

SYM-AM-23-058



EXCERPT FROM THE
PROCEEDINGS
OF THE
TWENTIETH ANNUAL
ACQUISITION RESEARCH SYMPOSIUM

**Acquisition Research:
Creating Synergy for Informed Change**

May 10–11, 2023

Published: April 30, 2023

Approved for public release; distribution is unlimited.

Prepared for the Naval Postgraduate School, Monterey, CA 93943.

Disclaimer: The views represented in this report are those of the author and do not reflect the official policy position of the Navy, the Department of Defense, or the federal government.



ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
NAVAL POSTGRADUATE SCHOOL

The research presented in this report was supported by the Acquisition Research Program at the Naval Postgraduate School.

To request defense acquisition research, to become a research sponsor, or to print additional copies of reports, please contact any of the staff listed on the Acquisition Research Program website (www.acquisitionresearch.net).



ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
NAVAL POSTGRADUATE SCHOOL

Effective Competition and Market Concentration in the Defense Industrial Base and the U.S. Federal Government

Edward (Ed) Hyatt, Ph.D.—is currently a senior research fellow at the Baroni Center for Government Contracting at George Mason University's School of Business. He has a decade of research experience and more than seven years of managerial experience in the public procurement profession. During this dual career he has earned several advanced degrees including a PhD in Business Management, served as a contracts and purchasing agent for multiple governmental institutions, and participated in the research and publication process on dozens of projects. His research values are aligned with the philosophical approaches of critical realism and pragmatism, and he is committed to executing meaningful projects that create public value and serve our national interests. [ehyatt4@gmu.edu]

Abstract

The concept of a fair, open, and competitive marketplace is a cornerstone of the U.S. economy, and hence a core concern for government contracting. However, the defense industrial base has been shrinking for years with fewer companies acting as prime contractors, leading to concerns about undue increases in market concentration and a consequent decline in competition. Despite the rhetoric, what remains uncertain is whether the rates of effective competition and market concentration in the defense industrial base are unique or whether they are reflective of the broader U.S. federal government.

The following research conceptualizes the U.S. Department of Defense as a unique consumer of goods and services and combines the rest of the U.S. federal government agencies as a comparison group. Relying on a unique database containing 20 years of contract award data for all government agencies, effective competition (multiple commercial responses to competitive solicitations) and market concentration (relative market shares of companies within a marketplace) were calculated for 1) every market (i.e., product or service category), 2) all markets excluding research and development (R&D) services, 3) and a set of markets identified as not being overly dominated by any single government agency. Results provide tentative evidence that concerns for ineffective competition and market concentration in the defense industrial base may be largely overstated when compared to other government agencies. The primary importance of this research is that it contextualizes defense acquisition within the larger U.S. federal marketplace, thereby providing a clearer picture of the prevalence of certain trends.

Keywords: Defense industrial base, industry consolidation, competition, Herfindahl–Hirschman Index (HHI)

Background

Since WWII the U.S. government has steadily turned to the private marketplace to supply many of its defense-related goods and services. U.S. companies have been steadily consolidating in multiple markets for decades, and a trend of declining prime contractors in the defense industrial base (DIB) is a well-documented phenomenon (Adjei & Hendricks II, 2022; Bresler & Bresler, 2020; United States General Accounting Office, 2021).¹ The number of major prime contractors fell from 50 to six between 1993 and 2000, and today five companies receive the lion's share of U.S. Department of Defense (DoD) procurement dollars and contracts (Gansler, 2011). This is important because competition is a cornerstone of government acquisition, and industry consolidation is often implicitly or

¹ For the purposes of this study, the defense industrial base is defined as contractors with contracts awarded by the U.S. Department of Defense.



explicitly linked to lower levels of competition, greater risks for reduced supply chains, greater use of sole source contracting, and the potential for higher product markups. Therefore, the shrinking DIB and its potential deleterious impact on competition is often lamented in acquisition literature and remains a source of policy concern.

Competition is statutorily preferred in government contracting because it is generally assumed to be positively linked to a host of good outcomes for the government. The Competition in Contracting Act (CICA) of 1984 generally requires “full and open competition” for government procurement contracts (41 U.S.C. §253). Competition or the use of competitive procedures are highlighted within the provisions of many other regulations; for example, see FAR Subpart 6.1 titled “Full and Open Competition,” as well as other subsections such as in the administration of awards and contracts to small businesses (15 U.S.C. 14A §644(j)(1)). A 2016 Council of Economic Advisers report neatly summarized the government’s position on the value of competition and the danger of increasing industry concentration (Council of Economic Advisers, 2016). President Biden recently signed an executive order titled *Promoting Competition in the American Economy*, establishing a White House Competition Council as part of a whole-of-government effort to promote competition in the American economy (Biden, July 9, 2021).

The DoD is concerned with at least two distinct concepts related to overall competition: effective competition and market concentration. Effective competition is defined under the DoD’s Better Buying Power policy as a contracting situation where more than one offer is received in response to a solicitation issued using full and open competition procedures. Conversely, “ineffective competition” is a situation where only one offer is received for a competitive solicitation (United States General Accounting Office, 2012). The DoD has repeatedly voiced concerns about competition and has taken multiple steps aimed at increasing competition in general, and in particular at producing higher rates of “effective competition.”

Market concentration, the number of firms and their respective share of production within a market, is often used as a proxy for the degree of competition in a market. High market concentration represents low levels of competition and is therefore a concern of antitrust agencies when considering individual firm market power and the potential impact of horizontal mergers on consumer welfare. Higher market concentration may come about from a variety of sources, including mergers and acquisitions, especially since U.S. industries have been steadily consolidating for decades (Amiti & Heise, 2021; Autor et al., 2020; Ganapati, 2021; Grullon et al., 2019).

Critically, what is missing beyond the rhetoric is empirical evidence of whether a shrinking supplier base, ineffective competition, and market concentration are unique DIB phenomena or if they also exist in the broader U.S. federal government. Even though the DoD has a unique mission it would be illuminating to see how its trends compare to other federal government agencies. This would provide a more comprehensive picture of the prevalence of these issues, thereby allowing DoD officials to place their own situation and policies in a broader context. Therefore, the purpose of this study is to evaluate the trends of (in)effective competition and market concentration within the DoD and to make explicit comparisons to all other federal government agencies combined. Because this study is heavily reliant on secondary data, the procedures for analysis are extensively described followed by only a brief discussion of the results.

Given it is a central measure of market concentration the Herfindahl–Hirschman Index (HHI) will be reviewed in brief. This measure is arguably the most accepted measure of market concentration used by government agencies such as the U.S. Department of



Justice, Antitrust Division and the Federal Trade Commission.² Those agencies often use the HHI to help determine the effects of a proposed horizontal merger or acquisition of actual or potential competitors by firms within a market. It provides a numerical score of the overall level of market concentration based on the number of firms and their respective share of that market. The HHI is calculated by identifying a market and the firms operating in it, calculating the market share of each firm, and then squaring that market share value of each firm and summing the resulting numbers (United States Department of Justice, Antitrust Division, 2018). It is mathematically expressed using the following notation:

$$HHI = \sum_i^N s_i^2, \text{ where } s \text{ is the market share of firm } i, \text{ and } N \text{ is the number of firms in the market (Wallsten, 2019, 3, footnote 1).}$$

The index ranges from a value of zero, when a market is occupied by many firms of relatively equal size, to a value of 10,000, when a market is controlled by a single firm (i.e., a monopoly). Therefore, a higher HHI value represents a higher level of concentration within a market and a presumed lower level of competition. According to the Horizontal Merger Guidelines, markets where the HHI is below 1,500 are defined as unconcentrated, between 1,500 and 2,500 points are moderately concentrated, and more than 2,500 points are highly concentrated. A key benefit of the HHI is that it considers both the absolute number of competitors in a market and their relative sizes, two features that are likely to be critical for characterizing the level of competition in a marketplace. The metric assigns proportionately greater weight to firms with larger market shares, thereby emphasizing the idea that larger firms matter more when considering concentration in a marketplace ecosystem. Therefore, even if a market has many firms, if one or more of those firms holds an outstanding amount of market share, it can be considered a more highly concentrated market than one with fewer firms.

Research Questions

Concerns regarding effective competition and market concentration within the DIB are well documented, but it is unknown whether the DoD is unique in its struggles or if similar patterns exist throughout the federal government. This study was exploratory in nature and driven by the perceived need to place the DoD's experience within greater context. As such, it was developed to address the following research questions:

RQ1. What are the competition and market concentration trends in the DIB over time? Specifically:

- a. What proportion of spend is (non)competitive dollars?
- b. What proportion of spend is (in)effective competition dollars?
- c. How concentrated are the markets?

