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## **FEDERAL GOVERNMENT STRATEGIC SOURCING OF INFORMATION PRODUCTS AND SERVICES**

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## **PREFACE**

This report describes the current landscape of the federal marketplace regarding the acquisition of information goods and services, including electronic databases, books, and serials. It compiles comprehensive data from fiscal year (FY) 1979 through the fourth quarter (Q4) of FY 2014 on the amount federal agencies have spent on these products and services, as well as identifying major vendors. In addition, the report forecasts through FY 2017 the potential savings to the federal government if agencies purchase these products and services through a strategic-sourcing initiative. The report presents this data in the form of tables, graphs, and charts, accompanied by narrative explanation and analysis.

The current report includes some new analyses of the federal information market. Whereas previous iterations of this report focused on the dollar values of transactions, the new analyses cover another measure of market activity for information commodities: the number of transactions for information products and services.

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## KEY FINDINGS

- Federal spending on the 15 product service codes (PSCs) that can be reasonably considered to constitute the federal information market totaled \$12.1 billion from fiscal year (FY) 1979 through FY 2014, an average of \$337.1 million annually. These figures are adjusted for inflation. (This report expresses all figures in FY 2009 dollars.)
- In the most recent complete fiscal year—FY 2014—federal spending on information commodities was \$548.7 million, one of the highest annual totals in the 36-year period from FY 1979 through FY 2014.
- In the last five complete fiscal years—FY 2010 through FY 2014—total federal spending on information products and services was \$2.8 billion, constituting 23 percent of all spending on these commodities from FY 1979 through FY 2014.
- Average annual spending in the last five complete fiscal years, FY 2010 through FY 2014, was \$563.1 million, far exceeding average annual spending for the longer period from FY 1979 through FY 2014.
- Average quarterly spending in the most recent five fiscal years—FY 2010 through FY 2014—was \$140.8 million, slightly more than double the quarterly average of \$84.3 million for the overall 36-year period from FY 1979 through FY 2014.
- The number of the federal government’s transactions involving information products and services has increased over time. From FY 1979 through FY 2014, federal agencies processed nearly 200,000 transactions for information products and services, nearly 5,500 transactions annually. However, in the last five years of that period—FY 2010 through FY 2014—the average number of annual transactions was 13,681.
- While annual spending and transactions for information products and services have increased, the average dollar amount per transaction has declined. From FY 1979 through FY 2014, the average amount per transaction—total spending for a year divided by the total number of transactions for that year—declined from \$174.1 thousand to \$48.9 thousand.
- From FY 1979 through FY 2014, six of the 15 information products and services accounted for 93 percent of federal spending on information commodities: books and pamphlets (22.3 percent of total spending); Web-based subscriptions (20.5 percent); administrative support for federal libraries (15.7 percent) and for information retrieval (11.6 percent); newspapers and periodicals (11.9 percent); and maps, atlases, charts, and globes (11.3 percent).
- In the most recent five-year period from FY 2010 to FY 2014, federal agencies have sharply reduced spending on maps, atlases, charts, and globes. Consequently, the five remaining products and services listed above composed 94.3 percent of the federal information market.
- In the time span from FY 1979 through FY 2014, five agencies accounted for 68.6 percent of total federal spending on information commodities: Department of Defense (42.9 percent of total spending), Department of Health and Human Services (9.8 percent), Department of

Commerce (5.8 percent), Department of Justice (5.5 percent), and Department of the Treasury (5 percent).

- In the more recent period from FY 2010 through FY 2014, seven federal agencies accounted for the majority of federal spending on information products and services: Department of Defense (23.0 percent of total federal spending), Department of Health and Human Services (13.3 percent), Department of Commerce (9.4 percent), Department of Justice (7.5 percent), Department of the Treasury (6.7 percent), Department of Veterans Affairs (6.7 percent), and Department of Homeland Security (6.0 percent). Collectively, these agencies' expenditure for information commodities constituted 72.6 percent of the total federal market for those products and services.
- Within the last five fiscal years—from FY 2010 through FY 2014—26 vendors received 50 percent of all federal spending on information products and services, and five of those vendors received nearly 25 percent of all such spending: Reed Elsevier (\$233.6 million; 8.3 percent of all federal spending on information products and services); West Publishing Corporation (\$221.8 million; 7.9 percent); Primus Solutions (\$138.0 million; 4.9 percent); EBSCO (\$83.9 million; 3.0 percent); and Swets and Zeitlinger (\$68.5 million, 2.4 percent).
- Federal spending on information commodities is forecast to be \$645.9 million in FY 2015 and \$674.5 million by FY 2017. Moreover, there is a 95-percent probability that spending for FY 2015 will be between \$325.8 million and \$966.1 million, and the same probability that FY 2017 spending will be between \$343.4 million and \$1.0 billion.
- The federal government could have saved approximately \$600 million to \$2.4 billion—5 percent and 20 percent savings, respectively—if it had already had in place a strategic-sourcing initiative for information commodities during the period from FY 1979 through FY 2014. At the 20-percent discount, the federal government's savings of \$2.4 billion over 36 years would have exceeded the amount it actually spent on information products and services over the last four completed fiscal years (\$2.3 billion spent during the period from FY 2011 through FY 2014).
- If federal agencies purchased information products and services through a strategic-sourcing process—such as the existing Federal Strategic Sourcing Initiative—the federal government could save between \$100 million and \$280 million on those commodities from FY 2015 through FY 2017, depending on the amount of federal spending channeled through strategic-sourcing procurement and the discount rates applied to that spending.



## INTRODUCTION

This report analyzes the U.S. federal government’s spending on information products and services from FY 1979 through the fourth quarter (Q4) of FY 2014, as well as estimating the cost savings that the federal government could realize from FY 2015 through FY 2017 if it were to procure information goods and services through a strategic-sourcing process. Among the topics analyzed are the products and services that compose the information market, the federal agencies that have been major purchasers of those products and services, and the contractors that have provided them. Throughout this report, data tables and graphs detail and illustrate the findings. Among the data and graphs contained in this paper are the dataset, diagnostic graphs, and various statistics used to create and assess forecasts of federal spending on information commodities. All of these are in the appendix.

Briefly summarized, the research finds that, from FY 1979 through FY 2014 (all the complete fiscal years during the period covered in this study), federal government agencies spent an estimated \$12.1 billion—\$337.1 million annually—on print publications, electronic databases, information retrieval, and other commodities, a set of products and services collectively referred to as “information commodities” or the “information market.” Furthermore, the annual amounts that federal agencies have collectively spent on information commodities have tended to increase over time, particularly since FY 2007. Total federal spending on information products and services increased from \$464.3 million in FY 2007 to \$607.7 million in FY 2013 and \$548.7 million in FY 2014. The spending figure for FY 2014 is expected to increase as federal agencies continue to provide spending data for the fourth quarter of FY 2014 (See the section “Defining the Federal Information Market,” below, for more information.)

However, the average dollar amounts for federal agencies’ transactions for information commodities have demonstrated a different trend. This report refers to new contracts and contract modifications for information products and services as “transactions.” Between FY 1979 and FY 2003, the average dollar amount for such transactions fluctuated substantially, ranging from a low of \$76.1 thousand (FY 1982) to a high of \$203.0 thousand (FY 1994). From FY 2004 through FY 2014, average amounts per transaction have declined overall, dropping from \$174.7 thousand in FY 2003 to \$23.4 thousand in FY 2007 and increasing to \$49.0 thousand in FY 2014. This trend reflects an overall increase in the annual number of transactions that federal agencies have conducted to procure information products and services. Moreover, evidence

suggests that the growth in the number of transactions is the result of changes in federal procurement policies and technologies. These changes have reduced the amount of time that agencies spend executing procurement transactions, as well as reducing the costs of these transactions.

Finally, data indicate that, if federal agencies were to procure information products and services through the federal government's existing strategic-sourcing program, the Federal Strategic Sourcing Initiative (FSSI), the federal government could realize savings in the range of approximately \$25 million to \$400 million for the three years from FY 2015 through FY 2017, depending on the amount the government spends on procurement through strategic-sourcing methods. In addition to these direct savings on purchases, the government could realize indirect savings on labor and other costs associated with procurement.

## **METHODOLOGY**

The researcher gathered data for this report from Federal Procurement Data System-Next Generation (FPDS-NG), an online database that the U.S. General Services Administration (GSA) Federal Procurement Data Center operates to disclose information on federal procurement contracts to the public. Information derived from database records includes the name of the funding agency, the award amount, and the award recipient. The FPDS-NG, operational since October 2003, replaced the previous system, the Federal Procurement Data System, which the federal government had placed in operation in 1978. The U.S. Office of Management and Budget (OMB) maintains a similar Web site called USAspending.gov, which also provides data on procurement contracts and on grants and loans. While some previous iterations of this report used data from USAspending.gov, the current report is based on data from the FPDS-NG. The FPDS-NG provides data covering a longer period (FY 1979 to present) than does USAspending.gov (FY 2000 and later), and, therefore, allows for better analyses of trends in federal spending.<sup>1</sup>

The first step in the research process was to determine which categories of goods and services might reasonably be considered to constitute the "information market." To make this

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<sup>1</sup> U.S. Government Accountability Office (GAO), "Improvements Needed to the Federal Procurement Data System-Next Generation" (report no. GAO-05-960R, Washington, DC, September 27, 2005), <http://www.gao.gov/assets/100/93613.pdf> (accessed August 6, 2012); USAspending.gov, "Learn About USAspending.gov," <http://usaspending.gov/learn?tab=FAQ> (accessed April 15, 2012).

determination, the researcher studied the product service codes (PSCs) that federal procurement contracts use to classify contracted products and services and identified 15 PSCs that designate information commodities (listed in Table 1, below). The researcher then used the FDPS-NG Web site's Adhoc Reports feature to acquire data on the 15 PSCs for the period from the first quarter (Q1) of FY 1979 through the third quarter (Q4) of FY 2014—October 1, 1978, through September 30, 2014.<sup>2</sup> Focusing on the federal agencies that awarded contracts for these 15 PSCs, and on the contractors awarded those contracts, the researcher downloaded nearly 198,000 records in comma-separated-value (CSV) format. The researcher used Microsoft Excel, the statistical program R, and the R program package MASS to analyze the data and create the graphs in this report.<sup>3</sup> The data are accurate as of the date of download, October 6, 2014. Future iterations of this report will incorporate spending data after FY 2014 Q4.

This report expresses all dollar figures in constant FY 2009 dollars, using OMB's deflators for defense and nondefense outlays. Using OMB conversion figures and expressing all figures in FY 2009 dollars has enabled the author of this report to adjust all figures for inflation.<sup>4</sup>

The data used in this analysis have some potential limitations. Various observers, including federal government agencies, have raised concerns about the accuracy and completeness of data in federal procurement databases such as the FPDS and USAspending.gov. Over time, GSA, OMB, and other federal agencies have made an effort to address those concerns, leading to more accurate and complete data, particularly for FY 2004 and later. One such effort was the creation of the FPDS-NG system as a successor to FPDS.<sup>5</sup> Given potential

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<sup>2</sup> To locate the relevant data in the FPDS-NG, the researcher used the "Adhoc Reports" feature of FPDS-NG's ezSearch. The first iteration of this study used 16 PSCs in its analysis, but the second iteration incorporated only 15 PSCs. One of the PSCs in the first study of the federal information market—miscellaneous printed matter (PSC 7690)—was dropped from the second analysis because it included substantial spending on products and services that the researcher later determined were not information products and services. See William Noël Ivey, "Federal Government Strategic Sourcing of Information Products and Services" (report, Federal Research Division, Library of Congress, Washington, DC, December 2011), 4, [http://www.loc.gov/flicc/publications/FRD/Strategic-Sourcing-Version-2\\_2011-Dec-5-Corrected.pdf](http://www.loc.gov/flicc/publications/FRD/Strategic-Sourcing-Version-2_2011-Dec-5-Corrected.pdf) (accessed April 15, 2012).

<sup>3</sup> R Core Team, "R: A Language and Environment for Statistical Computing" (Vienna, Austria: R Foundation for Statistical Computing, 2013), <http://www.R-project.org/> (version 3.0.2 downloaded October 3, 2013); William N. Venables and Brian D. Ripley, *Modern Applied Statistics with S* (New York: Springer, 2002).

<sup>4</sup> U.S. Office of Management and Budget, "Table 10.1—Gross Domestic Product and Deflators Used in the Historical Tables: 1940–2019," in *Fiscal Year 2015 Historical Tables, Budget of the U.S. Government* (Washington, DC: U.S. Government Printing Office, 2014), 217–18, <http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/hist.pdf> (accessed October 6, 2014).

<sup>5</sup> Michael Hardy, "Fixing the Next Generation Procurement Data System," *Federal Computer Week* 19, no. 40 (November 21, 2005): 65–66, [http://www.proquest.com/en-US/\(DOI 218835006](http://www.proquest.com/en-US/(DOI%20218835006)); accessed April 15, 2012 via ProQuest); U.S. Government Accountability Office (GAO), "Improvements Needed to the Federal Procurement Data System-Next Generation."

limitations of the federal procurement data available at the time the research for this analysis was completed (December 2014), the researcher presents these findings with the following caveats: the data relied on for this report may contain inaccuracies, and the comparability of data across years is limited to an unknown extent.

## **OVERVIEW OF THE FEDERAL STRATEGIC-SOURCING INITIATIVE**

In May 2005, OMB and the Office of Federal Procurement Policy issued a memorandum requiring federal agencies to identify commodities that the government could efficiently purchase through strategic sourcing. The document defined strategic sourcing as “the collaborative and structured process of critically analyzing an organization's spending and using this information to make business decisions about acquiring commodities and services more effectively and efficiently.”<sup>6</sup> Soon after, in November 2005, GSA and the Department of the Treasury launched the Federal Strategic Sourcing Initiative (FSSI). As of October 2014, GSA has established individual FSSIs for computer software and services (“SmartBUY”), domestic delivery services, hardware supplies, janitorial and sanitation supplies, printing products and services, and wireless services. GSA plans several additional FSSIs, including for furniture, human resources services, and office supplies, and. In addition, the Library of Congress administers an FSSI for information products and services, the commodity group that is the subject of this analysis.<sup>7</sup> According to GSA, federal government agencies using the existing FSSIs collectively saved \$24.9 million on domestic-delivery services, \$20.1 million on office supplies, \$2.2 on print management, \$7.3 million on telecommunications-expense management services, and \$300,000 on wireless services in FY 2014 through Q2 (January 1, 2014, through

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<sup>6</sup> U.S. Office of Management and Budget, “Implementing Strategic Sourcing” (memorandum, Washington, DC, May 20, 2005), <http://www.uspto.gov/web/offices/ac/comp/proc/OMBmemo.pdf> (accessed July 15, 2011). A very similar definition of strategic sourcing was included in legislation introduced in both the House of Representatives and the Senate on July 16, 2013. The House and Senate bills—both formally called the Buy Smarter and Save Act of 2013—defined strategic sourcing as “a structured and collaborative process of critically analyzing an organization's spending patterns to better leverage its purchasing power, reduce costs, and improve overall value and performance.” See Buy Smarter and Save Act of 2013, H.R. 2649 and S. 1304, 113<sup>th</sup> Cong., (2013), <http://beta.congress.gov/bill/113th/house-bill/2694/text> and <http://beta.congress.gov/bill/113th/senate-bill/1304/text> (accessed September 17, 2013).

<sup>7</sup> U.S. General Services Administration, “Current Solutions,” <https://strategicsourcing.gov/strategic-sourcing-solutions> (accessed October 27, 2014); U.S. General Services Administration, “Future Solutions,” <https://strategicsourcing.gov/future-solutions> (accessed October 27, 2014); Library of Congress, “FEDLINK’s Strategic Sourcing Initiative,” [http://www.loc.gov/flicc/strategicsourcing/index\\_strategic.html](http://www.loc.gov/flicc/strategicsourcing/index_strategic.html) (accessed October 27, 2014).

March 31, 2014). The joint savings that federal agencies realized through participating in these FSSIs ranged from 20 percent to 47.3 percent (on telecommunications-expense management services and wireless services, respectively).<sup>8</sup> In other words, federal agencies that used existing FSSIs to procure products and services realized savings ranging from approximately 20 to nearly 50 percent on those commodities. Studies of strategic sourcing by private-sector entities and by public-sector agencies outside of the United States have found that entities in foreign countries achieved slightly lower rates of savings than did U.S. agencies, ranging from 8 percent to 20 percent of procurement costs.<sup>9</sup>

A further development regarding federal strategic sourcing occurred in July 2013, with the introduction of legislation in the House and Senate that would promote federal agencies' use of strategic sourcing in their procurement activities. The proposed legislation—the Buy Smarter and Save Act of 2013—would require the comptroller general, OMB, the president of the United States, and certain federal agencies to conduct specified actions to support implementation of strategic sourcing as a procurement method. As of December 2014, both House and Senate had referred their versions of the bill to committee, with no further action taken.<sup>10</sup>

## **DEFINING THE FEDERAL INFORMATION MARKET**

The U.S. federal government does not formally define the term “information market” in its publications. Moreover, researchers in academic and industrial sectors who report on publishing and other aspects of the information industry do not cite a common definition of the term. To define the term “information market,” operationally for the purpose of this study, the researcher constructed a taxonomy of products and services, based on the PSC classification system that federal agencies use to specify goods and services purchased under government procurement contracts.<sup>11</sup>

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<sup>8</sup> U.S. General Services Administration, “Overview of Metrics Data,” <https://strategicsourcing.gov/> (accessed December 1, 2014).

<sup>9</sup> Cathy Hayward, “Reforming the Old Bill,” *Supply Management*, January 4, 2011, 21–23, <http://www.proquest.com/en-US/> (DOI 222195677; accessed April 15, 2012 via ProQuest); Carlos Niezen, Wulf Weller, and Heidi Deringer, “Strategic Supply Management,” *MIT Sloan Management Review* 48, no. 2 (Winter 2007): 7, <http://www.proquest.com/en-US/> (DOI 2224964805; accessed April 15, 2012 via ProQuest).

<sup>10</sup> Buy Smarter and Save Act of 2013, H.R. 2649 and S. 1304, 113<sup>th</sup> Cong., (2013), <http://beta.congress.gov/bill/113th/house-bill/2694> and <http://beta.congress.gov/bill/113th/senate-bill/1304> (accessed April 4, 2014).

<sup>11</sup> U.S. General Services Administration, “Frequently Asked Questions About FPDS-NG,” [http://www.acquisition.gov/faqs\\_whataboutfpds.asp](http://www.acquisition.gov/faqs_whataboutfpds.asp) (accessed July 28, 2011).

Federal government agencies also use another classification system for procurement, the North American Industry Classification System (NAICS), which outlines categories of industries and commercial activities that provide products and services. However, this report relies on PSC data, rather than NAICS categories, because NAICS classifications specify the industries that produce and distribute goods and services, whereas PSC designations identify the procured products and services.<sup>12</sup> Moreover, federal contract data on PSC classifications are more readily available than are contract data organized by NAICS categories, since the data records for procurement contracts, available through the FPDS-NG and USAspending.gov, almost invariably list PSC class but often do not include NAICS category.

According to the PSC classifications, 15 categories of products and services are identifiable components of the federal information market. These products and services, listed in Table 1, below, include a range of commodities, including books, electronic databases, and library services. For formal definitions of these PSCs, see Table 11 in Appendix 2.

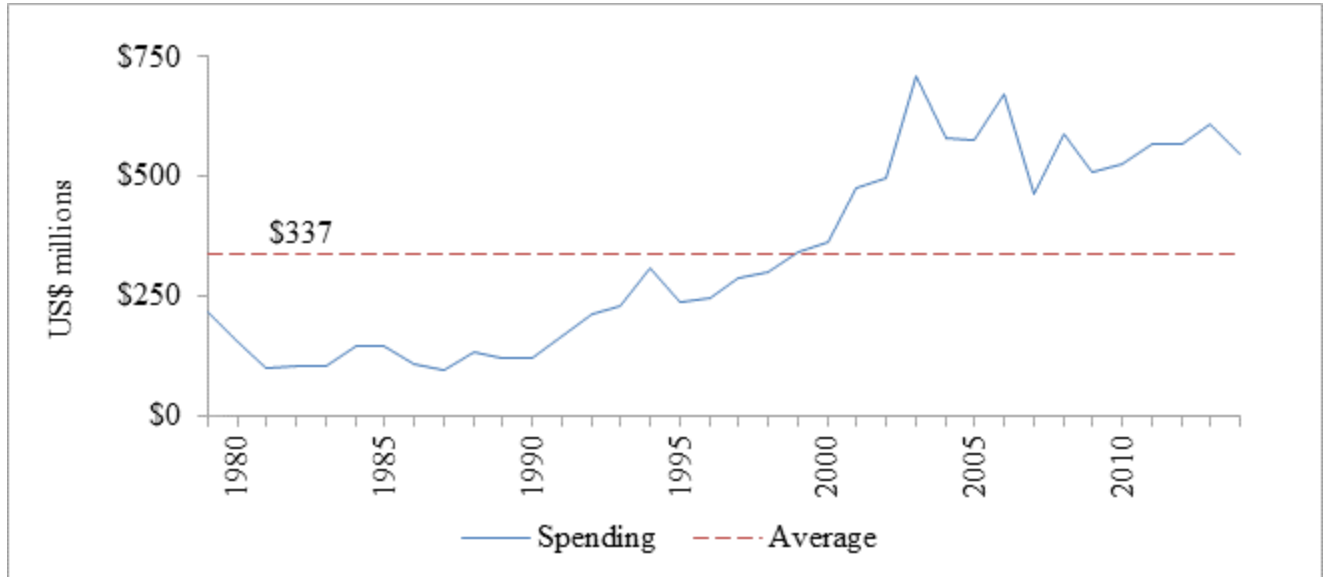
Spending data from FPDS-NG indicate that federal government agencies spent around \$12.1 billion on information products and services in the 36 years from FY 1979 through FY 2014 (as noted above, these and all other spending figures are in constant FY 2009 dollars). In addition, federal agencies spent nearly one-fourth of those funds (\$2.8 billion; see Table 1, below) during the last five complete fiscal years of that period, from FY 2010 through FY 2014. Average spending was \$337.1 million annually from FY 1979 through FY 2014, and even higher in the last five years of that period—FY 2010 through FY 2014—at nearly \$563.1 million annually. Consequently, available evidence strongly indicates increasing federal government spending on information products and services (see Table 1 and Figure 1, below).

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<sup>12</sup> U.S. Census Bureau, *2007 NAICS Definitions* (Washington, DC, 2007), page 376 of downloadable pdf, <http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2007> (accessed July 19, 2011).

**Table 1. Federal Information Market, Products and Services, FY 1979–FY 2014**

<b>Products and Services (Product Service Code)</b>	<b>Contracts (in \$ millions) FY 1979– FY 2014</b>	<b>Percentage of Total Contracts</b>	<b>Contracts (in \$ millions) FY 2010– FY 2014</b>	<b>Percentage of Total Contracts</b>
Books and pamphlets (7610)	\$2,700.5	22.3%	\$599.6	21.3%
Web-based subscriptions (D317)	\$2,492.4	20.5%	\$671.8	23.9%
Administrative support, library (R605)	\$1,901.1	15.7%	\$443.1	15.7%
Newspapers and periodicals (7630)	\$1,438.9	11.9%	\$398.7	14.2%
Administrative support, information retrieval (R612)	\$1,408.3	11.6%	\$541.5	19.2%
Maps, atlases, charts, and globes (7640)	\$1,371.8	11.3%	\$9.5	0.3%
Drawings and specifications (7650)	\$301.5	2.5%	\$52.8	1.9%
Microfilm, processed (7670)	\$290.5	2.4%	\$1.0	0.0%
Digital maps, charts, and geodetic products (7644)	\$114.0	0.9%	\$33.3	1.2%
Technical representative-books, maps, and other publications (L076)	\$88.2	0.7%	\$51.5	1.8%
Aeronautic maps, charts, and geodetic products (7641)	\$12.6	0.1%	\$8.7	0.3%
Sheet and book music (7660)	\$8.4	0.1%	\$0.6	0.0%
Topographic maps, charts, and geodetic products (7643)	\$4.6	0.0%	\$2.6	0.1%
Hydrographic maps, charts, and geodetic products (7642)	\$2.3	0.0%	\$0.8	0.0%
<b>Total</b>	<b>\$12,135.3</b>	<b>100.0%</b>	<b>\$2,815.4</b>	<b>100.0%</b>



**Figure 1. Federal Spending on Information Products and Services, FY 1979–FY 2014**

However, the aforementioned spending figures are only an estimation of actual federal spending on information commodities. The author of this report has based these calculations on the PSC codes entered in the FPDS-NG, and the extent to which the code designations reliably correlate with the information products and services that federal agencies actually procured is likely impossible to determine. Federal agency personnel enter the data on spending, the corresponding PSCs, and other procurement data in FPDS-NG. However, the nearly 200,000 transactions they designated with one of the 15 PSCs for information commodities may include commodities that are not actually information products or services. For example, the 2,587 transactions for PSC 7610 (“Books and Pamphlets”) in FY 2014 include transactions for commodities described as “Advertisement on recruiting web site” (\$3,470.48 in current FY 2014 dollars), “Baggage tags” (\$5,791.78) and “Color printers” (\$12,681.70).

