CSIS-CM-15-121

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#HQ0034-12-A-0022

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Acknowledgments

The study team would like to acknowledge the contributions of Jacob Bell, Gabriel Coll, Samantha Cohen, Ryan Crotty, Guy Nzeribe, Madison Riley, and John Vick to the quality and robustness of this research effort.

Contents

Figures

1. Introduction

For almost a decade, the Defense-Industrial Initiatives Group at the Center for Strategic and International Studies (CSIS) has analyzed and reported on trends in federal contracting in general, and Department of Defense (DoD) contracting specifically. CSIS has, in recent years, sought to drill down deeper into this data with regard to DoD's key components, and for the different varieties of goods and services for which DoD contracts. Past CSIS work for the Naval Postgraduate School has focused on trends in DoD services contracting. In this report, the study team shifts its focus to DoD products contracting.

Products accounted for more than half of all DoD contract obligations in the early 1990s, but since then, roughly equal shares of obligations have been awarded for products and services in most years, with both hovering around 40 percent (CSIS treats R&D contracts as a category distinct from products and services). The driving force behind the previous CSIS research on defense services was the general lack of attention paid to a segment of the DoD contracting portfolio that, since 2009, has accounted for a slightly larger share of overall DoD contract obligations than did products.

Even for DoD products, however, the existing literature tends to focus on large, high-profile, and high-cost programs that qualify as Major Defense Acquisition Programs (MDAPs). This focus, however, does not capture the full range of products for which DoD contracts. Though the data do not provide a direct measure of the percentage of defense products contract obligations that go to MDAPs, various indirect measures show that more than half of defense products obligations are awarded for non-MDAP products.[1] In an effort to fill a gap in the literature, CSIS has undertaken a comprehensive analysis of trends in DoD products contracting and its key components: the Army, Navy, Air Force, Defense Logistics Agency (DLA), and "Other DoD," which comprises all remaining contracting entities not captured by the first four categories.

In order to facilitate analysis of the differences in contracting trends between different types of products, CSIS has created a taxonomy of the universe of DoD products,[2] using U.S. government Product and Service Codes (PSCs) to separate DoD products into 10 product categories: Aircraft; Clothing & Subsistence; Electronics & Communications; Engines & Power Plants; Fuels; Ground Vehicles; Launchers & Munitions; Missiles & Space; Ships; and "Other Products."[3]

This paper focuses on four areas related to both historical and recent trends in defense products:

- Historical trends in competition for DoD products

[1] The six product categories that are not primarily composed of platforms and programs related to MDAPs (Clothing & Subsistence, Electronics & Communications, Fuels, Engines & Power Plants, Launchers & Munitions, and "Other Products") accounted for 55 percent of DoD products contracts in 2014, though those categories do include some MDAPs. Using the FPDS *system equipment code* field, over 60 percent of contract obligations are not associated with an MDAP in 2014, but that field is not filled in consistently. Though neither of these methods can provide a precise figure for the share of products contract obligations associated with MDAPs, it is safe to say that a significant share of defense products contract obligations, perhaps as much as half, are not associated with MDAPs.

[2] Though the CSIS DoD products taxonomy differs from the portfolio groupings used by DoD, CSIS has the capability to cross-walk between the two taxonomies.

[3] The ten product categories were created by manually classifying the four digit PSCs. The full CSIS PSC classification tables (for products, services, and research & development) are available on the CSIS GitHub data repository: https://github.com/CSISdefense/Lookup-Tables/blob/master/ProductOrServiceCodes.csv

- Changes in the industrial base for DoD products
- The impact of sequestration and its aftermath on DoD products contracting overall, by component and by product category
- Trends in other contract characteristics: contract pricing mechanism, contract vehicle, and contract size

By broadening the scope of examination of products beyond just MDAPs, and adding in contracting data from pre-2000, as discussed further below, this study allows for an assessment of how the post–Cold War drawdown of the 1990s affected the industrial base across the full range of products acquisition. It also allows for a comparison of this history with the changes seen to date happening as a result of the current defense drawdown, sequestration, and its aftermath. While the effects of the post–Cold War industry consolidation (i.e., the Last Supper) are overwhelmingly clear in the contracting data from the late 1990s, there is as yet no similar clear trend that has occurred as a result of the current drawdown. However, it is possible that another structural change in the defense industry could be occurring, but that it is not yet evident in the contracting data due to time lags in acquisition. The methodology and research tools developed in this study, however, will enable CSIS to track such changes as data on contracts from FY2015 and beyond become available.

1. Methodology

To provide greater historical context to recent trends, CSIS has integrated FY1990–1999 contracting data into its analysis for this study. All data from FY2000–2014 is drawn from the publicly available Federal Procurement Data System (FPDS) through the USASpending.gov portal. Due to a lack of pre-2000 data available through USASpending.gov, and how unwieldy it is to get the full range of relevant study variables for the entire department using the FPDS.gov web tool, CSIS is using archival DD350 data[4] for the 1990–1999 period.[5] The adoption of archival DD350 data for the 1990–1999 poses challenges discussed below, of which CSIS is aware and has worked diligently to mitigate and standardize.

This report relies on the methodology that the study team has established and refined for analysis of federal contracting data over the course of the last decade.[6] For this study in particular, there are a few key differences and updates:

- All dollar figures are in constant 2014 dollars, using the latest OMB deflators.
- In FY2013, the Defense Commissary Agency (DeCA) stopped reporting most of its contract obligations (approximately $5 billion) into FPDS. Because this creates a significant data discrepancy that distorts trend analysis, CSIS has excluded DeCA from the dataset throughout the 1990–2014 study period.
- For analysis of the industrial base, the composition of the "Big 6" defense vendors has changed—BAE Systems, which has declined as a DoD vendor in recent years, has been replaced by United Technologies for all years in the dataset.

Notable Limitations and Gaps in Pre-2000 Contract Data

Use of archival DD350 data for the 1990–1999 period carries some cost in data quality, as there are notable differences in coding schema and granularity between the DD350s and the modern FPDS architecture. The most notable issues:

- DD350 data for FY1990–1999 reflect pre-FY2004 reporting thresholds, which did not require DoD to report more than summary information on contracts below $25,000.
- FY1990 has a significant percentage of data left blank or otherwise unclassifiable, mostly in the fields used for competition, pricing mechanism, and vehicle.
- FY1994 data had a serious data issue, where nearly all Army contracts were improperly classified under other components. CSIS has been able to partially correct this issue, and is continuing to seek a full solution, but Army contract obligations for 1994 remain understated.
- The DD350 does not include the "Statutory Exemption to Fair Opportunity" field, which CSIS uses for greater precision on levels of competition for Indefinite Delivery Vehicle (IDV) contracts.
- Prior to FY1997, DD350 data did not reliably differentiate between numbers of offers greater than two (such that most contracts receiving two or more offers had "2" listed under number of offers.) As such, pre-1997 competition data have reduced granularity in terms of number of offers.

[4] Form DD350 was the main contract information gathering mechanism for DoD contracting data until the exclusive adoption of FPDS. Though archival DD350 data was, at one time, available online through DoD sources, at present it is available primarily through the National Archives.

[5] Past CSIS work has at times included 1990–1999 data extracted from the FPDS.gov webtool, but that approach did not allow for examining vendor size or examining more than one variable at a time.

[6] See http://csis.org/program/methodology for the complete methodology.

Attempts to use data from FPDS.gov to address these issues have been hampered by a more serious data gap: for 1990–1994, the total DoD contract obligations in FPDS are approximately $20 billion per year lower than in the data contained in the DD350s, representing about a sixth of total DoD contract obligations for those years. Upon further investigation, the study team found that a number of large contracts in the DD350 dataset are either completely missing from FPDS or have vastly lower obligation levels associated with them. CSIS is currently engaged with policymakers inside DoD to raise awareness of this issue, identify the source of the data gap, and work toward a solution.

Though these are serious data quality issues, CSIS nonetheless believes the overall quality and reliability of the dataset is more than sufficient to perform meaningful trend analysis.

2. Literature Review

Defense Products Literature Review

This literature review presents a sample of the academic, industrial, and governmental discourse on product-specific defense acquisitions.

If acquisition reform setbacks are one trademark of the defense acquisition domain, then the absence of extensive literature is another. Within the already-scant acquisition literature landscape, there exists a considerable gap between MDAPs and more ordinary acquisition projects. This trend mirrors that of real spending on MDAPs by DoD. According to the Government Accountability Office's (GAO) analysis of DoD data, "the ten highest-cost programs accounted for 59 percent of the development and procurement cost and the majority of cost growth in 2013."[7] As a result, the majority of acquisition research and literature understandably concerns MDAPs, which include high-profile projects such as the F-35 joint strike fighter (JSF) and the Navy littoral combat ship (LCS).

However, lower-profile acquisition project areas such as subsistence, electronic systems, and fuels are also vital to DoD capabilities, and understanding their respective project performances is critical for achieving resource efficiencies within DoD. Therefore, this literature review places an emphasis on less prominent acquisition programs to gain a more complete understanding of the DoD acquisition landscape.

This literature review is divided into two distinct parts: a brief background with corresponding literature regarding the current defense acquisition landscape and efforts for reform; and an overview of literature covering specific product areas:

- Aircraft
- Ground Vehicles
- Ships
- Missiles & Space
- Engines & Power Plants
- Electronics & Communications
- Fuels
- Launchers & Munitions
- Clothing & Subsistence
- "Other Products"

[7] U.S. Government Accountability Office, "Defense Acquisitions: Assessments of Selected Weapon Programs," March 2014, http://www.gao.gov/assets/670/662184.pdf.

Defense Acquisition Landscape and Reform

Defense acquisition projects and efforts for their reform are scrutinized by a host of stakeholders: DoD, Congress, the GAO, think tanks such as CSIS and other independent observers, and the media. Each has a particular focus within the realm of defense acquisitions, but a broad survey of their publications indicates significant concern that defense acquisitions have been characterized at times by failed projects, cost overruns, project delays, lack of competition, and a short-handed and sometimes ill-equipped acquisition workforce.

One example of this concern is expressed in the 2014 version of GAO's annual report assessing selected weapon programs that included detailed analysis of 38 MDAPs. Overall, the report found that the total size of DoD's MDAP portfolio decreased from 85 programs to 80 programs while the estimated total cost increased marginally by $14.1 billion.[8] Beneath the top level, 64 percent of the programs in the portfolio projected that they could acquire their end items at less cost than projected previously, reflecting an increase in buying power. However, of the 38 MDAPs GAO studied in detail significant risk factors remained:

> Most of the 38 programs GAO assessed this year are not yet fully following a knowledge-based acquisition approach. This held true for the seven programs that passed through one of three key decision points in the past year. Each implemented some knowledge based practices but practices—such as fully maturing technologies prior to development start and bringing all manufacturing processes under control—were not implemented. As a result, many of the 38 programs will carry unwanted risk into subsequent phases of acquisition that could result in cost growth or schedule delays.[9]

Increasing the knowledge and professionalism applied to acquisition programs is a major focus of the "Better Buying Power 2.0" guidance issued in April 2013 by Frank Kendall, Under Secretary of Defense for Acquisition, Technology and Logistics (AT&L). This second iteration of the department's internal acquisition improvement initiative was focused on applying critical analysis and sound judgment to acquisition decision making including employing appropriate contract types, better defining "best value" and "technically acceptable" criteria in competitive source selections, and updating guidelines for creating a competitive environment for acquisition and establishing strategies for intellectual property, establishing a market research portal and growing small business roles and opportunities within federal contracting.[10]

Since then, Secretary Kendall has released "Better Buying Power 3.0," a third iteration of the initiative to address threatened U.S. technological superiority. The white paper for this initiative proposes acquisition improvements that focus on achieving dominant capabilities, notably including an effort to develop a long-range research and development plan to provide a roadmap for technology investments.[11]

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[8] Ibid.
[9] Ibid., 2.
[10] Frank Kendall, "Better Buying Power 2.0," Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, 2012.
[11] Frank Kendall, "Better Buying Power 3.0," Office of the Under Secretary of Defense for Acquisition, Technology and Logistics, 2014.

And there is, in fact, some evidence of progress. In addition to the GAO finding that most programs gained buying power in 2014, a separate July 2014 report analyzed the extent to which DoD source selection processes were consistent with relevant policy guidance. It found that best value processes continued to underlie the majority of DoD's new, competitively awarded contracts, and that its decision-making was generally rooted in knowledge about requirements and vendors capabilities.[12]

In 2014 the CRS provided Congress with a report detailing the history of and possible road ahead for acquisition reform. The report identified four key areas in which DoD was improving acquisition processes: rewriting the acquisitions regulatory structure, launching the Better Buying Power initiatives, improving the use of data to support decision making, and establishing an acquisition reform legislative task force. The CRS recognizes that DoD can only improve acquisitions so much by itself—congressional feedback is critical for extensive reforms, especially in the area of workforce and culture.[13]

Specific Product Area Assessments

The following sections provide a snapshot of each literature relating to specific product area acquisition history and current climate, as well as a medium for observations between major and non-major acquisition programs.

Aircraft

Aircraft is perhaps the most visible product acquisition area, consistently accounting for the largest share of DoD contract obligations per year since 2000.[14] The literature predominantly focuses on high-profile programs such as the F-22 and the F-35 Joint Strike Fighter (JSF). For example, among the F-35 literature is a 2013 GAO report noting, "the program must fully validate design and operational performance against warfighter requirements, while, at the same time, making the system affordable so that the United States and partners can acquire new capabilities in the quantity needed and can then sustain the force over its life cycle."[15]

High-profile program literature that tracks, analyzes, and provides policy recommendations on individual projects is useful, but only to an extent. There exist very few product-area wide assessments with data-informed analysis. One such report is a 2013 RAND Corporation assessment of investment options for Air Force aircraft acquisitions and how they might affect the industrial base. It recommended that the Air Force develop a strategy to slow the progression of higher unit procurement costs and flying hour costs for new systems if the Air Force is going to be able to recapitalize and modernize effectively.[16] Additional literature in this section provides examples of project-specific acquisition research:

RAND: DoD Should Avoid a Joint Acquisition Approach to Sixth-Generation Fighter

- This report recommends that, unless the participating services have identical, stable requirements, DoD should avoid future joint fighter and other complex joint aircraft programs.

[12] U.S Government Accountability Office, "Factors DOD Considers When Choosing Best Value Processes Are Consistent with Guidance for Selected Acquisitions," 2014.
[13] Mosche Schwartz, "Defense Acquisition Reform: Background, Analysis, and Issues for Congress," Congressional Research Service, 2014.
[14] Data from FPDS.
[15] U.S. Government Accountability Office, "F-35 Joint Strike Fighter: Current Outlook Is Improved, but Long-Term Affordability Is a Major Concern," 2013.
[16] Mark V. Arena, John C. Graser, and Paul DeLuca, "Implications of an Air Force Budget Downturn on the Aircraft Industrial Base," Project AIR FORCE, RAND Corporation, 2013.

The JSF is progressing similarly to legacy joint aircraft and is not expected to save money over separate single-service programs.[17]

GAO: Tactical Aircraft: F-22A Modernization Program Faces Cost, Technical, and Sustainment Risks

- This report finds that the total projected cost of the F-22A modernization program more than doubled since the program started—from $5.4 billion to $11.7 billion—and the schedule for delivering full capabilities slipped 7 years, from 2010 to 2017. Visibility and oversight of the program's cost and schedule are hampered by a management structure that does not track and account for the full cost of specific capability increments.[18]

Ships

The Ships acquisition domain does not receive the same level of academic, trade, and popular media attention as that of aircraft. A central contribution to comprehensive Ships acquisition literature is a 2011 RAND report titled "Are Ships Different: Policies and Procedures for the Acquisition of Ship Programs." This report identified ambiguities in ship acquisition programs and suggested changes in either DoD or Navy policies and procedures that could ameliorate any undesirable consequences (such as reporting requirements that are not useful to Program Managers or to oversight) and resolve procedural uncertainty for major ship acquisitions.[19]

The report noted that Ships programs are subject to the same broad trends affecting other MDAPs, but project size, complexity, and length render them unique. RAND recommended that additional and more specific guidance should be provided to ensure a more standardized interpretation of policy and process for tailoring, and noted that standards are effective only if key stakeholders (both oversight and program management officials) agree to early and continuous interactions.[20] Additional literature in this section provides examples of project-specific acquisition research:

Grey Ghost LLC: A Better Basis for Ship Acquisition Decisions

- This 2011 report examines root causes of poor cost, performance, schedule, and risk estimates and projections. The report also identified eight solution vectors that can provide higher-quality estimates and projections earlier in the design process. Some examples are: reducing the uncertainties faced by decision makers, saving expensive engineering labor, and increasing assurance that the delivered ship will satisfy requirements.[21]

NPS: A Qualitative Study of Affordability: Virginia and San Antonio Class Programs

- This 2014 report studied the affordability of the Virginia-class submarine and the San Antonio-Class ship and isolated key metrics and relationships that demonstrate an apparently significant

[17] Mark A. Lorell et al., "The Department of Defense Should Avoid a Joint Acquisition Approach to Sixth-Generation Fighter," RAND Corporation, 2014.
[18] U.S. Government
Accountability Office, "Tactical Aircraft: F-22A Modernization Program Faces Cost, Technical, and Sustainment Risks," 2012.
[19] Jeffrey A. Drezner et al., "Are Ships Different: Policies and Procedures for the Acquisition of Ship Programs," National Defense Research Institute, RAND Corporation, 2011.
[20] Ibid.
[21] Dan Billingsley, "A Better Basis for Ship Acquisition Decisions," Grey Ghost LLC, 2010.

impact on affordability. The study found that in the acquisition stage, it is possible to reverse cost-growth by setting a non-negotiable cost target and establishing all other factors as flexible.[22] The report recommended policy changes such as implementing MDAP-wide supplemental extensions of sustainment initiative case studies.

CRS: Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress

- This report assessed the merits of the proposed truncation of the LCS program from 52 to 24, or 32 ships. It also noted the Navy's dual-award strategy would avoid, at least for the near future, the possibility of a contract protest being filed against a Navy down select decision.[23]

Massachusetts Institute of Technology: Improving the Parametric of Cost Estimating Relationships of Naval Ships

- This technical report focused on improving the current parametric cost-estimating method as referenced in NAVSEA's Cost Estimating Handbook. It attempted to identify outfit density as a significant cost predictor, as opposed to the weigh-based estimating relationship still in use in industry and academia. The analysis did not find significance but recommended future study.[24]

Ground Vehicles

Ground Vehicle acquisitions have been an area of particular concern for DoD, receiving a great deal of popular and trade media coverage. Yet, as with Aircraft acquisitions, the majority of literature focuses on specific products while comprehensive analysis on the entire product area is largely absent.

A 2010 GAO report to Congress assessed the Future Combat System (FCS) project history and its ultimate cancellation, noting that "the Army and DOD have an opportunity to improve the likely outcomes for the Army's ground force modernization initiatives by adhering closely to recently enacted acquisition reforms and by seeking to avoid the numerous acquisition pitfalls that plagued FCS" and recommended that the Army "pursue an incremental approach for its post-FCS efforts." [25] The GAO noted such practices are applicable to the entire ground vehicle product area. The following literature examples examine product-specific acquisition processes:

GAO: Future Ground-Based Vehicles and Network Initiatives Face Development and Funding Challenges

- This 2011 report addressed potential issues related to developing the new Ground Combat Vehicle (GCV), a common information network, and the Joint Light Tactical Vehicle (JLTV) in a constrained budget environment. It noted the pending reductions in the defense budgets are having a significant impact on Army acquisition programs and the Army is already reprioritizing its combat vehicle investments. As plans for GCV move forward, it will be important for DoD, the

[22] Craig A. Knox, Daniel D. Reid, and Timothy M. Winters, "A Qualitative Study of Affordability: Virginia and San Antonio Class Programs," Naval Postgraduate School, 2014.
[23] Ronald O'Rourke, "Navy Littoral Combat Ship (LCS) Program: Background and Issues for Congress," Congressional Research Service, 2014.
[24] Ungtae Lee, "Improving the Parametric of Cost Estimating Relationships of Naval Ships," Massachusetts Institute of Technology, 2014.
[25] Michael J. Sullivan, "Defense Acquisitions: Opportunities and Challenges for Army Ground Force Modernization Efforts," U.S. Government Accountability Office, 2010.

Army, and Congress to focus attention on what GCV will deliver and at what cost and how that compares to other needs within the combat vehicle portfolio.[26]

CRS: Marine Corps Amphibious Combat Vehicle (ACV) and Marine Personnel Carrier (MPC)

- This report assesses the feasibility of proposed Marine Corps ACV and MPC acquisition projects given heavy Marine involvement in primarily land-based protracted campaigns in Iraq and Afghanistan and the growing acquisition of anti-access technologies. It recommends Congress establish guidelines on restarting the program, perhaps establishing criteria on when it would be necessary to initiate a new MPC program as opposed to simply restating the existing program.[27]

Launchers & Munitions

Literature focusing on the Launchers & Munitions product area is sparse, but one key contribution is a 2013 U.S. Army War College report describing the current status of the munitions Defense Industrial Base (DIB). It focused on the U.S. Army's strategic pivot to the Asia-Pacific region and the Army of 2020 to identify any excess or shortfalls in the current capacity, finding that the retention of newer equipment and the building improvements gained through legislative ingenuity of the 2005 BRAC, along with commercial partnerships, could provide surge capacity well beyond 2020, provided that the decision process encourages leaders to achieve further savings from ongoing cost reductions in producing munitions.[28]

Missiles & Space

Missiles & Space acquisitions are subject to a fair amount of product area-wide research and literature. In 2013, the U.S. Air Force published a report detailing issues it needs to address in space acquisitions. The report identified three mandates for space system acquisitions: deliver on the space capabilities in the pipeline today, aggressively pursue opportunities to make such systems more affordable, and explore new architectures and constructs for providing space capability in the future.[29] According to the report, the current USAF space acquisition strategy and programs confront these mandates head on.