RQ2. How do the DIB trends compare to other federal government agencies? Specifically:

- a. Are there similar proportions of (non)competitive and (in)effective competition in other agencies?
- b. How concentrated are the markets in other agencies for comparable goods and services purchased from DIB suppliers?

² See the relevant section in the Horizontal Merger Guidelines at <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010#5c>.



Method

Data

A unique dataset was developed based on files downloaded on March 1, 2023 from the Award Data Archive located at USAspending.gov. USAspending.gov is updated with contract data from the U.S. General Services Administration (GSA) Federal Procurement Data System (FPDS) on a nightly basis. Contracts whose estimated value is over the micro-purchase threshold of \$10,000, along with any modification to that contract regardless of dollar value, must be reported in FPDS.³ The downloaded files contain data for all federal government agencies for every fiscal year (October 1 to September 30) from FY 2001 to FY 2022. There are 285 possible data points (i.e., “fields”) for every contract action record, including key information about the contractor (e.g., awardee, awardee parent company, Unique Entity IDs: UEI), contract (e.g., contract type, amount of monies obligated), industry (e.g., Product or Service Code: PSC, North American Industrial Classification System: NAICS code), and solicitation/award process (e.g., award type, use of competition procedures, number of offers received). Because there are often multiple actions involving each contract (e.g., additional work, change orders, close out), the number of contract actions vastly exceed the number of contracts. The number of contract actions varies for each fiscal year and averages roughly 3.5 million observations per year for all government agencies, and an average of just over 2 million observations per year for the DoD (see Table 1)⁴. This dataset represents a nearly universal set of contract transaction information between federal government agencies and private contractors; exceptions include some agencies are not required to report their contract data, confidential contracts with no reporting requirements are absent, and information pertaining to subcontractors is not included.

Procedure

Definitions and measures used in this study adhered as closely as possible to ones used in previous research and government reports. In all analyses the awarding agency was used rather than the funding agency because the former is the agency that creates and administers an award, thereby interacting most directly with a contractor, while the latter pays for the award.⁵ Also, even though in most cases the awarding and funding agency are the same, there appeared to be far more missing data for the funding agency than the awarding agency. For example, for FY02, imputing the awarding agency for missing funding agencies resulted in an additional \$14 billion (5.3% of total federal spend) that were previously unallocated and shifted the relative rankings of many agencies for total dollars obligated on contracts (e.g., USAID went from 30th place to 18th place). Given the research questions, dollars obligated to contractors on DoD contracts are considered to be the defense industrial base whereas dollars obligated on all other agency contracts are used as a point of comparison. Finally, all dollar values have been converted to FY19 dollars using a price deflator calculator provided by the U.S. Department of the Interior.⁶

Both sets of analyses, effective competition and market concentration, proceed through several levels of scrutiny. Each level narrows the markets (i.e., PSCs) under consideration, thereby becoming progressively more focused on the most comparable

³ See https://www.fpds.gov/wiki/index.php/FPDS_FAQ.

⁴ Most tables and figures are included in the appendix due to page constraints.

⁵ See <https://www.usaspending.gov/analyst-guide>.

⁶ See <https://www.doi.gov/sites/doi.gov/files/uploads/2021-pb-deflator.xls>.



market situations between the DoD and other government agencies. Details for the two sets of analyses are provided below.

Effective Competition

Contract actions involving obligated funds are recorded in USAspending data via four types of awards: definitive contracts, purchase orders, BPA calls, and delivery orders (encapsulating delivery orders for supplies and task orders for services). Competition rates in this study were calculated using all four types of awards. Hereafter, “Contracts” refer to definitive contracts and purchase orders and “Delivery Orders” refer to BPA calls and delivery orders. A Contract is a stand-alone legally binding document between a government agency and a contractor. Delivery Orders reference a parent Indefinite Delivery Vehicle (IDV) that are themselves not generally considered contracts for most federal procurement purposes since they do not obligate funds but instead enable funded Delivery Orders with the contractor(s). Examples of IDVs include Government-Wide Acquisition Contracts (GWAC), Indefinite Delivery / Indefinite Quantity (IDIQ) contracts, Federal Supply Schedules (FSS), and Blanket Purchase Agreements (BPA).

The overall (non)competition rate was defined as dollars obligated via (non)competitive Contracts and Delivery Orders as a percentage of all obligations, relying on the “federal action obligation” field. Obligations made on competitive versus non-competitive Contracts were identified using several fields: “extent competed,” “solicitation procedures,” and “fair opportunity/limited sources.” For Contracts, several values in the “extent competed” field indicate competitive procedures whereas others indicate non-competitive procedures. For Delivery Orders, when more than one contractor has been awarded a parent award under an IDV, a fair opportunity to compete for ensuing delivery orders is generally afforded to each contractor. Therefore, when a Delivery Order indicated that it was subject to multiple-award fair opportunity in the “solicitation procedures” field, but it was ultimately awarded using an exception to fair opportunity as noted in the “fair opportunity/limited sources” field, this was counted as a non-competitive contract action. For Delivery Orders not subject to fair opportunity, such as those based on a single award IDV where further competition is rendered moot, the competition data was derived from the underlying IDV, thereby treating it more similarly to Contracts. This overall (non)competition rate includes all Contracts and Delivery Orders where (non)competitive procedures were used regardless of the number of offers received.

As mentioned before, under the DoD’s Better Buying Power policy, effective competition is a subset of competition defined as those situations when more than one offer was received in response to a competitive solicitation. Conversely, “ineffective competition” is a situation where only one offer is received for a competitive solicitation. The effective and ineffective competition rates were similarly defined in this study and computed for competitive contract actions using the “number of offers” field.

Analyses were conducted in a series of steps to make ever more meaningful comparisons between the DoD and other agencies. First, the effective competition, non-effective competition, and non-competed contract actions for all products and services were calculated for the DoD and all other federal agencies combined. Then, the analysis was repeated after removing research and development (R&D) services contracts so as to not include contracts likely to be related to the development of weapons systems, a unique DoD mission.⁷ Finally, in an exploratory attempt to evaluate markets that are not dominated by a

⁷ See the following GAO reports for the basis of this rationale, although most of those reports also excluded products in their analysis: GAO-12-384, GAO-13-325, GAO-14-395, and GAO-15-484r.



single agency, which is usually the DoD, the analysis was further restricted to only those selected markets (PSCs) for which no agency represented more than 90% of the dollars obligated to contractors in that market for each year. For example, in FY15, the U.S. Department of State represented 90.2% of the market for repair or alteration of museums and exhibition buildings (PSC: Z2JA), and in FY17 the DoD represented 97.4% of the market for combat ships and landing vehicles (PSC: 1905). Consequently, those two markets were excluded in the final analysis for their respective fiscal years. This was done to remove any potential monopsony effects and to approximate the level of competition for goods and products that are more widespread in the federal government. After all, everyone buys pencils, but only the U.S. Air Force buys F-15s.

Market Concentration

The “Product or Service Code” (PSC) field, a government-designed code that identifies the product or service procured, was used to define markets in each government agency. The PSC field was used instead of the “naics” field representing the North American Industrial Classification System (NAICS) code because the amount of obligated dollars attributed to PSCs was greater than those attributed to NAICS codes in every fiscal year (in some years, nearly 15% more obligated dollars). Relying on files available on the Acquisition.gov PSC Manual website⁸ and other search capabilities and files provided by the handy Defense Pricing and Contracting (DPC) Office PSC selection tool website⁹, wherever possible individual-level PSCs were consolidated into spend categories at the Level 2 category-level (e.g., “18.5 Technical Representative Services”). Many of the older PSCs still in use do not have a Level 2 categorization; in those instances, the PSC itself was used. Some PSCs have changed over time but most of them have retained their original codes and meanings as they have been updated; the ones used in this study are current as of April 2022.

Contract awardees and their parent companies were identified based on their Unique Entity IDs (UEIs) generated by SAM.gov for use across the federal government. This 12-character alphanumeric ID number has subsumed the nine-digit Dun & Bradstreet D-U-N-S Numbers historically used to identify companies prior to April 4, 2022. Since large contractors will frequently have multiple subsidiary companies, the parent company was used rather than contract awardees in market concentration analyses to gain a truer sense of the cumulative market share captured by a company’s various subsidiaries. Additional steps were taken to consolidate parent companies that have multiple unique identifiers; these companies were identified by matching their Global Company Key (GVKEY) in the Capital IQ Compustat database for all firms in the S&P 1500 at any point from 2000–2021.