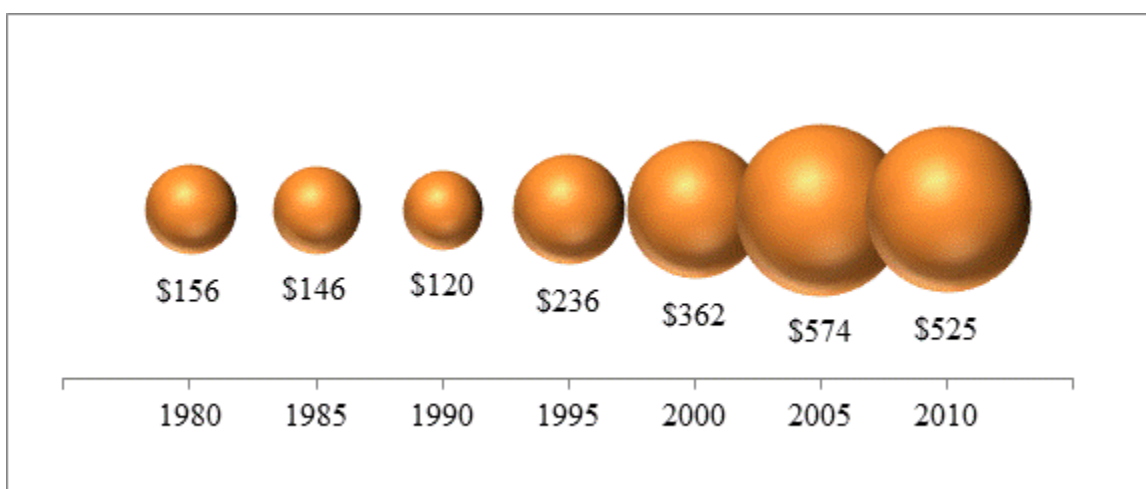
On the other hand, evidence indicates that these spending figures actually undercount the value of the information market, excluding the value of contracts for commodities that are not designated with a PSC for information products and services but that actually should be designated information commodities. For example, the \$12.1 billion in federal spending on information products and services from FY 1979 through FY 2014 does not include several federal contracts with Reed Elsevier and West Publishing for the LexisNexis and Westlaw electronic databases, because these contracts listed PSCs such as 7030 “ADP [automatic data processing] software,” R499 “Other professional services,” and T003 “Cataloging services.”



Similarly, several contracts for eBooks, with vendors such as Mackin Book Company, Netlibrary, and Rittenhouse Book Distributors, have PSC designations such as 6730 “Photographic projection equipment,” R419 “Educational services,” and U009 “Education services,” and are therefore excluded from the spending figures in this report, which uses only the 15 PSCs for information commodities.

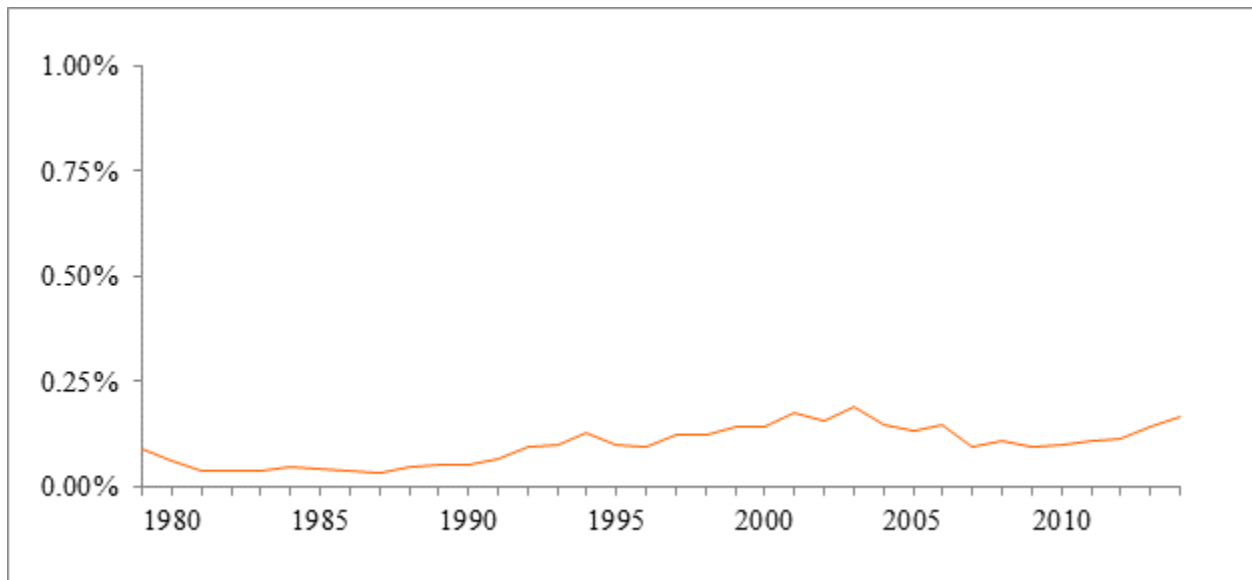
Another finding is that federal government spending on information products and services has fluctuated but has grown overall. From FY 1979 through FY 2014—the entire period for which the FPDS-NG provides federal spending data—spending on information commodities increased from \$217.4 million in FY 1979 to \$362.4 million in FY 2000, to \$524.7 million in FY 2010, and to \$548.7 million by FY 2014. However, the spending figures for FY 2014 and other recent fiscal years may change as federal agencies continue to input and update spending data for those years into FPDS-NG.

Expressing federal spending on information products and services for each year as ratios, rather than as dollar figures, clarifies that spending on information products and services grew overall from FY 1979 through FY 2014. The spheres in Figure 2, below, which graphically represent this spending, illustrate the growth in federal spending on information commodities since FY 1980. As federal procurement of information commodities continued to expand, spending ratios increased as well. Spending in FY 2000 was more than two times greater than in FY 1980, and spending in FY 2010 was more than three times greater than in FY 1980.

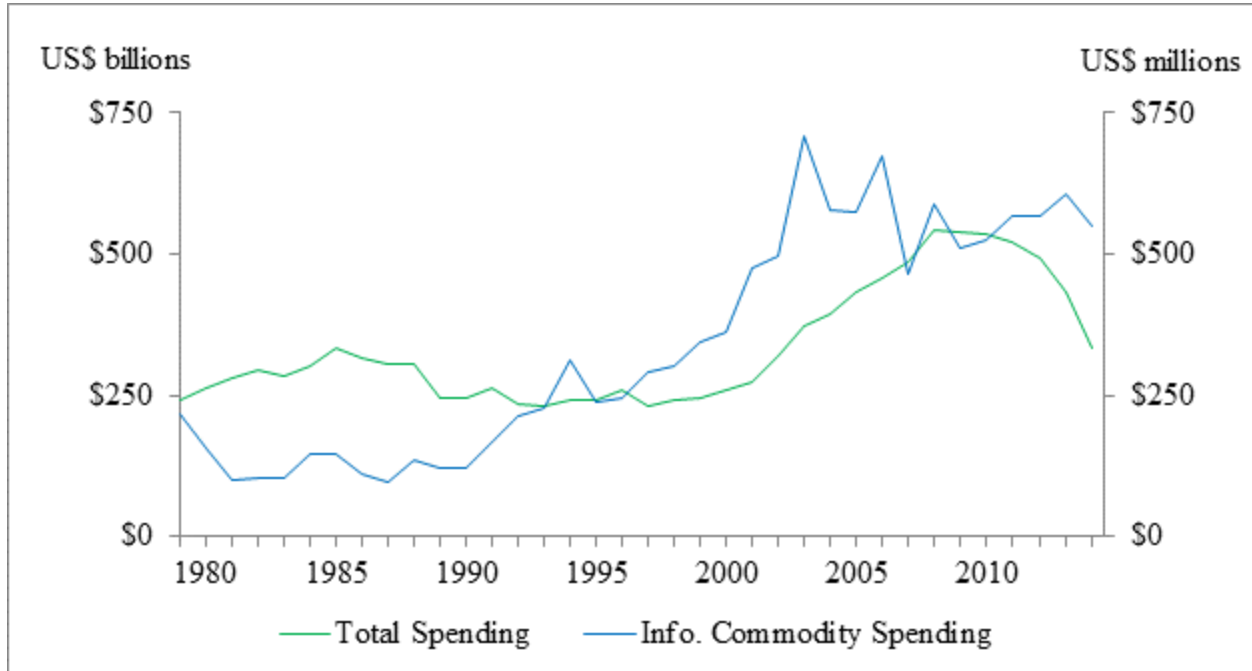


**Figure 2. Growth of Federal Spending on Information Products and Services, FY 1980–FY 2010**

One interesting research finding is that the increase of federal spending on information commodities is against the trend of federal spending overall, which demonstrates an apparent stagnation and decline. According to data from FPDS-NG, federal spending on *all* products and services from FY 1979 through FY 2014 was \$12.0 trillion, indicating that the \$12.1 billion in federal spending on information products and services was a small portion—0.10 percent, or one-tenth of 1 percent—of total federal spending during FY 1979 through FY 2014. Indeed, annual federal spending on information products remained below 0.20 percent of total federal spending from FY 1979 through FY 2014 (see Figure 3, below). However, in the last five fiscal years (FY 2010 through FY 2014) spending on information products and services has increased overall while total federal spending has declined (see Figure 4, below; please note the different dollar scales for total federal spending and federal spending on information products and services.)

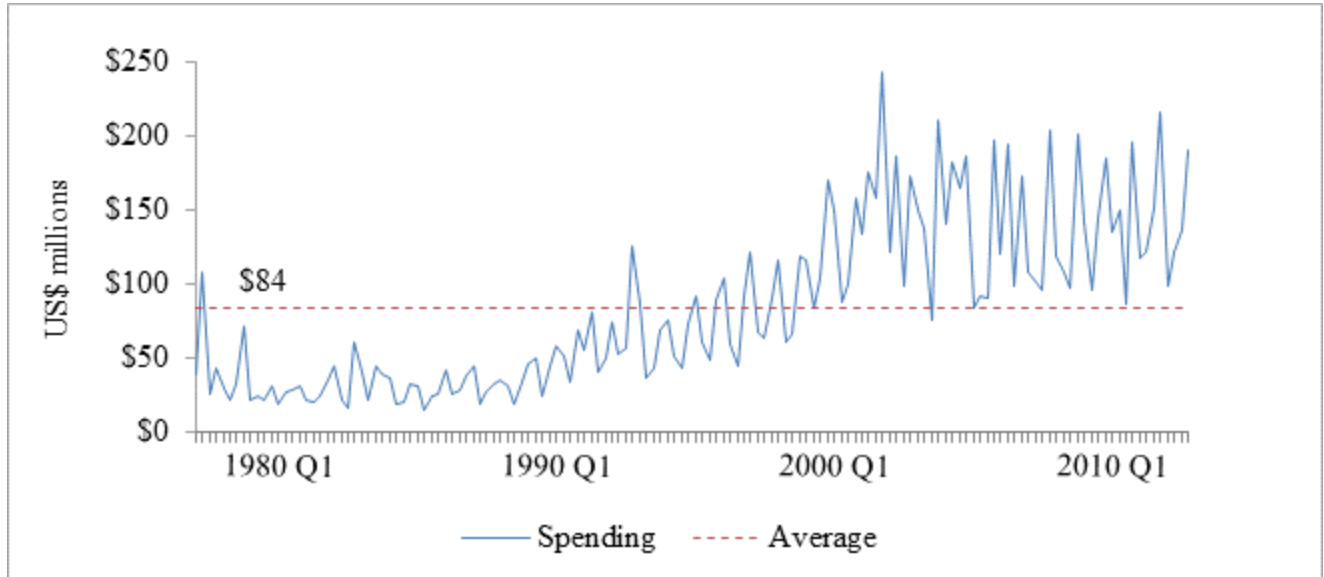


**Figure 3. Federal Spending on Information Products and Services as a Percent of Total Federal Spending, FY 1979–FY 2014**



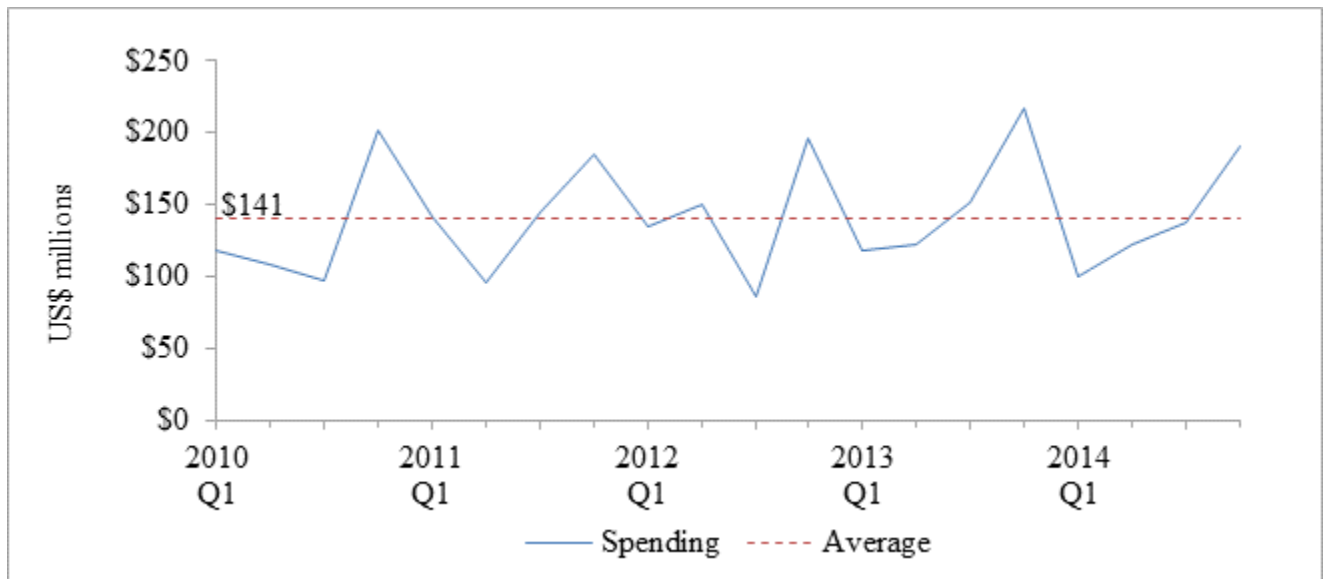
**Figure 4. Total Federal Spending and Federal Spending on Information Commodities, FY 1979–FY 2014**

While federal spending on information commodities generally increased from FY 1979 through FY 2014, spending also fluctuated substantially within that period. Federal spending on information commodities consistently increased and declined from one quarter to the next, and the dollar amounts of these quarterly variations have grown over time. Figure 5, below, depicts these variations, showing federal spending on information products and services for all fiscal quarters from FY 1979 Q1 through FY 2014 Q4. Figure 5 illustrates that spending on information commodities has trended upward but has proven quite variable from quarter to quarter, and that average spending by quarter was \$84.3 million for the period.



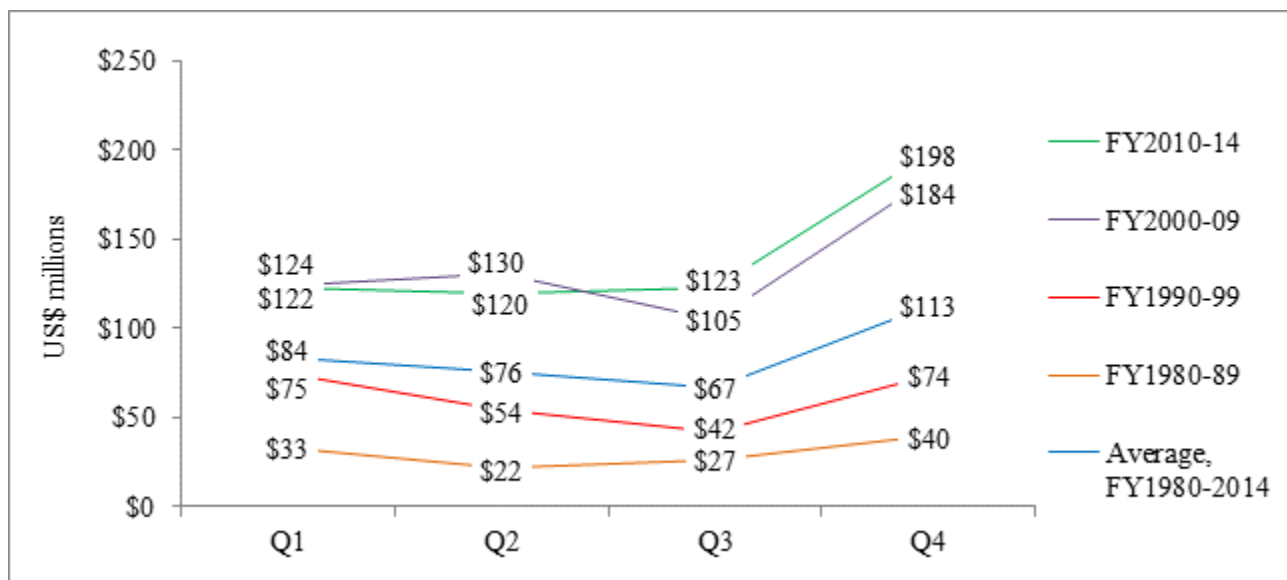
**Figure 5. Federal Spending on Information Products and Services by Quarter, FY 1979 Q1–FY 2014 Q4**

Although spending varied substantially within the most recent five years, FY 2010 through FY 2014, it remained at a higher level than during the 36 years from FY 1979 through FY 2014. In that recent five-year period, spending generally ranged from \$100 million to \$200 million per quarter and varied by as much as \$100 million between quarters. In addition, average quarterly spending was \$140.8 million, higher than the quarterly average of \$84.3 million for the longer period from FY 1979 through FY 2014 (see Figure 6, below).



**Figure 6. Value of the Federal Information Market by Quarter, FY 2010 Q1–FY 2014 Q4**

The comparison of average spending for the four quarters of each fiscal year also reveals substantial variations in spending within each fiscal year. These variations appear in all fiscal quarters of the 1980s through the 2010s (the first complete decade of this study through the current decade).<sup>13</sup> In the 35 years between FY 1980 and FY 2014, the federal government’s average spending on information products and services was highest in Q4 (\$113 million) and lowest in Q3 (\$67 million). Average quarterly spending for Q1 and Q2 fell between those two extremes, at \$84 million in Q1 and \$76 million in Q2 (see Figure 7, below).



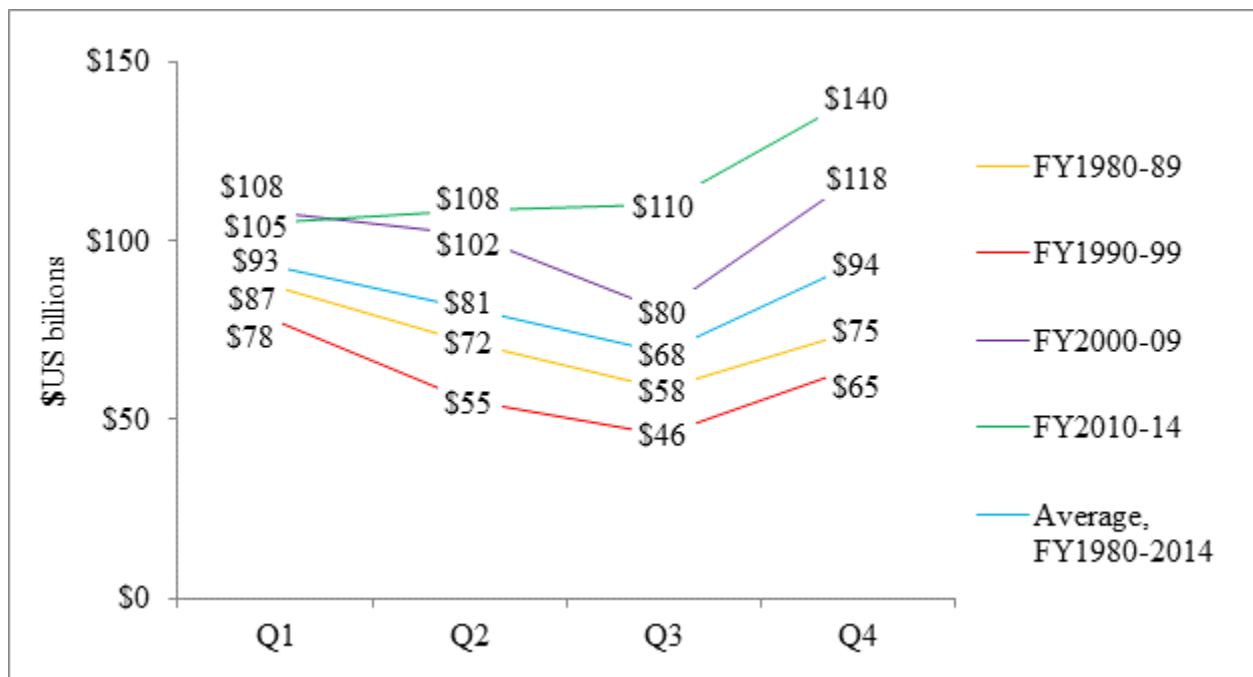
**Figure 7. Federal Information Market, Average Quarterly Spending, FY 1980–FY 2014**

However, when quarterly spending from FY 1980 through FY 2014 is disaggregated by decade, the aforementioned pattern in quarterly spending does not hold. During the first complete decade of the study (FY 1980 through FY 1989), average first-quarter spending on information products (\$33 million) was somewhat lower than average fourth-quarter spending (\$40 million). In the following decade (FY 1990 through FY 1999), average first-quarter spending (\$75 million) was at near parity with average fourth-quarter spending (\$74 million).

<sup>13</sup> FPDS-NG provides spending data for only a single year in the 1970s—FY 1979. Quarterly spending on information products for FY 1979 was \$39.9 million in Q1, \$108.8 million in Q2, \$25.3 million in Q3, and \$43.4 million in Q4, totaling \$217.4 million for the year. However, quarterly spending for FY 1979 is not included in this comparison, because the focus in this analysis is the decade-by-decade changes in average quarterly spending, and a single year is insufficient to represent a decade. Furthermore, this comparison by decade also includes only five years—FY 2010 through FY 2014—from the decade FY 2010 to FY 2019. Although five years are of limited use in representing a decade for the purpose of comparative analysis, the researcher has included these years because they provide recent data that may be of interest to readers.

However, the pattern in quarterly spending changed in the subsequent decade (FY 2000 through FY 2009), when average first-quarter spending (\$122 million) was well below average fourth-quarter spending (\$184 million). This pattern has thus far continued into the five complete years of the fourth and current 10-year period (FY 2010 through FY 2014). In sum, federal spending on information products has grown substantially over time, as well as exhibiting increasing variability between fiscal years and within fiscal years.

The quarterly spending patterns for information products and services are somewhat different than patterns for federal spending on all products and services. Historically, federal spending has been higher in Q1 than in Q4; only in the first five years of the current decade (FY 2010–FY 2014) has fourth-quarter spending been higher than first-quarter spending (see Figure 8, below).



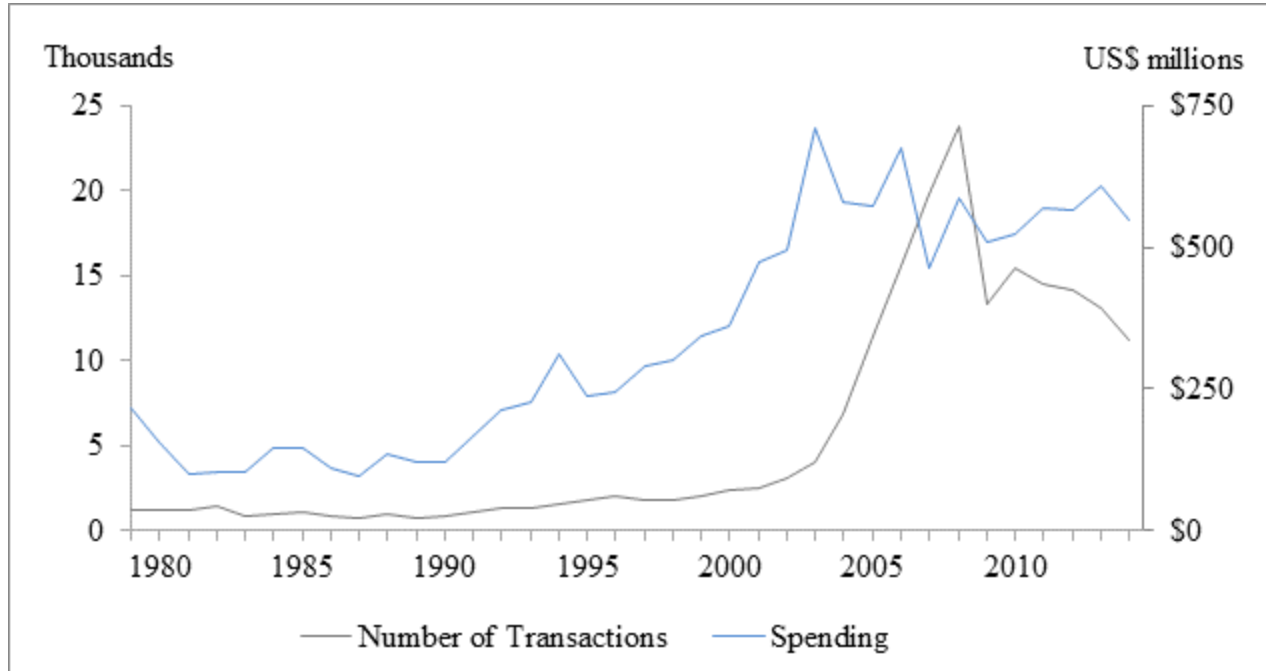
**Figure 8. Average Federal Government Quarterly Spending on All Products and Services, FY 1980–FY 2014**

Data on spending help to illustrate the federal government’s acquisition of information products and services, but data for another element of procurement reveal additional information about the cost and pace of procurement outlays, contributing to an even richer portrait of federal procurement of information commodities. Specifically, data on the number of procurement

transactions for information commodities, and data on the average dollar amount of these transactions, indicate that, while federal spending on information products and services has increased, the amount paid per transaction has declined.

Just as annual spending on information commodities has grown over the 36-year period from FY 1979 through FY 2014, the annual number of transactions for those products and services has also increased. From FY 1979 through FY 2014, federal agencies processed 198,141 transactions for the aforementioned 14 categories of information products and services (see Figure 9, below). On average, federal agencies completed 5,504 transactions annually for information commodities, nearly 21 transactions each working day. In the first 24 fiscal years of the 36 years in this analysis, from FY 1979 through FY 2002, the annual number of transactions was well below that average, fluctuating from approximately 800 to 3,000 transactions annually. Since FY 2002, the number of annual transactions has risen substantially. From FY 2009 through FY 2014, approximately 11,000 to 15,000 transactions occurred annually (see Figure 9, below.)

