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Authors
Brown, Clair
Sturgeon, Timothy
Lane, Julia

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Clair Brown, Timothy Sturgeon, and Julia Lane

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Using a business function framework to examine outsourcing and offshoring by US organizations

Clair Brown
University of California, Berkeley

Timothy Sturgeon
MIT Industrial Performance Center

Julia Lane
American Institutes for Research

June 19, 2014

Abstract: There is an ongoing debate in the United States and elsewhere on the effects of outsourcing and offshoring on employment and wages, yet little is known how U.S. enterprises have restructured their organizations by externalizing business functions domestically and internationally. This paper presents the results from a pilot survey that uses a *business function* framework to collect information about the domestic and international sourcing practices of United States organizations. Our results suggest that offshoring is not as pervasive as might be expected and appears to be most common in large goods-producing companies. Offshoring is spread across all business functions and international sourcing is more commonly from foreign affiliates than independent contractors. Perhaps most surprisingly, most offshoring is to countries with costs that are the similar to the United States. About two thirds of internal domestic employment is in the primary business function, and the distribution of employment by business function is roughly similar across industry groupings. Wages show clear variation across business functions. We find that international sourcing is positively related to percentage of workers in high wage jobs, suggesting that offshoring is complementary to domestic activities and may substitute for low wage jobs.

Keywords: Outsourcing and offshoring, services offshoring, international sourcing, global value chains, business functions

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Introduction

There is an ongoing debate in the United States and elsewhere on the effects of outsourcing and offshoring on employment and wages.[1] Yet little is known how U.S. enterprises have restructured their organizations by externalizing business functions domestically and internationally. Even basic facts such as the scale and distribution of outsourcing and offshoring remain largely un-measured, let alone the effects on domestic jobs (Sturgeon *et al*, 2006; NAPA, 2006; Graham, 2007). In our view, the core challenge is that official surveys do not capture information about the full range of an enterprise's business operations. This paper presents the results from a pilot survey that uses a business function framework to collect information about the domestic and international sourcing practices of United States organizations. Our results demonstrate that it is possible to use such a framework to ask organizations of different sizes and in different sectors questions about their offshoring and outsourcing practices, as well as about their domestic jobs and earnings.

Because the survey collected data on conditions in 2010, it is called the 2010 National Organizations Survey (2010 NOS).[2] The data are drawn from two samples. The first is representative of US-based employers, and is derived from the 2008 General Social Survey, a nationally-representative survey of individuals. The second is an oversample of large organizations drawn from Fortune Magazine's 2008 list of the largest 1000 US corporations. We collect data on both the level and type of outsourcing and offshoring, by business function, examine if offshoring is to affiliated companies or independent suppliers, and for companies that are engaged in offshoring, if the source country has costs that are the same, slightly lower, or much lower than the United States.

There are some intriguing descriptive results. The first has to do with the scale and character of offshoring. Our sample, which was necessarily quite small for this pilot study,[3] suggests that offshoring is not as pervasive as might be expected and appears to be most common in large goods-producing companies. Offshoring to foreign affiliates is more common than to independent contractors. Perhaps most surprisingly, most offshoring is to countries with costs that are the similar to the United States.

The second set of findings has to do with how the primary (main revenue producing) function is combined with support functions in the context of offshoring. Jensen and Kletzer (2006) hypothesize that an organization that outsources its activities in the U.S. will be likely to engage in international sourcing, arguing that activities that can be outsourced in the United States can also be sourced abroad.

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[1] By outsourcing we mean the practice of sourcing goods and services externally, from suppliers, vendors and other service providers. Outsourcing can be from domestic or international suppliers. By offshoring we mean international sourcing. International sources can be either internal, from foreign affiliates, or external, from independent suppliers.

[2] The survey included explicit instructions to respondents about the time frame for various data. For single point data, such as the total domestic U.S. employment of the organization, the survey asked respondents to supply information for December 31, 2010. For annual data, such as sourcing costs by business function and total revenues, the survey asked respondents to supply data for the calendar year 2010.