Dollars obligated using the “federal action obligation” field were used to calculate the market share of each contractor. Market share was defined as the revenues generated per parent company divided by the total amount obligated within each agency market, per fiscal year. However, many contracts continue year-to-year and in any given fiscal year a contractor may have net negative obligated dollars in a market, perhaps reflecting a close-out action or defunding action. As a reminder, the HHI captures the level of market concentration by summing the squares of the relative market share of each competitor. Therefore, only companies that had a net positive revenue in a market from the government were included in all analyses since it does not make sense to include negative market shares. Furthermore, squaring those results would make those negative values turn

⁸ See <https://www.acquisition.gov/psc-manual>.

⁹ See <https://psctool.us/>.



positive, leading to the inaccurate appearance of positive market share and erroneously contributing to the HHI calculation. The Herfindahl-Hirschman index (HHI) measure was then calculated to assess the level of market concentration within each agency market.

Similar to the effective competition analyses, multiple levels of market concentration analyses were conducted to examine the trends of market concentration for the DoD and all other agencies combined. First, market concentration for all markets without restriction was examined. Then, the analysis was repeated twice, first without R&D services contracts and then with only the selected markets identified earlier. Since there are roughly 100 markets for every agency in each fiscal year, for presentation purposes this paper only shows a subsection of those selected markets, as follows. All selected markets for every year were ranked according to total obligated dollars and five PSCs rose to the top. These five PSCs (R425, R499, D399, 6505 and R408) ranked in the top five of total dollars obligated for every fiscal year since FY10, with three of the PSCs (R425, R499, and D399) ranked in the top five since FY01 and the remaining two PSCs (6505 and R408) still ranked in the top ten since FY01. These five PSCs cumulatively represented roughly 12%–15% of the total dollars obligated by the federal government each year from FY10–FY19.¹⁰

Table 2. Selected PSCs for HHI Analysis

PSC Code	PSC Description	Level 2 PSC Category
R425	Support-Professional: Engineering/Technical	Technical and Engineering Services (non-IT)
R499	Support-Professional: Other	Management Advisory Services
6505	Drugs and Biologicals	Drugs and Pharmaceutical Products
D399	IT and Telecom—Other IT and Telecommunications*	--
R408	Support-Professional: Program Management/Support	Management Advisory Services

Results

The research questions aimed to identify important acquisition trends like effective competition and market concentration in the DIB and to establish whether there are substantial differences between the DoD and other government agencies. Results are presented in several categories below, accompanied by a short conclusion detailing the importance of the results. Due to page constraints, only FY10–FY19 results are shown and discussed below, but similar results for FY01–FY09 are available from the author upon request.

As overview, Table 3 shows the trends in the contractor base for both the entire federal government and the DoD. The number of new DoD contractors has declined every subsequent year since FY05 with one exception (FY13 to FY14), which is reflective of the shrinking DIB trend noted in other research reports. However, the number of new contractors as a percentage of unique contractors with DoD contracts is in near perfect synchronicity with the entire federal contractor base (see Table 4). The rate of contractors exiting the DIB is also mirrored in the overall federal contractor base, although the absolute

¹⁰ Only a handful of those PSCs dominated by a single agency (e.g., 1510: fixed wing aircraft), excluded from this analysis, accounted for similarly high obligated dollars. As such, these five PSCs are an excellent sub-group to use.



numbers for more recent years should be taken with a grain of salt since they are based on fewer ensuing fiscal years. Regardless, given that DoD contractors consistently represent less than half of all federal government contractors, these numbers demonstrate that the overall shrinking contractor base appears to be dispersed throughout the federal government and is not a phenomenon that is unique to the DoD.

Table 4. New Prime Contractor Rate (% of Unique Contractors)

Fiscal Year	Total	DoD
FY10	19.1%	18.0%
FY11	17.3%	16.5%
FY12	14.1%	14.5%
FY13	12.5%	11.9%
FY14	13.2%	13.1%
FY15	13.0%	13.2%
FY16	12.8%	12.8%
FY17	12.7%	12.2%
FY18	11.9%	11.9%
FY19	10.9%	11.2%

Effective Competition

The results for the overall competition rates of the DoD versus all other agencies combined are shown in both dollar amounts (Figure 2) and percentages (Figure 3). Figures 4 and 5 show the same results for all contracts excluding R&D services contracts. Overall, in all years the proportion of contracts not competed is higher for the DoD than all other agencies; for the DoD it ranges from 37%–56% while for other agencies it ranges from 20%–34%. This is not surprising given the relatively higher rates of sole source contracting conducted by the DoD. The ineffective competition rate as a proportion of all contracts, however, is much smaller for the DoD than it is for all other agencies. For the DoD, it ranges from 7%–13% whereas for all other agencies it ranges from 11%–21%. When the R&D services contracts are removed, the competition rates for both the DoD and other agencies combined generally went up slightly. In short, this means that when contracts are competed by the DoD, they are more effectively competed than other agencies.

When considering the competition dollars and rates for the selected market only (Figures 6 and 7), a clear but relatively uninteresting pattern emerges. For example, for the DoD in FY19, an overall ineffective competition rate of 18.2% had improved to 15.6% when R&D services contracts were removed. However, when considering only the selected markets, the ineffective competition rate reverts to 17.6%. This same pattern is generally consistent in all the data for the DoD and other agencies, which means there is little value in examining markets less dominated by a single agency, at least based on the 90% threshold used in this analysis. As such the effective competition rate was not calculated for these selected markets.

Figure 8 shows the effective versus ineffective competition rates for all contracts for the DoD and all other agencies combined, followed by the same results for all contracts excluding R&D services contracts in Figure 9. When considering only the competed contracts, in almost every year (except FY03) the DoD's effective competition rate as a portion of its overall competed contracts is higher than all other agencies. This mirrors the result seen in the rates of all types of competition. When the R&D services contracts are excluded from analysis, from FY10–FY19 the DoD's effective competition rate increases,



albeit slightly, while the effective competition rate of the other agencies remained roughly the same or slightly decreased.

The primary research question driving this part of the paper was: what are the key trends and how does the DoD compare to other agencies in terms of effective competition? In conclusion,

1. The DoD has a lower overall competition rate than all other agencies combined.
2. The ineffective competition rate as a percentage of overall obligations was lower for the DoD than all other agencies for every fiscal year. This means that when competed, the DoD has a better track record than other agencies at achieving the goal of competition with at least two bidders. While much attention has been focused on the DoD's non-competition rate, its higher effective competition rate is worth highlighting.
3. This result becomes starker when all R&D services contracts are excluded, providing a more relevant comparison between the DoD and all other agencies combined.

Market Concentration

As a way of obtaining an overall picture of market concentration in the DoD compared to all other agencies combined, averages were calculated based on the HHIs for every individual market and then weighted by the value of each of those markets against the total dollars obligated by the DoD and all other agencies. As demonstrated in Figure 10, when considering all contracts, with a few exceptions both the DoD and all other agencies exhibit HHI values mostly just below the moderately concentrated threshold of 1,500. The DoD consistently has a lower HHI value than other agencies for most of the FY10–FY19 time period, albeit only slightly in many cases. This means that the market concentration within the DoD is slightly better than it is for the rest of the federal government, which runs contrary to the rhetoric of a market concentration problem in the DIB. This result, however, largely reverses when all R&D services contracts are excluded (see Figure 11). In this instance, whereas both the DoD and the other agencies exhibit decreased market concentration, the DoD's decrease is not as great when compared to the rest of the government.

