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Measuring the Impact of Sequestration and the Drawdown on the Defense Industrial Base

AUTHORS
Rhys McCormick
Andrew P. Hunter
Gregory Sanders

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

A Report of the
CSIS DEFENSE-INDUSTRIAL INITIATIVES GROUP

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Center for Strategic & International Studies
1616 Rhode Island Avenue, NW
Washington, DC 20036
202-887-0200 | www.csis.org

Rowman & Littlefield
4501 Forbes Boulevard
Lanham, MD 20706
301-459-3366 | www.rowman.com

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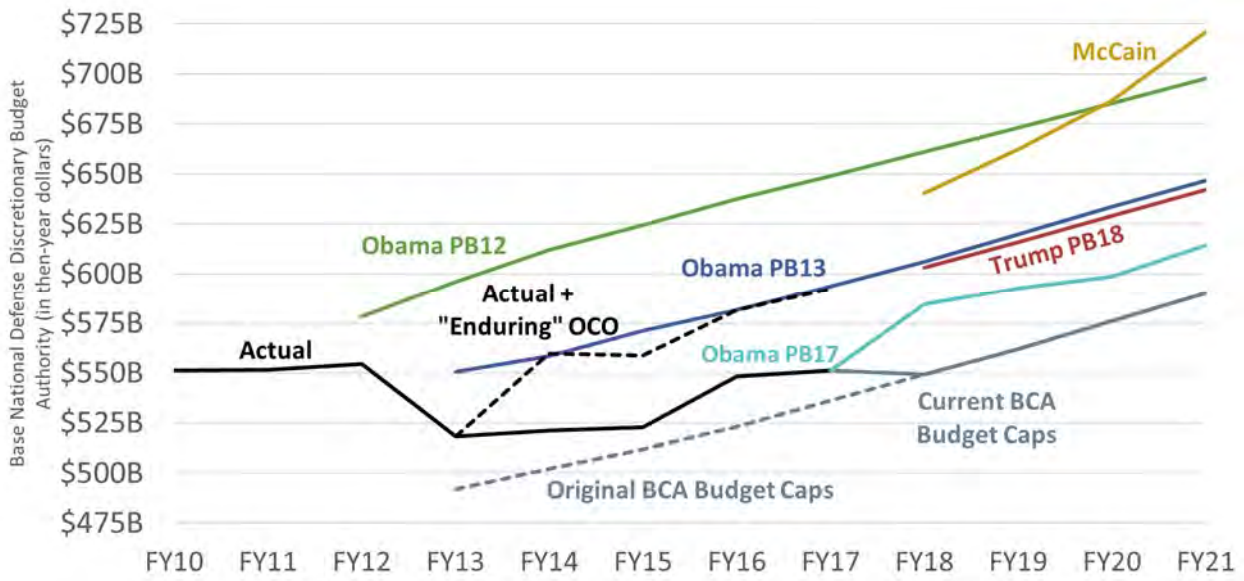
Executive Summary

The United States has long recognized the importance of supporting and sustaining an advanced defense industrial base for maintaining global technological superiority. Maintaining a technologically superior industrial base requires a wide vendor pool from which to produce products, conduct research and development (R&D), and provide services for the Department of Defense (DoD). However, the implementation of the 2011 Budget Control Act's (BCA) enforced reductions to the federal budget, as shown in Figure 0-1, has prompted congressional, DoD, government oversight, and industry officials all to express concerns over the health and future of the defense industrial base. Overseas Contingency Operations (OCO) funding associated with the wars in Iraq and Afghanistan is exempt from these caps, but has also declined steeply since 2011. The combined effect of these reductions is referred to as the current defense drawdown, or the drawdown, for this study.[I]

Figure 0-1: Defense Budget Proposals Compared to the Defense Budget Caps



Source: Todd Harrison and Seamus Daniels, *Analysis of the FY 2018 Defense Budget* (Washington, DC: CSIS, December 2017), https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171208_Defense_Budget_Analysis.pdf?_bMzg.Rwos033iujMRE7YyyabElygTDY.

CSIS analysis showed that buried within the substantial decline in defense contract obligations were significant variations from sector to sector, with declines varying from catastrophic (Land Vehicles), to steep (Facilities and Construction, Space Systems), to relatively modest (Ships & Submarines). Other sectors suffered a whipsaw effect in which solid business growth suddenly switched to sharp decline (Aircraft). Due to the limitations in the subcontract database, CSIS cannot say whether these companies have exited the industrial base entirely, or still perform work at the lower tiers. The shape of the supporting industrial base was significantly restructured in some sectors, although the size of losing and gaining vendors varied substantially across industry. However, in general, Small firms mostly

[I] CSIS copublished a version of this executive summary with the Aerospace Industries Association in November 2017.

succeeded in holding market share, and the Big 5 saw the composition of their work shift away from R&D and toward products and services.[II]

The most complex dynamic occurred in competition. Overall effective competition remained fairly steady, but there were notable declines in sectors where competition was already fairly limited (Aircraft; Ordnance and Missiles; Air and Missile Defense). The size of a platform portfolio's decline had little explanatory effect. Different sectors experienced similar levels of decline while experiencing very different trends in the rate of effective competition within the sector. Sectors where the DoD vendor base may strongly overlap with robust commercial markets—such as Facilities and Construction; and Electronics, Comms, & Sensors (EC&S)—showed slight decrease in competition despite large declines in obligations and vendors.

METHODOLOGY and RESEARCH DESIGN

This report leverages and builds upon the methodology used in previous CSIS reports on federal contracting and DoD contracting by platform portfolio and analyzed these platform portfolios to measure the impact of sequestration and drawdown on different sectors of the defense industrial base.[III] The study specifically focuses on five research questions: [IV]

- Did the DoD components respond differently to sequestration and the drawdown?
- Were the different subsectors of an industrial base equally impacted?
- How did the share of contract obligations change among vendors of different sizes, particularly small businesses?
- Did the number of prime vendors change within a sector?
- Did the rate of effective competition change within a sector?

Though the defense budget had been declining in the years leading up to sequestration in Fiscal Year (FY) 2013, the enactment of sequestration and budget caps marked a severe market shock that had a considerable impact on the defense industry. To measure that shock, CSIS categorized contracts into periods to measure two different questions: What was the trajectory of the industrial base sector prior to the enactment of sequestration and budget caps? Did the enactment of sequestration and budget caps change the industrial

[II] CSIS splits the industrial base into four categories. The Big 5 are the five largest defense contractors: Lockheed Martin, Boeing, Raytheon, Northrop Grumman, and General Dynamics. Large vendors are those other vendors that have been identified by CSIS as having $3 billion or more in total annual revenue from all sources. Small vendors are those defined as Small businesses by the federal government; all remaining vendors are categorized as Medium.

[III] The 11 unique CSIS platform portfolios are as follows: Aircraft; Ships & Submarines; Land Vehicles; Air and Missile Defense; Space Systems; Ordnance and Missiles; Other Products; Electronics, Comms, and Sensors; Facilities and Construction; Other Services; and Other R&D and Knowledge Based.

[IV] The 11 platform portfolio categories were developed by categorizing contracts primarily by the platform they support. This was done using multiple columns of data in FPDS, including looking at the specific system supported, the claimant program, and finally the product or service code. To overcome ambiguity between missiles and space systems, contracts managed by the Missile Defense Agency that are not otherwise claimed are classified in the Air and Missile Defense platform portfolio.

base compared to its previous trajectory, and if so, how? To measure these questions, the study team created the following three periods:

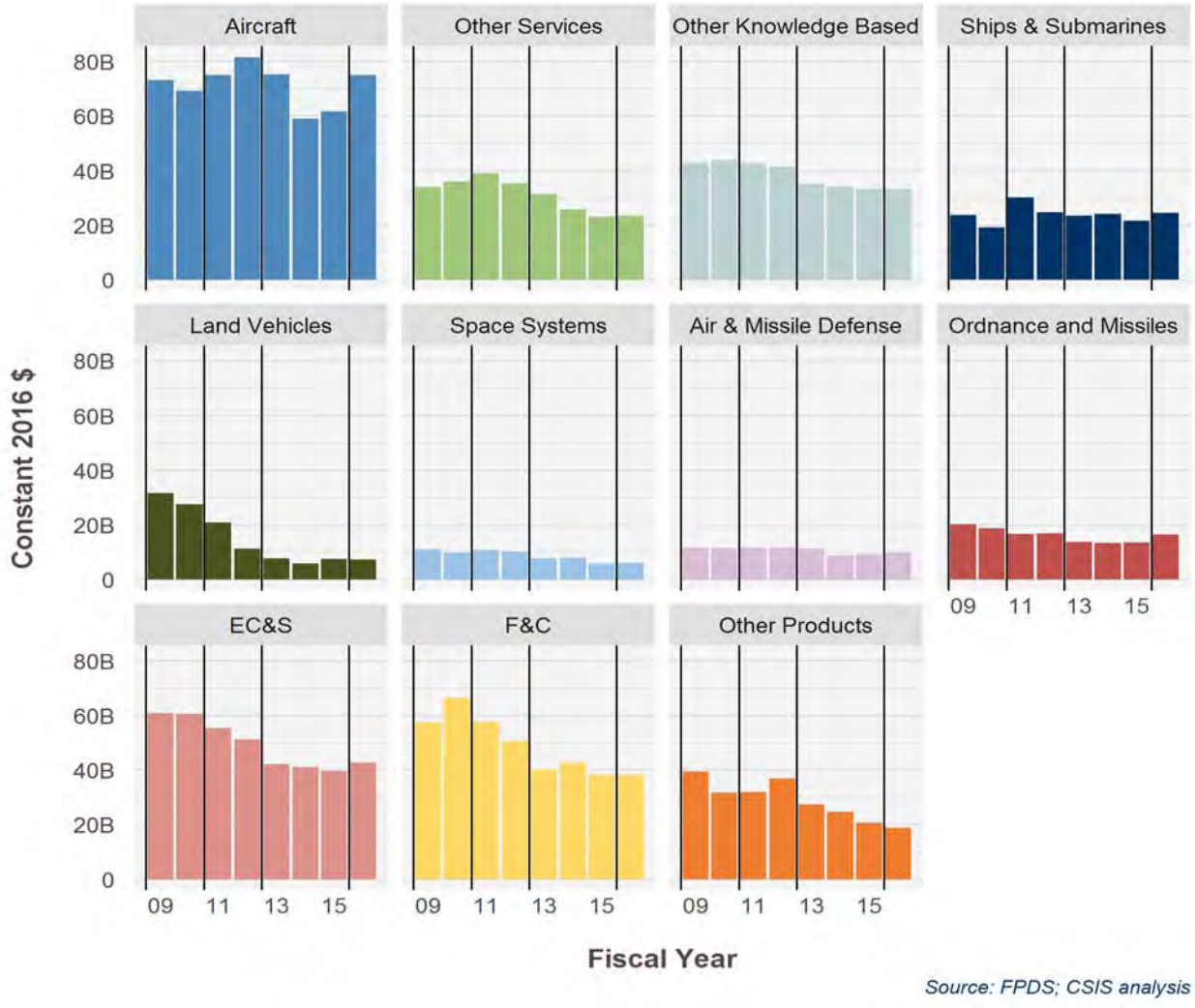
- Pre-drawdown: FY 2009 to FY 2010
- Start of Drawdown: FY 2011 to FY 2012
- BCA Decline: FY 2013 to FY 2015

Additionally, to better measure the trends between periods, the study team averaged contract obligations across the years comprising a period.

OVERALL DoD TRENDS BY PLATFORM PORTFOLIO

At the start of the drawdown (FY 2011 to FY 2012), average annual defense contract obligations decreased by 5 percent compared to the pre-drawdown (FY 2009 to FY 2010) period. When sequestration was triggered in FY 2013, defense contract obligations decreased by 15 percent from FY 2012 in that single year. Average annual defense contract obligations fell 23 percent during the BCA Decline period (FY 2013 to FY 2015).

Figure 0-2: Defense Contract Obligations by Platform Portfolio, 2009–2016



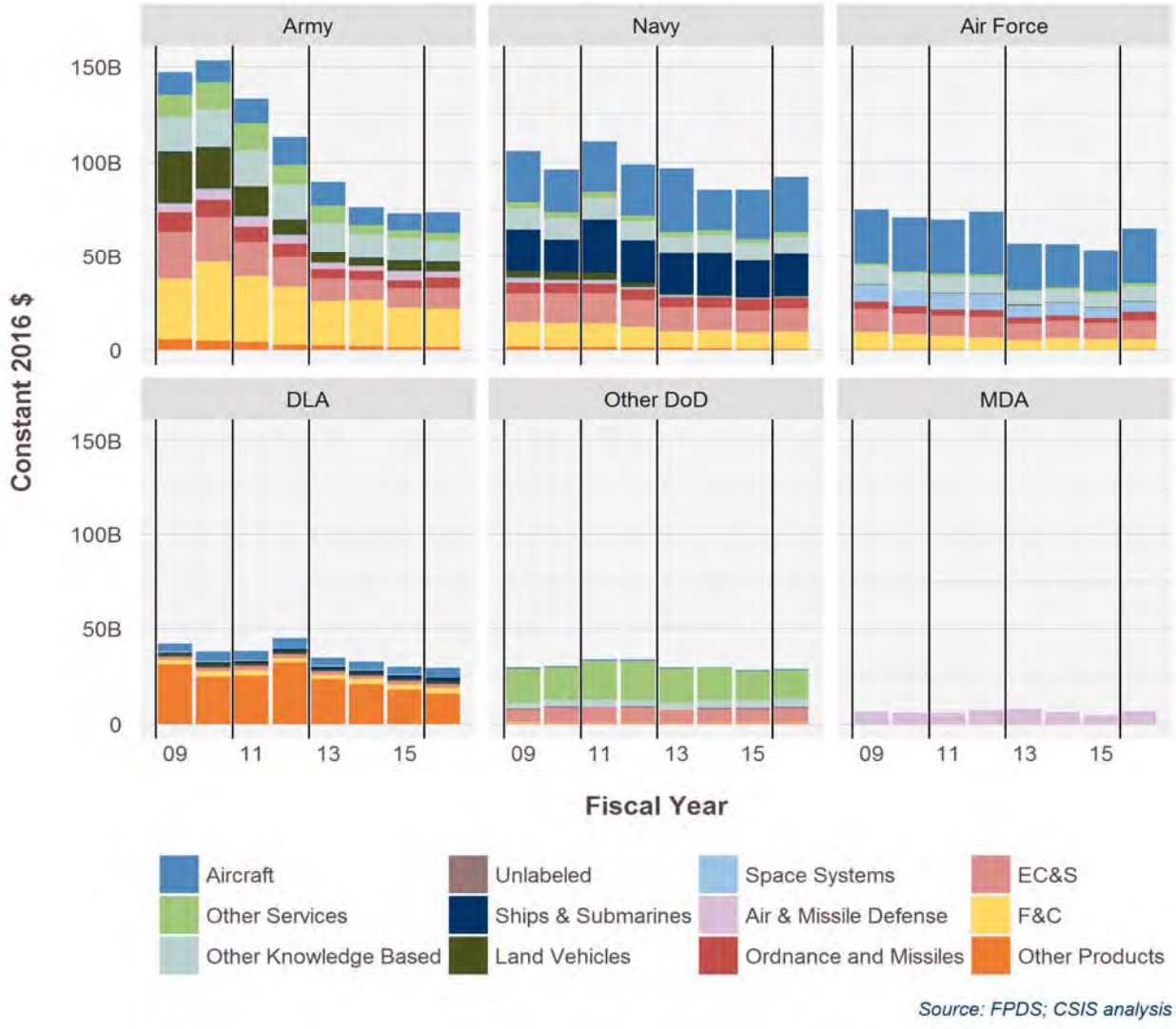
As shown in Figure 0-2, the impact of sequestration and the defense drawdown on the different sectors of the defense industrial base varied widely in magnitude. Although every platform portfolio experienced double-digit percentage declines during the BCA decline period, the degree of cuts in this period ranged from the 16 percent decline in Ships & Submarines to the 56 percent decline in Land Vehicles. In addition to Ships & Submarines, Air and Missile Defense (-16 percent), Aircraft (-19 percent), Other R&D (-19 percent), and Ordnance and Missiles (-20 percent) all experienced reductions smaller than the overall rate of decline across DoD. At the other end of the spectrum, Space Systems (-32 percent), Other Products (-30 percent), and Other Services (-28 percent) joined Land Vehicles in experiencing cuts greater than the overall decline.

RESEARCH FINDINGS

Did the DoD components respond differently to sequestration and the drawdown?

As seen in Figure 0-3, the data show that the DoD components took different approaches in responding to the market shock of sequestration and the defense drawdown. The Army, which took the largest percentage cut in total contract obligations, distributed cuts across all platform portfolios unevenly. For example, the Army's Air and Missile Defense contract obligations fell at a rate slower than the overall rate of Army decline at the expense of other platform portfolios such as Land Vehicles. The Air Force took a more distributed approach with only a few platform portfolios, such as Air and Missile Defense and Space Systems, seeing cuts larger than the overall rate of decline. The Navy prioritized contracts for Aircraft and Ordnance and Missiles at the expense of more severe cuts in Facilities and Construction, Land Vehicles, Air and Missile Defense, and Space Systems.

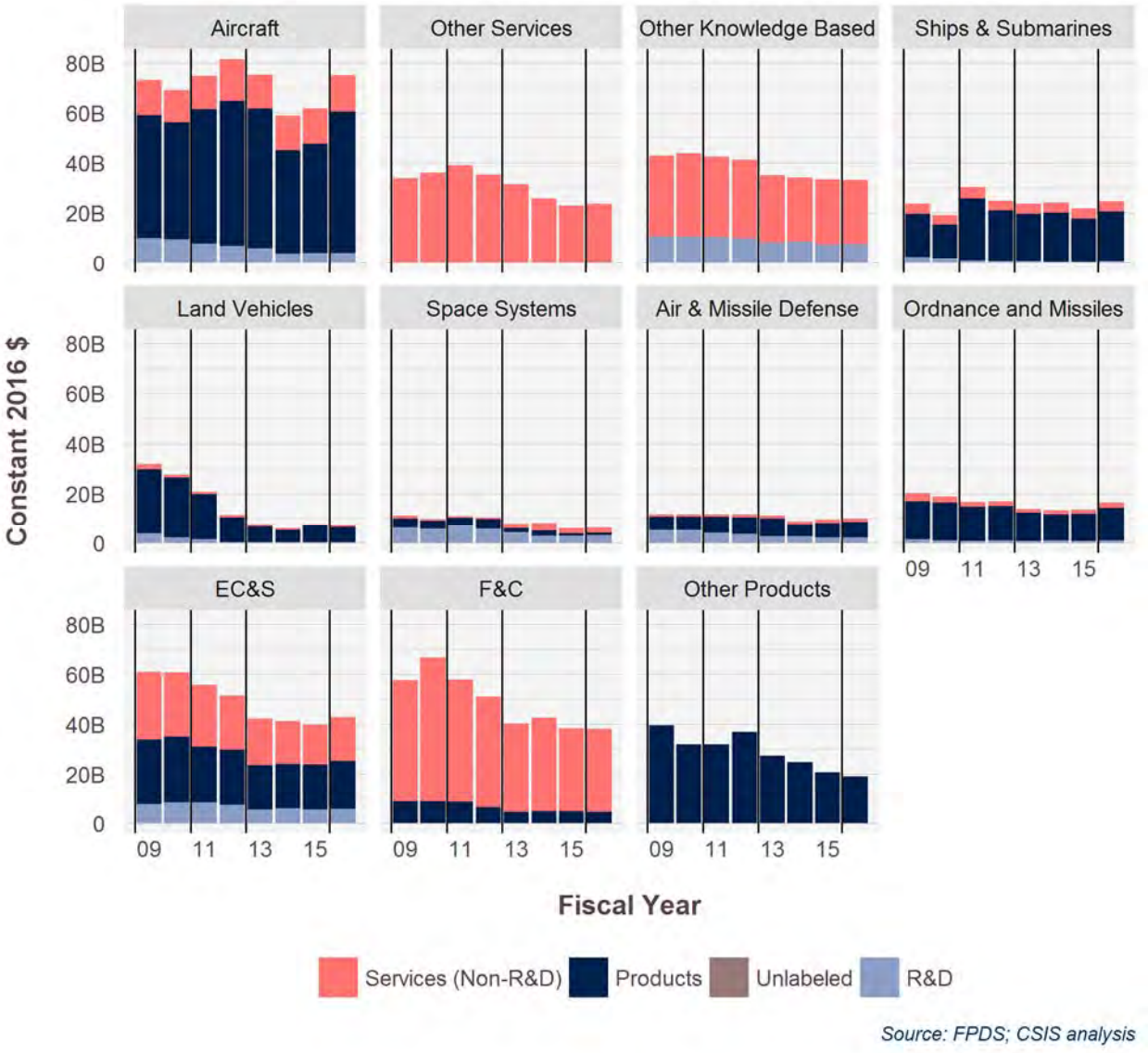
Figure 0-3: Defense Component Contract Obligations by Platform Portfolio



Were the different areas (products, services, R&D) of an industrial base sector equally impacted?

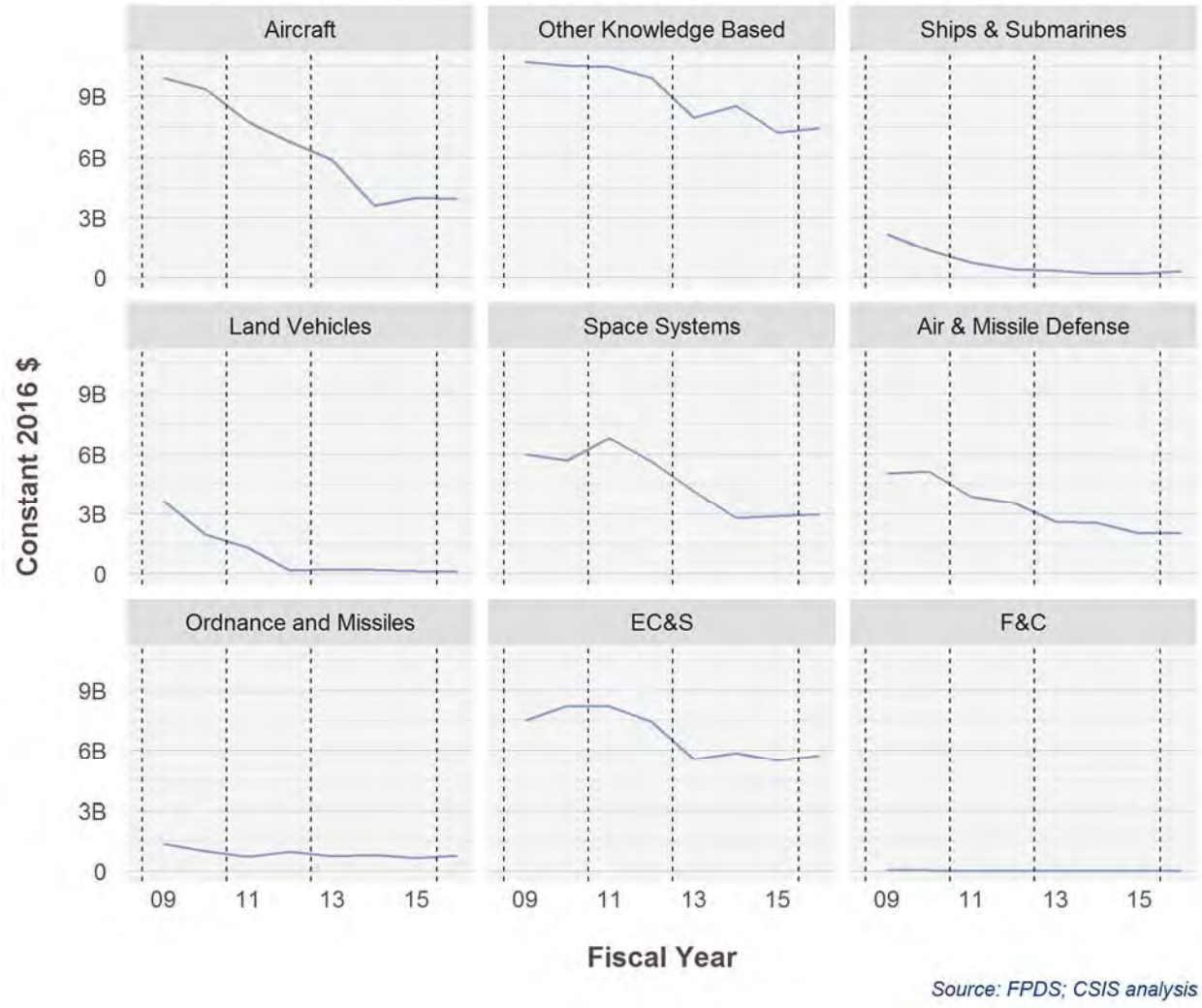
As shown in Figures 0-4 and 0-5, over the course of the drawdown, R&D took cuts greater than products or services in most platform portfolios. The data show that across most platform portfolios, R&D took disproportionate cuts, but the products and services trends were more sector specific. At the start of the drawdown, EC&S and Space Systems R&D contract obligations fell at rates faster than the overall platform portfolio rate of decline. During the BCA decline period, EC&S and Space Systems R&D also experienced greater than overall platform portfolio percentage declines, though Ordnance and Missiles R&D contracts fell at a rate slower than the overall rate of decline.

Figure 0-4: Platform Portfolio Contract Obligations by Area, 2009–2016



Source: FPDS; CSIS analysis

Figure 0-5: R&D Contract Obligations by Platform Portfolio, 2009–2016



How did the share of contract obligations change among vendors of differing sizes?

The data show that despite pre-sequestration predictions, the drawdown did not disproportionately harm Small vendors. In six of the eight platform portfolios analyzed in this paper, Small vendors either increased their share of platform portfolio contract obligations or held steady, while Large and Medium vendors were most harmed by the market shock from sequestration and the defense drawdown.

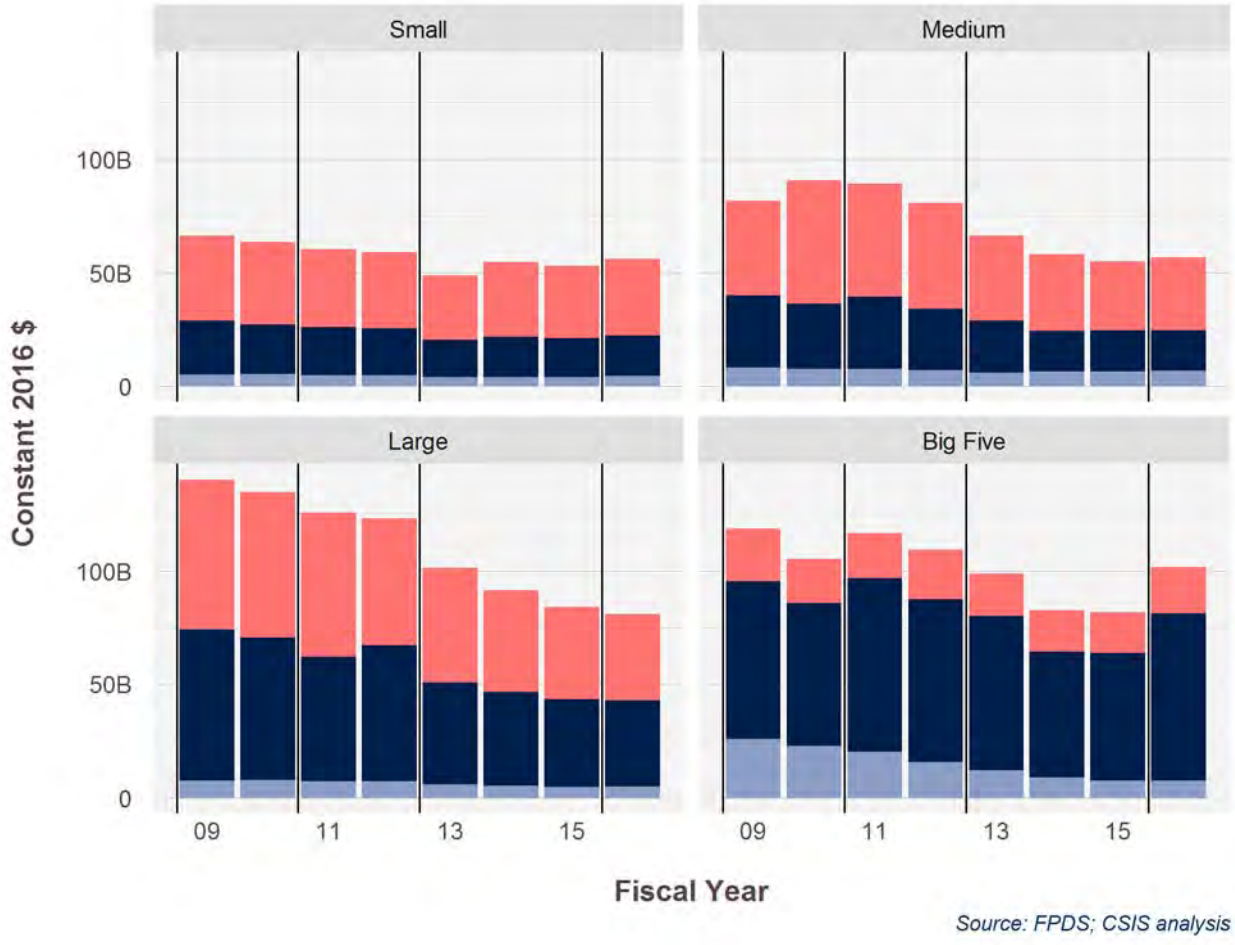
Small vendors fared best in the Land Vehicles; EC&S; and Facilities and Construction platform portfolios, where their share of contract obligations increased during the drawdown. Interestingly, Small vendors held steady over the drawdown in the three platform portfolios (Aircraft, Space Systems, and Air and Missile Defense) where Small vendors received less than 5 percent of total platform portfolio contract obligations pre-drawdown.

Small vendors' share of contract obligations fell in the Ordnance and Missiles and Ships & Submarines platform portfolios over the drawdown. While the share of contract obligations fell in both platform portfolios, there are different explanations for that decline. In Ordnance

and Missiles, the decline is explained by Small vendors' contract obligations falling at a rate greater than the overall platform's rate of decline. In Ships & Submarines, Small vendors' contract obligations grew 5 percent at the start of the drawdown compared to the pre-drawdown period; however, contract obligations for the Big 5, Large, and Medium vendors also grew at rates higher than the overall rate of decline.

Beyond the top-line defense vendor size and area trends, there are distinct differences in the impact of sequestration and the defense drawdown on vendors of differing sizes depending on what area (products, services, or R&D) vendors are contracted for. Figure 0-6 shows defense contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 0-6: Defense Contract Obligations by Area, by Size of Vendor, 2009–2016



For defense products, the Big 5 experienced a notable whipsaw between the start of the drawdown and the BCA decline period. At the start of the drawdown, average annual Big 5 products contract obligations grew 12 percent from pre-drawdown levels, even as overall Big 5 contracts declined. However, during the BCA decline period, annual average Big 5 defense products declined by 19 percent, a rate higher than the overall Big 5's period of decline.

For defense R&D, the notable findings are the differing rates at which average annual contract obligations declined compared to the overall rate throughout the study period. At the start of the drawdown, Large (-6 percent), Medium (-7 percent), and Small (-5 percent) all

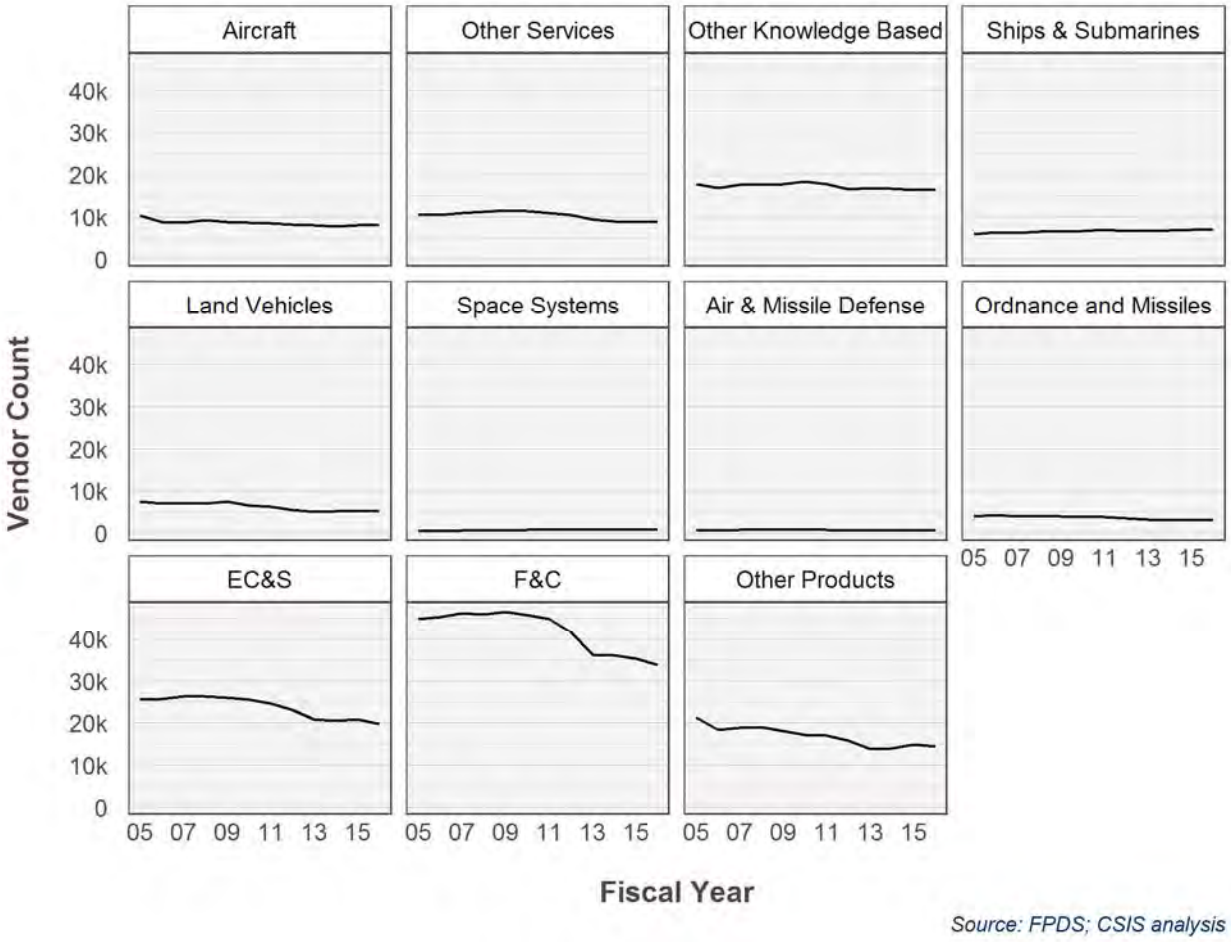
fell at rates well below the overall rate of decline (-17 percent), while the Big 5 vendors took the brunt of the R&D cuts (-26 percent). During the BCA decline period, prime contract awards to Medium and Small vendors continued to fall at rates well below the overall rate of decline (-33 percent), falling just 14 and 18 percent respectively. Large vendors (-27 percent) continued to decline slower than overall defense R&D, while Big 5 average annual Defense R&D contract obligations crashed, declining 48 percent during the BCA decline period compared to the start of the drawdown.

For defense services, the Big 5 (-4 percent) declined at a rate roughly equal to the overall rate of decline (-5 percent) at the start of the drawdown, only to fall 10 percent during the BCA decline period, a rate significantly below the overall 21 percent decline. Large vendors declined at rates slightly higher than the overall sub-sector in both the start of the drawdown (-8 percent) and BCA decline period (-24 percent). Medium vendors were the only ones to see a complete reversal in trajectories, declining in the BCA decline period (-29 percent) after previously growing at the start of the drawdown (+1 percent). Finally, Small vendors fell at a nearly consistent rate across the start of the drawdown and BCA decline period (-8 percent; -9 percent).

Did the number of prime vendors change?

Across the defense industrial base, the number of prime vendors declined from an average of approximately 78,500 pre-drawdown to approximately 72,600 at the start of the drawdown (-8 percent decline), and then fell to approximately 61,700 in the BCA decline period, a 15 percent decline from the previous FY 2011-to-FY 2012 period. Although the number of overall DoD first-tier prime vendors was already declining slowly prior to the drawdown, the market shock of sequestration and the budget caps accelerated those trends. In total, the number of prime vendors was reduced by roughly 20 percent, or about 17,000 vendors. Across the sectors analyzed in this paper, the total number of prime vendors in each sector decreased, except in Ships & Submarines and Space Systems. Unlike other sectors, the total number of Ships & Submarines prime vendors grew from approximately 6,500 pre-drawdown to about 6,775 at the start of the drawdown and essentially held steady during the BCA decline period. The total number of prime vendors for Space Systems grew during the drawdown, going from approximately 750 vendors pre-drawdown to 850 vendors at the start of the BCA decline period. However, this growth might prove temporary, as the number of vendors in this sector fell 6 percent during the BCA decline period and an additional 8 percent in FY 2016.

Figure 0-7: Vendor Count by Platform Portfolio



Source: FPDS; CSIS analysis

Did the share of contract obligations awarded after effective competition change?

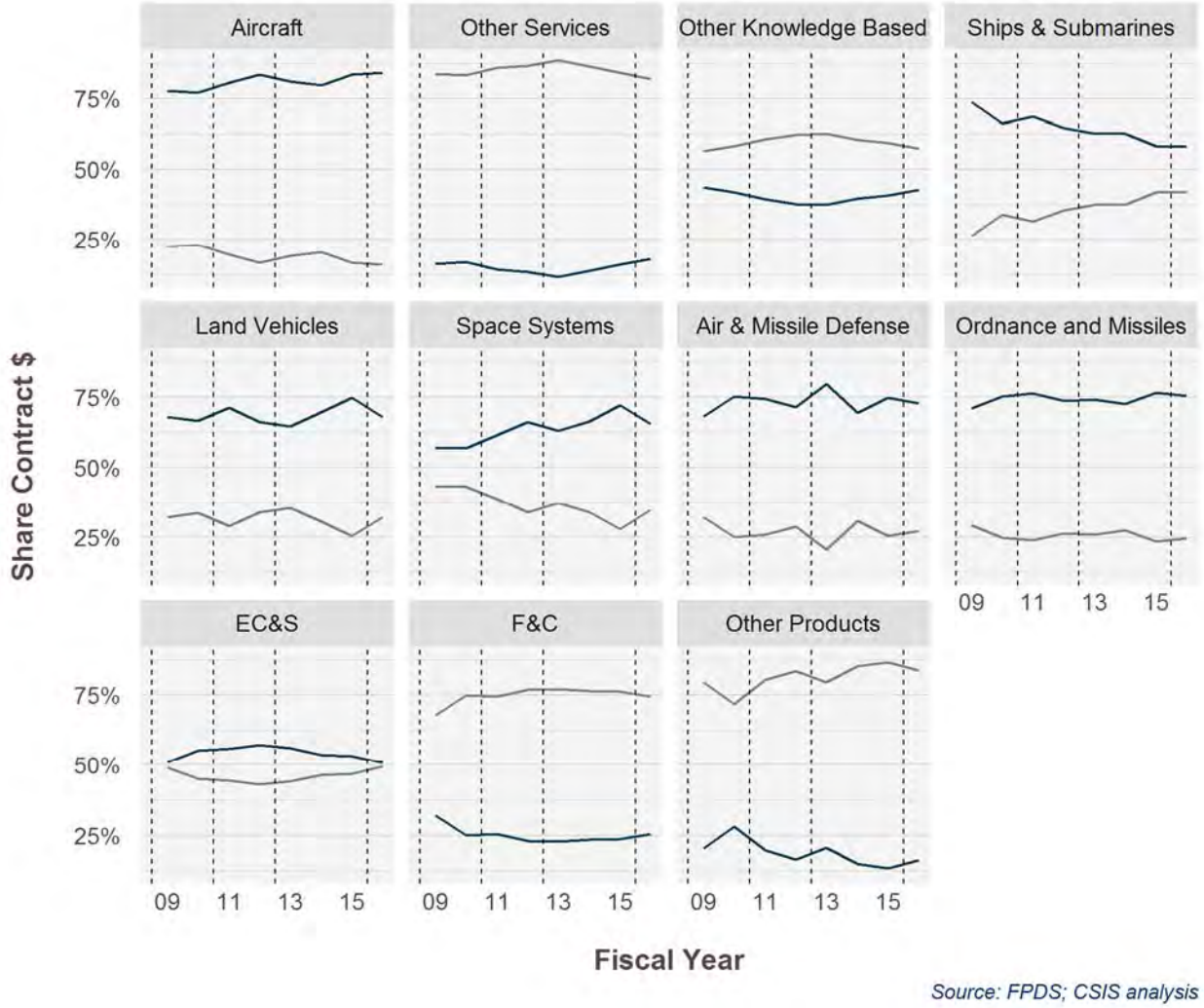
The data show that DoD's overall rate of effective competition remained steady near 50 percent throughout the course of the drawdown, but the trends were more complex at the sector level.[V] During the drawdown, the Ships & Submarines and Facilities and Construction platform portfolios saw increases in the share of contract obligations awarded following effective competition. The positive trend in Ships & Submarines was largely the result of contract obligations awarded after effective competition increasing at the start of the drawdown from $6.5 billion to $9.1 billion. This increase is notable given that the Ships & Submarines industry is often anecdotally referred to as one of the least-competitive sectors of the industrial base.

Within the Land Vehicles; Air and Missile Defense; EC&S; and Ordnance and Missiles platform portfolios, the rate of effective competition fell between 2 to 3 percent during the drawdown compared to pre-drawdown levels. The Aircraft and Space Systems platform portfolios saw more significant declines in the rate of effective competition during the drawdown than other platform portfolios. Comparing rates of effective competition from the pre-drawdown

[V] CSIS defines effective competition as competitively sourced contracts receiving at least two offers.

to the BCA decline period, Aircraft fell from 23 percent to 19 percent, while Space Systems fell from 43 percent to 33 percent.

Figure 0-8: Rate of Effective Competition by Platform Portfolio, 2009–2016



Source: FPDS; CSIS analysis

CONCLUSION

The empirical data presented here show that the effect of the defense drawdown on industry was substantial; and that while defense contract obligations fell across all platform portfolios, the impact of the drawdown on the different sectors of the defense industrial base varied widely. Some sectors saw continual declines in contract obligations, while others experienced a whipsaw effect, swinging rapidly from growth to decline. In general, Small and Big 5 vendors' market share remained steady, while Medium and Large vendors' shares were more volatile. Over the course of the drawdown, the Big 5's contract portfolio shifted toward products and services, and away from R&D.

