (European Commission et al. 2009) provides recommendations for compiling the national accounts, and the sixth edition of the *Balance of Payments and International Investment Position Manual* (IMF 2009) provides recommendations for compiling the international accounts.
4. For more information, see the Economic Classification Policy Committee's "Issue Paper No. 1" (ECPC 1993).
5. See Doherty (Chapter 2 of this volume) for a discussion of identifying FGPs in the U.S. Statistical System.
6. The *System of National Accounts 2008*, published by five international organizations, is the international guideline for compilation of gross domestic product and other national accounts statistics (European Commission et al. 2009), and the *Balance of Payments and International Investment Position Manual*, published by the International Monetary Fund, is the international guideline for compilation of balance of payments and international investment position statistics (IMF 2009).
7. In practice, this may not hold. Maurer and Degain (2010) state that, for most cases, the value of the manufacturing service or the processing fee is not simply the difference between the value of the goods before processing and the value after processing.
8. For more information, see BPM6, Chapter 10, Sections 10.65–10.66 (IMF 2009, p. 162). For a discussion of the measurement issues related to goods for processing, see United Nations Economic Commission for Europe (2011), pp. 71–84.
9. The term "affiliated" refers to a direct investment relationship, which exists when a U.S. person has ownership or control, directly or indirectly, of 10 percent or more of a foreign business enterprise's voting securities or the equivalent, or when a foreign person has a similar interest in a U.S. business enterprise.
10. A U.S. "person" includes companies.
11. See questions 28–30 on the 2009 Benchmark Survey of U.S. Direct Investment Abroad for U.S. parents that are not banks (BE-10A) at [http://www.bea.gov/surveys/pdf/be10a\\_web.pdf](http://www.bea.gov/surveys/pdf/be10a_web.pdf).
12. See Schedule D on the 2011 Benchmark Survey of Transactions in Selected Services and Intellectual Property with Foreign Persons (BE-120), at <http://www.bea>

.gov/surveys/pdf/be120.pdf, p. 12. Prior versions of the survey recorded receipts and payments for contract manufacturing services within the “other services” category.

13. The 2012 Economic Census includes a similar set of questions to those in the 2011 COS. It will provide the richest set of information at the establishment level once the data collection process is completed.
14. See <http://www.bea.gov/surveys/pdf/be120.pdf> for further details.
15. The COS data are unedited and have had no adjustments for survey nonresponse.
16. Form NC-99001, Section 3D, Questions 1–3; see <https://www.census.gov/econ/overview/mu0700.html> for a description of the survey. Also see Appendix 3A.
17. A company is an economic unit comprising one or more establishments under common ownership or control. The COS may survey different subsidiaries of the same company, so several survey units may belong to one firm identification code.
18. Industry assignments remain qualitatively unchanged if payroll information is used instead to assign sectors.
19. Sales data are not readily available for all firms in the sample. Therefore, employment is used to assign a sector.
20. The LBD contains information on employment within the United States only; therefore, figures on employment at foreign subsidiaries of U.S. parent companies are not available in the linked LBD-COS data set.
21. The 2007 CM and 2009 LFTTD are the most recent available years. See Bernard, Jensen, and Schott (2009) for an overview of LFTTD, including match rates.
22. For more on the BE-10 U.S. Direct Investment Abroad methodology, see [http://www.bea.gov/international/pdf/usdia\\_2004f/Text%20sections/methodology.pdf](http://www.bea.gov/international/pdf/usdia_2004f/Text%20sections/methodology.pdf).
23. See the subsection of this chapter titled “Census Bureau Surveys,” pp. 54–55, for details.
24. See Question 26 on the 2012 Economic Census manufacturing sample forms, located at <http://bhs.econ.census.gov/ec12/php/census-form.php>. An example of such a form is found at <https://bhs.econ.census.gov/2012forms/MC31101.pdf>.





## Appendix 3A

### Excerpts from Three Survey Forms Used in This Chapter

Questions on contract manufacturing services activities included these from the 2011 Report of Organization Survey (Form NC-99001):