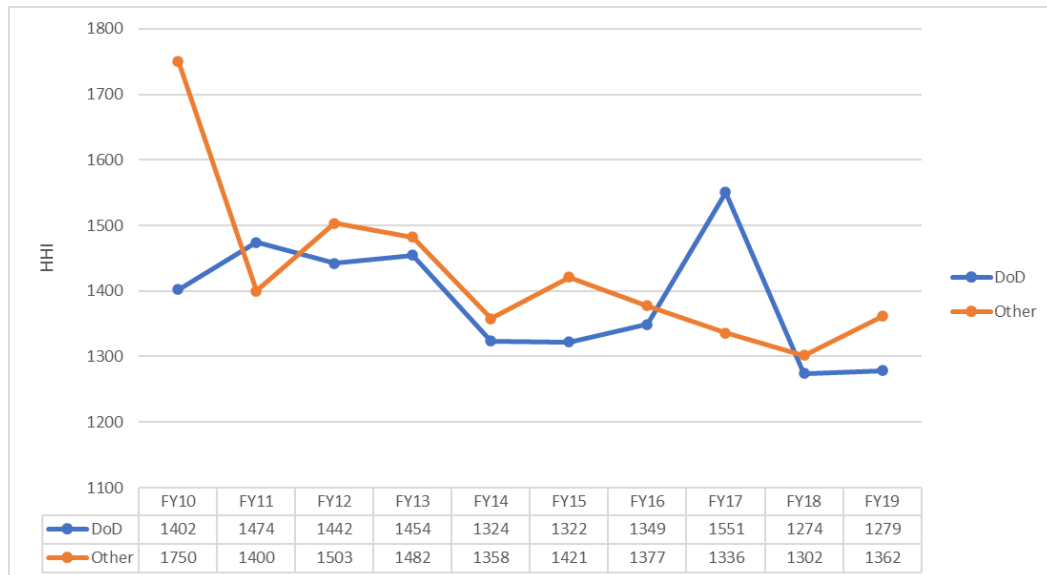


Figure 10. HHI (Weighted Average), All Contracts



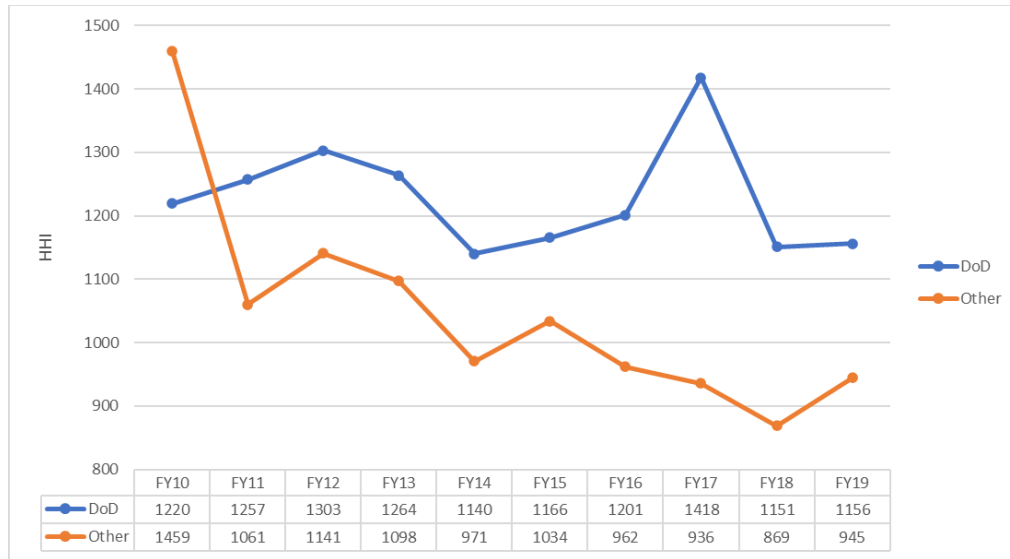


Figure 11. HHI (Weighted Average), R&D Services Contracts Excluded

The HHI results for the DoD and all other agencies combined for the five markets under direct examination in this paper are presented in Figures 12–16. The DoD has higher market concentration than all other agencies combined for almost every year in all five markets, with the exception of a few years in the largest dollar market (R425 Support-Professional: Engineering/Technical). This result reflects the general concern that the DoD has a market concentration problem. However, it is important to note that similar to the overall HHI, only one of those four markets (6505 Drugs and Biologicals) is at a level that would be considered highly concentrated. In fact, none of the other four markets would even be considered moderately concentrated as their HHI values are below 1,500. This means that while the DoD is more concentrated in comparison to other government agencies for these five markets, it still does not appear to rise to a high level of concern according to U.S. Department of Justice standards.

Contributions, Limitations, and Future Research

The contributions of this study are threefold. First, the trends identified advance our collective knowledge of the evolving situation within DoD acquisition. Specifically, the results provide insight into the potential effects of the shrinking defense industrial base on effective competition and market concentration in the DIB. Second, the study sheds light on how competition and concentration trends in the DoD compare to the rest of the federal government. This provides important context for certain debates regarding the overall standing of the DoD on important issues that concern the entire federal government. Third, the database developed for this study provides a strong foundation to contribute further to the sparse literature on government contracting. The Center for Government Contracting at George Mason University is already underway improving on this proprietary dataset and using it to facilitate additional research on important acquisition topics.

This study has several potential limitations, including that it majorly relies on USAspending.gov data. Contract information is manually entered by hundreds of different contract analysts across the federal government, so even with best efforts and training the information is undoubtedly incomplete in areas or contains errors that cannot be easily identified. Also, the data are limited in that only unclassified program information and prime contractor information is available. These concerns notwithstanding, the USAspending.gov



data are regularly relied upon by other government agencies like the U.S. General Accounting Office. That office has generally noted in recent reports that system-wide changes implemented at least as of October 2009 have mitigated many previous errors and make the data suitable for analysis. The lack of classified programs is not likely to significantly impact the overall results, as Carril and Duggan (2020) reported that classified contract actions accounted for only 1.4% of contract obligations from 1985 through 2001. Finally, recent efforts at capturing more subcontractor activity in the Electronic Subcontracting Reporting System should bear fruit in the future. Therefore, it appears that for the time being USAspending.gov remains the single best, most authoritative source of federal contract information.

A logical extension of research focused on the concepts of effective competition and market concentration would be to examine their effects on outcomes like the quality of contracts, contract transaction costs, acquisition process costs, and overall program costs. For example, additional analysis can calculate what the HHI of a market in one year means for the contract awards of the following year(s) since the level of market competitiveness may be a predictor of the distribution of future awards. A few studies have done this type work to-date (e.g., Hunter et al., 2019; Josephson et al., 2019; Sanders & Huitink, 2018), and more research in this vein would be welcome. Other future research should probably examine specific aspects of the reduction of prime contractors in the DIB. The results of this study show that the number of new contractors has declined nearly every subsequent year since FY05, a phenomenon that has been similarly noted in other research. The barriers to entry experienced by potential new contractors are an important area that should receive more rigorous empirical investigation. Additionally, contractors exiting the DIB is another contributing factor to the overall reduction in prime contractors. This is usually attributed to DIB “consolidation,” which implies mergers and acquisitions. While this activity undoubtedly contributes to the declining numbers of prime contractors, it is not likely to be the sole explanation. Other reasons for why contractors are exiting the prime supplier base should be investigated more thoroughly; otherwise, effective interventions cannot be designed to ameliorate the situation.

Conclusion

This study was exploratory and descriptive in nature, mostly concerning itself with DoD acquisition trends and comparing them with the rest of the federal government. The results of this study show that across many markets the DoD shows higher levels of effective competition and reasonable levels of concentration compared to other federal government agencies. Additionally, despite the decline in the number of prime contractors, the DoD’s effective competition rate and level of market concentration do not appear to be negatively affected. This should be encouraging to DoD policymakers, and it likely means that future research efforts can focus on other fruitful areas of government contracting.

References

- Adjei, S. O., & Hendricks II, C. O. (2022). *Increasing defense contractor competition in a predominately sole-source contracting environment* [Thesis, Acquisition Research Program]. <https://dair.nps.edu/handle/123456789/4529>
- Amiti, M., & Heise, S. (2021). U.S. market concentration and import competition. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3847929>
- Autor, D., Dorn, D., Katz, L. F., Patterson, C., & Van Reenen, J. (2020). The fall of the labor share and the rise of superstar firms. *The Quarterly Journal of Economics*, 135(2), 645–709. <https://doi.org/10.1093/qje/qjaa004>