[3] Of the adjusted sample size of 1,777 organizations and business segments, 333 organizations responded to the survey, with 264 responses coming from the GSS and 69 responses coming from the Fortune 1000 oversample.

For the primary business function, domestic outsourcing and offshoring display a positive statistical relationship (using linear regressions with controls for size and sector), although no support functions display a significant relationship between domestic outsourcing and offshoring. These patterns are consistent with the hypothesized relationship between domestic outsourcing and offshoring of the core function, and also consistent with firms setting up support functions to support their core operations in foreign markets.

These results are revealing and provocative. They suggest that an effort by United States statistical agencies to adopt a business function framework in new or existing surveys might usefully shed light on international sourcing and other important phenomenon with a minimum of respondent burden. Business functions offer a set of generic, easy-to-understand categories that describe the various activities carried out by enterprises in a mutually exclusive, exhaustive, yet concise way. They offer a straightforward method for capturing newer, hard-to-measure business such as services offshoring and the use of manufacturing services. Indeed, statistical agencies in Europe (Eurostat) and Canada (Statistics Canada) have begun to experiment with new surveys on international sourcing[4] using a business function framework, and the United National Statistical Division is developing an internationally-agreed-upon list of business functions for statistical purposes. [5]

Background

Since the 1990s, outsourcing and offshoring by high profile firms in economically important industries such as electronics (Sturgeon, 2002; Brown and Linden, 2009) and motor vehicles (Sturgeon and Florida, 2004; Thun, 2008) has profoundly altered public perceptions and expectations about the geography of manufacturing and associated employment.

In the early 2000s, the outsourcing and offshoring trend spread to services and service industries as well. Public anxiety increased when software coding work, call centers for sales and customer service, and a range of back office functions began to crop up in lower cost locations such as India and the Philippines, enabled by the new low-cost, high-capacity digital voice and data communications networks underpinning the global Internet (Dossani and Kenney, 2003 and 2005). Companies have even begun to experiment with fragmenting and relocating the R&D process, with various related activities interlinked via cross-border ICT systems (Uzunidis and Boutillier, 2012). This literature suggests that work across the spectrum of business functions, from innovation to production to distribution and after- sales service, is becoming more mobile.

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[4] See http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/International_sourcing and http://www.ic.gc.ca/eic/site/eas-aes.nsf/eng/h_ra02092.html

[5] The first official survey to introduce the concept of business functions in a statistical context was the European survey on International Sourcing, initially carried out in 2007 and repeated again in 2012. Statistics Canada used a similar approach in 2009 and 2012 in its Survey of Innovation and Business Strategy (see http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/International_sourcing and http://www.ic.gc.ca/eic/site/eas-aes.nsf/eng/h_ra02092.html). The international classification effort is being led by the United Nations Statistical Division's Technical Subgroup on the Classification of Business Functions.

Some scholars have tried to counter the widespread anxiety and apparent inevitability of economic globalization, either by pointing out that falling costs for key imported goods and services (e.g., personal computers and information technology (IT) services) can help to drive economic growth at home (Mann and Kirkegaard, 2006); by arguing that outsourcing and offshoring are, in fact, less pervasive than generally thought, especially in services (Jensen, 2011); or by predicting that manufacturing will return to the United States and other high-wage economies with the advent of new manufacturing technologies such as 3-D printing, and as experiments in offshoring to low wage economies fail because the totals costs[6] of offshoring have not been taken into account (Berger, *et al*, 2013).

In sum, policy makers lack the basic facts needed to make judgments about the benefits and costs of economic globalization, or to devise effective policy responses. Basic questions such as, "How big are outsourcing and offshoring?" and "Is outsourcing and offshoring confined to specific industries or types of companies?" cannot be answered with current data resources, much less questions about how outsourcing and offshoring are affecting employment and wages in the United States. Without better data on the practices of United States companies it will remain difficult, if not impossible, to know the nature and impact of outsourcing and offshoring or to track changes over time.

