



**Economic and Social  
Council**

Distr.  
GENERAL

ECE/CES/2009/18  
30 March 2009

Original: ENGLISH

**ECONOMIC COMMISSION FOR EUROPE**

**STATISTICAL COMMISSION**

CONFERENCE OF EUROPEAN STATISTICIANS

Fifty-seventh plenary session  
Geneva, 8-10 June 2009  
Item 4 of the provisional agenda

**SEMINAR ON STRATEGIC ISSUES IN BUSINESS STATISTICS**

**SESSION II: EMERGING AREAS, NEW DEVELOPMENTS AND USER NEEDS IN  
BUSINESS STATISTICS**

**DOMESTIC OUTSOURCING AND IMPORTED INPUTS IN THE UNITED STATES  
ECONOMY: INSIGHTS FROM INTEGRATED ECONOMIC ACCOUNTS**

Note by the United States Bureau of Economic Analysis

*Summary*

The Conference of European Statisticians selected in June 2008 (ECE/CES/74) the topic “Strategic issues in business statistics” for a seminar to be held at its 2009 plenary session. The Bureau, acting on behalf of the Conference, approved the outline for the seminar at its February 2009 meeting (ECE/CES/2009/2) and requested the United States Bureau of Economic Analysis to prepare a note to provide basis for the discussion.

The note deals with how the data from the United States Bureau of Economic Analysis annual industry accounts are used to shed light on the growth of outsourcing and imported inputs in the United States economy. The note discusses different types of outsourcing and describes how the measurement of outsourcing-related activities is shaped by definitions and conventions of the United States statistical system. The note also provides empirical results based on data from annual industry accounts and includes recommendations for future improvements.

## I. INTRODUCTION

1. One of the interesting features of the dynamic United States (U.S.) economy over the past 25 years has been continued growth in the outsourcing of intermediate inputs, primarily services but also goods, as firms seek to reduce costs, improve productivity, and increase profits. Recent data for 2007 show that the share of U.S. Gross Domestic Product (GDP) accounted for by domestic providers of outsourcing services increased to over 12 percent from 7 percent in 1982. Outsourcing became more prevalent as part of the restructuring that accompanied recovery from the recessions of the early 1980's and it further accelerated during the latter half of the 1990's with the growth of information and communications technology services.

2. In addition, imports for intermediate use by industries continue to grow and now account for about 50 percent of all U.S. imports. Because U.S. firms outsource some services offshore to foreign entities, imports of business, professional, and technical services have steadily increased. The growth of imported inputs has raised concerns about the effects of import substitution on the domestic industries that supply the outsourced inputs.<sup>1</sup>

3. Unfortunately, no apparent consensus exists in the economics profession on how to define outsourcing and international guidelines for national economic accounts provide little guidance on how to treat outsourcing. Partly as a result, the data that are available for studying outsourcing-related issues are quite limited. A recent study (Day, Houseman, and Polivka) concluded that despite evidence pointing towards significant growth in outsourcing, available data are not adequate for understanding its implications on employment and labor policy.

4. Official international guidelines, such as the System of National Accounts (SNA), could be very useful for statistical agencies grappling with the implications of the rapid growth of offshore outsourcing or concerned about the regional effects of domestic outsourcing. The proposed 2008 revision of the SNA provides a basis for addressing outsourcing measurement issues by recommending multi-factor productivity (MFP) measures prepared at the industry level in a capital-labor-energy-materials-services (KLEMS) framework.<sup>2</sup>

5. In this paper, published and unpublished data from the United States Bureau of Economic Analysis' (BEA) annual industry accounts are used to shed additional light on the growth of outsourcing and imported inputs in the U.S. economy. The integrated industry accounts, which were first released in June 2004, are well-suited for understanding important developments in the economy, such as outsourcing, because the rich industry-level data on production, employment, and prices are tightly integrated with the more highly aggregated national economic accounts data for final uses and imports. BEA's expansion of these accounts in 2005 to include the KLEMS framework for measuring and presenting data on industry intermediate inputs further enhanced the usefulness of the accounts for such studies. This paper demonstrates how the

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<sup>1</sup> The National Academy of Public Administration recently concluded, however, that a better understanding of domestic outsourcing could help improve our understanding of offshore outsourcing.

<sup>2</sup> The proposed SNA chapter on the production account includes a paragraph related to outsourcing. It acknowledges that it is increasingly common for producers to change the way in which a production activity is completed and that contracting out activities to other producers changes the pattern of intermediate inputs.