- Bresler, A., & Bresler, A. (2020, May 13). The effect of defense-sponsored innovation programs on the military's industrial base. *Acquisition Research: Creating Synergy for Informed Change*. Seventeenth Annual Acquisition Research Symposium, Online. <https://dair.nps.edu/bitstream/123456789/4208/1/SYM-AM-20-059.pdf>
- Carril, R., & Duggan, M. (2020). The impact of industry consolidation on government procurement: Evidence from Department of Defense contracting. *Journal of Public Economics*, 184, 104141. <https://doi.org/10.1016/j.jpubeco.2020.104141>
- Cool, K., Röller, L.-H., & Leleux, B. (1999). The relative impact of actual and potential rivalry on firm profitability in the pharmaceutical industry. *Strategic Management Journal*, 20(1), 1–14. [https://doi.org/10.1002/\(SICI\)1097-0266\(199901\)20:1<1::AID-SMJ995>3.0.CO;2-X](https://doi.org/10.1002/(SICI)1097-0266(199901)20:1<1::AID-SMJ995>3.0.CO;2-X)
- Council of Economic Advisers. (2016). *Benefits of competition and indicators of market power*. Executive Office of the President. https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160414_cea_competition_issue_brief.pdf
- Ganapati, S. (2021). Growing oligopolies, prices, output, and productivity. *American Economic Journal: Microeconomics*, 13(3), 309–327. <https://doi.org/10.1257/mic.20190029>
- Gansler, J. S. (2011). *Democracy's arsenal: Creating a twenty-first-century defense industry*. MIT Press. <https://books.google.com/books?id=b8zxCwAAQBAJ>
- Grullon, G., Larkin, Y., & Michaely, R. (2019). Are U.S. industries becoming more concentrated? *Review of Finance*, 23(4), 697–743. <https://doi.org/10.1093/rof/rfz007>
- Hunter, A. P., Sanders, G., & Huitink, Z. (2019). *Evaluating consolidation and the threat of monopolies within industrial sectors*. Center for Strategic & International Studies: Defense-Industrial Initiatives Group. <https://www.csis.org/analysis/evaluating-consolidation-and-threat-monopolies-within-industrial-sectors>
- Josephson, B. W., Lee, J.-Y., Mariadoss, B. J., & Johnson, J. L. (2019). Uncle Sam rising: Performance implications of business-to-government relationships. *Journal of Marketing*, 83(1), Article 1. <https://doi.org/10.1177/0022242918814254>
- Sanders, G., & Huitink, Z. (2018). What does consolidation mean for performance? Concentration, competition, and defense contracting outcomes. *Journal of Strategic Contracting and Negotiation*, 4(1–2), 30–57. <https://doi.org/10.1177/2055563620921116>
- United States Department of Justice, Antitrust Division. (2018, July 31). *Herfindahl-Hirschman index*. <https://www.justice.gov/atr/herfindahl-hirschman-index>
- United States General Accounting Office. (2012). *Defense contracting: Competition for services and recent initiatives to increase competitive procurements* (GAO-12-384). <https://www.gao.gov/assets/gao-12-384.pdf>
- United States General Accounting Office. (2013). *Defense contracting: Actions needed to increase competition* (GAO-13-325). <https://www.gao.gov/assets/gao-13-325.pdf>
- United States General Accounting Office. (2014). *Defense contracting: Early attention in the acquisition process needed to enhance competition* (GAO-14-395). <https://www.gao.gov/assets/gao-14-395.pdf>
- United States General Accounting Office. (2015). *Defense contracting: DoD's use of competitive procedures* (GAO-15-484r). <https://www.gao.gov/assets/gao-15-484r.pdf>
- United States General Accounting Office. (2021). *Small business contracting: Actions needed to implement and monitor DoD's small business strategy* (GAO-22-104621). <https://www.gao.gov/assets/gao-22-104621.pdf>



Table 1. Contract Actions and Obligated Dollars

Fiscal Year	Start Date	End Date	Contract Actions (Total)	Contract Actions (DoD*)	Sum of Obligated Dollars (Total)	Sum of Obligated Dollars (DoD)	DoD Obligations / Total Obligations
FY01	10/1/2000	9/30/2001	642,069	344,057	\$313,055,709,309	\$203,755,868,821	65%
FY02	10/1/2001	9/30/2002	830,653	498,343	\$365,993,413,713	\$236,975,665,973	65%
FY03	10/1/2002	9/30/2003	1,183,910	622,576	\$440,758,210,394	\$288,584,669,184	65%
FY04	10/1/2003	9/30/2004	2,001,920	751,042	\$449,474,407,677	\$306,219,578,319	68%
FY05	10/1/2004	9/30/2005	2,923,827	1,422,643	\$502,664,325,983	\$347,914,078,506	69%
FY06	10/1/2005	9/30/2006	3,798,103	1,365,909	\$536,467,883,431	\$374,089,479,051	70%
FY07	10/1/2006	9/30/2007	4,112,108	1,471,782	\$569,581,606,299	\$404,736,150,299	71%
FY08	10/1/2007	9/30/2008	4,505,579	1,598,235	\$635,794,000,955	\$466,632,357,828	73%
FY09	10/1/2008	9/30/2009	3,497,431	1,519,332	\$634,184,321,975	\$437,995,529,663	69%
FY10	10/1/2009	9/30/2010	3,543,595	1,568,107	\$646,834,214,212	\$424,823,840,472	66%
FY11	10/1/2010	9/30/2011	3,408,259	1,549,799	\$608,717,931,604	\$422,235,710,389	69%
FY12	10/1/2011	9/30/2012	3,129,370	1,462,380	\$574,855,572,309	\$401,574,270,801	70%
FY13	10/1/2012	9/30/2013	2,514,645	1,335,207	\$503,749,329,286	\$336,159,316,572	67%
FY14	10/1/2013	9/30/2014	2,528,295	1,349,267	\$477,569,703,466	\$304,501,785,864	64%
FY15	10/1/2014	9/30/2015	4,374,783	3,209,315	\$468,146,197,631	\$291,945,653,893	62%
FY16	10/1/2015	9/30/2016	4,821,448	3,668,472	\$502,392,329,856	\$315,366,246,225	63%
FY17	10/1/2016	9/30/2017	4,912,578	3,670,466	\$530,671,054,531	\$334,602,839,954	63%
FY18	10/1/2017	9/30/2018	5,617,867	4,508,657	\$565,393,321,313	\$365,629,889,690	65%
FY19	10/1/2018	9/30/2019	6,486,887	4,340,286	\$590,177,739,500	\$383,626,685,588	65%

Note. All dollar values adjusted for 2019 dollar values.

*DoD indicates any contract action where the DoD is listed as the awarding agency.



Table 3. Contractors

Fiscal Year	Unique Contractors* (Total)	Unique Contractors (DoD)	Exiting Contractors^ (Total)	Exiting Contractors (DoD)	New Contractors† (Total)	New Contractors (DoD)
FY01	70,242	33,949	12,961	5,415	--	--
FY02	82,616	45,406	15,109	7,712	38,310	22,875
FY03	104,549	57,396	21,409	10,211	45,098	24,516
FY04	135,122	68,522	26,792	12,921	58,882	26,147
FY05	164,870	84,009	33,522	17,808	61,452	29,058
FY06	171,401	80,388	31,781	15,361	49,227	19,768
FY07	176,588	82,090	32,522	15,579	41,672	17,673
FY08	179,443	81,274	36,066	15,697	38,796	16,438
FY09	173,626	80,825	31,872	16,062	35,880	15,783
FY10	174,579	79,043	33,239	16,050	33,330	14,255
FY11	170,803	76,014	37,093	16,013	29,476	12,573
FY12	155,025	71,023	30,973	15,345	21,871	10,275
FY13	142,634	63,913	26,445	12,633	17,762	7,626
FY14	138,816	61,529	25,379	11,501	18,292	8,055
FY15	136,835	60,844	25,914	11,928	17,797	8,043
FY16	133,984	58,756	26,746	11,673	17,084	7,496
FY17	137,850	56,920	34,167	12,110	17,481	6,939
FY18	123,962	54,386	29,580	12,754	14,794	6,476
FY19	113,650	51,099	30,223	14,474	12,417	5,731

Note. Each Fiscal year runs from October 1 through September 30, named for the year in which it ends.

*All Contractors hereafter reference parent companies of award recipients.

^Contractors with no contract records in ensuing fiscal years, through FY20.

†Contractors with a contract record from any previous fiscal year, starting in FY01.