As noted above, over the course of the drawdown, the total number of first-tier prime vendors declined by approximately 17,000 vendors, or roughly 20 percent. Due to limitations

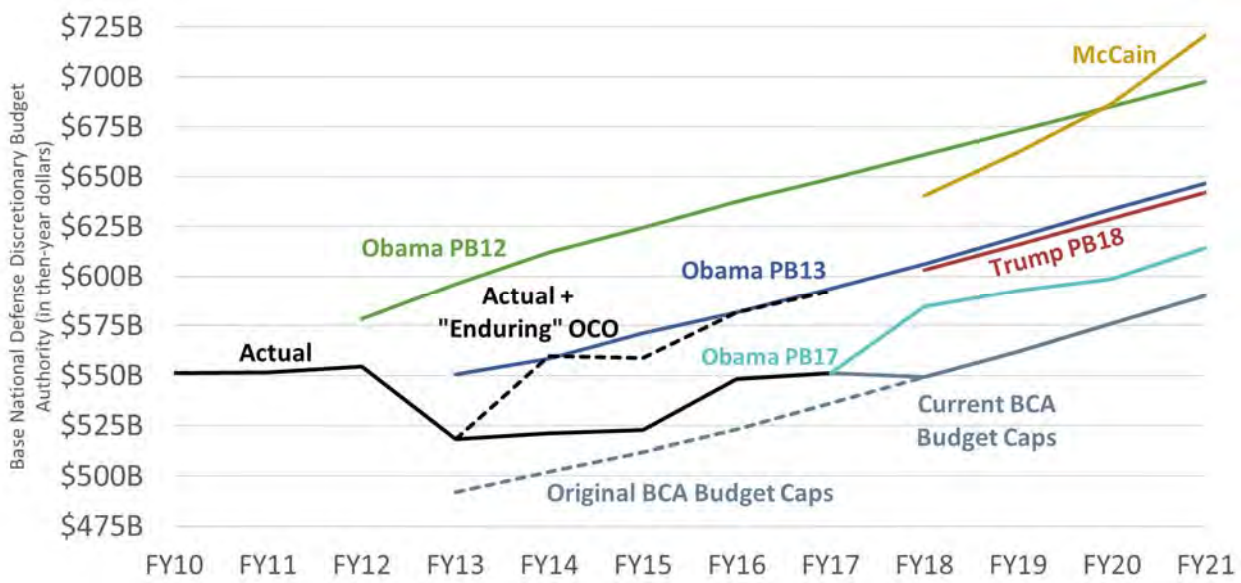
in the data, CSIS cannot definitively say what happened to these vendors: did they completely exit the defense marketplace? Did they remain in the defense marketplace, but as lower-tier suppliers? CSIS's research effort also was limited by the lack of reliable subcontracting data. There is no doubt that a huge portion of the recent turbulence in the defense industrial base has taken place among subcontractors, who are less equipped to tolerate the defense marketplace's funding uncertainly and often onerous regulatory regime—yet it remains extremely difficult to determine the real impact of these conditions on subcontractors. Reliable self-reporting by industry could be helpful in this area.

Both the findings here, and the remaining gaps in our understanding, highlight the vital importance of the industrial base review now underway in DoD and other government departments. The president's Executive Order has come at a critical time; as it notes, "The ability of the United States to maintain readiness, and to surge in response to an emergency, directly relates to the capacity, capabilities, and resiliency of our manufacturing and defense industrial base and supply chains." Ultimately, these issues are not just about the interests of the defense industrial base, but about its ability to sustain U.S. forces and ensure continued U.S. technological superiority for potential future conflicts—with a clear demand signal from DoD informed by insight into the state of the industrial base and the burdens it faces, that ability can be secured.

Chapter 1 | Introduction

The presence of a technologically superior, advanced-defense industrial base that is supported and sustained has been the foundation of U.S. defense strategy since the 1940s. This vendor pool includes both the defense contractors that are awarded prime contract obligations as well as the lower subcontracting tiers of the industrial base. However, as shown in Figure 1-1, the 2011 Budget Control Act (BCA) imposed mandatory budget caps on annual defense discretionary spending from Fiscal Year (FY) 2012 to FY 2021 that was well below requested funding levels. While the caps have been raised every year since they went into enforcement in FY 2013, the caps are well below historical and proposed funding levels. Prior to and since the 2011 BCA budget caps went into effect, congressional, Department of Defense (DoD), government oversight, and industry officials have all expressed concerns over the health and future of the defense industrial base. These cuts affect not only the top tier of the industrial base (the prime contractors), but also the more numerous lower-tier suppliers (subcontractors) that are so often sources of critical technological advances. Heavily dependent on subcontract awards from the prime contractors, some of these subcontractors face the risk of going out of business due to the drawdown. Funding associated with the wars in Afghanistan and Iraq has also declined steeply since 2011, further reinforcing and magnifying the effect of the 2011 BCA reductions. The combined effect of these reductions is what is referred to as the current defense drawdown, or the drawdown, for this study.

Figure 1-1: Defense Budget Proposals Compared to Defense Budget Caps



Source: Todd Harrison and Seamus Daniels, *Analysis of the FY 2018 Defense Budget* (Washington, DC: CSIS, December 2017), https://csis-prod.s3.amazonaws.com/s3fs-public/publication/171208_Defense_Budget_Analysis.pdf?_bMzg.Rwos033iujMRE7YyyabElygTDY.

The current public discussion surrounding the impact of the drawdown on industry is largely based on anecdotes that lack empirical support. Through analysis of publicly available contract data, this research effort measures the impacts of the drawdown on the defense

industrial base to better understand how prime and subprime contractors have responded to this external market shock. Beyond the topline trends, this study measures the impact of the drawdown on the different sectors of the defense industrial base by using CSIS's platform portfolios, such as Ships & Submarines, Land Vehicles, and Aircraft. Although sectors may contain overlapping suppliers, they are functionally distinct in meaningful ways.[1] Additionally, this study does not measure the impact of issues such as readiness and force structure. Although these issues are important, they are beyond the scope of this study. This study specifically focuses on the impact on industry as measured through Federal Procurement Data System (FPDS) and Federal Subaward Reporting System (FSRS) data.

This paper begins by analyzing the literature on market shocks and defense industrial base evolution in order to illuminate research variables that, while present in business and academic journals, have historically been underexplored in the defense context. Following the literature review, this paper identifies the research variables and methodology to be used in assessing the impact of both sequestration and the drawdown on the defense industrial base. Next, the paper analyzes whether the DoD components responded differently to the challenges posed by sequestration and the budget caps. Then, the paper analyzes eight platform portfolios that cover the broad spectrum of the defense industrial base. Finally, this paper summarizes the trends across the different platform portfolios to identify the common and notable unique trends across the defense industrial base.

[1] For example, companies like General Dynamics, Lockheed Martin, and Northrop Grumman are just a few that are major prime contractors on major defense acquisition programs in multiple sectors.

Chapter 2 | Literature Review

As stated previously, the public discussion surrounding the impact of budget drawdown trends on industry is often based on anecdotes, absent of empirical evidence. To better assess the validity of some of these claims, the study team looked to the academic literature to help ground the analysis in general historical principles of industrial base evolution. Where similarities exist, the academic literature permits comparing the challenges of sequestration, and subsequent responses, to similar historical external market shocks that were seen in the private sector. Reviewing the academic literature further illuminates research variables that, while present in business and academic journals, have been underexplored in the defense context.

DoD COMPONENT

DoD faced the largest overall reductions of any department in the U.S. federal government during sequestration. These reductions had significant but uneven effects on DoD spending and affected each service in differing ways. Though the defense industrial base is effectively a monopsony in which the U.S. federal government is ultimately the only buyer, many acquisition decisions are not made by a singular decisionmaking organization. Rather, they are made by the major DoD components. While a topline budget and overall/cross-department acquisition trends are somewhat out of the components' control, lower-level trends are likely to reflect the component's top priorities and not just standardized cuts across the board. For example, given these dynamics, it would not be surprising to see the Navy limit, to the extent possible, cuts to its shipbuilding budget, even if it meant taking sharper cuts elsewhere.

The policy guidance for responding to budgetary cuts that were coming out of the components both leading up to and throughout the defense drawdown reflects this dynamic. Each of the different components had their own set of priorities and varied plans for addressing the budgetary challenges. For example, the Navy's choices are seen in this 2014 Quadrennial Defense Review statement: "[t]o sustain investment in critical force structure and modernization, the Navy will reduce its funding for contractor services by approximately $3 billion per year to return to 2001 levels of contractor support."[2] Meanwhile, the Air Force planned to address the budgetary challenge by making "near-term capacity reductions in mission areas such as lift, command and control, and fighters" to prioritize its top three modernization programs: F-35 fighter, B-21 bomber, and KC-46A tanker.[3] Furthermore, the Army announced that it would take an approach different from either the Air Force or the Navy, electing to protect funding for readiness at the expense of modernization and force structure.

VENDOR SIZE

[2] Department of Defense, *Quadrennial Defense Review 2014* (Washington, DC: Department of Defense, 2014), http://www.defense.gov/pubs/2014_Quadrennial_Defense_Review.pdf.
[3] Ibid.

A critical question asked prior to and throughout sequestration and the drawdown was if smaller defense contractors would be able to survive the sequestration and continuing drawdowns.[4] Furthermore, Sen. Mary Landrieu, then-chairwoman of the Small Business and Entrepreneurship Committee, speculated that "small businesses are going to be the ones that feel the most immediate affects" of spending cuts originating from the BCA.[5] Due to the number of contracts held by smaller defense contractors and their specialized niche capabilities, some argued that it seemed almost inevitable that the negative impacts of sequestration will "disproportionately" affect smaller contractors.[6] Without having a large and diversified portfolio of defense contracts that reduce the impact of spending cuts in one line of business, small defense contractors looked to be unable to withstand the reductions in military spending.[7]

Within the academic literature, the relationship between vendor size and its success during a downturn is less clear. Even though commentators tend to give credit to larger businesses having more success than small businesses during an economic downturn, the literature suggests that success is more dependent on the strategies available to a company, not their size alone.[8] The role of vendor size is indirect, but can still be critical; the size of a vendor influences what business strategies are available for pursuit. Vendors of different sizes pursue different strategies during periods of market shock, such as economic downturns.

Smaller businesses and nonprofits may have their strategic options limited, because they face significantly higher obstacles to other strategies, like raising money, during an economic downturn.[9] Due to their associated risk, small businesses were often denied necessary external financing from banks during the 2008 recession.[10] Without the revenue of a growing market and more-limited access to external financing, job losses were higher at small businesses than larger businesses.[11] Additionally, during the recent recession, it was common for organizations to immediately seek the means to reduce their operating costs in order to stay afloat.[12] Larger companies typically rely on their ability to consolidate and reduce significant amounts of operating costs to survive an economic downturn.[13] While this option may be available to larger companies who have multiple lines of business and substantial

[4] Darren Samuelsohn, "Sequester hitting small biz hardest," *Politico*, April 16, 2013, https://www.politico.com/story/2013/04/sequestration-small-businesses-090114.
[5] Ibid.
[6] Mackenzie Eaglen, *Defense Sequestration Targets Small Business* (Washington, DC: American Enterprise Institute, October 2012), http://www.aei.org/publication/defense-sequestration-targets-small-business/.
[7] Timothy Homan, "Defense Cuts Increase Risks for Smallest Contractors," *The Fiscal Times*, April 24, 2014, http://www.thefiscaltimes.com/Articles/2014/04/24/Defense-Cuts-Increase-Risks-Smallest-Contractors.
[8] Michael Sivy, "The Big Winner of the Great Recession Is …," TIME.com, January 18, 2012, http://business.time.com/2012/01/18/the-big-winner-of-the-great-recession-is/.
[9] Shelly Banjo and Mitra Kalita, "Once-Robust Charity Sector Hit with Mergers, Closings," *Wall Street Journal*, February 2, 2010, https://www.wsj.com/articles/SB10001424052748704586504574654404227641232.
[10] Jeff Guo, "Why Was the Recession So Much Worse for Small Businesses? Blame Lending," *Washington Post*, November 26, 2014, https://www.washingtonpost.com/news/storyline/wp/2014/11/26/why-did-small-businesses-suffer-so-badly-in-the-great-recession-blame-loans/.
[11] Ibid.
[12] Ranjay Gulati, Nitin Nohria, and Franz Wohlgezogen, "Roaring Out of Recession," *Harvard Business Review* 88, no. 3 (2010): 62–69.
[13] Ajit Kambil, "What Is Your Recession Playbook?," *Journal of Business Strategy* 29, no. 5 (2008).

reserves to pull from, small businesses do not have the same quantity of cash flow nor large cash reserves available.[14]

Although small businesses generally faced increasingly more difficult challenges during the downturn, they also retained certain benefits that large companies did not have.[15] When reducing operating costs, large companies often undergo substantial structural changes that force larger layoffs.[16] Small firms, on the other hand, have a notable strength in flexibility and adaptability to a rapidly changing market. Without the levels of bureaucracy in a large company, small companies retain a shorter timeline for decisionmaking, which allows them to respond quickly and efficiently to their customer base.[17]

VENDOR COUNT: "CONSOLIDATION THEORY"

Both the academic literature and history suggests that DoD should expect to see consolidation within the defense industrial base under sequestration and the subsequent drawdown. Since the end of the Cold War, defense contractors have resorted to consolidation amid budgetary drawdowns.[18] As the defense budget fell sharply throughout the 1990s, defense contractors turned to horizontal mergers, acquisitions, and divestitures to prevent themselves from going under. These strategies set off "a wave of consolidation" that reduced the number of American-based, large prime defense contractors from 16 in 1993 to only 6 in 2000.[19]

After the BCA was enacted in 2011, and with the prospect of sequestration looming on the horizon, many defense contractors were worried about their imminent future.[20] Although history suggests that we would expect to see an increase in consolidation in such circumstances, that may not be the case at the top tier of defense contracting. The already high level of consolidation during the immediate post–Cold War drawdown left little room for the large prime defense contractors to acquire additional market share.[21] Nonetheless, in the period leading up to sequestration, large primes, such as Lockheed Martin, L-3, and Exelis, were vocal about seeking the means to consolidate and waiting to "take any available piece of a shrinking pie."[22]

The academic literature supports the argument that we might expect to see further consolidation within the defense industry under market shocks such as sequestration and the

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[14] Jenny S Bossaller and Jenna Kammer, "On the Pros and Cons of Being a Small Firm in an Economic Downturn," *Small Business Update*, January 2009.
[15] Yanqing Lai et al., "In a Recession , Large Firms Are More Likely Than SMEs to Resort to Personnel Cuts," *LSE Business Review*, 2016.
[16] Ibid.
[17] Bossaller and Kammer, "On the Pros and Cons of Being a Small Firm in an Economic Downturn."
[18] Eugene Gholz and Harvey M Sapolsky, "Restructuring the U.S. Defense Industry," *International Security* 24, no. 3 (2000): 5–51.
[19] Julie Alfieri et al., "Spring 2014 Industry Study Final Report Private Sector Support & Services Industy," 2014, http://es.ndu.edu/Portals/75/Documents/industry-study/reports/2014/es-is-report-privatized-mil-ops-2014.pdf; William E Kovacic and Dennis E Smallwood, "Competition Policy, Rivalries, and Defense Industry Consolidation," *Journal of Economic Perspectives* 8, no. 4 (1994): 91–110.
[20] Megan Scully, "Upcoming Pentagon Budget Cuts Worry Defense Contractors," *National Journal*, July 2011.
[21] Loren B Thompson, *Defense Industry Consolidation : This Time Will Be Different* (Washington, DC: Lexington Institute, June 2010), http://www.lexingtoninstitute.org/defense-industry-consolidation-this-time-will-be-different/.
[22] Russ Banham, "Contractors Are Consolidating in Anticipation of Drawdowns," *CFO*, 2013.

defense drawdown. One strategy for improving profit and revenue during a recession has been to effectively consolidate certain aspects of a business.[23] A recessionary period offers a unique opportunity for businesses to capitalize on competitors' vulnerabilities and increase value through consolidation. In a recession, consolidation through a merger has been shown to generate 15 percent more value than in "normal conditions."[24] Furthermore, the relationship between market shocks such as recessions and higher rates of consolidation was also recently demonstrated by the higher consolidation rate in the banking industry during the 2008 recession.

COMPETITION

The presence of effective competition within the defense industrial base has historically been used as one measure of the industrial base's health and is, therefore, an evergreen top DoD priority.[25] In the *Guidelines for Creating and Maintaining a Competitive Environment for Supplies and Services in the Department of Defense*, DoD lays out seven reasons competition is important in the defense marketplace:[26]

1. "Competition creates an incentive for contractors to provide goods and services at a lower price (economic efficiency);

2. Competition spurs innovation of transformational technologies, which allows the Department to field the best weapon systems for our warfighters quickly;

3. Competition yields improvements in the quality of products delivered and services rendered (firms that turn out low quality are driven out of the market and are unable to effectively compete);

4. Competition affords the Department the opportunity to acquire performance improvements (e.g., faster, lighter, more sustainable) by using "best value" source selection criteria;

5. Competition provides opportunities for capable small businesses to enter new markets;

6. Competition enhances (or maintains) a strong defense industrial base which provides an operational surge capability to handle demand spikes; and

7. Competition curbs fraud by creating opportunities to reassess sources of goods and services reinforcing the public trust and confidence in the transparency of the Defense Acquisition System."

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[23] Kambil, "What Is Your Recession Playbook?"
[24] David Rhodes and Daniel Stelter, "Seize Advantage in a Downturn," *Harvard Business Review* 87, no. 2 (2009).
[25] Greg Sanders, Jesse Ellman, and Samantha Cohen, *Competition and Bidding Data as an Indicator of the Health of the U. S. Defense* (Washington, DC: CSIS, 2015), https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/151020_Sanders_CompetitionBiddingDataIndicator_Web.pdf.
[26] Office of the Undersecretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), *Guidelines for Creating and Maintaining a Competitive Environment for Supplies and Services in the Department of Defense* (Washington, DC: USD(AT&L), 2014), https://www.acq.osd.mil/dpap/cpic/cp/docs/BBP_2-0_Comp_Guidelines_Update_(3_Dec_2014).pdf.

Given the importance of competition, DoD tracks and publishes the share of contract obligations in its annual "Competition Report." In DoD's FY 2015 "Competition Report," it reported that the share of contract obligations awarded after competition had been falling (with the exception of FY 2014) each year since FY 2009.[27] Whereas 60.7 percent of FY 2009 contract obligations had been awarded after competition, only 55.4 percent of FY 2015 contract obligations were awarded after competition.[28] However, CSIS analysis, supported by data contained in the *FY 2015 Competition Report,* shows that the declines in the overall rate of competition are a result of policies reducing the instances of contracts being awarded after open competition, but only receive one offer. Therefore, while the overall rate of competition may have technically fallen, the rate of effective competition, contracts awarded after open competition that receive two or more offers, has remained relatively steady.[29]

The academic literature on consolidation is also relevant here because market shocks can further reduce competition by encouraging consolidation. In a consolidated market, a smaller number of firms have a greater market share, which reduces the number of potential competitors for any given project. While the decline in competition predates sequestration, its continuation during most of the drawdown years seems to show that at the department-wide level, the literature and the DoD's metrics are aligned.

However, while the annual DoD competition report provides important data at the topline, it insufficiently measures the rate of competition at lower levels, particularly sector by sector. Beyond the topline, the annual competition reports provide data on the rate of competition within the major DoD components. However, each service reports their data differently, and these reporting frameworks do not always align for comparative purposes.

[27] Defense Procurement and Acquisition Policy (DPAP), *Department of Defense Competition Report for FY 2015* (Washington, DC: DPAP, 2015), http://www.acq.osd.mil/dpap/cpic/cp/docs/DoD_FY_2015_Competition_Report.pdf.
[28] Andrew Hunter et al., *Defense Acquisition Trends, 2016: The End of the Contracting Drawdown* (Washington, DC: CSIS, 2017), https://defense360.csis.org/defense-acquisition-trends-2016/.
[29] Nancy Y Moore, Clifford A Grammich, and Judith D. Mele, *Findings from Existing Data on the Department of Defense Industrial Base* (Santa Monica, CA: RAND, 2014), http://www.rand.org/pubs/research_reports/RR614.html.

Chapter 3 | Methodology and Study Design

This report leverages and builds upon the methodology used in previous CSIS reports on federal contracting and DoD contracting by platform portfolio.[30] These platform portfolios, generally aligning to the different major DoD platforms, contain the records of all contracts within that specific platform portfolio. To measure the impact of sequestration and the defense drawdown on different sectors of the defense industrial base, the study team first created a dataset of prime and sub-prime contract awards from FY 2009 to FY 2015 using the Federal Procurement Data System (FPDS) and Federal Subaward Reporting System (FSRS).[31] Compared to previous CSIS FPDS analysis by platform portfolio, the study team has made refinements to its platform portfolio classification methodology to allow for greater granularity when examining what had been our Missiles and Space Systems portfolio that previously grouped together somewhat disparate industrial sectors—since these two sectors were also grouped in native FPDS coding systems.[32]

From this dataset, the CSIS study team separated the defense industrial base into 11 distinct platform portfolios.[33] To create these platform portfolios, the study team categorized contracts using the following process. First, contracts are categorized using their Project ID, a CSIS field based upon the System Equipment Code in FPDS. Second, Missile Defense Agency (MDA) contracts not already categorized using Project ID are categorized as Air and Missile Defense. Third, contracts are categorized using their listed DoD Claimant Program Code. Finally, for all remaining contracts not categorized during any of the previous steps, contracts are categorized by their Product Service code.

After categorizing contracts by platform portfolio, the study team then focused its analysis on the different sectors of the industrial base. For each platform portfolio, the CSIS study team focused on FPDS data:

- DoD Component: How did the DoD components respond to the external market shock of sequestration and the defense drawdown?

- Area: Were the different areas (products, services, and research and development) of an industrial base sector equally impacted?

[30] For the full CSIS FPDS methodology, see: http://csis.org/program/methodology.
[31] Note, this study is specifically focused on the trends from FY 2009 to FY 2015, but does include preliminary analysis of FY 2016 data. More detailed analysis of the FY 2016 trends will be included in DIIG's next report in its annual *Defense Acquisition Trends* report series set to be released early 2018.
[32] David Berteau, Rhys McCormick, and Gregory Sanders, "Defense Contracting Trends by Platform Portfolio," in *Proceedings of the Eleventh Annual Acquisition Research Symposium*, vol. II (Monterey CA: Naval Postgraduate School, 2014), 129–43, http://www.acquisitionresearch.net/files/FY2014/NPS-AM-14-C11P14R01-054.pdf.
[33] The 11 unique CSIS platform portfolios are as follows: Aircraft; Ships & Submarines; Land Vehicles; Air and Missile Defense; Space Systems; Ordnance and Missiles; Other Products; Electronics, Comms, and Sensors (EC&S); Facilities and Construction; Other Services; and Other R&D and Knowledge Based.

- Vendor Size: How did the share of contract obligations change among vendors of differing sizes, particularly small vendors?

- Vendor Count: How did the number of vendors change?

- Competition: Did the share of contract obligations awarded after effective competition change?[34]

Though the defense budget had been declining in the years leading up to sequestration in FY 2013, the enactment of sequestration and budget caps in subsequent years marked a severe market shock that had a considerable impact on the defense industry. To measure the impact of this market shock, CSIS organized contracts into different periods in order to answer two different research questions: What was the trajectory of the industrial base sector prior to the enactment of sequestration and budget caps? How did the enactment of sequestration and budget caps change the trajectory of the industrial base sector? These periods were:

- Pre-drawdown: FY 2009 to FY 2010

- Start of drawdown: FY 2011 to FY 2012

- BCA decline period: FY 2013 to FY 2015

Additionally, to better measure the trends between periods, the study team averaged contract obligations amongst the years comprising a period to create an annual average contract obligation for that period. For example, overall DoD contract spending totaled $399.08 billion in FY 2011 and $378.87 billion in FY 2012, resulting in an average of the annual contract obligations for the start of the drawdown period of $388.97 billion. The decision to use average annual contract obligations as opposed to year-to-year trends, as used in previous CSIS analysis, was made for two primary reasons: First, the contract timing for large contracts can cause shifts in the data that don't reflect a fundamental underlying trend but can cause shifts in the data by merely a small delay or other isolated event. For example, unexpectedly long negotiations on an F-35 production contract merely shifted contract obligations from one fiscal year to the next. Second, the use of period averages better aligns trends within defined periods and reflects known events—for example, passage of BCA, imposition of sequester—instead of the arbitrariness of picking only two years.

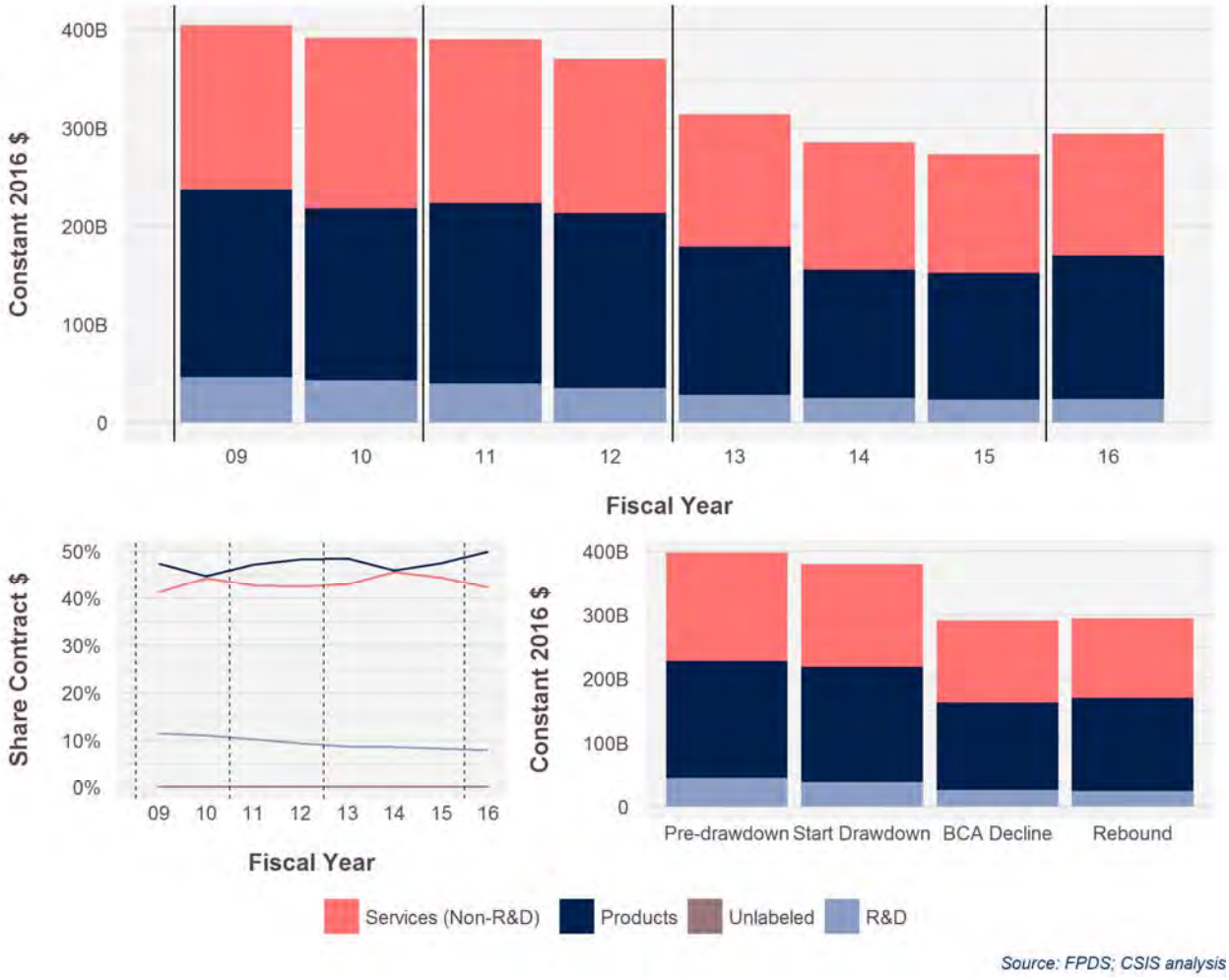
Finally, the study team sought to evaluate the availability and quality of subcontracting data across the different sectors of the defense industrial base. This effort builds off a 2014 study conducted by Nancy Moore at RAND, which used FSRS data from FY 2010 to FY 2012 and concluded that FSRS data was often incomplete or missing, but was improving each year.

[34] CSIS uses the term "effective competition" to refer to competition with two or more offers.

Chapter 4 | Overall DoD Trends

Even prior to the 2011 BCA enforcing caps on discretionary defense budget spending, defense contract spending had been declining. At the start of the drawdown (FY 2011 to FY 2012), average annual defense contract obligations decreased by 5 percent compared to the pre-drawdown (FY 2009 to FY 2010) period. As shown in Figure 4-1, when sequestration was triggered in FY 2013, defense contract obligations decreased by 15 percent from the previous year. Average annual defense contract obligations fell 23 percent during the BCA decline period (FY 2013 to FY 2015) compared to the start of the drawdown.

Figure 4-1: Defense Contract Obligations by Area, 2009–2016



Source: FPDS; CSIS analysis

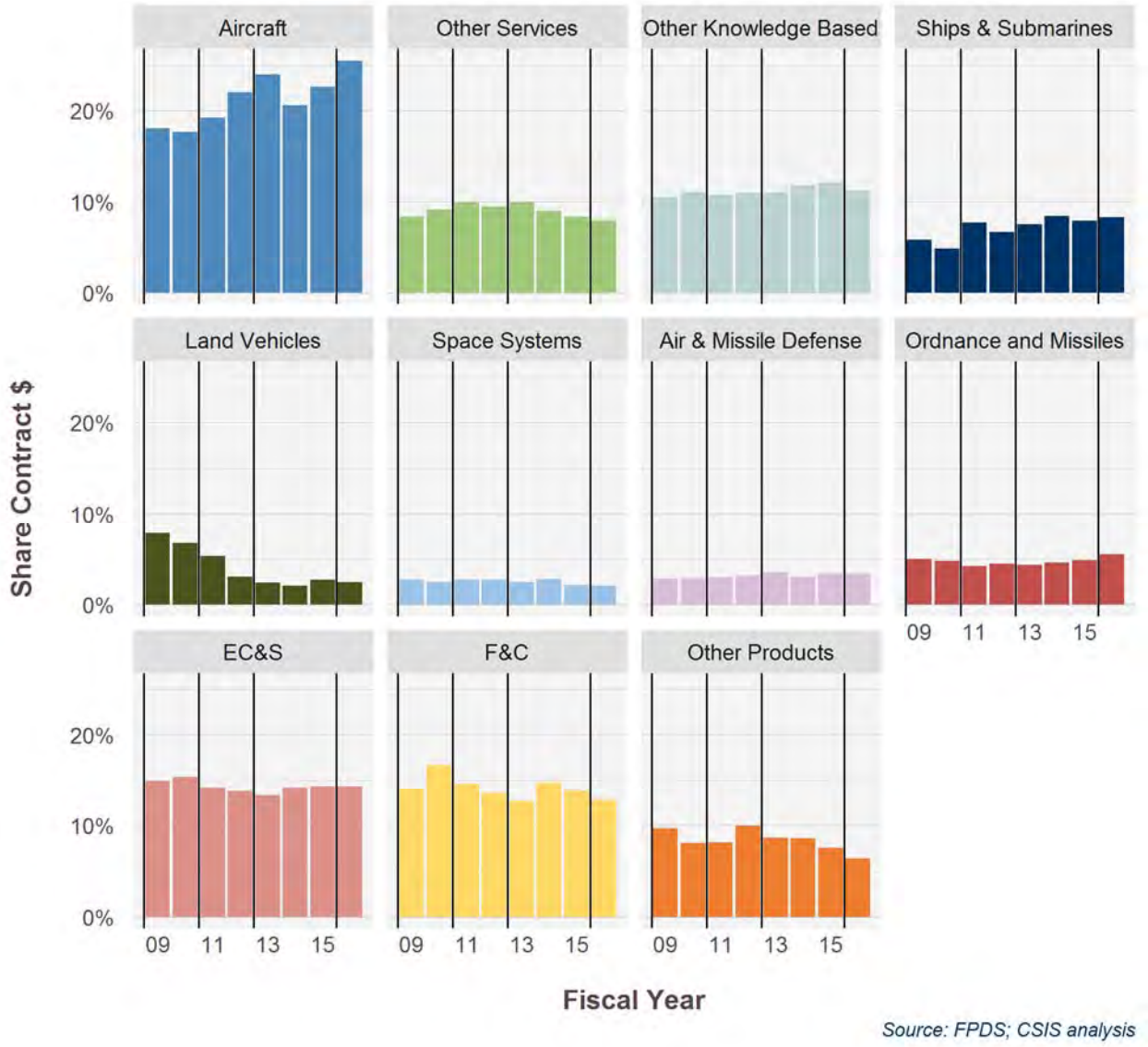
The 23 percent decline in average annual defense contract obligations during the FY 2013-to-FY 2015 BCA decline period impacted all three areas of what DoD contracts for—products, services, and research and development (R&D). The decline in average annual defense R&D contract obligations during this period (-33 percent) outpaced the overall decline in defense contract obligations. Over that same period, average annual contract

obligations for defense products (-24 percent) in parallel with the overall decline in defense contract obligations, obligations for services (-21 percent) declined more slowly than the overall rate of decline.

Within the sectors of the defense industrial base, the impacts of the sequestration and the defense drawdown widely varied in magnitude. Although every platform portfolio experienced double-digit percentage declines during the BCA decline era, the degree of cuts in this period ranged from the -16 percent decline in Ships & Submarines to the -56 percent decline in Land Vehicles. In addition to Ships & Submarines, Air and Missile Defense (-16 percent), Aircraft (-17 percent), Other R&D (-19 percent), and Ordnance and Missiles (-19 percent) all experienced reductions smaller than the overall rate of decline across DoD. At the other end of the spectrum, Space Systems (-31 percent), Other Products (-30 percent), and Other Services (-28 percent) joined Land Vehicles in experiencing cuts greater than the overall DoD rate of decline.

Figure 4-2 shows defense contract obligations by Platform Portfolio from FY 2009 to FY 2016.

Figure 4-2: Defense Contract Obligations by Platform Portfolio, 2009–2016



OVERALL DoD: VENDOR SIZE

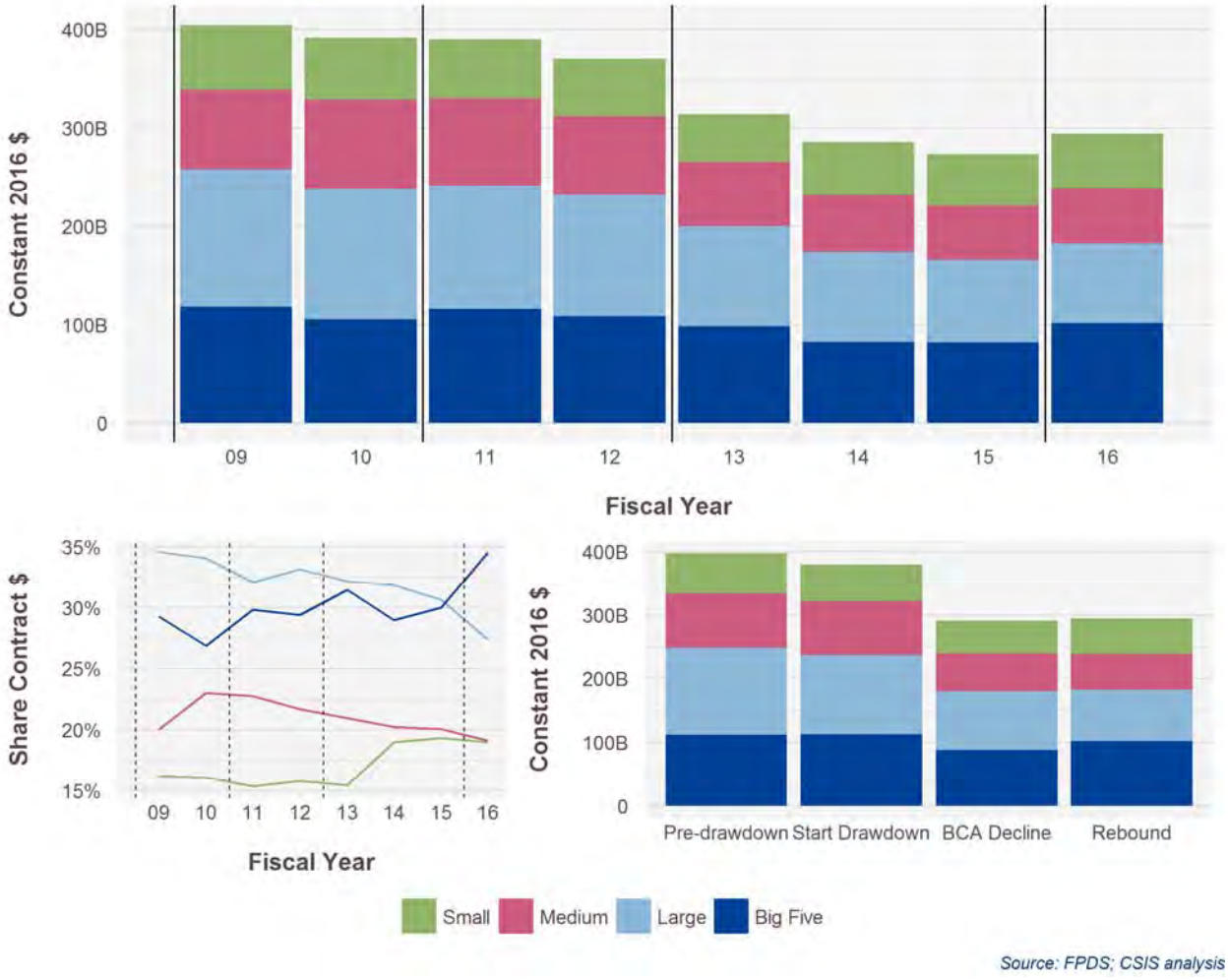
During the start of the drawdown and BCA decline period, there were slight changes in the composition of the industrial base as the share of annual average contracts obligated to the Big 5 and Small vendors increased at the expense of Large and Medium-sized vendors.[35] During the pre-drawdown period, DoD awarded an average of 28 percent of contract obligations to the Big 5, 34 percent to Large vendors, 22 percent to Medium vendors, and 16 percent to Small vendors. Throughout the start of the drawdown period, the average share of contract obligations going to Big 5 vendors increased to 30 percent, while the share going to Large vendors fell to 33 percent. Large vendors continued to decline as a share of defense contract obligations during the BCA decline period, going from 33 percent to 32 percent.

[35] CSIS defines the Big 5 as Lockheed Martin, Boeing, Raytheon, Northrop Grumman, and General Dynamics.

Meanwhile, the average share of contract obligations obligated to Medium vendors fell to 20 percent, while the share obligated to Small vendors rose from 16 percent to 18 percent.

Figure 4-3 shows the composition of the defense industrial base and defense contract obligations by size of vendor from FY 2009 to FY 2016.

Figure 4-3: Defense Contract Obligations by Size of Vendor, 2009–2016



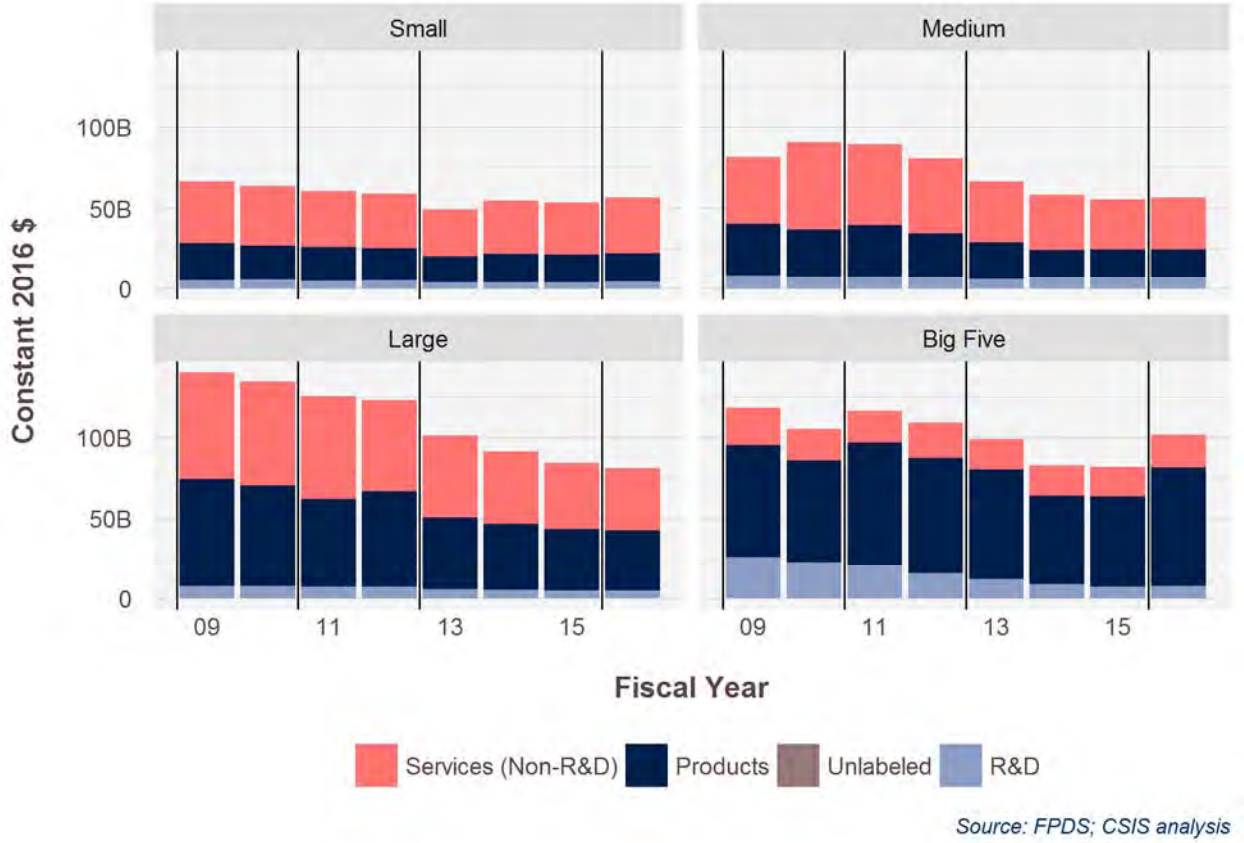
Source: FPDS; CSIS analysis

OVERALL DoD: AREA BY SIZE OF VENDOR

Beyond the top-line defense vendor size and area trends, there are distinct differences in the impact of sequestration and the defense drawdown on vendors of differing sizes depending on what (Products, Services, or R&D) vendors are contracted for. The following section, and the respective sections in the detailed platform portfolio sections, examines the cross-cutting data on contract obligations by area, which is then further broken down by vendor size.