Data and Measurement

To begin to fill these data gaps a pilot international sourcing survey was conducted in the United States[7] Data from the 2010 National Organizations Survey is collected from two sources. The first of these is a sample of organizations derived from the workplaces of individuals in a nationally-representative survey of individuals. The sample frame is generated from responses to the General Social Survey (GSS), a survey of individuals in the U.S. conducted every two years by the National Opinion Research Center based at the University of Chicago.[8] In 2008, the GSS survey included a module of questions that asked full-time employed respondents, among other things, for the name, address and phone number of their current workplace.[9]

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[6] Total costs, in this context refer to costs beyond direct labor, including managerial, logistics and material costs, and also the less tangible costs that can come with offshoring, including degradation of quality, responsiveness, and the innovation 'ecosystem' at home. Innovation ecosystems include institutional supports, supply-bases, and labor markets underpinning product development.

[7] A full description of the 2010 NOS project can be found in Brown *et al* (2013). A public use data set and supporting materials have been uploaded to the Inter-university Consortium for Political and Social Research (ICPSR) website located at the University of Michigan (www.icpsr.umich.edu) with the title: 2010 National Organizations Survey: Examining the Relationships Between Job Quality and the Domestic and International Sourcing of Business Functions by United States Organizations (study # 35011). The data set includes all data corrections and weights.

[8] The GSS is uses a randomly selected sample of adults of eighteen years of age or older who are not institutionalized. For more information on the GSS, see the main website for the data: http://www3.norc.org/gss+website/.

[9] The National Organization Survey (NOS) has been conducted three prior times using this sampling method: in 1991, 1996 and 2002. In earlier versions of NOS the sample frame consisted only of the workplaces of full-time workers surveyed in the GSS; no oversample was added.

The second sample for the 2010 NOS is drawn from Fortune Magazine's 2008 list of the largest 1000 U.S.-headquartered companies, otherwise known as the Fortune 1000. While any employer in the U.S. could have employees sampled in the GSS, only 81 Fortune 1000 organizations in the 2010 NOS were linked to the 2008 GSS. Because large firms are more likely to be operate globally, we use the Fortune 1000 oversample to develop a representative sample of large U.S firms. And, because large firms tend to be organized according to distinct *business segments*, data are collected at this level from multi-segment firms. We take this approach because differences in products, technology, and markets often require distinct management and decision-making structures for various business segments within large organizations. Because the 2010 NOS is a study of U.S. organizations, foreign-owned companies are excluded from both samples. However all sectors, including public and non-profit organization as well as for-profit enterprises, are included.

The 2010 NOS was administered from July 1 through December 31, 2011. The Henne Group, a survey research company based in San Francisco, California, developed and administered the web and telephone surveys. As part of its development, the survey was tested in small rounds with respondents at organizations not in the sample.

The survey included explicit instructions to respondents about the time frame for various data. For single point data, such as the total domestic U.S. employment of the organization, the survey asked respondents to supply information for December 31, 2010. For annual data, such as sourcing costs by business function and total revenues, the survey asked respondents to supply data for the calendar year 2010. Of the adjusted sample size of 1,777 organizations and business segments, 333 organizations responded to the survey, with 264 responses coming from the GSS and 69 responses coming from the Fortune 1000 oversample.

Measurement of business functions

A business function framework is used in the 2010 NOS to categorize data on sourcing, employment, and wages. Business functions categorize the tasks carried out by an enterprise. The tasks within a given business function are a set of activities that perform a specific service or produce given outputs. Business functions are similar to occupations, but are focused on business activities rather than the activities of individual workers. A specific business function will typically involve a range of job categories and occupations.

Business functions offer a set of generic, easy-to-understand categories that describe the various business activities of organizations in a concise yet comprehensive and mutually exclusive way. The framework is based on the recognition that firms, in addition to producing the goods and services for which they are generally known and earn revenues, typically engage in a variety of other activities to support the organization's primary line of business.