The report addressed affordability in an austere budgetary environment and identified key components of an updated acquisition strategy: quickly transitioning programs from development to production, introducing lean processing and production flow, reducing and eliminating unnecessary testing, reducing unnecessary oversight, reducing reporting requirements, introducing competition, and consolidating baselines and contracts. The report stressed the USAF's goals to cut costs by engaging more with the commercial market, as well as leveraging the international space environment with cooperative programs and shared capabilities. Additional literature in this section provides an example of project-specific acquisition research:

GAO: Missile Defense: Mixed Progress in Achieving Acquisition Goals and Improving Accountability

[26] Belva Martin, "Defense Acquisitions: Future Ground-Based Vehicles and Network Initiatives Face Development and Funding Challenges," U.S. Government Accountability Office, 2011.
[27] Andrew Feickert, "Marine Corps Amphibious Combat Vehicle (ACV) and Marine Personnel Carrier (MPC): Background and Issues for Congress," U.S. Government Accountability Office, 2013.
[28] Gary Martin, "Defense Industrial Base (DIB): Munitions Realignment for 2020," United States Army War College, 2013.
[29] Ellen M. Pawlikowski, "Space Acquisition Issues in 2013," *Air & Space Power Journal*, 2013.

- This 2014 report assessed the Missile Defense Agency's (MDA) progress in achieving its acquisition goals to develop, test, and produce elements of the Ballistic Missile Defense System (BMDS). Since 2002, MDA—the agency charged with developing an integrated BMDS—has spent over $98 billion to develop and deploy this highly complex group of systems and has requested an additional $38 billion for fiscal years 2014 through 2018 to continue its efforts. Despite this, its cost estimates are unreliable. For example, MDA's 2013 cost estimates still do not include operations and support costs for military services, which may significantly understate total costs.[30]

DoD: Selected Acquisition Report: Evolved Expendable Launch Vehicle

- DoD published data in this 2014 report on approximately 60 acquisition projects across all services. Information on this particular launcher is included in this literature review to exemplify such reports, as there is a dearth of secondary literature on launcher acquisitions.[31]

GAO: Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrency

- This report makes seven recommendations to the Secretary of Defense to reduce concurrency and strengthen MDA's near- and long-term acquisition prospects. DoD's stated actions were generally responsive to problems already at hand, but did not consistently address implications for concurrency in the future, as discussed more fully in the report.[32]

Engines & Power Plants

An otherwise low-profile component of the defense acquisition landscape, engine acquisitions gained notoriety in 2014 when the Russian Federation's actions in Ukraine emphasized the United States' reliance on Russian-built liquid-fueled RD-180 engines to power the Atlas V rocket. December 2014 legislation allocated $220 million for rocket propulsion system development aimed at weaning the United States off Russian equipment critical to sensitive operations.[33]

During the defense community's deliberation on a proposed two-engine option for the JSF, this product area received a great deal of attention from industry experts. For example, a 2012 CRS report, building on existing engine acquisition literature, found that competition for the proposed F-136 JSF engine would yield favorable results in engine performance, program costs, and ability to export.[34] The two-engine option was cut in 2014 due to concerns about the upfront costs of developing a second engine. Observers compared the fight to continue the F-136 to the "great engine war" of the mid-1980s and

[30] U.S. Government Accountability Office, "Missile Defense: Mixed Progress in Achieving Acquisition Goals and Improving Accountability," 2014.
[31] Defense Acquisition Management Information Retrieval (DAMIR), "Selected Acquisition Report (SAR): Evolved Expendable Launch Vehicle (EELV)," Department of Defense, 2014.
[32] Government
Accountability Office, "Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrency," 2014.
[33] Brendan McGarry, "U.S. Funds Development of Russian Rocket Engine Replacement," *Defense Tech*, 2014.
[34] Jeremiah Gertler, "F-35 Alternate Engine Program: Background and Issues for Congress," Congressional Research Service, 2014.

1990s in which Pratt & Whitney competed against General Electric for an engine contract worth more than $10 billion,[35] garnering coverage in the media, academic, and trade literature.

Electronics & Communications

Literature on Electronics & Communications in defense acquisition is scant, and the existing literature only provides analyses of specific products. However, the increasing centrality of unmanned systems to DoD operations makes this product area increasingly more appealing for research and literature publication.

A 2014 Naval Postgraduate School thesis qualitatively and quantitatively evaluated unmanned system acquisition strategies and found that in 2014, U.S. unmanned systems industry received its highest level of funding in history. The prospects of commercial demand are very appealing and indicate a possible shift of responsibility for maturation from the DoD to the commercial market. The thesis recommended that DoD increase funding to unmanned systems development and procurement, focusing more on exploration and RDT&E until U.S. government policies that inhibit civilian market growth are mitigated.[36] Additional literature in this section provides examples of project-specific acquisition research:

GAO: Major Automated Information Systems: Selected Defense Programs Need to Implement Key Acquisition Practices

- This report recommended that DoD direct the programs to address respective weaknesses in risk management, requirements management, and project monitoring and control practices.[37]

Fuels

Fuels are central to DoD operations. Accordingly, there exists a robust body of literature for specific products and the product area at large. A 2011 report from the Defense Business Board to the Secretary of Defense found that despite the inherent volatility of fuel prices, DoD does not effectively manage defense fuel price risk. It noted that, if "DoD used current best practices to manage fuel price protection, uncertainty and risk related to future fuel prices would be reduced"[38] and recommended that "DLA should request fuel price quotes from suppliers both with and without a 'price adjustment' feature" and should "revisit the possibility of an intra-governmental price stability agreement."[39]

In 2009, the CRS published a report analyzing trends in DoD fuel spending, supply, acquisitions, and policy. The report showed that in FY2000, fuel costs represented 1.2 percent of total DoD spending, but by FY2008 fuel costs had risen to 3.0 percent. Over the same time, total defense spending had more than doubled, but fuel costs increased nearly 500 percent. CRS noted that the Defense Energy Support Center (DESC), which falls under DLA, bases contract delivery price on the lowest cost to the government; however, the hidden logistical cost borne by operational commands moving the fuel to their area of operations may not be fully accounted. The acquisition process for new military capabilities

[35] Victoria M. Mayes, "Analysis of the Air Force and the Great Engine War," The Air University, 1988.
[36] Courtney David Jones, "An Analysis of the Defense Acquisition Strategy for Unmanned Systems," Naval Postgraduate School, 2014.
[37] U.S. Government Accountability Office, "Major Automated Information Systems: Selected Defense Programs Need to Implement Key Acquisition Practices,", 2014.
[38] Defense Business Board, "Report to the Secretary of Defense: Re-examining Best Practices for DoD Fuel Acquisition," 2011.
[39] Ibid.

now requires that DoD account for fuel logistics when evaluating lifecycle costs.[40] Additional literature in this section provides examples of project-specific acquisition research:

CRS: DoD Alternative Fuels: Policy, Initiatives and Legislative Activity

- This 2012 report found that the armed services had spent an aggregate $48 million on alternative fuels, and the Navy has proposed a $170 million investment in biofuel production capacity. By comparison, DoD purchases of petroleum fuels totaled approximately $17.3 billion in FY2011. The report noted that each service has met its unique alternative fuel goals with moderate success, save for the Army, which had not adopted any specific alternative fuel goals at the time of publication.[41]

Clothing & Subsistence

An often-overlooked product area, literature regarding Clothing & Subsistence is understandably sparse. One broad, but largely surface-level 2013 CRS report examined DoD subsistence acquisitions. The report found that DLA Troop Services buys and manages about $13.4 billion worth of food, clothing, textiles, and other products procured in accordance with the provisions of the Berry Amendment and the Buy American Act (BAA). According to CRS, the current subsistence acquisition process operates in accordance with the solicitation guidelines "best value" selection criteria such as the distribution and delivery system, location, record of past performance, corporate experience, electronic data interchange capability, and socioeconomic considerations. Additional literature in this section provides examples of project-specific acquisition research:

CRS: Military Uniform Procurement: Questions and Answers

- This report assessed DLA Troop Support spending on clothing, textiles, and equipment, which surpassed $1.9 billion in FY2012. It concluded that DoD had not met the statutory requirement to develop joint criteria, nor had the services sought opportunities to reduce clothing costs and collaborate on uniform inventory costs.[42]

Conclusion

The defense product acquisition literature landscape is broad and diverse, but lacks the robustness required to make informed conclusions about product area performances. Specifically, MDAPs and other individual projects are most often the subject of academic, industrial, and governmental discourse while comprehensive analysis of product areas are lacking. Additionally, among product areas, Aircraft, Ships, and Missiles & Space receive the majority of meaningful analysis. While aircraft and ship acquisitions do indeed take up large percentages of DoD acquisition obligations, there is no clear relationship between size (in dollars) of the product area and its corresponding literature landscape. Product areas such as Electronics & Communications and Clothing & Subsistence account for significant shares of defense contract obligations, yet a dearth of literature, especially in the academic realm, inhibits meaningful analysis of acquisition performance in such areas. In order to conduct more

[40] Anthony Andrews, "Department of Defense Fuel Spending, Supply, Acquisition, and Policy," Congressional Research Service, 2009.
[41] Katherine Blakeley, "DOD Alternative Fuels: Policy, Initiatives and Legislative Activity," Congressional Research Service, 2012.
[42] Valerie Bailey Grasso, "Military Uniform Procurement: Questions and Answers," U.S. Government Accountability Office, 2014.

thorough analysis, a concerted effort by academia, think tanks, federal supervisory bodies, and DoD to expand the literature on lower-profile product acquisitions is required.

3. Historical Trends

Competition for Defense Products

In a recent short paper, the study team noted that competition rates for products, services, and R&D for DoD overall were remarkably consistent from 2008–2014.[43] During that period, around one-third of contract obligations were awarded after effective competition.[44] With the integration of pre-2000 data into the CSIS federal contracting database, the study team can now extend this analysis back to 1991.[45] This historical data give us new insight into the post–Cold War drawdown, a period that gives important context to the present drawdown. This comparison is particularly valuable because it can help illuminate the effects of sequestration, which was not a factor in the 1990s.

From 1991 to 1998, the rate of effective competition for DoD product contracts fluctuated between 38 percent and 42 percent in all but one year (36 percent in 1995). The data show a slow but steady decline in effective competition rates after 1996, which coincides with the "Last Supper" industry consolidation that removed a number of major competitors from the defense market via mergers and acquisitions.[46]

The rate of effective competition fell from 40 percent in 1996 to 33 percent in 2004, before surging to 40 percent in 2005. From 2007 on, effective competition rates hovered between 33 percent and 37 percent.

The rate of effective competition for overall DoD products does not tell the whole story because of significant differences between the different product categories. Figure 4-1 puts these differences into context by comparing 2014 competition rates for each product category to their overall average competition rate from 1991–2014:

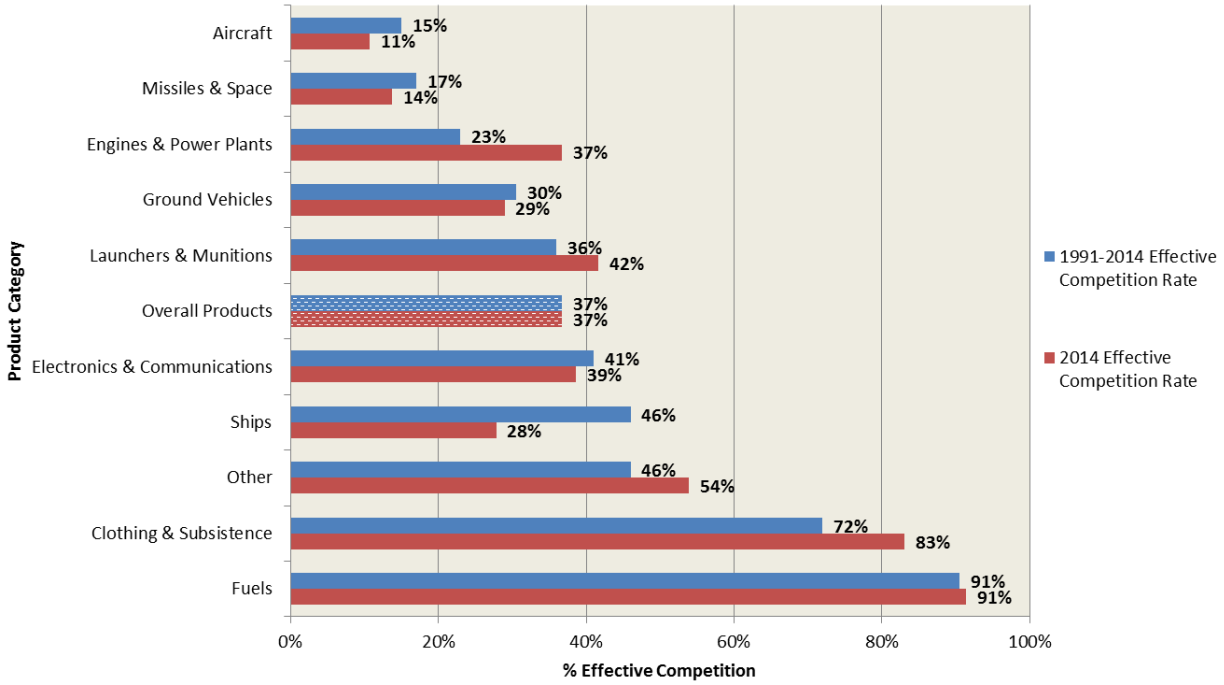
[43] Jess Ellman, "Quality of Competition for Defense Contracts under 'Better Buying Power,'" 2014, http://csis.org/publication/quality-competition-defense-contracts-under-better-buying-power.

[44] CSIS defines "effective competition" as a competitively solicited award that received two or more offers, which is similar to DoD's definition of effective competition. For the purposes of this study, "unlabeled" contract obligations are counted as not effectively competed, because the study team observed a nearly one-to-one correlation between declines in the share of obligations classified as "unlabeled" and increases in the share awarded after no competition.

[45] Data from 1990 are excluded here because nearly 36 percent of obligations in that year are "unlabeled" for competition.

[46] The "Last Supper" is the colloquial name for a meeting between Deputy Secretary of Defense William J. Perry and industry leaders in 1993, where Perry informed industry leaders that DoD's official policy was to encourage industry consolidation in the face of declining defense budgets.

Figure 4-1: 1991–2014 Effective Competition Rates vs. 2014 Effective Competition Rates for Defense Products, by Product Category



Source: FPDS; CSIS analysis.

For overall DoD products, the 2014 effective competition rate is right in line with the rate of effective competition for the entire period, reinforcing the point that the rate of competition for overall products as a category has been quite stable over time at 37%. For Aircraft, Missiles & Space (M&S), Ground Vehicles, Electronics & Communications (E&C), and Fuels, the 2014 rates of competition are within a few percentage points of their historical averages. Rates of effective competition in 2014 for Engines & Power Plants (E&PP), Launchers & Munitions (L&M), Clothing & Subsistence (C&S), and "Other Products" are notably above their historical averages, while the effective competition rate for Ships is well below the historical average.

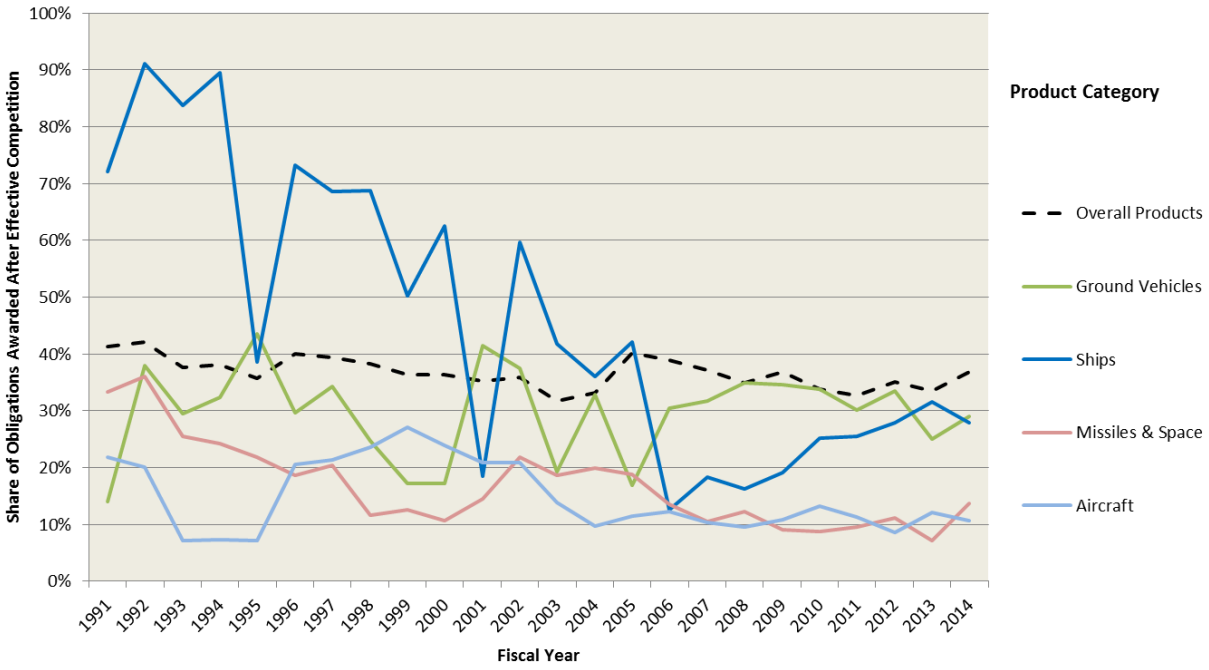
However, historical averages can only provide so much visibility into trends, and effective competition rates within product categories have been quite volatile from year to year—given the relatively "small" size of the various products categories, it is unsurprising that one or two big contracts (or a group of smaller ones) can cause big shifts in effective competition rates. Still, looking at effective competition rates over the period in question can provide greater insight into long-term trends.

The analysis that follows examines rates of effective competition for the ten product categories. The ten categories are divided into three groups: Platforms and Complex Systems; Systems and Subsystems, and Commodities and Commercial Goods. Each chart also includes the rate of competition for overall DoD products (not just those included in the particular chart), for use as comparison.

Platforms and Complex Systems: Aircraft, Ground Vehicles, Ships, and Missiles & Space

Figure 4-2 shows effective competition rates for the four MDAP-focused product categories between 1991 and 2014.[47]

Figure 4-2: Rate of Effective Competition for MDAP-Focused Product Categories, 1991–2014



Source: FPDS; CSIS analysis.

Aircraft

The effective competition rate for Aircraft has consistently been among the lowest, if not the lowest, among the product categories, owing to both the length and complexity of the programs and the limited number of vendors able to effectively compete at the development stage. Interestingly, even after the "Last Supper"-inspired flurry of mergers and acquisitions in the mid-1990s radically changed the landscape of the Aircraft industrial base, the rate of effective competition was largely stable in the low to mid-20s from 1996 until 2003, when the rate fell to 14 percent. One possible explanation for the delayed effect is the amount of time it takes for new major Aircraft programs to start up: large programs like the F-22 and F-35 were just starting to ramp up in the early 2000s. After 2003, the rate of effective competition for Aircraft has never exceeded 13 percent, hovering between 10 and 12 percent in most years, about one-third the rate for overall DoD products.

Missiles & Space

Similar to Aircraft, the consistently low rates of effective competition for M&S are reflective of highly complex programs with a limited industrial base. The rate of effective competition for M&S peaked at 36 percent in 1992, but dropped off steadily (with a couple of plateaus) afterwards, to a low of 11 percent in 2000. The rate spiked up briefly to between 19 percent and 22 percent from 2002–2005, primarily

[47] Data for 1990 are excluded due to data-quality issues. See the Methodology section for further discussion.

due to increased Air Force contract obligations for “space vehicles,” but subsequently dropped off, and did not exceed 12 percent in any year from 2007–2013. In 2014, the rate of effective competition doubled, from 7 percent in 2013 (the lowest rate in the period) to 14 percent.

Ground Vehicles

The available industrial base able to compete for most Ground Vehicle programs is significantly broader than that for the two previous categories, so it is not surprising that the rate of effective competition for ground vehicles has usually been higher. That rate was extremely volatile in the 1990s, rising as high as 44 percent in 1995, and then falling back to 17 percent in 1999 and 2000. That volatility continued into the early 2000s, with effective competition rates rising to 41 percent in 2001, and then fluctuating between the mid-30s and the high teens over the next four years. Between 2006 and 2012, however, effective competition rates have hovered in the low- to mid-30 percent range, in part as a result of the highly competitive MRAP contracts in the mid- to late 2000s. The effective competition rate for Ground Vehicles fell from 34 percent in 2012 to 25 percent in 2013, but rose back to 29 percent in 2014.