Figure 4-4 below shows defense contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 4-4: Defense Contract Obligations by Area by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

For defense products, the Big 5 experienced a notable whipsaw between the start of the drawdown and the BCA decline period. During the start of the drawdown, average annual Big 5 products contract obligations grew 12 percent from pre-drawdown levels, even as overall Big 5 contract declined. However, as the defense budget fell during the BCA decline period, annual average Big 5 defense products declined by 19 percent, a rate higher than the overall Big 5's period decline. Of note, when overall defense contracting rebounded in FY 2016, Big 5 and Small vendors defense products increased from the previous period. The Big 5 vendors contract obligations grew 23 percent, reaching a rate slightly below pre-drawdown spending levels. Small vendors' products contract obligations only grew 4 percent, but did not continue declining as was the case for Large and Medium-sized vendors.

For defense R&D, the notable trends are the differing rates at which average annual contract obligations declined compared to the overall rate throughout the study period. At the start of the drawdown, Large (-6 percent), Medium (-7 percent), and Small (-5 percent) all fell at rates well below the overall rate of decline (-17 percent), while the Big 5 vendors took the brunt of the R&D cuts (-26 percent). During the BCA decline period, Medium and Small vendors continued to fall at rates well below the overall rate of decline (-33 percent), falling just 14 and 18 percent respectively. Large vendors (-27 percent) continued to decline slower than overall defense R&D, but the difference was not as significant as it had been previously. Finally, Big 5 average annual Defense R&D contract obligations crashed, declining 48 percent during the BCA decline period compared to the start of the drawdown.

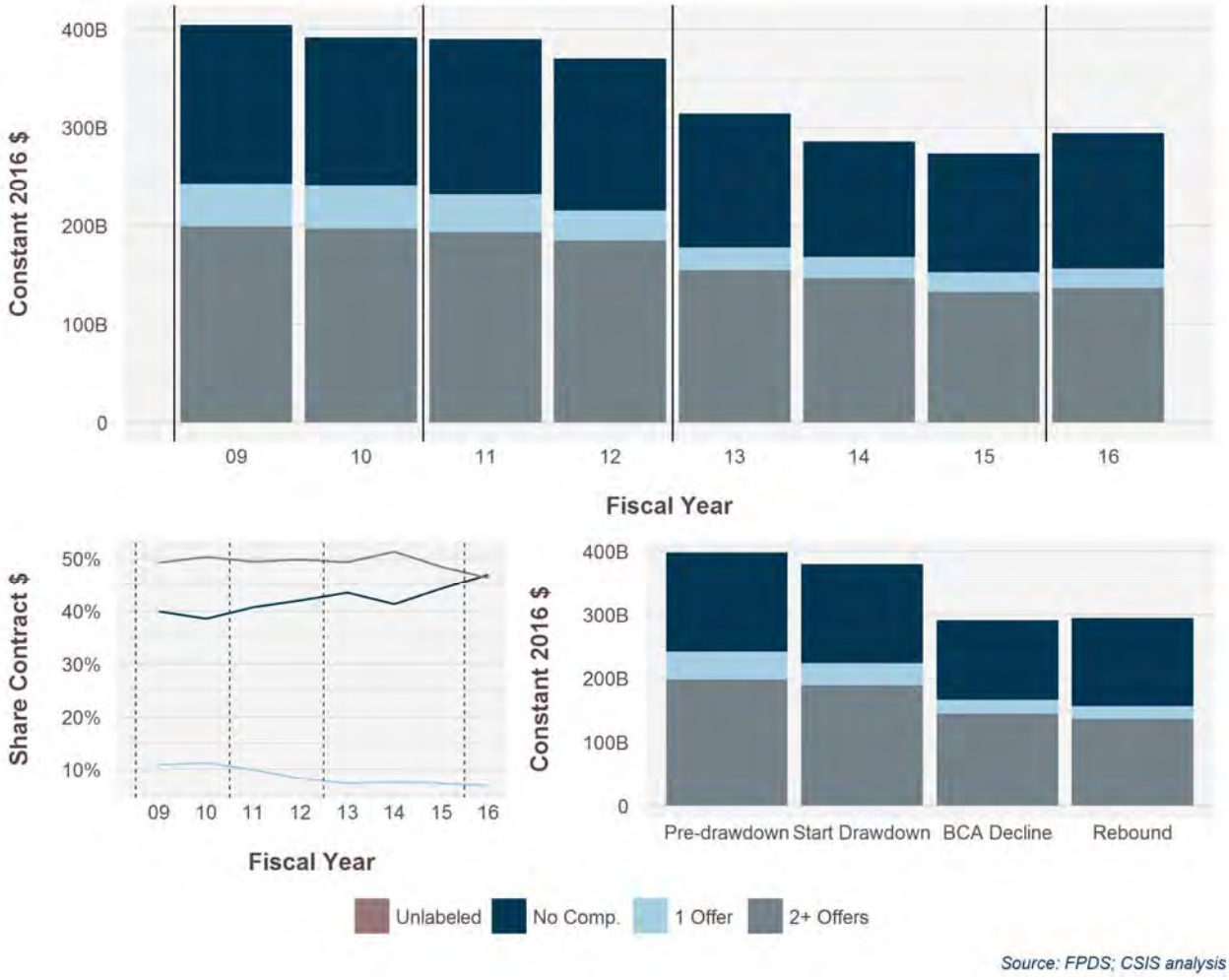
Sequestration and the defense drawdown had a unique impact on defense services contract obligations by size of vendor. At the start of the drawdown, the Big 5 (-4 percent) declined at a rate roughly equal to the overall rate of decline (-5 percent) only to fall 10 percent during the BCA decline period, a rate significantly below the overall 21 percent decline. In both the start of the drawdown and BCA decline period, Large vendors fell at rates slightly higher than the overall sub-sector, declining 8 and 24 percent respectively. Medium vendors were the only ones to see a complete reversal in trajectories, declining in the BCA decline period after previously growing at the start of the drawdown. Medium vendors average annual Defense services contract obligations grew from $47.8 billion at the start of the drawdown to $48.1 billion, a 1 percent increase, only to fall to $34.22 billion, a 29 percent decrease. Finally, Small vendors fell at a near-consistent rate across the start of the drawdown and BCA decline period (-8 percent; -9 percent) that resulted in them falling at a rate slightly above the overall rate of decline and then significantly below the overall sub-sector decline.

OVERALL DoD: COMPETITION

The overall DoD rate of effective competition held steady around 49 percent throughout the study period. However, while the overall defense rate of effective competition held steady, single-offer contract obligations, contracts that were competitively awarded but received only one offer, did decline throughout the entire study period. Pre-drawdown, an average of 11 percent of overall DoD contract obligations were awarded after receiving just one offer. Single-offer competition fell during the start of the drawdown period to 9 percent of overall DoD contract obligations, and it continued to decline during the BCA decline period, going from 9 percent to 7 percent. As overall DoD single-offer competition fell, the share of contract obligations awarded without competition increased from 39 percent in the pre-drawdown period to 41 percent at the start of the drawdown, and then finally rising to 43 percent during the BCA decline period.

Figure 4-5 below shows the level of competition for defense contract obligations from FY 2009 to FY 2016.

Figure 4-5: Level of Competition for Defense Contract Obligations, 2009–2016

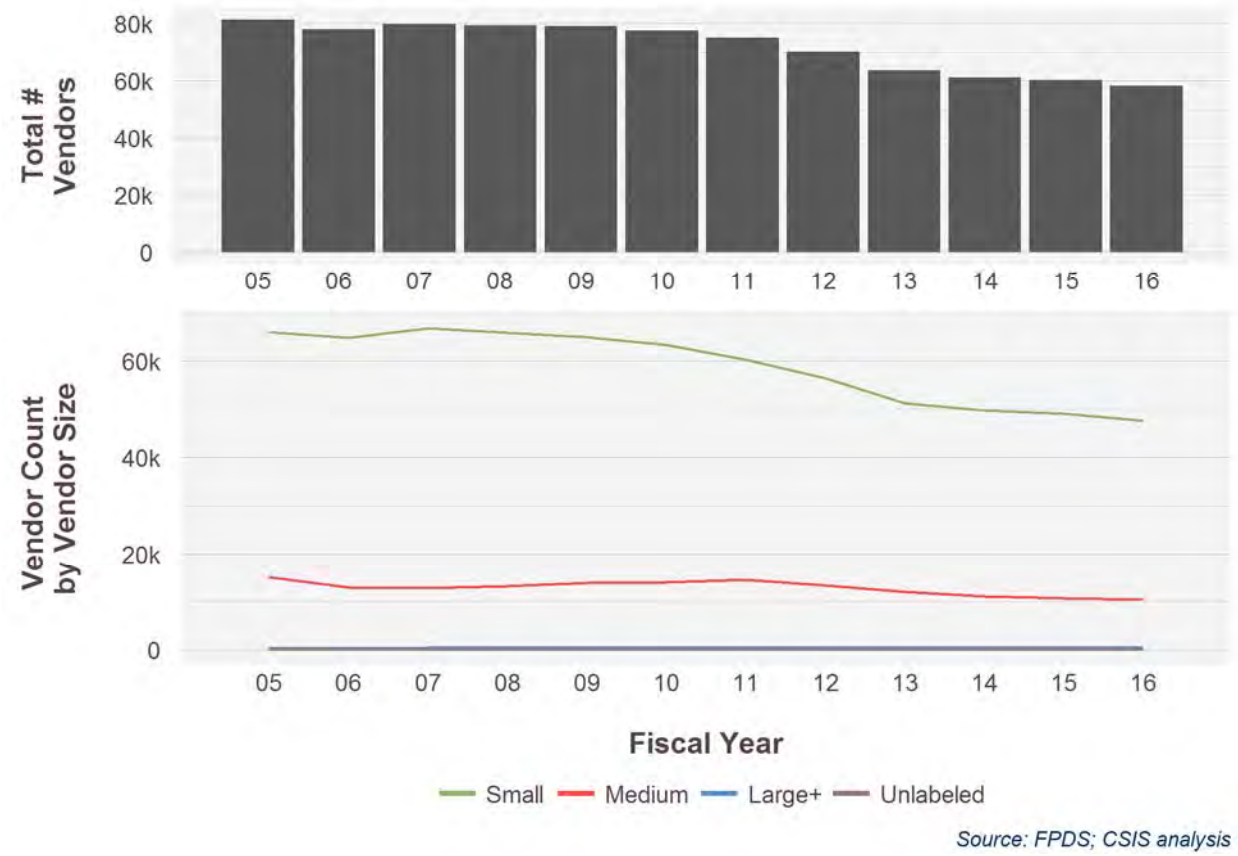


Source: FPDS; CSIS analysis

OVERALL DoD: VENDOR COUNT

The start of the defense drawdown and the enactment of budget gaps accelerated the ongoing trends of decline in the total number of prime vendors across DoD, which had already been gradually occurring over the preceding years. In FY 2005, there were approximately 81,400 vendors across DoD, but from FY 2006 to FY 2008, DoD averaged 79,100 vendors, a -2.8 percent decline. During the pre-drawdown period, the average number of vendors fell an additional 0.8 percent to around 78,500 vendors. During the start of the drawdown period, the average number of vendors across DoD declined 8 percent, with the overall number of vendors falling to near 72,600. These trends accelerated further during the BCA decline period, as the average number of vendors across DoD went from approximately 72,600 to about 61,700, a 15 percent decline from the start of the drawdown period.

Figure 4-6: Defense Vendor Count by Size of Vendor, 2005–2016

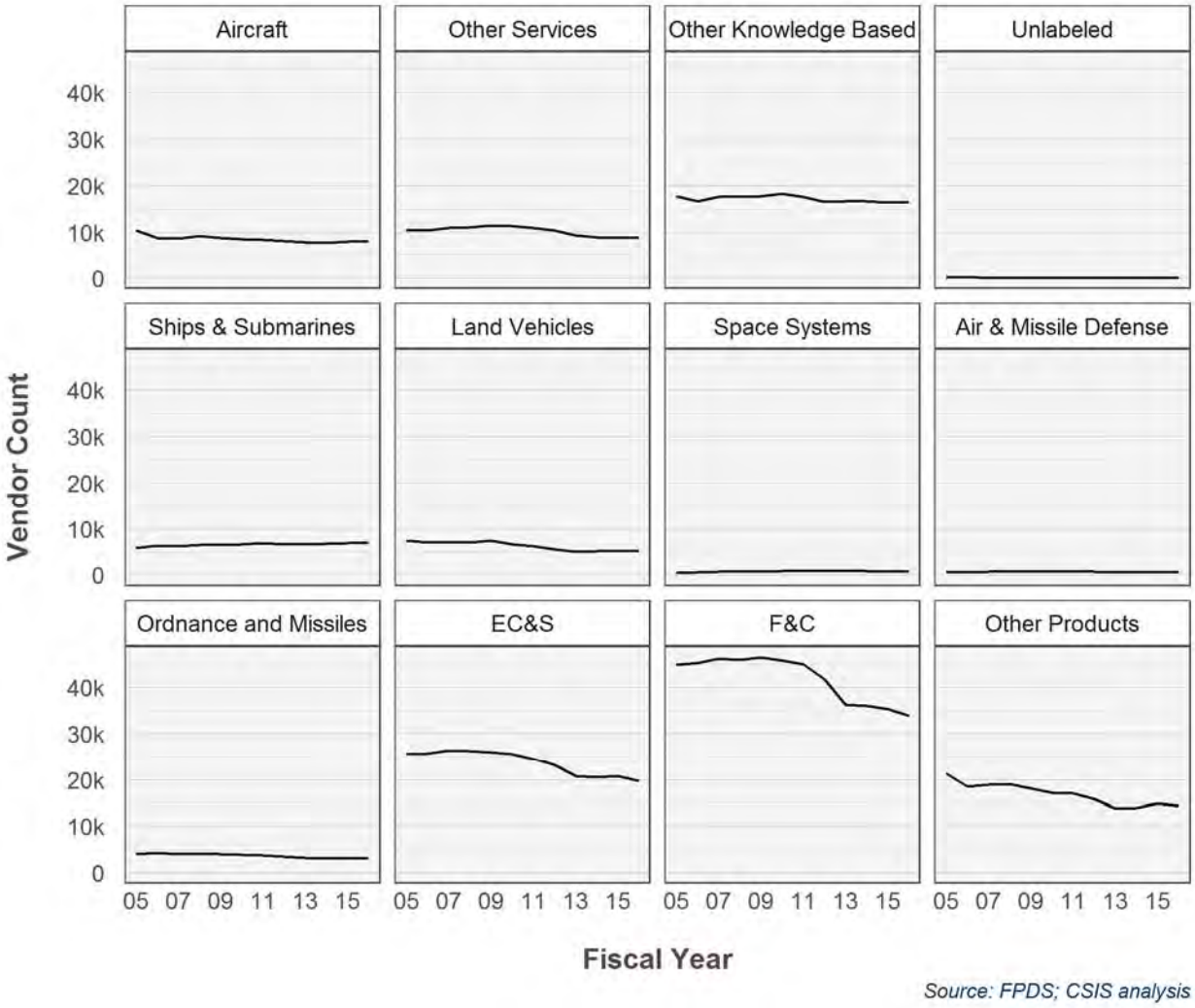


Source: FPDS; CSIS analysis

As shown in Figure 4-6, the market shock of sequestration and the defense drawdown had a disproportionate effect on Small and Medium-sized prime vendors. At the start of the drawdown, the average number of Small vendors across DoD fell approximately 9 percent, which contrasts significantly with the historical percentage decline of between 0.3 and 2 percent. During the BCA decline period, Small vendors fell even more sharply, declining 14 percent compared to the start of the drawdown period. While Medium-sized vendors managed to hold steady at the start of the defense drawdown, they too experienced significant declines during the BCA decline period. In this period, the average number of Medium-sized prime vendors across DoD fell from approximately 13,900 to about 10,400, a 19 percent decline.

While the overall number of vendors across DoD has been decreasing since 2005, it is important to note that the vendor count data from across the different sectors of the industrial base provides a more complete picture of where prime vendors have disappeared from the first tier of the defense industrial base. As shown in Figure 4-7, there are dramatically different vendor count trends within the various sectors of the industrial base. For example, the Facilities and Construction; Electronics, Comms, & Sensors (EC&S); and Other Products sectors saw greater prime vendor declines than other sectors, such as Ships & Submarines. The vendor count trends will be explored in more depth in each platform portfolio's respective section. Additionally, these numbers do not account for the number of vendors in the lower tiers of the industrial base.

Figure 4-7: Defense Vendor Count by Platform Portfolio

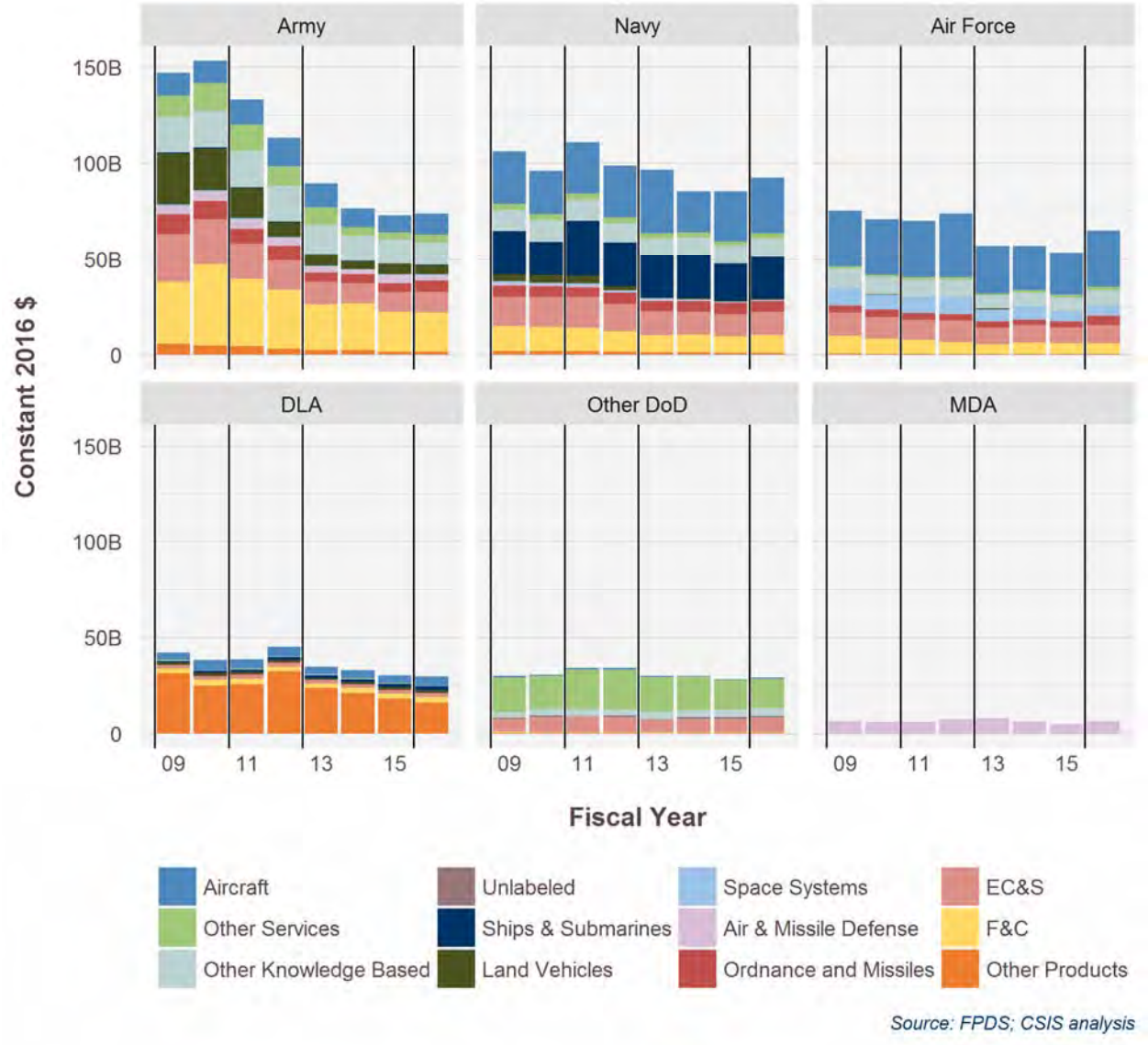


Source: FPDS; CSIS analysis

Chapter 5 | Did the DoD Components Respond Differently?

As shown in Figure 5-1, across DoD the response to the market shock of sequestration and the defense drawdown diverged amongst the DoD components, in both the magnitude of cuts and the strategy for managing their contracting portfolios.

Figure 5-1: DoD Component Contract Obligations by Platform Portfolio, 2009–2016



Within the major DoD components, decisions on how to response to the impact of sequestration and the defense drawdown on their contracting portfolios differed. The Air Force, more so than any other component, balanced the distribution of the BCA decline

period cuts, but still elected to fund certain platform portfolios over others. During the BCA decline period, average annual Air Force contract obligations for Aircraft (-26 percent); Electronics, Comms, & Sensors (-18 percent); Facilities and Construction (-18 percent); and Other R&D and Knowledge Based (-19 percent) all fell at rates roughly parallel with the overall Air Force decline (-23 percent). The Air Force made cuts greater than the overall rate of decline to its Air and Missile Defense (-62 percent), Other Products (-30 percent), and Space Systems (-29 percent), while Ordnance and Missiles (-15 percent) fell at a rate notably slower than the overall rate of decline. [36]

During the BCA decline period, the Army made cuts to every platform portfolio, but the cuts were not distributed evenly across the platforms. During the BCA decline period, average annual contract obligations in several of the Army's platform portfolios, including Aircraft (-26 percent), Air and Missile Defense (-27 percent), and Other R&D and Knowledge Based (-28 percent) declined more slowly than overall Army contract obligations. These smaller cuts were offset by more severe cuts in the Army's Land Vehicles (-56 percent), Other Products (-44 percent), and Other Services (-50 percent) portfolios. Finally, the Army's Electronics, Comms, & Sensors (-36 percent), Facilities and Construction (-30 percent), and Ordnance and Missiles (-39 percent) portfolios fell at rates comparable to the rate of overall decline.[37]

Like the Army, the Navy elected to protect certain platform portfolios over others during the BCA decline period. Unlike the Army, though, the Navy preserved funding for certain platform portfolios. While the Navy's overall average annual contract obligations declined by 15 percent during the BCA decline period as compared to the start of the drawdown period, Navy spending on Ordnance and Missiles increased 6 percent, and Navy Aircraft contract obligations grew 1 percent from previous spending levels. Offsetting these preserved funding levels, the Navy made more sweeping cuts to its Facilities and Construction (-23 percent), Land Vehicles (-84 percent), Air and Missile Defense (-62 percent), Other Products (-34 percent), and Space Systems (-39 percent) platform portfolios. Finally, average annual Navy contract obligations for Ships & Submarines (-17 percent); Electronics, Comms, & Sensors (-20 percent); Other R&D and Knowledge Based (-14 percent); and Other Services (-15 percent) all declined roughly equal to the overall Navy decline rate.

[36] Average annual contract obligations for Air Force Land Vehicles grew by 93 percent during the BCA decline period. Additionally, average annual Air Force Ships & Submarines contract obligations declined -11 percent, below the overall rate of Air Force rate of decline. However, Land Vehicles and Ships & Submarines total just 0.6 percent of Air Force contract obligations during the BCA decline period.

[37] The Army's Space Systems and Ships & submarines portfolio declined 42 percent and 24 percent respectively in the BDA decline period, but represent just 0.25 percent and 0.61 percent of the Army's contracting portfolio.

Chapter 6 | Subcontracting FSRS Data

At the onset of this project, CSIS sought to measure and compare the trends between prime and subprime contracts within the varying sectors of the defense industrial base. Prior research by Nancy Moore et al. at RAND and others has suggested that, while the subcontract Federal Subaward Reporting System (FSRS) data availability was initially poor due to older, multiyear contracts not being required to report, subaward data missing for large Major Defense Acquisition Programs (MDAP) not reported, and several other factors, data quality should have improved as FSRS matured.[38] Analysis of subprime contractors would have enabled a much richer understanding of the industrial base, particularly regarding Small vendors and subprime vendors comprising critical supply chains. However, CSIS analysis of FSRS data concluded that the subcontract database remains too incomplete to draw top-level trends across every platform portfolio category. Attempting to present an analysis of the trends in the FSRS up to the present would have likely produced an incomplete or false picture of the ongoing trends in the second tier of the defense industrial base. Instead, the study team chose to highlight the key areas in data availability and reliability.

The data show the critical issue that makes analysis of FSRS data difficult: the high likelihood that a substantive sum of subcontract obligations is not reported in FSRS. Previous research on the ratio of subcontract obligations to prime contract obligations by the Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy (MIBP) suggested that "often 60–70 percent, of defense dollars provided to prime contractors is subcontracted."[39] CSIS research showed that the level of subcontract awards reported to FSRS was closer to a quarter of total defense reportable prime contract obligations, far lower than the MIBP's expected 60 to 70 percent. Even comparing FSRS data to the smaller level of subcontract-to-prime contract dollars seen during the 1990s (~50 percent), the publicly available subcontracting database paints an incomplete picture.[40]

Across the different industrial base sectors, CSIS found that FSRS data quality was poor with three exceptions: Facilities and Construction; Air and Missile Defense; and Ordnance and Missiles. Comparatively, the data availability in other platform portfolios was rather poor. In both Aircraft and Ships & Submarines, the two-year average ratio of subcontract awards to prime contract from FY 2014 to FY 2015 obligations was around 9 percent. The ratio in some platform portfolios, such as Land Vehicles (~40 percent) and Electronics, Comms, & Sensors

[38] Nancy Young Moore, "Findings from Existing Data on the Department of Defense Industrial Base: Guided Missile and Space Vehicle Manufacturing Example," in Twelfth Annual Acquisition Research Symposium (Monterey CA: Naval Postgraduate School, 2015), https://calhoun.nps.edu/bitstream/handle/10945/53563/SYM-AM-15-087.pdf?sequence=1; Government Accountability Office, *Linking Small Business Subcontractors to Prime Contracts Is Not Feasible Using Current Systems* (Washington, DC: GAO, 2014), 2, http://www.gao.gov/assets/670/667410.pdf.

[39] Under Secretary of Defense for Acquisition—Office of the Deputy Assistant Secretary of Defense for Manufacturing and Industrial Base Policy, *Annual Industrial Capabilities Report to Congress* (Washington, DC: Department of Defense, 2013), 2, http://www.dtic.mil/dtic/tr/fulltext/u2/a591327.pdf.

[40] U.S. Congress, Office of Technology Assessment, *After the Cold War: Living with Lower Defense Spending*, OTA-1TE-524 (Washington, DC: U.S. Government Printing Office, February 1992), http://www.dtic.mil/dtic/tr/fulltext/u2/a251692.pdf.

(EC&S) (~34 percent) was better than the overall defense ratio, but still not quite the expected ratio of subcontract awards to prime contract obligations.

Even within platform portfolios, CSIS found that data quality varied widely among the different components. For example, in the Aircraft platform portfolio, the CSIS study team found that the Navy had significantly higher subcontract awards per reportable prime contract obligations than the Air Force and Army. For the past three years, the average ratio of subcontract awards to reportable prime contract obligations in the Navy was 16 percent compared to 3 percent in the Air Force and 5 percent in the Army. Though the Navy's subcontracting sum is well below expected levels, the magnitude of the difference between the Navy's sum and the sums for the Army and Air Force is stark and bears further investigation.

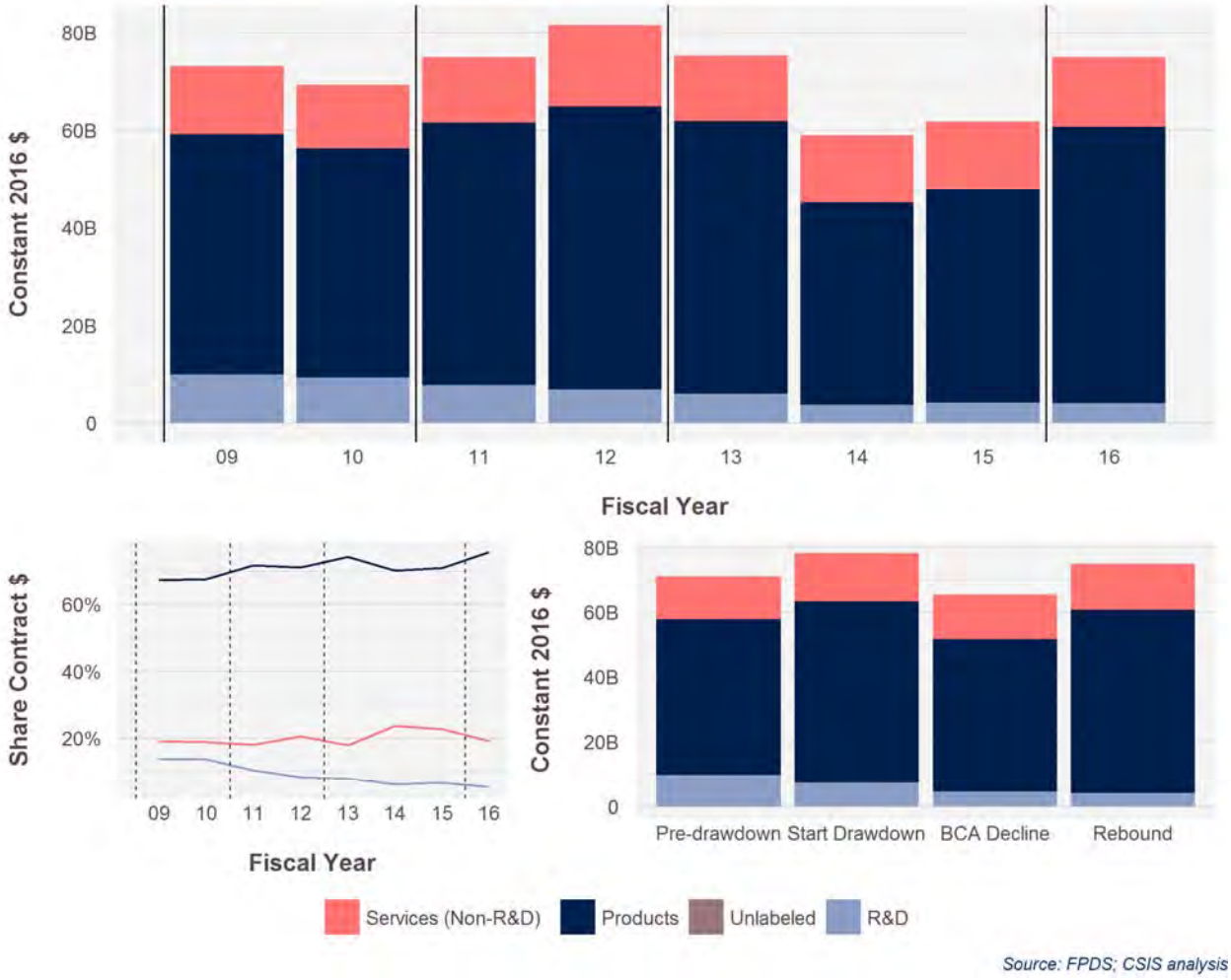
Finally, CSIS analysis supports previous research findings showing that for many large, major weapon-systems contracts, data is woefully incomplete or completely missing. When Nancy Moore's team at RAND analyzed FSRS data from FY 2010–FY 2012, they identified a list of the 16 largest weapon systems contracts without FSRS awards.[41] In the years since, the FSRS data quality for many major weapon systems continues to show little more than marginal improvement from FY 2012. One example of this issue is the KC-X Tanker Modernization Program contract signed in February 2011, which continues to show no subcontract awards in FSRS. FSRS data issues are not limited to an MDAP's failure to report any subcontract data, but also issues with the likely incomplete subcontract data being submitted. For example, the SSN 792 and F-35B Low Rate Initial Production (LRIP) procurement contracts both total over $10 billion in prime contract obligations, but only show around $100 million in total subprime contract awards respectively. The CSIS study team finds it unlikely that only 1 percent or less of these projects goes toward sub-contractors. These data-quality issues are not limited to these programs or their respective prime vendors. They are just a few examples of a broader problem.[42]

[41] Moore, Grammich, and Mele, *Findings from Existing Data on the Department of Defense Industrial Base*, 14.
[42] It is plausible that these, and similar, contracts are not required to report subcontract data, but it is unlikely given the contract award dates and the limited exceptions included in the Federal Funding Accountability and Transparency Act of 2006 (FFATA) that created the FSRS reporting requirement. Outside of contracts exempted due to the time-phased reporting requirements by contract size, exceptions are largely limited to entities with less than $300,000 in total revenue and classified information.

Chapter 7 | Aircraft

During the start of the defense drawdown period (2011–2012), Aircraft average annual contract obligations increased by 10 percent as compared to the pre-drawdown period (2009–2010). However, those trends reversed during the BCA decline period (2013–2015) when average annual Aircraft contract obligations declined by 17 percent compared to the start of the defense drawdown. Shown in Figure 7-1, the largest source of this decline was the 38 percent decline in average annual Aircraft R&D contract obligations. Average annual Aircraft products contract obligations fell at a rate near the overall rate of decline during this period (-16 percent), while average contract obligations for services decline more slowly (-9 percent).

Figure 7-1: Aircraft Contract Obligations by Area, 2009–2016



Source: FPDS; CSIS analysis

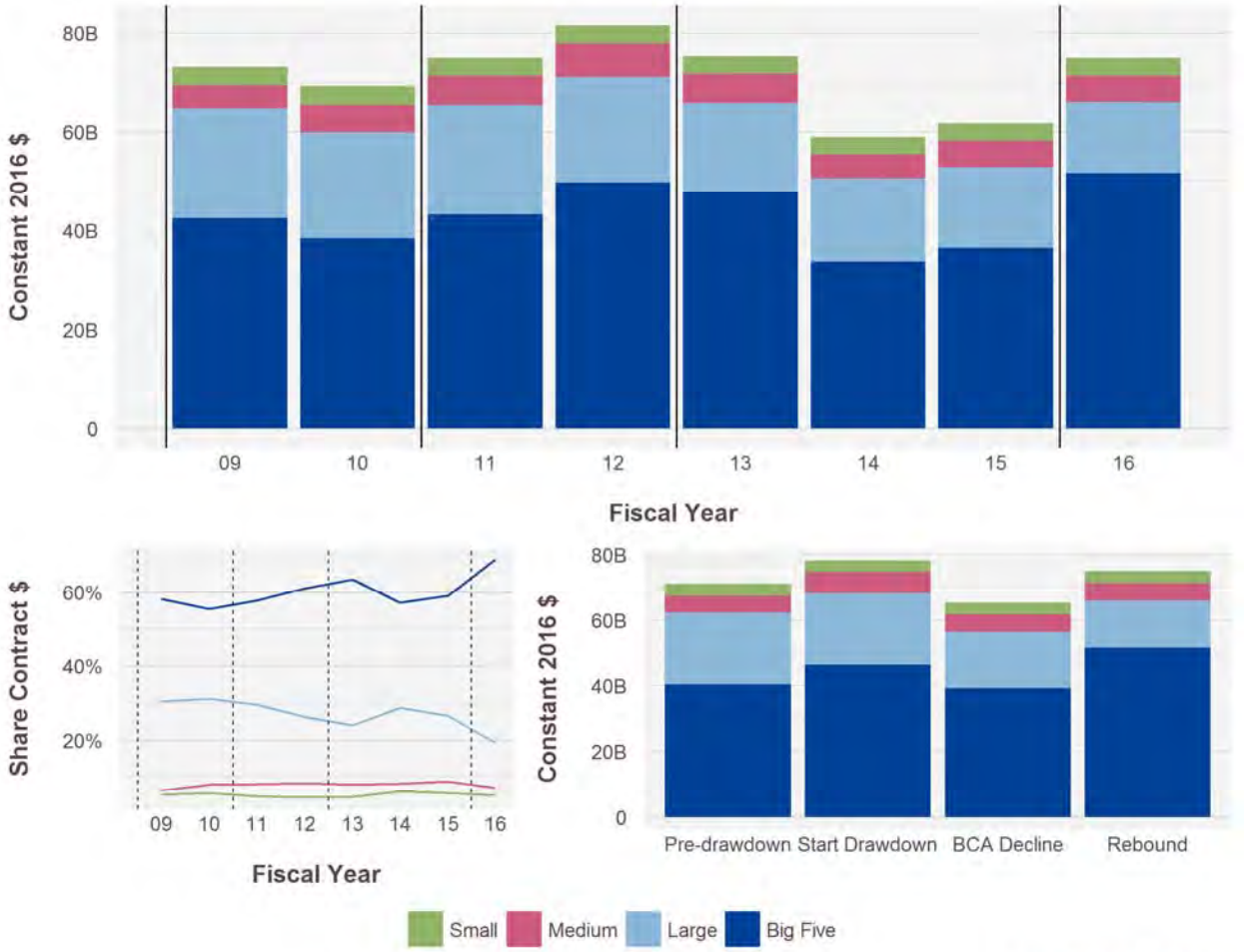
AIRCRAFT: VENDOR SIZE

Under sequestration and the defense drawdown, the Big 5 have only further increased their market share in this sector at the expense of Large vendors. During the start of the drawdown period, the Big 5 accounted for 59 percent of total Aircraft contract obligations, compared to 28 percent for Large vendors. During the BCA decline period, the Big 5 increased their market share to 60 percent of total Aircraft contract obligations, while Large vendors slipped to 26 percent. These trends continued into FY 2016 and the reversal of the contracting drawdown. During that year, the share of total Aircraft contract obligations awarded to the Big 5 rose to 69 percent, and the share awarded to Large vendors fell to 15 percent.

Small and Medium vendors' share of Aircraft contract obligations remained steady in the BCA decline period. At the start of the drawdown, Small and Medium vendors accounted for 5 and 8 percent of total Aircraft contract obligations respectively and remained at those levels in the BCA decline period. This outcome is in line with the finding from the literature that business strategy drives results more than business size.

Figure 7-2 shows the composition of the Aircraft industrial base by size of vendor from FY 2009 to FY 2016.

Figure 7-2: Aircraft Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

AIRCRAFT: AREA BY SIZE OF VENDOR

The data show that beyond the top-line trends for Aircraft vendor size and area, sequestration and the defense drawdown had differing impacts on vendors of differing sizes performing work in the products, services, and R&D areas.

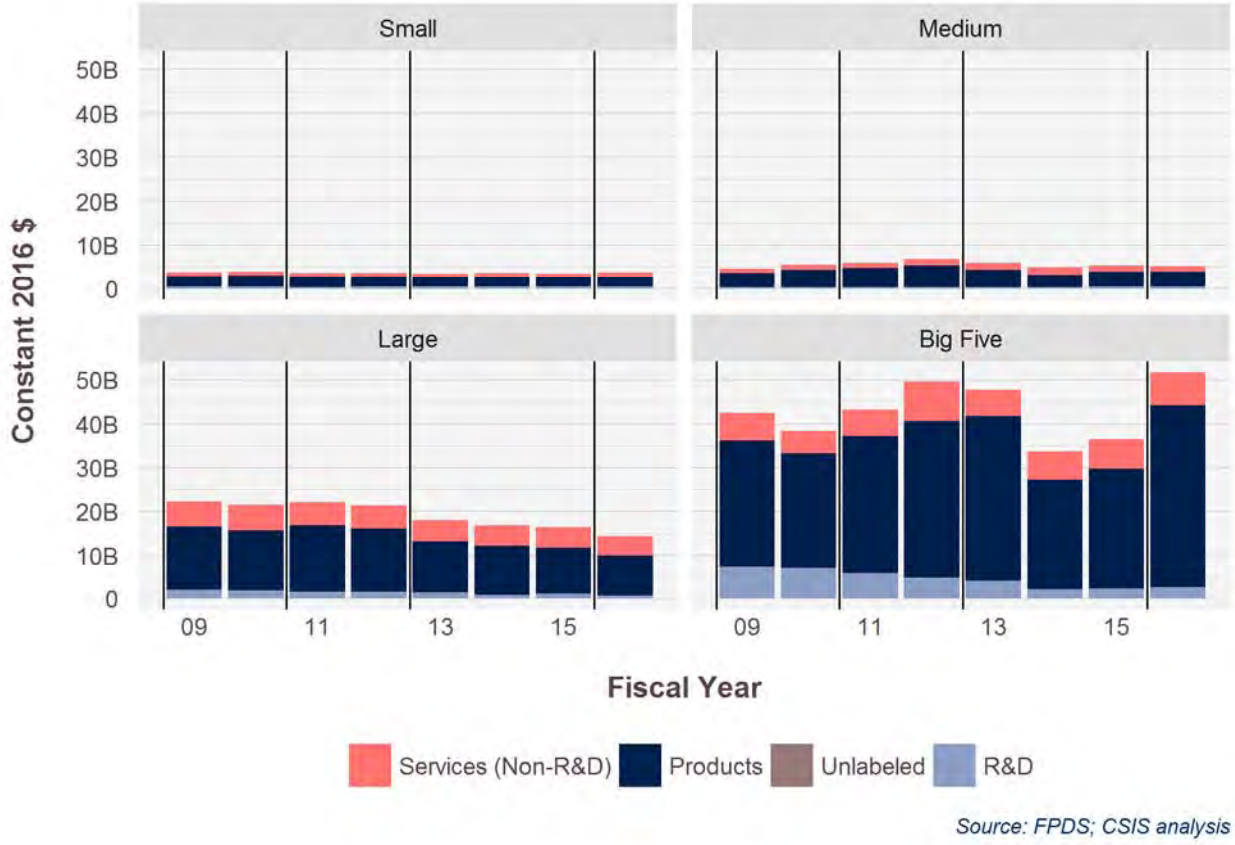
In Aircraft products, the Big 5 (-10 percent) and Small vendors (-10 percent) fell at rates below the overall rate of decline (-16 percent) during the BCA decline period, while Large (-25 percent) and Medium (-27 percent) fell at rates higher than the overall platform portfolio decline. Of note, while the Big 5's Aircraft contract obligations fell more slowly than the overall Aircraft platform portfolio, the Big 5 have experienced a significant whipsaw effect over the past few years. At the start of the drawdown, average annual Big 5 Aircraft contract obligations were on a growth trajectory, increasing by 22 percent from the pre-drawdown period. As previously mentioned, this growth path proved to be temporary, as average annual Big 5 contract obligations declined 10 percent during the BCA decline period. While contract obligations for Big 5 Aircraft products increased in 2016 by 38 percent over the BCA decline period numbers, it remains to be seen if this year is a return to previous growth paths or is a one-year anomaly.