KLEMS framework that was recently adopted by BEA and that is recommended for the revised SNA can be used to improve the measurement of outsourcing and imported inputs.

6. The remainder of this paper is presented in three sections. Section II discusses different types of outsourcing in the U.S. economy, explains the concept of outsourcing adopted for this study, and describes how the measurement of outsourcing-related activities is shaped by definitions and conventions of the U.S. statistical system. Section III describes how BEA's annual industry accounts evolved to become a more useful statistical framework for studying outsourcing. Section III also provides empirical results based on both published and unpublished data from BEA's annual industry accounts. Section IV is a summary and conclusion that includes recommendations for future improvements.

## II. TREATMENT OF OUTSOURCING IN ECONOMIC STATISTICS

7. In order to better understand the strengths and limitations of the existing data for studying outsourcing, it is useful to consider how outsourcing activities are treated in U.S. economic statistics and how their treatment has changed over time. For this purpose, it is necessary to define outsourcing more precisely and to address issues related to the different types of statistical units from which economic data are collected.

8. Many economic studies view outsourcing as a special case of specialization in production, whereby firms de-consolidate their production processes over time and engage in a form of vertical disintegration.<sup>3</sup> As part of this process, new firms or plants arise, perhaps in different physical locations, to produce intermediate inputs such as parts or materials that were previously provided within the firm.<sup>4</sup> Specialization might then have resulted in the formation of two different establishments, one producing the parts and materials and the other producing the finished product.

9. For some purposes, outsourcing describes a process whereby a manufacturing firm that once produced final products no longer does so, but now contracts out their manufacture or assembly to other manufacturing firms.<sup>5</sup> Another manifestation of outsourcing is a firm that once employed its own staff to provide support services but now "contracts out" or purchases these services from other firms. Finally, outsourcing sometimes refers to the substitution of imported inputs for domestically-produced inputs, with no change in the structure of the company.

### A. Concept of outsourcing

10. The concept of outsourcing adopted for this paper has a strong establishment-based production orientation and is based on changes over time in the composition of inputs used by an

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<sup>3</sup> See Abraham and Taylor (1996) for an analysis and discussion of the reasons that firms outsource activities.

<sup>4</sup> This process of vertical disintegration applies to both goods and services used as intermediate inputs and it often results in the formation of new business entities or leads to a larger volume of transactions between existing business entities.

<sup>5</sup> A related form of this process is when a company establishes divisions or subsidiaries in new locations, including overseas, to perform operations once performed at the parent company.

industry to produce its output. Outsourcing is viewed as the change in an industry's production process that results in the substitution of certain types of purchased services (domestic or imported) and imported non-energy materials for labor and domestically-produced materials. Outsourcing for this paper does not include the substitution of domestically-produced materials for labor as a result of increased specialization in manufacturing because this aspect of outsourcing does not appear to be prominent in today's economy.

11. In contrast to some previous studies, this paper does not treat an industry's total purchased services, or even just its purchases of business services, as the measure of outsourcing. Rather, outsourcing is defined in terms of a broad subset of specific purchased services that the establishment in the short run can choose to produce and consume on its own or to acquire from other establishments, affiliated or otherwise.<sup>6</sup>

12. For this study, outsourcing does not include manufacturing companies contracting out the manufacture of products that were produced at one time by establishments owned by the company. This type of outsourcing manifests itself as the transformation over time of a manufacturing company into a distribution or wholesale trade company as the primary activity of the enterprise changes from selling products manufactured by its own plants to selling products manufactured by others.<sup>7</sup> While this type of outsourcing changes the composition of U.S. corporations in terms of the establishment-based industries in which they are engaged, it does not generally affect the composition of inputs for establishment-based industries.

## **B. Company versus establishment**

13. An important issue for studying outsourcing and for understanding how outsourcing-related activities are classified is the nature of the statistical unit used for data collection and analysis. In the U.S. statistical system, establishments and companies are the statistical units for which most data classified by industry are widely available.<sup>8</sup>

14. Industrial statistics for the U.S. and most other countries are based on establishment data rather than company data.<sup>9</sup> Establishment data provide more meaningful economic time series because they are not affected by mergers, acquisitions, and other changes in corporate organization or ownership.<sup>10</sup>

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<sup>6</sup> Examples of these types of services include maintenance, accounting, management consulting, and computer systems design.

<sup>7</sup> For example, a U.S. company that primarily distributes (resells) products that are made overseas and then imported into the U.S. would be classified in wholesale trade as a manufacturers' sales branch or sales office, even if it owns the foreign manufacturing plant.