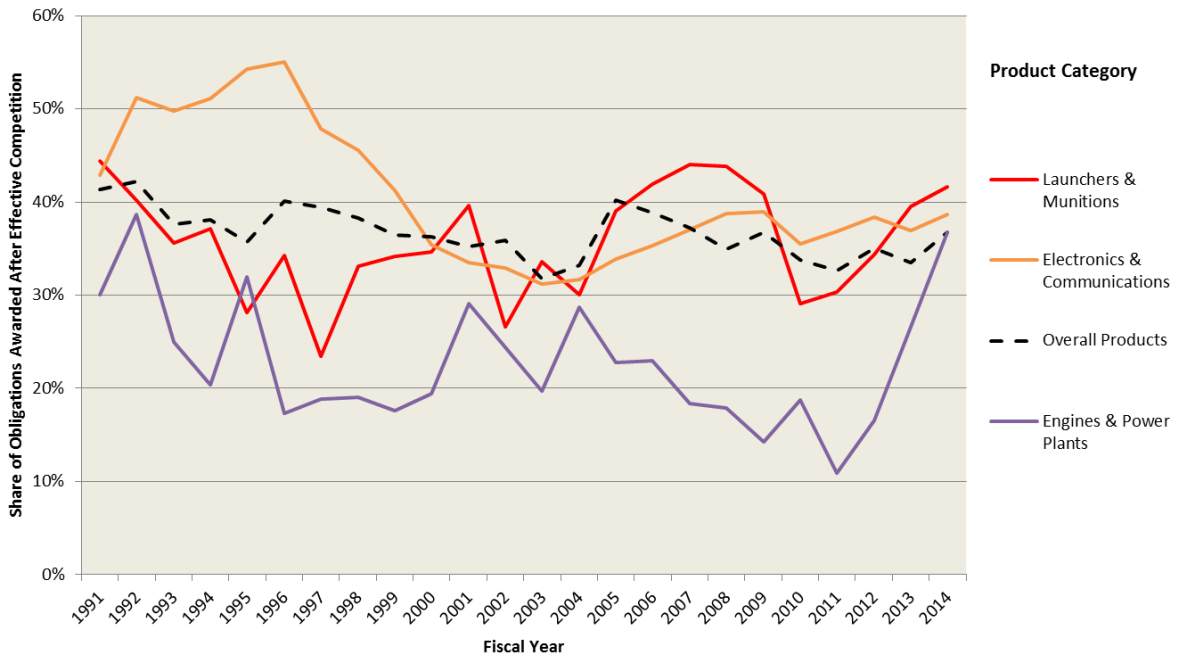
Ships

Considering the size and complexity of the platforms involved, the high rates of effective competition for Ships in the 1990s—as high as 91 percent in 1992, and over 60 percent in all but one year between 1991 and 2000—is somewhat surprising. The private shipyard consolidation in the late 1990s and early 2000s had a major impact on the level of competition, as the rate of effective competition never exceeded 50 percent after 2002, only exceeded 30 percent in one year after 2005, and remained below 20 percent from 2006 through 2009. Since 2009, however, the rate of effective competition has increased, remaining above 25 percent in every year and rising to 32 percent in 2013. This is likely the result of deliberate decisions to split the procurement of certain high-cost platforms, such as the Littoral Combat Ship (LCS) and Aegis-class destroyers, between two competing shipyards. Whether such “split-buy” arrangements actually accrue the full benefits of competition is a potential subject for future research, but it is the study team's operating assumption that having more than one bidder induces competitive pressures that generally exceed those existing for contracts with fewer than two offerors.

Systems and Subsystems: Electronics & Communications, Launchers & Munitions, and Engines & Power Plants

Figure 4-3 shows trends in the rate of effective competition from 1991 through 2014 for the three product categories that are mostly composed of systems and subsystems.

Figure 4-3: Rate of Effective Competition for Systems/Subsystems Product Categories, 1991–2014



Source: FPDS; CSIS analysis.

Electronics & Communications

The rate of effective competition for E&C has declined precipitously since the 1990s. Around half of defense E&C contract obligations were awarded after effective competition from 1991–1996, but the rate quickly dropped off after that, to 35 percent by 2000. A major driver of this decline is likely the post-"Last Supper" industry consolidation in the E&C market discussed later in this paper, with significant shares of obligations shifting from medium vendors to the Big 6 defense vendors. The rate of effective competition for E&C remained around one-third through the early and mid-2000s, but has risen since, hovering just below 40 percent in most years since 2007.

Competition with a single offer is a particularly large issue in E&C, one that was masked in the late 1990s and early 2000s by an abnormally high rate of contract obligations that were not properly labeled in terms of level of competition. As late as 2004, 19 percent of E&C contract obligations were unlabeled; when that rate dropped to 1 percent in 2005, the share of obligations awarded after competition with only one offer spiked from 13 percent in 2004 (already among the highest of any product category) to 24 percent in 2005 (the highest share seen for any product category except "Other Products"). The study team assumes that most, if not all of those unlabeled contract obligations were either uncompeted (as the study team has observed in other research of defense contracts) or were awarded after competition with only one offer. The share of obligations awarded after competition with a single offer has declined significantly in recent years, to 15 percent in 2014, but that rate is the highest of any product category.

The relatively low rate of effective competition for E&C is somewhat surprising, but it may be a reflection of the barriers to entry for tech firms that are not traditional defense vendors. This is particularly noteworthy given the rapid expansion of the industrial base capable of producing E&C products over the last two decades; despite the significant increases in the breadth and depth of the industrial base, the rate of effective competition for E&C products has not increased. The high rate of single-offer competition may be partly driven by similar factors, but also by the difficulty of writing

requirements for IT and communications projects, which can lead to solicitations that are not attractive to potential bidders. E&C may be an area where generating additional competition may be possible, and CSIS urges policymakers to examine how that might be accomplished.

Launchers & Munitions

The rate of effective competition for L&M contract obligations has been highly variable, falling as low as 23 percent in 1997 and rising to 44 percent in 2007 and 2008. Interestingly, despite a high degree of industry consolidation in the wake of the "Last Supper," there was not a significant, sustained drop in the rate of effective competition for L&M in the corresponding time period. In recent years, the rate of effective competition fell from 44 percent in 2008 to 29 percent in 2010, but rebounded to 42 percent by 2014, reflecting the seemingly cyclical nature of L&M competition rates.

Engines & Power Plants

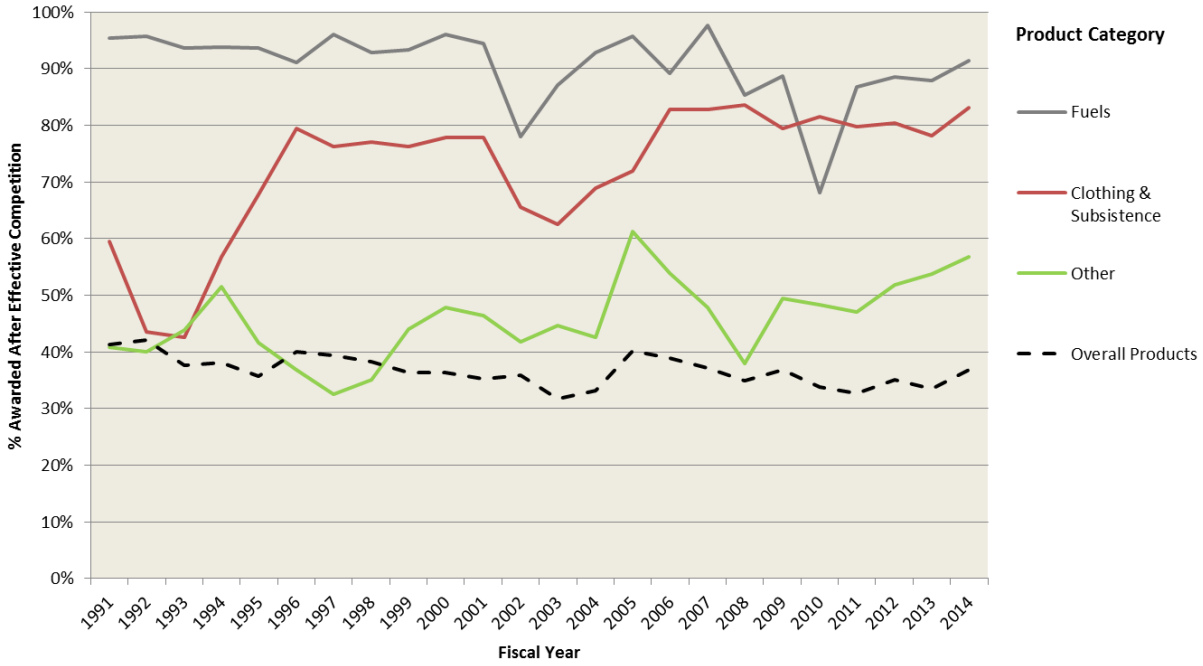
Effective competition rates for E&PP contract obligations have been relatively variable, but for the most part, they have hovered near 20 percent in most years. In the past two years, however, there has been a significant increase: The share of contract obligations awarded without effective competition has risen from 17 percent in 2012 to 37 percent in 2014, the highest share since 1992, with the increase roughly split between competitions with 2 offers and those with 3–4 offers. And unlike most previous spikes, this recent increase in effective competition is not solely the result of declining levels of obligations; while E&PP contract obligations have declined by 23 percent since 2012, E&PP contract obligations awarded after effective competition have more than doubled.

The share of E&PP contract obligations awarded after competitions with only one offer has declined significantly in recent years, from 14 percent in 2009 to 5 percent in 2013 and 2014.

Commodities and Commercial Goods: Fuels, Clothing & Subsistence, and "Other Products"

Figure 4-4 shows trends in the rate of effective competition from 1991 through 2014 for the three product categories that mostly comprise commodities and commercial goods.

Figure 4-4: Rate of Effective Competition for Commodities and Commercial Goods Product Categories, 1991–2014



Source: FPDS; CSIS analysis.

Fuels

Defense contract obligations for Fuels have long been highly competitive, with over 90 percent of obligations awarded after effective competition in all but two years between 1991 and 2005. Since then, aside from a spike to 98 percent in 2008 (the highest rate for Fuels in the period observed), and a one-year drop to 68 percent in 2010 (by far the lowest rate for Fuels in the period observed), the effective competition rate for Fuels has remained near 90 percent.

Clothing & Subsistence

The rate of effective competition for C&S contract obligations was surprisingly low in the early 1990s, falling as low as 43 percent in 1992 and 1993. That rate quickly increased, however, rising to 79 percent by 1996, remained near 80 percent for most of the rest of the period, aside from a brief dip from 2002–2005, when the rate fell as low as 63 percent (in 2003). That decline seems to have been in large part due to data-labeling issues, with 15 percent of C&S contract obligations classified as unlabeled in 2003, but some of the decline appears to have been a real decline in effective competition.

"Other Products"

Considering that the vast majority of the "Other Products" category is made up of commodities and commercial goods, it is somewhat surprising that the rate of effective competition for this product category is not that much higher than the rate for overall defense products in most years, and actually lower in a few. In recent years, however, the effective competition rate has increased notably, from 47 percent in 2011 to 57 percent in 2014. Single-offer competition has been a major issue for "Other Products"; between 2002 and 2008, the share of contract obligations awarded after competition with a single offer rose from 8 percent to 43 percent. Though that rate fell off quickly afterwards, to 23 percent

in 2009, the single-offer competition rate has remained high despite policy guidance designed to reduce it, remaining at 14 percent from 2012–2014.

"Other Products" thus seems like a potential source of increased competition, and the study team urges policymakers to examine why the rate of single-offer competition remains so high, and if additional competition can be brought to bear in acquisition of "Other Products."

Changes in the Defense Products Industrial Base, 1990–2014

In addition to tracking trends on the customer side of defense contracts, CSIS also tracks trends on the vendor side of the equation. In particular, the study team has built up the capability to track contract obligations by size of vendor. In order to facilitate this analysis, vendors are divided into four size categories: Small, Medium, Large, and the "Big 6." Any organization designated as small by the FPDS database—according to the criteria established by the federal government—was categorized as such unless the vendor was a known subsidiary of a larger entity. Vendors with annual revenue of more than $3 billion, including from nonfederal sources, are classified as large. The Big 6, separated out from "large," consists of the six largest defense firms in recent years (Boeing, Lockheed Martin, Northrop Grumman, General Dynamics, Raytheon, and United Technologies Corporation).[48, 49] And, any contractor that qualifies as neither small nor large is classified as "medium."

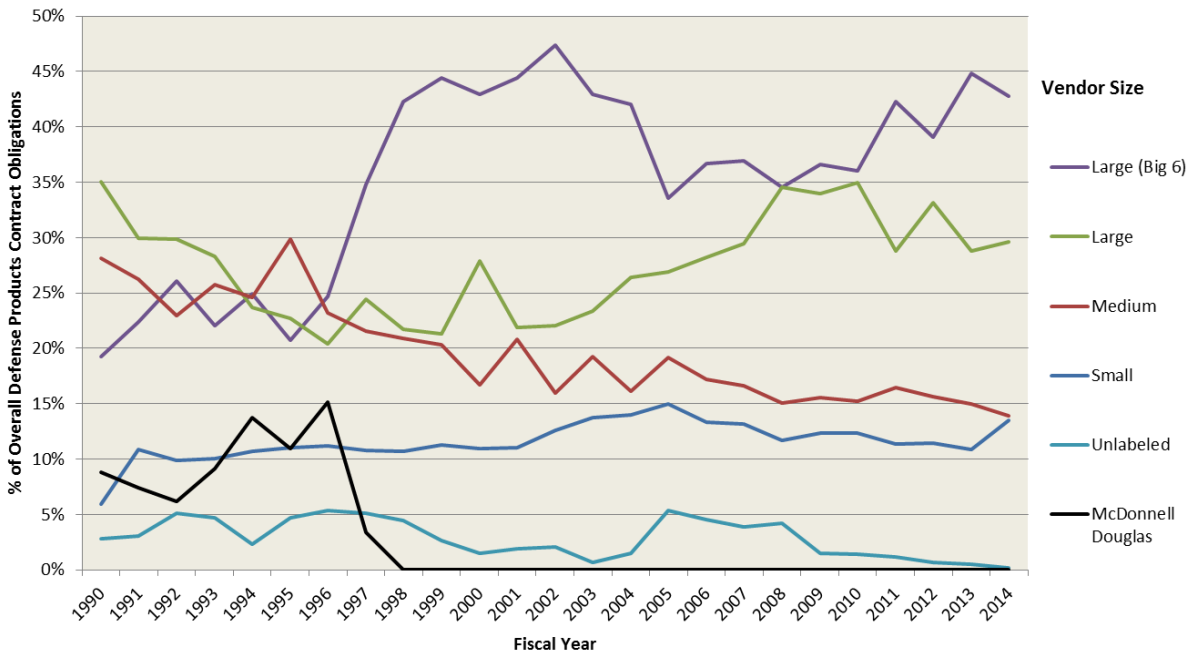
For this analysis, McDonnell Douglas, which would otherwise be classified as "Large", is broken out separately prior to its merger with Boeing, because its enormous share of the overall defense products market (and for specific product categories like Aircraft) would otherwise distort the data, showing an enormous shift in share from Large to Big 6 that is almost entirely a result of the Boeing/McDonnell Douglas merger in certain product categories. The study team chose not to incorporate McDonnell Douglas into the Big 6 prior to the merger with Boeing to highlight how great an impact that merger had on the industrial bases of certain product categories. The analysis in this section will note other cases where the data trends are affected by changes in the size status of significant vendors, rather than changes in DoD buying patterns.

The shares of DoD products contract obligations awarded to each size category (plus the share marked as "Unlabeled" due to data-quality issues) are shown in Figure 4-5.

[48] United Technologies replaces BAE in the "Big 6" in this report and going forward, because BAE has fallen off in recent years as DoD purchases of ground vehicles have slowed.

[49] While Northrop Grumman, United Technologies, Raytheon, and General Dynamics were all consistently among the top defense products vendors before the "Last Supper" industry consolidation, Boeing was not consistently in the top echelon of vendors until the merger with McDonnell Douglas (which had consistently been a top products vendor), and Lockheed Martin did not exist until the merger of Lockheed and Martin Marietta. For this analysis, Lockheed is classified as a Big 6 vendor prior to the merger, while Martin Marietta is classified as simply "Large".

Figure 4-5: Share of Defense Products Contract Obligations, by Size of Vendor, 1990–2014



Source: FPDS; CSIS analysis.

The share of overall defense products contract obligations awarded to small vendors has been extremely stable throughout the period observed. Small vendors accounted for between 10 percent and 11 percent of products contract obligations in every year from 1991–2001, rose steadily to 15 percent by 2005, and gradually fell back to 11 percent from 2011–2013. The 14 percent share awarded to small vendors in 2014 is the highest since 2005.

The share of products contract obligations awarded to medium vendors hovered in the mid- to high 20s in the early 1990s, peaking at 30 percent in 1995. That rate sharply declined in 1996, to 23 percent, and declined steadily for the rest of the decade, likely as the result of the mergers and acquisitions coming out of the "Last Supper." The share awarded to medium vendors never exceeded 19 percent after 2001, and has hovered in the mid-teens for most of the 2000s and 2010s, falling to an all-time low of 14 percent in 2014.

McDonnell Douglas, which was either the largest or second-largest defense products vendor in every year between 1990 and 1996, by itself matched or exceeded the share of products contract obligations going to all small vendors between 1994 and 1996. The impact of its merger with Boeing can be seen in the data for the Big 6 defense vendors—as the McDonnell Douglas share drops off between 1996 and 1997, that share goes directly to the Big 6, and accounts for virtually all of the increase in the Big 6 share in that year.

Other post-"Last Supper" mergers and acquisitions were relatively evenly distributed between medium and large vendors, particularly between 1997 and 1998, when the share going to the Big 6 once again rose significantly. The share of defense products contract obligations awarded to the Big 6 eventually peaked at 47 percent in 2002, seemingly at the expense of medium firms, whose share fell to a then-low of 16 percent by 2002. Large vendors, which accounted for 30 percent or more of defense products

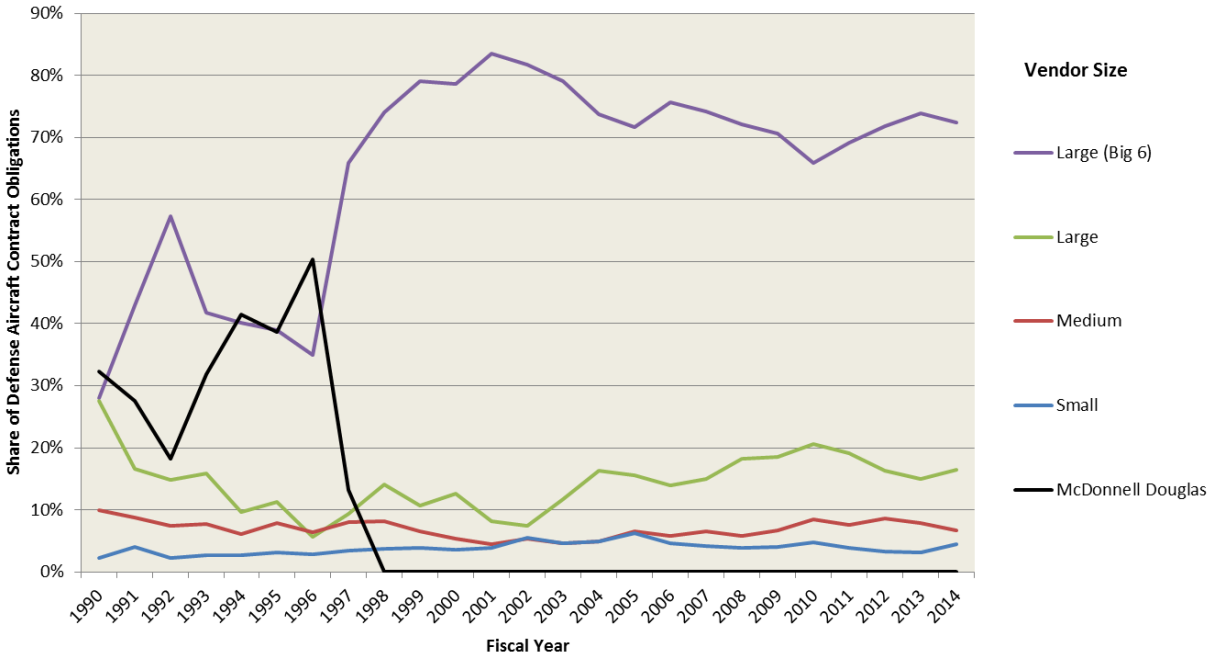
contract obligations between 1990 and 1992, fell off quickly, fluctuating between 20 percent and 24 percent in all but one year from 1994–2003 (28 percent in 2000.)

In the 2000s, large vendors began to recover market share, rising from 22 percent of products contract obligations in 2001 to 35 percent in 2008, while the Big 6 share fell from 44 percent to 35 percent over that same period. Since 2008, the trend has shifted again, with the share going to the Big 6 rising steadily (to 43 percent in 2014), while the share going to large vendors declined to 30 percent by 2014. This change happened despite the countervailing trend of divestments, including Northrop Grumman's divestment of its shipbuilding business into Huntington Ingalls Industries.

As with the other areas of analysis in this report, looking at overall trends for vendor size does not tell the whole story—the industrial bases serving the different product categories are vastly different. The following sections will look at trends in the industrial bases for the 10 product categories identified in this paper.

Aircraft

Figure 4-6: Share of Defense Aircraft Contract Obligations, by Size of Vendor, 1990–2014



Source: FPDS; CSIS analysis.