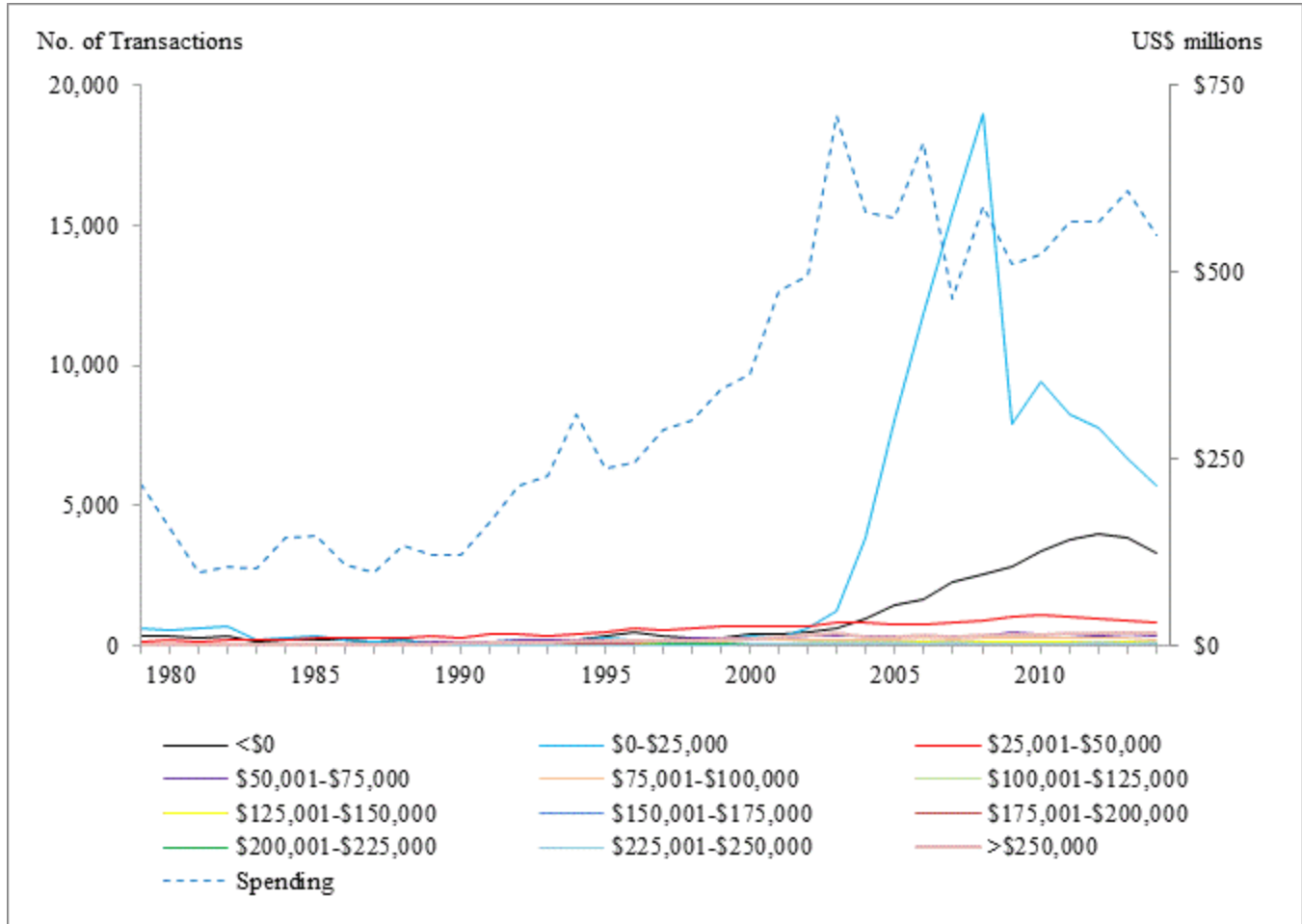
Although the increase in spending on information products and services might intuitively appear to result from a rise in transactions for those commodities, the data indicate that spending and transactions have not risen and fallen in tandem. Indeed, data suggest that the relationship between spending and transactions is complex. For example, spending began to rise substantially in approximately FY 1990, peaking during the years from FY 2003 through FY 2006. However, transactions began to increase substantially in FY 2003—more than a decade after appreciable growth in annual spending—and peaked during the years from FY 2006 through FY 2008, at the same time that spending began to decline. In the most recent five-year period from FY 2010 through FY 2014, spending and transactions have exhibited nearly divergent trends, with spending continually increasing and transactions steadily falling in number (see Figure 9, below; please note the different scales of measurement on the two vertical axes).



**Figure 9. Federal Government Transactions for Information Products and Services, FY 1979–FY 2014**

Examining the number of transactions for varying spending levels clarifies the relationship between spending and transactions. From FY 1979 through FY 2014, the amount of spending for individual transactions ranged from a low of -\$27.0 million to a high of \$87.2 million (negative transaction amounts are for reductions in existing contracts). Most transactions (81.6 percent) were for amounts between \$0 and 87.2 million. Disaggregating the number of transactions into \$25,000 intervals—grouping the number of transactions according to their amounts, that is, from \$0 to \$25,000; \$25,001 to \$50,000; \$51,001 to \$75,000, etc.—suggests that substantial increases in relatively low-level spending transactions have driven the overall growth in annual transactions. Figure 10, below, shows annual number of transactions at varying spending levels. Although the many lines representing those different levels of spending are jumbled together in a veritable haze of different-colored lines, one line clearly stands out from the others. That line depicts the number of transactions for spending between \$0 and \$25,000. As shown in Figure 10, transactions between \$0 and \$25,000—sometimes referred to as “small purchases” by federal agencies—began to increase sharply in FY 2003 and have been the numerically predominant level of spending since that time.





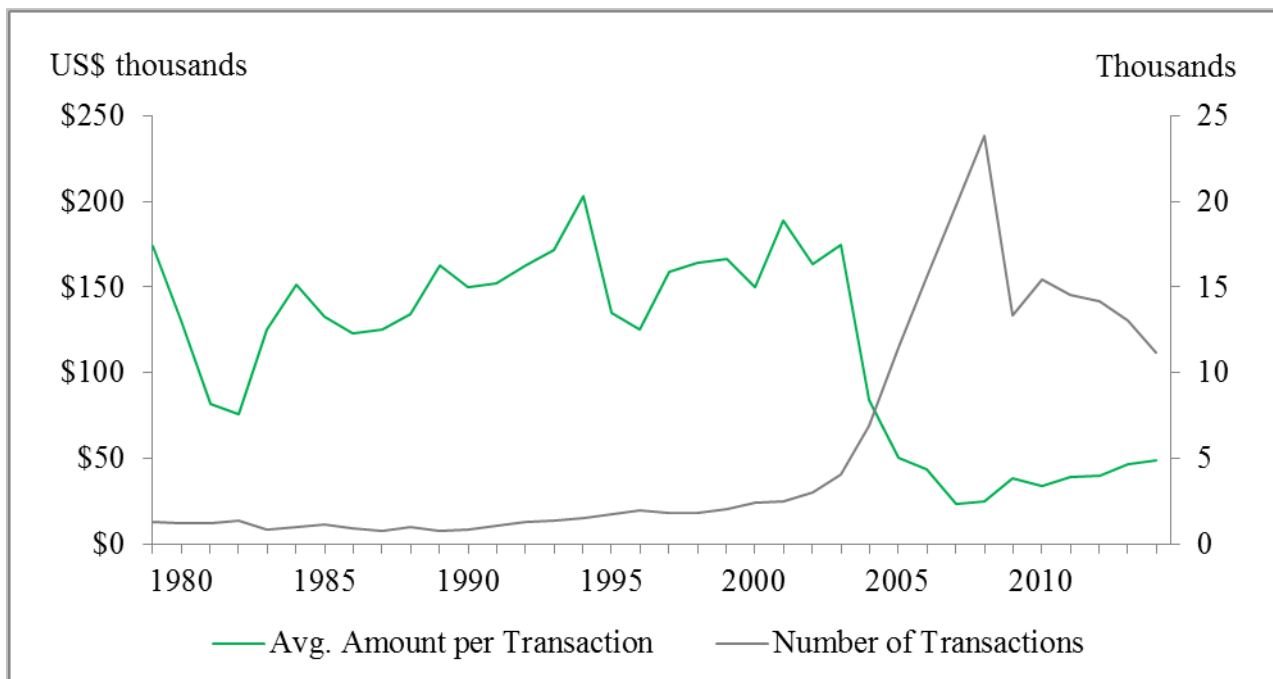
**Figure 10. Number of Transactions for Various Spending Levels FY 1979–FY 2014**

The increase in transactions for products and services priced at relatively low ranges of spending is also apparent in the increase in the number of “micro purchases.” Until September 28, 2006, the federal government defined “micro purchases” as acquisitions not exceeding \$2,500; thereafter, the government defined these transactions as acquisitions not exceeding \$3,000.<sup>14</sup> In the nearly 10 years from October 1, 2006 (i.e., the beginning of FY 2007) through the end of FY 2014, transactions for procurements ranging from \$0 to \$3,000 comprised 25.8

<sup>14</sup> Before September 2006, relevant federal regulations put the threshold for micro purchases at \$2,500. See U.S. General Services Administration, Department of Defense, and National Aeronautics and Space Administration, “FAC 2005–09 May 19, 2006,” in *Federal Acquisition Regulation*, vol. I, part 2.1 (Washington, DC, September 2001, updated 2005), 2.1–9, <https://acquisition.gov/far/05-12/pdf/FAR.book.pdf> (accessed December 30, 2014); U.S. General Services Administration, Department of Defense and National Aeronautics and Space Administration, “FAC 2005–13 September 28, 2006,” in *Federal Acquisition Regulation*, vol. I, part 2.1 (Washington, DC, March 2005), 2.1–9, <https://acquisition.gov/far/05-13/pdf/FAR.book.pdf> (accessed December 30, 2014); U.S. General Services Administration, Department of Defense and National Aeronautics and Space Administration, “Federal Acquisition Circular” (Circular No. 2005-13, Washington, DC, September 28, 2006), <http://www.acquisition.gov/far/fac/fac05-13.pdf> (accessed December 30, 2014).

percent of all transactions and transactions ranging from \$3,001 to \$25,000 constituted an additional 38.1 percent of all transactions.

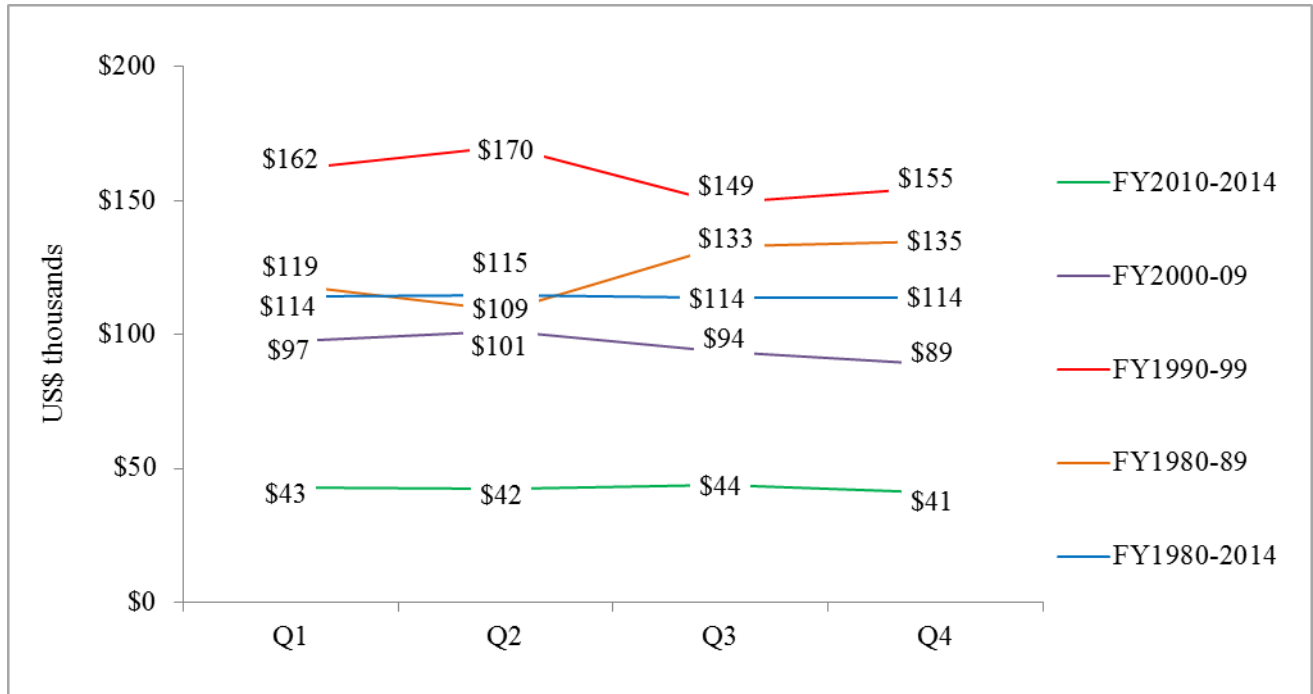
One apparent consequence of the growth in annual spending and transactions is the decline of the average dollar amount per transaction--the total spending for a year divided by the total number of transactions for that year. From FY 1979 through FY 2014, the average amount per transaction declined from \$174.1 thousand to \$48.9 thousand (see Figure 11, below). Furthermore, from FY 1979 through FY 2004, the average amount per transaction was in the range of \$76.1 thousand to \$203.0 thousand, while, during the most recent 10 fiscal years from FY 2005 through FY 2014, the average amount per transaction ranged from \$23.4 thousand to \$50.1 thousand.



**Figure 11. Average Transaction Amounts for Information Products and Services, FY 1980–FY 2014**

The figures for the fiscal quarters of each decade covered by this report also reflect this decline. In the first two decades covered in this analysis, the 1980s and the 1990s, average transaction amounts were higher in each fiscal quarter than in the fiscal quarters of the previous two decades—FY 2000 through FY 2009, and FY 2010 through FY 2014 (see Figure 12, below). For example, in the 1990s the average amount per transaction was \$161.5 thousand in Q1 and

\$154.7 thousand in Q4. From FY 2010 through FY 2014, the average transaction amount was \$43 thousand in Q1 and \$41 thousand in Q4. Moreover, quarterly variations in average transaction amounts have diminished over time, in contrast to quarterly variations in average spending (see Figure 8, above, and Figure 12, below).

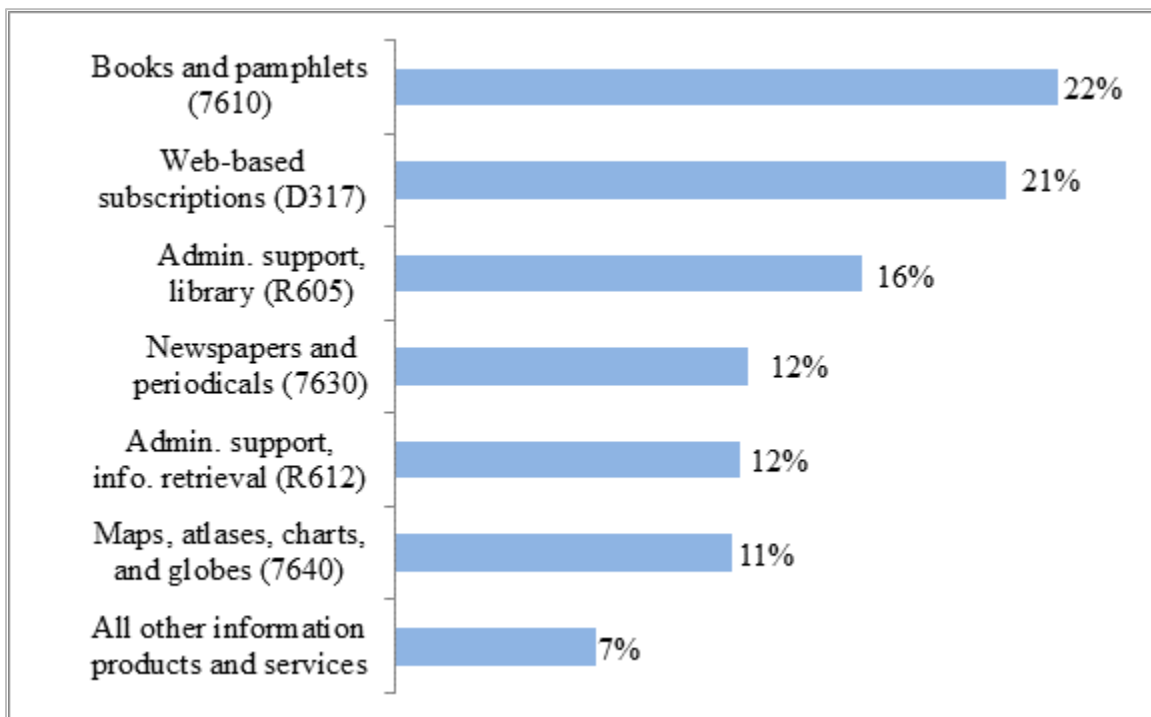


**Figure 12. Federal Information Market, Average Quarterly Transaction Amounts, FY 1980–FY 2014**

The examination of various dimensions of federal procurement of information products and services illuminates two aspects of strategic sourcing: the government’s overall demand for information commodities and the pace at which agencies have procured these products and services. In general, the dollar amount spent for various categories of products and services, and the volume of transactions required to obtain them, are measures of the demand for those commodities.

With regard to the major products and services in the information market, six of the 15 types of information products and services accounted for 93 percent of federal government spending on the information market, as measured by contract value from FY 1979 through FY 2014. Those products and services include books and pamphlets (22.3 percent of total spending); Web-based subscriptions (20.5 percent); administrative support for federal libraries (15.7

percent) and for information retrieval (11.6 percent); newspapers and periodicals (11.9 percent); and maps, atlases, charts, and globes (11.3 percent) (see Table 1, above, and Figure 13, below). Comparing spending on these commodities, or other aspects of their procurement, is difficult, because some commodities are relatively newer than others. Web-based subscriptions, for example, have not existed as long as books and pamphlets have. Therefore, federal agencies have been procuring some products and services over a shorter period than the 36 years from FY 1979 through FY 2014. In addition, the emergence of Web-based subscriptions and other new information media suggests that the federal information market is becoming increasingly multidimensional, encompassing an array of electronic resources, print media, and professional services.



**Figure 13. Federal Information Market, Products and Services, FY 1979–FY 2014**

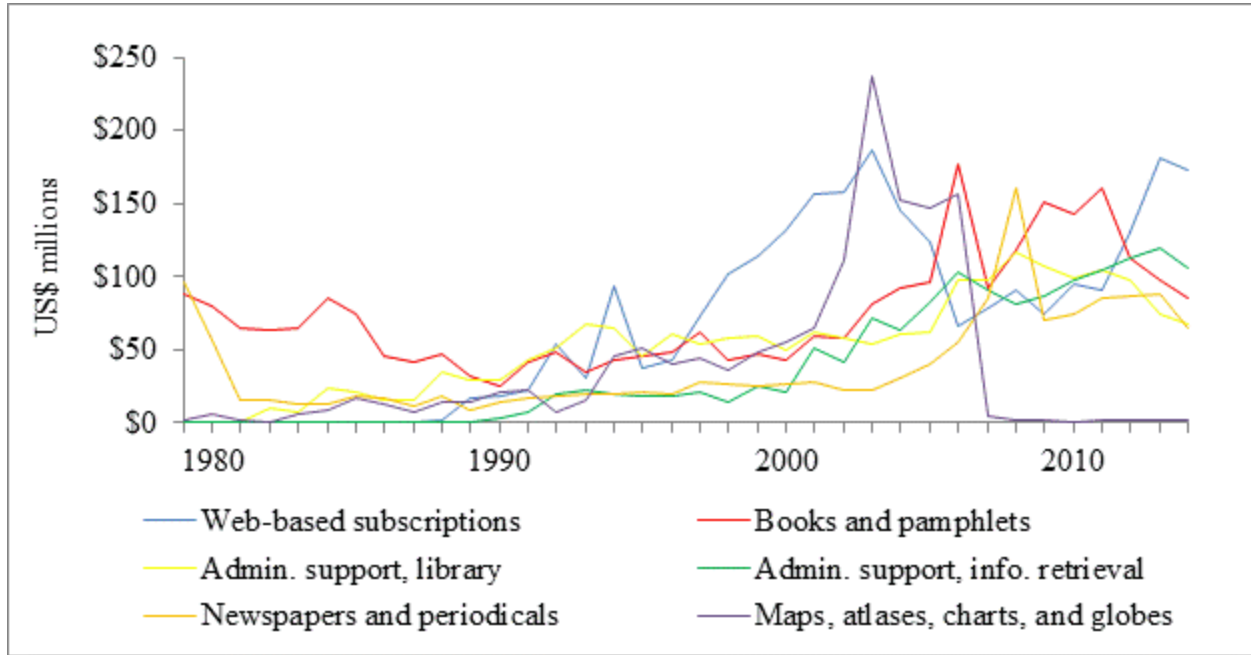
Just as federal spending on the information market as a whole has varied over time, federal spending on specific products and services within that market has fluctuated over time. The federal government has directed most of its spending on information commodities to the purchase of only a few products and services. However, new products and services have become prominent in this market, some for only a few years, others on a more enduring basis. Three

commodities have consistently received a high proportion of total federal spending on information products and services: administrative support for federal libraries (PSC R605), books and pamphlets (7610), and newspapers and periodicals (7630). During the 1990s, Web-based subscriptions (D317) and administrative support for information retrieval (R612) emerged as prominent commodities, and these have remained popular expenditures throughout the period covered in this report. By contrast, the commodity group comprising maps, atlases, charts, and globes (7640) also became prominent in the federal information market during the 1990s but has since declined significantly as a component of the overall market. Federal spending on this commodity group peaked at \$236.4 million in FY 2003—33.2 percent of the entire information market for that year—and then ranged from \$146.6 million to \$156.2 million from FY 2004 through FY 2006. Thereafter, however, federal spending on this product category declined substantially, falling precipitously to \$4.3 million in FY 2007 and to \$2.1 million by FY 2014 (see figures 7 and 8, below).

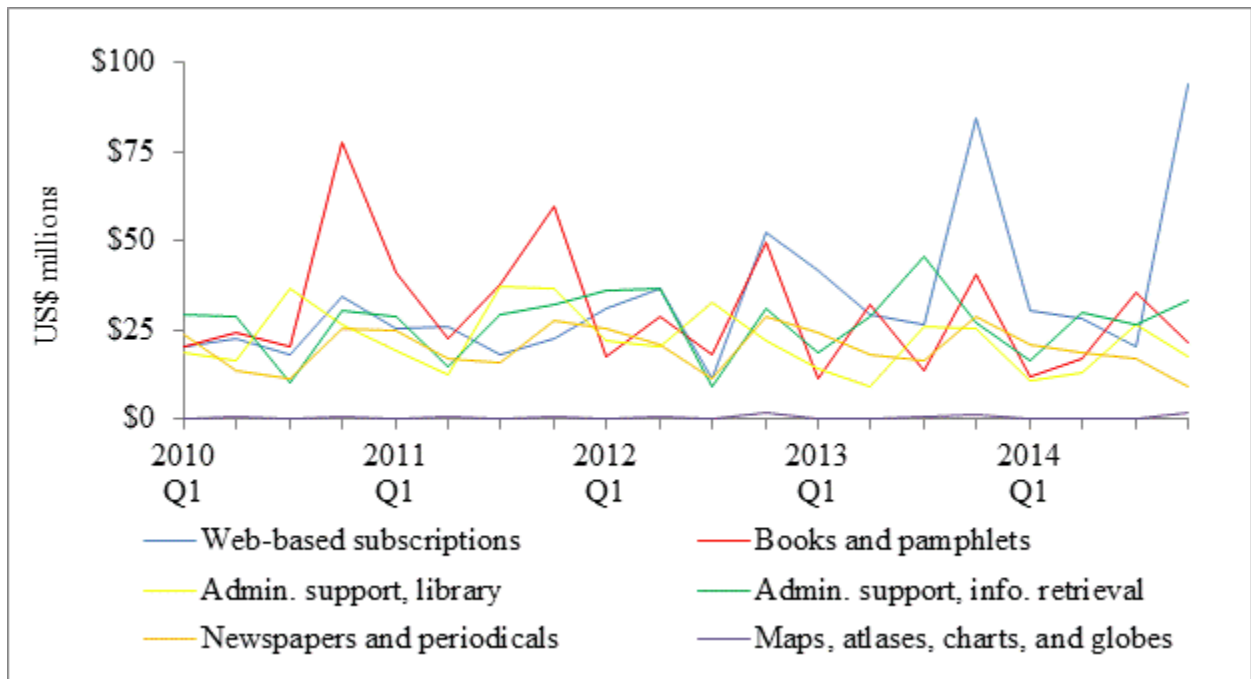
In addition, spending on the major elements of the federal government’s information market has exhibited some interesting—perhaps, surprising—changes. For example, in the period from FY 1997 through FY 2003, the Internet and electronic media emerged as prominent sources of information, and federal spending on Web-based subscriptions was higher than for most other information commodities. Although the Internet and electronic media have remained prominent information sources, federal spending on Web-based subscriptions has fluctuated substantially, declining from FY 2003 through FY 2006, stagnating from FY 2007 through FY 2011, and increasing thereafter.<sup>15</sup> Federal spending on two commodity groups—books and pamphlets and administrative support for libraries—also fluctuated from FY 1997 through FY 2013, although spending on these categories often exceeded spending on Web-based subscriptions (see figures 14 and 15, below). Many vendors of books and pamphlets publish both electronic and print materials, but the PSC data does not indicate whether spending in that category was for electronic or for print publications.