In Aircraft R&D, Large and Big 5 vendors saw significant declines in both percentage terms and absolute dollars throughout the study period, while Medium and Small vendors, though minor in total dollars, fared better. For the Big 5, the BCA decline period accelerated the downward trend that had begun at the start of the drawdown. Pre-drawdown, contract obligations for the Big 5 Aircraft R&D averaged $7.1 billion annually. During the start of the drawdown, the Big 5's annual average R&D contract obligations fell to $5.3 billion, a 26 percent decline. During the BCA decline period, the Big 5 saw an even sharper decline in their annual average R&D Aircraft obligations, falling to $2.8 billion, a 47 percent decline over the previous period. Similar to the Big 5, Large vendor's average annual Aircraft R&D contract obligations declined 25 percent at the start of the drawdown and then 26 percent during the BCA decline period. Small and Medium vendors, although they only represented approximately 7 percent of Aircraft R&D contract obligations pre-drawdown, fared better over the course of the drawdown, falling more slowly than the overall decline during the start of the drawdown. During the BCA decline period, both Small and Medium-sized vendors' average annual contract obligations grew. Small vendors increased 4 percent from the previous period, while Medium vendors grew from $0.21 billion to $0.28 billion, a 34 percent increase.

In Aircraft services, Large vendors saw the largest losses, because the Big 5 experienced a similar whipsaw effect to what occurred with Aircraft products, and Small and Medium vendors continuously grew. Large vendors declined 9 percent during the start of the drawdown period and an additional 10 percent during the BCA decline period. For the Big 5 vendors, the whipsaw effect seen in Aircraft products was similarly repeated in Aircraft services, with annual average contract obligations for a period increasing 32 percent at the start of the drawdown, only to decline 15 percent during the BCA decline period. Small vendors grew 2 percent from the pre-drawdown to the start of the drawdown period, and then grew an additional 15 percent during the BCA decline period. Finally, Medium vendors saw continuous double-digit percentage growth over the defense drawdown period, increasing 27 percent during the start of the drawdown and 18 percent during BCA decline period. However, as contract obligations rebounded in FY 2016, Medium vendors' Aircraft services contract obligations declined 12 percent, even as overall Aircraft services contract obligations rose 4 percent, but it is too early to tell if this is the start of a new trend or a one-year data point.

Figure 7-3 below shows Aircraft contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 7-3: Aircraft Contract Obligations by Area by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

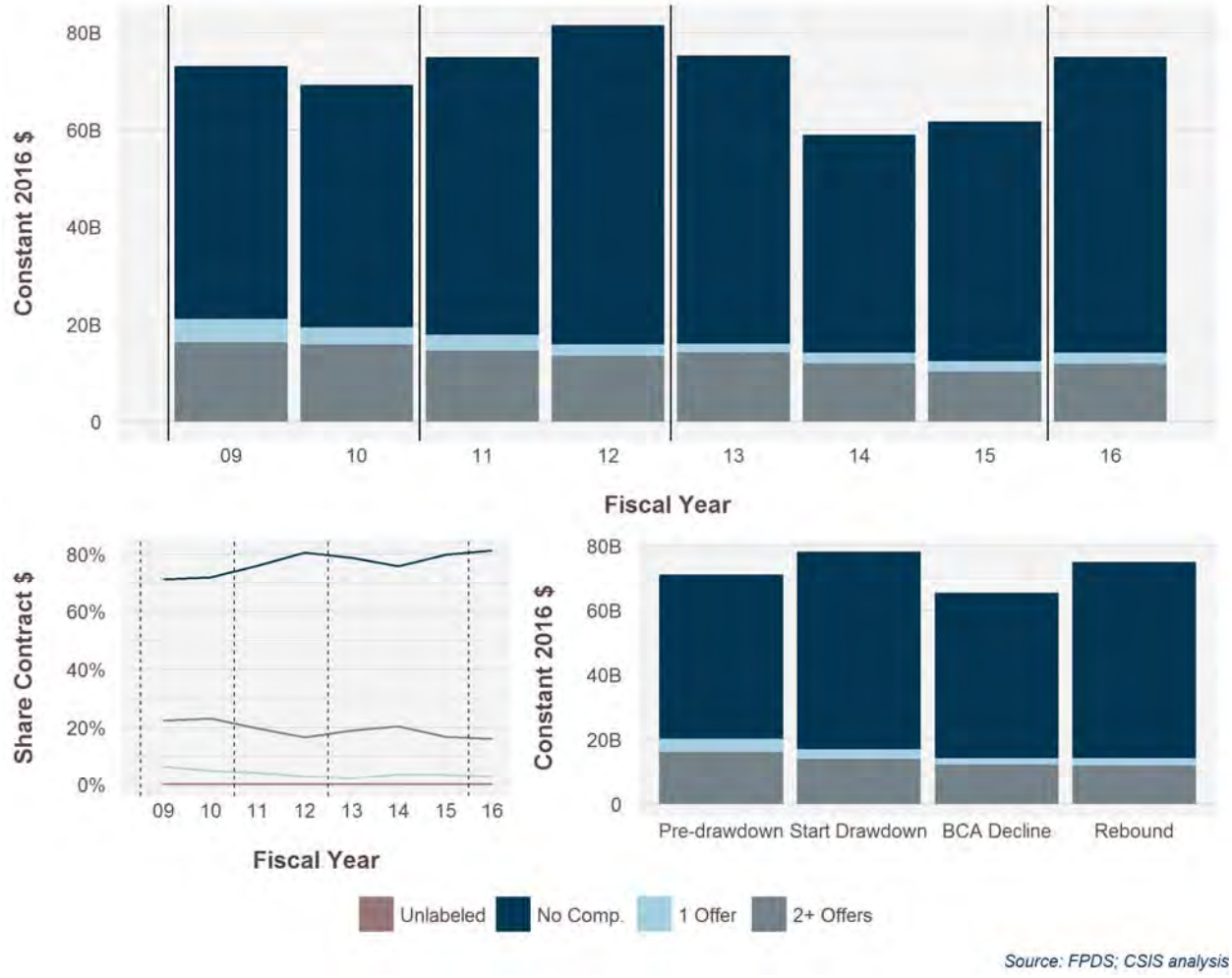
AIRCRAFT: COMPETITION

Under sequestration and the defense drawdown, the historical trend toward less competition continued and grew. Between FY 2000 and FY 2009, 26 percent of Aircraft contract obligations were awarded after effective competition, compared to 67 percent of contract obligations being awarded after no competition. In the two years comprising the start of the drawdown (2011–2012), the average share of contract obligations awarded after effective competition fell to 18 percent, while the share of annual average contract obligations awarded without competition increased to 78 percent. The downward trends in single-offer competition continued into the BCA decline period, when the percentage of average annual contract obligations awarded after effective competition rose from 18 percent to 19 percent at expense of single-offer competition.

When the contract drawdown began to reverse in 2016, these trends only continued with the share of Aircraft contract obligations awarded after no competition increased to 81 percent. In 2016, only 6 percent of Aircraft contract obligations were awarded after effective competition.

Figure 7-4 shows Aircraft contract obligations by level of competition from FY 2009 to FY 2016.

Figure 7-4: Level of Competition for Aircraft Contract Obligations, 2009–2016



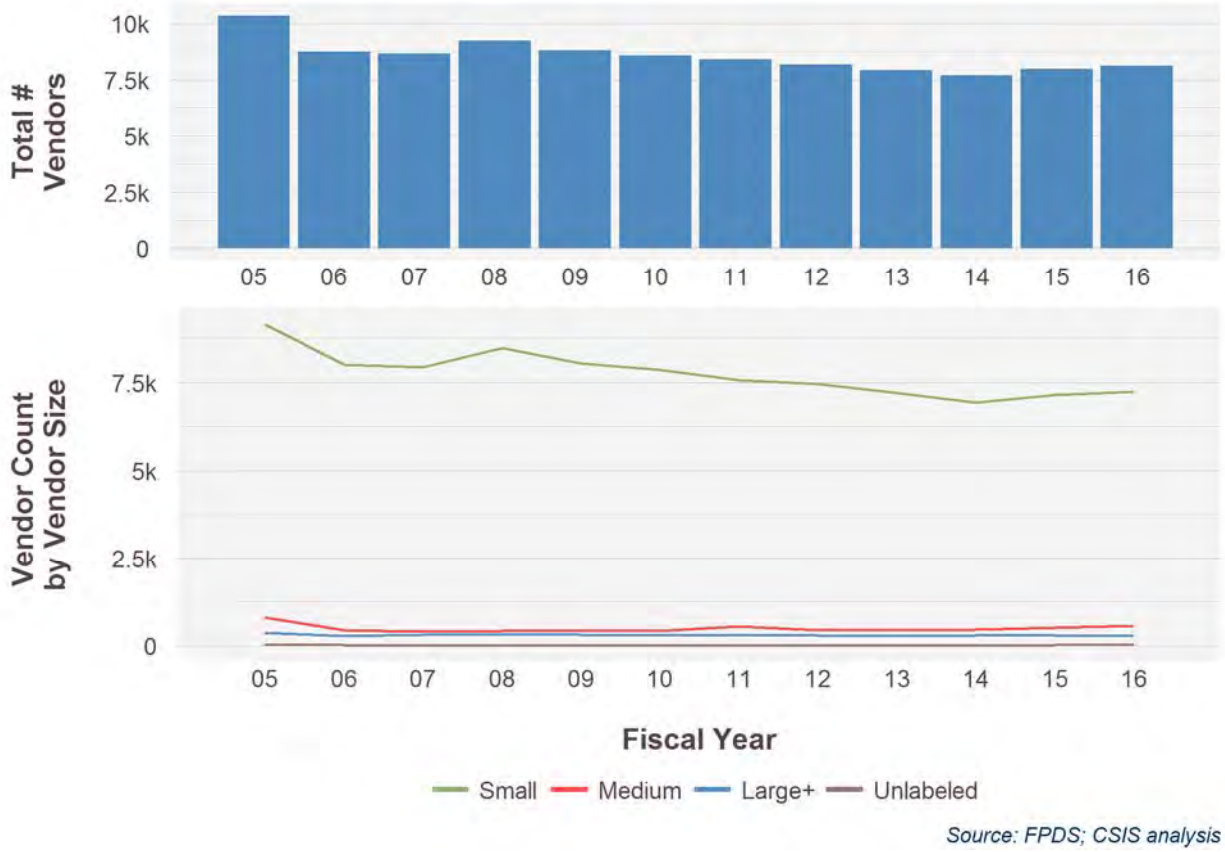
Source: FPDS; CSIS analysis

AIRCRAFT: VENDOR COUNT

After an initial decline, the number of vendors in the Aircraft sector increased over the course of the defense drawdown. This result is somewhat surprising given that since FY 2005 the number of vendors in the Aircraft sector had been declining compared to the previous year (except for 2008), reaching approximately 6,100 vendors in FY 2010. This decline continued until 2014, when there were under 5,700 vendors, a 7 percent decline from 2010. However, beginning in 2015 (and continuing into 2016), the number of vendors in the Aircraft sectors increased from the previous year. In FY 2016, there were approximately 6,250 vendors in the Aircraft sector, a 10 percent increase as compared to 2014. The speed with which the number of vendors rebounded, as well as the market share for Small and Medium vendors remaining steady, is consistent with the observation in the literature that smaller players can prove nimble in response to market shocks.

Figure 7-5 shows the number of vendors in the Aircraft platform portfolio from FY 2005 to FY 2016 by size of vendor.

Figure 7-5: Aircraft Vendor Count by Size of Vendor, 2005–2016



Source: FPDS; CSIS analysis

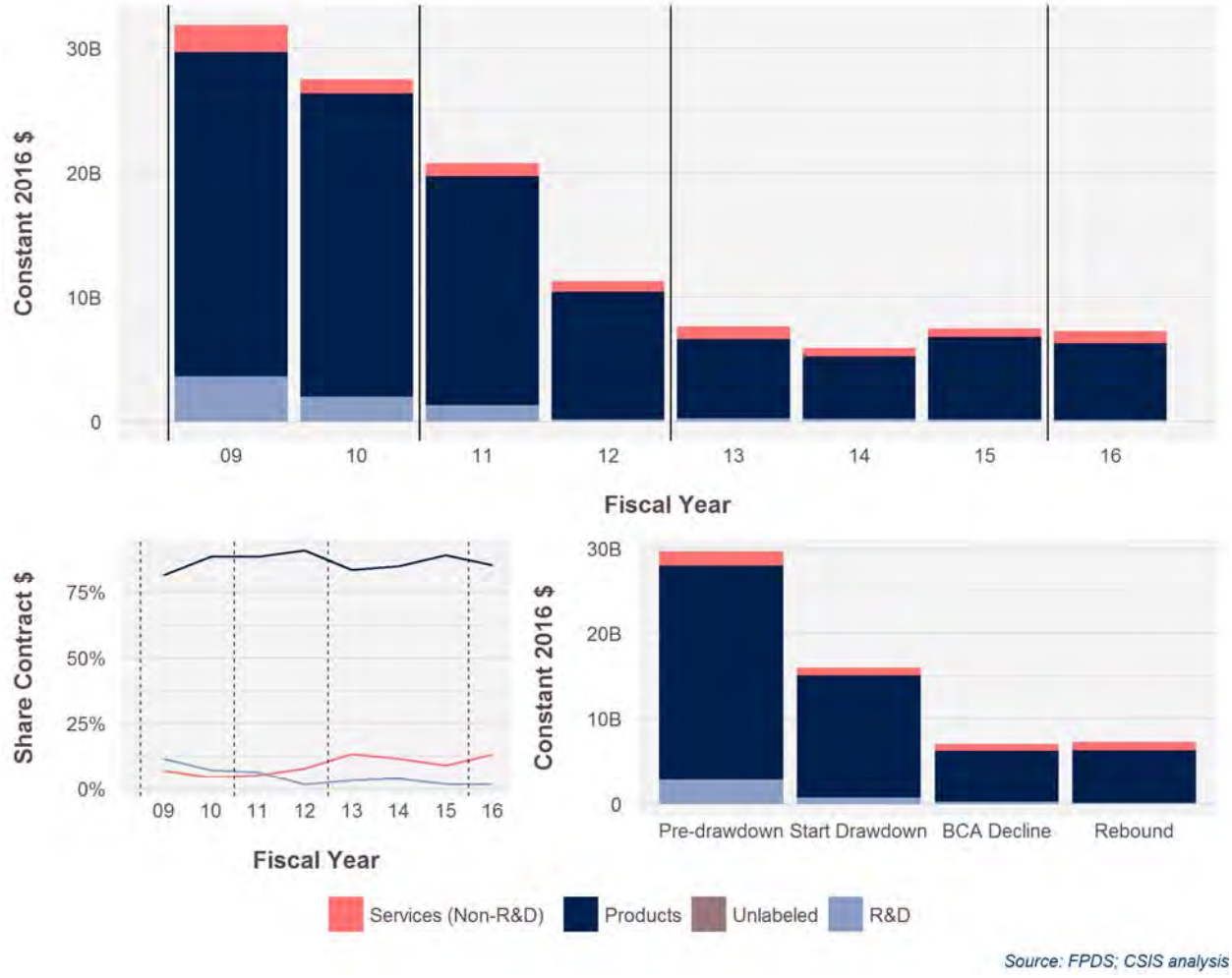
Chapter 8 | Land Vehicles

Even prior to the BCA decline period (2013–2015), the Land Vehicles sector had experienced significant declines, falling 46 percent throughout the start of the drawdown compared to the pre-drawdown period (2011–2012). During the BCA decline period, the Land Vehicles portfolio further collapsed, with average contract obligations declining by 56 percent from 2013–2015. The collapse reflects more than just that the components priorities went elsewhere. It also demonstrates a fall from favored status during the period of large-scale contingency operations with a focus on rapid acquisitions of highly protected, tactical vehicles such as mine-resistant, ambush-protected vehicles. The 56 percent decline was nearly twice the next-highest decline and significantly higher than the 24 percent overall DoD decline.[43]

Figure 8-1 shows Land Vehicles contract obligations by area from FY 2009 to FY 2016.

[43] The 32 percent in Space Systems was the next-highest decline during this BCA decline period.

Figure 8-1: Land Vehicles Contract Obligations by Area, 2009–2016



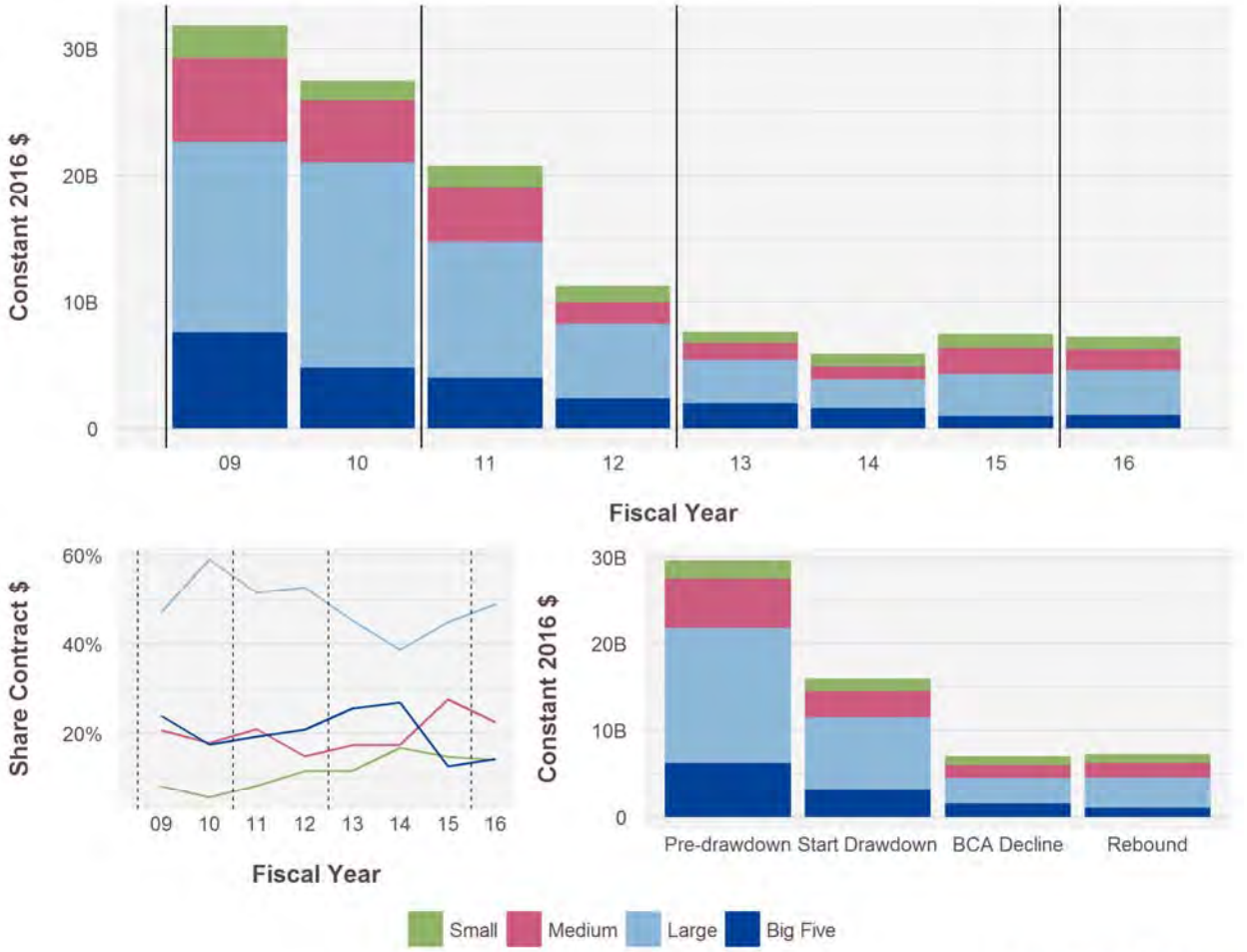
Source: FPDS; CSIS analysis

LAND VEHICLES: VENDOR SIZE

The Land Vehicles sector experienced significant changes to its composition during the BCA decline period. During the start of the drawdown period, the Big 5 and Large vendors accounted for 20 and 52 percent of Land Vehicles contract obligations respectively, whereas Medium vendors accounted for 19 percent and Small vendors 9 percent. During this FY 2013-to-FY 2015 BCA decline period, the share of annual average contract obligations for Large vendors fell to 43 percent, while the share going to the Big 5, Medium, and Small Vendors increased to 21, 21, and 14 percent respectively. During the start of the drawdown, Large vendors' Land Vehicles contract obligations averaged $8.3 billion annually, compared to their $3.0 billion in average annual Land Vehicles contract obligations during the BCA decline period.

Figure 8-2 shows the composition of the Land Vehicles industrial base by size of vendor from FY 2009 to FY 2016.

Figure 8-2: Land Vehicles Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

LAND VEHICLES: AREA BY SIZE OF VENDOR

Looking beyond topline trends, the data show a few trends of note that, while less impactful than the trends seen in Aircraft, demonstrate how the drawdown impacted different-sized Land Vehicles vendors differently in products, services, and R&D.

In Land Vehicles products, the drawdown impacted all vendors, but it did so at slightly different rates depending on size. Large and Medium vendors fell at rates near or above the overall rate of decline, while Small vendors continuously fell at a rate below the overall rate of decline. The Big 5, though they declined at a rate less than the overall rate of decline during the start of the drawdown period, did fall at a rate roughly equivalent to the overall rate of decline in the BCA decline period. Of note, although Large and Medium-sized vendors saw the greatest cuts during the drawdown, they experienced the greatest percentage increases during the FY 2016 rebound. Large vendors' contract obligations increased from an average of $2.7 billion annually during the BCA decline period to $3.1 billion in FY 2016, a 13 percent increase. Meanwhile, Medium vendors increased from $1.2 billion to $1.4 billion, a 17 percent increase. However, even after a double-digit percentage

rebound in FY 2016, contract obligations for Land Vehicles products are still well below pre-drawdown annual average contract obligations.

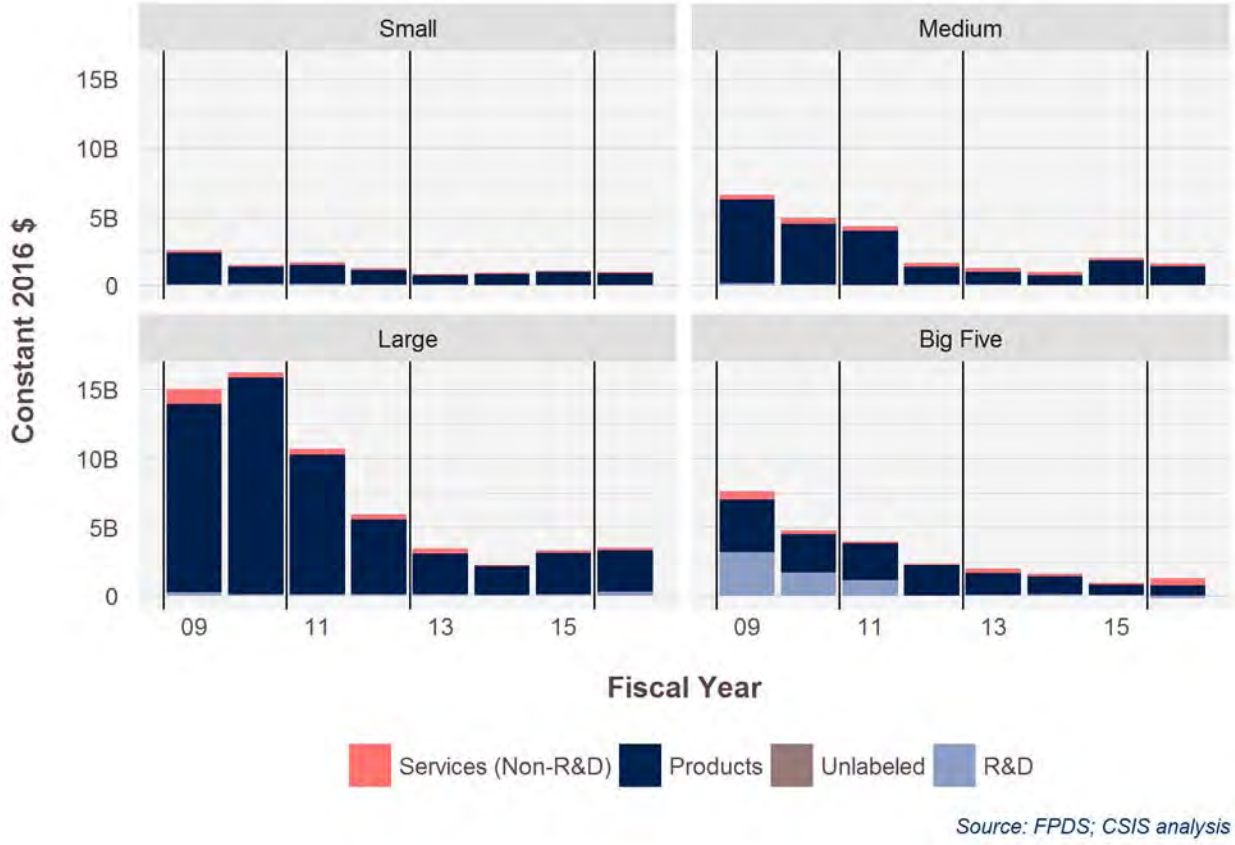
In Land Vehicles R&D, the story of the drawdown is the continuous overwhelming cuts in Big 5 contract obligations. Average annual Land Vehicle R&D contract obligations going to the Big 5 went from $2.4 billion pre-drawdown to $0.6 billion during the start of the drawdown period, a 78 percent decline, to $0.1 billion in the BCA decline period, an 87 percent decline. As described in previous CSIS reports, this decline cannot solely be attributed to sequestration and the defense drawdown, given the cancelations of the Future Combat System and its follow-on Ground Combat Vehicle during this period. However, the budget reductions did have an impact, as the Army elected to cut modernization funding to prioritize readiness and force structure.[44]

In Land Vehicles services, the Big 5's whipsaw effect and the acceleration of cuts for Small vendors are the most notable trends. In the start of the drawdown period, Big 5 Land Vehicles services fell from $0.4 billion to $0.1 billion, a 69 percent decline. This sharp decline was followed by an equally sharp increase in the BCA decline period (69 percent) that continued into the FY 2016 rebound (115 percent). Small vendors average annual contract obligations decreased 5 percent at the start of the drawdown (significantly smaller than the 43 percent overall rate of decline), only for the Small vendors Land Vehicle services' market to freefall during the BCA decline period, declining 38 percent—or twice the overall decline (-17 percent).

Figure 8-3 shows Land Vehicles contract obligations by area by size of vendor from FY 2009 to FY 2016.

[44] Rhys McCormick and Andrew Hunter, *The Army Modernization Imperative: A New Big Five for the Twenty-First Century* (Washington, DC: CSIS, 2017), https://csis-prod.s3.amazonaws.com/s3fs-public/publication/170530_Hunter_ArmyModernization_Web.pdf?230oluRM4PwJBi4XRunDpVRMndOnunc.

Figure 8-3: Land Vehicles Contract Obligations by Area by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

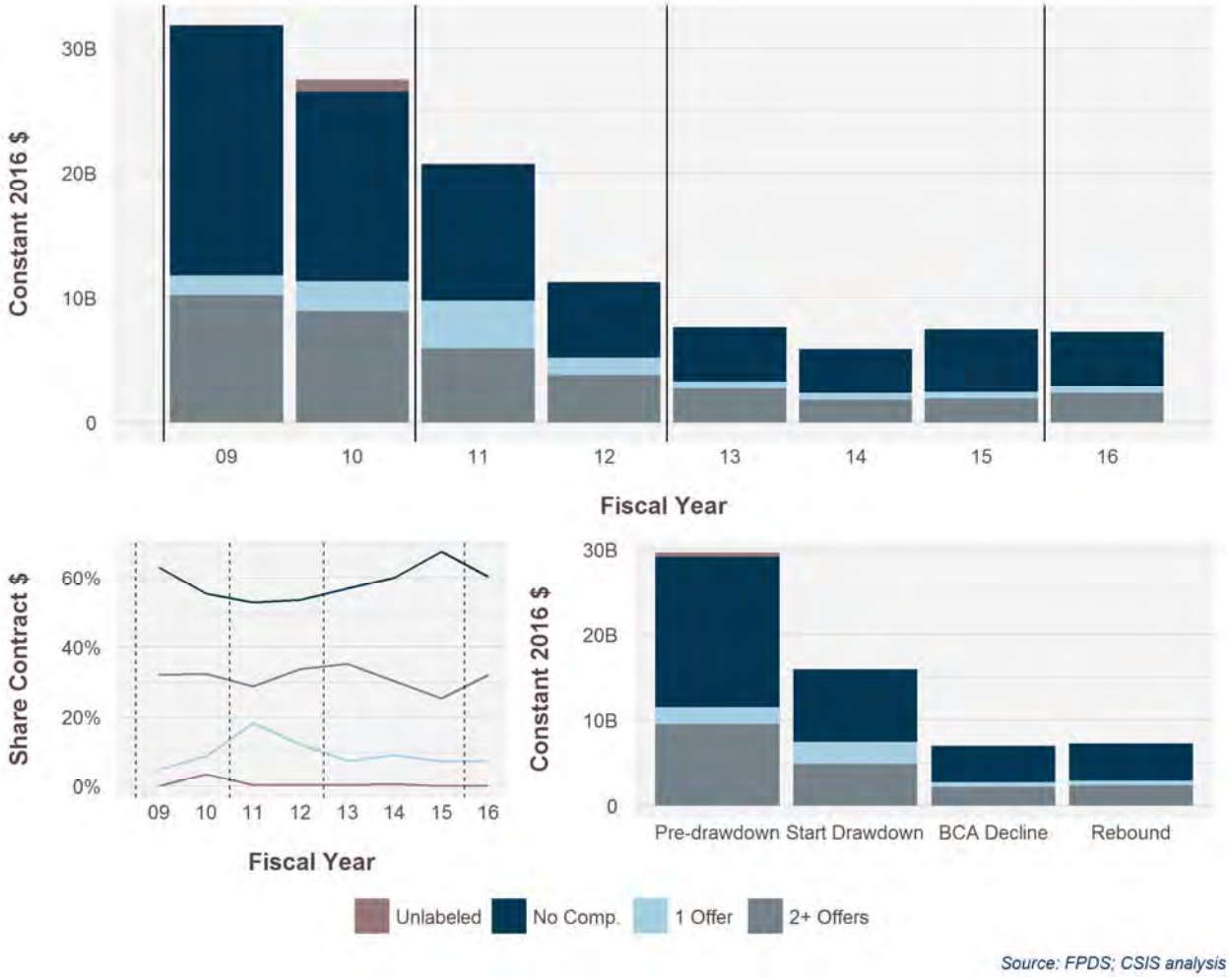
LAND VEHICLES: COMPETITION

Throughout the defense drawdown, the Land Vehicles sector saw a decline in the rate of effective competition and an increase in the share of contract obligations awarded without competition. At the start of the drawdown, 31 percent of Land Vehicles contract obligations were awarded after effective competition, and 53 percent were awarded without any competition. During the BCA decline period, the share of contract obligations awarded after effective competition fell slightly to 30 percent, as the share of contract obligation awarded without competition increased by 8 percentage points to 61 percent.

These trends began to reverse themselves in FY 2016 as the share of contract obligations awarded after effective competition increased to 32 percent, and the share of contract obligations awarded without competition fell to 60 percent. The platform portfolio experienced 9 percent growth in contract obligations in FY 2016 over its numbers during the BCA decline period.

Figure 8-4 shows Land Vehicles contract obligations by level of competition from FY 2009 to FY 2016.

Figure 8-4: Land Vehicles Contract Obligations by Level of Competition, 2009–2016

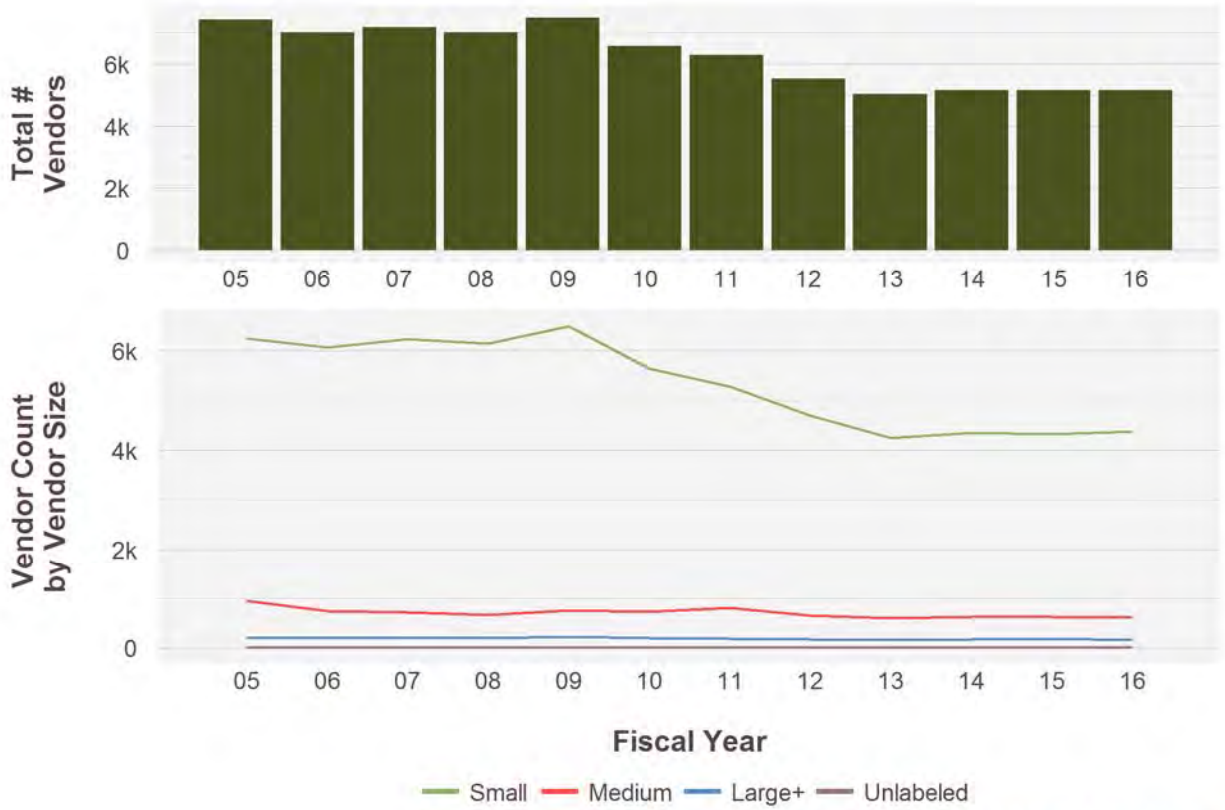


Source: FPDS; CSIS analysis

LAND VEHICLES: VENDOR COUNT

At the start of this defense drawdown, the number of vendors in the Land Vehicles sector continued to decline, before eventually flattening out and slowly rebounding near the end of the study period. After spiking in FY 2009 at approximately 5,900 vendors, FY 2010 marked the start of the decline in the number of Land Vehicles vendors, as the wars in Afghanistan and Iraq and subsequent war-related vehicle funding declined. This trend continued until FY 2013, when there were just under 3,950 vendors, a 33 percent decline from FY 2009. However, that trend began to slowly reverse in FY 2014, with the number of Land Vehicles vendors growing on average 1.5 percent per year since FY 2014, as shown in Figure 8-5.

Figure 8-5: Land Vehicles Vendor Count by Size of Vendor, 2005–2016



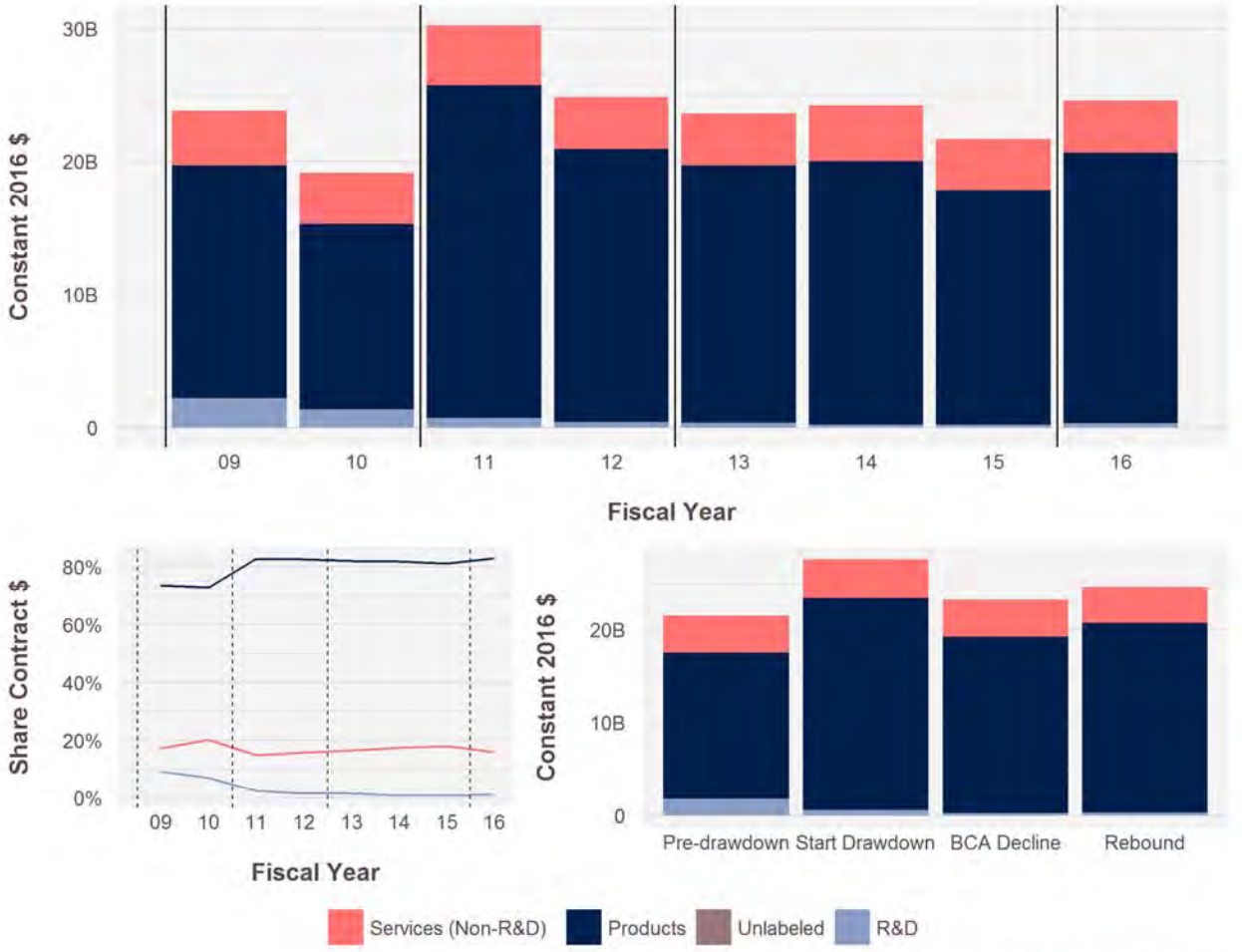
Source: FPDS; CSIS analysis

Chapter 9 | Ships & Submarines

Similar to the Aircraft portfolio, the Ships & Submarines portfolio grew at the start of the defense drawdown (2011–2012), only to fall during the BCA decline period (2013–2015). At the start of the defense drawdown period, Ship & Submarines' average annual contract obligations increased 28 percent from the pre-drawdown period (2009–2010). Those trends reversed in the BCA decline period, as average annual Ships & Submarines contract obligations decreased 16 percent compared to the previous period. The predominant source of the Ships & Submarine decline was the 58 percent decline in their average annual R&D contract obligations. Ships & Submarines products and services contract obligations also experienced a difference in decline. The annual average contract obligations for products fell at a rate close to the overall rate of decline during this period (-17 percent), while the average annual contract obligations for services fell significantly more slowly (-5 percent).

Figure 9-1 shows Ships & Submarine contract obligations by area from FY 2009 to FY 2016.