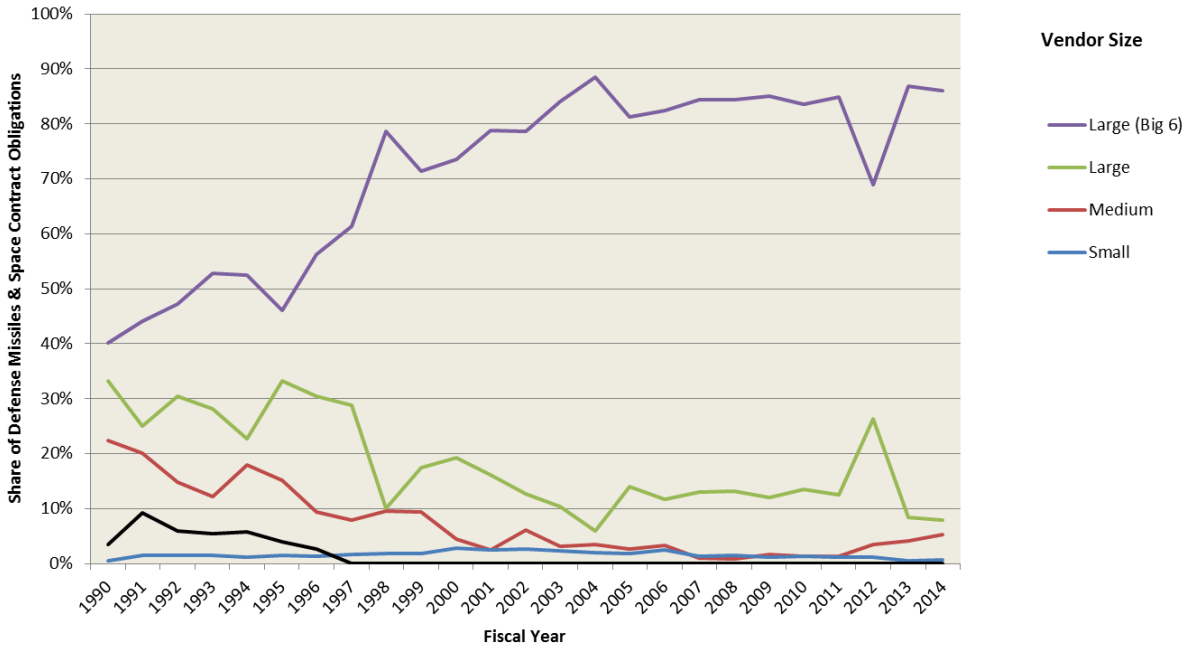
The effect of the "Last Supper" industry consolidation was particularly pronounced for Aircraft, and is almost entirely the result of the merger between Boeing and McDonnell Douglas. In 1996, fully half of Aircraft contract obligations went to McDonnell Douglas; as that share fell off over the next two years as the merger with Boeing was finalized, the share of obligations going to the Big 6 rose from 35 percent in 1996 to 74 percent in 1998, with a smaller, likely unrelated increase in the share going to large firms (from 6 percent in 1996 to 14 percent in 1998).

Big 6 vendors continued to dominate the Aircraft market throughout the period, accounting for three-quarters or more of Aircraft contract obligations in most years until the late 2000s. Large vendors saw a

notable increase in share in the 2000s, rising from 7 percent in 2002 to 21 percent in 2010, before falling off slightly over the last few years. Small and medium vendors have been relatively minor players in the Aircraft market throughout the period, although medium vendors have seen slight gains since the mid-2000s.

Missiles and Space

Figure 4-7: Share of Defense Missiles & Space Contract Obligations, by Size of Vendor, 1990–2014

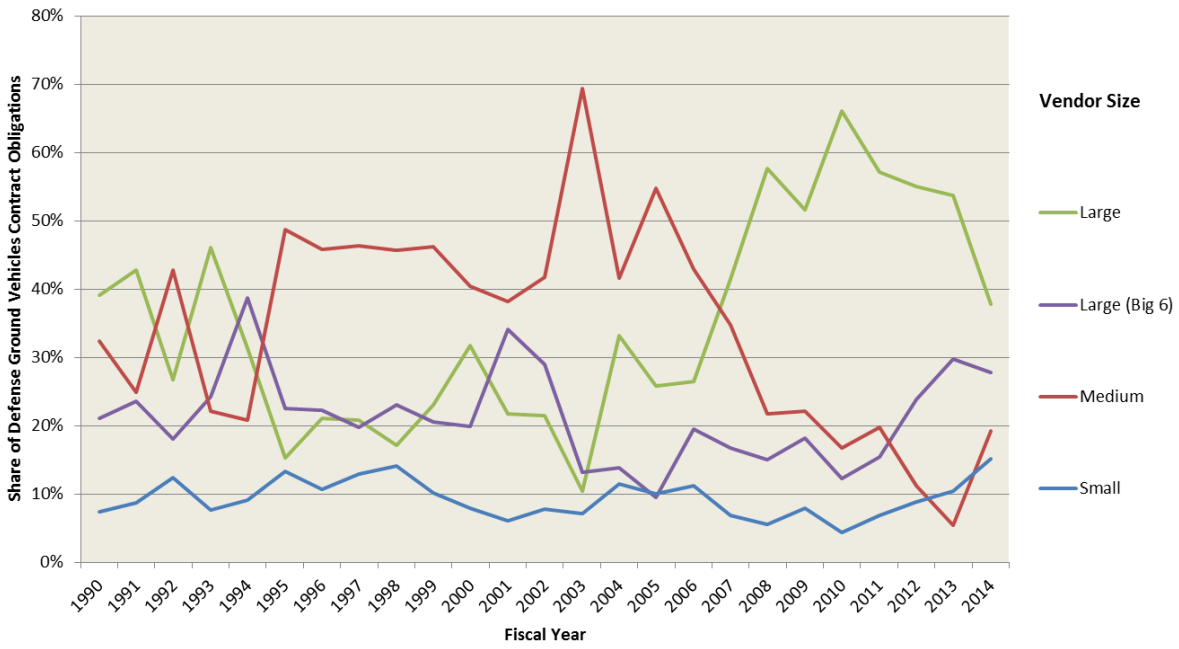


Source: FPDS; CSIS analysis.

As with several other categories, M&S saw a post-"Last Supper" shift in contract obligations from medium and large vendors to the Big 6. The data show that throughout the 1990–2014 period, the share of M&S contract obligations awarded to small vendors never exceeded 3 percent, by far the lowest share for small vendors of any product category. Similarly, while medium vendors accounted for shares in the mid-teens to low 20 percent range from 1990–1995, medium vendors have not been a significant factor in M&S contracting since 1999. Between 2000 and 2014, the share of M&S contract obligations awarded to medium vendors has only exceeded 4 percent in two years (6 percent in 2002, 5 percent in 2014).

Ground Vehicles

Figure 4-8: Share of Defense Ground Vehicles Contract Obligations, by Size of Vendor, 1990–2014



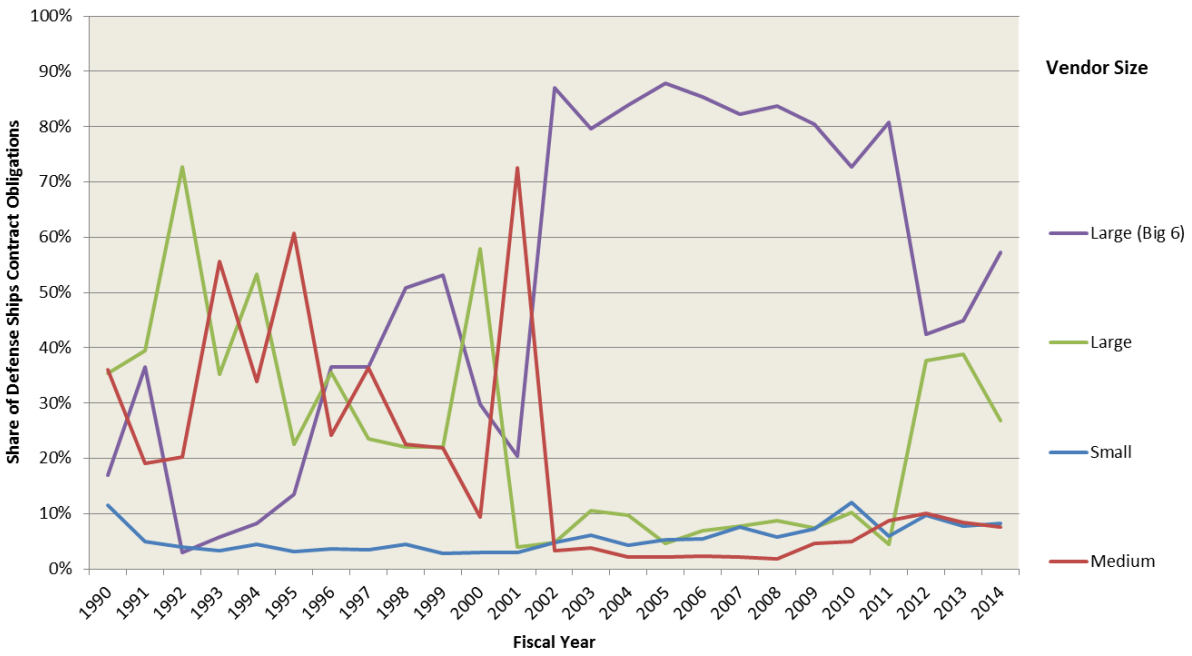
Source: FPDS; CSIS analysis.

Small business participation in the defense Ground Vehicles market was never particularly robust, but it declined notably after the 1990s—after hovering around 10 percent for most of the decade, the share of Ground Vehicles contract obligations going to small vendors remained below 8 percent for most of the 2000s, falling as low as 4 percent in 2010. Since then, however, that share has nearly quadrupled, to 15 percent in 2014, though this is a result of contract obligations to small vendors falling off more slowly as overall Ground Vehicles contract obligations plummeted, rather than any growth in obligations to small vendors.

Medium vendors dominated the DoD Ground Vehicles market from the mid-1990s through the mid-2000s, accounting for as much as 69 percent of contract obligations in 2003, and 55 percent as late as 2005. As Ground Vehicles contract obligations surged in the mid- to late 2000s, driven largely by the purchase of MRAPs, the share awarded to large vendors skyrocketed, reaching 66 percent by 2010.

Ships

Figure 4-9: Share of Defense Ships Contract Obligations, by Size of Vendor, 1990–2014



Source: FPDS; CSIS analysis.

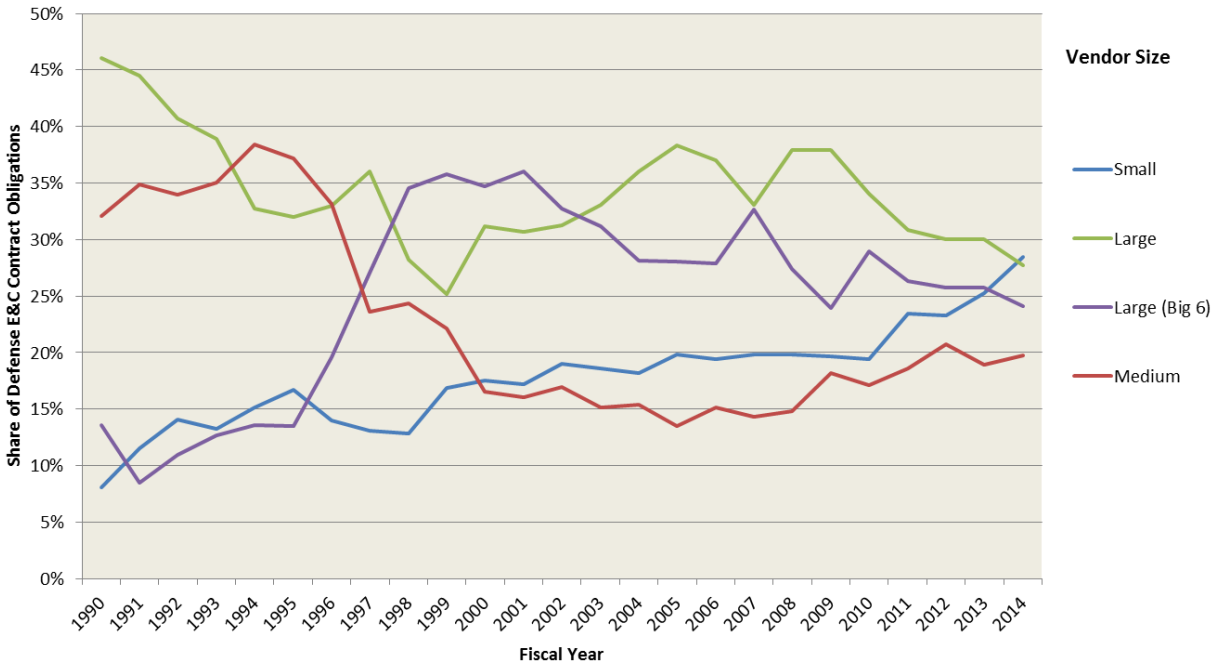
The shares of contract obligations for Ships going to the different vendor size categories were highly volatile in the 1990s, as a result of the large size of many Ships contracts. Medium and large firms, primarily shipyards, dominated the Ships market for much of the 1990s, but the post-"Last Supper" industry consolidation changed that dramatically. By 2002, after Northrop Grumman acquired both Newport News Shipbuilding and Litton Industries, 87 percent of Ships contract obligations were awarded to the Big 6.

Since then, the divestment of Northrop Grumman's shipbuilding segment in 2011, to form Huntington Ingalls Industries, has led to the observed decline in Big 6 market share, with a corresponding increase for large vendors. Medium vendors, which had not exceeded 5 percent between 2002 and 2010, saw their share of Ships contract obligations rise to between 8 percent and 10 percent from 2011 to 2014, largely due to the strength of Austal USA's contracts to produce Littoral Combat Ships.

Interestingly, small vendors, which did not account for more that 6 percent of Ships contract obligations from 1991–2006, rose to 12 percent by 2010, and have remained near 10 percent in the majority of years since.

Electronics & Communications

Figure 4-10: Share of Defense Electronics & Communications Contract Obligations, by Size of Vendor, 1990–2014



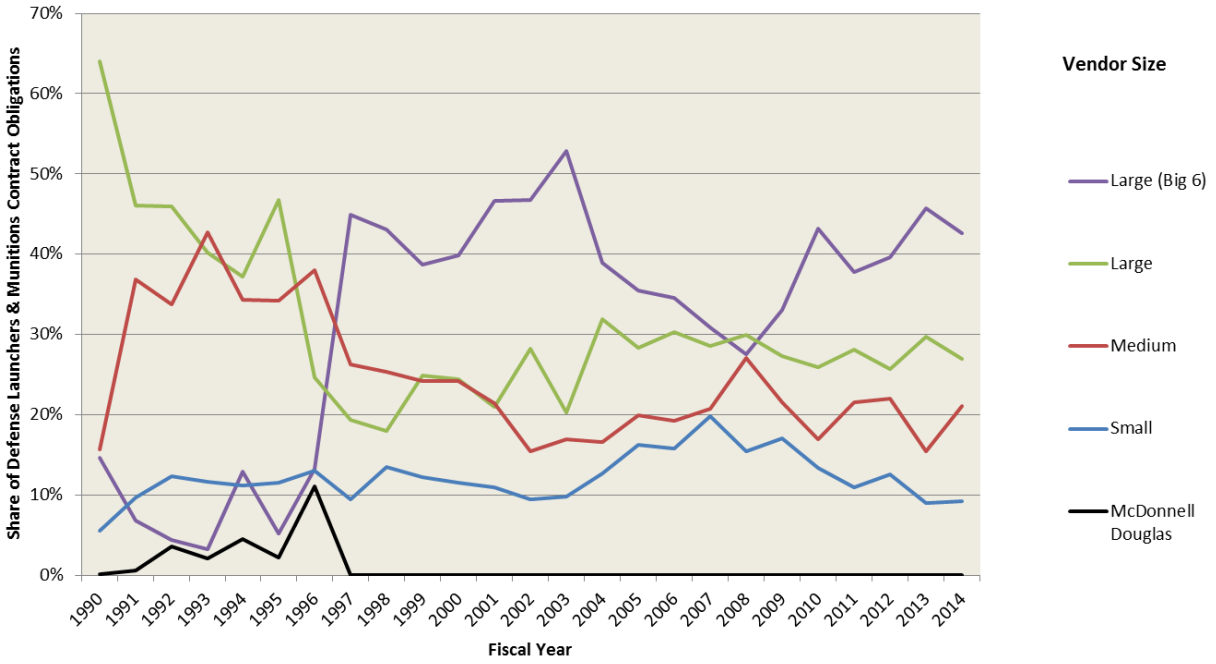
Source: FPDS; CSIS analysis.

The "Last Supper" industry consolidation had a profound effect on the E&C industrial base, with the share of contract obligations going to the Big 6 rising from 11 percent in 1993 to 36 percent in 1999, drawing roughly equally from medium and large vendors, though large vendors recovered some of their share of the E&C market from the Big 6 in the early to mid-2000s. The most interesting trend in recent years has been the consistent growth in E&C contract obligations to small vendors: from 17 percent in 1999, the share awarded to small vendors has grown steadily through the intervening years, to a high of 29 percent in 2014, the highest share of any size category and over double the rate for overall defense products. This growth has apparently come at the expense of the Big 6, which saw their share of E&C contract obligations decline from 36 percent in 1999 to 24 percent in 2014.

The decline in share awarded to medium vendors for E&C contract obligations in the aftermath of the "Last Supper" industry consolidation unsurprisingly coincides with a notable decline in the rate of effective competition for E&C contract obligations over that same period, as seen in Figure 4-3. Interestingly, the sharp increase in the share of E&C contract obligations awarded to small vendors has not resulted in a similar increase in effective competition. This may indicate that many of the contracts awarded to small vendors are sole source contracts, or are awarded under some sort of non-competitive small business set-aside.

Launchers & Munitions

Figure 4-11: Share of Defense Launchers & Munitions Contract Obligations, by Size of Vendor, 1990–2014

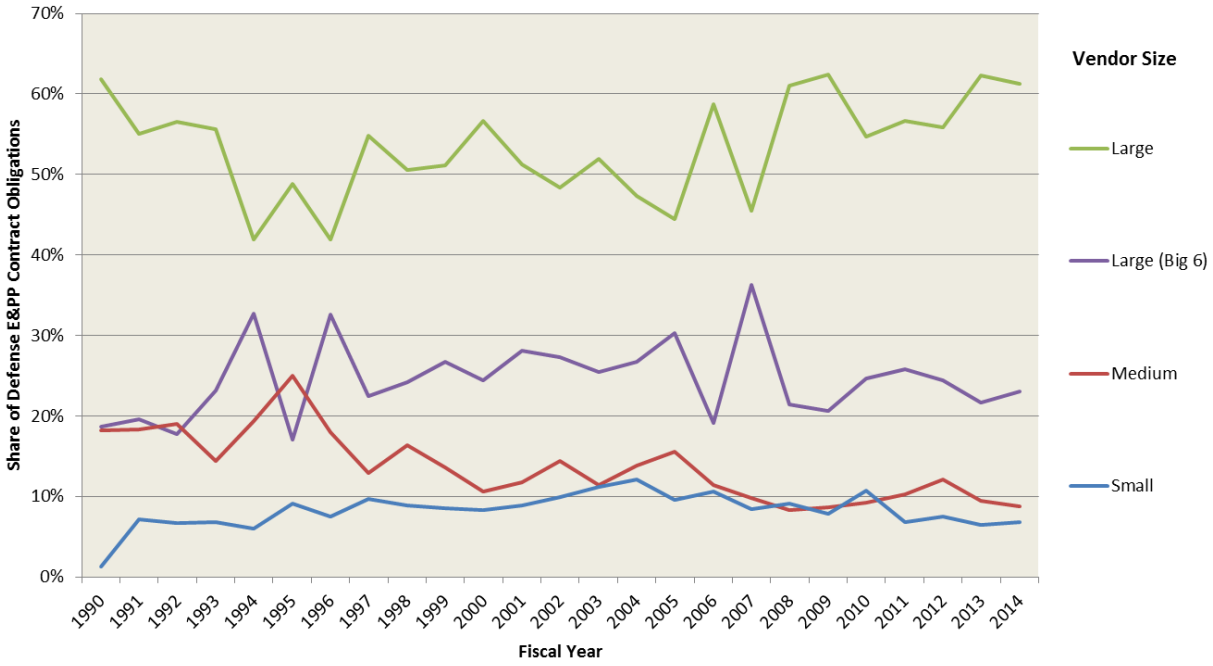


Source: FPDS; CSIS analysis.

As with E&C, the industry consolidation in the wake of the "Last Supper" led to significant changes in the L&M industrial base. Between 1996 and 1997, L&M contract obligations to the Big 6 rose from 13 percent in 1996 to 45 percent in 2007, drawing roughly equally from medium and large vendors, as well as McDonnell Douglas, which alone accounted for 11 percent of L&M contract obligations in 1996. In the mid-2000s, there was a notable surge in contract obligations to small vendors, whose share of L&M contract obligations rose from 9 percent in 2002 to 20 percent in 2007. That increase was short lived, however, and the share awarded to small businesses has declined steadily since, back to 9 percent in 2013 and 2014, with much of that lost share seemingly going to the Big 6.