#### Illustration 3A.1 Excerpt from Form NC-99001

<p><b>6</b> COMPANY ACTIVITIES - continued</p> <p><b>D. MANUFACTURING ACTIVITIES</b></p> <p>In 2011, did your company do any of the following activities related to manufacturing?</p> <p><b>1.</b> Operate manufacturing facilities (such as a factory, plant, or mill) where products are completed or partially produced?</p> <p>9709 <input type="checkbox"/> Yes - <i>Go to line 2</i></p> <p>9710 <input type="checkbox"/> No - <i>Go to line 3</i></p> <p><b>2.</b> Provide contract manufacturing services to other companies incorporating their patents, trade secrets, or proprietary technology?</p> <p>9711 <input type="checkbox"/> Yes</p> <p>9712 <input type="checkbox"/> No - <i>Go to line 3</i></p> <p>Estimate the percent of operating revenues and net sales, as reported in <b>6</b>B, from contract manufacturing services.</p> <p>9713 <input type="checkbox"/> Less than 25%</p> <p>9714 <input type="checkbox"/> 25 to 49%</p> <p>9715 <input type="checkbox"/> 50 to 74%</p> <p>9716 <input type="checkbox"/> 75 to 99%</p> <p>9717 <input type="checkbox"/> 100%</p> <p><b>3.</b> Purchase contract manufacturing services from other companies or foreign subsidiaries of your company incorporating your company's patents, trade secrets, or proprietary technology?</p> <p>9718 <input type="checkbox"/> Yes</p> <p>9719 <input type="checkbox"/> No - <i>Go to 4, CERTIFICATION</i></p> <p><b>a.</b> Use 3rd party contract manufacturing services inside the U.S.?</p> <p>9720 <input type="checkbox"/> Yes</p> <p>9721 <input type="checkbox"/> No</p> <p><b>b.</b> Use 3rd party contract manufacturing services outside the U.S.?</p> <p>9722 <input type="checkbox"/> Yes</p> <p>9723 <input type="checkbox"/> No</p>
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(continued)

**Illustration 3A.1 (continued)**

c. Use your company's foreign subsidiaries' or affiliates' contract manufacturing services at locations outside the U.S.?

9724  Yes

9725  No

d. Estimate the percent of the cost of sales from expenses for contract manufacturing services.

9726  Less than 25%

9727  25 to 49%

9728  50 to 74%

9729  75 to 99%

9730  100%

Questions on purchases of contract manufacturing services included these from the 2009 Benchmark Survey of U.S. Direct Investment Abroad for U.S. parents (Form BE-10A):

**Illustration 3A.2 Excerpts from Form BE-10A**

1. Did this U.S. reporter purchase contract manufacturing services from others (including foreign affiliates)? (Yes/No)
2. The U.S. reporter **owned** some or all of the materials used by the contract manufacturers and the companies providing the manufacturing services were:
  - a. Located **inside** the U.S. (Yes/No)
  - b. Located **outside** the U.S. (Yes/No)
3. The U.S. reporter **did not own** the materials used by the contract manufacturers and the companies providing the manufacturing services were:
  - a. Located **inside** the U.S. (Yes/No)
  - b. Located **outside** the U.S. (Yes/No)

This survey also included a question on performance of contract manufacturing services for others:

1. Did this U.S. reporter **perform** contract manufacturing services for others (including foreign affiliates) outside the U.S.? (Yes/No)

Questions on purchases of contract manufacturing services included these from the 2011 Benchmark Survey of Transactions in Selected Services and Intellectual Property Products with Foreign Persons (Form BE-120):

**Illustration 3A.3 Excerpts from Form BE-120**

<ol style="list-style-type: none"> <li>1. Did you purchase contract manufacturing services from foreign persons in Fiscal Year 2011?</li> <li>2. Are you able to report the fee you paid for contract manufacturing services?             <ul style="list-style-type: none"> <li>• If yes—enter the amount you paid foreign persons for contract manufacturing services.</li> </ul> </li> <li>3. The payments for manufacturing services in Question 2 were (check the appropriate box):             <ul style="list-style-type: none"> <li><input type="checkbox"/> Based on accounting records.</li> <li><input type="checkbox"/> Estimated by persons knowledgeable regarding these transactions.</li> </ul> </li> <li>4. Destination of goods produced after you purchased contract manufacturing (check the appropriate box):             <ul style="list-style-type: none"> <li><input type="checkbox"/> Goods do not enter United States.</li> <li><input type="checkbox"/> Goods are imported into the United States.</li> <li><input type="checkbox"/> A portion of the goods remain abroad and a portion are imported into the United States.</li> <li><input type="checkbox"/> Destination is unknown.</li> </ul> </li> </ol>
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Questions on receipts for contract manufacturing services include the following:

<ol style="list-style-type: none"> <li>1. Did you perform contract manufacturing services for foreign persons in Fiscal Year 2011?</li> <li>2. Are you able to report the fee you received for performing contract manufacturing services?             <ul style="list-style-type: none"> <li>• NOTE: This may include the cost of the materials you purchased to perform this service.</li> <li>• If yes—enter the amount received from foreign persons for contract manufacturing services you performed on goods owned by foreign persons and go to Questions 3 and 4.</li> </ul> </li> <li>3. The receipts for manufacturing in Question 2 were (check the appropriate box):             <ul style="list-style-type: none"> <li><input type="checkbox"/> Based on accounting records.</li> <li><input type="checkbox"/> Estimated by persons knowledgeable regarding these transactions.</li> </ul> </li> <li>4. Destination of goods produced after you performed contract manufacturing (check appropriate box):             <ul style="list-style-type: none"> <li><input type="checkbox"/> Goods remain in the United States.</li> <li><input type="checkbox"/> Goods are exported from the United States.</li> <li><input type="checkbox"/> A portion of the goods remain in the United States and a portion are exported from the United States.</li> <li><input type="checkbox"/> Destination is unknown.</li> </ul> </li> </ol>
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