Figure 9-1: Ships & Submarines Contract Obligations by Area, 2009–2016



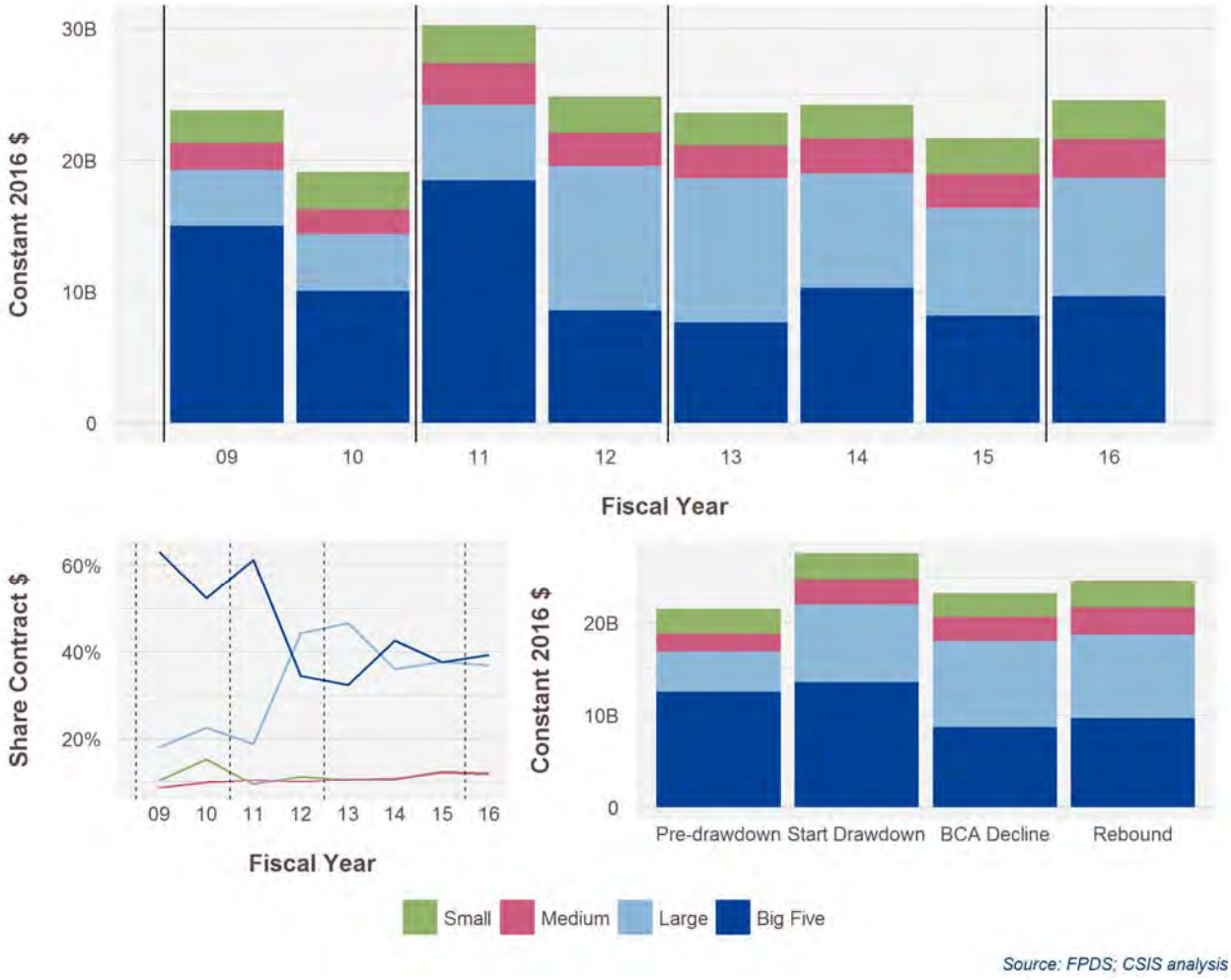
Source: FPDS; CSIS analysis

SHIPS & SUBMARINES: VENDOR SIZE

Over the study period, the Ships & Submarines platform portfolio saw a significant shakeup in its composition, as the Big 5 saw significant declines in market share. However, this trend was largely driven by Northrop Grumman's decision to spin off its shipbuilding sector into Huntington Ingalls Industries (HII) effective halfway through FY 2011. Northrop Grumman decided to prioritize investment in other sectors of the defense industrial base and spin off its shipbuilding asset because of shipbuilding's low profit margins and then-uncertainty about future defense budgets at that time.[45]

Figure 9-2 shows the composition of the Ships & Submarines industrial base by size of vendor from FY 2009 to FY 2016.

Figure 9-2: Ships & Submarines Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

Figure 9-2 shows that at the start of the drawdown, and prior to the formation of HII, the Big 5 accounted for 58 percent of all Ships & Submarines contract obligations. However, by the

[45] Christopher Drew, "Northrop to Spin Off Shipyards," *New York Times,* March 15, 2011, http://www.nytimes.com/2011/03/16/business/16ship.html.

end of the BCA decline period, the Big 5 accounted for just 38 percent of contract obligations, as the share of contract obligations awarded to Large vendors increased from 30 percent to 40 percent. Both the share and sum of contract obligations awarded to Medium-sized vendors remained relatively steady. The share of average annual contract obligations going to Small vendors fell slightly during the start of the drawdown period, going from 13 percent to 10 percent, but experienced a trivial rebound in the BCA decline period when it increased to 11 percent.

SHIPS & SUBMARINES: AREA BY SIZE OF VENDOR

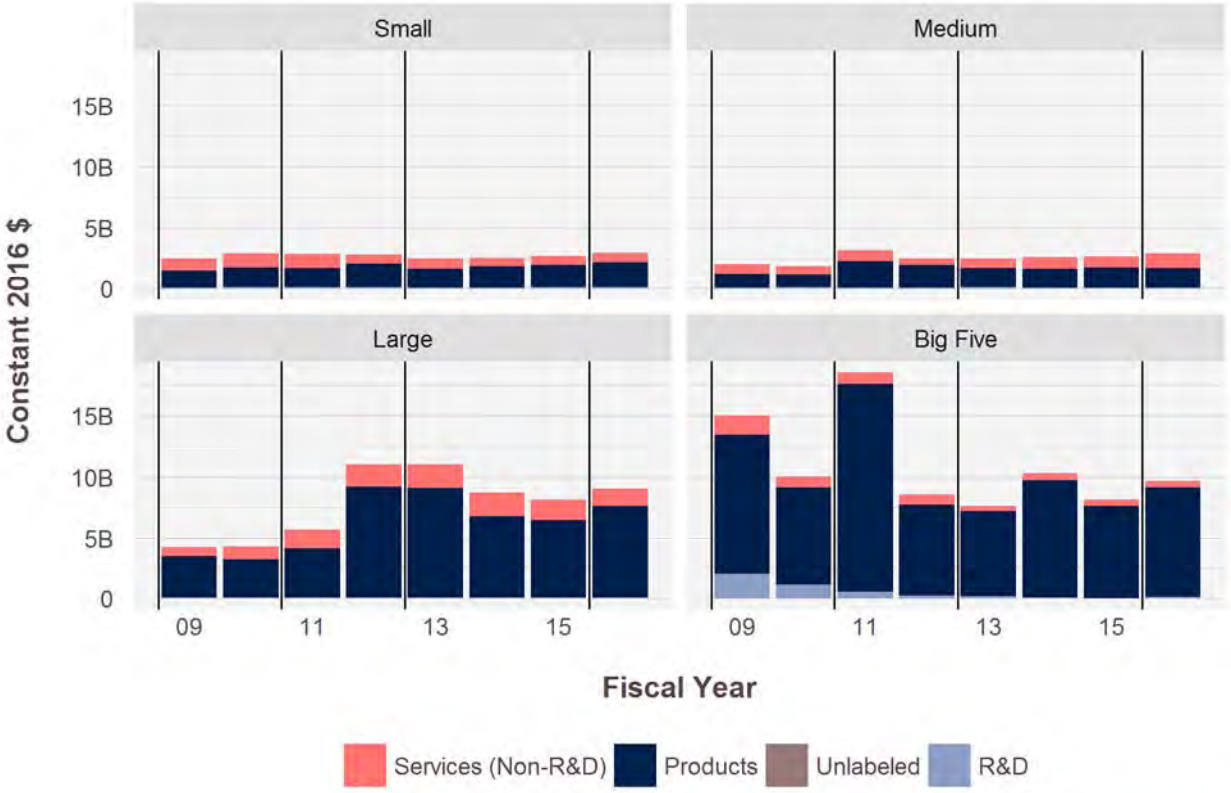
In Ships & Submarines products, vendors of all sizes were on varying growth trajectories from the start of the defense drawdown until the BCA decline period. In that period, vendors of all sizes except Large declined in comparison to the previous period's average annual contract obligations. Average annual contract obligations for Large vendors increased 12 percent during this time, rising from $6.6 billion to $7.4 billion. Of note, although Small vendors did fall during the BCA decline period, they declined just 2 percent, which is significantly smaller than the overall 17 percent decline.

In Ships & Submarines R&D, the two most interesting trends were the collapse of the Big 5 R&D markets and the whipsaw effect seen by Small vendors. At the start of the drawdown, Big 5 average annual R&D contract obligations declined 76 percent from the pre-drawdown period. Although a significant portion of this decline comes from the Northrop-HII spinoff, the lack of an increase in annual average Large R&D contract obligations (1 percent decline) reflects that the Northrop-HII impact is not the only explanation. During the BCA decline period, Big 5 R&D average annual contract obligations continued to free-fall, declining 81 percent from the previous period. Small vendors experienced a whipsaw effect over the entirety of defense drawdown, increasing by 27 percent during the start of the drawdown period and declining 34 percent during the BCA decline period.

In Ships & Submarines services, the notable trends not influenced by the HII spinoff were the growth in Medium vendors and declines in Small vendors. At the start of the drawdown, Medium vendors were on a downward trajectory, declining 9 percent from the pre-drawdown period. During the BCA decline period, Medium vendors' average annual contract obligations increased by 26 percent, which continued and even further increased in FY 2016 by 40 percent. Average annual contract obligations obligated to Small vendors declined throughout the entire drawdown, falling 13 percent during the start of the drawdown period, even as the overall Ships & Submarines market grew, and then declining 20 percent during the BCA decline period.

Figure 9-3 shows Ships & Submarines contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 9-3: Ships & Submarines Contract Obligations by Area by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

SHIPS & SUBMARINES: COMPETITION

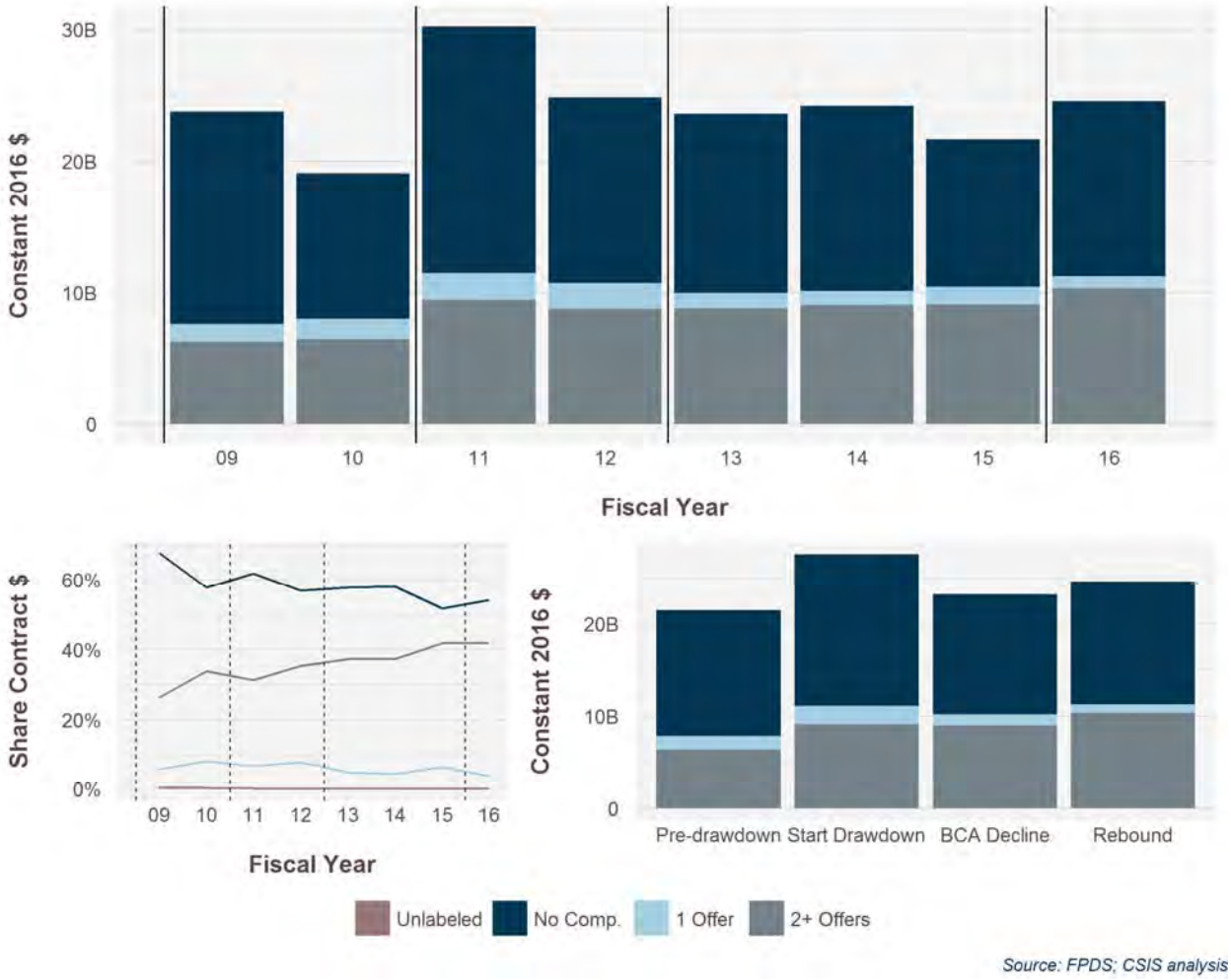
Since the start of the defense drawdown, the share of average annual Ships & Submarines contract obligations awarded after effective competition has continuously increased through the various study periods. In the pre-drawdown period, only 30 percent of average annual period contract obligations were awarded after effective competition, compared to the 63 percent awarded without competition and 7 percent awarded after receiving just one offer. Throughout the start of the drawdown period, the share of average annual period contract obligations awarded after effective competition increased to 33 percent, and the share of contract obligations awarded without competition fell to 59 percent. Finally, during the BCA decline period, the share of average annual period contract obligations awarded after effective competition increased by 6 percentage points, rising from 33 to 39 percent. Simultaneously, the share of average annual period contract obligations for no competition fell from 59 to 56 percent, and the share awarded after one offer fell from 7 to 5 percent.

Of note, the increase in the share of contract obligations awarded after effective competition was not only the result of those contract obligations declining at a slower rate than those that were awarded without effective competition. Although that proved to be the case during the BCA decline period (a -2 percent decline in average annual contract obligations awarded after effective competition, compared to a -21 percent decline in average annual contract obligations awarded without competition), there was an actual increase in effective competition during the start of the drawdown period. During that period, average Ships &

Submarines contract obligations awarded after effective competition increased from $6.4 billion to $9.1 billion, a 44 percent increase. During that same period, average Ships & Submarines contract obligations awarded without competition grew from $13.6 billion to $16.4 billion, a 21 percent increase.

Figure 9-4 shows Ships & Submarines contract obligations by level of competition from FY 2009 to FY 2016.

Figure 9-4: Level of Competition for Ships & Submarines Contract Obligations, 2009–2016



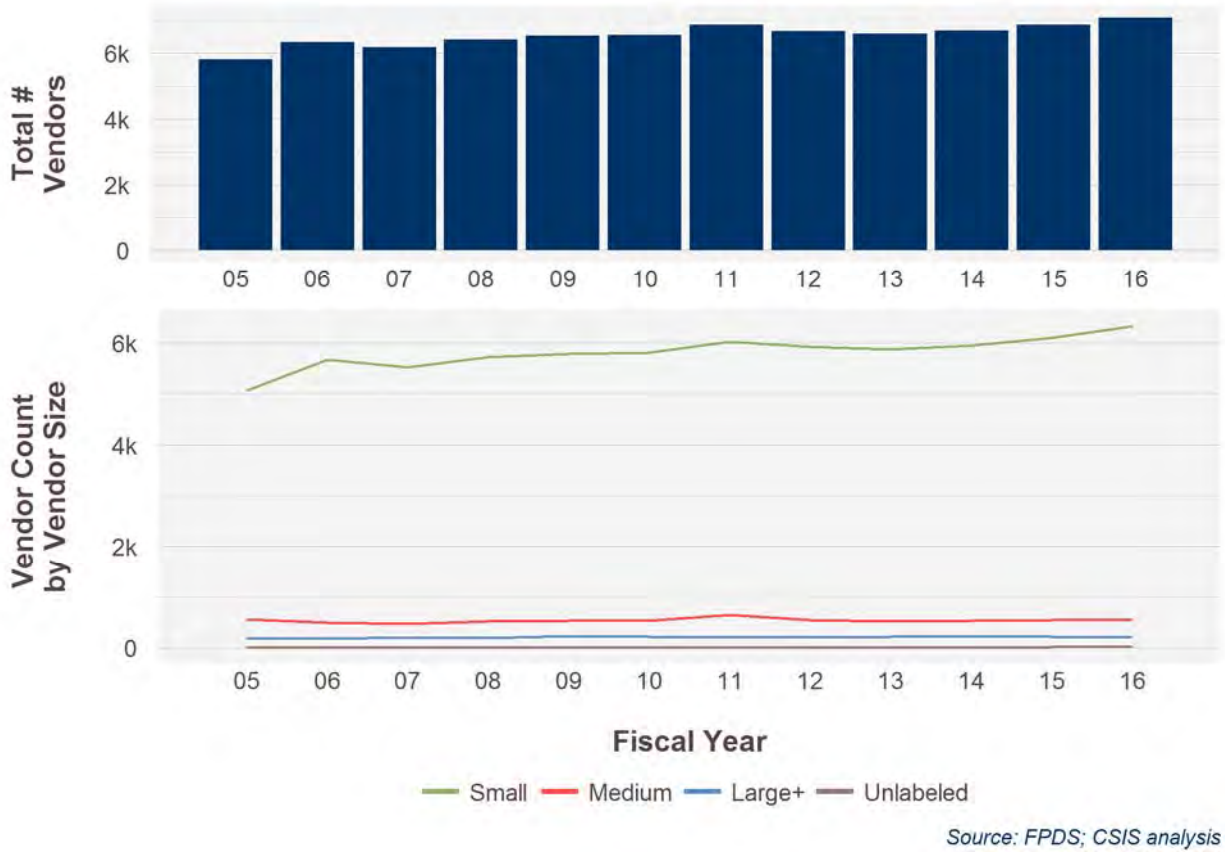
Source: FPDS; CSIS analysis

SHIPS & SUBMARINES: VENDOR COUNT

In the years leading up to the defense drawdown, the number of vendors in the Ships & Submarines sector had been slowly increasing after a previous decline, peaking at approximately 5,300 in FY 2011. After peaking in FY 2011, the number of vendors in the Ships & Submarines sector declined slightly, approximately 1 percent, for two years until FY 2013. Since FY 2013, the number of vendors in this platform portfolio has increased by 2.7 percent annually, totaling approximately 5,600 vendors.

Figure 9-5 shows the number of vendors in the Ships & Submarines platform portfolio from FY 2005 to FY 2016.

Figure 9-5: Ships & Submarines Vendor Count by Size of Vendor, 2009–2016



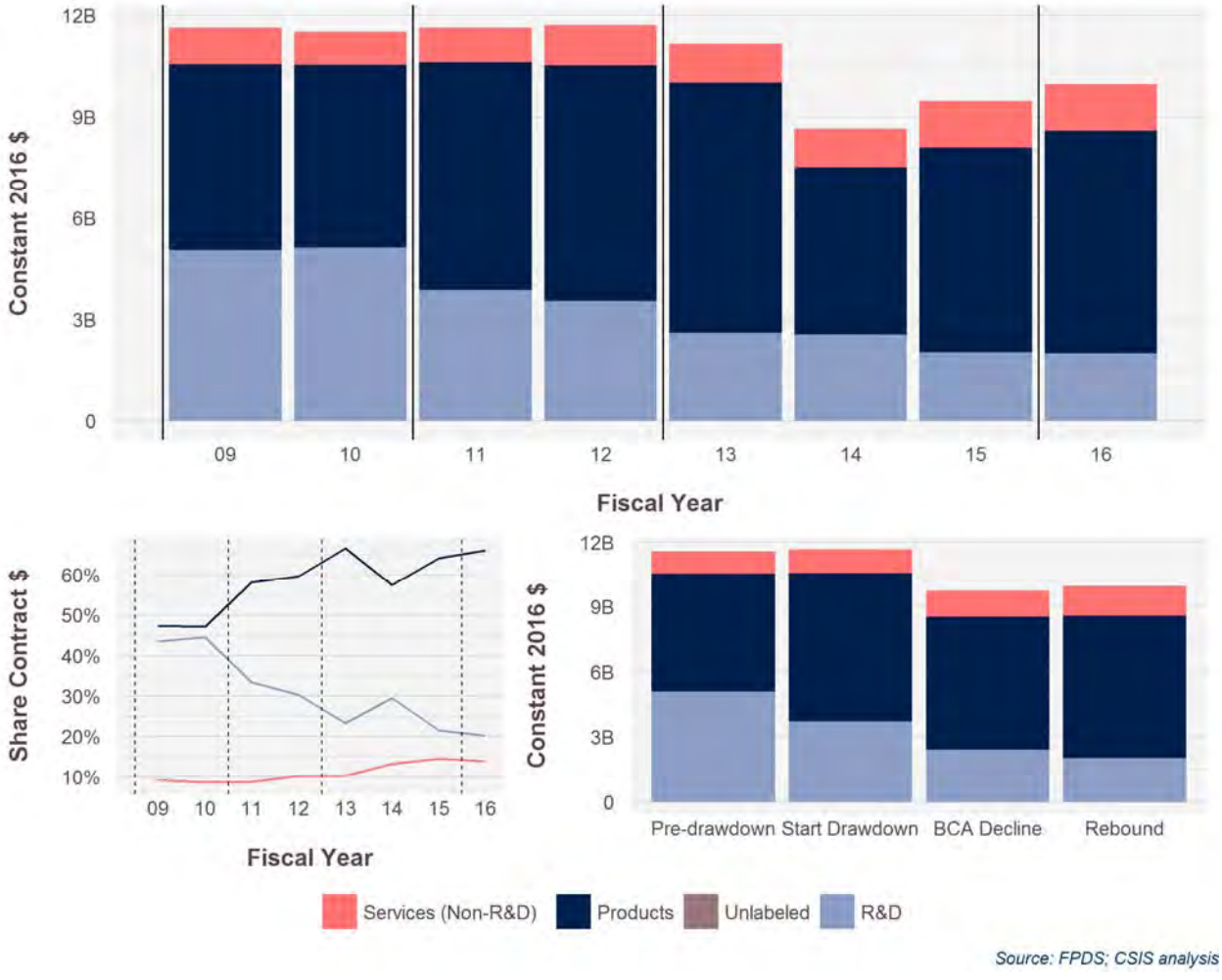
Source: FPDS; CSIS analysis

Chapter 10 | Air and Missile Defense

During the BCA decline period (2013–2015), average annual contract obligations in the Air and Missile Defense platform portfolio declined after previously growing at the start of the defense drawdown (2011–2012). Between FY 2013 and FY 2015, average annual Air and Missile Defense contract obligations declined 16 percent compared to the start of the defense drawdown period. The 35 percent decline in average annual Air and Missile Defense R&D contract obligations was the largest driver of the overall decline. Average annual contract obligations for Air and Missile Defense products (-10 percent) declined slower than the overall rate of decline, while services contract obligations within the portfolio grew 10 percent.

Figure 10-1 shows Air and Missile Defense contract obligations by area from 2009 to 2016.

Figure 10-1: Air and Missile Defense Contract Obligations by Area, 2009–2016



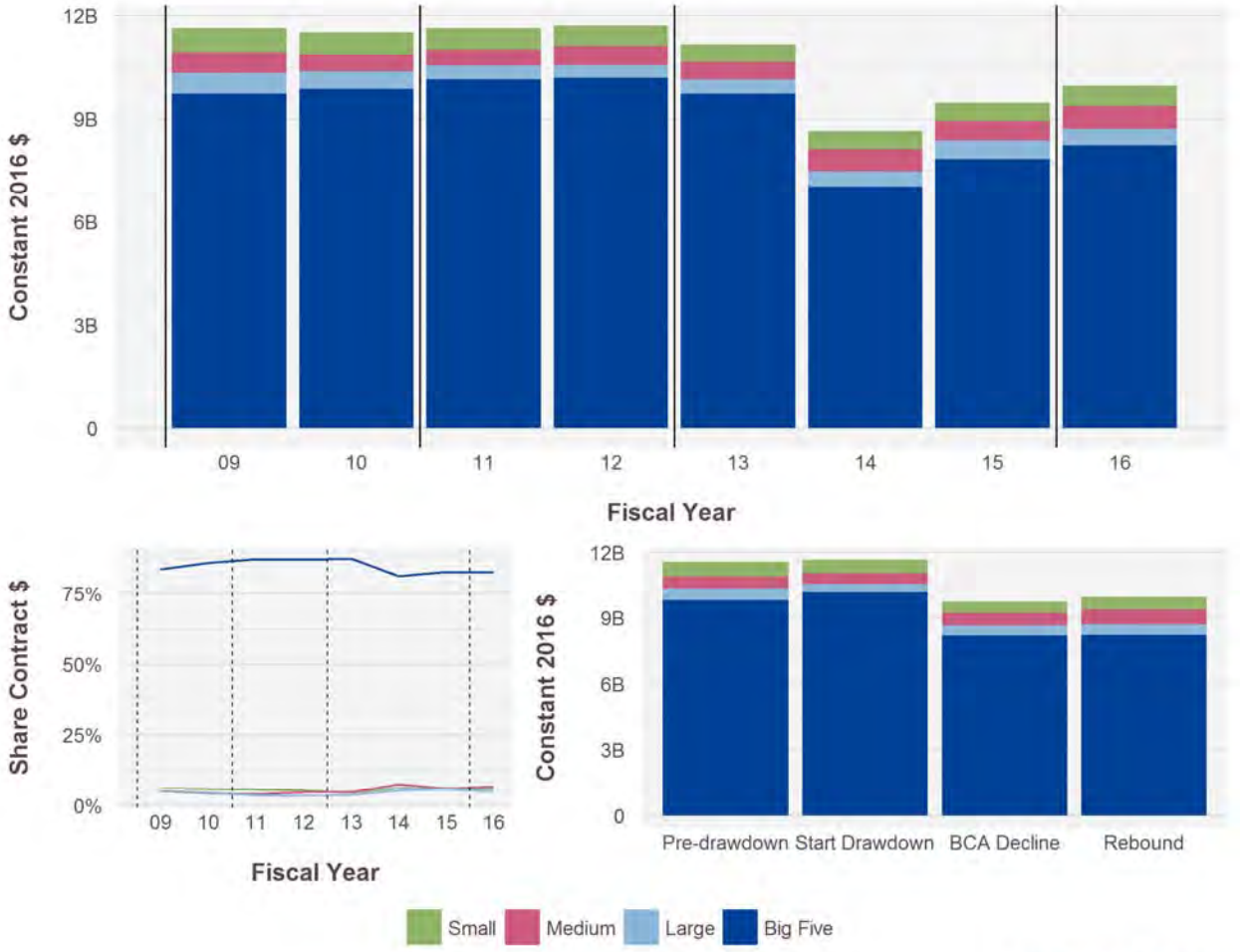
Source: FPDS; CSIS analysis

AIR and MISSILE DEFENSE: VENDOR SIZE

Throughout the start of the defense drawdown and BCA decline period periods, there were minimal changes in the composition of the Air and Missile Defense sector by vendor size, with the overwhelming majority of contract obligations going to the Big 5 vendors. Before the drawdown, 85 percent of average annual contract obligations went to the Big 5. At the start of the drawdown, the share of average annual period contract obligations increased slightly to 87 percent, before decreasing to 84 percent during the BCA decline period.

Figure 10-2 shows the composition of and contract obligations in the Air and Missile Defense platform portfolio from FY 2009 to FY 2016.

Figure 10-2: Air and Missile Defense Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

AIR and MISSILE DEFENSE: AREA BY SIZE OF VENDOR

In Air and Missile Defense products, the notable trends are the continued growth in average annual contract obligations for Medium and Small vendors during the BCA decline period. At the start of the drawdown, vendors of all sizes were on a growth trajectory, but this was followed by a 10 percent decline in overall Air and Missile Defense products during the BCA

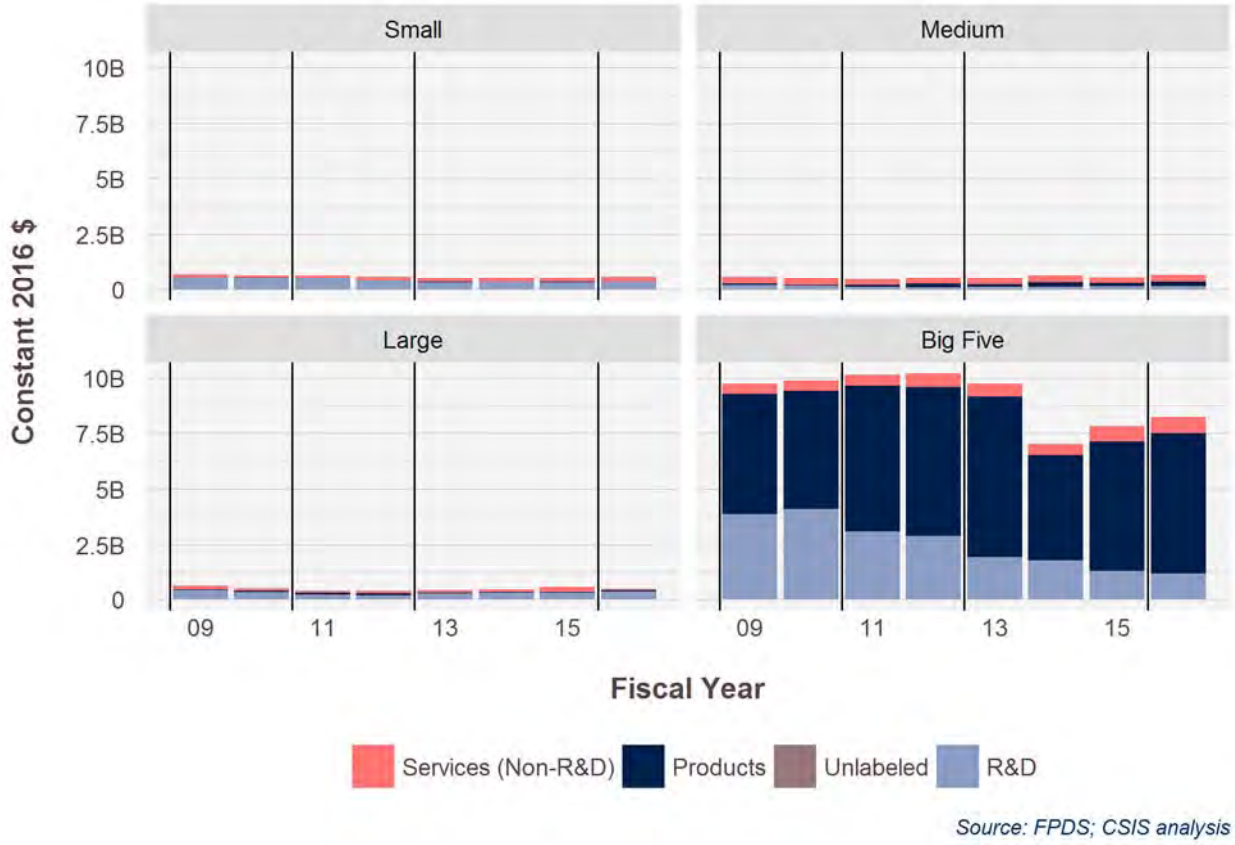
decline period. Large vendors went from experiencing 77 percent growth in average annual contract obligations at the start of the drawdown period to declining 63 percent during the BCA decline period. Though the overall market declined 10 percent, Small and Medium vendors continued to grow in this era. Medium vendors' average annual contract obligations increased from $0.04 billion pre-drawdown to $0.12 billion at the start of the drawdown (199 percent growth) and then grew an additional 30 percent to $0.19 billion in the BCA decline period. Comparatively, Small vendors experienced continuous steady growth, increasing 13 percent at the start of the drawdown and 12 percent during the BCA decline period.

In Air and Missile Defense R&D, the notable trend was Large and Medium vendors' average contract obligations increasing during the BCA decline period after previously declining. Comparing the start of the drawdown to the pre-drawdown period, vendors of all sizes declined anywhere from 22 percent (Small vendors) to 48 percent (Large vendors), leading to a 27 percent overall decline in Air and Missile Defense R&D contract obligations. In the BCA decline period, the Big 5 and Small vendors continued to decline, but Large and Medium vendors increased compared to the previous period. Average annual contract obligations for Large vendors rose from $0.2 billion to $0.3 billion, a 52 percent increase, and Medium vendors rose from $0.10 billion to $0.11 billion, a 13 percent increase. In the FY 2016 rebound, Large and Medium vendors continued to increase, reaching near pre-drawdown levels, even as the overall Air and Missile Defense R&D sector continued to fall by 16 percent. Additionally, in FY 2016 Small vendors increased by 7 percent, but Big 5 still fell an additional 30 percent.

Average annual Air and Missile Defense services contract obligations gradually rose over the entire drawdown, increasing 7 percent during the start of the drawdown period and then 10 percent during the BCA decline period. The Big 5 (19 percent; 7 percent) and Small vendors (45 percent; 6 percent) experienced continuous growth throughout all periods, but saw their rate of growth slow down significantly during the BCA decline period. Large and Medium vendors were on a downward trajectory at the start of the drawdown, declining 18 percent and 14 percent respectively, before increasing to levels near or just above pre-drawdown budget levels during the BCA decline period. Large vendors annual average contract obligations rose from $0.11 billion to $0.14 billion, a 25 percent increase, and Medium vendors increased to $0.30 from $0.27 billion, a 13 percent increase.

Figure 10-3 shows Air and Missile Defense contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 10-3: Air and Missile Defense Contract Obligations by Area by Size of Vendor, 2009–2016



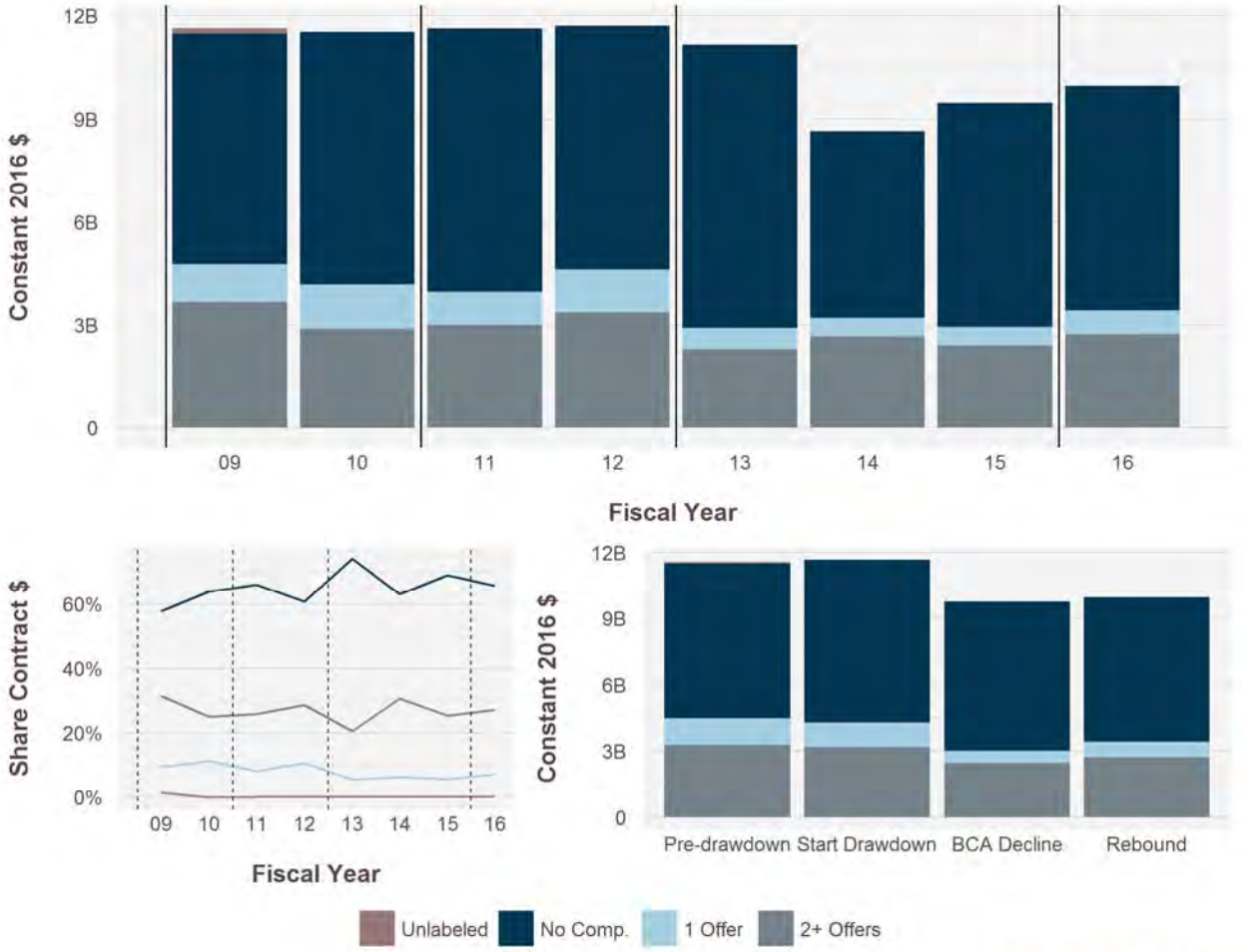
Source: FPDS; CSIS analysis

AIR and MISSILE DEFENSE: COMPETITION

Over the course of the study period, the rate of effective competition across the Air and Missile Defense sector experienced continuous, gradual decline. Pre-drawdown, 28 percent of Air and Missile Defense average annual period contract obligations were awarded after effective competition. The level of effective competition for the Air and Missile Defense sector declined to 27 percent at the start of the drawdown period. During the BCA decline period, the level of effective competition further declined to 25 percent of average annual period contract obligations. Over the course of the study period, the share of contract obligations awarded without effective competition rose because of both an increase in the sum of contract obligations awarded without competition and a decrease in the sum of contract obligations awarded after receiving only one offer.

Figure 10-4 shows Air and Missile Defense contract obligations by level of competition from FY 2009 to FY 2016.

Figure 10-4: Level of Competition for Air and Missile Defense Contract Obligations, 2009–2016



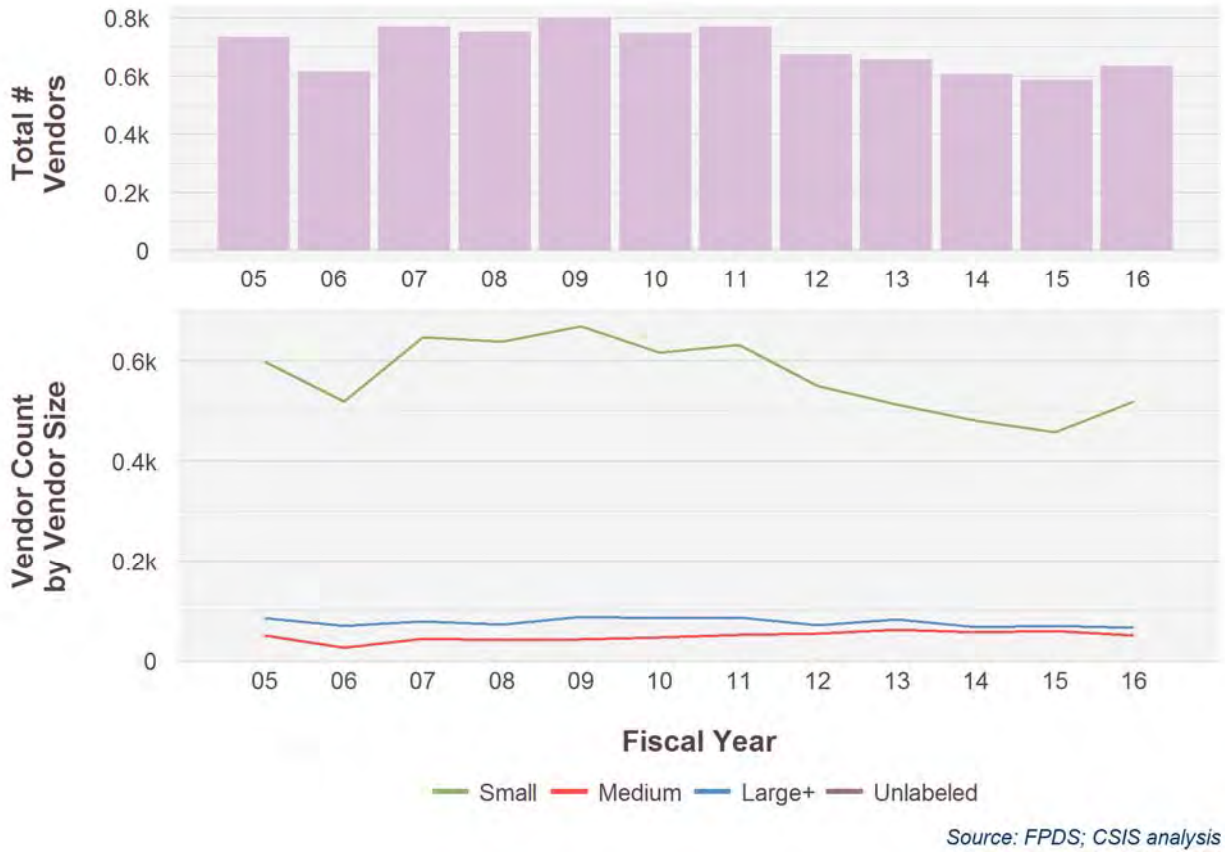
Source: FPDS; CSIS analysis

AIR and MISSILE DEFENSE: VENDOR COUNT

During the entire drawdown period (2011–2015), the number of prime vendors in the Air and Missile Defense sector declined after previously growing. Prior to the drawdown, the average number of vendors from FY 2009 to FY 2010 increased by 8 percent compared to the average of the FY 2005-to-FY 2008 period. At the start of the drawdown, the number of vendors fell by 7 percent from the new pre-drawdown level. During the BCA decline period, the number of vendors in this sector fell even more sharply, declining 15 percent.

Figure 10-5 shows the number of vendors in the Air and Missile Defense sector from FY 2005 to FY 2016.