Engines & Power Plants

Figure 4-12: Share of Defense Engines & Power Plants Contract Obligations, by Size of Vendor, 1990–2014

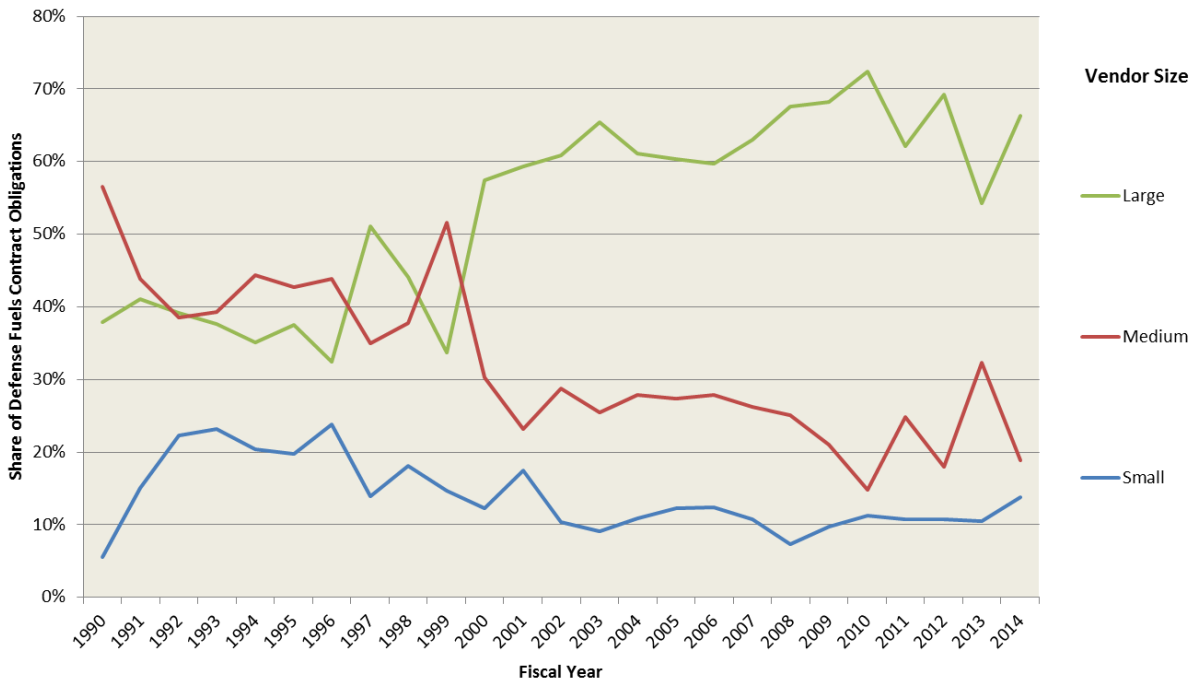


Source: FPDS; CSIS analysis.

The "Last Supper" seemed to have a minimal effect on the shares of contract obligations going to large and Big 6 vendors, but there was a definite impact on medium vendors. After peaking at 25 percent in 1995, the share of defense E&PP contract obligations going to medium vendors declined steeply, to 13 percent by 1997. The share awarded to medium vendors never exceeded 16 percent after 1996, and never exceeded 12 percent after 2005.

Fuels

Figure 4-13: Share of Defense Fuels Contract Obligations, by Size of Vendor, 1990–2014



Source: FPDS; CSIS analysis.

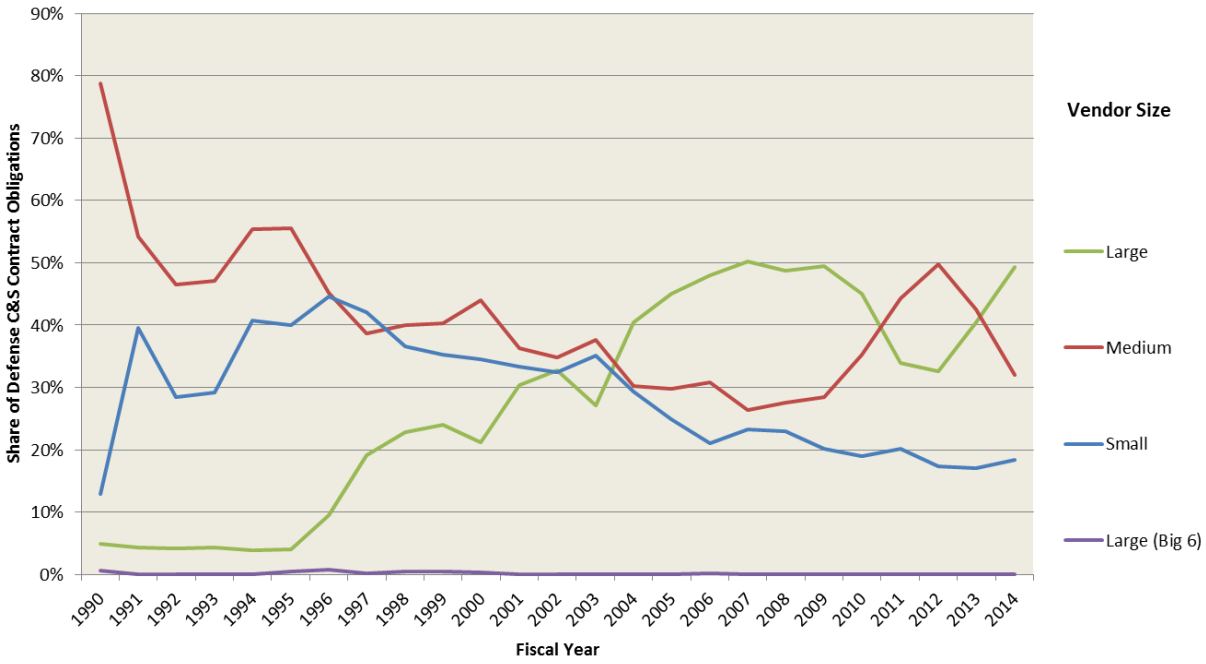
The composition of the DoD Fuels industrial base has changed dramatically since the 1990s. As late as 1996, 24 percent of Fuels contract obligations were awarded to small vendors, but that share dropped off rapidly, to 12 percent by 2000. The share awarded to small vendors never exceeded 12 percent from 2002–2013, though it rose to 14 percent in 2014. Similarly, medium vendors at one point accounted for the largest share of the DoD Fuels market, accounting for 52 percent of obligations as late as 1999.[50] That share declined steeply, to 23 percent by 2001, and never exceeded 30 percent after that, falling to a low of 15 percent in 2010.

The market share lost by small and medium vendors went to large vendors, whose share rose from 32 percent in 1996 to 51 percent in 1997, and remained between 60 percent and 70 percent for most of the 2000s and 2010s. The Big 6, unsurprisingly, have never had any contract obligations for Fuels with DoD at any point in the study period.

[50] A number of the top DoD Fuels vendors in the early part of the 1990s were privately held companies that either no longer exist or were acquired by larger companies, and for whom no reliable revenue data for the period can be found. It is thus possible that some of these vendors categorized as Medium would have met the CSIS threshold for Large. Absent revenue data, however, CSIS defaults to categorizing these vendors as Medium.

Clothing & Subsistence

Figure 4-14: Share of Defense Clothing & Subsistence Contract Obligations, by Size of Vendor, 1990–2014



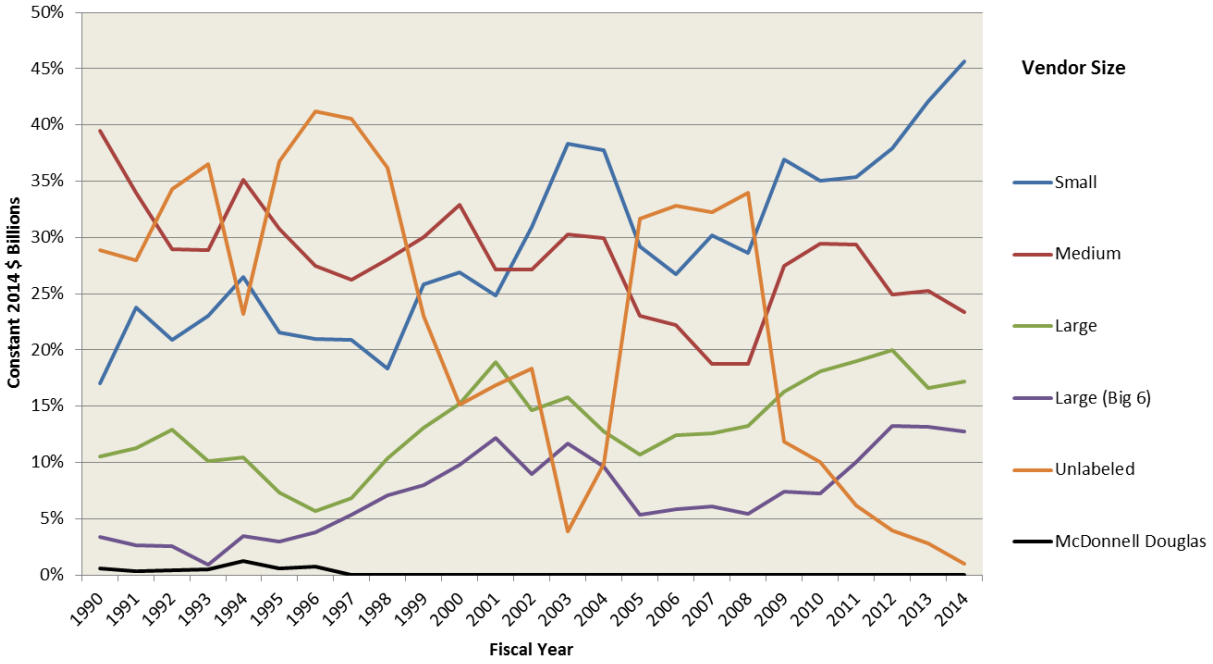
Source: FPDS; CSIS analysis.

There has been a notable shift in the industrial base for C&S over the 1990–2014 period. In the early to mid-1990s, small and medium vendors dominated the C&S market, with small vendors capturing over 40 percent of C&S contract obligations in most years, and medium vendors accounting for as much as 56 percent. After 1995, however, large vendors captured increasing shares of C&S contract obligations, rising from 4 percent in 1995 to 33 percent in 2002, with the majority of the increase drawn away from medium vendors, which fell to 35 percent by 2002. The high rate of effective competition in this category speaks to the ability of small and medium vendors to win contracts, even as large vendors has become more prominent parts of the C&S industrial base.

In the years since, the share of C&S obligations awarded to large vendors continued to rise, to 50 percent in 2009, drawing mostly from small vendors, which declined as a share of C&S obligations from 32 percent in 2002 to 20 percent in 2009, and have never exceeded 20 percent since. The share of contract obligations awarded to medium vendors briefly spiked in the early 2010s, but has returned to near previous levels by 2014.

"Other Products"

Figure 4-15: Share of Defense "Other Products" Contract Obligations, by Size of Vendor, 1990–2014



Source: FPDS; CSIS analysis.

Small and medium vendors predictably controlled most of the market for "Other Products" in the 1990s. The share awarded to small vendors has surged since then, reaching a high of 46 percent by 2014. Some of that surge, however, coincides with a marked improvement in data labeling, so it appears that small business participation (along with shares for the other size categories) was notably underreported in the mid-2000s due to poor data quality. Meanwhile, the market share lost for medium vendors has declined steadily, albeit inconsistently, with both large and Big 6 vendors gaining market share in the late 1990s, declining in the mid-2000s, and then reaching new highs in the 2010s.

4. The Impact of Sequestration on Defense Products Contracts

This section will examine the impact of sequestration, and its aftermath, on DoD contract obligations for products overall, and for those DoD components and product categories that showed notable trends. In order to examine the sources of changes in obligations levels, the study team has done further analysis to examine the specific PSCs and system equipment codes (which identify the program that a contract is associated with) that show notable changes in obligations levels from year to year.

Trends in Overall Defense Contract Obligations under Sequestration

Even in the context of a sharp downturn in defense contract obligations since 2008, the decline in over the last two years, as DoD has had to live under sequestration and its aftermath, has been significant. Overall defense contract obligations have declined by 31 percent since 2008, from $409 billion to $283 billion, but nearly two-thirds of that decline (65 percent) took place in 2013 and 2014. Overall defense contract obligations declined by 15 percent in 2013, and fell a further 9 percent in 2014. The latter decline was particularly notable because it contradicts the perception that the decline in 2013 was heavily driven by work being delayed and pushed back into FY2014 in the midst of the uncertainty surrounding sequestration. This perception led many to believe that 2014 would see, if not an increase, then a stabilizing of overall defense contract obligations; instead, 2014 saw another sharp decline.

In the FY2013 edition of CSIS's series of reports on DoD Contract Trends,[51] the study team noted that the dramatic decline of overall DoD contract obligations in 2013 was not evenly distributed among the major DoD components: the Army (-21 percent), Air Force (-22 percent), and DLA (-23 percent) all declined more rapidly than did overall DoD contracts, while the Navy (-2 percent) and "Other DoD"[52] (-8 percent) were relatively spared. Similarly, in 2014, Army (-14 percent) declined notably more steeply than did overall DoD, while "Other DoD" (-5 percent) declined more slowly than overall, Air Force contract obligations remained steady (0 percent), and both Navy (-11 percent) and DLA (-7 percent) declined at rates comparable to overall DoD.

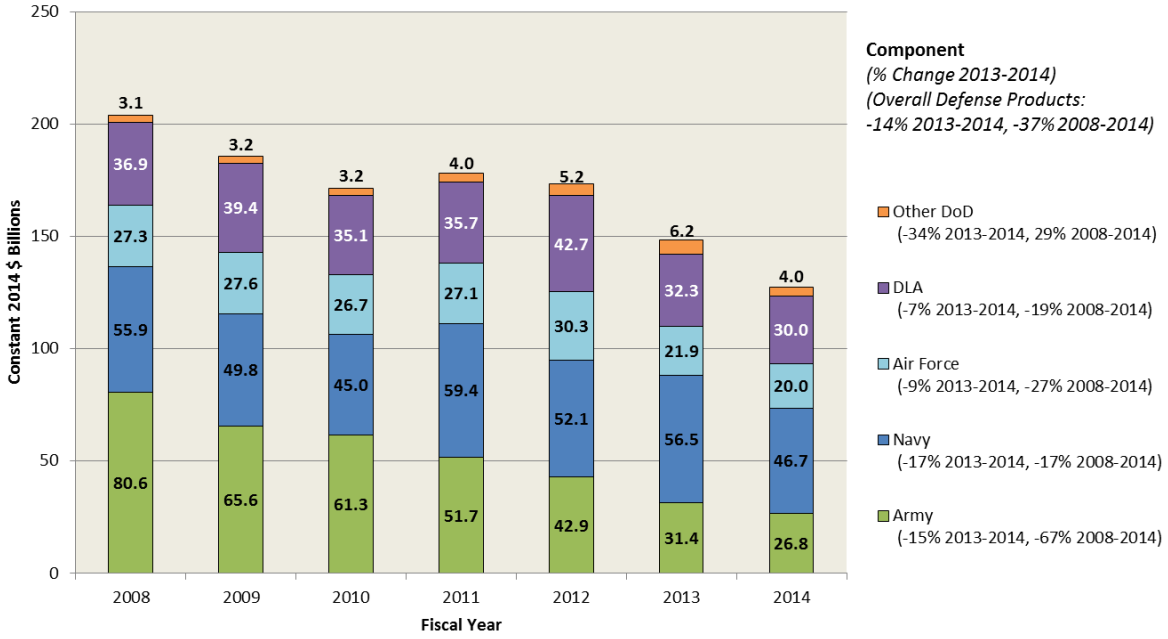
In 2013, as overall defense contract obligations declined by 15 percent, defense products contract obligations declined roughly in parallel (-14 percent). In 2014, as overall defense contract obligations declined by 9 percent, defense products contract obligations again declined by 14 percent. Since their peak in 2008, defense products contract obligations have declined by 37 percent; the declines in 2013 and 2014 have accounted for 60 percent of that total decline.

[51] David Berteau et al., "U.S. Department of Defense Contract Spending and the Industrial Base, 2000-2013," October 2014, http://csis.org/publication/us-department-defense-contract-spending-and-industrial-base-2000-2013.

[52] The decline in "Other DoD" cited here is notably lower than was discussed in the aforementioned CSIS report due to the study team's removal of DeCA data from the sample. This change was made in response to DeCA stopping reporting of most of its contract data into FPDS in 2013. See the Methodology and Data Issues section for further discussion.

Defense Products Contract Obligations within Major DoD Components (after Sequestration)

Figure 5-1: Defense Products Contract Obligations by Component, 2008–2014



Source: FPDS; CSIS analysis.

As with overall DoD contracts, the declines in defense products contract obligations were not evenly distributed among the major DoD components, as seen in Figure 5-1.

Army

Army products contract obligations, which peaked in 2008, have declined by two-thirds since then.

In 2013, Army products contract obligations declined by 27 percent, twice the rate of overall DoD products. There were numerous drivers of this sharp decline, including: a nearly $800 million decline in contract obligations related to the CH-47D helicopter; an over $1 billion decline related to the Tactical Unmanned Aerial Vehicle (UAV) program; a $1.7 billion decline in obligations for "rotary wing aircraft"; a $1.3 billion decline in contract obligations for "combat assault and tactical vehicles"; and a $500 million decline in contract obligations for "land mines." At the same time, the Army did see significant increases in contract obligations for certain programs and types of products, including: a $900 million increase in contract obligations related to the CH-47F helicopter[53]; a $1.3 billion increase for the Longbow Apache Block III, largely for "airframe structural components"; and a nearly $600 million increase in contract obligations for "wheeled trucks and truck tractors."

[53] The concurrent decline in obligations coded as related to the CH-47D and increase in obligations coded as related to the CH-47F may reflect a coding change, rather than a real change in contracting activity. The study team suspects that some CH-47F contract obligations were improperly coded as related to the CH-47D prior to 2013.

In 2014, Army products contract obligations declined by a further 15 percent, but this decline was roughly in line with the decline in overall DoD products. Significant declines were seen in all three cases noted above that saw significant increases in 2013: the CH-47F helicopter (-$700 million); Longbow Apache Block III (-$1.5 billion, to less than $20 million); and "wheeled trucks and truck tractors (-$700 million). These declines were counterbalanced by significant increases in some programs and product types, including $700 million for the AH-64A Apache and $1.1 billion for the Scout helicopter program (from $42 million in 2013).

This analysis shows the significant degree of volatility in contracts for Army rotary aircraft programs, with obligations spiking and dropping off dramatically over the course of just two years.

Navy

Navy products contract obligations have been relatively preserved in the current budgetary downturn—while overall DoD products contract obligations declined by 37 percent between 2008 and 2014, Navy products only declined by 17 percent.

In 2013, as overall products contract obligations declined by 14 percent, Navy products contract obligations actually increased by 9 percent. The main driver of this increase was a nearly $8 billion increase related to the F-35 Joint Strike Fighter, but there were numerous other significant increases, including: $2 billion related to the Patriot missile program; nearly $1 billion for both nuclear reactors and unspecified "combat ships and landing vessels"[54]; an $800 million increase related to the CVN-68 aircraft carrier[55]; $700 million related to the DDG-51 destroyer program; and $800 million for the H-1 helicopter upgrade program. Navy products also saw programs and types of products with significant declines in 2013, including: a $3 billion decline related to the P-8 Poseidon aircraft/MMA; a decline of $2 billion related to the America-class amphibious assault ship; $1 billion for unspecified "combat assault and tactical vehicles"; and over $600 million for "miscellaneous vessels."

In 2014, Navy products contract obligations saw a drop after the notable increase in 2013, declining by 17 percent, slightly more steeply than overall DoD products. Again, the main driver of the year-to-year change was in the F-35 program, which declined by over $8 billion to below the 2012 obligations level. Other programs and product types also saw significant drops in contract obligations, including: a $700 million decline in the E-2C/E-2D Advanced Hawkeye program; a $500 million decline for the H-1 helicopter upgrade program; and a $1.4 billion decline in the LPD-17 amphibious transport dock program. Even with the steep decline, some Navy programs saw significant increases, including a $600 million increase related to the Ford-class aircraft carrier program and a $3 billion increase in the SSN-774 Virginia-class submarine program.

Overall, while there has been significant fluctuation in the contract obligations going to individual programs and product types, Navy obligations for products have been relatively steady once the volatility in the F-35 program is accounted for. For the most part, the Navy has been able to preserve funding for its key platforms despite the budgetary constraints imposed by sequestration in 2013, and its aftermath in 2014.

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[54] This report uses "unspecified" to refer to contracts that are not associated with a system equipment code in cases where the study team believes that a significant share of the obligations are related to an MDAP.

[55] The study team believes these obligations labeled as related to the older Nimitz-class aircraft carriers, which are coded under the PSC for "Combat Ships & Landing Vessels," may be mislabeled obligations tied to the newer Ford-class aircraft carrier program.

Air Force

Air Force products contract obligations declined somewhat more slowly than did overall DoD products during the current budget downturn—27 percent for Air Force between 2008 and 2014, versus 37 percent for overall DoD products.

Air Force contract obligations were higher in 2012 than they had been since 2007, but declined by 28 percent between 2012 and 2013, double the rate of overall DoD products. The main driver of the decline was a $3.4 billion drop in obligations related to the C-17A transport aircraft program,[56] as well a $3 billion decline in obligations for unspecified "aircraft, fixed wing."[57] The most significant increase in Air Force contract obligations in 2013 was a $900 million increase in contract obligations related to the Shillelagh antitank missile, a 1970s Army program. CSIS believes this anomaly is due to the Air Force reusing system equipment codes, which are used in FPDS to tie contract obligations to a particular program. The money associated with the Shillelagh missile in FPDS is otherwise classified as "aircraft, fixed wing," and CSIS is seeking an updated system-equipment codebook.

In 2014, Air Force products contract obligations declined by only 9 percent, versus 14 percent for overall DoD products. Three programs saw particularly significant increases in contract obligations in 2014: obligations related to the C130-J transport aircraft increased by $900 million; the Joint Air-to-Surface Standoff Missile (JASSM) cruise missile program saw a $450 million increase; and the NAVSTAR GPS satellite program saw a $350 million increase. Three Air Force programs or product types saw declines of approximately $400 million each: the Advanced Medium-Range Air-to-Air Missile (AMRAAM) program, "miscellaneous aircraft accessories and components," and "electronic countermeasure and quick reaction equipment." Notably, contract obligations for "airframe structural components" related to the A-10 Warthog close-air support aircraft fell by over $200 million to just $13 million in 2014, though this may be due to the timing of contracts, since a similar obligations level was seen in 2012 (after obligations levels near $200 million in 2010 and 2011).