There are many advantages to using such a framework. They allow data to be collected on support functions (mainly services) in additional to the primary business function typically associated with the enterprise's industry or activity code. The questions are generic in that they are applicable to enterprises in any industry and apply equally well to goods-producing and services-producing

enterprises, as well as public organizations. They can be used to categorize a wide variety of variables. Business functions reflect the categories typically used by managers, who find questions about them intuitive and easy to answer. In the 2010 NOS survey, only 5% of respondents answered 'don't know/refused' to the question about distribution of employment by business function, 4.5% entered ranges (allowing the research team to make estimations), and 1.2% provided blank observations.

The business function list used in the 2010 NOS is comparable to those used in surveys by Eurostat and Statistics Canada, and the 2010 NOS is part of a larger and on-going international effort to improve business statistics related to global values chains. (Nielsen and Sturgeon, 2014)

The eight business functions used in the 2010 NOS are:

1) Primary Business Function: The main thing the organization makes or does (usually captured by the enterprise's NAICS classification);
2) Research and Development of Products, Services, or Technology: Including designing, redesigning, or improving products or services, equipment, or procedures; and basic research and experimentation with new technology, systems, and processes;
3) Sales and Marketing: Including pre-sale interactions with existing or potential buyers, advertising, market research, account management, managing brands or products;
4) Transportation, Logistics, and Distribution: Including packing, storing, shipping or transporting in-process and finished products, and warehousing inventory;
5) Customer and After-Sales Service: Including call center services (excepting sales), maintaining and repairing products, technical support, customer service, and warranty support;
6) Management, Administration, and Back Office Functions: Including top management and centralized administrative support and procurement, human resources, accounting, legal, and finance;
7) Information Technology Systems: Including developing, maintaining, and repairing computer systems for internal use, writing software for internal use, and processing or managing data for internal use; and
8) Facilities Maintenance: Including maintenance and repair of owned or leased space or buildings, and janitorial and cleaning services.

Measurement of domestic and international sourcing

To help illustrate how the survey's data collection framework helps to describe the sourcing practices of an organization, consider a hypothetical example of a firm that primarily manufactures automotive parts. It may produce some of those parts (its "primary business function") in-house in one or more of its domestic factories and also manufacture other parts internationally ("offshore") in the factories of affiliated companies, have in-house expenditures devoted to research and development of new products, plus domestically source transportation services from a local domestic trucking company, and internationally source a portion of its software design and coding work (included in the IT services function) from an external supplier.

To efficiently collect domestic and international sourcing information for all of these possibilities, the 2010 NOS uses a four-part division of organizational and geographic sourcing options (see Figure 1): 1) domestic sourcing in internal operations (in-house sourcing); 2) domestic sourcing to external suppliers (domestic external sourcing); 3) international sourcing to affiliated companies; and 4) international sourcing to external suppliers (international external). International affiliates were considered as part of the parent enterprise when a domestic U.S. parent had a 10% or greater equity stake.

This approach, combined with the business function list above, provides a framework for capturing and quantifying these four possible sourcing practices for each of the eight business functions. For example, the hypothetical automotive parts manufacturer just discussed might incur 60% of its IT services from its in-house software development group, and 40% of IT services internationally from an external supplier. Because respondents were asked to indicate the distribution of costs across the four sourcing options for each function, the relative importance of each option was measured for each business function and not for the whole organization (organizations have costs that cannot be associated with sourcing, such as the cost of capital).

Figure 1. Four Sourcing Options for Business Functions

	Domestic Sourcing	International Sourcing (Offshoring)
Internal Sourcing	1) Domestic in-house sourcing Work performed within the enterprise or enterprise group within the U.S.	3) International (offshore) sourcing to affiliates Work performed within the enterprise or enterprise group outside the U.S. (a foreign operation in which a U.S. parent has 10% or greater equity stake)
External Sourcing (Outsourcing)	2) Domestic outsourcing Work performed outside the enterprise or enterprise group by non-affiliated enterprises within the U.S. (e.g., sourced from independent suppliers, service providers, vendors, contractors, etc.)	4) International (offshore) outsourcing Work performed outside the enterprise or enterprise group by non-affiliated enterprises outside the U.S. (e.g., sourced from independent suppliers, service providers, vendors, contractors, etc.)