Figure 2. Competition Rates, All Contracts (\$)

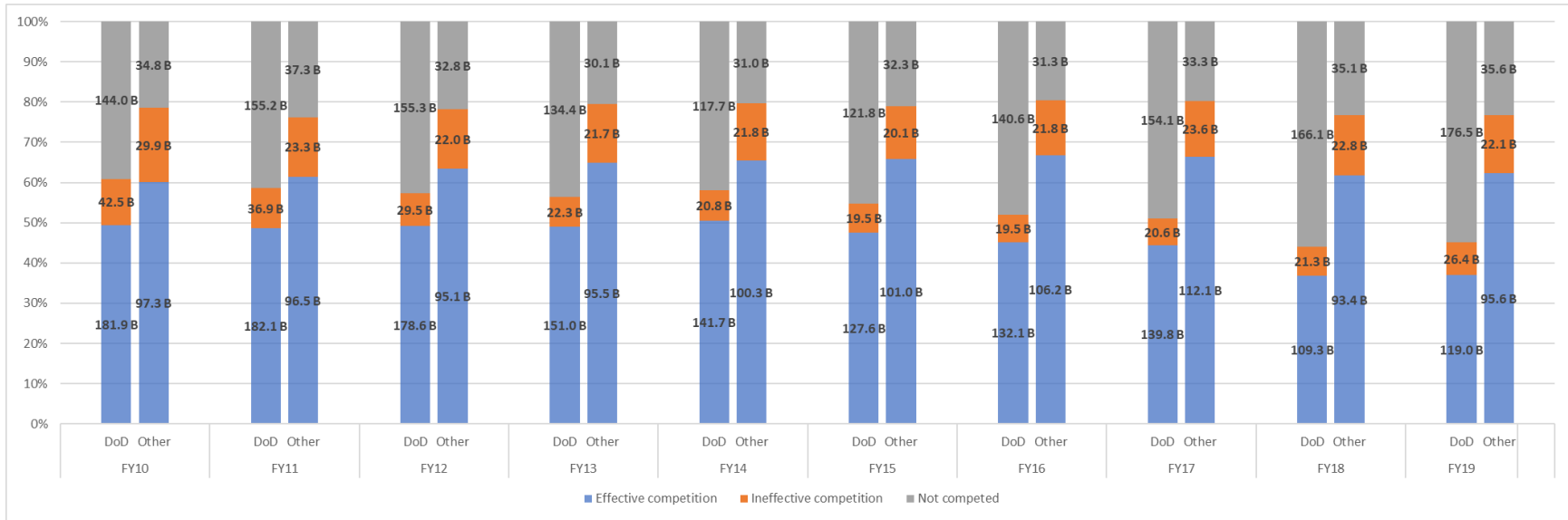


Figure 3. Competition Rates, All Contracts (%)

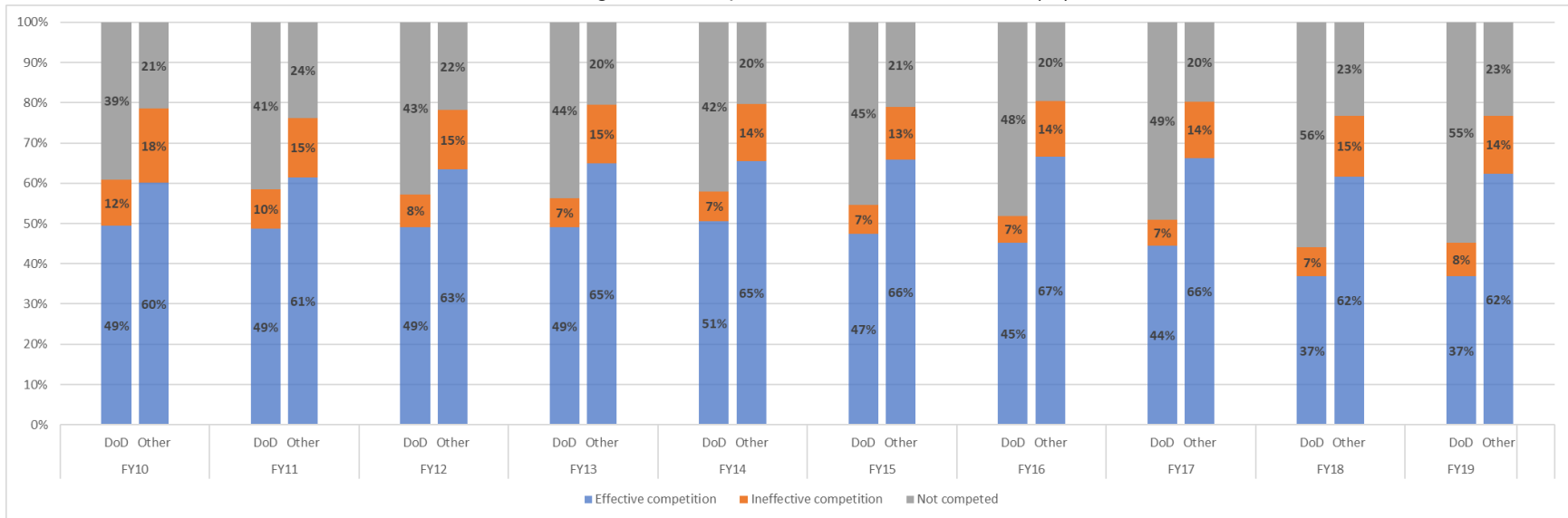


Figure 4. Competition Rates, R&D Services Contracts Excluded (\$)

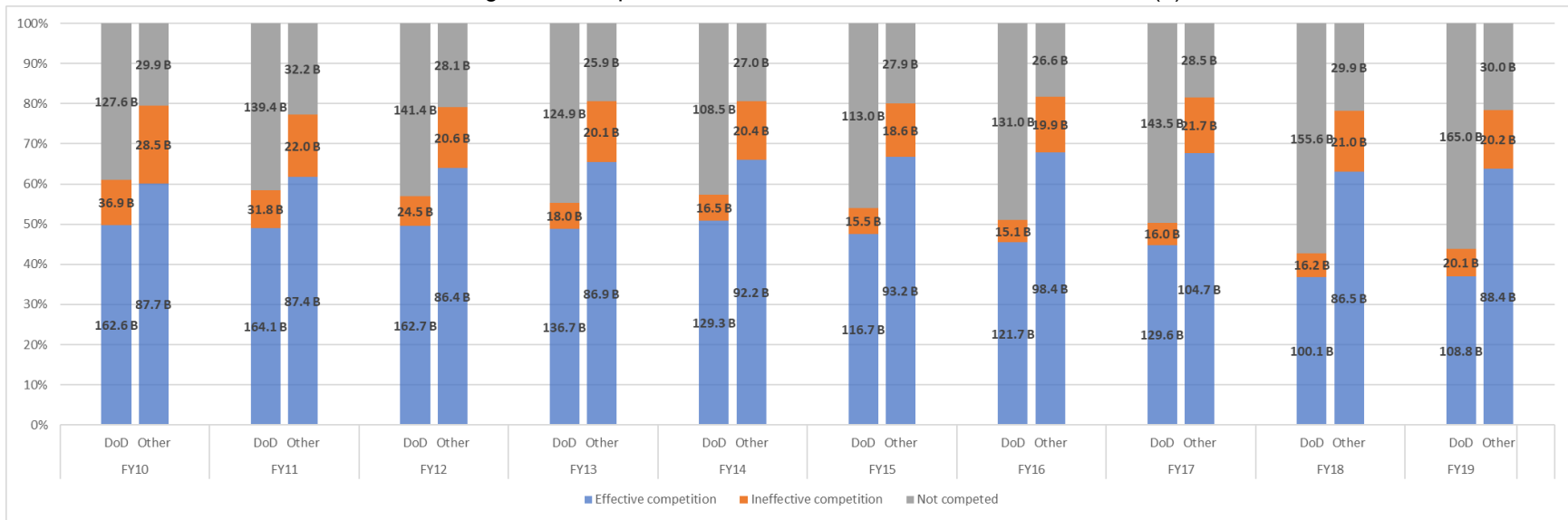


Figure 5. Competition Rates, R&D Services Contracts Excluded (%)