Overall, the study team is wary of reading too much into the trends beneath the surface of Air Force products contract obligations in recent years, due to the significant data-labeling issues. CSIS urges Air Force policymakers to promote greater clarity in the use of system equipment codes among those responsible for entering data into FPDS.

DLA

Between 2008 and 2014, DLA products contract obligations (-19 percent) declined at just over half the rate of overall DoD products.

DLA products contract obligations declined by 24 percent in 2013, significantly more steeply than did overall DoD products. This is primarily due to a one-year spike of $8 billion in DLA contract obligations for "liquid propellants–petroleum base" in 2012, which skews the trends in 2013. CSIS has engaged with DLA officials to determine the cause of this spike in contract obligations for fuel in 2012, and the explanation the study team finds most probable is that the spike was due to an anomaly when large fuels contracts were signed, with more than usual happening to fall within FY2012. 2013 also saw

[56] There was also a nearly $2.3 billion decline in Air Force products contract obligations related to the Evolved Expendable Launch Vehicle (EELV) program, but that decline was due to a coding change, with space launches related to the program being reclassified as a service rather than a product.

[57] Due to poor data labeling, FPDS shows almost no Air Force contract obligations associated with the F-35 program. The study team believes that the majority of unspecified "aircraft, fixed wing" obligations are related to the F-35 program.

significant declines in DLA contract obligations for "dairy foods and eggs" (-$900 million) and "fuel oils" (-$2 billion). Obligations for "drugs and biologicals," meanwhile, increased by $500 million.

In 2014, DLA products contract obligations declined by 7 percent, half the rate of decline for overall DoD products. There was a sharp decline in obligations for "liquid propellants–petroleum base" (-$3 billion), and the decline in obligations for "dairy foods and eggs" observed in 2013 continued in 2014, with obligations falling an additional $1 billion. Similarly, contract obligations for "drugs and biologicals" continued to increase in 2014, rising by nearly $1 billion, while obligations for "fuel oils" rebounded partially, increasing by $900 million.

Though DLA products trends in recent years are somewhat masked by the fuel contract timing anomaly in 2012, the overall data show DLA shifting away from contracts in support of overseas contingency operations and toward those in support of a force refitting and recovering from over a decade at war. The relatively small decline in 2014 may be indicative of how much of a role DLA contracting will play in those roles.

"Other DoD"[58]

As overall DoD products contract obligations fell by 37 percent between 2008 and 2014, "Other DoD" products contract obligations increased by 29 percent. "Other DoD" was the only component to see an increase in contract obligations, over the period, let alone such a dramatic increase. Obligations actually doubled between 2008 and 2013, but fell sharply in 2014.

In 2013, "Other DoD" products contract obligations increased by 19 percent, as overall DoD products fell sharply. The main driver of this increase was a $2 billion rise in Missile Defense Agency (MDA) Support, most of which fell under the category of "guided missiles." "Other DoD" contract obligations for guided missiles that were not classified as "MDA Support" fell by $600 million (to under $40 million), though this may be a result of better data labeling and properly classifying those obligations under "MDA Support" in 2013, rather than a real decline. There was a real decline in obligations for "miscellaneous aircraft accessories and components," which fell by $400 million.

In 2014, "Other DoD" products contract obligations declined by 34 percent, nearly two-and-a-half times the rate of decline for overall DoD products. Contract obligations for MDA Support fell by $2 billion, back to near the 2012 obligations level. It thus appears that the sharp rise in contract obligations for MDA Support in 2013 was a one-year spike.

Defense Products Contract Obligations by Type of Product[59]

As described in the methodology, CSIS has sorted the range of products for which DoD contracts into 10 categories in order to facilitate analysis of how contracting trends differ across different types of products. Figure 5-2 shows how these 10 categories of DoD products have fared during the current budgetary downturn and in the wake of sequestration.

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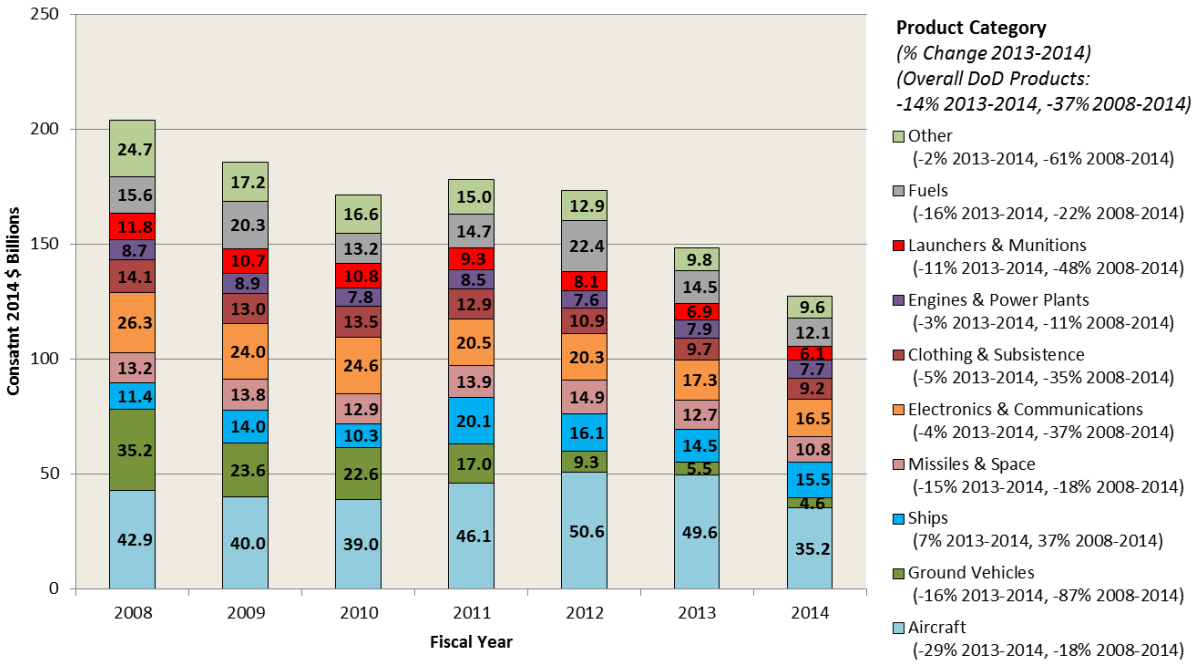
[58] As mentioned above, the study team has removed DeCA data (which would fall under "Other DoD") from the sample in response to DeCA stopping reporting of most of its contract data into FPDS in 2013. See the Methodology and Data Issues section for further discussion.

[59] In order to avoid repetition, the specific dollar changes to programs/specific product types mentioned in the "By Component" section above will not be repeated in this section, except where changes in cross-component totals differ significantly from the changes discussed above.

Figure 5-2: Defense Products Contract Obligations by Product Category, 2008–2014



Source: FPDS; CSIS analysis.

The following sections will look more deeply into trends for six of these product categories to determine the specific programs and product types that experienced significant changes in obligations levels under sequestration and its aftermath.

Aircraft[60]

As overall DoD contract obligations declined by 37 percent since 2008, contract obligations for Aircraft have fallen at half that rate (-18 percent).

In 2013, despite the steep drop in overall DoD products under sequestration, contract obligations for Aircraft fell by only 2 percent, one-seventh the rate of overall DoD. As discussed in the component-specific discussions above, 2013 saw a near-tripling of obligations related to the F-35 Joint Strike Fighter, along with major increases related to the CH-47F helicopter, E-2C/E-2D Advanced Hawkeye, H-1 helicopter upgrade program, and Longbow Apache Block III. There were also sharp declines in obligations related to the C-17A transport aircraft, P-8 Poseidon aircraft/Multimission Maritime Aircraft (MMA), and Tactical UAV. Additionally, there was an approximately $800 million decline in obligations relating to the V-22 Osprey across the services, a $2.9 billion decline in unspecified "aircraft, fixed wing" (primarily in the Air Force, believed to be mostly unspecified F-35 contracts), and a $1.7 billion decline in unspecified "aircraft, rotary wing" (primarily in the Army).

In 2014, Aircraft contract obligations (-29 percent) declined at over twice the rate of overall DoD products, the largest decline of any product category in 2014. This decline was largely driven by the

[60] This category includes the only PSC for unmanned systems, called "Drones." PSCs do not provide any further visibility into what type of unmanned system a particular contract is for; CSIS urges policymakers to break out the catch-all "Drones" code to provide more data granularity.

huge drop in F-35 contracts discussed in the Navy section above, which appears to be primarily an issue of contract timing. There were also significant declines in that same pool of Air Force unspecified "aircraft, fixed wing" contracts, as well as with contracts related to the CH-47F helicopter, E-2C/E-2D Advanced Hawkeye, H-1 helicopter upgrade, and Longbow Apache Block III, all of which saw significant increases in 2013. There were, however, some programs that saw significant increases in obligations in 2014, including the AH-64A Apache helicopter, C130-J transport aircraft, and the Army's Scout helicopter.

Overall, the spike in Navy contracts for F-35s in 2013 obscured significant declines in numerous other Aircraft programs, and many of the other programs that saw significant increases in contract obligations in 2013 declined heavily in 2014. Data labeling is a significant issue in this category, as over $5.6 billion in contract obligations for rotary and fixed-wing in 2014 aircraft (representing one-seventh of total Aircraft contract obligations) are not properly classified under their parent programs.

Missiles & Space

Contract obligations for M&S declined by 18 percent between 2008 and 2014, less than half the rate of overall DoD products.

In both 2013 and 2014, contract obligations for M&S appeared to decline by 15 percent, roughly in parallel with the decline in overall DoD products. The decline in 2013, however, was almost entirely the result of a data-coding change: $2.3 billion in obligations for space launches under the EELV program were reclassified as services, rather than products. By contrast, 2014 saw what appear to be real, significant changes: a $2 billion decline in obligations for MDA Support for "guided missiles," a $400 million decline related to the AMRAAM missile program, and notable increases in obligations related to the JASSM cruise missile program and the NAVSTAR GPS satellite program.

Ground Vehicles

Between 2008 and 2014, contract obligations for Ground Vehicles declined by a remarkable 87 percent. Even accounting for the fact that 2008 represented a nearly 50 percent spike in obligations (related to MRAP purchases) compared to 2007 and 2009, obligations have dropped by around 80 percent from 2007 and 2009 levels.

In 2013, contract obligations for ground vehicles declined by 41 percent, the largest fall for any product category under sequestration. The major drivers of this decline were a $1.8 billion decline in unspecified obligations for "combat assault & tactical vehicles" (primarily within the Marines), a $500 million decline in obligations for unspecified "combat assault & tactical vehicles–wheeled" (primarily within the Army), and a $400 million decline in obligations related to the Bradley Fighting Vehicle.

In 2014, by contrast, Ground Vehicles contract obligations (-16 percent) only declined slightly faster than did overall DoD products. The Army saw further reductions in obligations for unspecified "combat assault and tactical vehicles–wheeled" (-$400 million), while obligations for "trucks and truck tractors–wheeled" fell by $700 million. Obligations for unspecified "combat assault & tactical vehicles" increased by nearly $500 million, but whereas the large decline for this product type in 2013 was for the Marines, the increase was primarily in the Army.

DoD contract obligations for Ground Vehicles have cratered since their peak in 2008, and are lower in 2014 than they have been since 1999, right as the Army was beginning its ill-fated Future Combat Systems program that was intended to provide replacements for its aging fleet of ground vehicles. The inability of the Army since then to get a new ground vehicle program into full production, as well as the end of major combat operations in Iraq and Afghanistan, are the main drivers of this precipitous decline.

Ships

During the 2008–2014 budget downturn, as overall DoD products contract obligations declined by 37 percent, obligations for Ships actually increased by 37 percent, making Ships the only category to see an increase over this period.

In 2013, contract obligations for Ships declined by 10 percent, somewhat more slowly than for overall DoD products. As discussed in the Navy section earlier, there were notable increases in obligations related to the CVN-68 aircraft carrier, DDG-51 destroyer, and unspecified "combat ships and landing vessels," along with significant declines in obligations related to the Ford-class aircraft carrier and the America-class amphibious assault ship.

As overall DoD products contract obligations declined by 14 percent in 2014, contract obligations for Ships actually increased by 7 percent; Ships was the only product category to see an increase in obligations in the year after sequestration. Obligations related to the Ford-class aircraft carrier and the SSN-74 Virginia-class submarine both nearly doubled in 2014.

The relative preservation of contract obligations for Ships in 2013, and the growth in 2014, is likely the result of a new policy development and a couple of existing factors. First, the "rebalance to the Asia-Pacific" has put a focus on the importance of sea platforms to future U.S. strategic interests and goals. Second, many of the major Ships programs are long-term production contracts, and some are under multiyear procurement agreements; cutting or delaying funding for these programs would likely lead to greater costs over the long term.

Electronics & Communications

Contract obligations for E&C declined at the same rate (-37 percent) as overall DoD products between 2008 and 2014.

In 2013, E&C contract obligations (-15 percent) declined roughly in parallel with overall DoD products. The largest decline was in the unhelpfully vague category of "miscellaneous communications equipment," which fell by $700 million. There were also declines of between $200 and $300 million in obligations in a variety of product types.

In 2014, E&C contract obligations fell by only 4 percent, less than a third of the rate of overall DoD products. No category within E&C saw a change of more than $250 million.

No particular product type (other than the catch-all "miscellaneous" category) saw a particularly noteworthy change in either year since 2012, though obligations for "electronic countermeasure & quick reaction equipment" have declined by nearly $700 million since 2012, and obligations for "night vision equipment have declined by nearly $400 million in the same period. It is notable that Army contract obligations for E&C have fallen significantly more steeply (-28 percent in 2013, -11 percent in 2014) than for the rest of DoD. On the whole, however, E&C contracts have weathered sequestration and its aftermath relatively well.

Launchers & Munitions

Over the course of the budgetary downturn between 2008 and 2014, DoD contract obligations for Launchers & Munitions (L&M) declined by nearly half (-48 percent), notably more steeply than for overall DoD products. This decline was primarily in the Army, which saw a 66 percent decline in L&M obligations over the same period.

Under sequestration in 2013, DoD contract obligations for L&M declined by 15 percent, roughly in parallel with overall DoD products. The only product type to see a particularly notable decline was "land mines," for which obligations fell by over $500 million (to less than $25 million).

In 2014, contract obligations for L&M declined by 11 percent, slightly more slowly than for overall DoD products. Contract obligations for "bombs" declined by nearly $500 million, while obligations for "fire control systems, complete" rose by over $300 million.

L&M contract obligations have declined roughly in sync with overall DoD products under sequestration and its aftermath. Unlike most other product categories, this decline is broad based across the range of L&M product types, rather than concentrated in a few product types or specific programs.

Engines & Power Plants

Between 2008 and 2014, contract obligations for E&PP (-11 percent) declined at less than a third of the rate of overall DoD products.

In 2013, as overall DoD products contract obligations declined sharply, obligations for E&PP actually increased by 4 percent, making E&PP the only category to see an increase under sequestration. Though there was a $500 million decline in contract obligations for unspecified "gas turbines & jet engines–aircraft," that was offset by a $1.1 billion increase in contract obligations for "nuclear reactors."

Obligations for E&PP continued to be relatively preserved in 2014, declining by only 3 percent, less than a quarter of the rate of overall DoD products. There was a nearly $500 million increase in E&PP contract obligations related to the F-35 program, which is somewhat interesting because of how it lagged the spike in obligations for the actual planes in 2013. The study team believes that E&PP obligations related to the F-35 have only in 2014 started to be properly labeled as such, as F-35 obligations never exceeded $100 million prior to 2014.

Overall, E&PP contract obligations have been remarkably stable during sequestration and its aftermath, which is likely a function of how major E&PP contracts are tied to large, prominent platforms that previous CSIS analysis found were largely protected under sequestration.[61]

Fuels

As overall DoD products contract obligations fell by 37 percent between 2008 and 2014, obligations for Fuels fell by only 22 percent.

Under sequestration in 2013, obligations for fuels fell by 35 percent, two-and-a-half times the rate of overall DoD. As discussed in the DLA section, however, this was largely the result of a one-year, over $8 billion spike in fuels contract obligations in 2012, apparently tied to anomalous timing of contracts, which obscured the true trend from 2011–2013.

In 2014, Fuels contract obligations declined by 16 percent, slightly more steeply than overall DoD products. Obligations for "liquid propellants–petroleum base," which make up most of Fuels obligations, fell by nearly a quarter, while obligations for "fuel oils" rose by over $900 million.

It is noteworthy that, despite the significantly slower pace of operations for U.S. forces overseas since 2008, the decline in DoD obligations for fuels has not seen a similarly significant decline. Though the

[61] Berteau, "U.S. Department of Defense Contract Spending and the Industrial Base, 2000–2013."

study team does not have visibility into the causes of this through FPDS data, the question of why obligations for fuels are still higher than they were in 2005, and are nearly as high as in 2010, seems to be worth further analysis.

Clothing & Subsistence[62]

DoD contract obligations for C&S (-35 percent) declined at a rate comparable to that of overall DoD products between 2008 and 2014.

In 2013, contract obligations for C&S declined by 11 percent, less steeply than overall DoD products under sequestration. A significant decline in contract obligations for "dairy foods and eggs" was partially offset by a moderate increase in "drugs and biologicals." Additionally, there was an over $300 million declined in obligations for "clothing, special purpose."

In 2014, C&S contract obligations (-5 percent) declined at just over a third of the rate of overall DoD products. Obligations for "dairy foods and eggs" and "drugs and biologicals" continued their respective trends from 2013, while obligations for "armor, personal" declined by nearly $500 million.

Analysis of this products category is hampered somewhat by the removal of DeCA data from FPDS, which previous made up over a third of contract obligations under this category. Still, the relatively slow decline in contract obligations over the last two years is likely indicative of the fact that, despite the ramping down of combat operations worldwide and the planned reductions in force levels going forward, the cost of providing for the existing force is not declining quickly.

"Other Products"

During the 2008–2014 budget downturn, contract obligations for "Other Products" declined by 61 percent, well above the rate of decline for overall DoD products over the same period.

Under sequestration in 2013, contract obligations for "Other Products" declined by 24 percent, nearly double the rate of overall DoD products. This represented a decline of $3.1 billion, and there was no one product type that was a main driver of the fall; rather, the decline was broad-based across the range of products that fall under "Other Products."

In 2014, contract obligations for "Other Products" fell by only 2 percent, one-seventh the rate of decline for overall DoD products. As in 2013, there were no product types that saw particularly notable increases or declines.

The "Other Products" category, largely composed of relatively simple products, bore a disproportionate share of the cuts in defense contracts under sequestration, which is not surprising—these sorts of "everyday" products are likely the easiest to either stop purchasing or delay purchasing. Whether the relative preservation of contract obligations in 2014 represents contracts pushed back from 2013, or represents the new baseline as offices within DoD found ways to trim unnecessary purchases under the pressure from sequestration, remains a subject for future investigation.

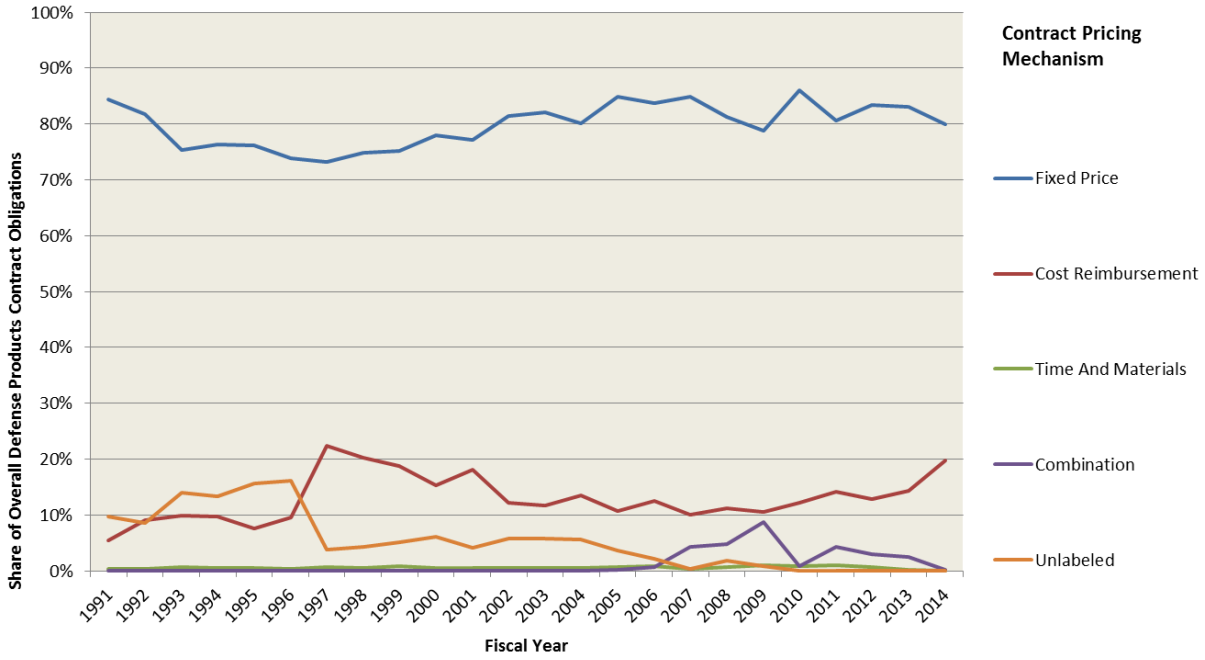
[62] Note again that DeCA contract obligations have been excluded from this sample due to their decision to stop reporting most of their contract obligations into FPDS starting in 2013. See the Methodology section for further discussion.

5. Other Contract Characteristics

Contract Pricing Mechanism[63]

From 1991–2014, contract obligations for overall defense products have been overwhelmingly awarded under fixed price contract types, as seen in Figure 6-1.