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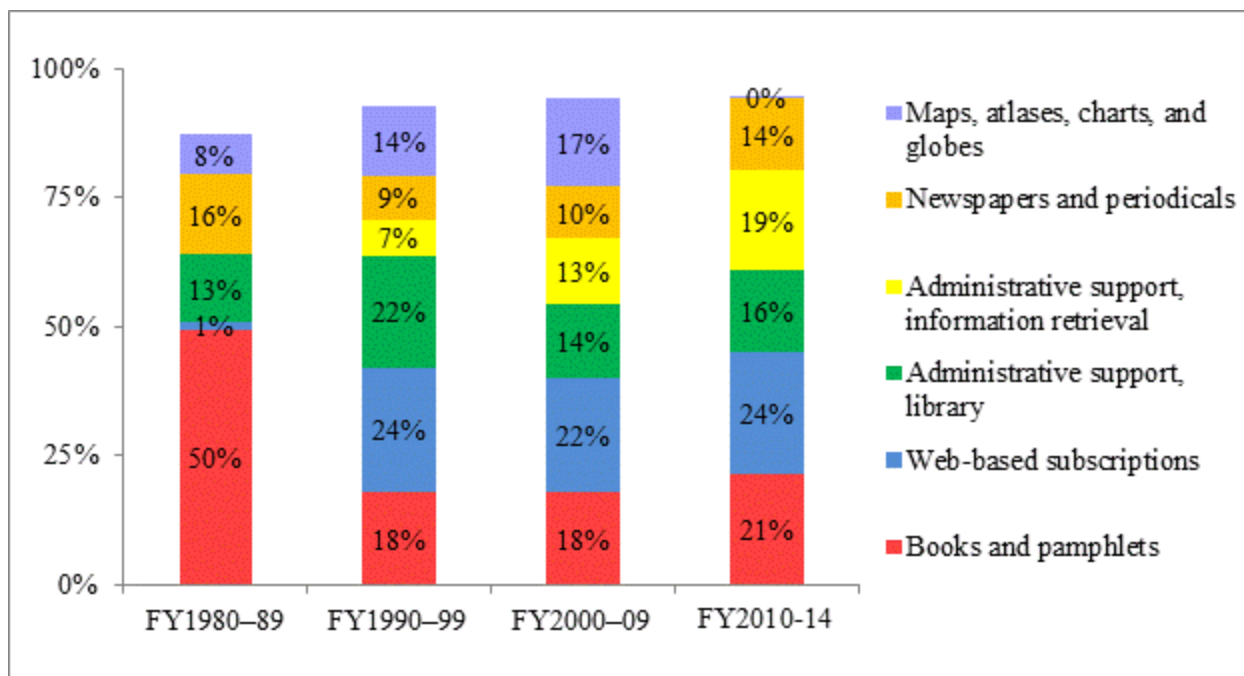
<sup>15</sup> The drop in federal spending on Web-based subscriptions (PSC D317) appears to have been due to reductions in spending by three federal agencies. More specifically, between FY2005 and FY2006 the Federal Acquisition Service reduced its spending with Computer Sciences Corporation by \$13.9 million, the Bureau of Public Debt decreased its spending with Forrester Research, by \$13.2 million, and the National Institutes of Health reduced its spending with Aspen Systems Corporation by \$7.7 million, a total drop in spending of \$34.9 million. All of these calculations are based on data downloaded from FPDS-NG.



**Figure 14. Federal Spending on Information Products and Services, FY 1979–FY 2014**

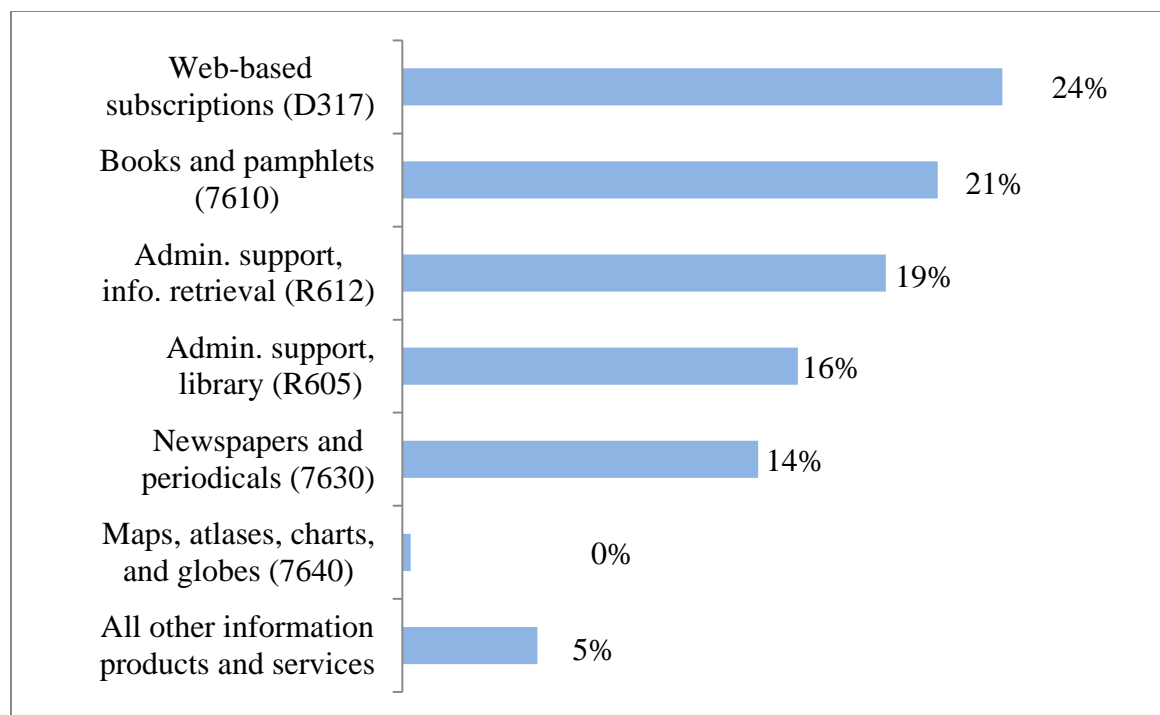


**Figure 15. Federal Spending on Information Products and Services, FY 2010 Q1–FY 2014 Q4**



**Figure 16. Federal Spending on Information Products and Services, by Decade**

Federal spending on various information commodities has concentrated increasingly on a narrower range of commodities. Since FY 2006, federal spending on maps, atlases, charts, and globes has declined, while spending on the other five information commodities—books and pamphlets, administrative support for libraries, newspapers and periodicals, Web-based subscriptions, and administrative support for information retrieval—has grown. Disaggregating federal spending on these commodities by decade reveals that the proportion of overall spending on these five commodities is growing over time. These five information products and services accounted for 81.9 percent of the federal information market for the overall period from FY 1979 through FY 2014 (see Figure 13, above). They accounted for 94.3 percent of federal spending on the information market from FY 2010 to FY 2014 (see Figure 16, above; Figure 17, below; and Table 12, in Appendix 3).



**Figure 17. Federal Information Market, Products and Services, FY 2010 Q1–FY 2014 Q4**

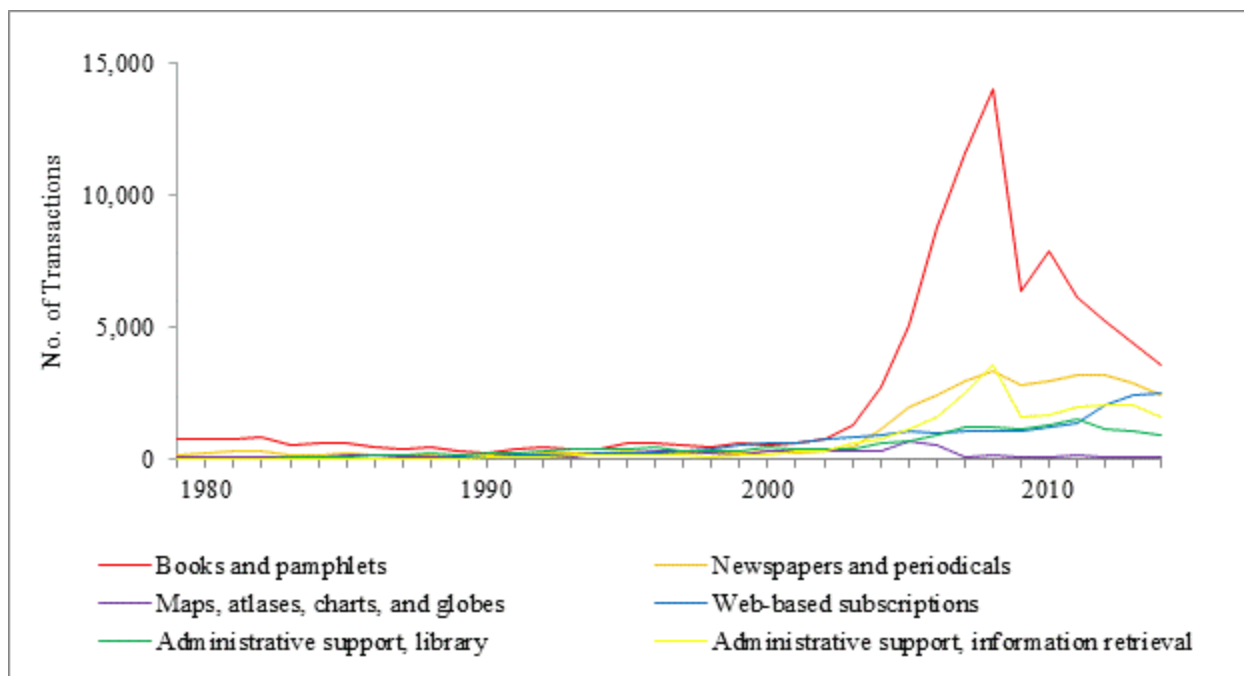
The number of transactions indicates the concentration of the federal information market on the aforementioned five products and services. Transactions for those five commodities accounted for 92.8 percent of all transactions for information products and services from FY 1979 through FY 2014. Among those five commodities, a relatively high number of transactions were for books and pamphlets (7610), particularly during the period from FY 2005 through FY 2014.

Some caution is warranted in comparing the 36-year totals for transactions assigned these five PSCs with the total transactions of other PSCs, for products that came into existence nearly 10 years later. However, throughout the entire period, the majority of annual transactions for information products and services received these five PSCs. In the most recent five-year period from FY 2010 through FY 2014, transactions with these five codes comprised 97 percent of all transactions for information commodities (see Table 2, below). Furthermore, annual transaction numbers for these five commodities increased overall from FY 1979 through FY 2014, although their transaction numbers did decline from FY 2012 through FY 2014, with the exception of Web-based subscriptions (PSC D317) (see Figure 18, below).



**Table 2. Transactions for Information Products and Services, FY 1979–FY 2014**

<b>Products and Services (Product Service Code)</b>	<b>FY 1979– FY 2014</b>	<b>Percentage of Total</b>	<b>FY 2010– FY 2014</b>	<b>Percentage of Total</b>
Books and pamphlets (7610)	89,872	45.4%	27,274	39.9%
Newspapers and periodicals (7630)	34,146	17.2%	14,583	21.3%
Administrative support, information retrieval (R612)	22,657	11.4%	9,296	13.6%
Web-based subscriptions (D317)	20,295	10.2%	9,376	13.7%
Administrative support, library (R605)	16,936	8.5%	5,792	8.5%
Maps, atlases, charts, and globes (7640)	5,584	2.8%	399	0.6%
Microfilm, processed (7670)	3,767	1.9%	135	0.2%
Drawings and specifications (7650)	1,749	0.9%	452	0.7%
Digital maps, charts, and geodetic products (7644)	1,173	0.6%	430	0.6%
Technical representative-books, maps, and other publications (L076)	678	0.3%	268	0.4%
Sheet and book music (7660)	623	0.3%	81	0.1%
Topographic maps, charts, and geodetic products (7643)	317	0.2%	209	0.3%
Aeronautic maps, charts, and geodetic products (7641)	265	0.1%	88	0.1%
Hydrographic maps, charts, and geodetic products (7642)	71	0.0%	23	0.0%
<b>Total</b>	198,133	100.0%	65,406	100.0%



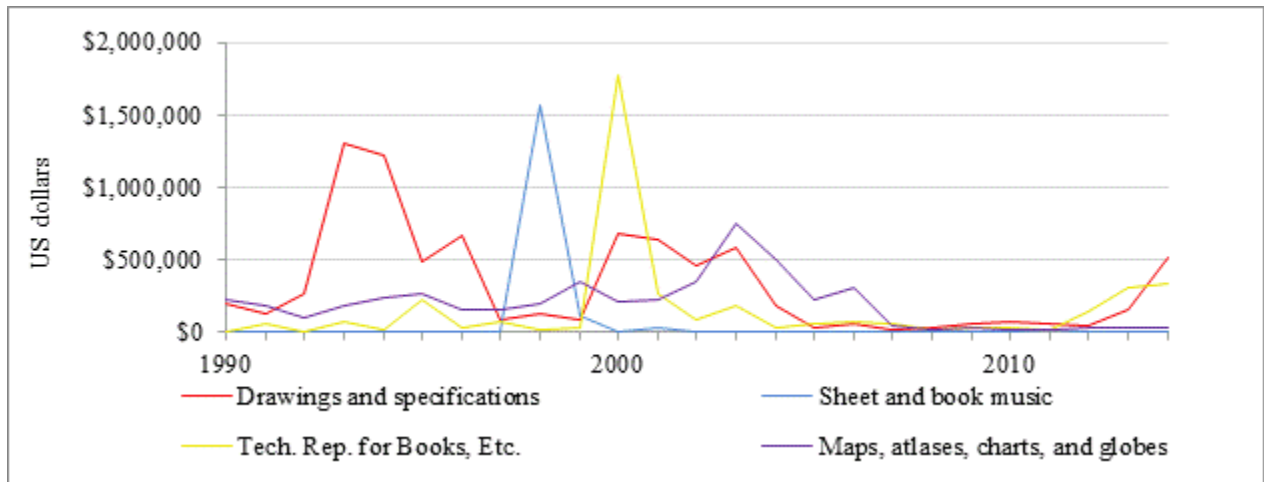
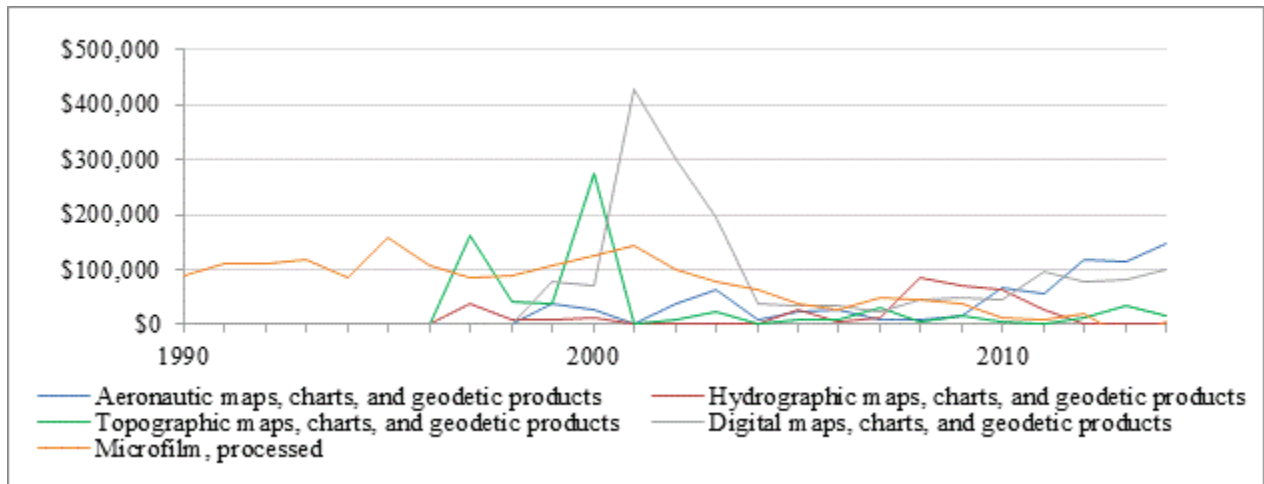
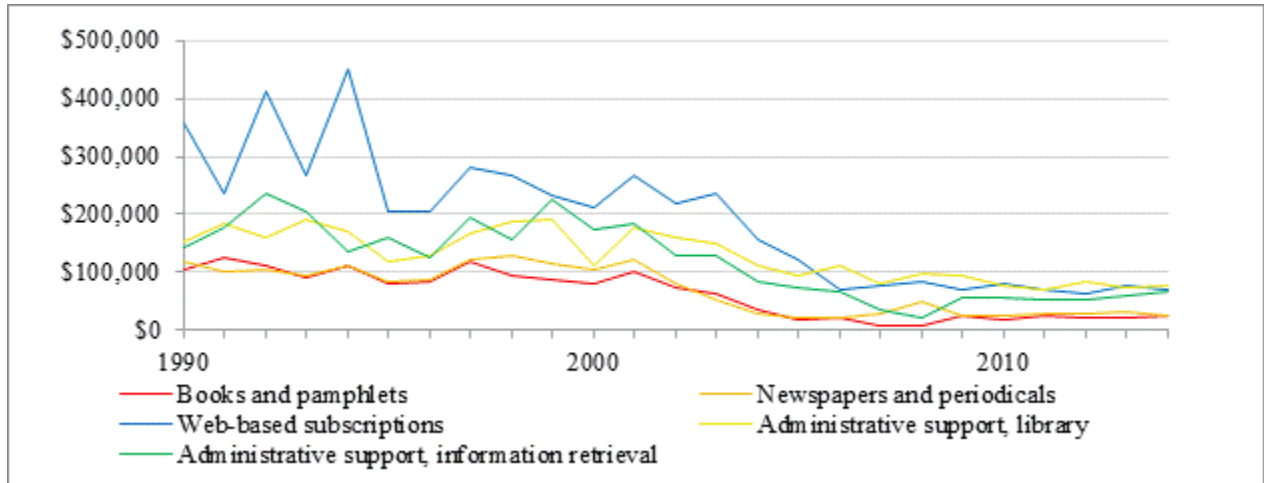
**Figure 18. Transactions for Information Products and Services, FY 1979–FY 2014**

As noted above, average transaction amounts for the overall federal information market have declined, and the same trend is apparent in transaction amounts for many, though not all, information products and services. For example, the federal government has spent more money on five particular information commodities— administrative support for federal libraries, administrative support for information retrieval, books and pamphlets, newspapers and periodicals, and Web-based subscriptions—and average transaction amounts for all of these commodities have decreased (see Figure 19, below). Other commodities, such as aeronautic and digital maps, have exhibited increases in average transaction amounts, although these commodities have constituted relatively small portions of overall federal spending on information commodities (0.1 percent and 0.9 percent, respectively, of total spending from FY 1979 through FY 2014).

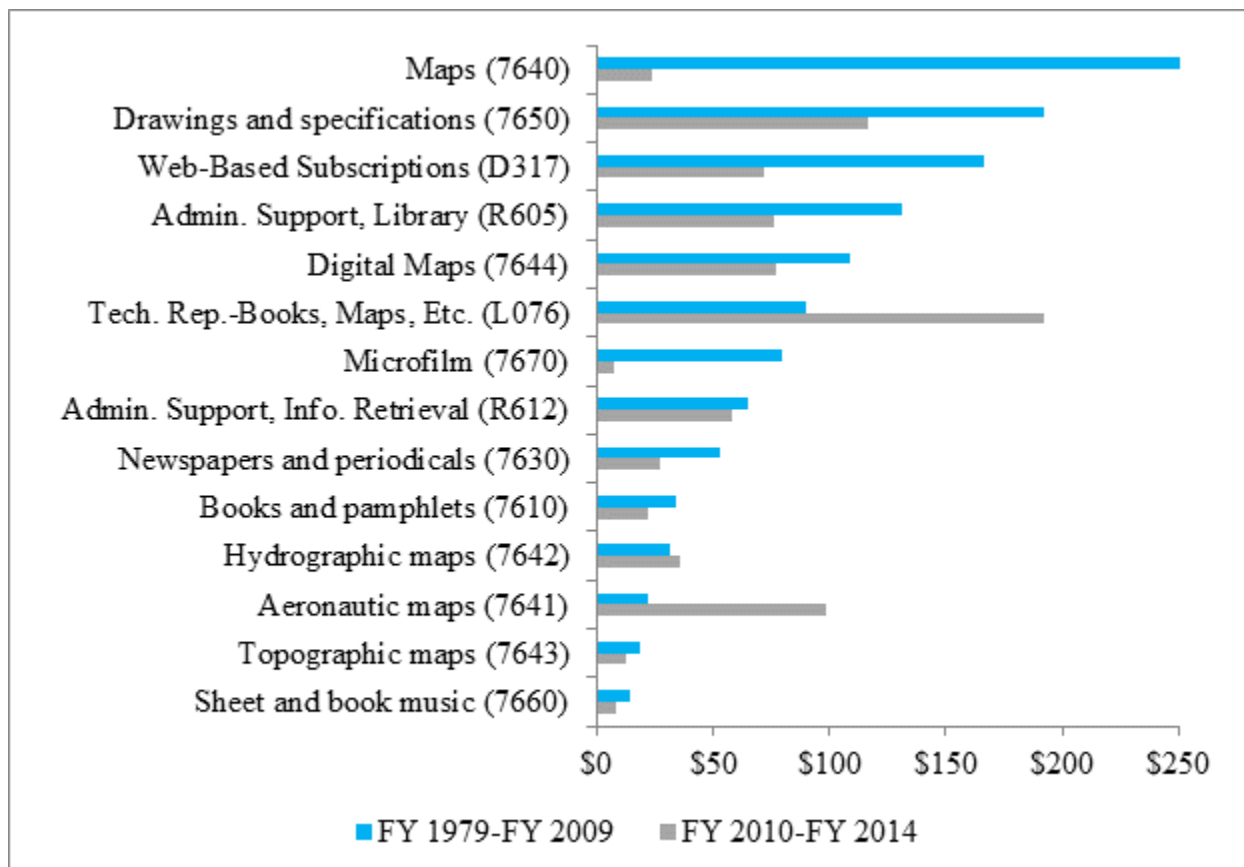
While no single trend is apparent in average transaction amounts for all information products and services, the varying patterns in average transaction amounts suggest that the overall growth in federal spending on information commodities reflects at least two procurement patterns. Over time, federal agencies have increased their procurement of books, Web-based subscriptions, and other commodities and have spent less per transaction in obtaining them. On the other hand, agencies have spent increasing amounts for aeronautical maps, digital maps, and

other products and services, but they have procured these commodities in relatively lower volumes than less costly products and services.

**Figure 19. Average Transaction Amounts for Information Products and Services, FY 1990–FY 2014**



In addition, data on average transaction amounts for the 14 products and services in this analysis show that for most of these commodities average transaction amounts in the most recent five fiscal years (FY 2010–FY 2014) were lower than in the prior 31-year period (FY 1979–FY 2009; see Figure 20, below).



**Figure 20. Average Transaction Amounts for Information Products and Services, FY 1979–FY 2009 and FY 2010–FY 2014**

### INFORMATION MARKET SPENDING BY FEDERAL AGENCIES

Federal spending on information products and services from FY 1979 through FY 2014 varied substantially among contracting agencies, from approximately \$11.3 million (Small Business Administration) to nearly \$5.2 billion (Department of Defense—DOD). Furthermore, federal spending on information commodities averaged approximately \$485.4 million per contracting agency. In the most recent five fiscal years from FY 2010 through FY 2014, agency spending ranged from \$4.8 million (Small Business Administration) to \$646.9 million (DOD), with an average spending of \$112.6 million per contracting agency (see Table 3, below).