Figure 10-5: Air and Missile Defense Vendor Count by Size of Vendor, 2005–2016



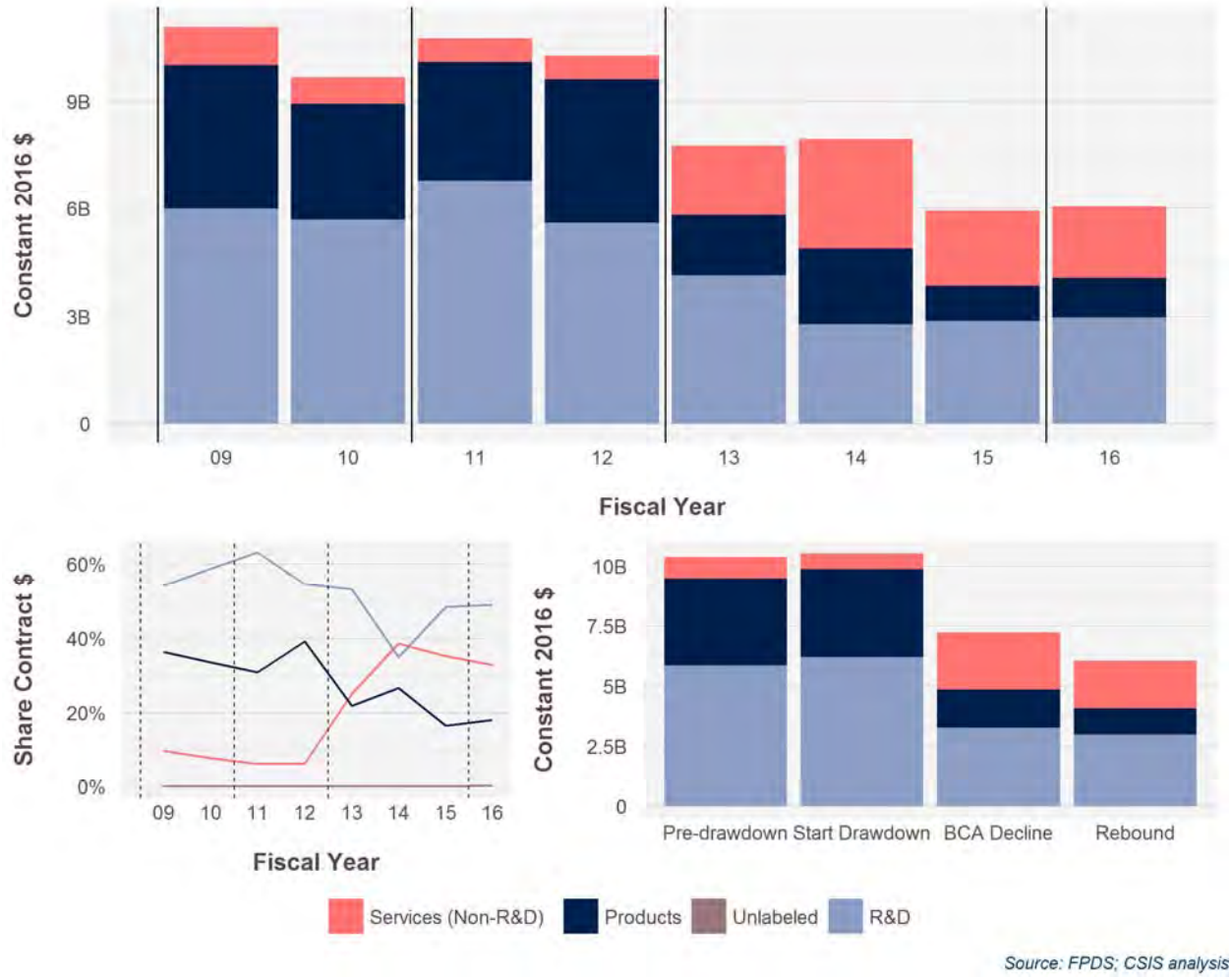
Source: FPDS; CSIS analysis

Chapter 11 | Space Systems

As shown in Figure 11-1, in the start of the defense drawdown period (2011–2012), Space Systems average annual contract obligations increased 1 percent from the pre-drawdown period (2009–2010). During the BCA decline period (2013–2015), Space Systems experienced the second-largest overall obligations decline in average annual contract obligations, declining 31 percent from the start of the defense drawdown. The 32 percent decline in the Space Systems portfolio was driven by large declines in average annual contract obligations for products (-56 percent) and R&D (-47 percent). During that same period, average annual contract obligations for services grew 258 percent. However, the large growth in services, and some of the decline in products, can be attributed by a FY 2013 decision to relabel Evolved Expendable Launch Vehicle (EELV) from products to services.[46]

[46] David J. Berteau, Jesse Ellman, Gregory Sanders, and Rhys McCormick, *U.S. Department of Defense Contract Spending and the Industrial Base*, 2000–2013 (Washington, DC: CSIS, 2014), 9, https://csis-prod.s3.amazonaws.com/s3fs-public/legacy_files/files/publication/140929_Ellman_DefenseContractSpending2013_Web.pdf.

Figure 11-1: Space Systems Contract Obligations by Area, 2009–2016



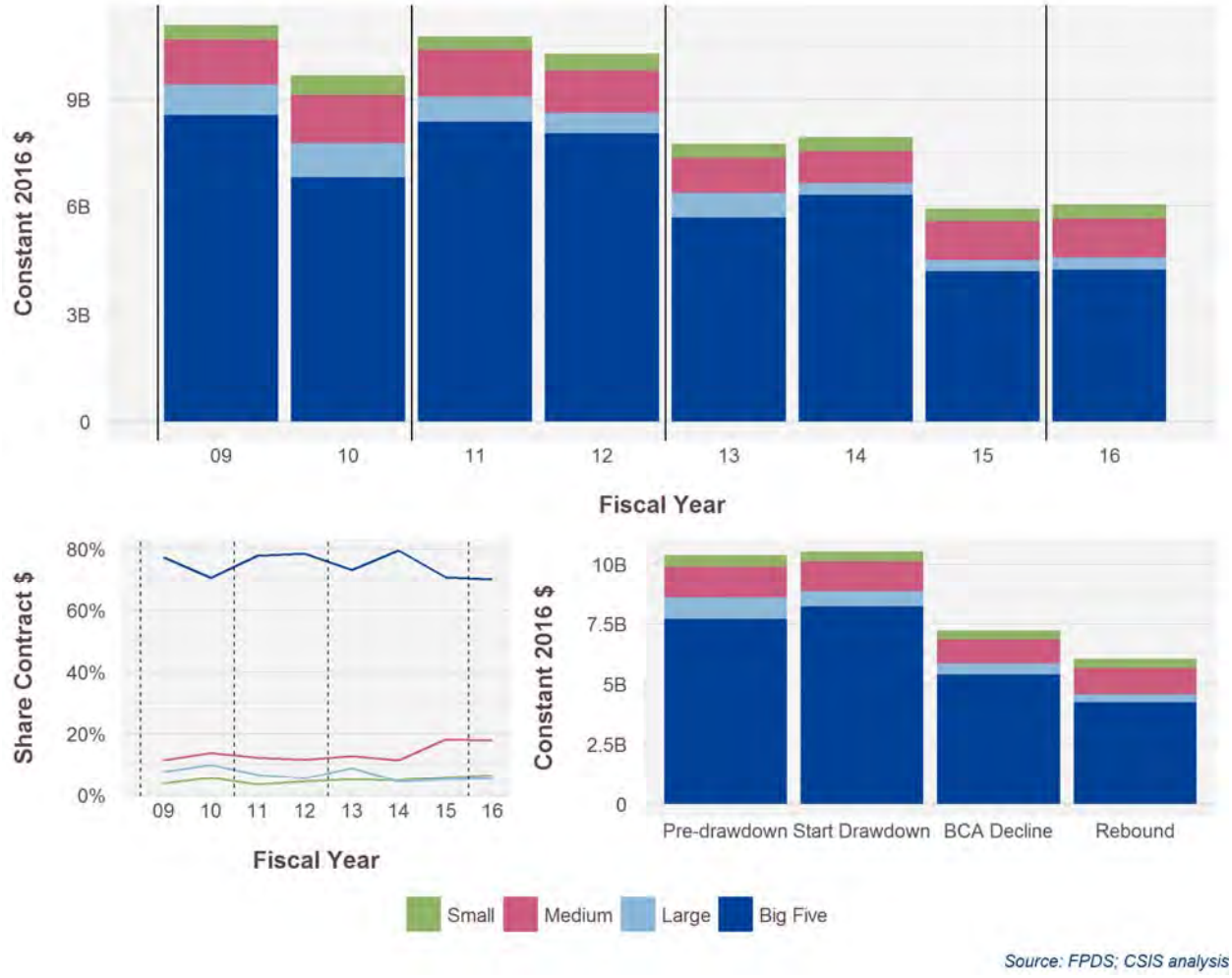
Source: FPDS; CSIS analysis

SPACE SYSTEMS: VENDOR SIZE

Throughout the entire study period, the Big 5 received the predominant share of Space Systems contract obligations. Pre-drawdown, 74 percent of Space Systems contract obligations went to the Big 5. During the start of the drawdown period, the Big 5's share of contract obligations rose to 70 percent as Big 5 total average annual contract obligations increased by 7 percent when compared to the previous period. The Big 5's market share decreased slightly during the BCA decline period, but still totaled 75 percent of total Space Systems contract obligations.

Figure 11-2 shows the composition of and contract obligations in the Space Systems platform portfolio from FY 2009 to FY 2016.

Figure 11-2: Space Systems Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

SPACE SYSTEMS: AREA BY SIZE OF VENDOR

The recategorization of EELV as a service in FY 2013 skews the Space Systems topline products trends, as EELV averaged a little over $2 billion in average annual products contract obligations at the start of the drawdown. Even after the reclassification of EELV, the Big 5 continued to account for the majority, around 65 percent, of Space Systems products contract obligations during the BCA decline period. Of note, Space Systems products were among the largest percentage declines among products for all platforms, even after accounting for the EELV recategorization. This decline negatively impacted vendors of all sizes, except for Small vendors, which saw an increase in contract obligations but still account for less than 1 percent of total Space Systems products contract obligations.

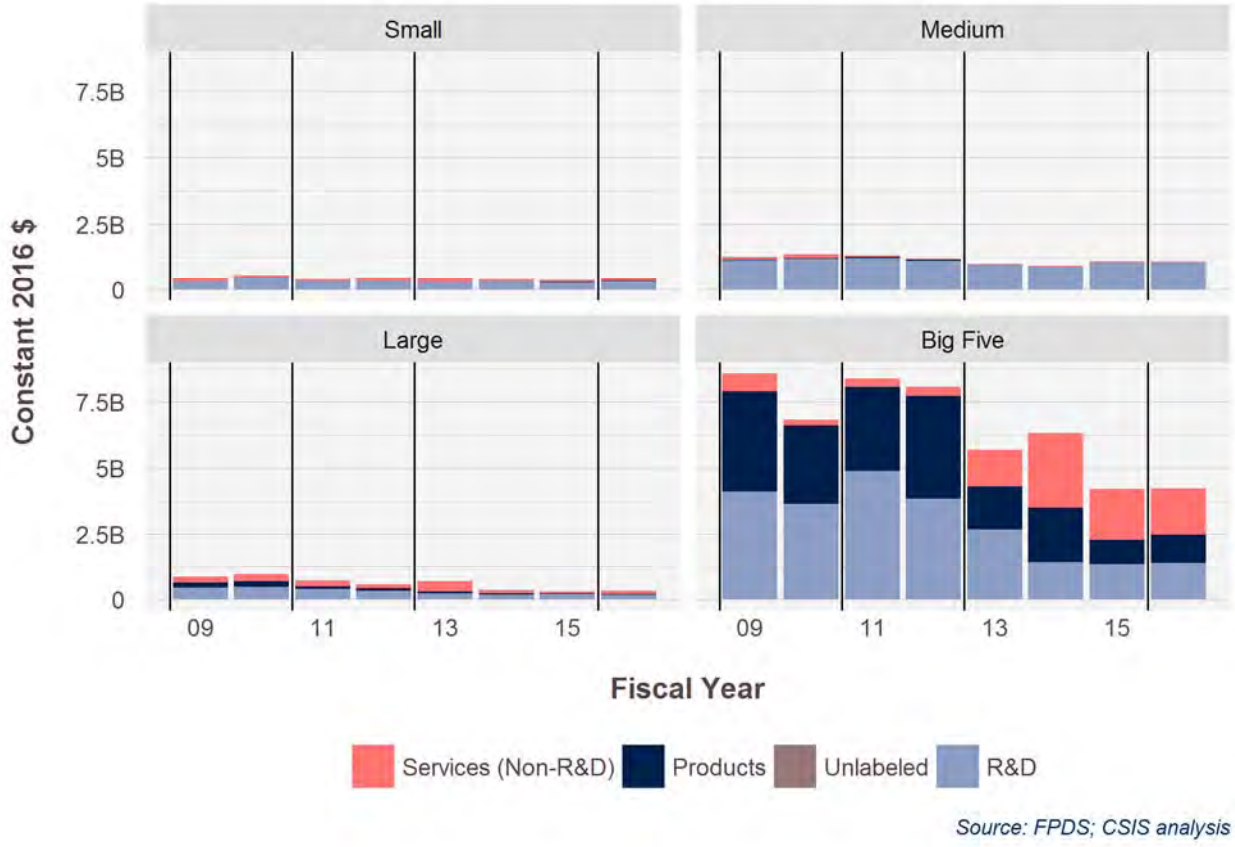
In Space Systems R&D, the defining impact of sequestration and the defense drawdown is the declining in market share for the Big 5 vendors in favor of Small and Medium vendors. At the start of the drawdown, Big 5 vendors received 70 percent of annual average Space Systems R&D contract obligations, compared to 19 percent for Medium vendors and 5 percent for Small vendors. By the BCA decline period, the Big 5 fell to 56 percent, with Medium and Small vendors rising to 29 percent and 9 percent respectively. By FY 2016, the

Big 5 no longer received most of the Space Systems R&D contract obligations, falling to 48 percent, compared to 36 percent for Medium vendors and 11 percent for Small vendors.

Similar to the impact on Space Systems products, the recategorization of EELV contracts to services also complicates the Space Systems services trends. Removing EELV contract obligations, average annual Big 5 Space Systems services contract obligations increased 13 percent during the BCA decline period from their numbers at the start of the drawdown. In the BCA decline period, Small vendors also saw a 13 percent increase in average annual Space Systems services contract obligations, whereas Large vendors declined 4 percent, and Medium vendors declined 60 percent.

Figure 11-3 shows Space Systems contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 11-3: Space Systems Contract Obligations by Area by Size of Vendor, 2009–2016



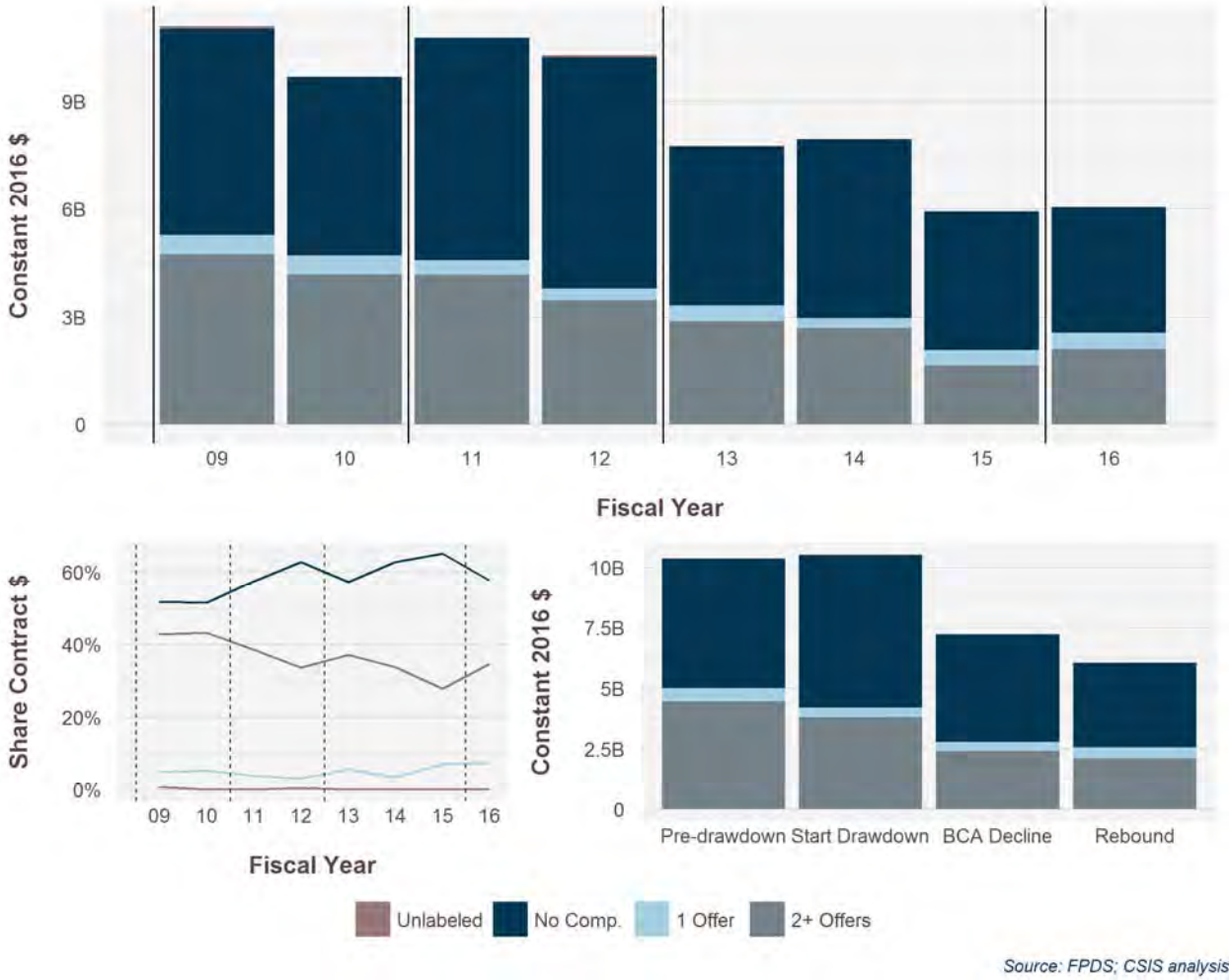
Source: FPDS; CSIS analysis

SPACE SYSTEMS DoD: COMPETITION

Figure 11-4 shows that throughout the study period, the share of Space System contract obligations awarded without effective competition gradually increased. Pre-drawdown (2009–2010), 57 percent of Space System contract obligations were awarded without effective competition. At the start of the drawdown, that share of Space Systems contract obligations grew from 57 percent to 64 percent. The 7 percent increase in the share of contract obligations awarded without effective competition was the result of increasing the

amount of contracting obligations that were awarded without competition and decreasing the amount of contract obligations that were awarded after effective competition. Compared to the pre-drawdown period, annual average Space System contract obligations without competition during the start of the drawdown rose from $5.4 billion to $6.3 billion, an 18 percent increase. At the start of the drawdown period, average annual Space System contract obligations awarded after effective competition fell from $4.5 billion to $3.8 billion, a 14 percent decrease.

Figure 11-4: Level of Competition for Space Systems Contract Obligations, 2009–2016



Source: FPDS; CSIS analysis

During the BCA decline period, the aforementioned topline competition trends continued with the share of average annual Space System contract obligations awarded without effective competition rising further to 67 percent, and the share of annual average Space System contract obligations awarded following effective competition falling to 33 percent.

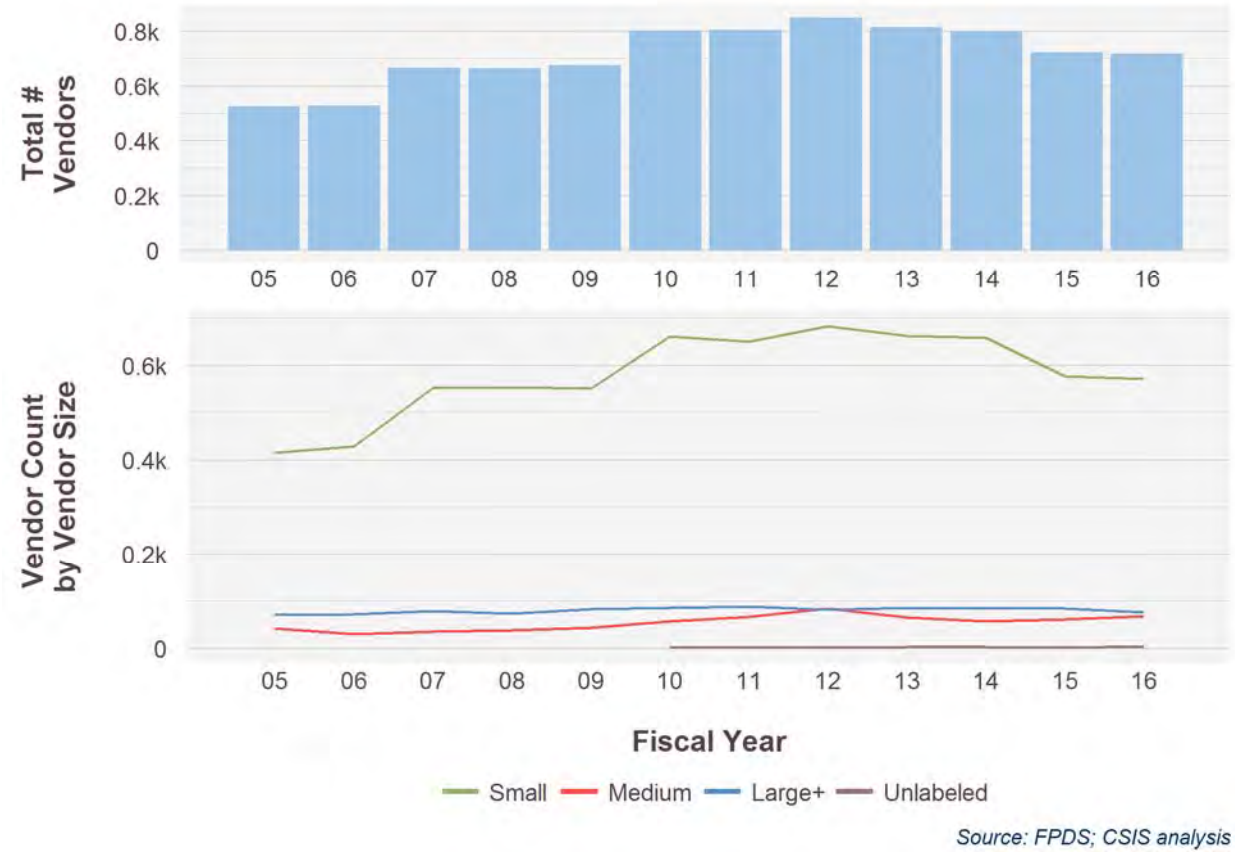
SPACE SYSTEMS: VENDOR COUNT

Up until the BCA decline period, the number of Space Systems vendors had been continuously growing. Just prior to the start of the drawdown, the average number of vendors in the Space Systems sector had increased by 40 percent since FY 2005, rising from

approximately 525 vendors in FY 2005 to approximately 750 in the pre-drawdown period. During the start of the drawdown period, the average number of vendors in the Space Systems increased 12 percent from the pre-drawdown period level, as period average annual contract obligations increased by 1 percent. Under the BCA decline period, this trend reversed, with the average number of vendors declining 6 percent as period average annual contract obligations fell 32 percent.

Figure 11-5 shows the number of vendors in the Space Systems sector by size of vendor from FY 2005 to FY 2016.

Figure 11-5: Space Systems Vendor Count by Size of Vendor, 2005–2016



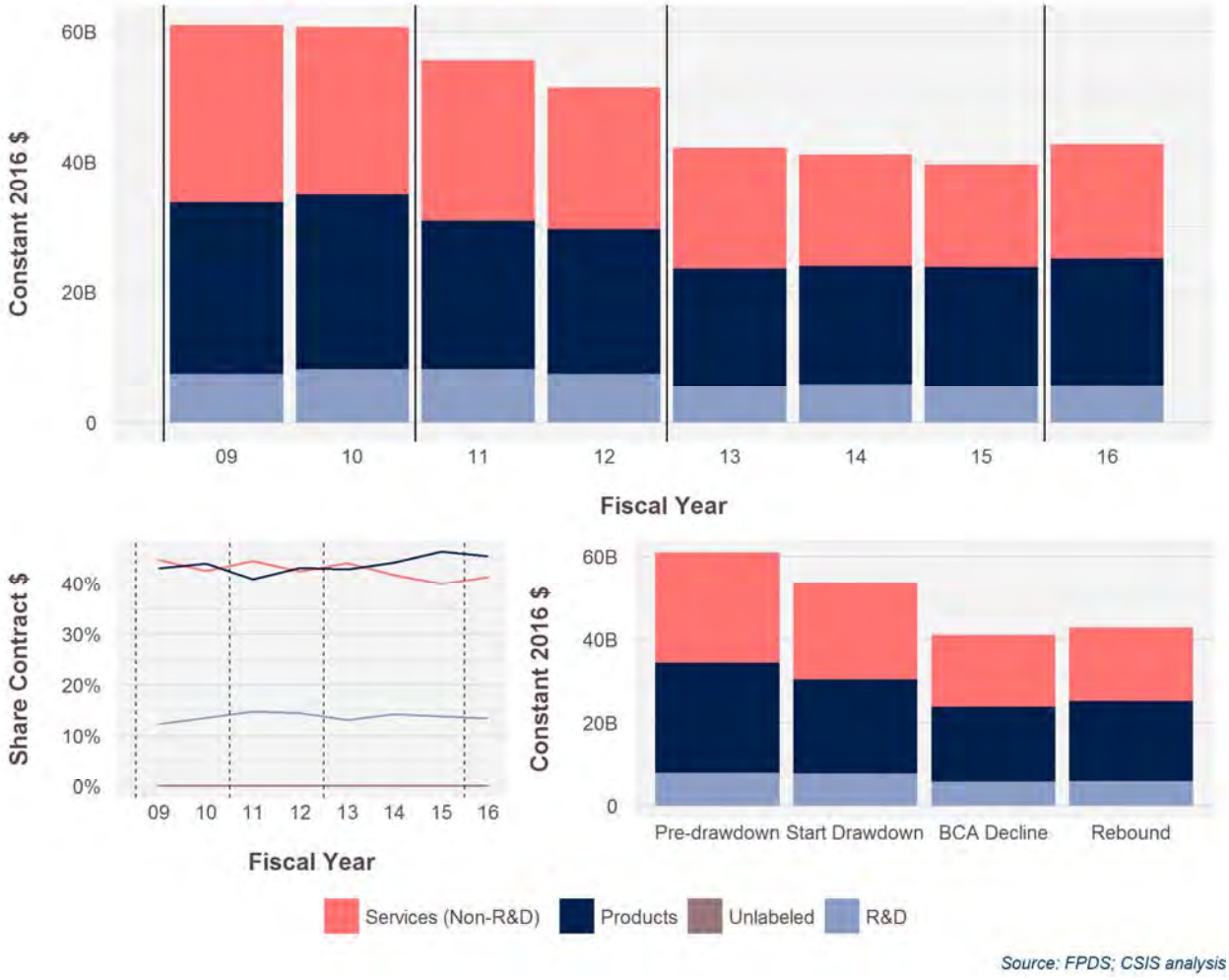
Source: FPDS; CSIS analysis

Chapter 12 | Electronics, Comms, & Sensors

The market shock of sequestration and budget caps imposed during the BCA decline period (2013–2015) only accelerated the rate of decline in the Electronics, Comms, & Sensors (EC&S) platform, which had been ongoing since the start of the defense drawdown period (2011–2012). During the start of the drawdown period, annual average EC&S contract obligations declined 12 percent compared to the pre-drawdown period (2009–2010). During the BCA decline period, average annual EC&S contract obligations declined by 23 percent compared to the previous period. Notably, EC&S declines were more evenly distributed among products, services, and R&D than other platform portfolios. Average annual EC&S R&D contract obligations (-28 percent) and services (-26 percent) declined at rates slightly above the overall rate of decline, while products (-19 percent) declined at a rate slightly below the overall rate of decline.

Figure 12-1 shows EC&S contract obligations by area from FY 2009 to FY 2016.

Figure 12-1: EC&S Contract Obligations by Area, 2009–2016



Source: FPDS; CSIS analysis

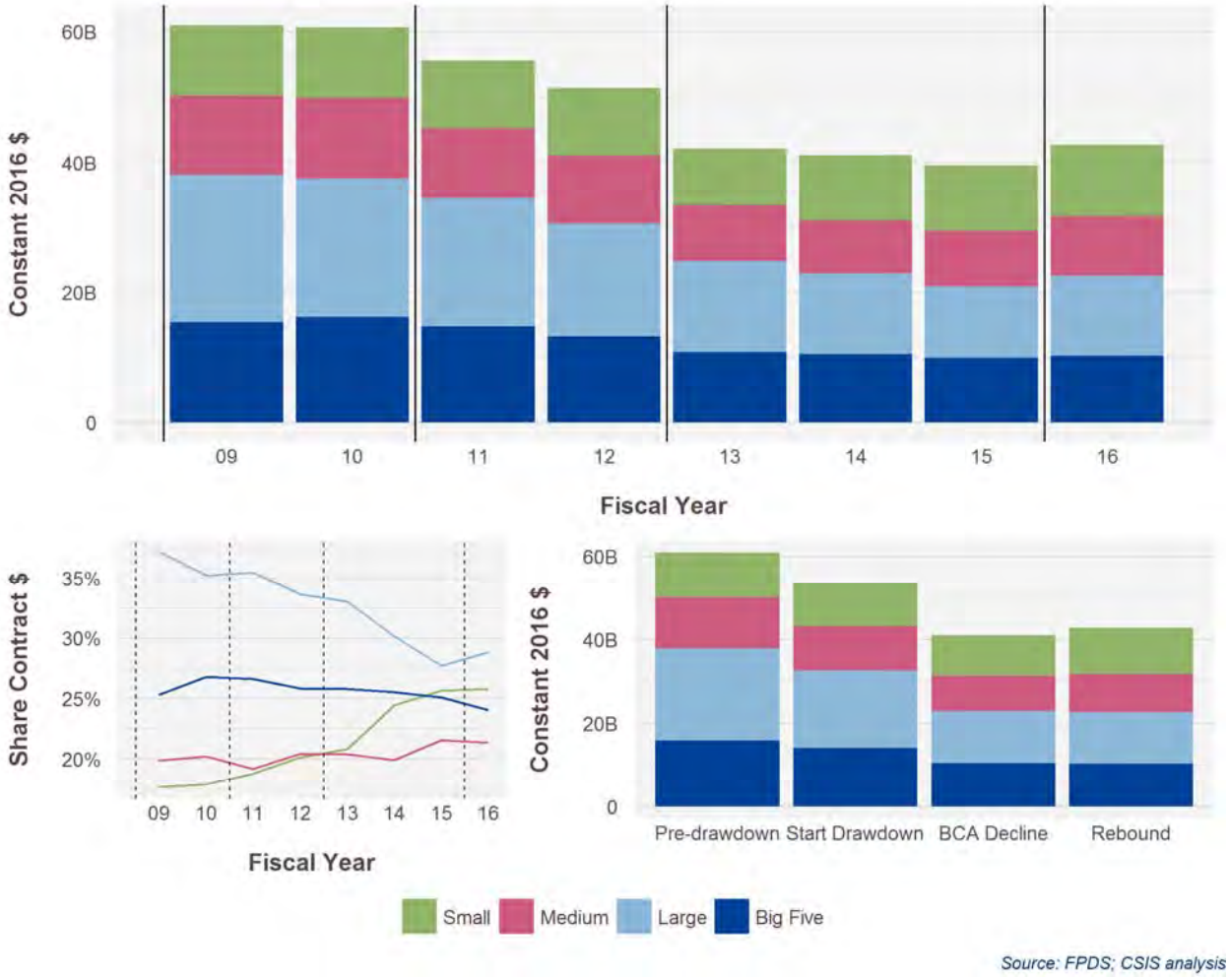
ELECTRONICS, COMMS, & SENSORS: VENDOR SIZE

At the start of the recent drawdown, there were minimal changes in the composition of the EC&S industrial base by vendor size, but that changed during the BCA decline period. During the start of the drawdown period, the share of annual average contract obligations by vendor size remained relatively steady, with Small vendors gaining 1 percent market share at the expense of Large vendors, even as average annual EC&S contract obligations declined 12 percent.

The 24 percent decline in average annual EC&S contract obligations during the BCA decline period brought about greater changes in market share to the benefit of Small vendors and to the detriment of Large vendors. During this period, Small vendors accounted for 24 percent of EC&S contract obligations, compared to 19 percent in the previous period. The share of EC&S contract obligations that was awarded to Large vendors fell from 35 percent in the previous period to 30 percent in this period. The swing in market share for Large and Small vendors is the result of Large annual average contract obligations (-33 percent) declining at a rate greater than the overall rate of decline (-23 percent), while Small vendors fell at a rate (-7

percent) well below the overall rate of decline. Figure 12-2 shows the composition of the EC&S industrial base by size of vendor portfolio from FY 2009 to FY 2016.

Figure 12-2: EC&S Contract Obligations by Size of Vendor, 2009–2016

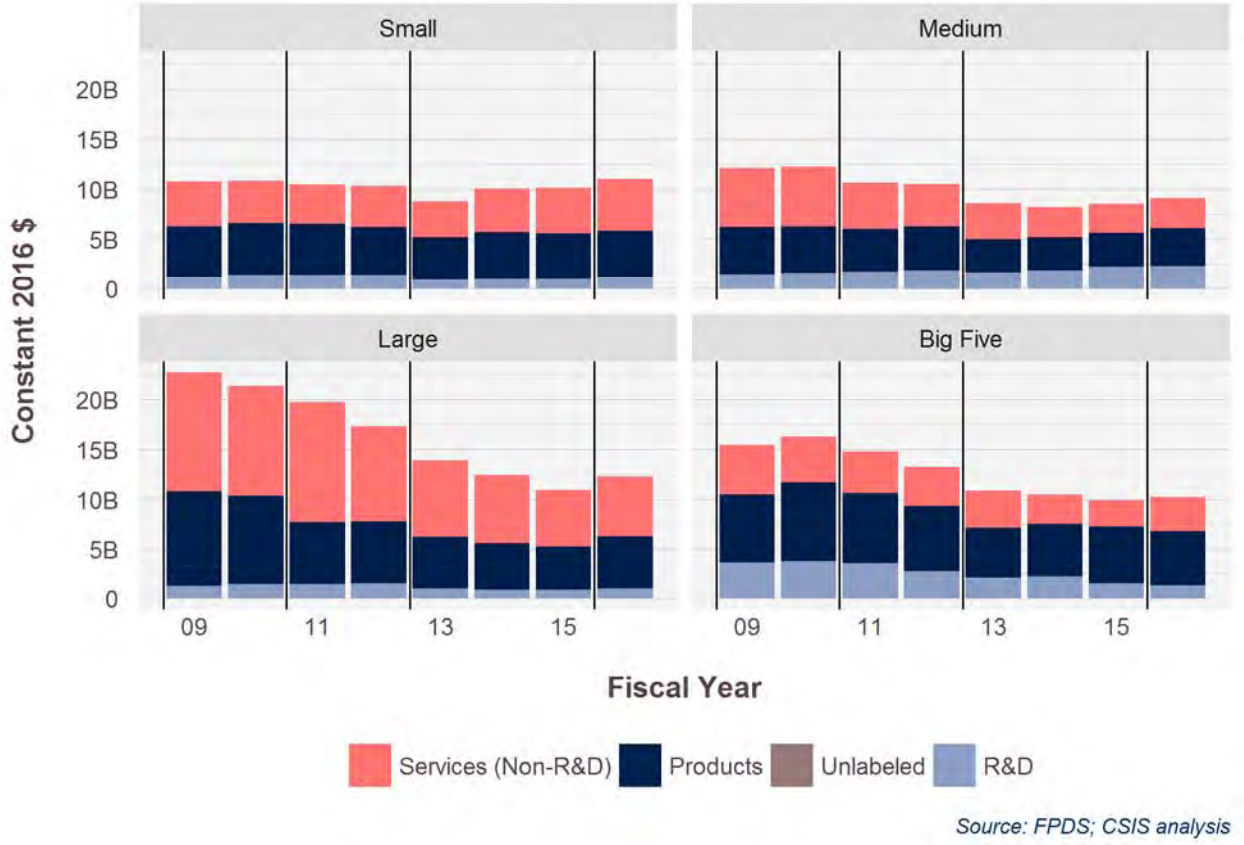


Source: FPDS; CSIS analysis

ELECTRONICS, COMMS, & SENSORS: AREA BY SIZE OF VENDOR

In EC&S products, the notable trend is Small vendors falling at a rate slower than the overall rate of decline throughout the entirety of the drawdown. At the start of the drawdown, EC&S average contract obligations for Small vendors fell only 3 percent, while the overall EC&S contract obligations declined 15 percent. Similarly, during the BCA decline period, even as the overall EC&S sector declined 19 percent, Small vendors only declined 9 percent. Figure 12-3 shows EC&S contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 12-3: EC&S Contract Obligations by Area by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

In EC&S R&D, there were three distinct trends: The Big 5 continuously declining; Large and Small vendors significantly declining during the BCA decline period after previously growing; and Medium vendors seeing continuous growth. Annual average EC&S Big 5 R&D contract obligations declined 16 percent at the start of the drawdown and an additional 39 percent during the BCA decline period. Annual average EC&S R&D contract obligations for Large and Small vendors grew 11 percent and 10 percent respectively at the start the start of the drawdown, before declining 39 percent and 35 percent respectively from FY 2013 to FY 2015. Finally, the average annual EC&S contract obligations going to Medium-sized vendors grew during the start of the drawdown from $1.5 billion to $1.8 billion, an 18 percent increase. Medium vendors continued to grow an additional 5 percent to $1.9 billion in the BCA decline period.

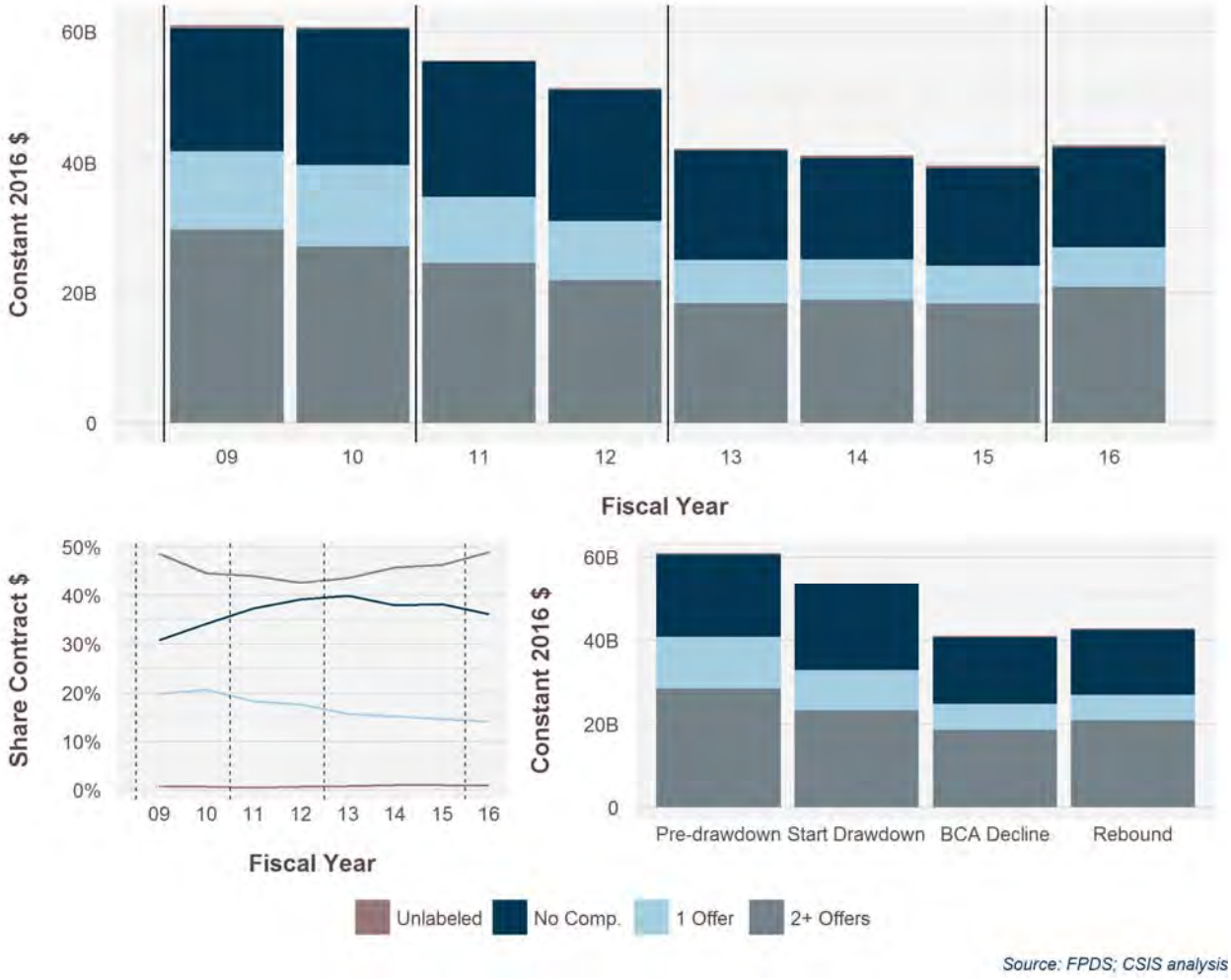
In EC&S services, Small and Large vendors were disproportionately affected by the budgetary caps imposed by the 2011 BCA. Prior to the enactment of the budget caps in the BCA decline period, Large vendors (-6 percent) had been declining at a rate half the overall EC&S services rate of decline (-12 percent). After the enactment of the budget caps in the BCA decline period, the rate of decline for Large vendors' (-38 percent) annual average contract obligations accelerated and exceeded the overall services rate of decline (-26 percent). Small vendors were on a negative growth trajectory at the start of the drawdown (-8 percent) (though slower than the overall rate of decline), but they saw a reversal of fortunes during the BCA decline period. Small vendors' EC&S services annual average contract obligations rose from $4.0 billion to $4.18 billion, a 4 percent increase. This trend continued into FY 2016 as

Small vendors' EC&S services contract obligations grew 24 percent when compared to their annual average contract for the 2013–2015 period, which even exceeded pre-drawdown spending levels.

ELECTRONICS, COMMS, & SENSORS: COMPETITION

Figure 12-4 shows that pre-drawdown, 53 percent of annual average EC&S contract obligations were awarded without effective competition. During the start of the drawdown period, the share of annual average EC&S contract obligations awarded without effective competition increased from 53 percent to 56 percent, which was the result of a 3 percent increase in average annual contract obligations for contracts awarded without competition. Meanwhile, overall EC&S average annual contract obligations fell.