Four sourcing options for any business function

To ensure a consistent understanding of what constitutes a cost, the survey provided respondents specific definitions of costs for different industries as follows:

1) Manufacturing: Costs represent the costs of goods sold (COGS), or the costs of materials, labor, and factory overhead;
2) Retail: Costs represent the COGS, described as what the organization pays to buy the goods that it sells to its customers;

3) Other Services: Costs represent the costs associated with persons or machines directly applying the service, a measure of costs typically referred to as the cost of sales by accountants; and,
4) Public Administration: Costs represent spending in the organization's operating budget.

Results

In our sample, 55.9% of full-time employees work at organizations that have some domestic outsourcing or international sourcing costs for one or more business functions. A separate examination of domestic and international sourcing reveals that 47.7% of full-time employees work at organizations that have some domestic outsourcing costs, while 23.2% work at organizations that source internationally, either from affiliates or external suppliers. About one third of full-time employees work at organizations that have some domestic outsourcing costs for facilities maintenance (34.1%), IT Services (33.9%), and transportation services (30.2%). The support business functions most likely to be sourced internationally are IT services and transportation services. On the other side of the spectrum lie the functions that are, in general, more likely to be sourced internally: management, administration and back office functions. Only 13.3% of employees work at organizations that outsource management, administration and back office functions domestically, and 3.9% of employees work at organizations that outsource them internationally.

While about a quarter of United States companies have some international sourcing, the expenditure figures are quite low. Only 3 percent of primary business function costs were outsourced within the U.S., and 4 percent were offshored, on average (see Table 1). Although the sample size is small, the evidence suggests that international sourcing costs are substantially higher for large goods-producing companies. Smaller organizations, which account for about 80 percent of employment, tend to be domestically oriented.

Table 1. Distribution of Sourcing Costs for U.S. Organizations by Business Function (full sample)

Business Function	Domestic In House	Domestic External	International Affiliate	International External	International Sourcing	N
Primary Business Function	93.3%	3.0%	2.9%	0.8%	3.7%	317
Research and Development	91.8%	3.4%	3.9%	0.9%	4.8%	190
Sales and Marketing	91.5%	4.2%	4.0%	0.3%	4.3%	222
Transportation Services	82.6%	12.6%	3.2%	1.7%	4.8%	210
Customer & After-sales Service	92.9%	2.3%	4.2%	0.6%	4.8%	220
Management, Admin, and Back-office	94.9%	1.8%	3.0%	0.4%	3.4%	292
Information Technology Systems	83.2%	12.4%	3.1%	1.4%	4.5%	253
Facilities Maintenance	81.6%	14.5%	3.4%	0.5%	3.9%	243

The international sourcing column indicates organizations that engage in internal (from affiliates), external (from external suppliers) international sourcing, or both.

Employment

About two thirds, or 67%, of internal domestic employment for the organization of the typical full-time worker is in the organization's primary business function (see Table 2). The next largest category is

management, at 9.6%. The remaining six business functions all account for less than 5% of employment and are distributed across the remaining support business function is roughly equal measure, ranging from a low of 3.1% of employment in R&D to a high of 4.7% in sales and marketing. These statistics provide the first evidence of the organizational structure of U.S. enterprises using a business function framework. The results are similar to what has been found in Western Europe, where a much larger set of surveys found 74% of employment, on average, to be in the primary business function, with the next highest management and administration, at 6.6%.

Large and smaller (defined as having fewer than 500 employees) organizations have generally similar distributions of employment across business functions, with a few exceptions. Specifically, large organizations tend to have a greater proportion of the workforce in R&D (3.5% compared to 2.6%), information technology services (4.1% compared to 1.7%) and facilities maintenance (4.1% compared to 2.4%); while smaller organizations tend to have a slightly greater proportion of the workforce in management and administration (10.5% compared to 9.0%). These differences could reflect a higher degree of specialization within large organizations, where respondents have an easier time associating individual workers with specific business functions. In small organizations, it could be more likely that workers are responsible for carrying out a range of tasks that contribute to several business functions.