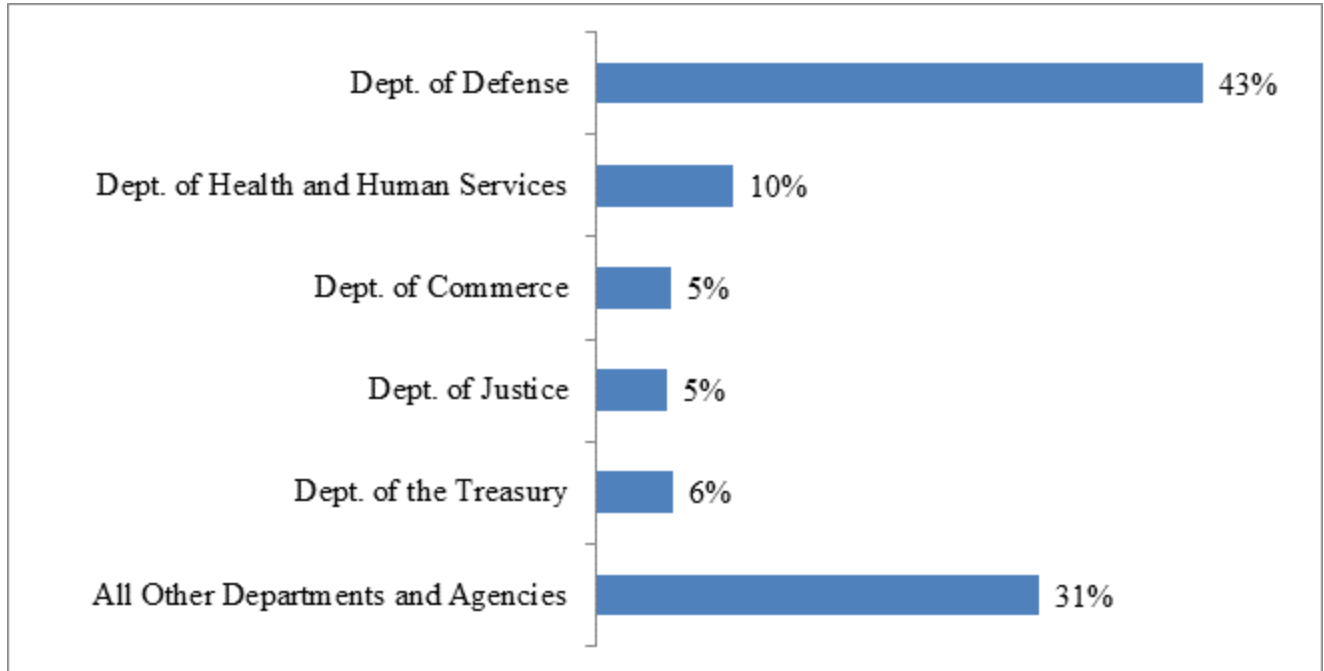
**Table 3. Federal Departments and Independent Agencies' Spending on Information Products and Services, FY 1979–FY 2014**

<b>Departments and Independent Agencies</b>	<b>Spending (in US\$ millions) FY 1979– FY 2014</b>	<b>Percent of Total</b>	<b>Spending (in US\$ millions) FY 2010– FY 2014</b>	<b>Percent of Total</b>
Dept. of Defense	\$5,207.2	42.9%	\$646.9	23.0%
Dept. of Health and Human Services	\$1,187.7	9.8%	\$373.6	13.3%
Dept. of Commerce	\$651.5	5.4%	\$264.9	9.4%
Dept. of Justice	\$614.8	5.1%	\$211.1	7.5%
Dept. of the Treasury	\$668.2	5.5%	\$189.4	6.7%
Dept. of Veterans Affairs	\$467.8	3.9%	\$188.6	6.7%
Environmental Protection Agency	\$460.9	3.8%	\$95.7	3.4%
All Other Agencies	\$459.8	3.8%	\$157.4	5.6%
General Services Administration	\$445.7	3.7%	\$38.5	1.4%
Dept. of Homeland Security	\$272.1	2.2%	\$169.4	6.0%
Social Security Administration	\$261.1	2.2%	\$103.8	3.7%
Dept. of the Interior	\$231.2	1.9%	\$64.9	2.3%
Dept. of State	\$176.3	1.5%	\$85.4	3.0%
Dept. of Transportation	\$191.0	1.6%	\$21.8	0.8%
Dept. of Agriculture	\$163.6	1.3%	\$41.7	1.5%
National Aeronautics and Space Administration	\$166.0	1.4%	\$24.8	0.9%
Dept. of Energy	\$132.6	1.1%	\$23.7	0.8%
Dept. of Education	\$92.1	0.8%	\$41.0	1.5%
United States Agency for International Development	\$95.7	0.8%	\$16.8	0.6%
Dept. of Labor	\$61.9	0.5%	\$16.3	0.6%
Dept. of Housing and Urban Development	\$56.5	0.5%	\$13.2	0.5%

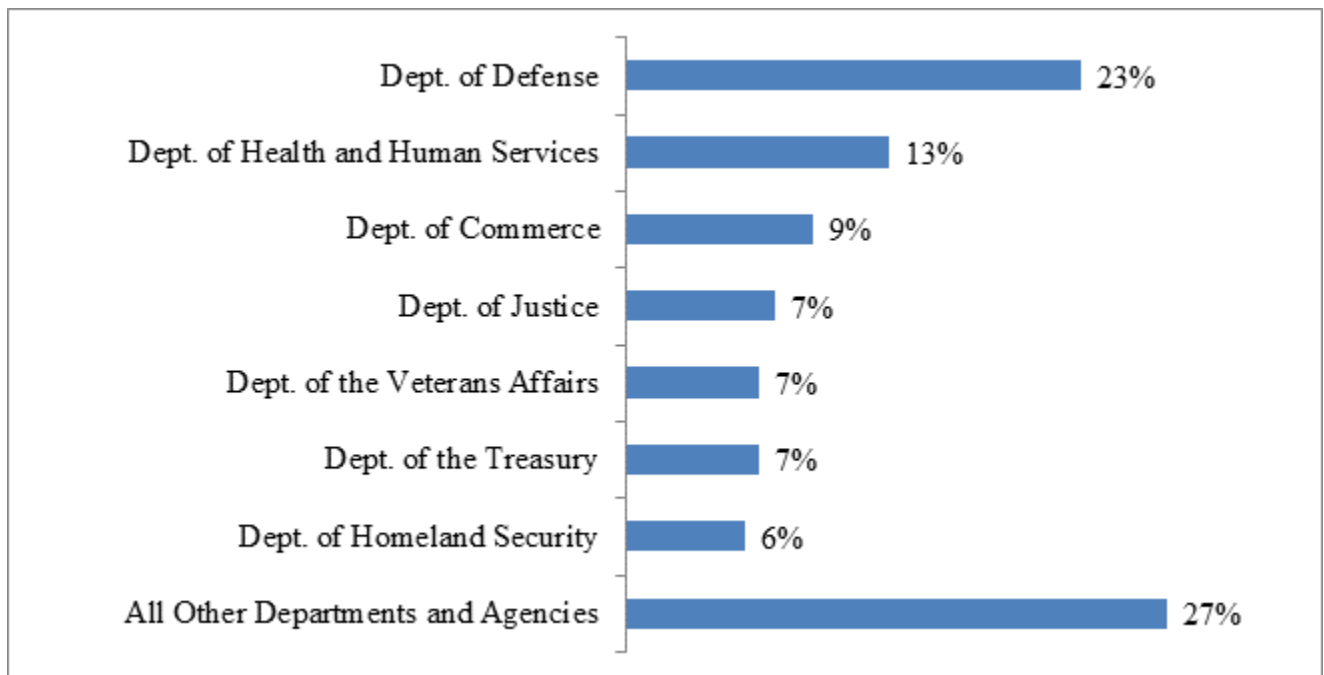
**Table 3. Federal Departments and Independent Agencies' Spending on Information Products and Services, FY 1979–FY 2014**

Departments and Independent Agencies	Spending (in US\$ millions) FY 1979–FY 2014	Percent of Total	Spending (in US\$ millions) FY 2010–FY 2014	Percent of Total
Nuclear Regulatory Commission	\$29.2	0.2%	\$8.5	0.3%
Office of Personnel Management	\$16.2	0.1%	\$6.7	0.2%
National Science Foundation	\$14.7	0.1%	\$6.6	0.2%
Small Business Administration	\$11.3	0.1%	\$4.8	0.2%
<b>Total</b>	\$12,135.3	100%	\$2,815.4	100%
<b>Average</b>	\$485.4		\$112.6	

Five federal government departments accounted for nearly 68.6 percent of all contracts for information products and services from FY 1979 through FY 2014, representing \$8.3 billion in spending during that period. Those were Defense (42.9 percent of total spending), Health and Human Services (9.8 percent), Treasury (5.5 percent), Commerce (5.4 percent), and Justice (5.1 percent) (see Table 3, above, and Figure 21, below). In the most recent five years, FY 2010 through FY 2014, these five departments accounted for a slightly lower proportion of the federal information market—59.9 percent. Two additional federal government departments emerged as prominent purchasers of information commodities, namely the departments of Homeland Security and Veterans Affairs. Each of these seven contracting departments accounted for at least 6 percent of federal spending on information products and services from FY 2010 through FY 2014, and their collective spending on these commodities constituted 72.6 percent of the total federal information market (see Table 3, above, and Figure 22, below).



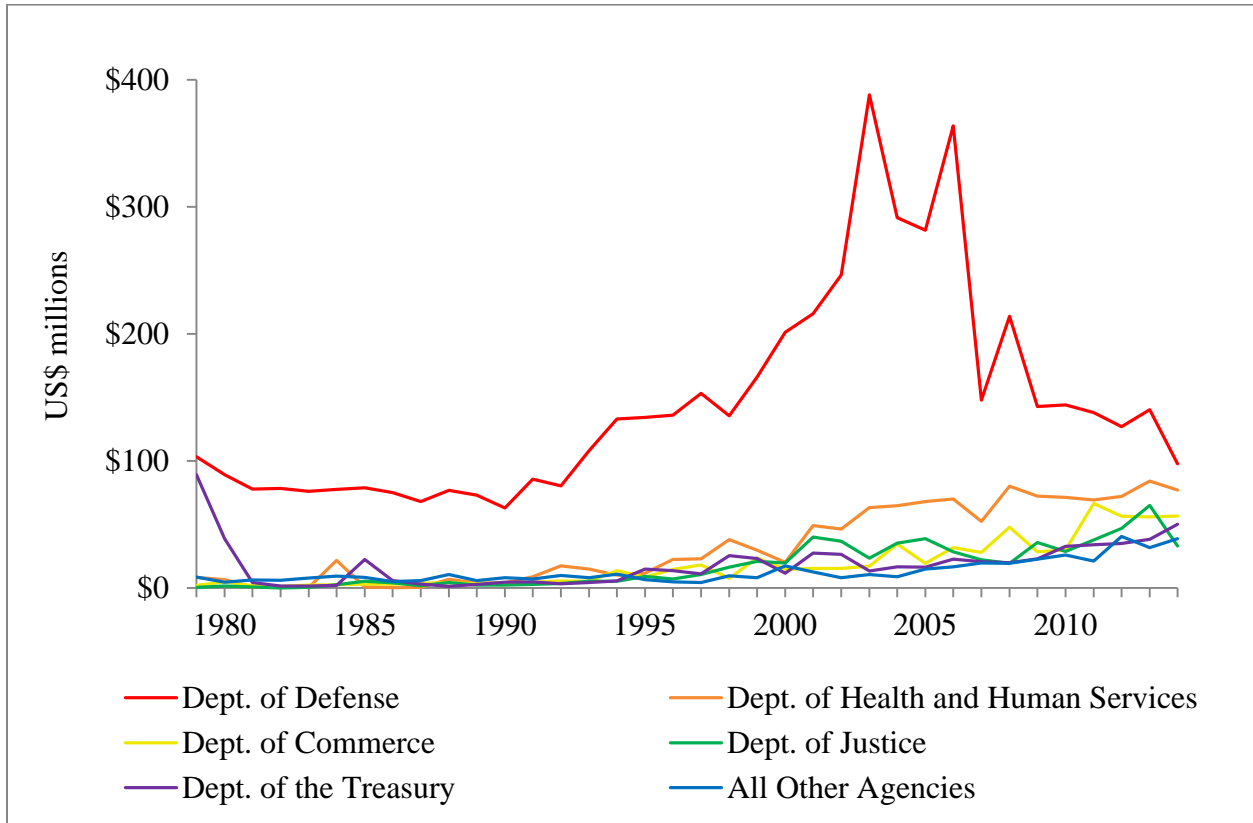
**Figure 21. Federal Information Market Spending by Agency as a Proportion of Total Spending, FY 1979–FY 2014**



**Figure 22. Federal Information Market Spending by Agency as a Proportion of Total Spending, FY 2010–FY 2014 Q4**

U.S. government departments' spending on information products and services fluctuated during the span of fiscal years covered in this study—FY 1979 through FY 2014. However, in

general, most departments' spending on information commodities either remained essentially constant or trended upward over the period. One apparent exception to this trend was the Department of Defense. Available data indicate a precipitous decline in DOD's spending on information commodities after 2006 (see Figure 23, below).

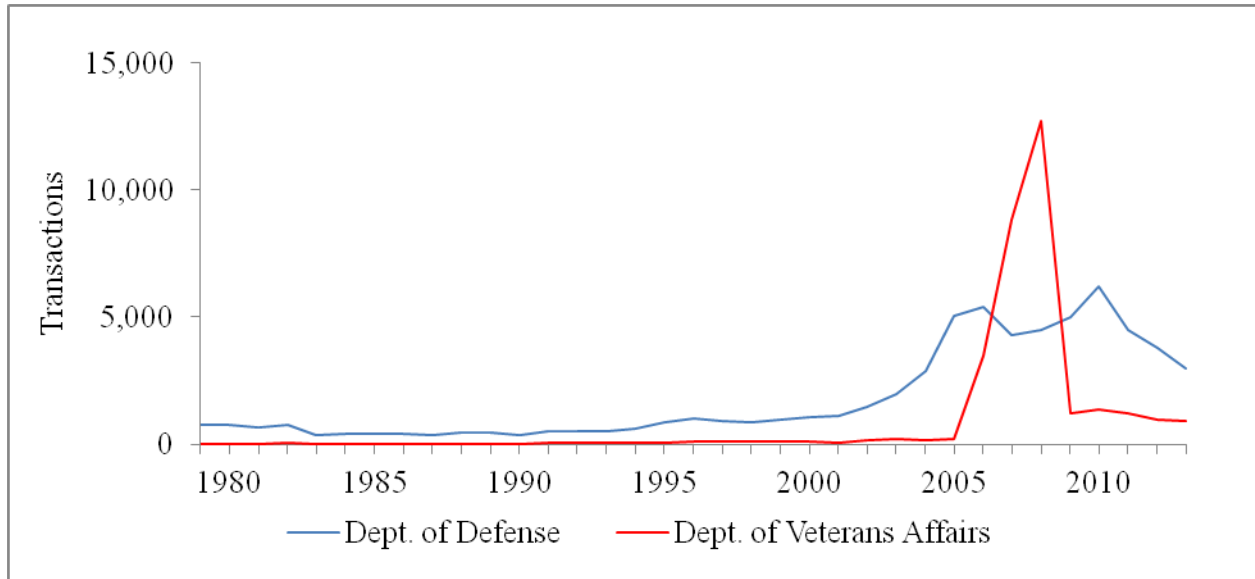


**Figure 23. Federal Information Market, Top Federal Agency Spending Trends, FY 1979–FY 2014**

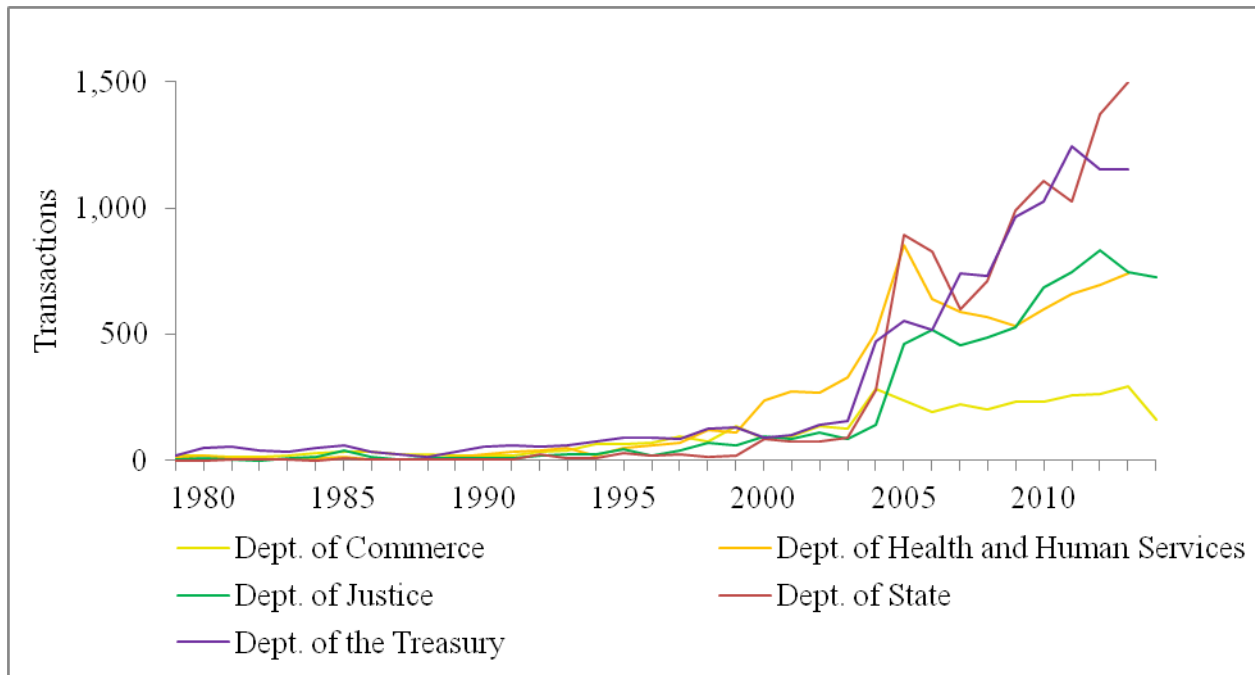
These departments' transactions have shown similar trends. From FY 2003 through FY 2014, most departments' transactions for information products and services have increasingly reached higher levels than in the previous years from FY 1979 through FY 2002. In the 12-year period from FY 2003 through FY 2014, many departments' transactions have steadily increased, while others have fluctuated up and down, but most departments' transaction counts have been higher overall in this period than during previous years. The transaction trends for several departments depicted in figures 24 and 25, below, demonstrate this trend. The figures show transactions over time for several departments, including five of the most prominent purchasers of information commodities (the Department of Commerce, DOD, the Department of Health and



Human Services, the Department of Justice, and the Department of the Treasury), and two others, which have had among the highest transaction counts of all departments (the Department of State and the Department of Veterans Affairs). Please note these two graphs have different scales on their vertical axes, reflecting very different transaction numbers.



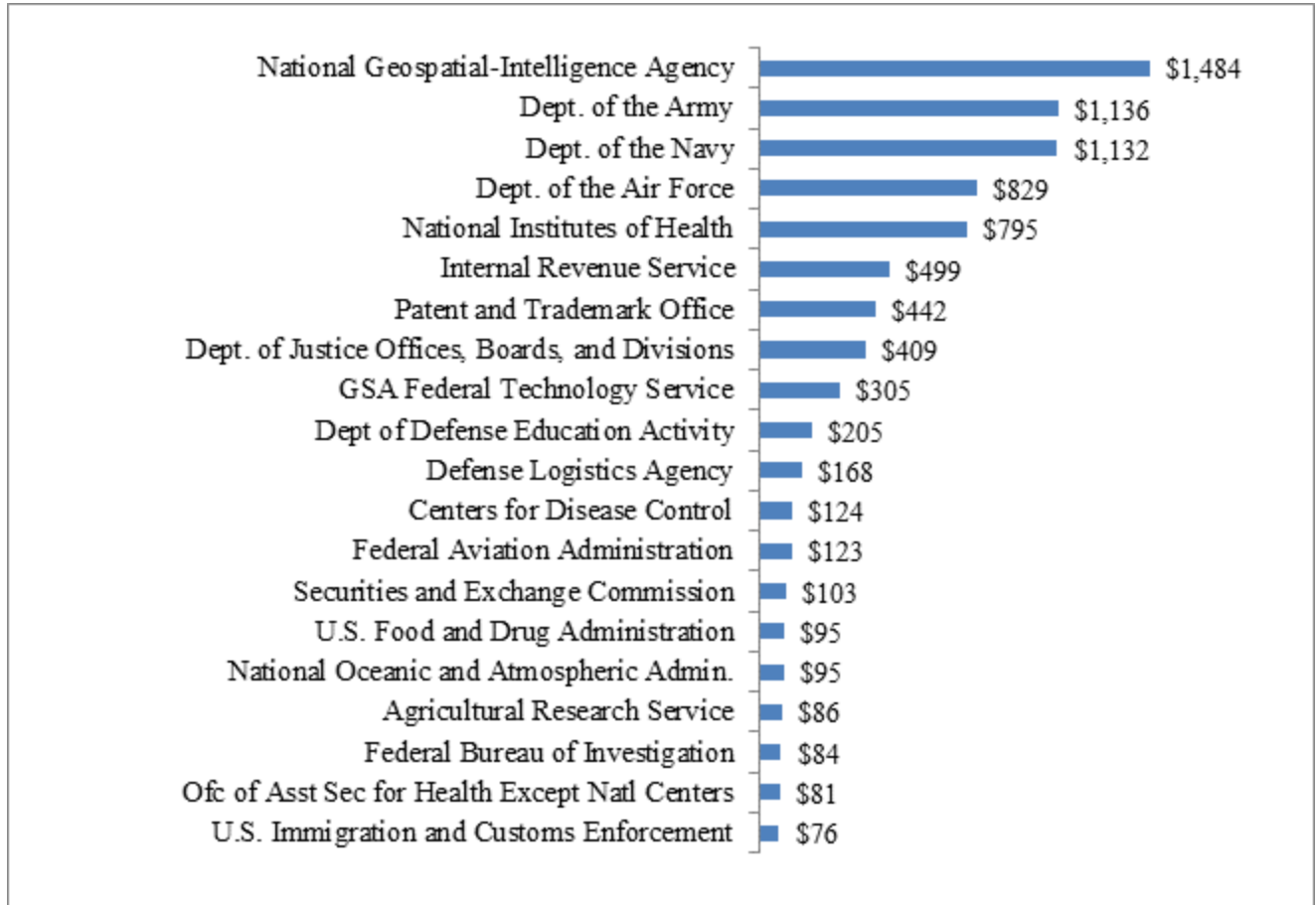
**Figure 24. Information Commodity Transactions by the Departments of Defense and Veterans Affairs, FY 1979–FY 2014**



**Figure 25. Information Commodity Transactions by Other Departments, FY 1979–FY 2014**

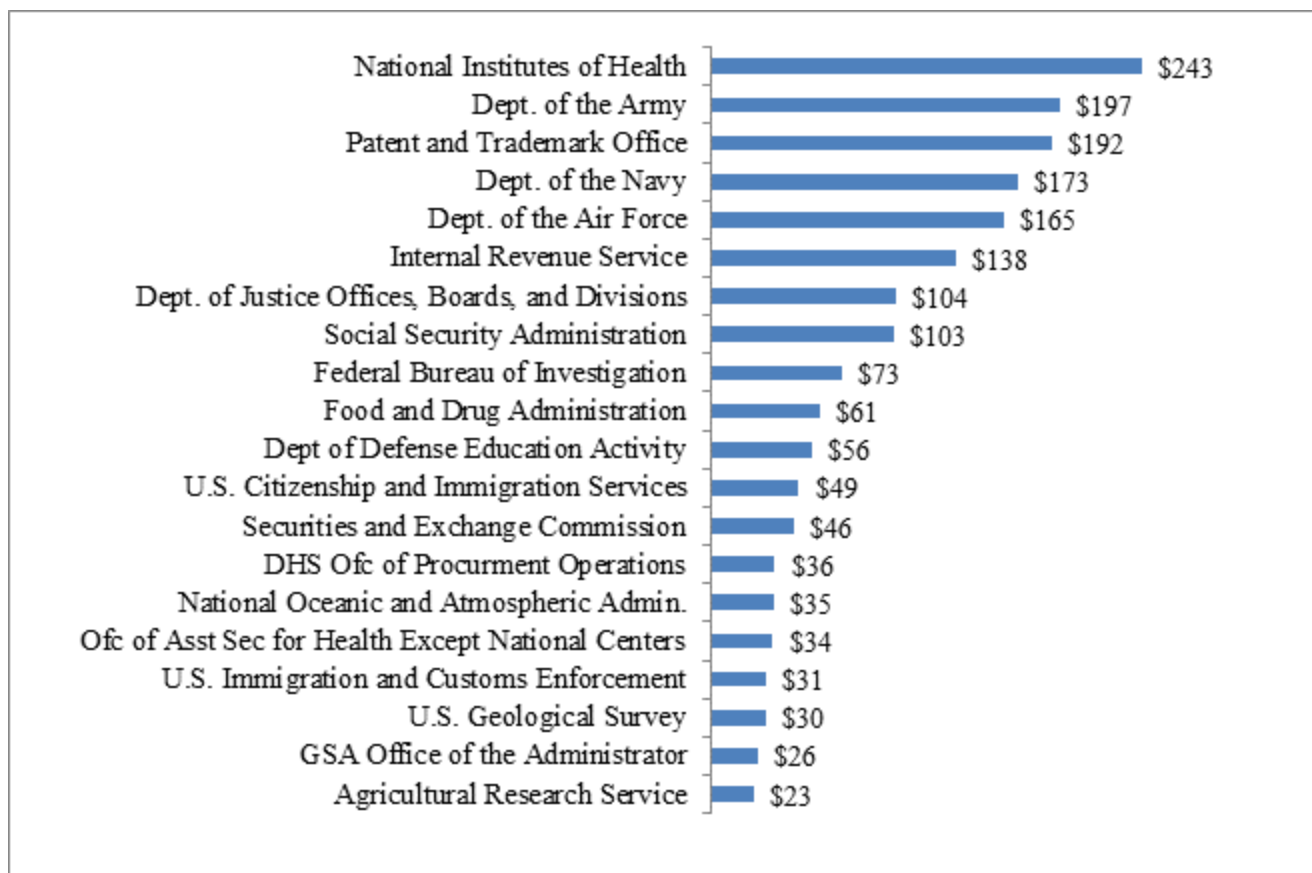
Examining the spending data of agencies below the departmental level reveals additional aspects of federal information commodity procurement. Analysis of federal procurement data from the FPDS-NG helps develop a detailed understanding of federal spending on information products and services at the departmental level, as well as at level of the agencies within the departments. However, sometimes the name of the contracting agency in the FPDS-NG database is unclear. The contracting agency specified in a federal procurement contract may be a department, such as the Department of State, but is more often an agency within a department, such as the National Institutes of Health (NIH), which falls under the Department of Health and Human Services. In other cases, the specific contracting agency is difficult to determine, because the database description is difficult to interpret—for example, the designation “Department of Defense Educational Activity” refers neither to a department nor to an agency but to a departmental activity.

Federal procurement data indicate that, from FY 1979 through FY 2014, several agencies under the Department of Defense were among the major purchasers of information products and services: the National Geospatial-Intelligence Agency (NGA), the departments of the Air Force, Army, and Navy, the Department of Defense Educational Activity, and the Defense Logistics Agency (see Figure 26, below). These six agencies collectively spent \$5.0 billion on information products and services, accounting for 40.8 percent of all federal government spending in the information market. Other agencies prominent in the market were NIH (\$795 million in spending; 6.5 percent of overall spending), the Internal Revenue Service (\$499 million; 4.1 percent), the Patent and Trademark Office (\$442 million; 3.6 percent), and Offices, Boards, and Divisions of the Department of Justice (\$409 million; 3.4 percent).



**Figure 26. Federal Information Market, Top-Spending Federal Agencies, FY 1979–FY 2014**

With some exceptions, the major purchasing agencies during FY 1979 through FY 2014 remained the major purchasers during the last five years of that period, FY 2010 through FY 2014. One such exception is the NGA, which spent more on information commodities than any single agency from FY 1990 through FY 2006, but has since dropped completely out of the information market, at least as far as can be determined from unclassified procurement data (see Figure 27, below).



**Figure 27. Federal Information Market, Top-Spending Federal Agencies, FY 2010–FY 2014**

## CONTRACTORS IN THE FEDERAL INFORMATION MARKET

From FY 1979 through FY 2014, federal agencies contracted with thousands of organizations to provide the 15 categories of information products and services listed in Table 1 (see above). Among this multitude of contractors, eight vendors stood out for receiving one-fourth of all contracts, as measured by the value of those contracts. The top contractor for information commodities for the federal government was West Publishing Corporation with \$654.9 million in contracts, followed by Reed Elsevier (\$557.5 million), GeoEye<sup>16</sup> (\$448.3 million), Computer Sciences Corporation (\$375.5), Primus Solutions (\$334.6), EBSCO (\$306.8), IHS Global (\$252.2), and Gartner (\$198.4). These eight companies collectively received nearly

<sup>16</sup> In 2006 Orbital Imaging Corporation (also known as ORBIMAGE) purchased Space Imaging LLC's assets and formed the company GeoEye. See GeoEye, "About Us," <http://www.geoeye.com/CorpSite/about-us/> (accessed July 29, 2011).

\$3.1 billion in federal government contracts for information products and services, nearly 26 percent of all contracts, as measured by contract value.