Figure 12-4: Level of Competition for EC&S Contract Obligations, 2009–2016



Source: FPDS; CSIS analysis

However, this trend slightly reversed itself during the BCA decline period, as the share of annual average EC&S contract obligations awarded without effective competition fell from 56 percent to 54 percent. This reversal in trends was driven by the combination of the rate of decline for contract obligations awarded after effective competition (-20 percent) being slower than the overall rate of decline (-23 percent) and the rate of decline for contract

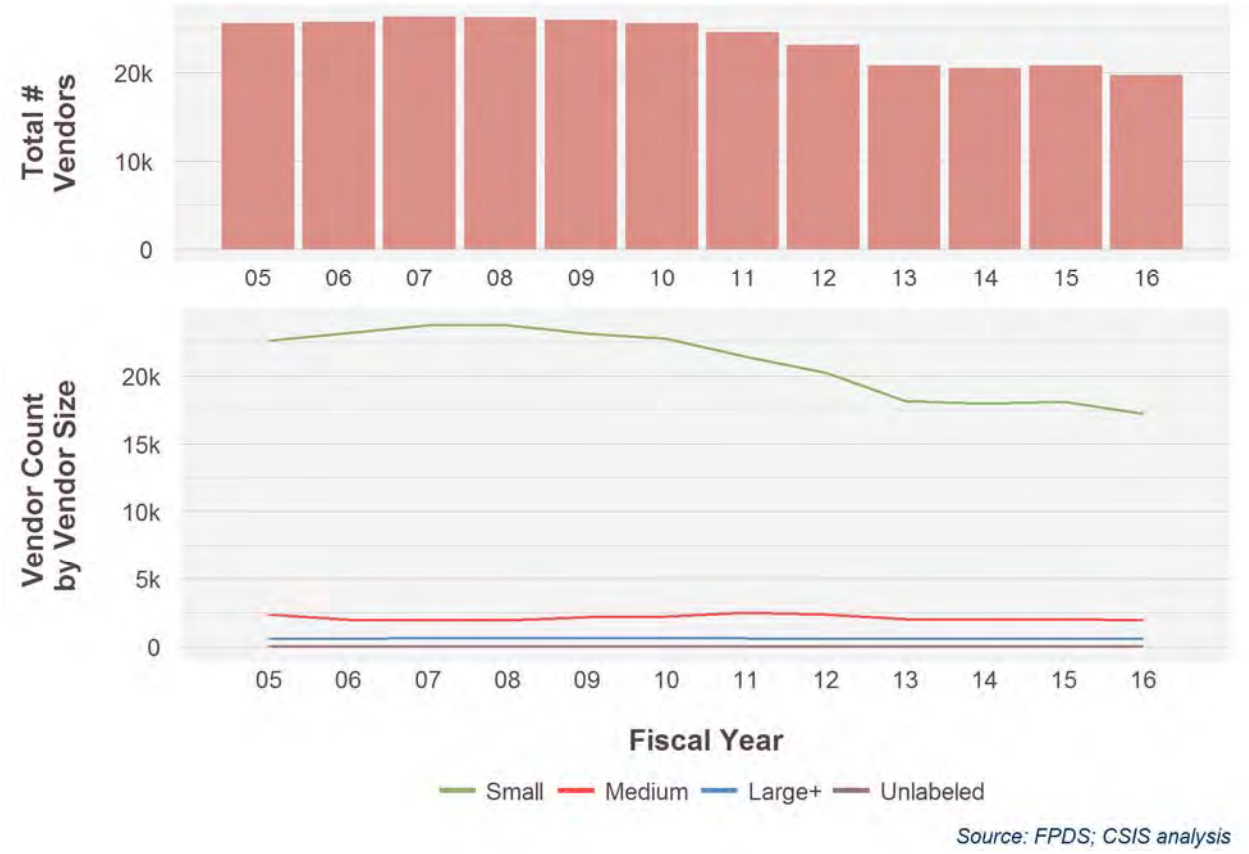
obligations awarded after a single offer (-35 percent) being significantly higher than the overall rate of decline.

ELECTRONICS, COMMS, & SENSORS: VENDOR COUNT

The trend in the declining number of vendors in the EC&S sector accelerated during the BCA decline period. At the start of the drawdown, there were approximately 23,850 vendors, a 7 percent decline from the approximate 25,750 vendors in the pre-drawdown period. During the BCA decline period, the number of vendors fell sharper, declining by 13 percent. The 13 percent overall decline in number of vendors came from vendors of all sizes, but Large vendors saw the smallest declines at just 1 percent. Also of note, Medium vendors grew from 10 to 11 percent from the pre-drawdown to the start of the drawdown period, but declined 17 percent during the BCA decline period, the largest decline of any size of vendor.

Figure 12-5 shows the number of vendors in the EC&S sector by size of vendor from FY 2005 to FY 2016.

Figure 12-5: EC&S Vendor Count by Size of Vendor, 2005–2016



Source: FPDS; CSIS analysis

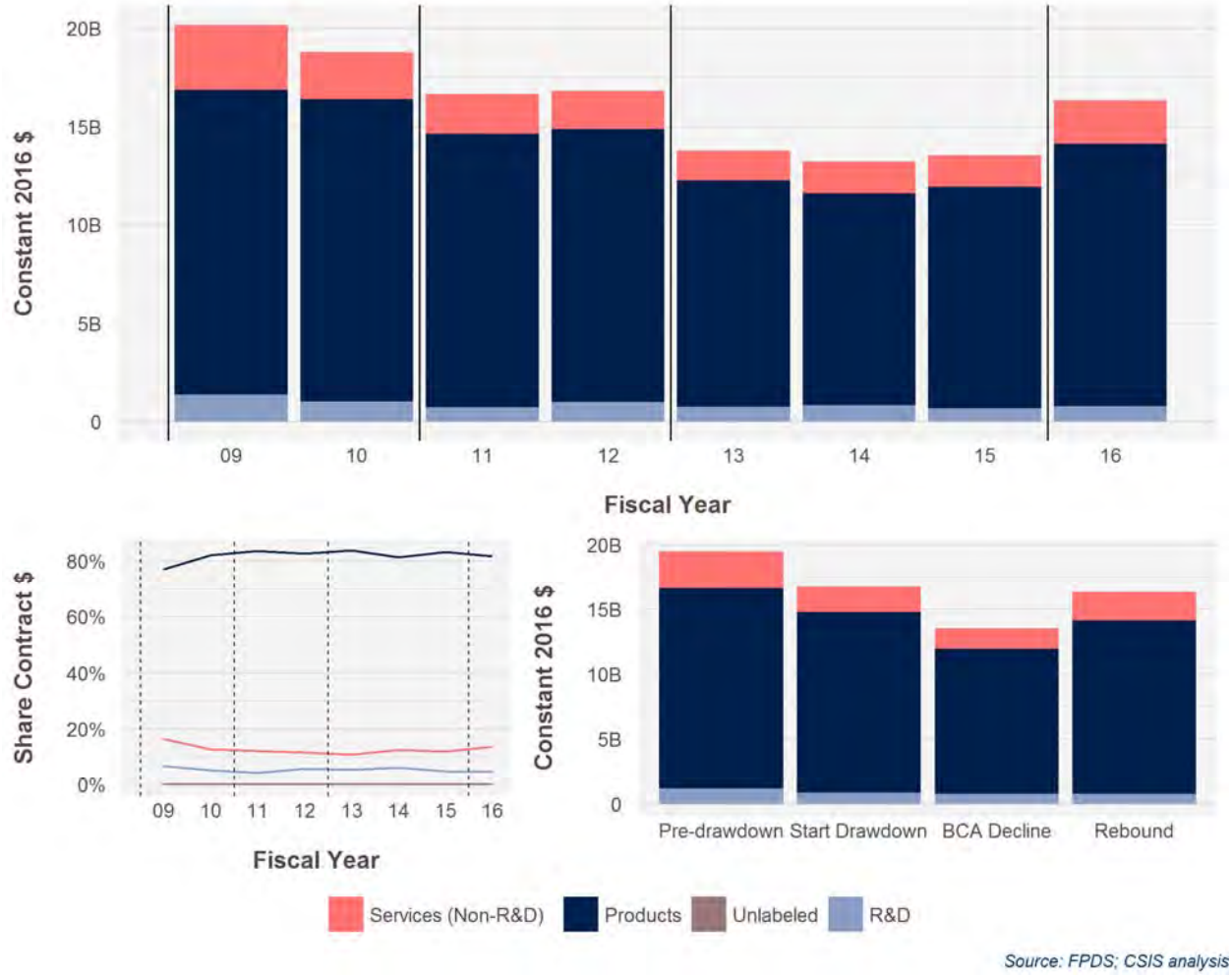
Chapter 13 | Ordnance and Missiles

Throughout the study period, average annual Ordnance and Missiles contract obligations continuously declined in both the start of the drawdown periods from FY 2011 to FY 2012 (-14 percent) and the BCA decline period from FY 2013 to FY 2015 BCA (-19 percent), though the composition of the cuts differed between the two periods. At the start of the drawdown, R&D (-28 percent) and services (-30 percent) bore disproportionately larger cuts than products (-10 percent). During the BCA decline period, the cuts were more evenly distributed among products, services, and R&D. In this period, products and services both declined by 20 percent, while R&D declined slightly slower, falling 12 percent compared to the previous period.

In FY 2016, the Ordnance and Missiles sector experienced a rebound, increasing by 21 percent over its average annual contract obligations during the BCA decline period. Ordnance and Missiles services contract obligations increased the most (41 percent), followed by products (19 percent), with R&D increasing 3 percent.

Figure 13-1 shows Ordnance and Missiles contract obligations by area from FY 2009 to FY2016.

Figure 13-1: Ordnance and Missiles Contract Obligations by Area, 2009–2016



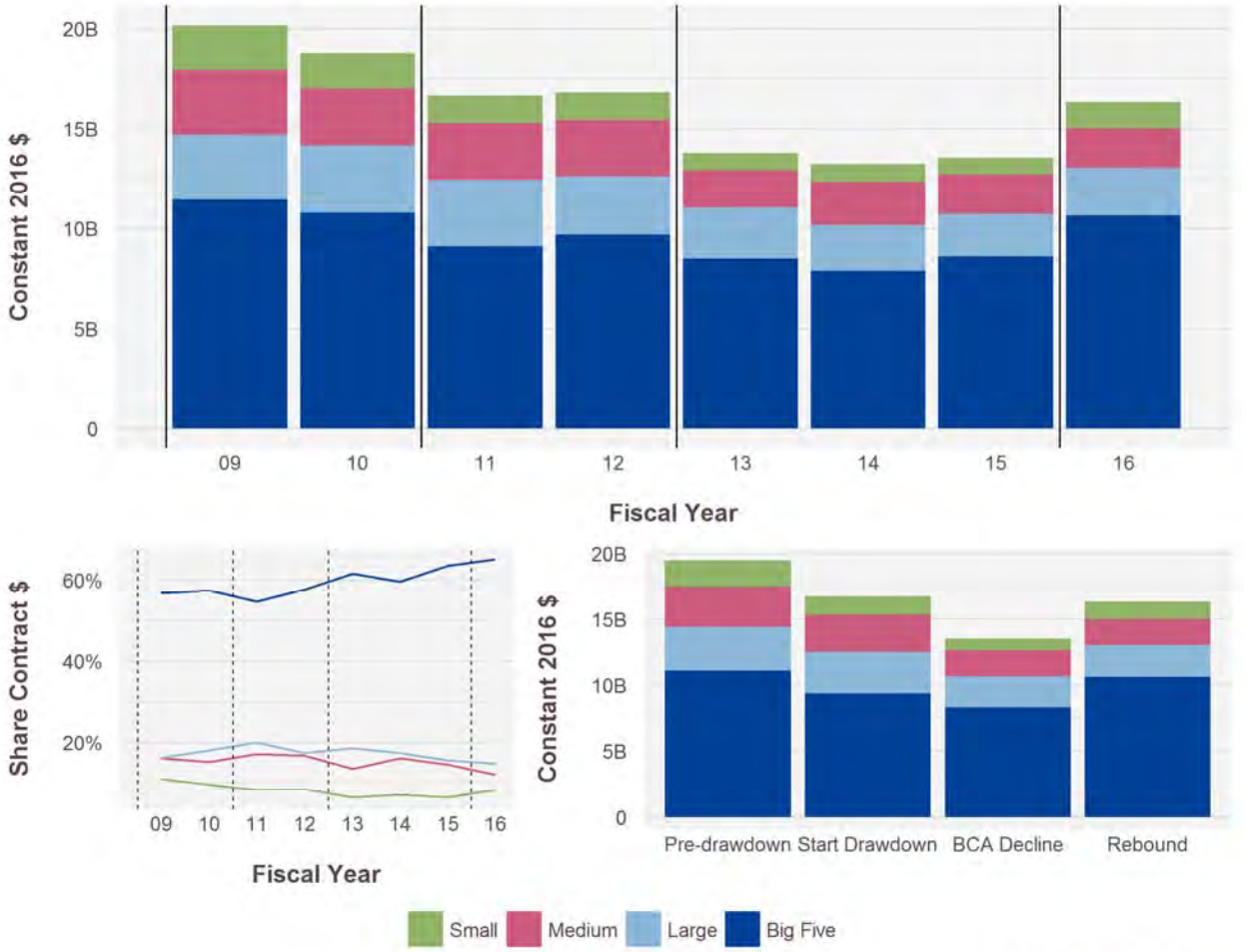
Source: FPDS; CSIS analysis

ORDNANCE AND MISSILES: VENDOR SIZE

The imposition of sequestration and the budget caps imposed by the 2011 BCA had a considerable impact on the composition of the Ordnance and Missiles industrial base. During the start of the drawdown period, Large and Medium-sized vendors were on market share growth trajectories after declining at rates slower than the 14 percent overall rate of decline, falling 6 and 7 percent respectively. Because of these slower rates of decline, the share of contract obligations awarded to Large vendors increased from 17 to 19 percent, while Medium vendors went from 16 to 17 percent. However, after the imposition of sequestration and the budget caps during the BCA decline period, these trends reversed themselves, and Large (-26 percent) and Medium (-30 percent) vendors soon fell at rates well above the overall 19 percent decline. The Big 5, which had fallen at a rate roughly equal to the overall rate of decline in the previous period, declined by 11 percent in this period (a rate slower than the overall rate of decline) and increased their share of Ordnance and Missiles period contract obligations from 56 to 62 percent.

Figure 13-2 shows the composition of the Ordnance and Missiles industrial base by size of vendor from FY 2009 to FY 2016.

Figure 13-2: Ordnance and Missiles Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

Of note, Small vendors saw a gradual decrease in their share of Ordnance and Missiles throughout the entirety of the defense drawdown, going from 10 percent pre-drawdown to 8 percent at the start of the drawdown, before finally dropping down to 7 percent in the BCA decline period.

ORDNANCE AND MISSILES: AREA BY SIZE OF VENDOR

In Ordnance and Missiles products, the Big 5, which received the majority of products contract obligations, fell at a relatively constant rate (9 percent; 10 percent) over the course of the entire defense drawdown. Medium vendors went from a positive spending trajectory at the start of the drawdown (2 percent) to declining at a rate (-31 percent) that was higher than the overall rate of decline (-20 percent). Throughout the defense drawdown, Small vendors fell at rates significantly higher than the overall rate of decline, falling 36 percent at the start of the drawdown and 43 percent during the BCA decline period. Of note, both Big 5 and Small vendors experienced growth in FY 2016. In FY 2016, Big 5 Ordnance and Missiles contract obligations totaled $8.98 billion, a level slightly higher than the pre-drawdown period and a 26 percent increase from average levels during BCA decline period. Small vendors grew 70 percent in FY 2016 from the average of the BCA decline period, but the $1.07 billion awarded to Small vendors in FY 2016 is approximately $300 million less than

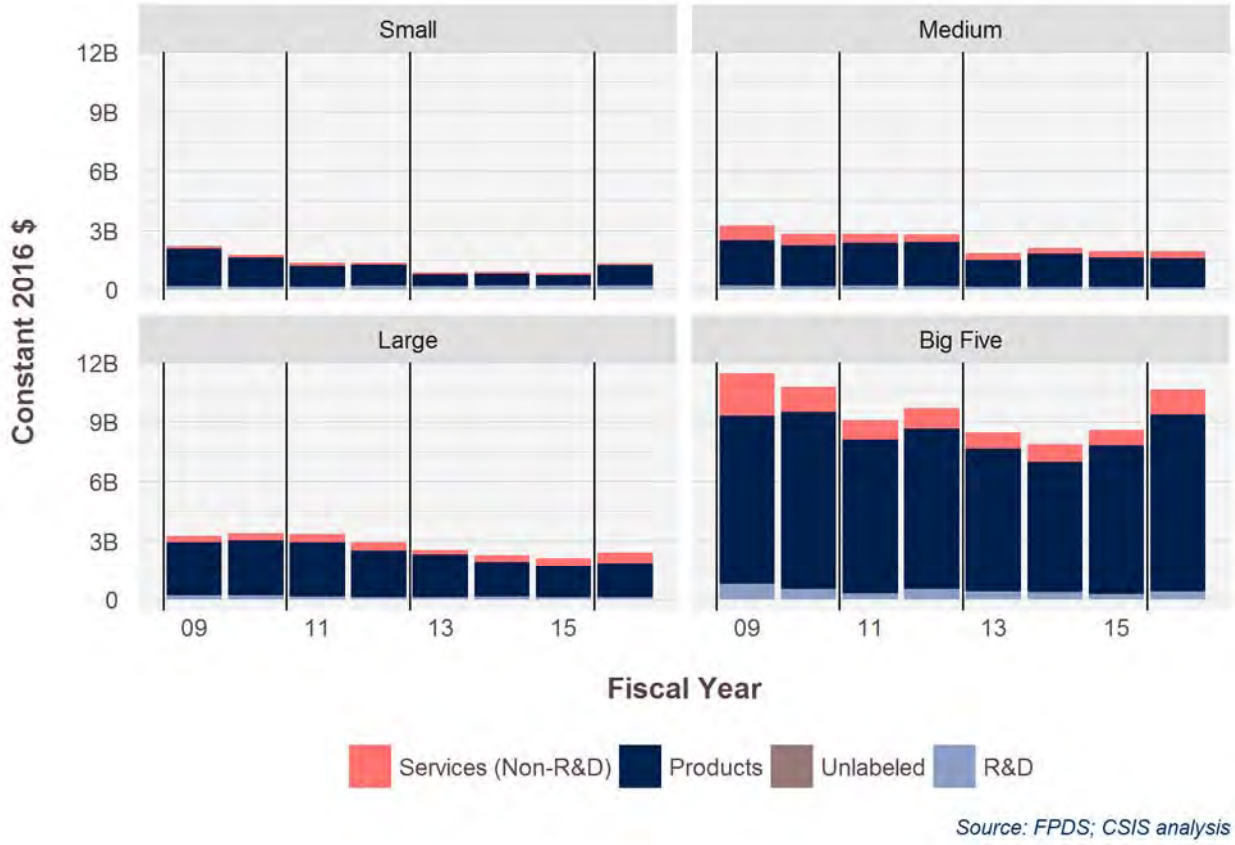
average amount spent during the start of the drawdown and $660 million less than the pre-drawdown averages.

In Ordnance and Missiles R&D, annual average contract obligations going to Small vendors grew over the course of the drawdown. Over the course of the entire defense drawdown, average annual Ordnance and Missiles R&D contract obligations obligated to Small vendors increased from $0.14 billion to $0.15 billion (a 6 percent increase) at the start of the drawdown and then to $0.17 billion (a 13 percent increase) during the BCA decline period. Meanwhile, Medium vendors at the start of the drawdown fell at a rate (-7 percent) significantly below the sector's overall R&D rate of decline (-28 percent) and then saw an accelerated decline during the 2013–2015 BCA decline period (-31 percent), as overall Ordnance and Missiles platform average annual R&D contract obligations declined 12 percent.

In Ordnance and Missiles services, the rise in Large vendors' market share and subsequent declines in the market share of Medium vendors are the most notable trends from the defense drawdown. Pre-drawdown, Medium vendors received $0.68 billion in annual average Ordnance and Missiles services contract obligations, accounting for 24 percent of total Ordnance and Missiles services spending. Meanwhile, Large vendors received $0.34 billion, which accounted for 12 percent of the market share. During the start of the drawdown period, Medium vendors' annual average contract obligations fell by 36 percent as Large vendors' annual average contract obligations rose 25 percent, resulting in Medium and Large vendors accounting for 22 and 21 percent respectively of total Ordnance and Missiles services spending. Though Large vendors then fell 19 percent during the 2013–2015 period, the simultaneous -25 percent cut to Medium vendors resulted in Large vendors surpassing Medium vendors' share of Ordnance and Missiles services spending. Finally, in the FY 2016 contract rebound—though contract obligations for both Medium (10 percent) and Large (58 percent) increased—Large vendors only further reinforced their market share lead over Medium vendors.

Figure 13-3 shows Ordnance and Missiles contract obligations by area by size of vendor from FY 2009 to FY 2016.

Figure 13-3: Ordnance and Missiles Contract Obligations by Area by Size of Vendor, 2009–2016



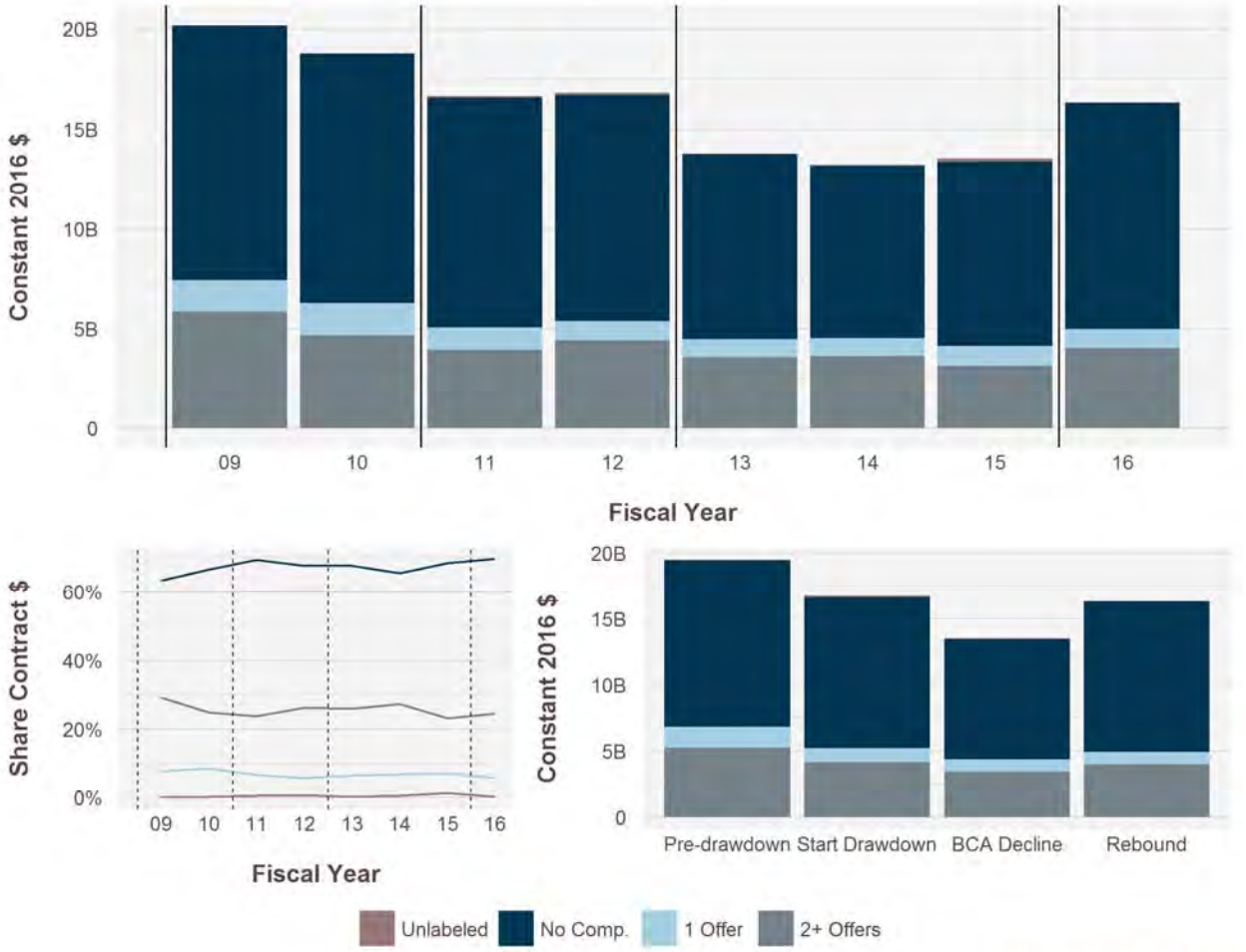
Source: FPDS; CSIS analysis

ORDNANCE AND MISSILES: COMPETITION

Sequestration and the defense drawdown had only minor impacts on the rate of effective competition in the Ordnance and Missiles platform portfolio. The largest impact came at the start of the drawdown, rather than from sequestration and the budget caps imposed during the 2013–2015 period. Pre-drawdown, 73 percent of annual average Ordnance and Missiles contract obligations were awarded without effective competition. At the start of the drawdown period, the share of contract obligations awarded without effective competition rose slightly to 75 percent. When sequestration and budget caps went into effect for the 2013–2015 period, the level of non-effective competition declined slightly to 74 percent.

Figure 13-4 shows Ordnance and Missiles contract obligations by level of competition from FY 2009 to FY 2016.

Figure 13-4: Level of Competition for Ordnance and Missiles Contract Obligations, 2009–2016



Source: FPDS; CSIS analysis

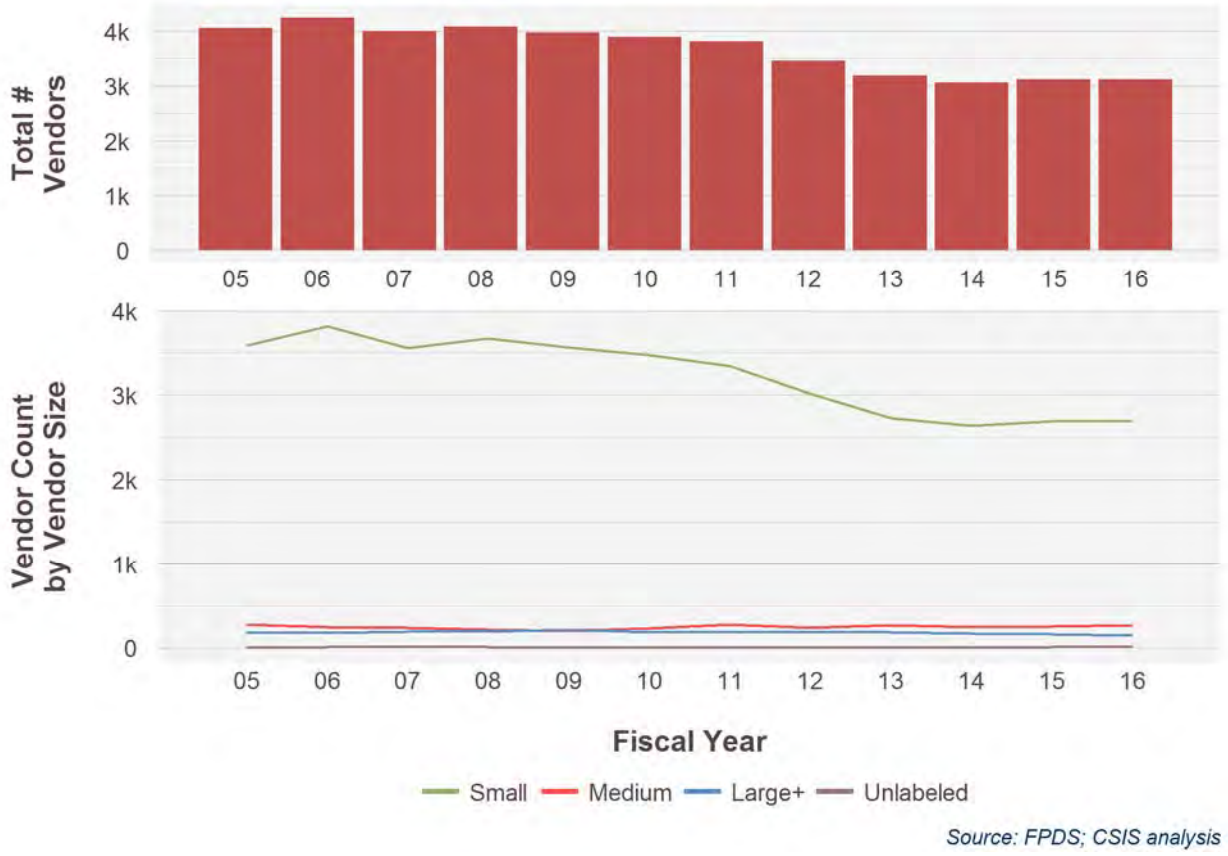
ORDNANCE AND MISSILES: VENDOR COUNT

Sequestration and the broader defense drawdown accelerated the trends in the declining number of vendors in the Ordnance and Missiles sector. During the start of the defense drawdown, the average number of vendors declined 8 percent from approximately 3,950 during the pre-drawdown period to approximately 3,650. During the BCA decline period, the number of vendors fell to approximately 3,100, a 14 percent decline from the start of the drawdown period.

Small vendors saw the largest decline of any vendor size in terms of both absolute number of vendors and percentage declines. Small vendors went from approximately 3,500 vendors in the pre-drawdown period to approximately 3,200 in the start of the drawdown period, before finally settling at 2,700 during the BCA decline period, a 10 and 16 percent decline respectively. Of note, the number of Medium-sized vendors increased 21 percent during the start of the drawdown period and remained steady at that level during the BCA decline period.

Figure 13-5 shows the number of vendors in the Ordnance and Missiles sector by size of vendor from FY 2009 to FY 2016.

Figure 13-5: Ordnance and Missiles Vendor Count by Size of Vendor, 2005–2016

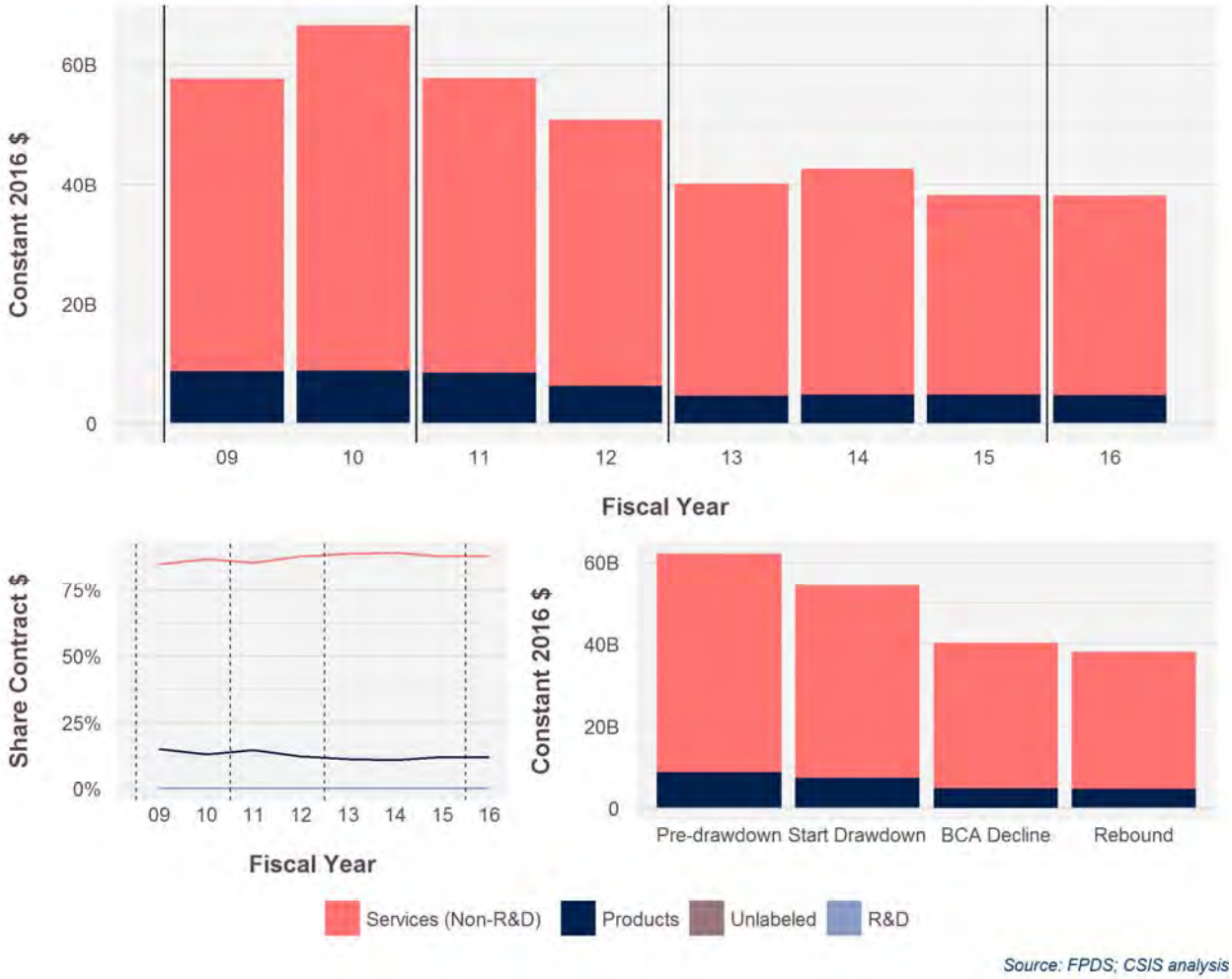


Source: FPDS; CSIS analysis

Chapter 14 | Facilities and Construction

As shown in Figure 14-1, during the start of the defense drawdown period (2011–2012), Facilities and Constructions average annual contract obligations decreased by 13 percent as compared to the pre-drawdown period (2009–2010). During the BCA decline period (2013–2015), overall sector reductions accelerated as Facilities and Construction average annual contract obligations went from $55.3 billion to $41.0 billion, a 26 percent decline. Facilities and Construction products saw the largest decline in percentage terms, declining 37 percent during the BCA decline period. Services, the predominant Facilities and Construction product or service category, fell from $46.9 billion in annual average contract obligations during the start of the drawdown period to $35.7 billion, a 24 percent decline.[47]

Figure 14-1: Facilities and Construction Contract Obligations by Area, 2009–2016



[47] R&D declined -69 percent, but represents 0.0096 percent of total Facilities and Construction contract obligations.

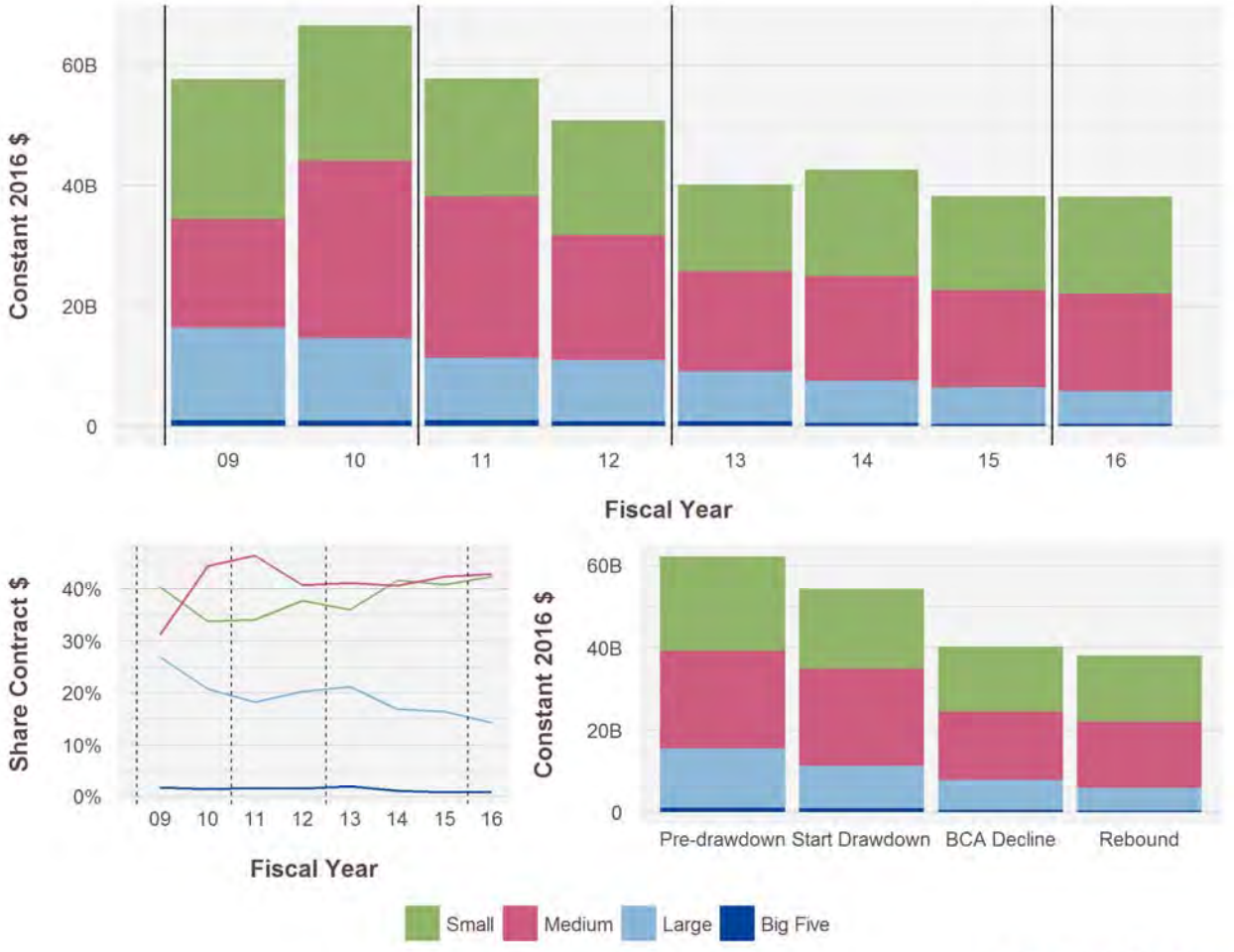
In 2016, Facilities and Construction continued to decline, but at a slower rate (-5 percent) than before.

FACILITIES AND CONSTRUCTION: VENDOR SIZE

The impact of sequestration and the defense drawdown disproportionately impacted Large vendors in the Facilities and Construction platform portfolio as shown in Figure 14-2. Pre-drawdown, Large vendors received, on average, $14.6 billion in annual contract obligations. At the start of the drawdown, annual average contract obligations fell to $10.4 billion, a 29 percent decline. Meanwhile, overall Facilities and Construction average annual contract obligations declined 13 percent. During the BCA decline period, Large vendors' average annual contract obligations fell even further to $7.3 billion, a 30 percent decline from the previous period.

Figure 14-2 shows the composition of the Facilites and Construction industrial base by size of vendor from FY 2009 to FY 2016.

Figure 14-2: Facilities and Construction Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

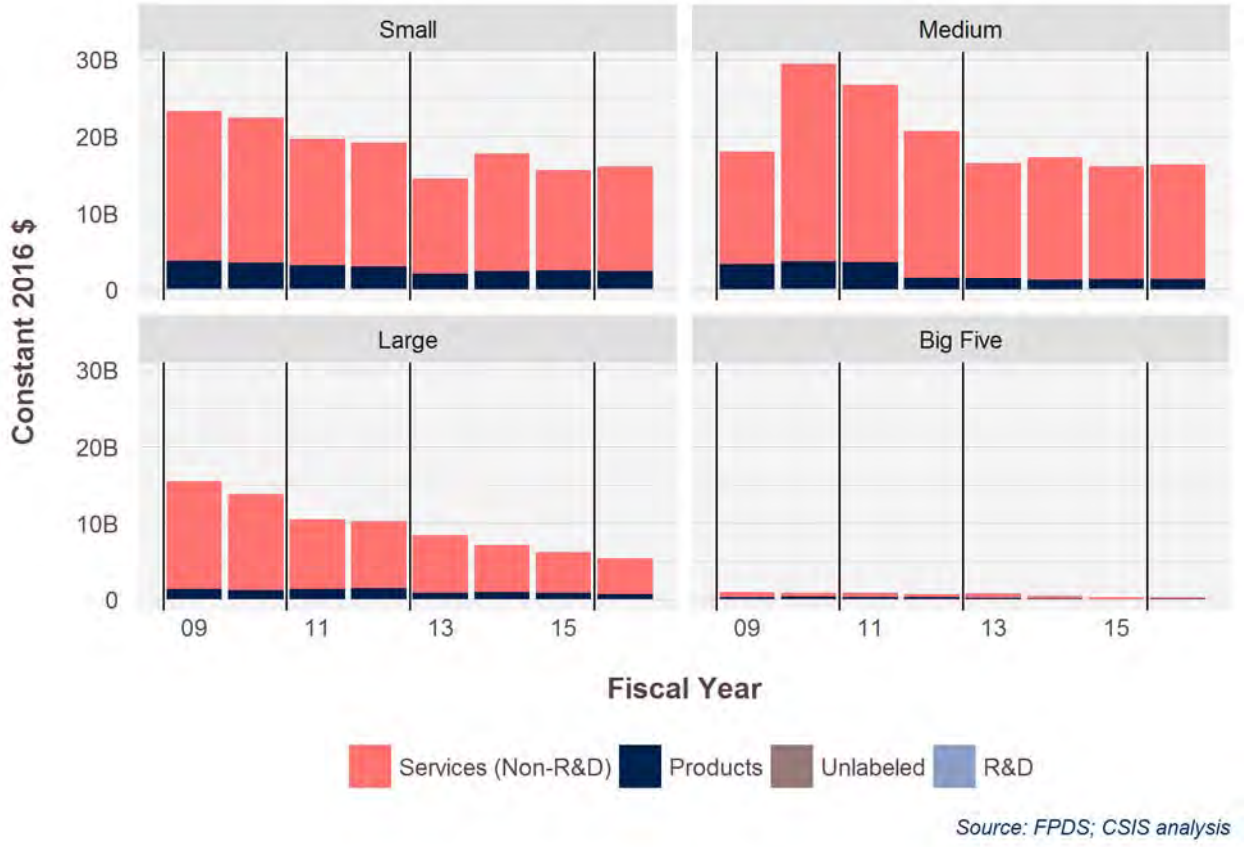
As Large vendors bore the brunt of the cuts in the Facilities and Construction sector, Small vendors saw increases in market share as a result of average annual contract obligations decreasing more slowly. At the start of the drawdown, Small vendors accounted for 36 percent of the total Facilities and Construction contract obligations. During the BCA decline period, Small vendors' average annual contract obligations fell 18 percent, significantly below the overall platform decline, leading to Small vendors now accounting for 39 percent of Facilities and Construction contract obligations.

FACILITIES AND CONSTRUCTION: AREA BY SIZE OF VENDOR

Shown in Figure 14-3, in Facilities and Construction products, only Large vendors saw a reversal in trajectories from the start of the drawdown to the BCA decline period. At the start of the drawdown, average annual Large vendors' Facilities and Construction products contract obligations increased 10 percent from the pre-drawdown period, but they then declined 38 percent during the BCA decline period. Big 5 average annual Facilities and Construction products contract obligations declined 10 percent at the start of the drawdown and fell even more sharply (-64 percent) during the BCA decline period.