The distribution of internal domestic employment by business function is also roughly similar across industry groupings. Notable differences include the comparatively higher proportion of R&D workforce in goods-producing organizations (5.6%), a lower proportion of sales and marketing personnel in public organizations (1.1%), and a higher share of transportation and customer service personnel in trade organizations (10.4%). While these differences tend to be modest, they could reflect real industry differences. For example, one might expect goods-producing organizations to have more personnel in R&D; trade organizations to have greater than normal employment in transportation, logistics, and distribution functions; and public, health, and educational institutions to have fewer employees in sales and marketing than organizations that are producing goods and services for profit.

Table 2. Distribution of Employment by Business Function at U.S. Organizations by Industry and Business function (full sample)

Industry	Primary Business Function	Research and Development	Sales and Marketing	Transportation, Logistics, & Dist. Services	Customer and After-sales Service	Management, Admin, and Back-office functions	Information Technology Systems	Facilities Maintenance	N
All	67.3%	3.1%	4.7%	4.2%	4.6%	9.6%	3.1%	3.4%	329
Goods-Producing	61.1%	5.6%	7.5%	5.6%	4.3%	9.7%	2.6%	3.7%	91
Trade	59.1%	3.0%	7.2%	10.4%	8.0%	7.2%	3.2%	2.0%	37
Other Services	66.5%	3.2%	5.8%	2.1%	6.1%	10.4%	3.6%	2.3%	93
Public/Health/Edu	74.8%	1.6%	1.1%	2.8%	2.1%	9.8%	3.0%	4.7%	108

Earnings Distribution

The 2010 NOS also uses the business function framework to collect the distribution of domestic wages across four ranges for annual wages: 1) the percentage of employees earning less than $40,000 annually; 2) the percentage of employees earning $40,000 to $60,000 annually; 3) the percentage of employees earning $60,000 to $90,000 annually; and 4) the percentage of employees earning more than $90,000 annually (see Figure 2). These four earning groups approximate the four quartiles of annual earnings for full-time domestic workers in the U.S. in 2010. The four categories add up to 100% in each business function for each organization where respondents provided wage data.