These and other contractors appear in Table 4, below, which lists the top ten recipients of federal government contracts for information products and services from FY 1979 to FY 2014. (Table 13 in Appendix 3 lists the top 50 vendors for the period.) These 10 contractors collectively received \$3.4 billion in contracts for information commodities—nearly 30 percent of the entire federal information market for that period.

Table 4 provides a readily accessible listing of the prominent contractors in the federal information market, presenting the data in a slightly different manner than in previous versions of this report. In earlier iterations of this analysis, vendor data included combined contract data for both parent companies and their subsidiaries. This approach, however, did not present data for subsidiary companies that are prominent vendors for federal agencies, such as West Publishing, which is a subsidiary of Thomson Reuters. The table now provides data for companies as stated in the FPDS-NG. Parent companies are listed in parentheses following their subsidiaries, as in the example, “West Publishing Corp. (Thomson Reuters).”<sup>17</sup>

**Table 4. Top Ten Contractors in the Federal Information Market, FY 1979–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	West Publishing Corp. (Thomson Reuters)	\$654.9	5.4%
2	Reed Elsevier	\$557.5	4.6%
3	GeoEye Inc.	\$448.3	3.7%
4	Computer Sciences Corporation	\$375.5	3.1%
5	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$334.6	2.8%

<sup>17</sup> The amounts in Table 4 differ from those provided in the equivalent tables in previous iterations of this report, with some vendors showing lower amounts and others showing higher amounts. These variations are the result of the discontinuation of one product service code (PSC) in these calculations (PSC 7690; see footnote 1); updated data available from the FPDS–NG; and data for subsidiary companies listed separately from their parent companies. In addition, previous iterations of this report incorrectly listed data for DynCorp Information Services as data for its parent company Computer Sciences Corporation (CSC); this version of the report lists DynCorp data separately from CSC.

**Table 4. Top Ten Contractors in the Federal Information Market, FY 1979–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
6	EBSCO	\$306.8	2.5%
7	IHS Global	\$252.2	2.1%
8	Gartner Inc.	\$198.4	1.6%
9	DigitalGlobe Inc.	\$197.1	1.6%
10	Wolters Kluwer	\$128.3	1.1%
	<b>Total</b>	<b>\$3,453.7</b>	<b>28.5%</b>

In the most recent five-year period, some indicators suggest that a declining number of vendors account for an increasingly large proportion of the federal information market. With some exceptions, the major providers of information products and services for the period from FY 1979 through FY 2014 were also the major providers of those commodities in the last five-year period, from FY 2010 through FY 2014, at least as measured by the value of the contracts those vendors signed with federal agencies (see Table 5, below). Moreover, the number of vendors accounting for the majority of information commodities was smaller during the last five fiscal years than during the 36-year period stretching back to 1979. Specifically, 46 vendors accounted for 50 percent of the federal information market from FY 1979 through FY 2014, whereas 26 vendors accounted for 50 percent of that market from FY 2010 through FY 2014 (see tables 11 and 12, Appendix 3). Moreover, eight vendors received 25 percent of all federal spending on information commodities from FY 1979 through FY 2014, whereas five companies received the same percentage of federal spending on information products and services in the most recent five fiscal years (FY 2010 through FY 2014). Similarly, the top 50 vendors accounted for 51 percent of the federal information market from FY 1979 through FY 2014, and the top 50 vendors in the last five fiscal years accounted for nearly 58 percent of the market.

The apparent consolidation of the federal information market to a declining number of vendors for the majority of information products and services to the federal government appears

to reflect two trends. First, companies in the information market are consolidating as some firms acquire others. Second, a growing number of vendors have received most of their federal procurement funding for information commodities within the last five fiscal years (FY 2010 through FY 2014). Specifically, 23 of the top 50 vendors experienced 50 percent or more of their information commodity sales within the most recent five years, and an additional 15 of the top 50 vendors realized 25 percent or more of their information commodity sales in that same period. For example, long-established organizations such as the Cambridge Information Group, Dun & Bradstreet, and Swets & Zeitlinger have provided information products and services to the federal government since FY 1995 or earlier, and all of these entities have experienced more than 50 percent of their information commodity sales to the federal government in the last five fiscal years (see Table 12, below, in Appendix 3).

**Table 5. Top Ten Contractors in the Federal Information Market, FY 2010–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	Reed Elsevier	\$233.6	8.3%
2	West Publishing Corp.	\$221.8	7.9%
3	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$138.0	4.9%
4	EBSCO	\$83.9	3.0%
5	Swets and Zeitlinger BV	\$68.5	2.4%
6	Dun and Bradstreet	\$64.5	2.3%
7	American Chemical Society	\$49.5	1.8%
8	Cambridge Information Group Inc.	\$49.2	1.7%
9	Wolters Kluwer	\$45.5	1.6%
10	IHS Global	\$45.1	1.6%
	<b>Total</b>	<b>\$999.6</b>	<b>35.5%</b>

The data in tables 3 and 4 indicate the major vendors in the overall information market, but not the major vendors for particular information products and services. Appendix 3 contains tables listing the major vendors for the top five information commodities for the previous five fiscal years—FY 2010 through FY 2014. Those five commodities were (in declining order of their proportion of the market): Web-based subscriptions, books and pamphlets, administrative support for information retrieval, administrative support for libraries, and newspapers and periodicals (see Figure 17, above).

### **BENEFITS OF A STRATEGICALLY SOURCED INFORMATION MARKET**

Thus far, this analysis has examined the federal information market as it has existed to date, without a federal strategic-sourcing program for information products and services. Calculations based on existing spending figures suggest that an initiative to source information products and services strategically could yield substantial savings on these products and services. For example, if an FSSI had covered information commodities in FY 2014, the federal government could have saved approximately \$30 million to \$110 million on information products and services (see Table 6, below).

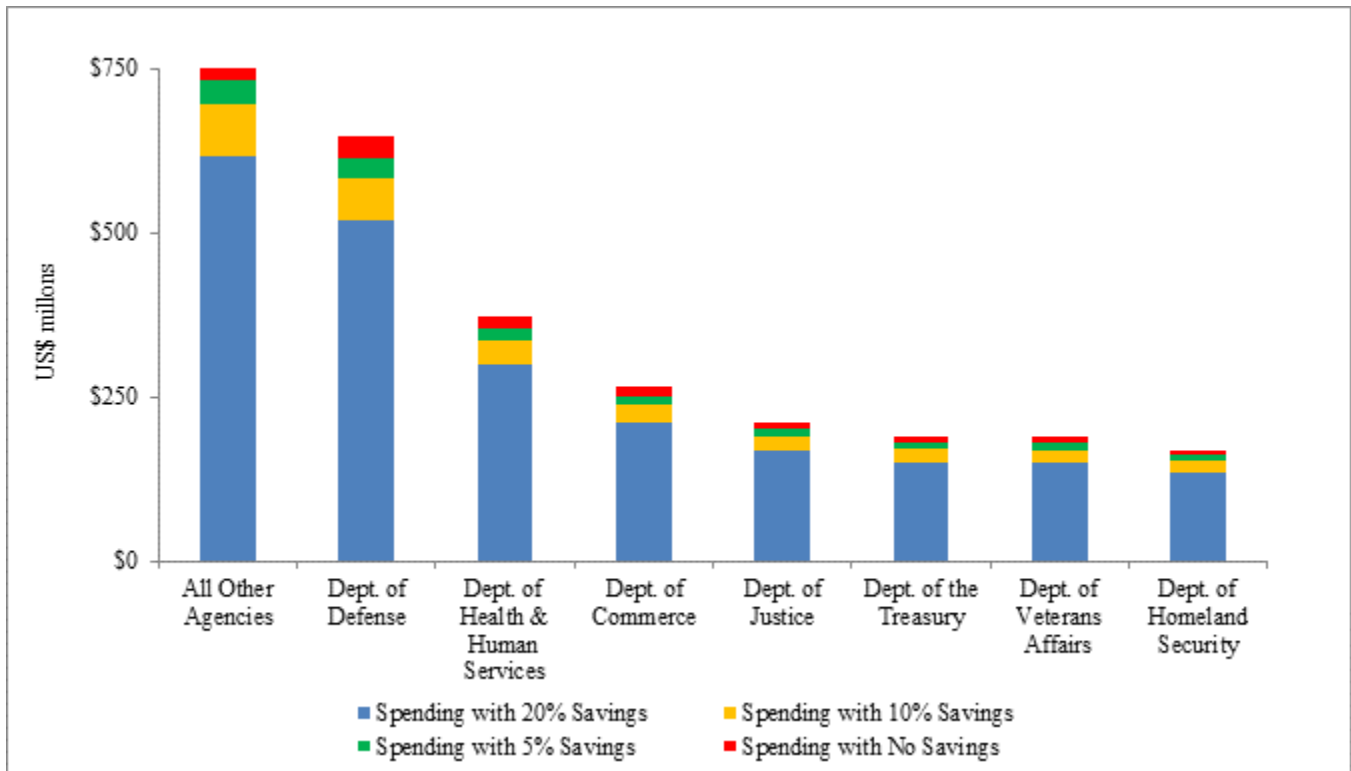
This estimate is based on a set of scenarios in which the government purchases information commodities at discounts ranging from 5 percent to 20 percent—comparable discounts to those that federal contracting agencies have realized in existing strategic-sourcing initiatives administered by GSA (see Overview of the Federal Strategic Sourcing Initiative, above). If federal contracting agencies had received such discounts for their expenditures during the most recent five fiscal years, the projected savings increase would range from approximately \$120 million to approximately \$490 million, as illustrated in Figure 28, below. In Figure 28, the tops of the colored-bar segments indicate the total spending levels that the federal government might realize through strategic sourcing of information commodities at different discount rates. The tops of the red segments indicate spending on information commodities without any discount, the tops of the green segments indicate spending with a 5-percent discount, the tops of the yellow segments indicate spending at a 10-percent discount, and the tops of the blue segments indicate spending at a 20-percent discount.



**Table 6. FY 2014 Spending by Agency Under Different Savings Scenarios**

Agency	No FSSI	5%		10%		20%	
	Spending	Spending	Savings	Spending	Savings	Spending	Savings
Dept. of Defense	\$97.7	\$92.8	\$4.9	\$87.9	\$9.8	\$78.1	\$19.5
Dept. of Health and Human Services	\$77.0	\$73.1	\$3.8	\$69.3	\$7.7	\$61.6	\$15.4
Dept. of Commerce	\$56.6	\$53.7	\$2.8	\$50.9	\$5.7	\$45.2	\$11.3
Dept. of the Treasury	\$50.0	\$47.5	\$2.5	\$45.0	\$5.0	\$40.0	\$10.0
Dept. of Homeland Security	\$38.9	\$36.9	\$1.9	\$35.0	\$3.9	\$31.1	\$7.8
Dept. of Veterans Affairs	\$34.8	\$33.1	\$1.7	\$31.3	\$3.5	\$27.9	\$7.0
Dept. of Justice	\$32.9	\$31.3	\$1.6	\$29.6	\$3.3	\$26.3	\$6.6
All Other Agencies	\$160.9	\$152.8	\$8.0	\$144.8	\$16.1	\$128.7	\$32.2
<b>Total</b>	<b>\$548.7</b>	<b>\$521.2</b>	<b>\$27.4</b>	<b>\$493.8</b>	<b>\$54.9</b>	<b>\$438.9</b>	<b>\$109.7</b>

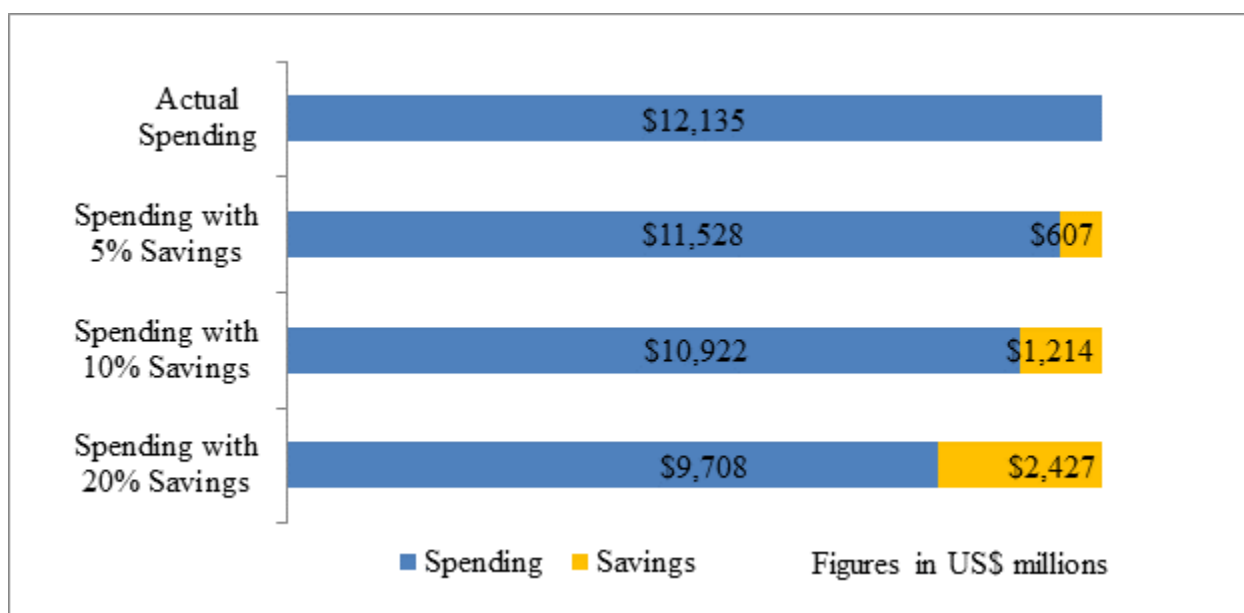
All figures are in \$ millions.



**Figure 28. Agency Spending with Different Savings Scenarios, FY 2010–FY 2014**

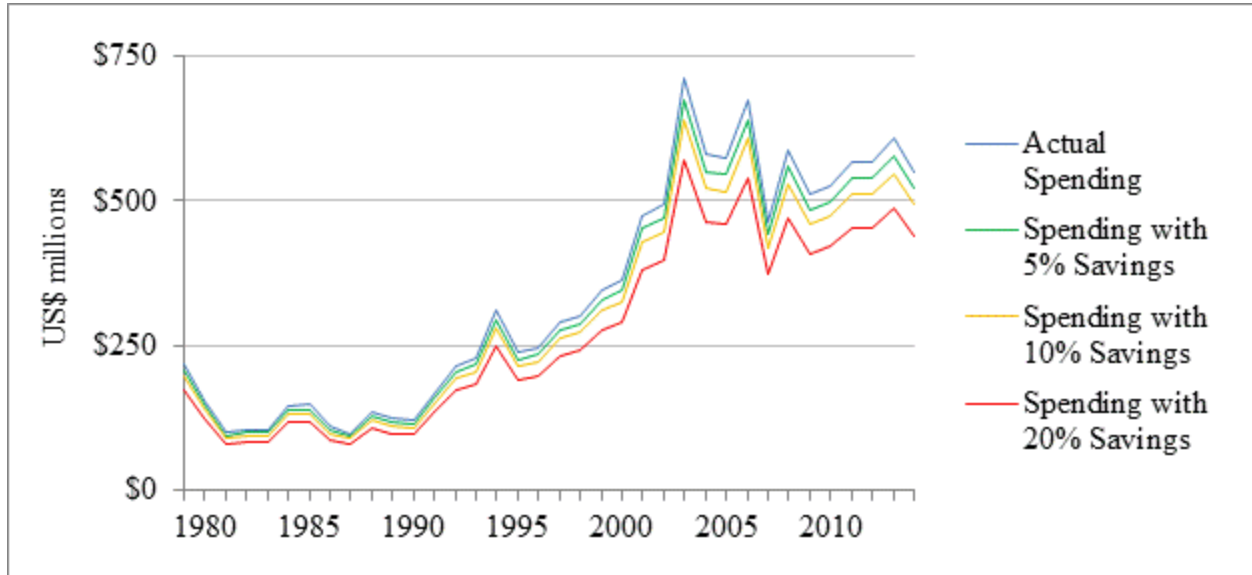
Applying discounted savings rates to the entire period covered by this analysis—FY 1979 through FY 2014—further emphasizes the savings the federal government could have realize

through strategic-sourcing arrangements. If the federal government had had strategic-sourcing initiatives in place, covering all the PSCs that constitute the federal information market as defined in this analysis, the government could have saved approximately \$600 million to \$2.4 billion—5-percent and 20-percent savings, respectively, of the total spending of \$12.1 billion for the period FY 1979 through FY 2014 (see Figure 29, below). The near \$2.4 billion in savings that the federal government could have realized through a 20-percent discount on spending in this near 36-year period exceeds the \$2.3 billion federal spending on information commodities over the last four completed fiscal years (\$567.4 million in FY 2011, \$567 million in FY 2012, \$607.7 million in FY 2013, and \$548.7 million in FY 2014).



**Figure 29. Federal Spending Using Different Savings Scenarios, FY 1979–FY 2014**

The graph in Figure 30, below, shows actual federal spending on information commodities, as well as projections of federal spending on those products and services at discounts of 5 percent, 10 percent, and 20 percent. This figure highlights the financial benefits to the federal government of strategic sourcing. The graph indicates that, at a 20-percent discount, the federal market would have rarely exceeded \$500 million in any of the fiscal years from FY 1979 through FY 2014.



**Figure 30. Federal Spending on Information Products and Services under Different Savings Scenarios, FY 1979–FY 2014**

Based on quantitative forecasts of federal spending on information products and services in the years beyond FY 2014, strategic sourcing could save the federal government money on these commodities. The spending trend in the information market suggests that spending levels for FY 2015 through FY 2017 are expected to continue an upward trend in spending from FY 2009 through FY 2014. Specifically, in FY 2013 and FY 2014, spending on information commodities was \$607.7 million and \$548.7 million, respectively, and, as previously noted, the figure for FY 2014 is expected to increase as federal agencies continue to publicize their spending data for that year.<sup>18</sup> The projected spending for FY 2015 is \$645.9 million, followed by an increase to \$674.5 million in FY 2017 (see Table 7, below).

<sup>18</sup> In a previous iteration of this report, the projected spending for FY 2014 was \$619.7 million. See William Noël Ivey, “Federal Government Strategic Sourcing of Information Products and Services” (report, Federal Research Division, Library of Congress, Washington, DC, April 2014), 32, [http://www.loc.gov/flicc/publications/FRD/Strategic-Sourcing\\_2014-Q1.pdf](http://www.loc.gov/flicc/publications/FRD/Strategic-Sourcing_2014-Q1.pdf).

**Table 7. Spending Projections, FY 2015–FY 2017**

Fiscal Year	Spending Projection	95% Prediction Interval*	
		Minimum	Maximum
2015	\$645.9	\$325.8	\$966.1
2016	\$660.2	\$334.8	\$985.7
2017	\$674.5	\$343.4	\$1,005.7

All figures in US\$ millions.  
\*Prediction intervals were derived with a Bonferroni coefficient. See Appendix 4, below, and footnote 19, below, for details.

Statistics also project that quarterly federal spending on information commodities in FY 2015 will be slightly higher than in FY 2014. As shown in Table 8, below, and Figure 32, below, projected quarterly spending on information products and services is \$154.6 million in FY 2015 Q1, \$150.0 million in Q2, \$135.5 million in Q3, and \$205.9 million in Q4, totaling \$645.9 million for the year.<sup>19</sup>

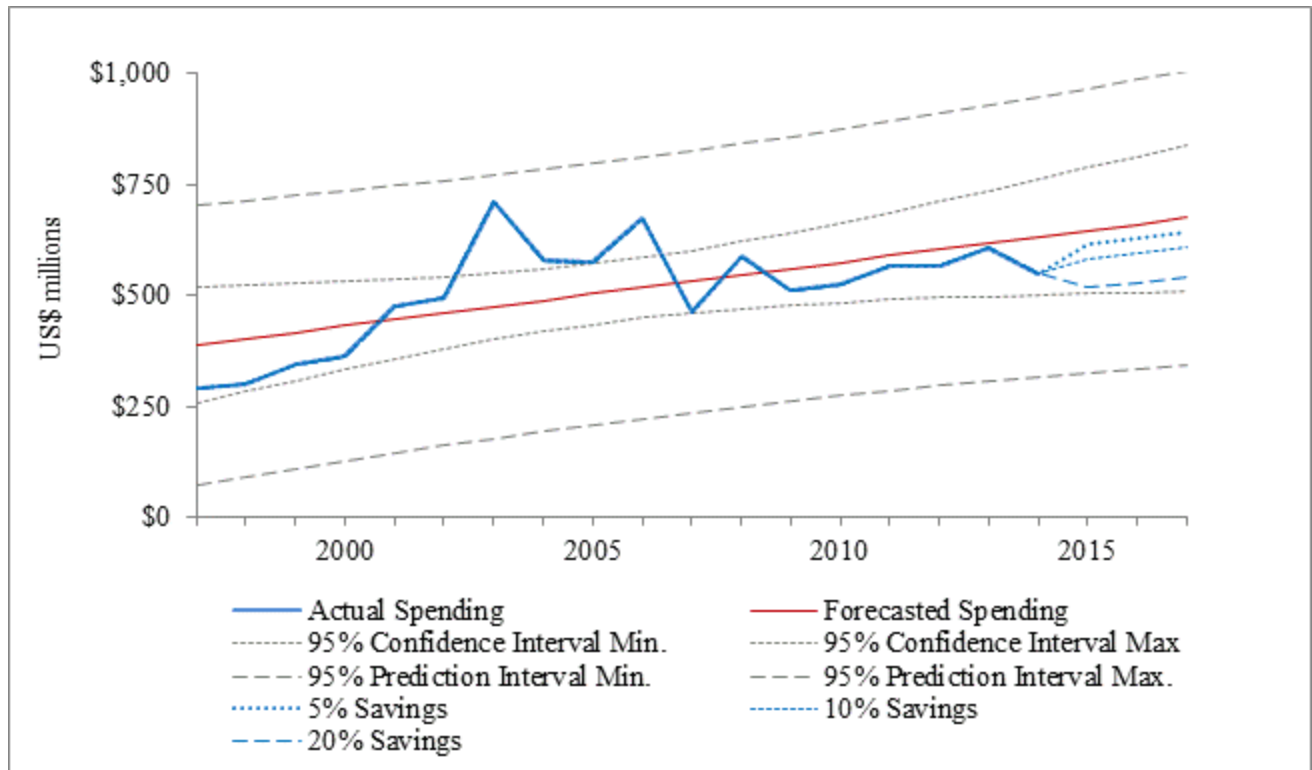
**Table 8. Quarterly Spending Projections, FY 2015**

Fiscal Quarter	Spending Projection	95% Prediction Interval*	
		Minimum	Maximum
2015 Q1	\$154.6	\$57.9	\$252.2
2015 Q2	\$150.0	\$53.2	\$246.7
2015 Q3	\$135.5	\$38.6	\$232.3
2015 Q4	\$205.9	\$108.9	\$302.9

All figures in US\$ millions.  
\*Prediction intervals were derived with a Bonferroni coefficient. See Appendix 4, below, and footnote 20, below, for details.

If the federal government established a strategic-sourcing program for information products and services, and if all federal agencies participated in the program, the government could realize total savings in the range of nearly \$100 million to \$400 million over the three years from FY 2015 through FY 2017, based on discounts of 5 percent and 20 percent, respectively (see Table 9, Appendix 1). Figure 31, below, depicts estimated growth in the information market by FY 2017 under various discount scenarios.

<sup>19</sup> These forecasts are from a seasonal time series forecast with dummy variables. See Appendix 4 for further details.

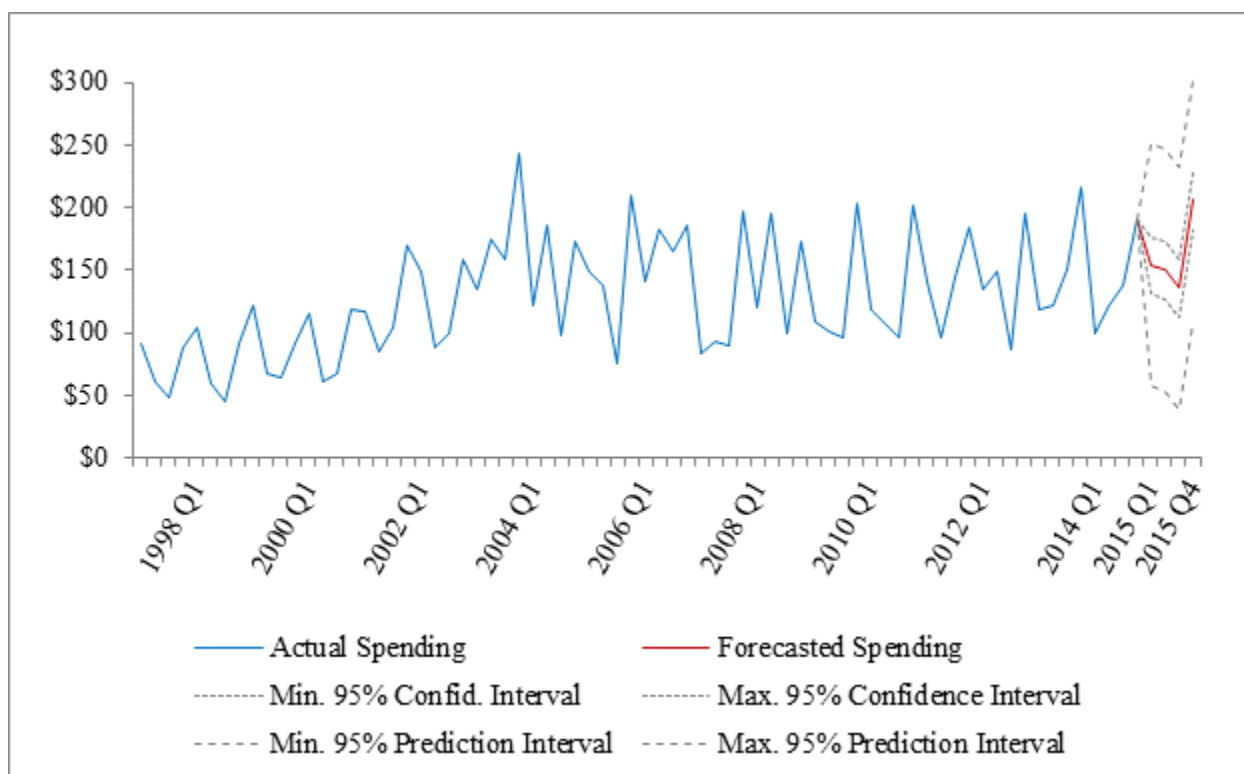


**Figure 31. Projected Growth and Potential Savings in the Federal Information Market, FY 2015–FY 2017**

The researcher derived these forecasts from a statistical analysis of changes in the federal information market from FY 1979 through FY 2014. To produce this statistical analysis, the researcher fitted a linear regression model to spending figures for the period from FY 1997 through FY 2014 and then used this model to derive forecasts for FY 2015 through FY 2017. The regression model is based on spending for the most recent 18-year period, because in FY 1997 federal spending on information commodities appears to have begun a sustained, upward shift to previously unprecedented annual spending levels. Before FY 1997, annual federal spending on information products and services had rarely exceeded \$250 million. However, since that year, annual spending has frequently exceeded \$500 million. This apparent trend shift is reflected in statistical diagnostic tests that invalidated various regression models of spending for the period from FY 1979 through FY 2014. In statistical terminology, regression models for the time span from FY 1979 through FY 2014 exhibited positive autocorrelation in their residuals, insignificant regression parameters, or both. These problems were not evident in some

regression models for the period from FY 1997 through FY 2014. (See Appendix 4, below, for further details.)