In Facilities and Construction services, Medium vendors' reversal of fortunes after the imposition of the budget caps in 2013 is the most notable trend. At the start of the drawdown, Medium vendors' average annual Facilities and Construction services contract obligations increased 4 percent, rising from $20.2 billion during the pre-drawdown period to $21.1 billion. However, after the market shock of sequestration and budget caps, Medium vendors' average annual Facilities and Construction services contract obligations declined 27 percent during the FY 2013 to FY 2015 BCA decline period, falling to $15.3 billion.

Figure 14-3: Facilities and Construction Contract Obligations by Area by Size of Vendor, 2009–2016



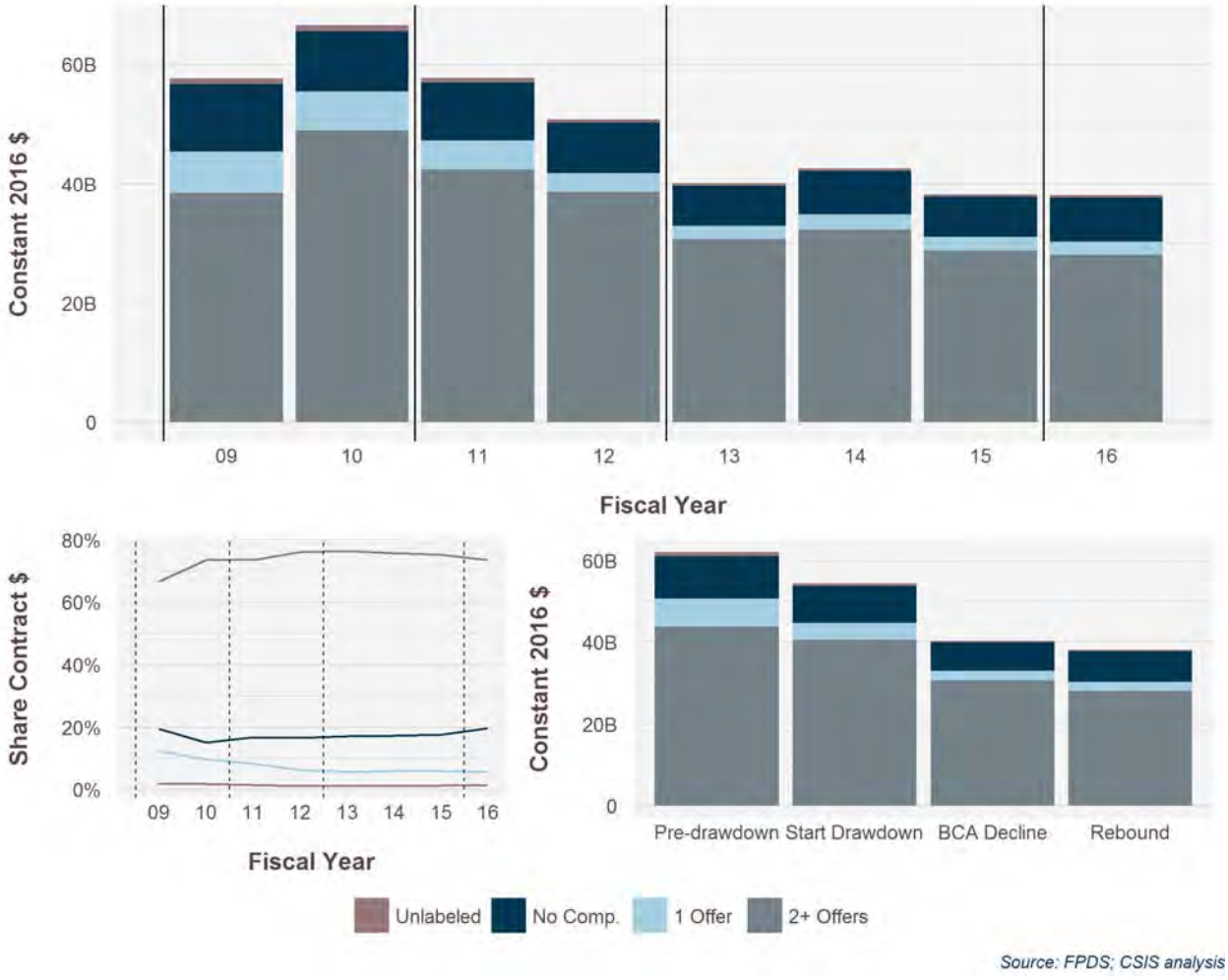
Source: FPDS; CSIS analysis

FACILITIES AND CONSTRUCTION: COMPETITION

The level of effective competition for Facilities and Construction contract obligations increased over the course of the defense drawdown, even as contract obligations fell. Pre-drawdown, 70 percent of Facilities and Construction contract obligations were awarded after effective competition. Throughout the start of the drawdown period, the share of annual average contract obligations awarded after effective competition increased to 75 percent. This trajectory further increased into the BCA decline period, as the share of share of average contract obligations awarded after effective competition rose to 76 percent.

Throughout both periods, the increases in the share of contract obligations awarded after effective competition came from decreases in the share of contract obligations awarded after one offer. In the pre-drawdown period, an annual average of $6.8 billion in Facilities and Construction contract obligations was awarded after one offer. At the start of the drawdown period, only an average of $4.0 billion in annual contract obligations was awarded after one offer, a 41 percent decline. This trend continued into the BCA decline period as average annual Facilities and Construction contract obligations declined an additional 42 percent from the FY 2011-to-FY 2012 period.

Figure 14-4: Level of Competition for Facilities and Construction Contract Obligations, 2009–2016



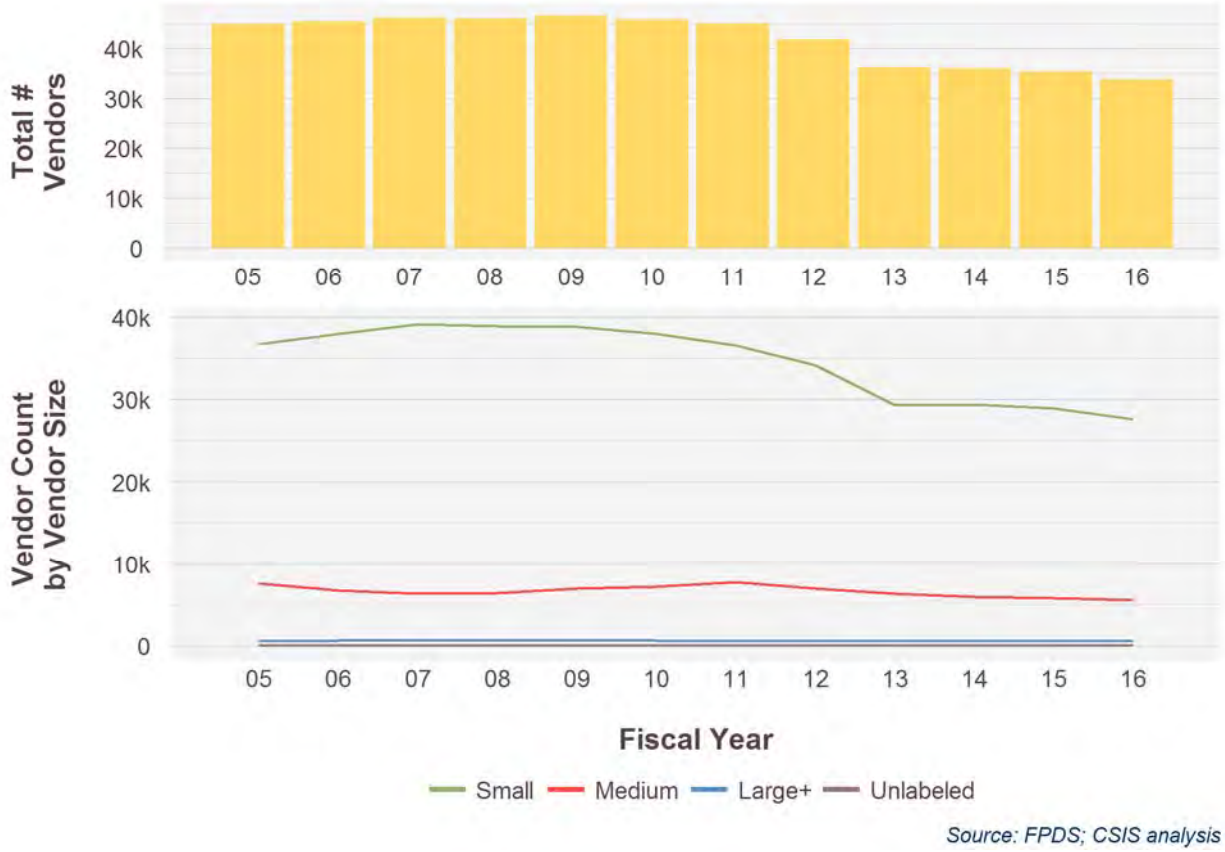
Source: FPDS; CSIS analysis

FACILITIES AND CONSTRUCTION: VENDOR COUNT

Of all the platform portfolios analyzed in this paper, Facilities and Construction saw the largest decline in average number of vendors during the BCA decline period (-17 percent). During this period, the average number of Facilities and Construction vendors fell to approximately 35,850 from approximately 43,300 during the start of the drawdown period. The 17 percent topline decline disproportionally affected Small and Medium-sized vendors. Small vendors declined 17 percent, going from approximately 35,400 vendors to approximately 29,250 vendors. Medium vendors went from approximately 7,300 vendors to approximately 6,000, an 18 percent decline. Comparatively, the approximately 550 Large vendors in Facilities and Construction remained steady with their numbers at the start of the drawdown.

Figure 14-5 shows the number of vendors in the Facilities and Construction sector by size of vendor from FY 2005 to FY 2016.

Figure 14-5: Facilities and Construction Vendor Count by Size of Vendor, 2005–2016

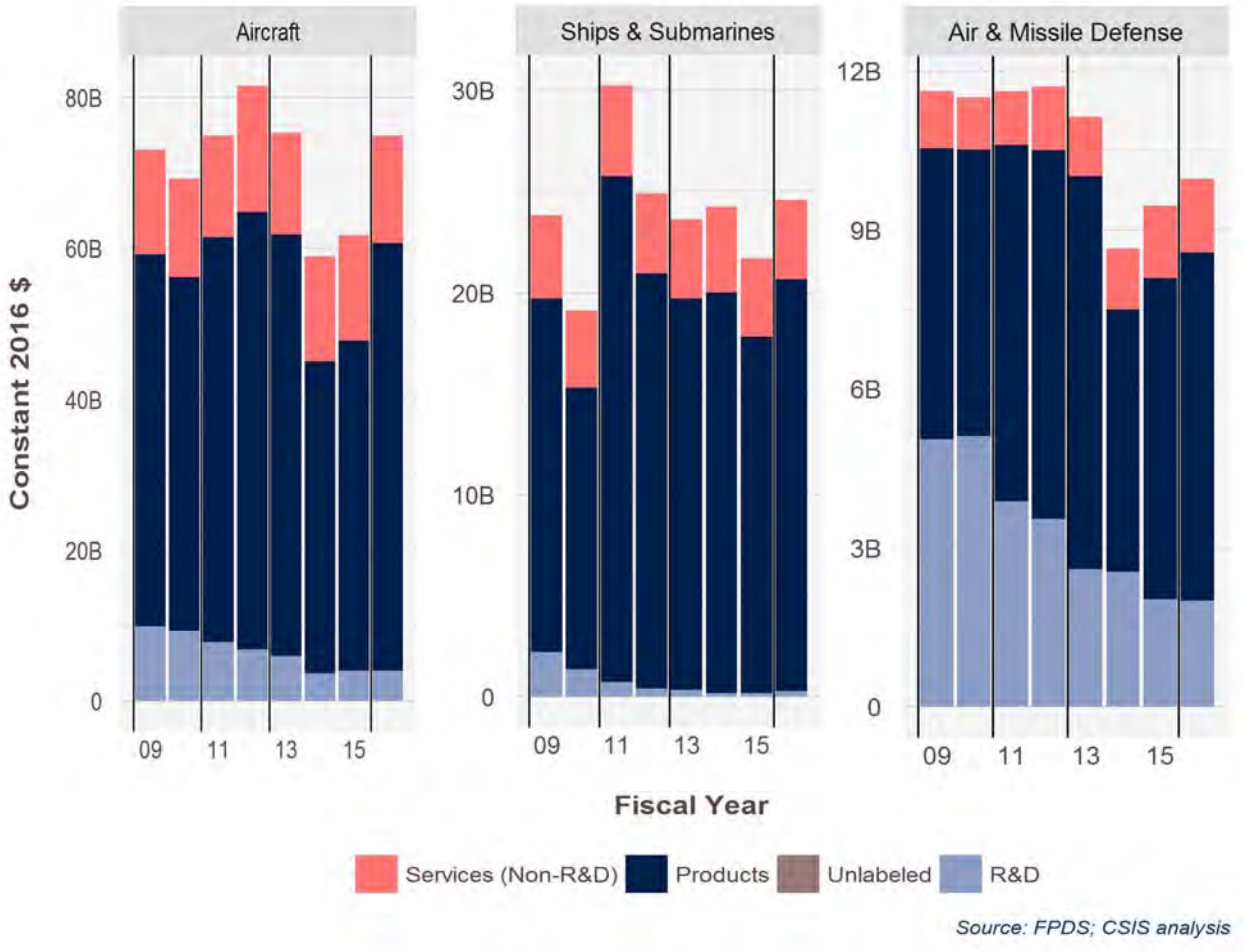


Source: FPDS; CSIS analysis

Chapter 15 | Conclusion

The results of this data analysis show that sequestration and the broader defense drawdown have made a measurable impact on the defense industrial base. Furthermore, the data show that the impact of sequestration and the defense drawdown has not been uniform across the entire defense industrial base, with each sector analyzed in this paper responding differently. While defense contract obligations fell across all platform portfolios, the impact of the drawdown on the different sectors of the defense industrial base varied widely. Some sectors saw continual declines in contract obligations, while others experienced a whipsaw effect, swinging rapidly from growth to decline as shown in Figure 15-1.

Figure 15-1: Whipsaw Effect in Platform Portfolios, 2009–2016



Our analysis showed that buried within the substantial decline in defense contract obligations were significant variations from sector to sector, with declines varying from catastrophic (land vehicles) to steep (Facilities and Construction, Space Systems) to relatively modest (Ships & Submarines). With some important exceptions, falling contract obligations led to reductions in the number of vendors in the first tier of the industrial base. Due to the limitations in the subcontract database, CSIS cannot say whether these companies have

completely exited the industrial base or still perform lower work at the lower tiers. In some sectors, the shape of the supporting industrial base was significantly restructured, although which vendors lost and which benefited varied substantially across industry. However, as a general matter, Small firms mostly succeeded in holding market share, and the Big 5 saw the composition of their work shift away from R&D and toward products and services. The most complex dynamic occurred in competition. Overall effective competition remained fairly steady, but there were notable declines in sectors where competition was already fairly limited (Aircraft; Ordnance and Missiles; Air and Missile Defense). The size of a sectors' decline had little explanatory effect, with different sectors that experienced similar levels of decline seeing very different trends in their rates of effective competition within the sector. Sectors where the DoD vendor base may strongly overlap with robust commercial markets, such as facilities and EC&S, showed slight decrease in competition despite large declines in obligations and vendors.

DoD COMPONENT: Did the DoD components respond differently to sequestration and the defense drawdown?

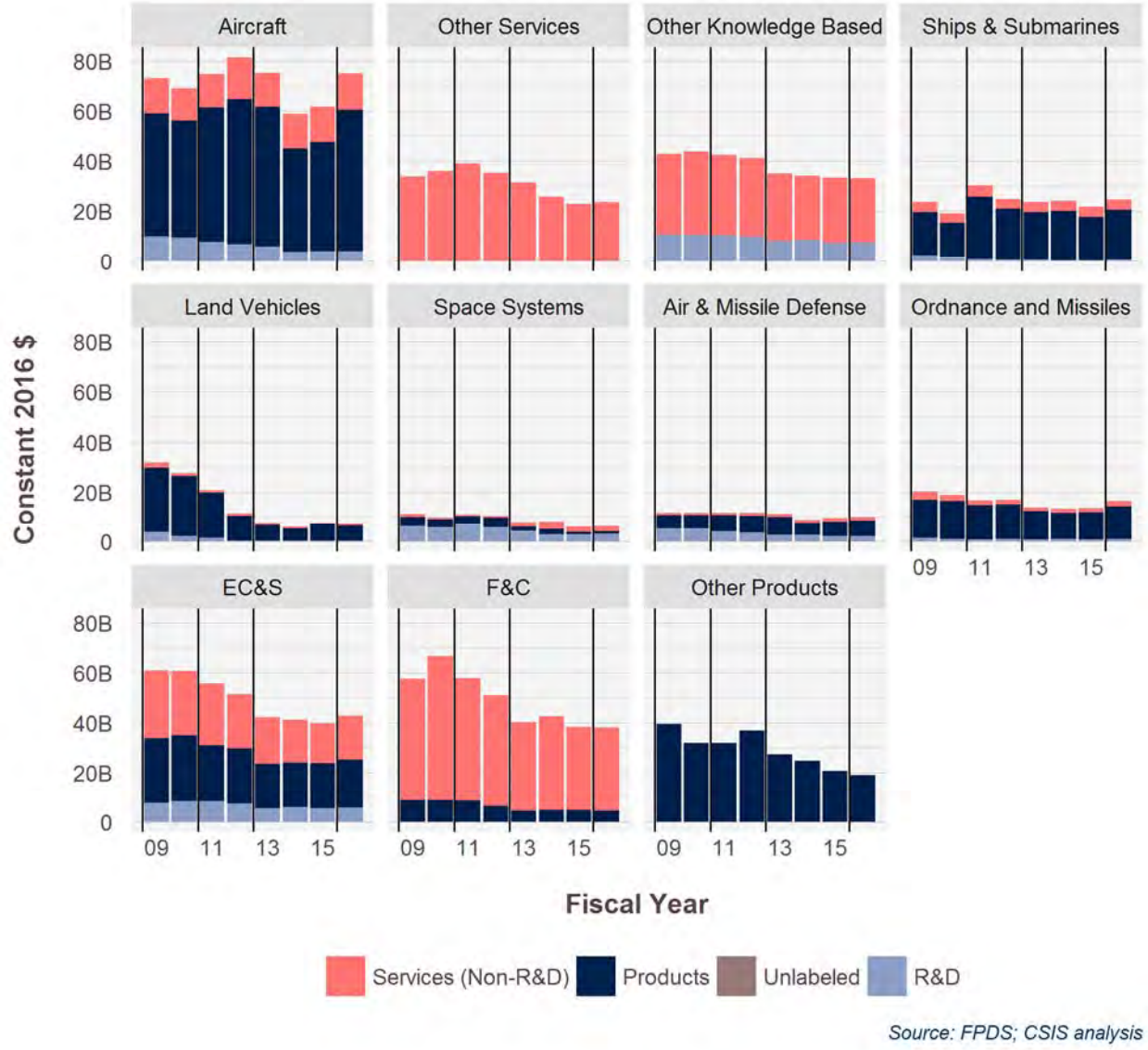
The data show that the Army, Navy, and Air Force each took a different approach to responding to the challenges imposed by sequestration and the defense drawdown. The Army, facing the most significant budgetary declines, elected to distribute uneven cuts across all platform portfolios. In the Army's contracting account, the Aircraft and Air and Missile Defense platform portfolios saw smaller cuts than the overall rate of Army decline, but did so at the expense of other platform portfolios, such as Land Vehicles, Other Products, and Other Services. The Air Force took a more distributed approach by implementing cuts larger than the overall rate of decline in a few platform portfolios, such as Air and Missile Defense and Space Systems. Finally, the Navy prioritized Aircraft, as well as Ordnance and Missiles, at the expense of more severe cuts in Facilities and Construction; Land Vehicles; Air and Missile Defense; Other Products; and Space Systems.

AREA: Were the different subsectors (products, services, R&D) of an industrial base sector equally impacted?

The data show that across most platform portfolios, R&D took disproportionate cuts when compared to products or services. The products and services trends saw greater variance between the specific platform portfolios. With the exception of EC&S and Space Systems, R&D contract obligations at the start of the drawdown fell at rates quicker than the overall rate of decline in all platform portfolios. During the BCA decline period, EC&S and Space Systems R&D also experienced percentage declines greater than overall platform portfolio, though Ordnance and Missiles R&D contracts fell at rater slower than the overall rate of decline.

Figure 15-2 summarizes trends in platform portfolio's average annual contract obligations by products, services, and R&D.

Figure 15-2: Defense Platform Portfolio Contract Obligations by Area, 2009–2016



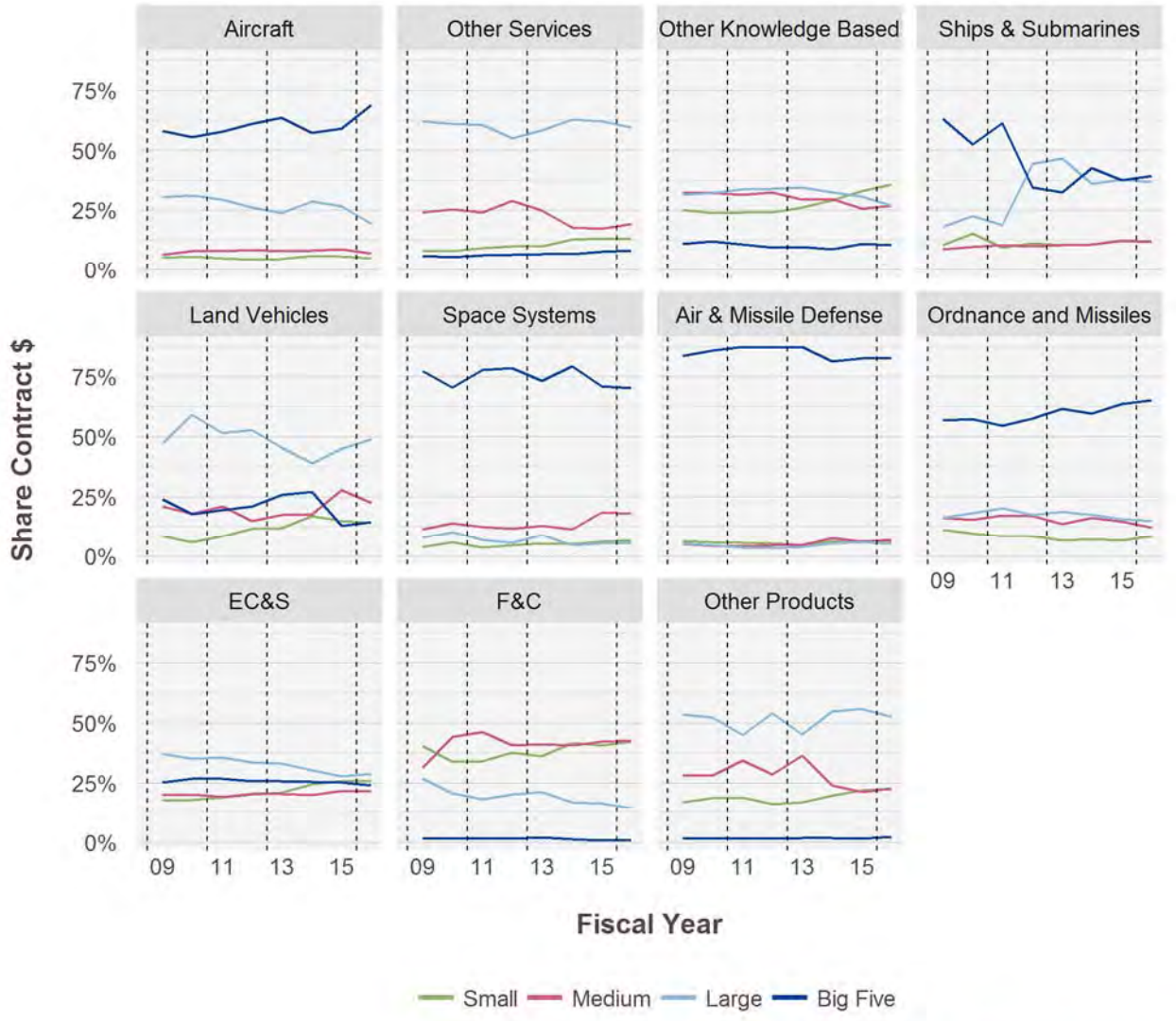
Source: FPDS; CSIS analysis

VENDOR SIZE: How did the share of contract obligations change among vendors of differing sizes, particularly Small vendors?

The data show that despite pre-sequestration predictions, the drawdown did not disproportionately negatively impact Small vendors. Generally, with two exceptions, Small vendors, as a share of platform portfolio contract obligations, either increased their market share or held roughly steady during the drawdown. As a share of overall DoD contract obligations, Small vendors went from 16 percent pre-drawdown to 18 percent during the BCA decline period. Similar to Small vendors, the Big 5 increased their overall DoD market share, going from 28 percent pre-drawdown to 30 percent during the start of the drawdown and BCA decline period, but the trends in the Big 5 were more volatile between platform portfolios than with Small vendors. The increased market share for Small and Big 5 vendors

came at the expense of Large and Medium vendors. Figure 15-3 summarizes the market share by vendor size across the eight platform portfolios analyzed in this paper for the study period.

Figure 15-3: Defense Platform Portfolio Contract Obligations by Size of Vendor, 2009–2016



Source: FPDS; CSIS analysis

Small vendors fared best in the Land Vehicles; Electronics, Comms, & Sensors; and Facilities and Construction platform portfolios. Small vendors, as a share of the Land Vehicles contract obligations, increased from 7 percent pre-drawdown to 9 percent at the start of the drawdown and then rose to 14 percent during the BCA decline period. Of note, this trend was not driven by actual increases in Land Vehicles contract obligations going to Small vendors, but by Small vendors falling at rates well below the overall platform portfolio rate of decline. Pre-drawdown, the Facilities and Construction and EC&S platform portfolios were already the two highest Small vendor market share platform portfolios, and only continued to grow during the drawdown. Small vendors went from 37 percent and 18 percent pre-

drawdown to 39 percent and 24 percent during the BCA decline period in Facilities and Construction and EC&S respectively.

In the Aircraft, Space Systems, and Air and Missile Defense platform portfolios, Small vendors' market share remained roughly steady, either remaining even or falling very slightly (within ~1 percent). Interestingly, in each of the three platform portfolios, Small vendors topped out around 5 percent of platform portfolio contract obligations.

Finally, the share of contract obligations awarded to Small vendors fell in the Ordnance and Missiles and Ships & Submarines platform portfolios during the drawdown. In Ships & Submarines, Small vendors' market share fell to 10 percent at the start of drawdown, compared to 13 percent pre-drawdown. It did slightly rebound, though, to 11 percent during the BCA decline period. Of note, even though Small vendors' contract obligations increased from $2.7 billion pre-drawdown to $2.8 billion at the start of the drawdown, the other vendor size categories grew at higher rates. In Ordnance and Missiles, Small vendors fell from 10 percent pre-drawdown to 8 percent at the start of the drawdown, and finally 7 percent during the BCA decline period. That decline was due, in large part, to Small vendors' contract obligations falling at a rate higher than the overall platform portfolio's rate of decline.

FSRS DATA AVAILABILITY: What does the subcontract (FSRS) data show?

At the onset of this project, CSIS sought to measure and compare the trends between prime and subprime contracts within the varying sectors of the defense industrial base. Prior research had suggested that FSRS data quality had been maturing since the database's creation. However, CSIS analysis concluded that FSRS remains too immature to draw top-level trends across most platform portfolios. Whereas one would expect the ratio of subcontract awards to prime contract obligations to be somewhere around 60 to 70 percent, CSIS found that the ratio was closer to 21 percent for reportable contracts for overall DoD.

CSIS found that across platform portfolios, FSRS data quality was poor, except for Facilities and Construction, Air and Missile Defense, and Ordnance and Missiles. For example, in Ships & Submarines and Aircraft, the ratio of subprime contact awards to prime contracts was just 8 percent. Additionally, CSIS found that within platform portfolios, data quality by the contracting DoD component varied widely. In Aircraft, the Navy reported a subcontract-prime ratio of 16 percent, compared to the 3 and 5 percent reported by the Air Force and Army respectively. Finally, CSIS analysis supported previous research findings that many major weapons systems reported either no subcontract data, or data that's likely to be largely incomplete.

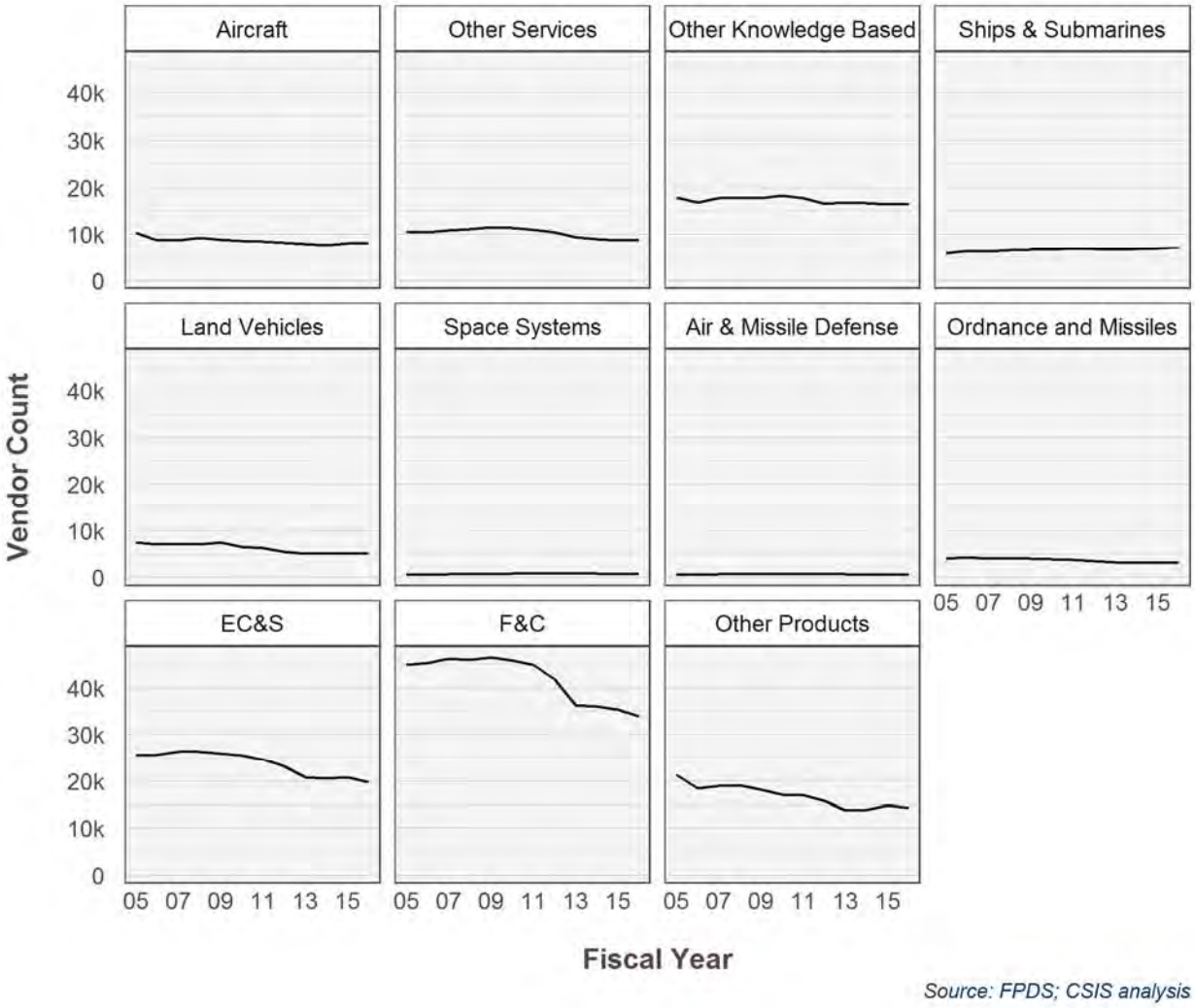
VENDOR COUNT: How did the number of vendors change?

Across the entire first tier of the defense industrial base, the number of prime vendors declined from an average of approximately 78,500 pre-drawdown to about 72,600 at the start of the drawdown, an 8 percent decline. The total number of vendors then fell to about 61,700 in the FY 2013-to-FY 2015 BCA decline period, a 15 percent decline from the previous FY 2011-to-FY 2012 period. Although the number of overall DoD prime vendors was already slowly declining prior to the drawdown, the market shock of sequestration and the budget

caps accelerated those trends. Across the sectors analyzed in this paper, the total number of prime vendors in each sector decreased, except in Ships & Submarines and Space Systems. Unlike other sectors, the total number of Ships & Submarines prime vendors grew from approximately 6,500 pre-drawdown to about 6,775 at the start of the drawdown, a 4 percent increase, and essentially held steady at that level during the FY 2013-to-FY 2015 period. The total number of Space Systems prime vendors grew during the drawdown, going from an approximate 750 vendors pre-drawdown to 850 vendors at the start of the BCA decline period, a 12 percent growth. However, this growth might prove temporary, as the number of vendors in this sector fell to approximately 775 during the FY 2013-to-FY 2015 period, a 6 percent decline, and continued to decline in FY 2016, falling to about 725 vendors, an 8 percent drop from the previous period.

Due to limitations in the data, CSIS cannot definitively say what happened to these vendors: did they completely exit the defense marketplace? Did they remain in the defense marketplace, but as lower-tier suppliers? CSIS's research effort also was limited by the lack of reliable subcontracting data. There is no doubt that a huge portion of the recent turbulence in the defense industrial base has taken place among subcontractors, which are less equipped to tolerate the defense marketplace's funding uncertainly and often onerous regulatory regime—yet it remains extremely difficult to determine the real impact of these conditions on subcontractors. Reliable self-reporting by industry could be helpful in this area.

Figure 15-4: Defense Platform Portfolios by Vendor Count, 2005–2016



Source: FPDS; CSIS analysis

COMPETITION: Did the share of contract obligations awarded after effective competition change?

The data show that DoD's overall rate of effective competition remained steadily near 50 percent throughout the course of the drawdown, but there were varying trends within the different sectors of the defense industrial base. The finding that the overall DoD rate of effective competition remained steady throughout the course of the drawdown is consistent with previous CSIS analysis. These analyses have shown that overall DoD rates of effective competition have historically remained steady and that it is difficult to increase effective competition through policy changes.[48]

[48] Rhys McCormick et al., *Measuring the Outcomes of Acquisition Reform by Major DoD Components* (Washington, DC: CSIS, 2015), http://csis.org/publication/measuring-outcomes-acquisition-reform-major-dod-components.

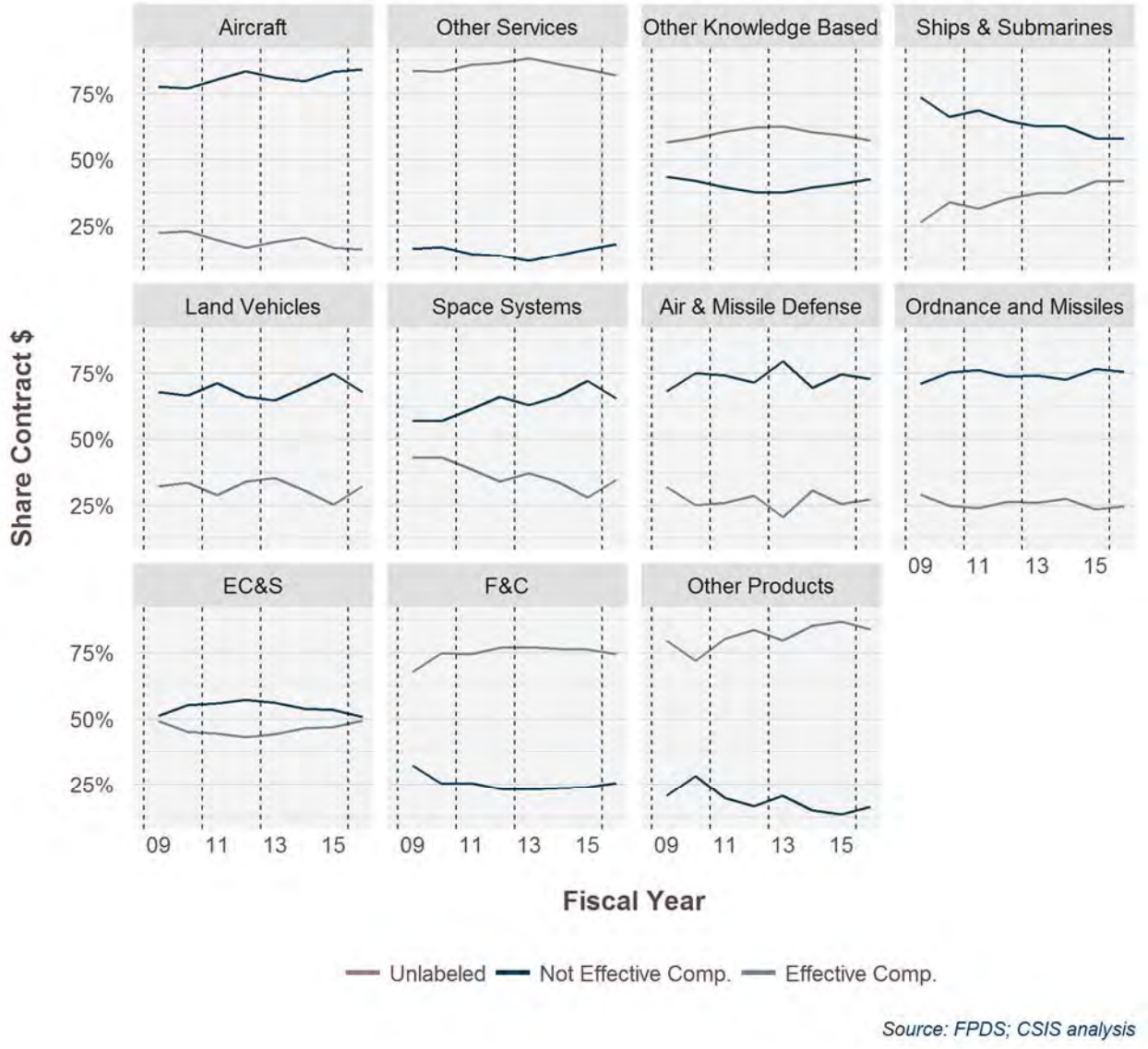
During the drawdown, the Ships & Submarines and Facilities and Construction platform portfolios saw an increase in the share of contract obligations awarded following effective competition. Ships & Submarines rate of effective competition increased from 30 percent pre-drawdown to 33 percent at the start of the drawdown, and then to 39 percent during the BCA decline period. This is notable given that the Ships & Submarines industry is often anecdotally referred to as one of the least competitive sectors of the industrial base. However, the data show that competition in this sector increased during the drawdown.

The rate of effective competition fell slightly during the drawdown in Land Vehicles; Air and Missile Defense; EC&S; and Ordnance and Missiles. Within these platform portfolios, the rate of effective competition fell between 2 and 3 percent during the drawdown from pre-drawdown levels. For example, the share of EC&S contract obligations awarded after effective competition fell from 47 percent pre-drawdown to 45 percent during the BCA decline period.

Aircraft and Space Systems saw the most significant declines in the rate of effective competition during the drawdown. Aircraft, already historically uncompetitive, went from a 23 percent rate of effective competition to 18 percent at the start of the drawdown, before rebounding slightly to 19 percent during the BCA decline period. Space Systems saw a dramatic decline over the course of the drawdown, falling from a 43 percent rate of effective competition pre-drawdown to 33 percent during the BCA decline period.

Figure 15-5 summarizes the rates of effective competition across the platform portfolios analyzed in this paper for the study period.

Figure 15-5: Platform Portfolio Contract Obligations by Rate of Effective Competition, 2009–2016



Source: FPDS; CSIS analysis

FINAL THOUGHTS

The empirical data presented here show that the effect of the defense drawdown on industry was substantial; and that while defense contract obligations fell across all platform portfolios, the impact of the drawdown on the different sectors of the defense industrial base varied widely. Some sectors saw continual declines in contract obligations, while others experienced a whipsaw effect, swinging rapidly from growth to decline. In general, Small and Big 5 vendors' market share remained steady, while Medium and Large vendors' shares were more volatile. Over the course of the drawdown, the Big 5's contract portfolio shifted toward products and services, and away from R&D.

Both the findings here, and the remaining gaps in our understanding, highlight the vital importance of the industrial base review now underway in DoD and other government

departments. The president's Executive Order has come at a critical time; as it notes, "The ability of the United States to maintain readiness, and to surge in response to an emergency, directly relates to the capacity, capabilities, and resiliency of our manufacturing and defense industrial base and supply chains."[49] Ultimately, these issues are not just about the interests of the defense industrial base, but about its ability to sustain U.S. forces and ensure continued U.S. technological superiority for potential future conflicts—with a clear demand signal from DoD informed by insight into the state of the industrial base and the burdens it faces, that ability can be secured.

[49] Executive Order No. 13806, 82 Fed. Reg. 34597 (July 21, 2017), https://www.gpo.gov/fdsys/granule/FR-2017-07-26/2017-15860.

About the Authors

Rhys McCormick is an associate fellow with the Defense-Industrial Initiatives Group (DIIG) at CSIS. His work focuses on unmanned systems, global defense industrial base issues, and U.S. federal and defense contracting trends. Prior to working at DIIG, he interned at the Abshire-Inamori Leadership Academy at CSIS and the Peacekeeping and Stability Operations Institute at the U.S. Army War College. He holds a B.S. in security and risk analysis from the Pennsylvania State University and an M.A. in security studies from Georgetown University.

Andrew P. Hunter is a senior fellow in the International Security Program and director of the Defense-Industrial Initiatives Group at CSIS. From 2011 to 2014, he served as a senior executive in the Department of Defense, serving first as chief of staff to undersecretaries of defense (AT&L) Ashton B. Carter and Frank Kendall, before directing the Joint Rapid Acquisition Cell. From 2005 to 2011, Mr. Hunter served as a professional staff member of the House Armed Services Committee. Mr. Hunter holds an M.A. degree in applied economics from the Johns Hopkins University and a B.A. in social studies from Harvard University.

Gregory Sanders is a fellow in the International Security Program and deputy director of the Defense-Industrial Initiatives Group at CSIS, where he manages a research team that analyzes data on U.S. government contract spending and other budget and acquisition issues. In support of these goals, he employs SQL Server, as well as the statistical programming language R. Sanders holds an M.A. in international studies from the University of Denver and a B.A. in government and politics, as well as a B.S. in computer science, from the University of Maryland.

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CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

1616 Rhode Island Avenue NW
Washington, DC 20036
202 887 0200 | www.**csis**.org

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