<sup>8</sup> Establishments are units, such as a plant, mine, store, or office where productive activities occur, and they are classified by industry according to their primary activity. Companies, or enterprises, are organizational units consisting of one or more establishments under common ownership and control, and their industry classification depends on their degree of horizontal diversification. The industrial classification of the company thus depends on the classification of the establishments that account for the largest portion of its activity.

<sup>9</sup> See Postner (1991) for a discussion on the implications of company-establishment differences for measuring outsourcing. Postner highlights that the choice of statistical unit can affect the identification of outsourcing and the measurement of its overall magnitude.

<sup>10</sup> For example, at one time General Motors Corporation owned establishments that were classified in several

### C. Auxiliary establishments

15. Large companies usually consist of both operating establishments that produce market output for sale outside the company and auxiliary establishments (or ancillary units) that provide captive services for other establishments of the same company. The most common type of auxiliary unit is a central administrative or headquarters unit that provides administrative and general management support services to the entire company.<sup>11</sup>

16. The North American Industry Classification System (NAICS) that is used for BEA's annual industry accounts provides advantages for studying outsourcing in the U.S. economy, partly because of its treatment of auxiliaries. Under NAICS, auxiliaries are classified according to the type of service they provide, rather than according to the industry of the establishments they serve, as they were under the Standard Industrial Classification system.

17. In many cases, the services that are provided by the auxiliaries could also be purchased in the market from independent establishments that are classified in the same industry as the auxiliary but that are owned by other companies located elsewhere in the U.S. or abroad.<sup>12</sup> On a company basis, the intra-company flows of services between auxiliaries and the establishments they serve would not be observed. These flows are observed, however, on a NAICS establishment basis in BEA's industry accounts because of the classification and valuation conventions used for these accounts.<sup>13</sup>

### III. OUTSOURCING AND INPUTS IN THE BUREAU OF ECONOMIC ANALYSIS' INDUSTRY ACCOUNTS

18. An important development in the evolution of data available for measuring outsourcing was BEA's June 2004 release of the integrated GDP-by-industry and annual input-output (I-O) accounts (Moyer et. al). These integrated annual industry accounts (AIAs) provided an internally consistent set of industry production accounts that was integrated statistically and conceptually consistent with estimates of final expenditures from the National Income and Product Accounts (NIPAs). Development of these new estimates finally allowed integrated analysis of industry output, inputs, final demand, and imports. Although import use tables were available in the past, they were not a consistent time series and did not include constant-price

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manufacturing industries related to motor vehicles, but it also owned establishments that were classified in data processing, financial services, and leasing. For the purpose of reporting company data on an industry basis, General Motors would have been classified in the motor vehicle assembly industry because that industry accounts for most of its payroll. As a result, all of the sales, payroll, employment, and other data for General Motors would also have been classified as motor vehicle manufacturing, when some of the data were actually for other manufacturing industries and for services industries.

<sup>11</sup> Other significant types of auxiliaries include research and development (R&D), trucking, warehousing, accounting, auditing, and bookkeeping services, data processing, and repair and maintenance services.

<sup>12</sup> By contracting out to its captive auxiliaries, a company can maintain control over the provision of these important services.

<sup>13</sup> Some would argue, though, that establishment-based estimates overstate outsourcing because the inputs are provided by affiliated entities and may not be acquired in arms-length market-oriented transactions.

(real) estimates. The AIAs opened wider possibilities for studying relationships between final demand, imports, industry outputs, inputs, and employment.

19. The AIAs time series is estimated within the framework of balanced make and use tables and are consistent with the National Income and Product Accounts estimates of final expenditures and industry estimates of gross output and value added. The additional layers of internal consistency in the AIAs increase the overall reliability of the estimates of intermediate inputs by industry.<sup>14</sup> The GDP-by-industry accounts feature nominal and real value added by industry estimates.<sup>15</sup> Price and quantity indexes of gross output, intermediate inputs, and value added are published for industries, industry groups, and broad sectors in the GDP-by-industry accounts. The related annual I-O accounts provide a time series of detailed, consistent information on the flows of goods and services that comprise industry production processes and that are included in final expenditures. These accounts provide more detail than the GDP-by-industry accounts on the commodities included in gross output and intermediate inputs.