With regard to the spending forecast depicted in Figure 31, above, the red line represents the linear regression line, and the solid blue line depicts actual spending. The red regression line and various dashed blue lines depict forecasts of spending at various savings rates. Although they are simplified projections, based on the performance of existing FSSI programs, and, therefore, simply provide probabilistic estimates of savings and growth, these calculations illustrate potential savings that the federal government could realize through strategic sourcing of information products and services.<sup>20</sup>



**Figure 32. Projected Quarterly Spending in the Federal Information Market, FY 2015**

These projections of future growth and potential savings in the information market assume that all federal agencies would participate in a strategic-sourcing program for

<sup>20</sup> The equation for the linear regression is  $Y=388.656+ 14.294 X$ ;  $R^2=0.404$ , and model standard error of equation ( $SE_{\hat{y}}$ ) is 95.5. The metrics for the quadratic regression model for the same data were  $Y= 576.654+ 14.294 X - 2.471 X^2$ ,  $R^2=0.662$ , and  $SE_{\hat{y}}=74.3$ . For the cubic regression model, those metrics were  $Y=576.654 + 2.188 X - 2.471 X^2 + 0.251 X^3$ ,  $R^2=0.716$ , and  $SE_{\hat{y}}=70.5$ . Calculations of the quadratic and cubic regression models incorporated a centered predictor variable, and both models had insignificant regression parameters. The forecasted values in tables 7, 8, and 9 and figure 31 are derived from the linear regression equation. The confidence and prediction intervals of the cubic regression incorporate a Bonferroni coefficient ( $B=t(1-0.05/(2x3),18-2)=t(0.9917,16)=3.008$ ).

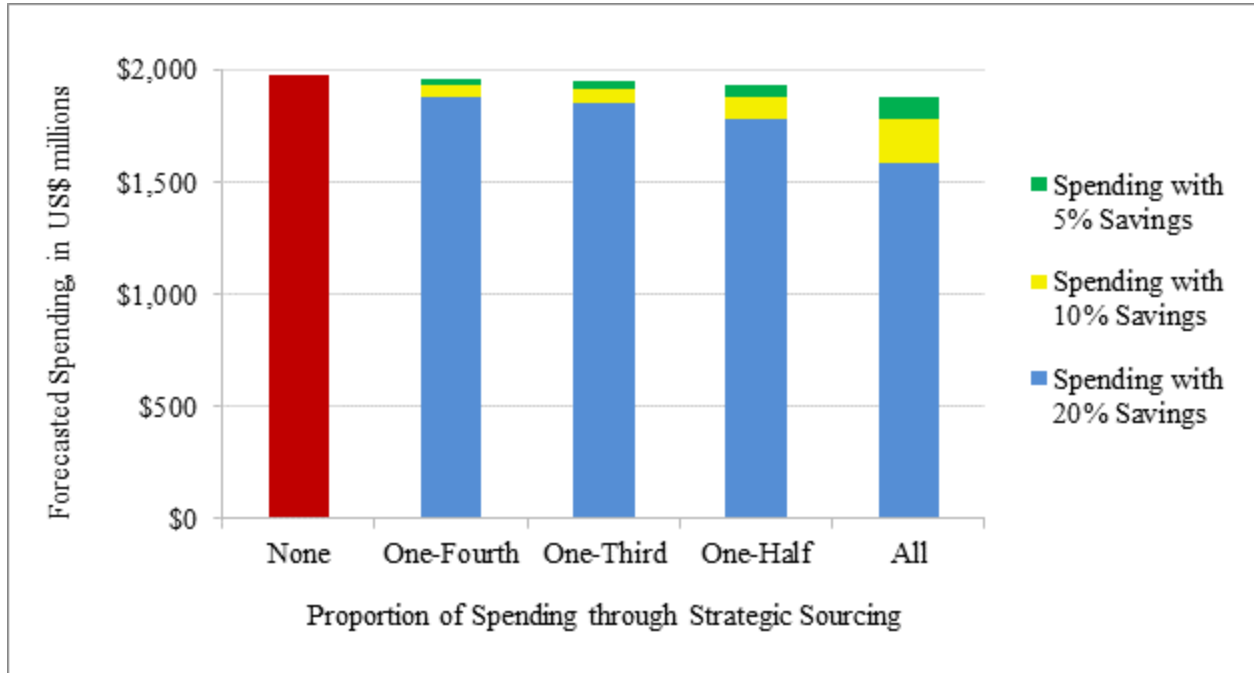
information products and services. In actuality, the number of federal agencies participating in the six currently available FSSI programs has varied. In FY 2014 Q1, for example, six agencies participated in the wireless-services program, and 70 agencies participated in the program for telecommunications-expense management services.<sup>21</sup>

Recalculating the growth and savings scenarios to include variations in federal-agency participation, would permit a more detailed picture of potential savings through strategic sourcing to emerge. However, such an exercise entails creating numerous scenarios in which agencies do or do not participate in strategic sourcing to varying extents and at varying discount rates, calculations that are beyond the scope of this report. To estimate the variation in the amount of savings that the federal agencies might realize if varying proportions of agencies participated in an information-commodity FSSI program, the researcher made additional limited calculations of savings, based on varying proportions of spending through such an FSSI program at varying discount rates. Specifically, the researcher calculated spending and savings on information products and services if one-fourth, one-third, and one-half of such spending occurred at the discount rates of 5 percent, 10 percent, and 20 percent.

These findings are detailed in Table 10 (see Appendix 1) and depicted in Figure 33, below. According to the researcher's calculations, total savings on federal spending on information commodities would vary from almost \$25 million, if one-fourth of such spending occurred at a 5-percent discount, to nearly \$400 million, if all of this spending occurred at a 20-percent discount. In Figure 33, the colored-bar segments indicate spending levels at different discount rates. For example, the tops of the green segments indicate spending on information commodities at a 5-percent discount, the tops of the yellow segments indicate spending at a 10-percent discount, and the tops of the blue segments indicate spending at a 20-percent discount. The red bar on the left of the graph depicts spending forecasts with no discount.

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<sup>21</sup> U.S. General Services Administration, "Strategic Sourcing Metrics."



**Figure 33. Total Spending Projections Based on Various Strategic-Sourcing Scenarios, FY 2015–FY 2017**



**APPENDIX 1. Estimated Spending and Savings Projections, FY 2015–FY 2017**

**Table 9. Projected Growth and Savings in the Federal Information Market, FY 2015–FY 2017**

Saving Rates	2015		2016		2017		Total		Average Annual Savings
	Spending	Savings	Spending	Savings	Spending	Savings	Spending	Savings	
No FSSI	\$645.9	\$0	\$660.2	\$0	\$674.5	\$0	\$1,980.7	\$0	\$0
5% savings	\$613.7	\$32.3	\$627.2	\$33.0	\$640.8	\$33.7	\$1,881.7	\$99.0	\$33.0
10% savings	\$581.4	\$64.6	\$594.2	\$66.0	\$607.1	\$67.5	\$1,782.7	\$198.1	\$66.0
20% savings	\$516.8	\$129.2	\$528.2	\$132.0	\$539.6	\$134.9	\$1,584.6	\$396.1	\$132.0

All figures are in US\$ millions.

**Table 10. Total Spending Projections Based on Strategic-Sourcing Spending, FY 2015–FY 2017**

Proportion of Spending Through Strategic Sourcing	5% Discount		10% Discount		20% Discount	
	Spending	Savings	Spending	Savings	Spending	Savings
None	\$1,980.7	\$0	\$1,980.7	\$0	\$1,980.7	\$0
One-Fourth	\$1,956.0	\$24.8	\$1,931.2	\$49.5	\$1,881.7	\$99.0
One-Third	\$1,948.1	\$32.7	\$1,915.4	\$65.4	\$1,850.0	\$130.7
One-Half	\$1,931.2	\$49.5	\$1,881.7	\$99.0	\$1,782.7	\$198.1
All	\$1,881.7	\$99.0	\$1,782.7	\$198.1	\$1,584.6	\$396.1

All figures are in US\$ millions.

**APPENDIX 2. Product Service Code Definitions**

The U.S. General Services Administration (GSA) has established formal definitions for the product service codes (PSCs) used in procurement contracts for the federal government. The following table includes the GSA’s definitions for the 15 PSCs featured in this report.

**Table 11. Formal Definitions of Product Service Codes**

<b>PSC</b>	<b>Definition</b>
76	None. This is not a product service code, but a product service group, specifically books, maps, and other publications.
7610	Books and pamphlets Includes: Technical and nontechnical books and pamphlets; regulations; instruction manuals; technical orders Excludes: Sheet and book music; periodicals; bibles
7630	Newspapers and periodicals
7640	Maps, atlases, charts, and globes Excludes: Training aid maps
7641	Aeronautic maps, charts, and geodetic products
7642	Hydrographic maps, charts, and geodetic products
7643	Topographic maps, charts, and geodetic products
7644	Digital maps, charts, and geodetic products

**Table 11. Formal Definitions of Product Service Codes**

PSC	Definition
7650	Drawings and specifications Includes: Federal, military, and departmental specifications
7660	Sheet and book music Excludes: Hymnbooks
7670	Microfilm processed
D317	IT and telecom–Web-based subscription Includes: Subscriptions to data, electronic equivalent of books, periodicals, newspapers, etc.
L076	Technical representative–books, maps, and other publications
R605	Support–administrative: Library
R612	Support–administrative: Information retrieval Includes: Services related to search and storage of text, images, video, and other such data

Source: U.S. General Services Administration, Office of Governmentwide Policy, *Federal Procurement Data System, Product and Service Codes Manual*, Washington, DC, August 2011, 66–202, <https://www.acquisition.gov/PSC%20Manual%20-%20Final%20-%202011%20August%202011.pdf> (accessed September 12, 2011).

**APPENDIX 3. Major Vendors for Major Information Commodities, FY 2010–FY 2014**

The tables below provide spending data for the top vendors of the top information commodities for the most recent five fiscal years, FY 2010 through FY 2014. Five information products and services account for \$2.7 billion in federal spending on information commodities from FY 2010 through FY 2014—94 percent of the overall \$2.8 billion spent in that period. The following tables provide details of spending on those commodities in that five-year period and name the top ten vendors for each commodity.

**Table 12. Federal Information Market, Products and Services, FY 2010–FY 2014**

<b>Products and Services (Product Service Code)</b>	<b>Contracts (in \$ millions)</b>	<b>Percentage of Total Contracts</b>
Web-based subscriptions (D317)	\$671.8	23.9%
Books and pamphlets (7610)	\$599.6	21.3%
Administrative support, information retrieval (R612)	\$541.5	19.2%
Administrative support, library (R605)	\$443.1	15.7%
Newspapers and periodicals (7630)	\$398.7	14.2%
Drawings and specifications (7650)	\$52.8	1.9%
Technical representative-books, maps, and other publications (L076)	\$51.5	1.8%
Digital maps, charts, and geodetic products (7644)	\$33.3	1.2%
Maps, atlases, charts, and globes (7640)	\$9.5	0.3%
Aeronautic maps, charts, and geodetic products (7641)	\$8.7	0.3%
Topographic maps, charts, and geodetic products (7643)	\$2.6	0.1%

**Table 12. Federal Information Market, Products and Services, FY 2010–FY 2014**

<b>Products and Services (Product Service Code)</b>	<b>Contracts (in \$ millions)</b>	<b>Percentage of Total Contracts</b>
Microfilm, processed (7670)	\$1.0	0.0%
Hydrographic maps, charts, and geodetic products (7642)	\$0.8	0.0%
Sheet and book music (7660)	\$0.6	0.0%
Books, maps, other publications (76)	\$0.0	0.0%
<b>Total</b>	<b>\$2,815.4</b>	<b>100.0%</b>

Tables 13 and 14 list the vendors stated in the FPDS-NG, listing parent companies in parentheses after their subsidiaries—“Bureau of National Affairs (Bloomberg),” for example. Although some contractor names in tables 9 and 10 are difficult to interpret—namely “Miscellaneous Foreign Awardee” and “Miscellaneous Foreign Contractor”—these entries for the contract awardees are reproduced verbatim, just as listed in the FPDS-NG.

**Table 13. Top 50 Contractors in the Federal Information Market, FY 1979–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	West Publishing Corp. (Thomson Reuters)	\$654.9	5.4%
2	Reed Elsevier	\$557.5	4.6%
3	GeoEye Inc.	\$448.3	3.7%
4	Computer Sciences Corporation	\$375.5	3.1%
5	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$334.6	2.8%

**Table 13. Top 50 Contractors in the Federal Information Market, FY 1979–  
FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
6	EBSCO	\$306.8	2.5%
7	IHS Global	\$252.2	2.1%
8	Gartner Inc.	\$198.4	1.6%
9	DigitalGlobe Inc.	\$197.1	1.6%
10	Wolters Kluwer	\$128.3	1.1%
11	Swets and Zeitlinger BV	\$126.3	1.0%
12	Lockheed Martin Corporation	\$119.3	1.0%
13	Faxon Company	\$110.1	0.9%
14	XMCO Inc. (Koniag Inc.)	\$108.7	0.9%
15	American Chemical Society	\$107.5	0.9%
16	Bureau of National Affairs	\$102.8	0.8%
17	Dun and Bradstreet	\$91.8	0.8%
18	Cenveo Inc.	\$89.8	0.7%
19	McGraw-Hill Inc.	\$88.4	0.7%
20	Techna-Graphics Inc.	\$83.0	0.7%
21	Altegrity Inc.	\$81.8	0.7%
22	Miscellaneous Foreign Contractors	\$75.6	0.6%

**Table 13. Top 50 Contractors in the Federal Information Market, FY 1979–  
FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
23	Basch Subscriptions Inc.	\$75.6	0.6%
24	Cambridge Information Group Inc.	\$74.9	0.6%
25	Boeing Company	\$74.2	0.6%
26	Pearson Education (Pearson)	\$74.1	0.6%
27	Labat-Anderson	\$70.4	0.6%
28	Alaska Newspapers Inc. (Calista)	\$70.2	0.6%
29	Hewlett-Packard Company	\$69.7	0.6%
30	Key Book Service Inc.	\$69.5	0.6%
31	Readmore	\$69.2	0.6%
32	GCI Information Services Inc.	\$68.9	0.6%
33	Alutiiq Business Services (Afognak Native Corporation)	\$64.3	0.5%
34	ChoicePoint Inc.	\$61.7	0.5%
35	Information International Associates Inc.	\$60.7	0.5%
36	Western Publishing Company Inc.	\$59.1	0.5%
37	Internet Systems Inc.	\$56.0	0.5%
38	Cartech Inc.	\$55.3	0.5%
39	American Overseas Book Company Inc.	\$51.6	0.4%

**Table 13. Top 50 Contractors in the Federal Information Market, FY 1979–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
40	CSR Inc.	\$51.4	0.4%
41	Andrulis Corp. (Dynamics Research Corporation)	\$50.6	0.4%
42	Academy for Educational Development Inc.	\$44.2	0.4%
43	International Health Terminology Standards Development Organisation, IHTSDO	\$43.1	0.4%
44	EADS North America Holdings Inc.	\$40.0	0.3%
45	All Native Services	\$37.9	0.3%
46	Pattison Group Inc.	\$37.6	0.3%
47	Logical Technical Services Corp. (Sentrillion)	\$37.1	0.3%
48	Thomson Reuters	\$34.9	0.3%
49	Wilson Information Services Corp.	\$34.9	0.3%
50	QuickSeries Publishing Inc.	\$32.0	0.3%
	<b>Total</b>	<b>\$6,207.8</b>	<b>51.2%</b>

**Table 14. Top 50 Contractors in the Federal Information Market, FY 2010–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>	<b>Last Five Years as Pct. of All Years</b>
1	Reed Elsevier	\$233.6	8.3%	41.9%
2	West Publishing Corp. (Thomson Reuters)	\$221.8	7.9%	33.9%



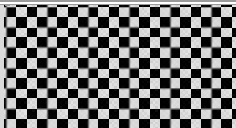
**Table 14. Top 50 Contractors in the Federal Information Market, FY 2010–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>	<b>Last Five Years as Pct. of All Years</b>
3	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$138.0	4.9%	41.2%
4	EBSCO	\$83.9	3.0%	27.3%
5	Swets and Zeitlinger BV	\$68.5	2.4%	54.2%
6	Dun and Bradstreet	\$64.5	2.3%	70.3%
7	American Chemical Society	\$49.5	1.8%	46.1%
8	Cambridge Information Group Inc.	\$49.2	1.7%	65.6%
9	Wolters Kluwer	\$45.5	1.6%	35.5%
10	IHS Global	\$45.1	1.6%	17.9%
11	Miscellaneous Foreign Contractors	\$44.4	1.6%	58.7%
12	Basch Subscriptions Inc.	\$40.4	1.4%	53.4%
13	All Native Services	\$37.9	1.3%	100.0%
14	International Health Terminology Standards Development Organisation, IHTSDO	\$28.6	1.0%	66.4%
15	Computer Sciences Corporation	\$28.3	1.0%	7.5%
16	Pearson Education (Pearson)	\$28.1	1.0%	37.9%
17	Cox Subscriptions Inc.	\$26.8	1.0%	88.3%
18	Bureau of National Affairs	\$24.2	0.9%	23.6%
19	Economist	\$22.7	0.8%	84.9%
20	McGraw-Hill Inc.	\$22.6	0.8%	25.6%
21	Hewlett-Packard Company	\$22.1	0.8%	31.8%
22	XMCO Inc. (Koniag Inc.)	\$20.2	0.7%	18.6%

**Table 14. Top 50 Contractors in the Federal Information Market, FY 2010–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>	<b>Last Five Years as Pct. of All Years</b>
23	Altegrity Inc.	\$17.5	0.6%	21.4%
24	Library Associates Inc.	\$16.9	0.6%	55.8%
25	QuickSeries Publishing Inc.	\$16.6	0.6%	52.0%
26	Advanced Educational Products Inc.	\$15.7	0.6%	57.6%
27	DRT Strategies Inc.	\$14.9	0.5%	100.0%
28	Pattison Group Inc.	\$14.2	0.5%	37.7%
29	State of California	\$12.4	0.4%	60.3%
30	Four Points Technology	\$12.4	0.4%	100.0%
31	Mackin Book Company	\$12.1	0.4%	49.6%
32	Bulletin News LLC	\$11.2	0.4%	50.0%
33	Complete Book & Media Supply Inc.	\$11.1	0.4%	54.2%
34	Education Media and Publishing Group Limited	\$10.2	0.4%	54.5%
35	Westat Inc.	\$10.1	0.4%	33.1%
36	Boeing Company	\$9.5	0.3%	12.9%
37	Alutiiq Business Services (Afognak Native Corporation)	\$9.5	0.3%	14.8%
38	Verizon Communications Inc.	\$9.4	0.3%	94.7%
39	LRP Associates Ltd	\$9.1	0.3%	40.9%
40	New Directions Technologies Inc.	\$9.0	0.3%	31.0%
41	John Wiley & Sons Inc.	\$8.9	0.3%	65.7%
42	Heitech Services Inc.	\$8.4	0.3%	69.1%

**Table 14. Top 50 Contractors in the Federal Information Market, FY 2010–FY 2014**

	<b>Contractor (Parent Company in Parentheses)</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>	<b>Last Five Years as Pct. of All Years</b>
43	Wilson Information Services Corp.	\$7.6	0.3%	21.9%
44	News Corporation	\$7.5	0.3%	46.0%
45	Southwest Research Institute Inc.	\$7.4	0.3%	67.7%
46	University of Maryland System	\$7.4	0.3%	45.8%
47	Gartner Inc.	\$7.2	0.3%	3.6%
48	University of North Carolina System	\$7.0	0.2%	46.3%
49	GRB Environmental Services Inc.	\$6.8	0.2%	24.0%
50	University of Utah	\$6.7	0.2%	53.9%
	<b>Total</b>	<b>\$1,642.8</b>	<b>58.3%</b>	

**Table 15. Top Contractors for Web-Based Subscriptions (PSC D317), FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	West Publishing Corp. (Thomson Reuters)	\$91.9	13.7%
2	Reed Elsevier	\$76.4	11.4%
3	Cambridge Information Group Inc.	\$34.6	5.1%
4	International Health Terminology Standards Development Organisation, IHTSDO	\$28.6	4.3%
5	EBSCO	\$15.1	2.2%
6	DRT Strategies Inc.	\$14.9	2.2%

**Table 15. Top Contractors for Web-Based Subscriptions (PSC D317), FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
7	Cox Subscriptions Inc.	\$14.2	2.1%
8	Dun and Bradstreet	\$13.7	2.0%
9	Four Points Technology	\$12.3	1.8%
10	IHS Global	\$11.4	1.7%
	<b>Total</b>	<b>\$312.9</b>	<b>46.6%</b>

**Table 16. Top Contractors for Books and Pamphlets (PSC 7610), FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	West Publishing Corp. (Thomson Reuters)	\$48.1	8.0%
2	American Chemical Society	\$45.8	7.6%
3	Basch Subscriptions Inc.	\$35.5	5.9%
4	Pearson Education (Pearson)	\$27.7	4.6%
5	Reed Elsevier	\$24.0	4.0%
6	EBSCO	\$22.2	3.7%
7	Wolters Kluwer	\$21.7	3.6%
8	Miscellaneous Foreign Contractors	\$21.1	3.5%
9	XMCO Inc. (Koniag Inc.)	\$20.2	3.4%

**Table 16. Top Contractors for Books and Pamphlets (PSC 7610), FY 2010–FY 2014**

<b>Contractor</b>		<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
10	QuickSeries Publishing Inc.	\$16.6	2.8%
<b>Total</b>		<b>\$282.9</b>	<b>47.2%</b>

**Table 17. Top Contractors for Administrative Support: Information Retrieval (PSC R612), FY 2010–FY 2014**

<b>Contractor</b>		<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	Reed Elsevier	\$68.5	12.7%
2	Dun and Bradstreet	\$48.4	8.9%
3	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$41.2	7.6%
4	West Publishing Corp.	\$39.5	7.3%
5	Hewlett-Packard Company	\$22.1	4.1%
6	IHS Global	\$10.8	2.0%
7	Westat Inc.	\$10.1	1.9%
8	Bureau of National Affairs	\$8.8	1.6%
9	State of California	\$8.2	1.5%
10	State of Texas	\$6.6	1.2%
<b>Total</b>		<b>\$264.2</b>	<b>48.8%</b>

**Table 18. Top Contractors for Administrative Support: Library (PSC R605),  
FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	Primus Solutions Inc. (Arctic Slope Regional Corp.)	\$96.8	21.9%
2	Computer Sciences Corporation	\$18.2	4.1%
3	Library Associates Inc.	\$16.9	3.8%
4	Altegrity Inc.	\$15.0	3.4%
5	EBSCO	\$11.7	2.6%
6	Heitech Services Inc.	\$8.3	1.9%
7	Wilson Information Services Corp.	\$7.6	1.7%
8	University of Maryland System	\$7.3	1.6%
9	University of North Carolina System	\$7.0	1.6%
10	GRB Environmental Services Inc.	\$6.8	1.5%
	<b>Total</b>	<b>\$195.8</b>	<b>44.2%</b>

**Table 19. Top Contractors for Newspapers and Periodicals (PSC 7630),  
FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
1	Reed Elsevier	\$58.9	14.8%
2	Swets and Zeitlinger BV	\$56.0	14.0%
3	West Publishing Corp.	\$35.0	8.8%

**Table 19. Top Contractors for Newspapers and Periodicals (PSC 7630),  
FY 2010–FY 2014**

	<b>Contractor</b>	<b>Contracts (in \$ millions)</b>	<b>Pct. of All Contracts</b>
4	EBSCO	\$33.0	8.3%
5	Miscellaneous Foreign Contractors	\$16.3	4.1%
6	Pattison Group Inc.	\$14.2	3.6%
7	Economist	\$12.9	3.2%
8	Cambridge Information Group Inc.	\$8.9	2.2%
9	IHS Global	\$8.8	2.2%
10	Wolters Kluwer	\$6.8	1.7%
	<b>Total</b>	<b>\$250.8</b>	<b>62.9%</b>

#### APPENDIX 4. Regression Diagnostics and Statistics

The forecast figures in this report are the result of a linear regression analysis. This appendix contains the regression data and output diagnostics, as well as the regression analysis statistics. Please note that all dollar figures are adjusted for inflation, with figures expressed in FY 2009 dollars.

Table 20, below, contains all data that the researcher used in various regression analyses, and Table 21, below, contains all data used in time series analyses. Regression models incorporating spending data for the years from FY 1979 through FY 2014 had problems with insignificant regression parameters, autocorrelation in residuals, or both. By contrast, these problems did not materialize with regression models based on spending data for the years FY 1997 through FY 2014. Data for these years and the graphs of this data suggest that federal spending on information products and services underwent a substantial and sustained increase in the years from FY 1997 through FY 2014, reaching a generally higher level of spending than occurred during the previous years, from FY 1979 through FY 1996.