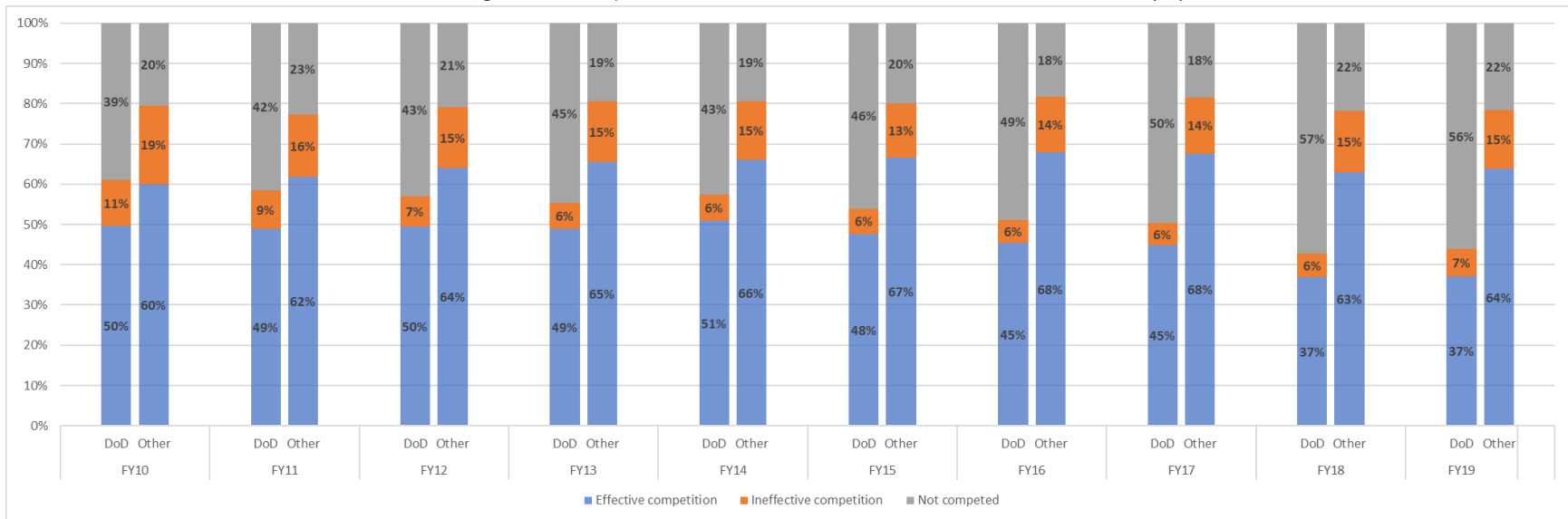


Figure 6. Competition Rates, Selected Markets (\$)

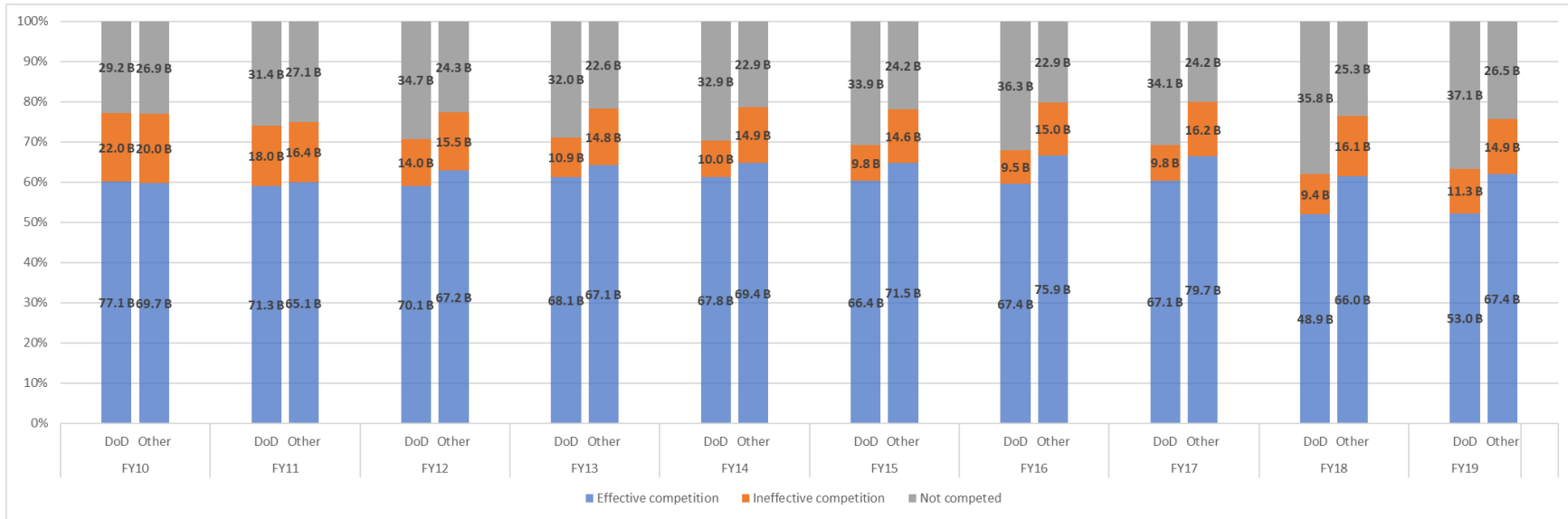


Figure 7. Competition Rates, Selected Markets (%)

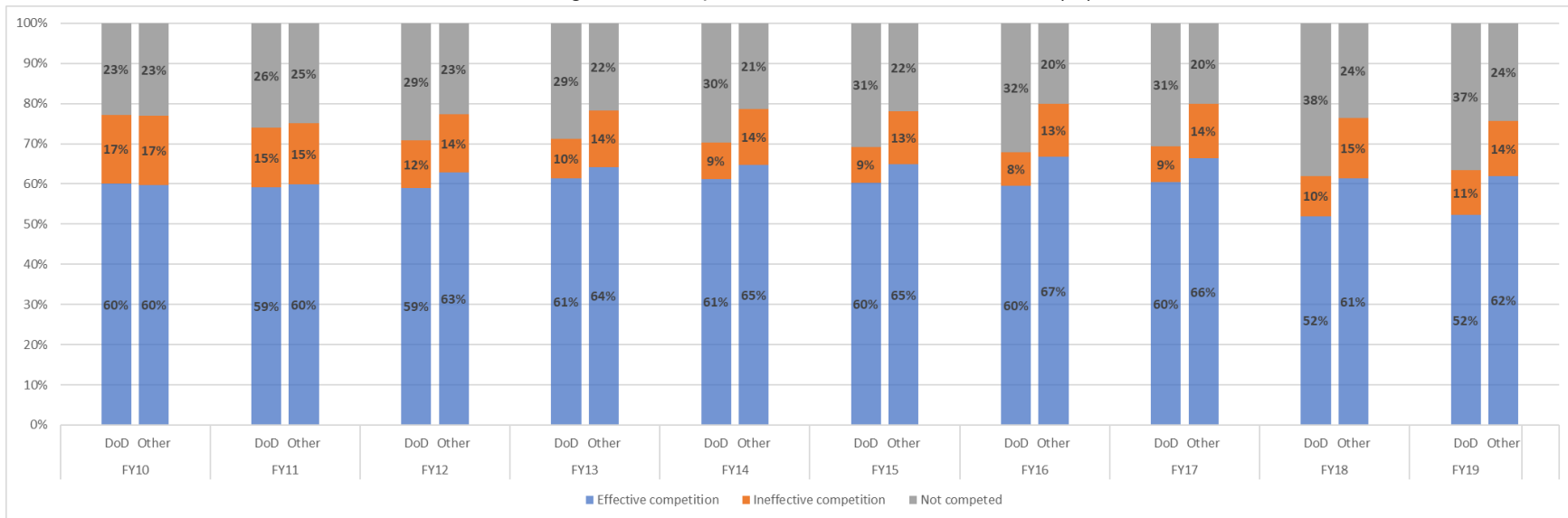


Figure 8. Effective vs. Ineffective Competition Rates, All Contracts (%)