20. In 2005, the AIAs were expanded to provide additional information on the composition of intermediate inputs by industry, allowing these accounts to be used to study trends in the use of energy, materials, and purchased services inputs (Strassner et al.). The balanced I-O use table, which shows the commodity composition of intermediate inputs by industry and by final demand category, provides the product detail needed for aggregating estimates of intermediate inputs into cost categories that are useful for economic analysis. These estimates were prepared by applying a KLEMS production framework to BEA's estimates of industry production. Each of the cost categories includes both imported and domestically produced goods and services.<sup>16</sup>

21. For this paper, BEA's published KLEMS-based intermediate input cost categories have been disaggregated to obtain estimates, by industry, of the domestic and imported inputs included in each input cost category. Import use tables were developed by BEA because of the lack of actual data on the use of imports by industry. For each commodity used by an industry, the portion attributable to imports was calculated as a percentage of the total purchase value, using the economy wide share of imports in the total supply of the commodity.<sup>17</sup> This "import comparability assumption" is common in studies of the impact of imports on intermediate inputs.

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<sup>14</sup> Industries are defined according to the 1997 version of NAICS. Estimates are published for 61 private industries and for four government classifications.

<sup>15</sup> Value added is defined as an industry's gross output (sales or receipts and other operating income) minus its intermediate inputs (energy, materials, and purchased services). Intermediate inputs are acquired from either domestic or foreign sources (imports).

<sup>16</sup> Intermediate inputs are valued in purchasers' prices, which include domestic transportation costs and wholesale trade margins plus sales and excise taxes.

<sup>17</sup> For example, if imports represent 40 percent of the domestic supply of semiconductors, then the estimates in the import use table assume that imports comprise 40 percent of the value of semiconductors in each industry that uses semiconductors. These import shares are first developed for the benchmark use table using very detailed product data, and they are updated annually at the same level of product detail.

<sup>17</sup> Value added is defined as an industry's gross output (sales or receipts and other operating income) minus its intermediate inputs (energy, materials, and purchased services). Intermediate inputs are acquired from either domestic or foreign sources (imports).

## A. Purchased services and outsourcing

22. Some studies equate outsourcing with purchased services and often cite increased outsourcing as the major reason for the long-term trend growth in purchased services inputs. Because the two measures are not necessarily equivalent, however, it is important to distinguish outsourcing-related services from other types of purchased services. Partly because no agreement prevails on which types of services constitute outsourcing, our previous study defined outsourcing somewhat narrowly to include business, professional, and technical (BPT) services but not other types of purchased services (Yuskavage et al.).

23. This narrow definition included NAICS commodities 5112 (packaged software), 514 (information and data processing services), 54 (professional, scientific, and technical services), and 561 (administrative and support services). It also included imports of affiliated BPT services, which are classified as non-comparable imports in the I-O accounts. For the most part, these are the types of services that firms choose to either provide within the same establishment using their own employees or to acquire from external suppliers. Other types of services, such as utilities, communications, and finance, are not as likely to be provided within the establishment on own-account.

24. In this paper, we adopt a broader definition of outsourcing that includes the BPT services described above but that also includes maintenance and repair services, certain kinds of transportation and warehousing services, and services associated with the management of companies and enterprises.<sup>18</sup> This broad definition results in a measure of outsourcing that is about 20 percent larger than one based on the narrow definition, but in contrast it grows a bit more slowly over the period. Other types of purchased services are not included in either definition of outsourcing because most of the other services are not subject to the same kinds of decisions in today's economy about in-house versus contracted-out sourcing. Table 1 provides a list of the detailed I-O commodities included in the broad definition of outsourcing.

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<sup>18</sup> Nearly all of the output of NAICS industry 551114 consists of auxiliary services provided to other establishments of the same company and it accounts for about five percent of outsourcing. Some would exclude these services because the activities represent intra-company transfers and are not based on market transactions. They are included in the broad definition of outsourcing because some if not all of the services would be purchased from outside of the company if they were not provided by the auxiliaries.

Table 1

**Commodities included in BEA's measure of outsourcing-related services**

<u>Code</u>	<u>Commodity Description</u>
2337	Maintenance and repair construction
4840	Truck transportation
4921	Couriers
4930	Warehousing and storage
5112	Software Publishers
5141	Information Services
5142	Data Processing Services
5411	Legal Services
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services
5413	Architectural, Engineering, and Related Services
5414	Specialized Design Services
5415	Computer Systems Design and Related Services
5416	Management, Scientific, and Technical Consulting Services
5417	Scientific Research and Development Services
5418	Advertising and Related Services
5419	Other Professional, Scientific, and Technical Services
5511	Management of Companies and Enterprises
5611	Office Administrative Services
5612	Facilities Support Services
5613	Employment Services
5614	Business Support Services
5615	Travel Arrangement and Reservation Services
5616	Investigation and Security Services
5617	Services to Buildings and Dwellings
5619	Other Support Services
8110	Repair and maintenance
8111	Automotive Repair and Maintenance
8112	Electronic and Precision Equipment Repair and Maintenance
8113	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance
9N00 (pt.)	Other private services payments to affiliated foreigners