Figure 6-1: Defense Products Contract Obligations by Contract Pricing Mechanism, 1991–2014[64]



Source: FPDS; CSIS analysis.

The share of defense products contract obligations awarded under fixed-price contract types has remained near 80 percent for most of the period observed, never falling lower than 73 percent (in 1997) and never rising higher than 86 percent (in 2010). The share awarded under cost reimbursement contract types spiked between 1996 and 1997, from 10 percent to 22 percent, but that is primarily the result of better data labeling, as seen in the corresponding decline in "Unlabeled." Use of cost reimbursement contract types fell off gradually over the next several years, to 11 percent by 2005, and remained between 10 percent and 14 percent until 2014, when the share rose to 20 percent. This is partly the result of declines in fixed-price contract obligations, but cost reimbursement contract obligations also rose by 19 percent in 2014, even as overall defense products contract obligations fell by 14 percent.

[63] The "combination" contract pricing mechanism coding, designating contracts that included elements of both fixed price and cost reimbursement, was used for a brief period in the mid- to late 2000s, before guidance was issued against its use in favor of coding contracts by the most appropriate pricing mechanism.

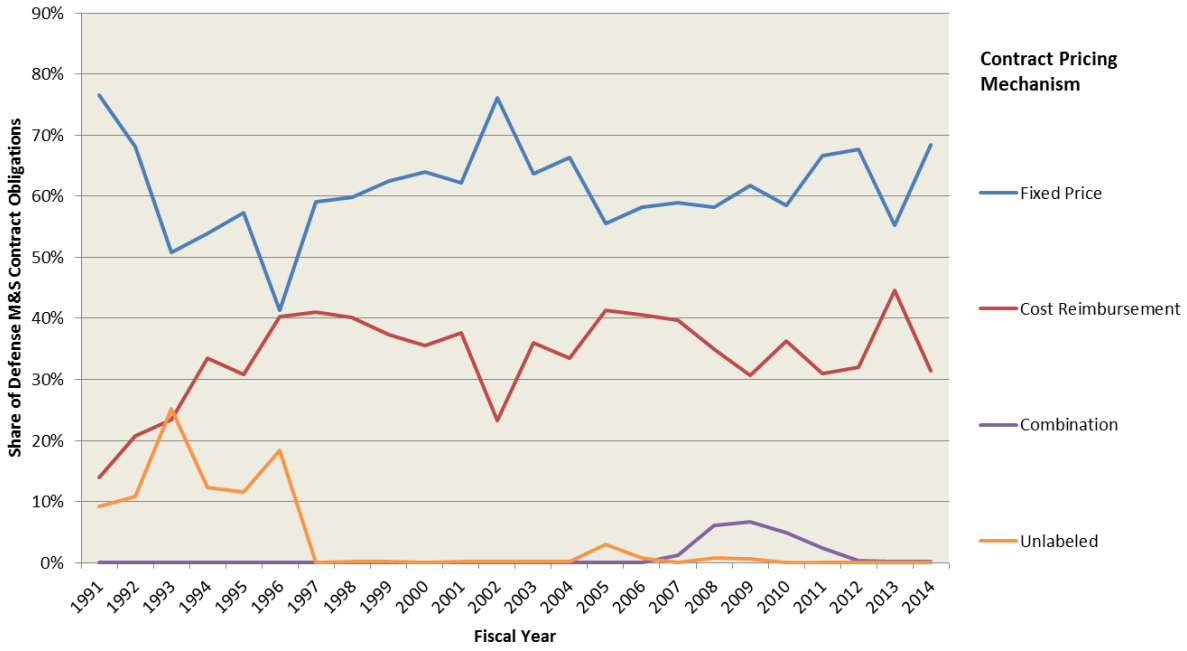
[64] As with the data on competition, the contract pricing mechanism data for FY1990 has a high percentage of obligations (38 percent) that are classified as "Unlabeled" due to poor data quality. As such, that year is excluded from the analysis that follows.

The brief rise of combination contract types in the mid- to late 2000s mostly obscured contract obligations that would have been more properly labeled as fixed price, as can be seen by the rise in fixed-price share once combination drops off in 2010.

The analysis that follows will examine trends in the use of contract pricing mechanisms in select product categories where the trends differ notably from the overall pattern for defense products.

Missiles & Space

Figure 6-2: Defense Missiles & Space Contract Obligations by Contract Pricing Mechanism, 1991–2014



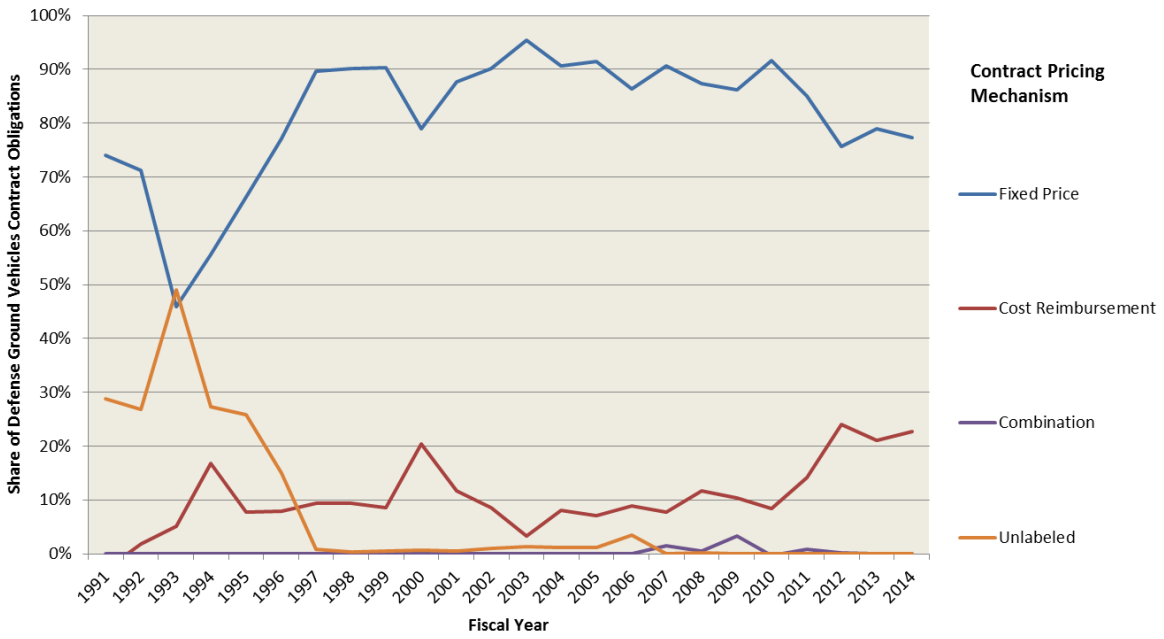
Source: FPDS; CSIS analysis.

For the period observed, M&S has seen a higher share of contract obligations awarded under cost-reimbursement contract types than any other product category, which makes sense when the technological-boundary-pushing nature of big M&S programs is considered. Between 1991 and 1997, the share awarded under cost-reimbursement contract types rose from 14 percent to 41 percent. That share was relatively consistent over much of the next decade, aside from a steep dip (down to 23 percent in 2002) in the early 2000s. Since 2006, however, that share has declined steeply, to 31 percent by 2009, and remaining at similar levels aside from one-year spikes in 2010 (36 percent) and 2013 (45 percent.)

Interestingly, the large decline in "Unlabeled" between 1993 and 1994 went almost entirely to cost reimbursement, while the subsequent decline in between 1996 and 1997 went almost entirely to fixed price.

Ground Vehicles

Figure 6-3: Defense Ground Vehicles Contract Obligations by Contract Pricing Mechanism, 1991–-2014

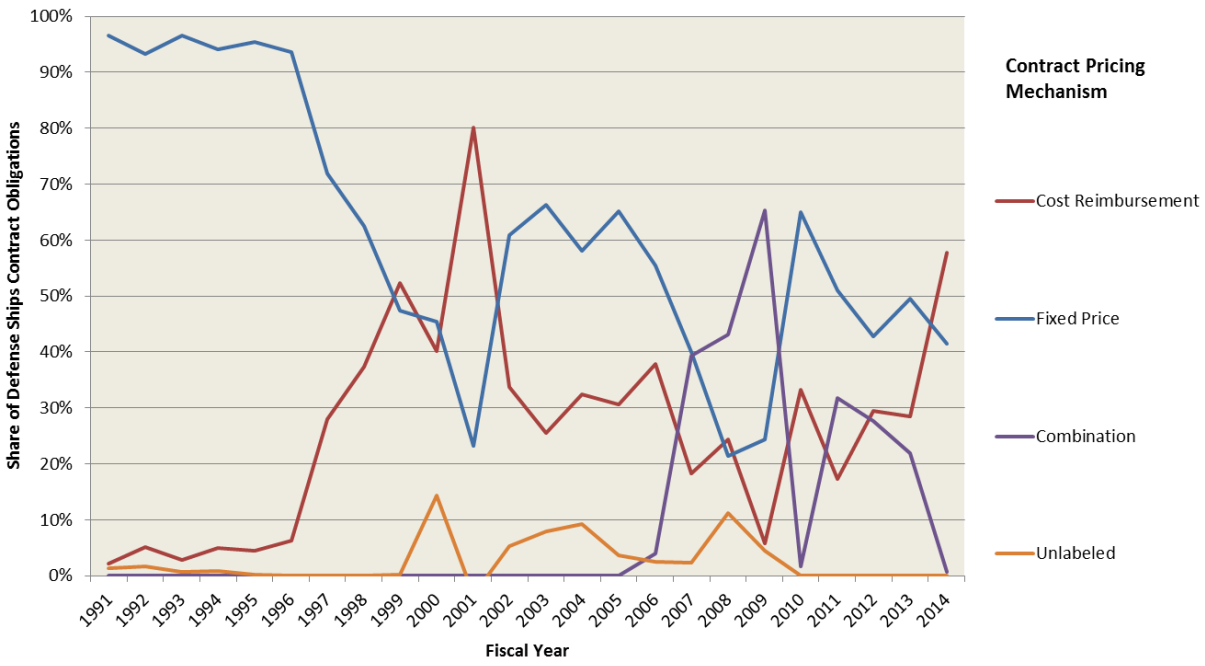


Source: FPDS; CSIS analysis.

Data labeling was a serious issue for ground vehicles in the early 1990s, with 49 percent of contract obligations classified as "Unlabeled" in 1994. As can be seen in Figure 6-2, that data-quality issue was apparently masking a large amount of fixed-price contracting. Beyond that, Ground Vehicles is notable for the sharp rise in the share of contract obligations awarded under cost-reimbursement contract types in recent years, from 8 percent in 2010 to 23 percent in 2014, with a corresponding decline in fixed price. This trend is not all that it seems, however, due to the enormous decline in contract obligations for Ground Vehicles over the same period. The increase in share for cost reimbursement is not a result of an actual increase in use of cost reimbursement contract types, but rather than contract obligations under cost-reimbursement contract types (-56 percent) have declined more slowly than those under fixed-price contract types (-75 percent) since 2010.

Ships

Figure 6-4: Defense Ships Contract Obligations by Contract Pricing Mechanism, 1991–2014



Source: FPDS; CSIS analysis.

Nearly all Ships contract obligations for Ships between 1991 and 1996 were awarded under fixed-price contract types, but that pattern rapidly shifted over the next few years, with the share awarded under cost reimbursement contract types rising from 6 percent in 1996 to 80 percent by 2001. The share awarded under cost-reimbursement contract types quickly fell off, to 34 percent in 2002, and fluctuated drastically over the next several years, though the trends in those years are obscured by the rapid rise of contract obligations coded as combination—65 percent of all contract obligations were coded as such in 2009, by far the highest of any product category. When combination plummeted to 2 percent in 2010, the share was split relatively evenly between fixed price and cost reimbursement.

Use of combination rose to high levels again from 2011–2013, but when those levels almost completely dropped off in 2014, virtually all of the share went to cost reimbursement, indicating that the 2011–2013 data may have drastically understated the use of cost-reimbursement contract types for Ships.

Fuels

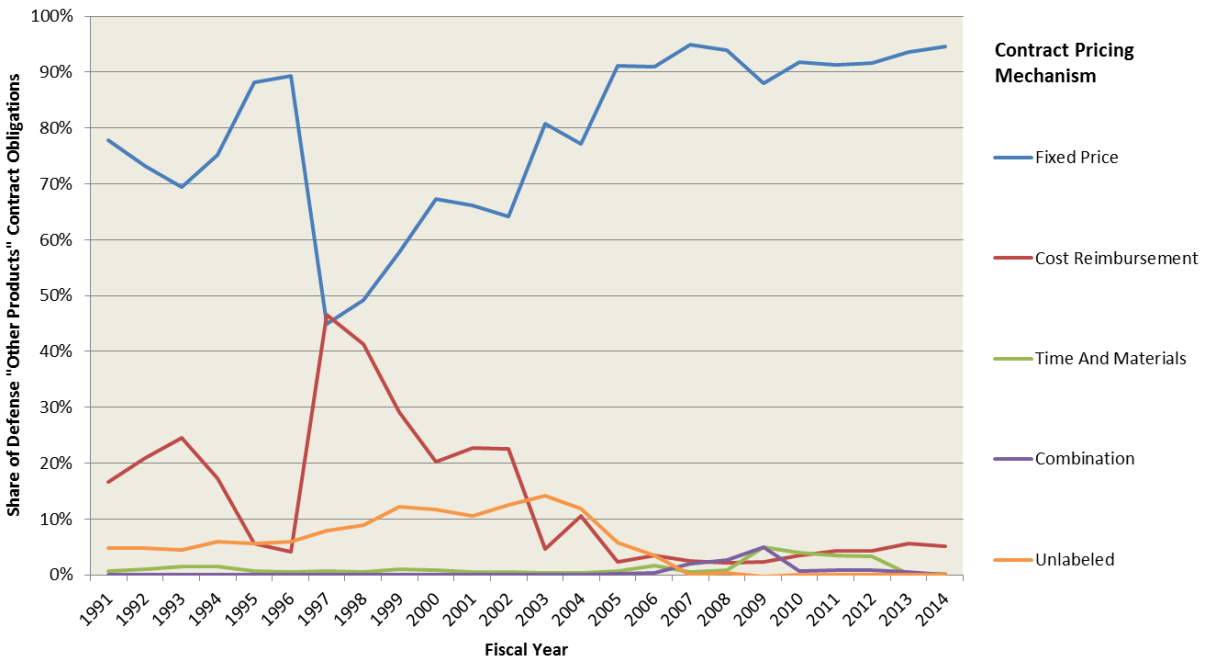
Contract obligations for Fuels are almost universally awarded under fixed-price contract types—in no year during the period observed did cost reimbursement account for even 1 percent of obligations.

Clothing & Subsistence

Unsurprisingly, cost-reimbursement contract types have never been a significant factor in contracting for C&S, never exceeding 1 percent of contract obligations in any year during the period. Excluding "Unlabeled," nearly all C&C contract obligations have been awarded under fixed-price contract types in every year from 1991–2014.

"Other Products"

Figure 6-5: Defense "Other Products" Contract Obligations by Contract Pricing Mechanism, 1991–2014



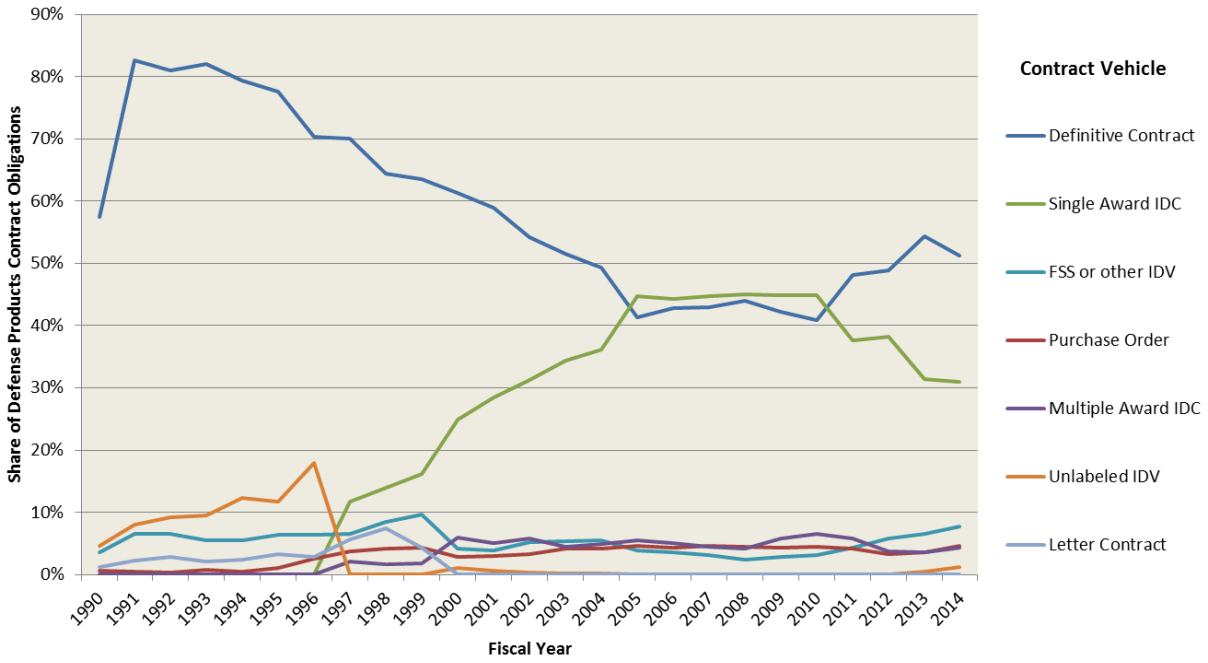
Source: FPDS; CSIS analysis.

"Other Products" is notable because, throughout the 1990s and into the early 2000s, the share awarded under cost-reimbursement contract types was significantly higher than average in most years, peaking at 47 percent in 1997. But after 1997, that share dropped off precipitously, to 20 percent by 2000, and then plummeted again between 2002 and 2003, from 23 percent to 5 percent. Since 2003, the share awarded under cost-reimbursement contract types has only exceeded 6 percent in one year (11 percent in 2004), and remained between 2 percent and 4 percent between 2005 and 2012.

Contract Vehicle

Defense products contract obligations were mostly awarded under definitive contract types throughout the 1990s, but various indefinite delivery vehicles (IDVs), particularly single-award IDCs, have risen to account for significant shares of obligations in the years since, as seen in Figure 6-6.

Figure 6-6: Overall Defense Contract Obligations by Contract Vehicle, 1990–2014



Source: FPDS; CSIS analysis.

"Unlabeled IDV" was prominent up through 1996 due to limitations in the granularity of the pre-2000 DD350 data, mostly obscuring contract obligations awarded under single-award IDCs. Similarly, "Letter Contracts," which are preliminary contracts allowing vendors to begin work before the contract is finalized, were a category used in the DD350 categorization of contract vehicles; in the FPDS data contract vehicle categorization schema, whether or not a contract is undefinitized is in an entirely separate field. Though the study team does not currently track undefinitized contracts in its analysis of contract vehicles in the 2000-2014 data, CSIS is considering updating its contract vehicle categorization schema to incorporate that data field going forward.

The share of obligations awarded under single-award IDCs rose steadily through the late 1990s and early 2000s, from 12 percent in 1997 to 45 percent in 2005, surpassing the share awarded under definitive contracts (41 percent) for the first time. Those shares remained roughly consistent through 2010, but single-award IDCs have declined since, likely due to the winding down of combat operations in Iraq and Afghanistan.

The analysis that follows will examine trends in the use of contract vehicles in select product categories where the trends differ notably from the overall pattern for defense products.

Missiles & Space

Over 80 percent of contract obligations for M&S were awarded under definitive contract types in every year between 1991 and 2014. There was a brief rise in the use of single-award IDCs in the mid- to late 2000s, peaking at 16 percent in 2011, but this rise was both shallower and much later than the increases seen in overall products and most other product categories. Since 2011, use of single-award IDCs has dropped sharply, falling to 4 percent of M&S contract obligations by 2014.

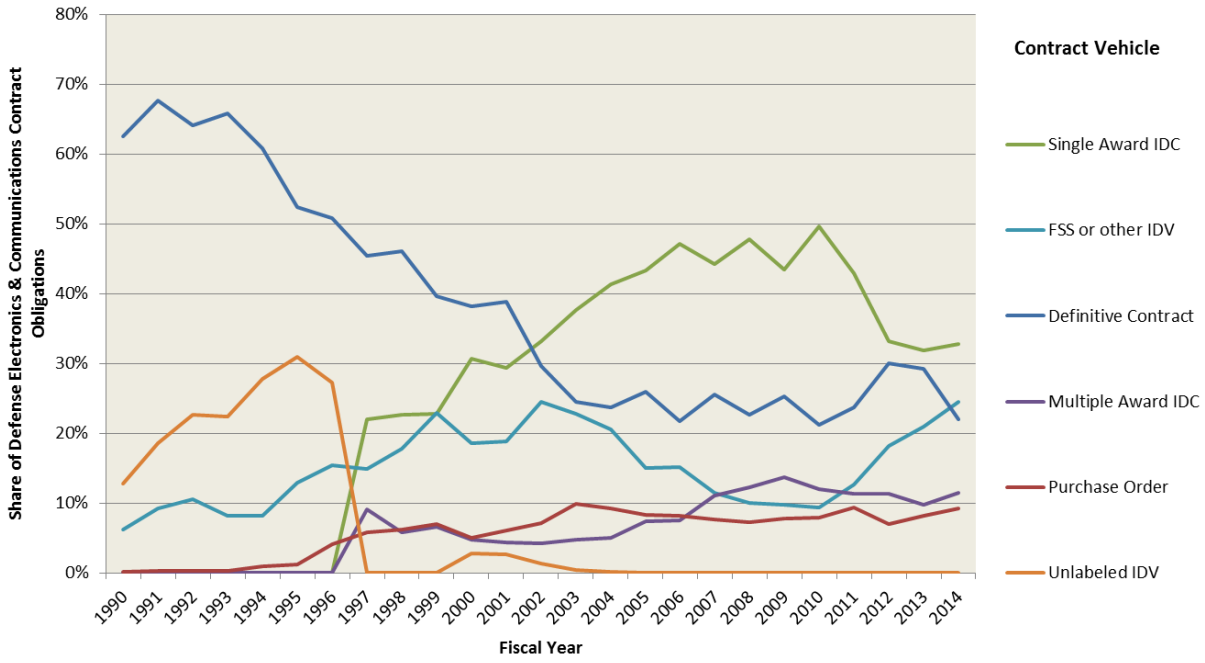
under multiple-award IDCs.