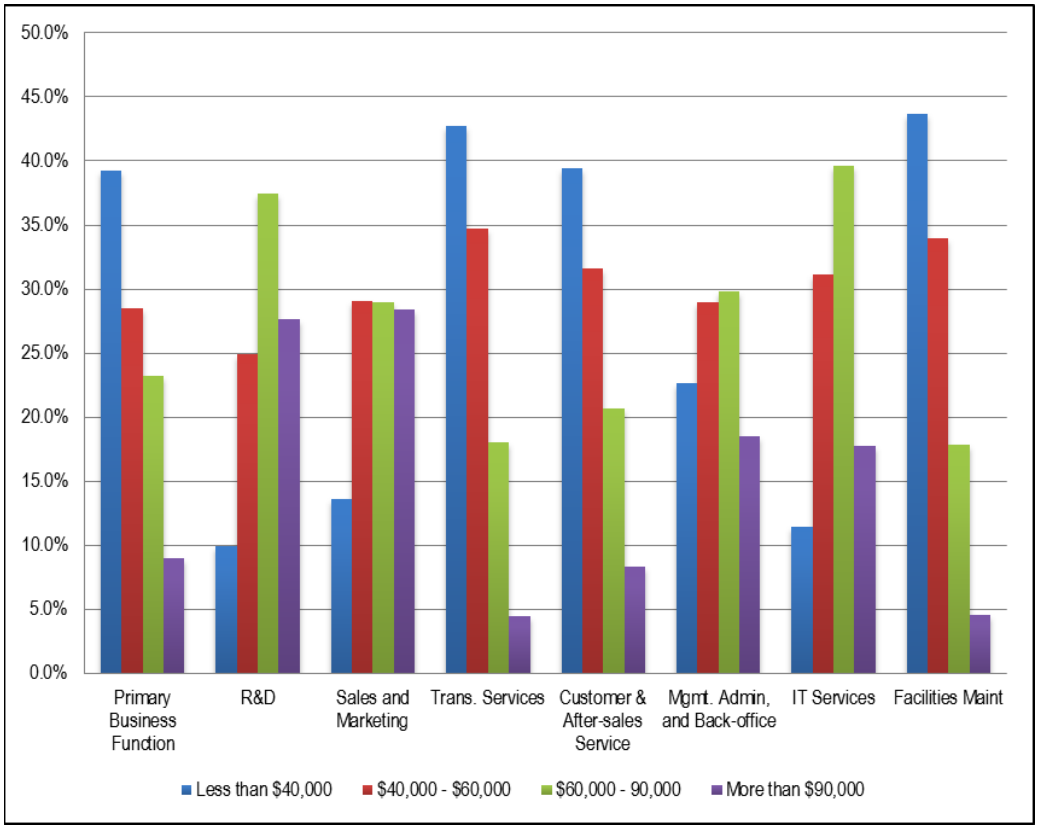
Organizations in our sample have, on average, 39% of employees making less than $40,000 annually, 29% of employees making $40,000 to $60,000 annually, 23% making $60,000 to $90,000 annually, and 9% making more than $90,000 annually. Not surprisingly, large organizations have a greater share of high-wage employment. For example, while the average small organization has 49.4% of employees making less than $40,000 and 5.6% of employees making more than $90,000, the average large organization has 28.8% of employees making less than $40,000 and 12.5% of employees making more than $90,000. This pattern holds across all business functions.

However, wages show clear variation across business functions. As Figure 2 shows, wages are skewed toward the low and low-middle ranges (less than $40,000 and $40,000-$60,000 per year) in the primary business function, transportation services, customer and after-sales service, and facilities maintenance. On the other side of the spectrum, wages are skewed toward the high-middle and high ranges ($60,000-$90,000 and more than $90,000 per year) in R&D and IT services.

Wages in the sales and marketing and management, administration, and back-office functions are more balanced across the four wage groupings, possibly because of the broad mix of occupations within them. For example, workers in the sales and marketing function might range from low paid call center workers to highly compensated workers in sales and marketing. Similarly, workers providing management, administration, and back-office functions might range from low paid clerical workers to highly paid top managers.

Some preliminary evidence that international sourcing is positively related to percentage of workers in high wage jobs, suggesting that offshoring activities are complementary to domestic activities and substitute for low wage jobs. However the sample sizes are insufficient to examine rigorously the relationships between offshoring and the domestic earnings and employment distribution.

Figure 2. Distribution of Wages for Organization of Full-time U.S. Domestic Employees, by Business function (full sample)



Summary

Our results provide some intriguing preliminary evidence about the scope, intensity, and character of outsourcing and offshoring by U.S. companies. The 2010 NOS suggests that the business function framework is well suited for the collection of economic data, and firms are able to respond to questions that ask about the structure of production within their organization.

Our most general, descriptive results show that almost one-half (48%) of full-time employees work at organizations that have some domestic outsourcing, and almost one-quarter (23%) work at organizations that source internationally. However, spending on international sourcing tends to modest in comparison with in-house costs. International sourcing is concentrated in large, goods-producing enterprises and is almost non-existent in organizations in the public/health/education grouping. It is spread across all functions, including R&D, and is mainly carried out through foreign affiliates. Domestic outsourcing is concentrated in transport, IT services, and facilities maintenance business functions, and spending is also quite modest.

Survey patterns suggest that offshoring activities are complementary to domestic activities and substitute for low wage jobs, and a rigorous analysis requires a larger sample collected periodically. This work has established that collecting data on a larger scale that would enable these questions to be answered.

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