25. Using this broad definition, we find that outsourced input costs accounted for nearly 12 percent of gross output and about 44 percent of purchased services inputs for all private industries in 2007.<sup>19</sup> Outsourcing increased as a share of purchased services for all private industries from 1997-2002 but it declined after 2002. Outsourcing's share of gross output in 2007 was higher for services-producing industries (13.1 percent) than for goods-producing industries (9.2 percent). Professional and business services had the highest outsourcing share of

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<sup>19</sup> Using the narrow definition from the earlier study, outsourcing accounted for about 37 percent of purchased services.

gross output (18.3 percent) followed closely by information (17.7 percent). Agriculture, forestry, fishing and hunting's share was the smallest at 2.6 percent.

## **B. Imported intermediate inputs**

26. Estimates of imported inputs are based on BEA's unpublished annual import use tables compiled on an establishment-industry basis (before redefinitions). As described above, these use tables are compiled using the import comparability assumption for each detailed "comparable" imported commodity and by assigning non-comparable imports from affiliated entities to specific using industries based on data from BEA's surveys of multinational companies.

27. Imported intermediate inputs increased from \$553 billion in 1997 to \$1267.2 billion in 2007. Their share of total U.S. imports in 2007 was 56.2 percent, compared to 54.3 percent in 1997. For all private industries, the import share of intermediate inputs increased from 8.3 percent in 1997 to 10.8 percent in 2007. For private-goods producing industries the import share increased from 12.0 percent in 1997 to 17.7 percent in 2007. The increase for private services-producing industries was much smaller, rising from 4.7 percent to 6.0 percent. Manufacturing's share increased from 13.5 percent to 20.4 percent, mostly due to prices for imported crude petroleum.

28. The import share of outsourcing can be interpreted as an indicator of offshore outsourcing. For all private industries, imports accounted for relatively small shares of both purchased services inputs (3.5 percent in 2007) and outsourcing-related inputs (2.6 percent in 2007). While low, the import share of outsourcing steadily increased from 1.7 percent in 1997 to 2.6 percent in 2007. The increase in the share for private goods-producing industries was larger than for private services-producing industries. Outsourcing import shares were highest in manufacturing durable goods (5.6 percent) and in transportation and warehousing (4.5 percent).

## **IV. SUMMARY AND CONCLUSION**

29. Outsourcing has received considerable attention during the past ten years, mostly because of concerns about its effects on the output and employment of domestic industries. Much anxiety has been expressed about the potential loss of high-paying professional jobs to foreign competitors. While concern about the impact of import substitution on jobs is not a new one, the concerns about the industries and occupations affected are different. Offshore outsourcing, however, should be studied in the broader context of domestic outsourcing, which is considerably larger and may be a pre-cursor to offshore outsourcing. Domestic outsourcing does not have the same job-loss implications as offshore outsourcing, but it is an important and interesting development that requires further study.

30. Empirical evidence for studying and assessing the impact of domestic outsourcing has been quite limited. A recent National Academy of Public Administration (NAPA) report on offshoring identified gaps and limitations in the federal statistical system that have stymied attempts to better understand the magnitude and impact of offshore outsourcing. Many of those data limitations are specific to foreign trade and relate to the difficulty obtaining reliable data on

international transactions, but some relate to domestic data and affect studies of domestic outsourcing.

31. This paper highlights results based on a combination of published and unpublished data from BEA's integrated annual industry accounts that can shed light on domestic outsourcing and imported inputs. For this purpose, the paper adopts a specific concept of outsourcing that is based on changes over time in the mix of industry inputs used in production. We find that outsourcing-related services have experienced strong growth in both the goods and services sectors, but that other types of purchased services have grown even faster than outsourcing, that the import intensity of intermediate inputs has increased sharply due to imports of outsourcing-related services and materials inputs.

32. Guidance from the research community and from international standards about how statistical agencies should develop industry-level time series data that are suitable for studying outsourcing would be welcome. Direction is also needed on the appropriate concepts and definitions to use for measuring outsourcing, including how to identify activities subject to outsourcing and on issues not directly addressed in this paper such as the proper treatment of leased assets and capitalized outsourced services like software and research and development. The recommendations in the revised SNA for multifactor productivity measurement at the industry level in a KLEMS framework are an important first step, but additional guidance aimed at directly improving the measurement of outsourcing is also needed.

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