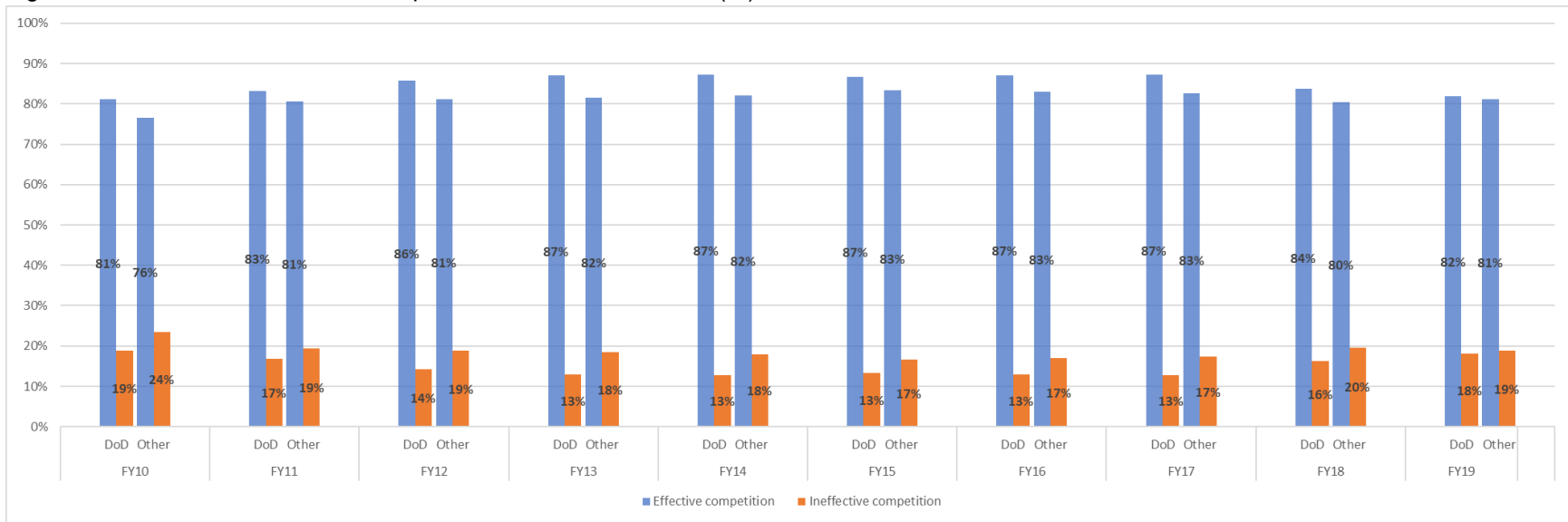
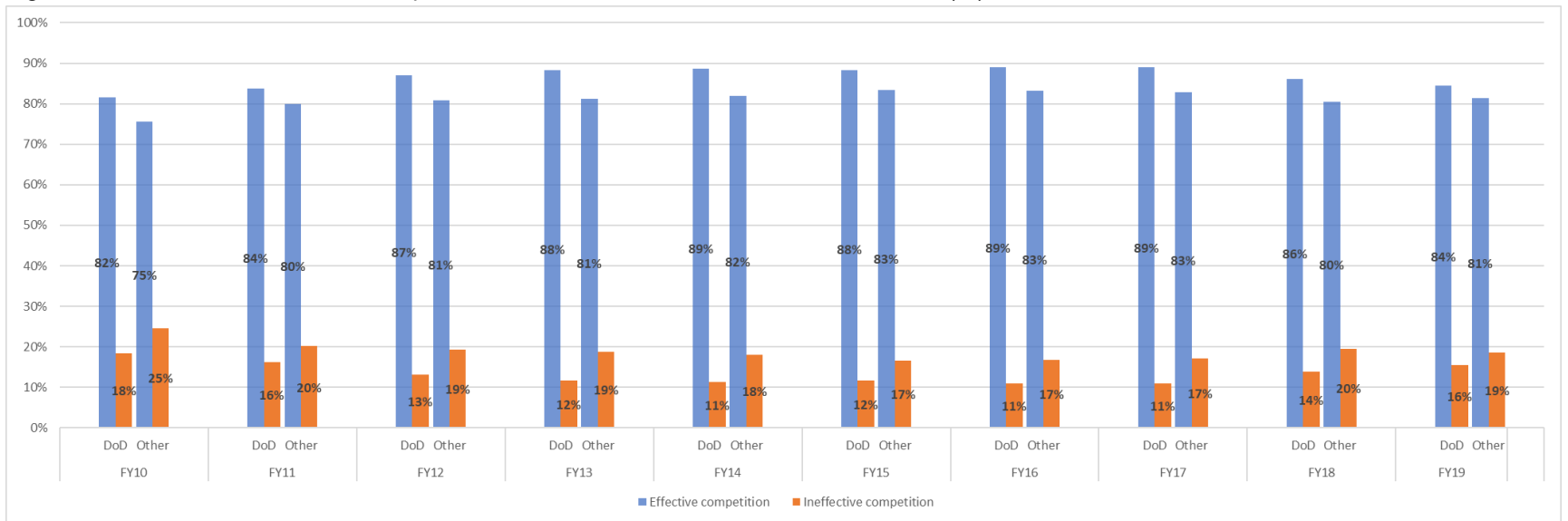


Figure 9. Effective vs. Ineffective Competition Rates, R&D Services Contracts Excluded (%)



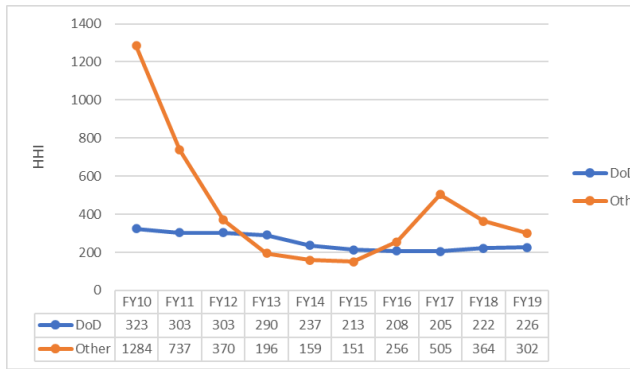


Figure 12. R425 Support-Professional: Engineering/Technical

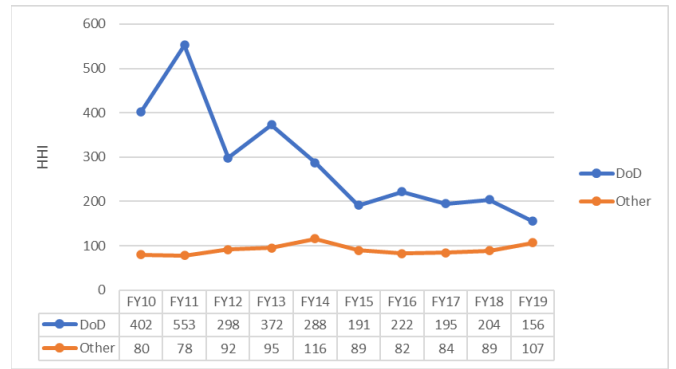


Figure 15. D399 IT and Telecom—Other IT and Telecommunications

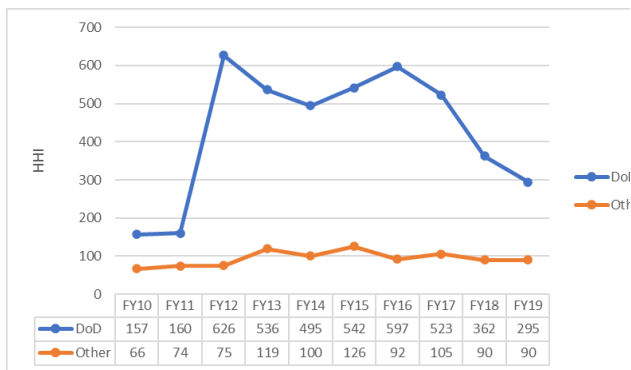


Figure 13. R499 Support-Professional: Other

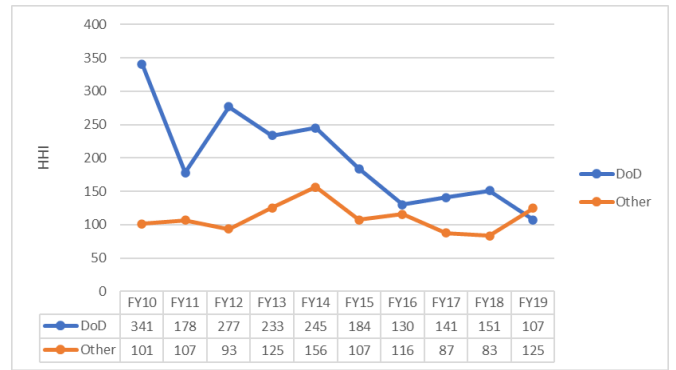


Figure 16. R408 Support-Professional: Program Management/Support

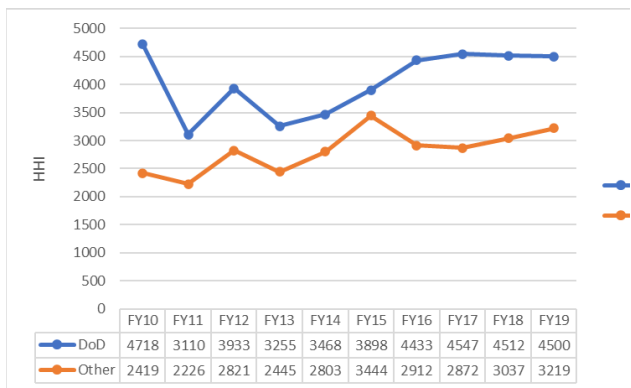


Figure 14. 6505 Drugs and Biologicals





ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF DEFENSE MANAGEMENT
NAVAL POSTGRADUATE SCHOOL
555 DYER ROAD, INGERSOLL HALL
MONTEREY, CA 93943

WWW.ACQUISITIONRESEARCH.NET