Ships

Unsurprisingly, contract obligations for Ships are overwhelmingly awarded under definitive contract types, with over 90 percent of Ships contract obligations awarded under definitive contracts in all but two years in the period observed (86 percent in 2010, 89 percent in 2012). The share awarded under single-award IDCs rose from 5 percent to 11 percent between 2009 and 2010, but dropped back to 5 percent in 2011, and has not exceeded 7 percent since.

Electronics & Communications

Figure 6-7: Defense Electronics & Communications Contract Obligations by Contract Vehicle, 1990–2014



Source: FPDS; CSIS analysis.

Similarly to the trend seen for overall defense products, contracting for E&C shifted in the early 2000s from primarily definitive contract types to primarily single-award IDCs. That trend has reversed dramatically in recent years, as the share of E&C contract obligations awarded under single-award IDCs has fallen from 50 percent in 2010 (an all-time high) to 33 percent in 2014, while the share awarded under "FSS or other IDVs" rose from 9 percent in 2010 to 25 percent in 2014, tied for the highest share in the period observed. The source of this growth was in both basic ordering agreements (BOAs) and

Blanket Purchasing Agreements (BPAs), which rose from almost no share in 2010 to 9 percent and 4 percent, respectively, in 2014.

The shares of E&C contract obligations awarded under purchase orders and multiple-award IDCs are both roughly double the shares for overall DoD products, further displaying the diversity of contract vehicle types used in contracting for E&C.

Launchers & Munitions

Similarly to overall defense products, there was a marked increase in use of single-award IDCs in contracting for L&M in the early 2000s. Unlike with overall products, however, the share of contract obligations awarded under single-award IDCs never surpassed that of definitive contract types, peaking at 39 percent in 2008 (compared to 51 percent for definitive contract types.) Since then, the share awarded under single-award IDCs has fallen off steeply, to 24 percent by 2014.

Multiple-award IDCs, which had remained between 6 percent and 9 percent from 2007–2013, saw their share increase to 14 percent in 2014, the result of a 62 percent increase in contract obligations awarded

Fuels

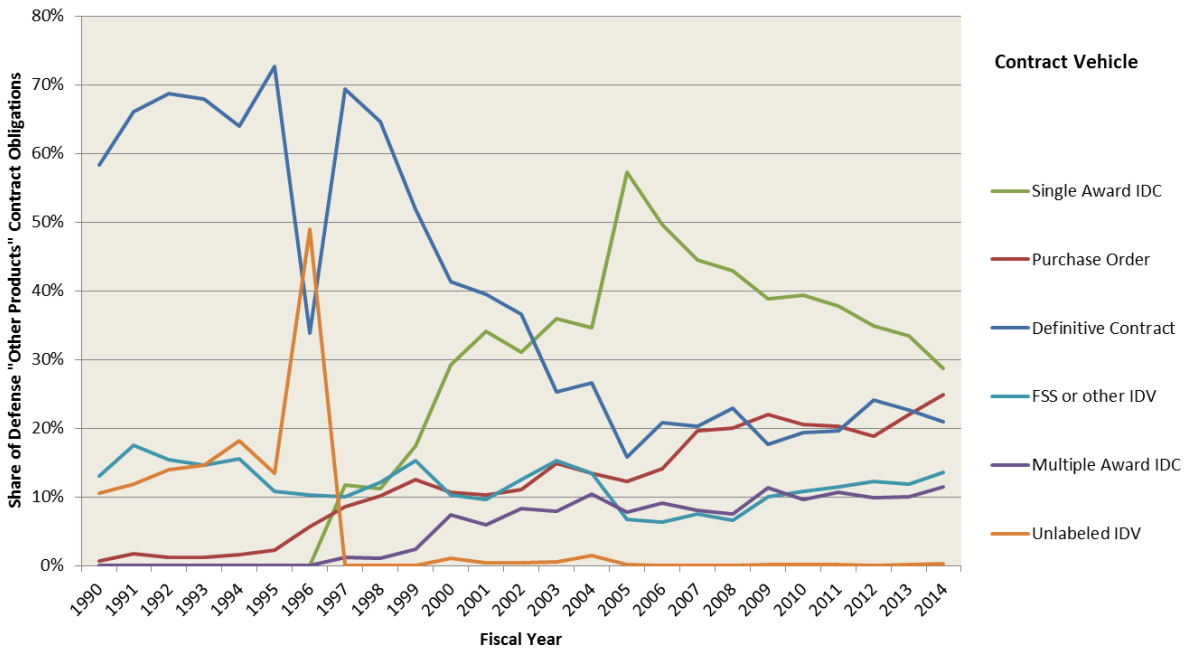
Prior to 2000, over 95 percent of defense Fuels contract obligations were awarded under definitive contract types. That abruptly shifted in 2000, when the share awarded under definitive contracts plummeted from 95 percent in 1999 to 1 percent in 2000; after 2000, definitive contracts never accounted for even 1 percent of Fuels contract obligations in any year. From 2000–2002, Fuels contract obligations were relatively evenly split between single- and multiple-award IDCs, but from 2003–2014, single-award IDCs accounted for at least 92 percent of Fuels contract obligations.

Clothing & Subsistence

Unlike overall DoD, contract obligations for C&S have overwhelmingly been awarded under IDV contract types, and more specifically single-award IDCs, with over 60 percent of contract obligations awarded under single-award IDCs in every year since 1997, and over 80 percent in every year since 2010. Use of multiple-award IDCs in C&S contracting briefly surged in the early to mid-2000s, peaking at 18 percent in 2005, but has fallen off steadily since, to a low of 1 percent in 2013 and 2014.

"Other Products"

Figure 6-8: Defense "Other Products" Contract Obligations by Contract Vehicle, 1990–2014



Source: FPDS; CSIS analysis.

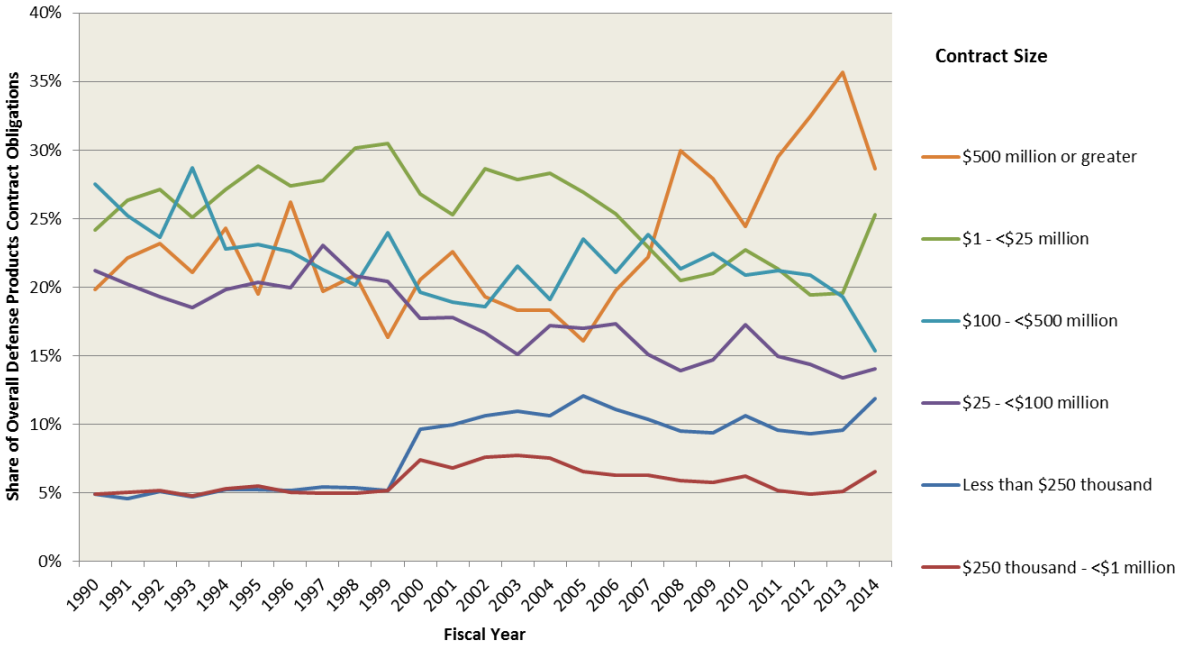
"Other Products" saw a rise in use of single award IDCs at roughly the same time as overall defense products and many other product categories, but unlike either overall or the other product categories, single-award IDCs have remained the predominant contract vehicle. Peaking at 57 percent in 2005, single-award IDCs have fallen off steadily since, to 29 percent in 2014, but that is still the largest share of any contract vehicle. Also differently from the trends discussed above, the decline in single-award IDCs in recent years has not led to an increase in the share awarded under definitive contract types. In fact, purchase orders, which are a relatively small factor in overall defense products contracting, have risen to account for a greater share (25 percent in 2014) than definitive contracts (21 percent in 2014), a trend not seen in any other product category.

The shares awarded under multiple-award IDCs and "FSS or other IDVs" have similarly risen as usage of single-award IDCs have declined, and both have had their shares either remain stable or grow slightly since 2009.

Contract Size

The study team also looked at trends in defense products contracting by size of contract, which CSIS classifies according to the amount of obligations under the particular contract in a given fiscal year. As such, the same contract could be categorized differently in different years across the life of the contract, based on annual obligation levels. Figure 6-9 shows contract size trends for overall defense products.

Figure 6-9: Overall Defense Products Contract Obligations by Contract Size, 1990–2014



Source: FPDS; CSIS analysis.

For the most part, the shares of defense products contract obligations going to the different contract size categories were remarkably consistent throughout the 1990s. Both contracts less than $250 thousand and contracts from $250 thousand–$1 million accounted for 5 percent of overall defense products contract obligations from 1990–1999. The other categories, though somewhat spiky year-to-year, were relatively stable overall; the exception was for contracts from $1 million - $25 million, which rose fairly steadily throughout the decade, from 24 percent in 1990 to 30 percent in 1999.

The share of contracts less than $250 thousand doubled, to 10 percent, between 1999 and 2000, but that is likely the result of changes in reporting for smaller contracts between the DD350 and FPDS, rather than any actual increase in the smallest contracts; the share for contracts less than $250 thousand remained between 9 percent and 12 percent throughout the 2000–2014 period. Contracts from $250 thousand–$1 million were similarly stable, accounting for between 5 percent and 8 percent of defense products contract obligations from 2000–2014.

There was more volatility in the larger contract size categories since 2000. The share of defense products contract obligations under contracts from $1 million–$25 million fell from a high of 29 percent in 2002 to 19 percent in 2012, but has rebounded since, to 25 percent in 2014. Contracts from $25 million–$100 million declined gradually after 2000, from 18 percent in 2000 to 14 percent in 2014. Contracts from $100 million–$500 million remained between 19 percent and 22 percent for most of the

2000–2013 period, but fell to 15 percent in 2014. And contracts of $500 million or greater rose from 22 percent in 2007 to 30 percent in 2008, and later accounted for as much as 36 percent of overall defense products contract obligations in 2013, largely due to the relative preservation of the largest contracts under sequestration. That share declined to 29 percent in 2014, as obligations under contracts of $500 million or greater declined at over twice the rate of overall defense products.

6. Analysis of Results

The Last Drawdown Holds Limited Lessons for the Current Drawdown

In theory, examining the last drawdown holds the potential for better understanding how the ongoing current drawdown in defense products contract obligations may unfold. Unfortunately, the dynamics of the previous drawdown are unique enough that it may not be possible, at the products category level, to glean meaningful insight into how the current situation will play out. Specifically, the "Last Supper" industry consolidation in the mid- to late 1990s thoroughly distorts any analysis of competition trends during that period—any changes in levels of competition as a result of the 1990s drawdown are overwhelmed by the changes resulting from the massive wave of industry consolidation.

With regards to the composition of the industrial base by size of vendor, there is nothing comparable to the "Last Supper" industry consolidation during the current budget drawdown. Instead of mergers and acquisitions, the primary trend among the defense industry seems to be that of divestiture and spin-off. For example, Northrop Grumman spun off its entire shipbuilding business line into Huntington Ingalls Industries, and SAIC split itself with part of the business renamed Leidos and much of its government services and IT elements organized into a new company, which kept the SAIC name. While a number of large corporations divested themselves of their defense business lines in the wake of the "Last Supper," most of those business units were sold to other defense contractors rather than spun off. As a result, while the "Last Supper" resulted in fewer, larger defense contractors, the current industry realignment has not eliminated vendors from the defense market. Rather, it has created newer, smaller, more specialized vendors, with a more coherent business portfolio counterbalanced by fewer overall resources.

At the topline level, however, it is useful to compare the two drawdowns. As significant as the decline in defense products contract obligations has been since the peak in 2008, obligations levels in 2014 ($127.4 billion) are still slightly higher than they were at the 1990s peak ($121.7 billion in 1991). This may, in part, explain why the industrial base reorganization of recent years has been so different from that of the 1990s. The buildup of the 2000s did not lead to many large new players entering the market, so much as it led to the existing large players adapting their current businesses and expanding into new businesses. As the drawdown continues, however, some of those companies have now begun to see those business units that they expanded or expanded into as not in synergy with their core business, or not profitable enough (now or looking forward) to continue in.

Put another way, the current drawdown is not yet deep enough to imperil the existence of the major players in the defense products industrial base. However, it is deep enough that those business units that the vendors expanded or expanded into during the peak years of the wars in Iraq and Afghanistan are no longer as attractive. Thus, vendors are increasingly looking to spin off business units that may be strong enough to survive, but no longer have the projected long-term profitability to justify retaining business units that are asynchronous with a vendor's core business.

Key Takeaways from Analysis of Non-MDAP-Focused Product Categories

A key goal of this research effort was to get insight into defense products contracting trends beyond the MDAP-focused product categories that dominate the public conversation. As discussed in the introduction, non-MDAP-focused products accounted for more than half of all defense products contract obligations in 2014.The following section describes key findings and policy recommendations for these non-MDAP-focused product categories.

The Impact of Sequestration

A number of the non-MDAP-focused product categories have seen obligations levels decline less steeply under sequestration than defense products contract obligations overall. Clothing & Subsistence, Electronics & Communications, Engines & Power Plants, and Launchers & Munitions all declined either in parallel with or less sharply than overall defense products in both 2013 and 2014. Fuels declined heavily in 2013, though that was primarily the result of a one-year contract-timing anomaly boosting obligations levels in 2012; in 2014, Fuels contract obligations declined at roughly the same rate as overall defense products. And "Other Products" declined at nearly twice the rate of overall defense products in 2013, but at one-seventh the rate of overall products in 2014.

Overall, despite the conventional wisdom that smaller, "less important" defense products would face disproportionate cuts in order to protect higher-profile programs, most non-MDAP-focused product areas saw cuts in 2013 and 2014 that were either roughly in line with or slower than the overall decline in defense products.

Levels of Competition

Increasing effective competition for MDAPs is a daunting prospect, due to the limited industrial base capable of delivering such highly complex platforms and systems. For non-MDAP products, despite the highly specialized products that DoD often contracts for, it would seem logical that there would be a more robust industrial base capable of performing and willing to compete for contracts. And yet, for a number of non-MDAP-focused product categories, rates of effective competition are on par with, if not lower than, the rate of effective competition for defense products overall.

For Electronics & Communications, after the "Last Supper" industry consolidation of the mid- to late 1990s, rates of effective competition have remained near the overall rate for defense products, despite the robust commercial industrial base for many types of IT and communications products. The relatively low rate of effective competition is particularly noteworthy given the rapid expansion of the commercial E&C industrial base; despite the significant increase in the number of companies competing for E&C products contracts, the rate of effective competition has not increased. This relatively low rate of effective competition may be a reflection of the difficulties that DoD has faced in identifying innovation in the commercial marketplace and bringing commercial entities into the government contracting world. Audit requirements, export control restrictions, and IP ownership issues are among the many factors that make many high-tech commercial firms skeptical about contracting with DoD, along with the difficulties DoD has faced in writing requirements for IT-focused contracts. There may be room to increase rates of effective competition for Electronics & Communications, but such improvements will likely require consideration of how DoD can ease barriers to entry for commercial firms into the defense contracting marketplace.

For both Engines & Power Plants (which has seen rates of effective competition well below the rates for overall DoD products in most years) and Launchers & Munitions (which has seen rates on par with overall DoD products), increasing rates of effective competition may be difficult, due to the long service lives of platforms and systems in those categories. While competition may exist in development stages, once a winner has been chosen, competition in production or sustainment is unlikely without acquiring the technical data rights from the developing vendor. And, in some cases, it may cost more to acquire the data rights than would potentially be saved by competing production.

"Other Products," which is primarily composed of commodities and commercial goods, has had a rate of effective competition that has been only moderately higher than the rate for overall DoD products in

most years. Because there is, or should be, a robust industrial base for many of the products under this category, there may be significant room to improve effective competition for this category.

Additionally, both Electronics & Communications and "Other Products" have unusually high levels of contract obligations awarded after competition with a single offer. While single-offer competition sometimes masks contracts that would be more properly classified as uncompetitive, because the contracting officer knew (or should have known) that there would only be one bidder, the study team believes that a another possible factor in the prevalence of single-offer competition (in all areas of the defense contracting portfolio, not just in specific products categories) is poorly written requirements or improperly structured contracts that dissuade potential vendors from bidding. CSIS urges policymakers to examine if there are systemic issues in requirements generation and/or contract design as overly prescriptive specifications.

The Defense Products Industrial Base

For a number of the non-MDAP-focused product categories, the composition of their respective vendor bases (based on size of vendor) has been relatively stable in the post-"Last Supper" period. But there have been some product categories that have seen notable shifts. For Electronics & Communications, which has long had high rates of small business participation, the share of contract obligations awarded to small businesses has grown steadily in recent years, to double the share for overall defense products. Taken together, small and medium vendors accounted for nearly half of all Electronics & Communications contract obligations in 2014.

For Launchers & Munitions, the Big 6 defense vendors saw a significant dip in their share of contract obligations in the mid- to late 2000s, with that share going relatively evenly to the other three size categories. In recent years, however, the share awarded to the Big 6 has rebounded to near prior levels, while the share awarded to small vendors has dropped off significantly. This is largely a function of obligations to Big 6 vendors remaining largely stable during the current drawdown, while obligations awarded to small vendors have declined by more than two-thirds.

7. Final Thoughts

This section presents what the study team believes to be among the most notable and relevant findings. The key takeaways from this analysis:

- The overall rate of effective competition for products seems to have been largely unaffected by the post–Cold War drawdown of the 1990s and the current drawdown plus sequestration. There is a logic to the assumption that rates of competition would increase as the same pool of vendors fought for a declining pool of contract dollars, but that assumption has not been borne out in the data. By contrast, there have been notable declines in competition rates for MDAP-heavy product categories such as Aircraft and Missiles & Space, particularly in the years after the Last Supper industry consolidation.
- The current downturn has seen the relative preservation of contract obligations going to the Big 6 defense vendors, despite the divestment of Northrop Grumman's large shipbuilding unit into Huntington Ingalls Industries. This is likely a reflection of the preservation of the largest, most high-profile programs as budgets declined; these programs are disproportionally contracted to the Big 6.
- Sequestration has had an enormous impact on defense products contracting, even in the context of the overall decline since the peak in 2008. Overall defense products contract obligations have declined by 37 percent since 2008, but three-fifths of that decline occurred in just 2013 and 2014.
- Cuts in obligations were not evenly distributed among the major DoD components and product categories in 2013 and 2014. Many of the components and product categories that saw the most significant declines in 2013 were relatively preserved in 2014, and vice versa. This also applies to specific programs—many programs that saw major increases or cuts in obligations in 2013 saw significant reversals in 2014.

Data quality, both in current data and the pre-2000 data, remains a significant barrier to some areas of analysis. The major outstanding data-quality issues include:

- The grouping of all unmanned systems contracts into a single PSC for "Drones" does not provide sufficient data granularity for an increasingly important segment of the DoD products portfolio.
- Data-labeling issues within the Air Force, which show almost no obligations associated with the F-35 and the reuse of old codes for new projects, as shown by nearly $1.5 billion associated with a 1970s Army antitank missile program, are reason for concern and skepticism about the reliability of the valuable system equipment code field.
- The huge amount of contracts apparently either missing from or significantly undervalued in FPDS between 1990 and 1994 are a significant bar to any analysis trying to use FPDS data to examine the previous budget drawdown of the 1990s: this is a vexing issue that negatively impacts the researcher's ability to distill out policy recommendations for policymakers.

Going forward, the study team will continue to work to find solutions to existing data-quality issues, and to highlight those issues to policymakers where solutions are not possible on our end. CSIS will also continue to dig deeper into the wide range of data available on contract and vendor characteristics in the DoD products contracting market, to identify key trends and possible lessons learned.

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