**Table 20. Data Used in the Regression Analysis**

Fiscal Year	$X_i$	Federal Spending on Information Products and Services, $Y_i$
1979	0	\$217.4
1980	1	\$156.4
1981	2	\$98.6
1982	3	\$104.7
1983	4	\$103.1
1984	5	\$144.3
1985	6	\$146.3
1986	7	\$108.6
1987	8	\$97.3
1988	9	\$134.0
1989	10	\$122.2
1990	11	\$120.1
1991	12	\$165.5
1992	13	\$213.3
1993	14	\$227.7
1994	15	\$310.4
1995	16	\$236.5
1996	17	\$246.0



**Table 20. Data Used in the Regression Analysis**

Fiscal Year	$X_i$	Federal Spending on Information Products and Services, $Y_i$
1997	18	\$289.7
1998	19	\$301.3
1999	20	\$343.6
2000	21	\$362.3
2001	22	\$474.8
2002	23	\$495.6
2003	24	\$710.6
2004	25	\$579.3
2005	26	\$573.9
2006	27	\$673.9
2007	28	\$464.3
2008	29	\$587.6
2009	30	\$510.4
2010	31	\$524.7
2011	32	\$567.4
2012	33	\$567.0
2013	34	\$607.7
2014	35	\$548.7

**Table 21. Data Used in the Time Series Analysis**

Fiscal Quarter	Federal Spending on Information Products and Services	Fiscal Quarter	Federal Spending on Information Products and Services
1979 Q1	\$39.9	1983 Q2	\$21.0
1979 Q2	\$108.8	1983 Q3	\$24.4
1979 Q3	\$25.3	1983 Q4	\$35.9
1979 Q4	\$43.4	1984 Q1	\$45.3
1980 Q1	\$30.2	1984 Q2	\$21.6
1980 Q2	\$21.7	1984 Q3	\$16.5
1980 Q3	\$32.8	1984 Q4	\$60.9
1980 Q4	\$71.7	1985 Q1	\$41.3
1981 Q1	\$21.6	1985 Q2	\$21.6
1981 Q2	\$24.8	1985 Q3	\$44.4
1981 Q3	\$21.4	1985 Q4	\$38.9
1981 Q4	\$30.8	1986 Q1	\$36.3
1982 Q1	\$18.8	1986 Q2	\$19.8
1982 Q2	\$26.9	1986 Q3	\$20.6
1982 Q3	\$28.3	1986 Q4	\$32.0
1982 Q4	\$30.8	1987 Q1	\$31.7
1983 Q1	\$21.9	1987 Q2	\$15.5

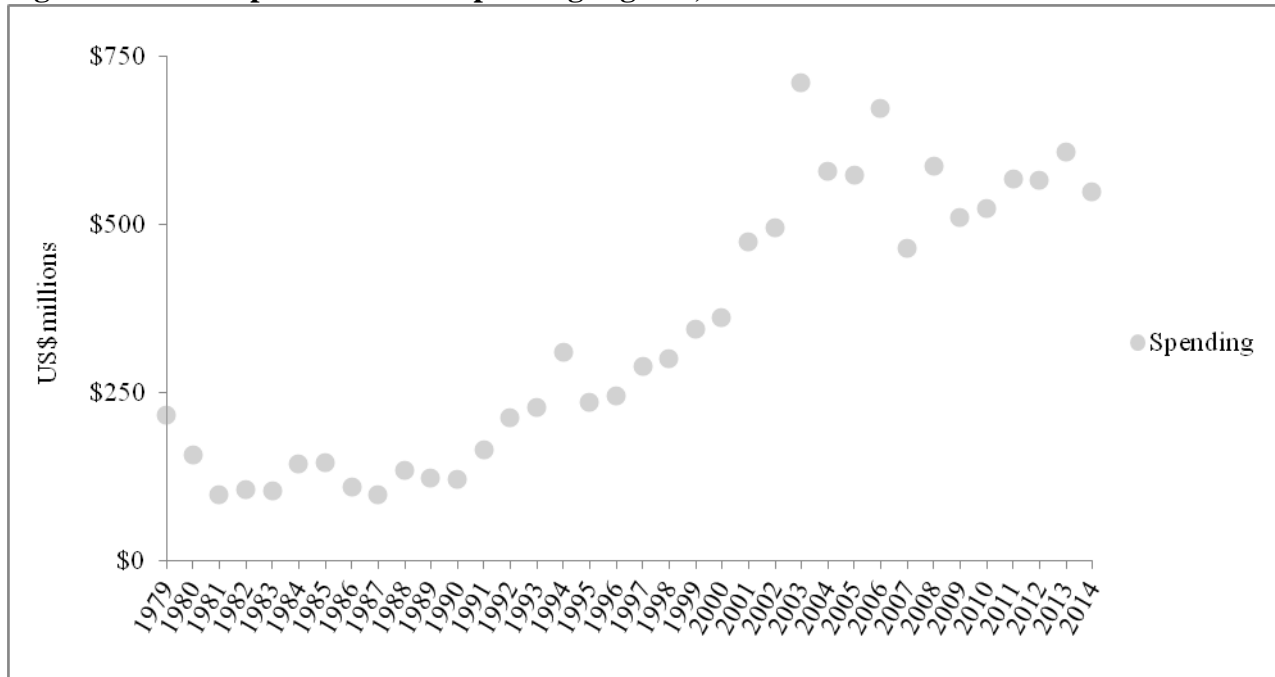
**Table 21. Data Used in the Time Series Analysis**

Fiscal Quarter	Federal Spending on Information Products and Services	Fiscal Quarter	Federal Spending on Information Products and Services
1987 Q3	\$24.3	1997 Q4	\$88.7
1987 Q4	\$25.8	1998 Q1	\$104.4
1988 Q1	\$41.5	1998 Q2	\$60.0
1988 Q2	\$26.2	1998 Q3	\$45.2
1988 Q3	\$28.0	1998 Q4	\$91.8
1988 Q4	\$38.4	1999 Q1	\$121.5
1989 Q1	\$44.2	1999 Q2	\$67.3
1989 Q2	\$19.1	1999 Q3	\$64.1
1989 Q3	\$26.9	1999 Q4	\$90.8
1989 Q4	\$32.0	2000 Q1	\$115.9
1990 Q1	\$36.0	2000 Q2	\$60.4
1990 Q2	\$31.6	2000 Q3	\$66.7
1990 Q3	\$18.5	2000 Q4	\$119.3
1990 Q4	\$34.0	2001 Q1	\$116.4
1991 Q1	\$46.0	2001 Q2	\$84.3
1991 Q2	\$49.9	2001 Q3	\$103.9
1991 Q3	\$24.4	2001 Q4	\$170.3
1991 Q4	\$45.2	2002 Q1	\$149.7
1992 Q1	\$58.8	2002 Q2	\$87.9
1992 Q2	\$51.4	2002 Q3	\$99.6
1992 Q3	\$33.6	2002 Q4	\$158.5
1992 Q4	\$69.5	2003 Q1	\$134.5
1993 Q1	\$56.0	2003 Q2	\$175.2
1993 Q2	\$80.7	2003 Q3	\$158.1
1993 Q3	\$40.3	2003 Q4	\$242.7
1993 Q4	\$50.7	2004 Q1	\$121.6
1994 Q1	\$74.4	2004 Q2	\$186.1
1994 Q2	\$52.7	2004 Q3	\$98.2
1994 Q3	\$56.9	2004 Q4	\$173.4
1994 Q4	\$126.4	2005 Q1	\$149.5
1995 Q1	\$86.9	2005 Q2	\$138.2
1995 Q2	\$36.9	2005 Q3	\$75.6
1995 Q3	\$43.8	2005 Q4	\$210.6
1995 Q4	\$68.9	2006 Q1	\$140.5
1996 Q1	\$76.5	2006 Q2	\$182.2
1996 Q2	\$51.7	2006 Q3	\$165.1
1996 Q3	\$44.1	2006 Q4	\$186.2
1996 Q4	\$73.7	2007 Q1	\$83.9
1997 Q1	\$91.6	2007 Q2	\$92.3
1997 Q2	\$60.4	2007 Q3	\$90.3
1997 Q3	\$48.9	2007 Q4	\$197.7

**Table 21. Data Used in the Time Series Analysis**

Fiscal Quarter	Federal Spending on Information Products and Services	Fiscal Quarter	Federal Spending on Information Products and Services
2008 Q1	\$121.0	2011 Q3	\$144.5
2008 Q2	\$195.3	2011 Q4	\$184.9
2008 Q3	\$98.9	2012 Q1	\$134.7
2008 Q4	\$172.4	2012 Q2	\$149.8
2009 Q1	\$108.8	2012 Q3	\$86.7
2009 Q2	\$100.9	2012 Q4	\$195.8
2009 Q3	\$96.7	2013 Q1	\$117.9
2009 Q4	\$204.0	2013 Q2	\$121.9
2010 Q1	\$118.5	2013 Q3	\$151.3
2010 Q2	\$108.1	2013 Q4	\$216.6
2010 Q3	\$96.9	2014 Q1	\$99.3
2010 Q4	\$201.1	2014 Q2	\$121.6
2011 Q1	\$141.7	2014 Q3	\$137.2
2011 Q2	\$96.3	2014 Q4	\$190.6

**Figure 34. Scatterplot of Annual Spending Figures, FY 1979–FY 2014**



**Table 22. Regression Analysis Statistics**

**ANOVA for Linear Regression Model of FY 1997–FY 2014**

	d.f.	SS	MS	F	Sig. F
Regression	2	145,941.1	72,970.5	10.9	0.001
Residual	14	98,993.9	7,071.0		
Total	16	244,934.9			

**Regression Statistics**

Model	FY 1979–FY 2014			FY 1997–FY 2014		
	Linear	Quadratic	Cubic	Linear	Quadratic	Cubic
R <sup>2</sup>	0.817	0.823	0.917	0.404	0.662	0.716
Multiple R <sup>2</sup>	0.904	0.907	0.957	0.636	0.813	0.846
Adjusted R <sup>2</sup>	0.812	0.812	0.909	0.367	0.641	0.846
Model Standard Error of Equation (SE <sub>ŷ</sub> )	86.4	86.3	60.2	95.5	74.3	70.5
Durbin-Watson d-Test	0.774	0.821	1.519	1.130	1.840	2.231
d <sub>L,1%</sub>	1.153	1.098	1.043	0.805	0.708	0.614
d <sub>U,1%</sub>	1.376	1.442	1.513	1.259	1.422	1.604
4- d <sub>U,1%</sub>	2.624	2.558	2.487	2.741	2.578	2.396
4- d <sub>L,1%</sub>	2.847	2.902	2.957	3.195	3.292	3.386
Insignificant parameters (i.e. parameters with 95% confidence intervals containing 0)	None	None	β <sub>2</sub>	None	None	β <sub>1</sub> , β <sub>3</sub>

**Linear Regression Output**

	Coefficient	Standard Error	t Statistic*	P-value	Lower 95% Confidence Interval	Upper 95% Confidence Interval
$\beta_0$	388.656	43.2	8.995	0.000	281.808	495.504
$\beta_1$	14.294	4.3	3.294	0.005	3.564	25.024

\* $t_{0.05, 14 \text{ d.f.}} = 2.145$

**Figure 35. Scatterplots of Linear and Quadratic Regression Residuals versus X-Values**

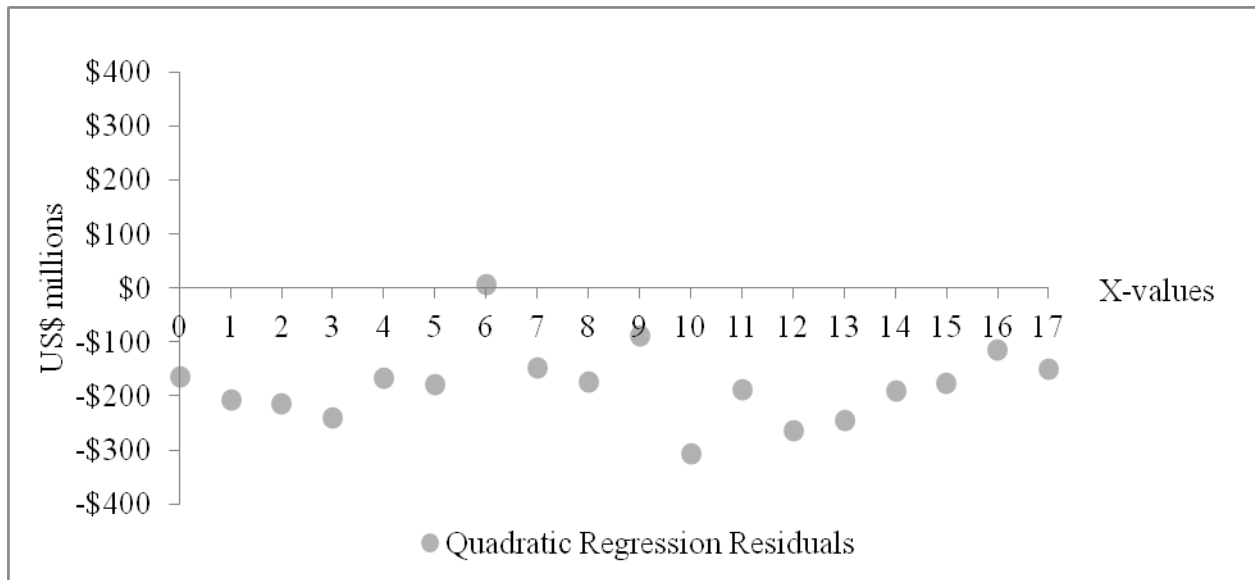
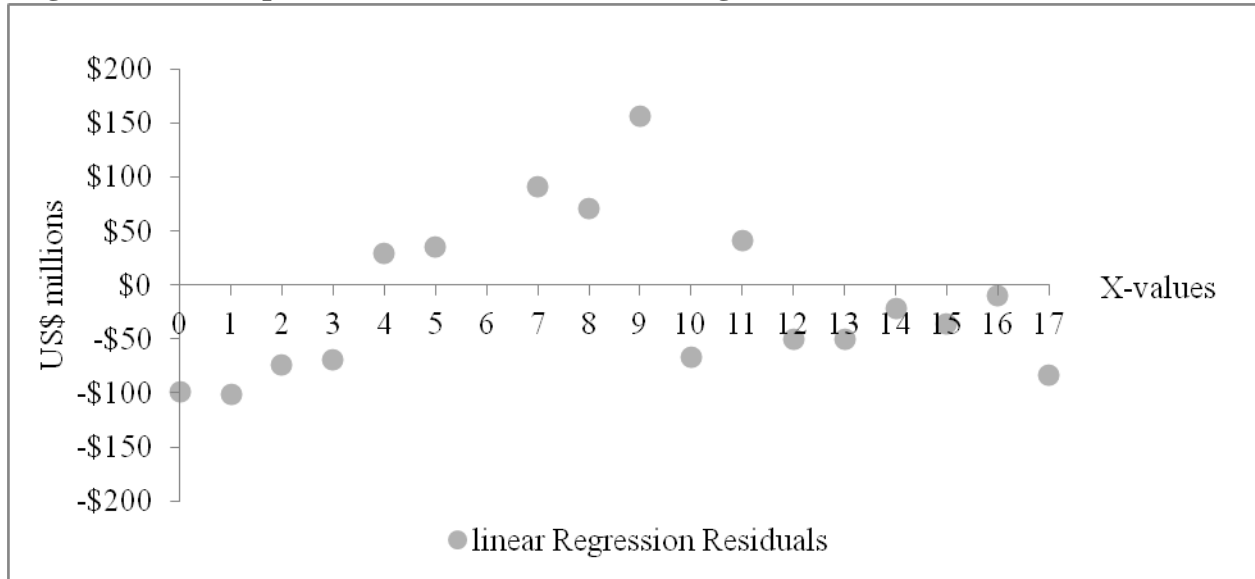
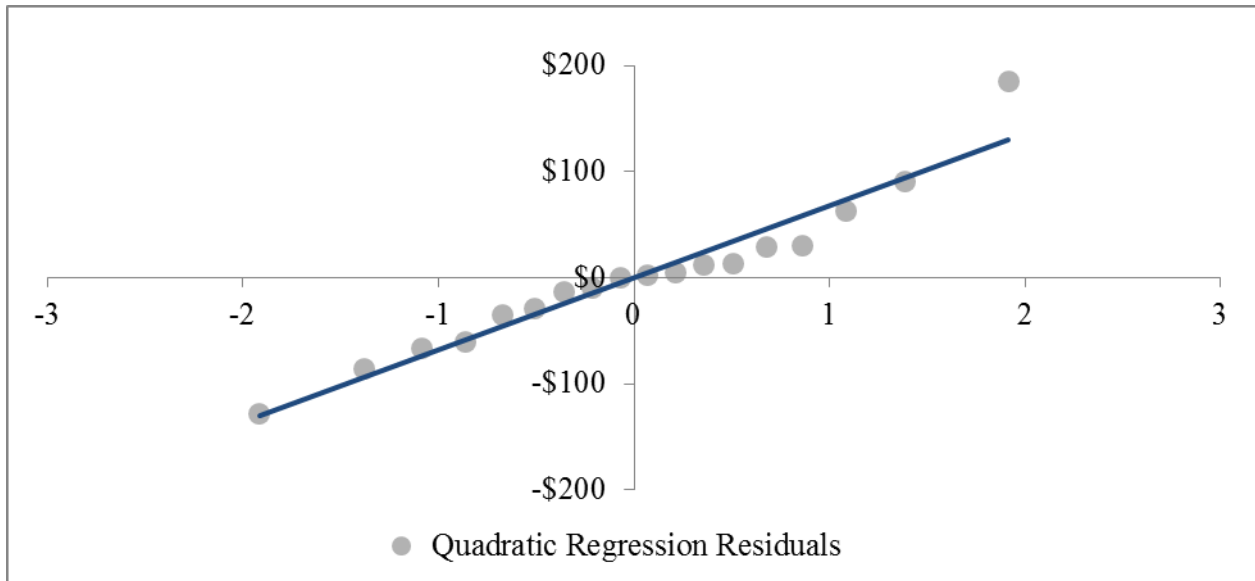
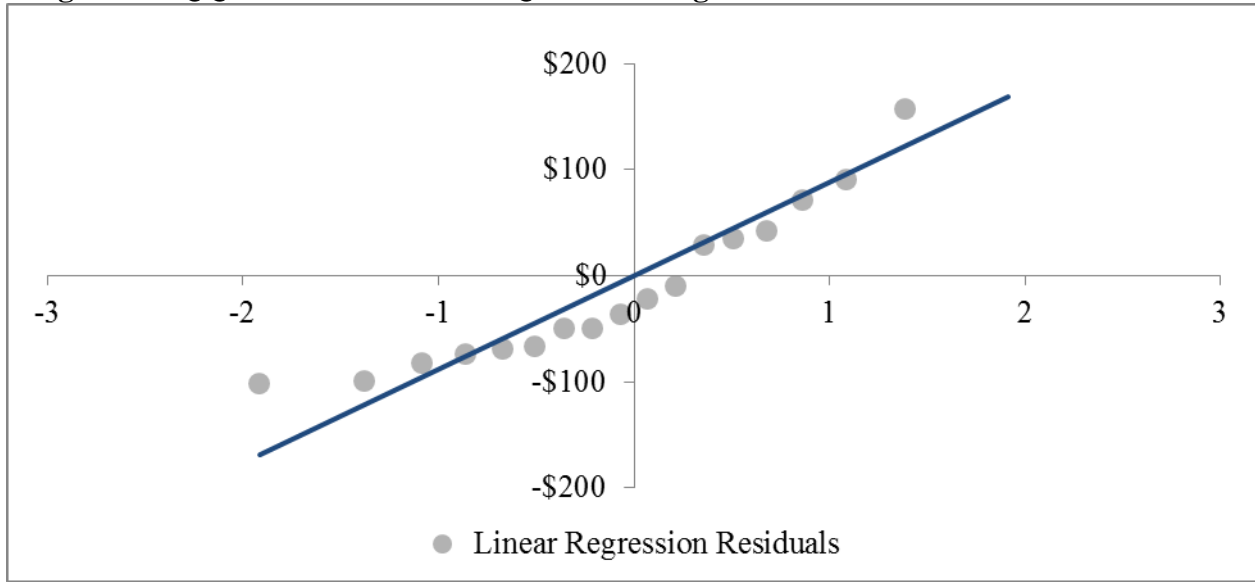
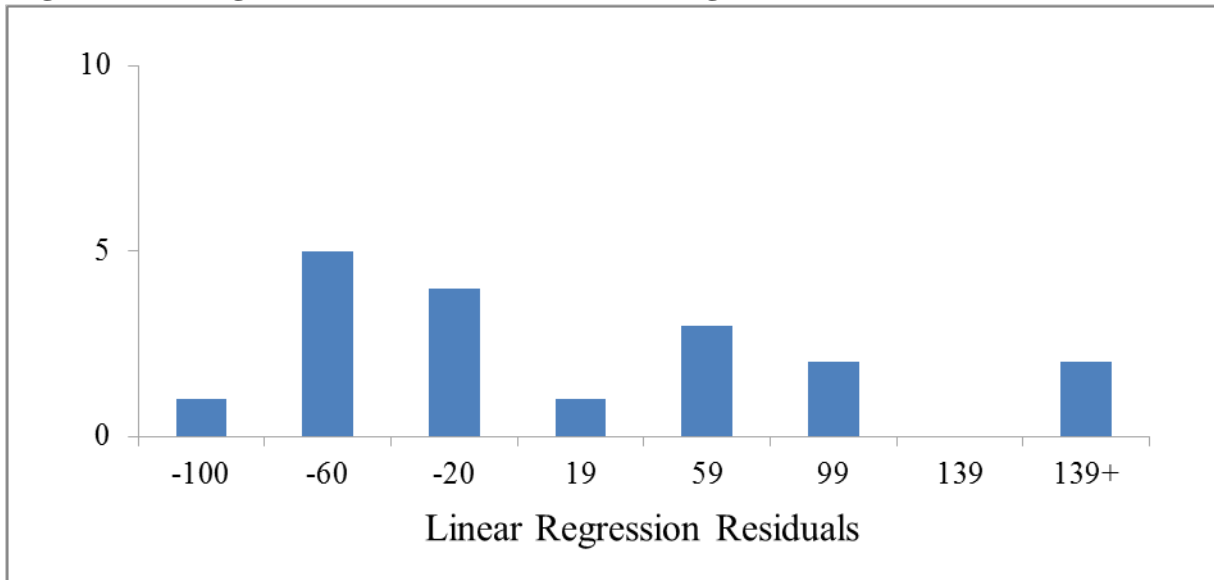


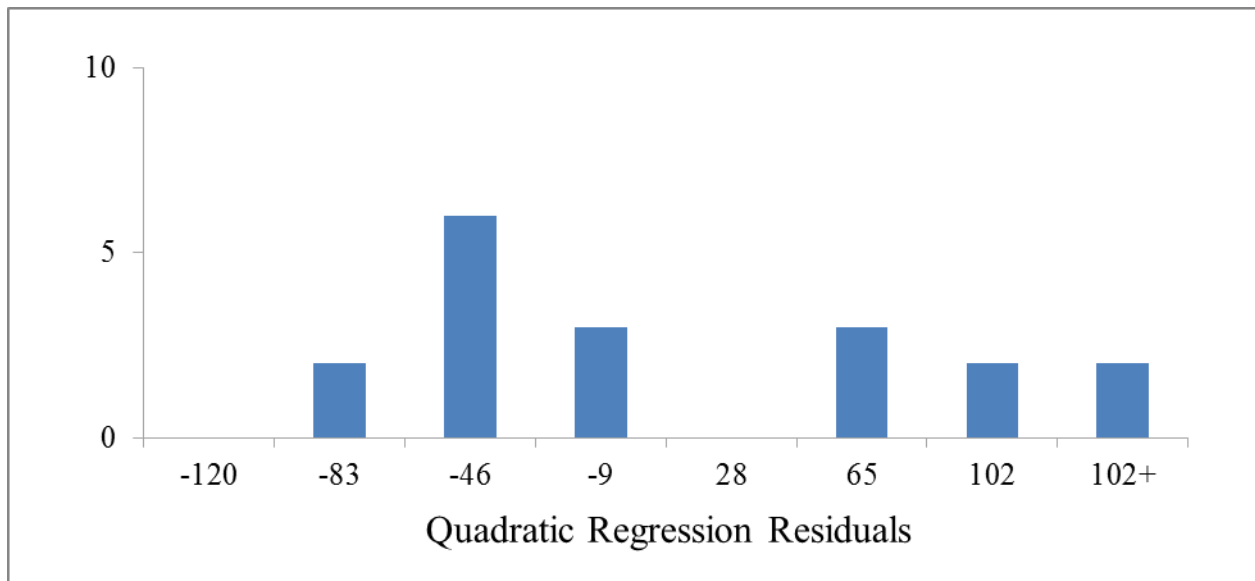
Figure 36. QQ-Plots of Linear and Quadratic Regression Residuals



**Figure 37. Histograms of Linear and Quadratic Regression Residuals**



Bin	Frequency
-100	1
-60	5
-20	4
19	1
59	3
99	2
139	0
>139	2



Bin	Frequency
-120	0
-83	2
-46	6
-9	3
28	0
65	3
102	2
>102	2

**Table 23. Statistics for Time Series Models for FY 1997 Q1 through FY 2014 Q4**

Time-Series Method	Parameters	MAPE	MAD	MSE	RMSE
Multiplicative Time-Series Model	n/a	47.41	85.01	9,422.68	97.07
Seasonal Forecast w/ Dummy Variables	n/a	22.95	25.87	1,034.37	32.16
Exponential Smoothing	$\alpha=0.2$	30.29	35.68	1,790.01	42.31
Exponential Smoothing	$\alpha=0.5$	32.98	38.76	2,183.63	46.73
Exponential Smoothing	$\alpha=0.8$	35.89	43.16	2,807.72	52.99
Exponential Smoothing	$\alpha=0.1$	29.32	35.25	1,799.35	42.42
Exponential Smoothing	$\alpha=0.117$ (from Excel Solver)	36.19	41.02	2,371.13	48.69
Dbl. Exponential Smoothing	$\alpha=0.0722$ , $\beta=1.000$ (fm Excel Solver)	29.67	34.88	1,779.91	42.19



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