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**ANALYSIS OF PRICE AND PROGRAM GROWTH IN
OPERATION AND MAINTENANCE, NAVY**

June 2020

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MAINTENANCE, NAVY**

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requirements for the degree of

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ANALYSIS OF PRICE AND PROGRAM GROWTH IN OPERATION AND MAINTENANCE, NAVY

ABSTRACT

For decades, operation and maintenance (O&M) has been growing as a share of the defense budget. To understand the drivers of that growth, we examined OP-32 and OP-32A data, which are the summary of price and program changes from the Navy's annual budget requests, and attempted to isolate price and program growth by budget activity and object class. We found violations in sound principles of budgeting and financial management regarding Overseas Contingency Operations (OCO) funding and how the annual budgets report the allocation of funding. Due to the lack of transparency and traceability of the current base budget practices, a clear answer to our primary research question could not be produced. The current base budgeting practices do not meet the ideals and are not effective. In lieu of providing insights into the growth of O&M at the budget activity and object class level, we provide recommendations to improve the transparency and completeness of defense budgets.

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TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	BACKGROUND	1
B.	BUDGET PROCESS AND STRUCTURE.....	2
C.	O&M, NAVY FUNDING	10
II.	METHODOLOGY	13
A.	IDENTIFYING THE DATA.....	13
B.	ORGANIZING THE DATA	14
C.	ANALYZING THE DATA	16
III.	ANALYSIS	19
A.	TOTAL O&M INCREASE OVERVIEW	19
B.	SIGNIFICANT YEARS OF GROWTH.....	20
C.	PRICE GROWTH CONTRIBUTION TO TOTAL GROWTH.....	22
D.	PROGRAM GROWTH CONTRIBUTION TO TOTAL GROWTH.....	26
E.	PRICE AND PROGRAM GROWTH CONTRIBUTION TO TOTAL GROWTH.....	29
F.	OBJECT CLASSES AND BUDGET ACTIVITIES DRIVING GROWTH.....	33
1.	Average Annual Rate of Change	33
2.	Budget Activities with Price and Program Growth.....	34
3.	Object Classes Driving Price Growth	36
4.	Object Classes Driving Program Growth.....	36
IV.	DISCUSSION	39
A.	CONTRADICTING RESULTS	39
B.	PRINCIPLES OF BUDGETING	42
C.	BUDGET ISSUES WITH OCO FUNDING.....	42
V.	CONCLUSION	45
A.	SUMMARY OF FINDINGS	45
B.	RECOMMENDATIONS FOR GOVERNMENT.....	46
C.	RECOMMENDATIONS FOR FURTHER RESEARCH	46
	LIST OF REFERENCES.....	49
	INITIAL DISTRIBUTION LIST	53

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LIST OF FIGURES

Figure 1.	Summary of the phases of the PPBE process. Source: P. Candreva (PowerPoint slides, August 23, 2017).....	3
Figure 2.	Future years defense plan program structures. Source: Candreva (2017, p. 206).....	5
Figure 3.	Budget activity information shown in Department of the Navy FY 2021 budget estimates. Source: OUSD (C) (2020a).....	6
Figure 4.	O&M, N budget activities and activity groups. Source: P. Candreva (PowerPoint slides, August 23, 2017).....	7
Figure 5.	Operating forces sub-activity groups. Source: P. Candreva (PowerPoint slides, August 23, 2017).....	8
Figure 6.	Object class information shown in Department of the Navy FY 2021 budget estimates. Source: OUSD (C) (2020a).....	9
Figure 7.	Appropriation groups as a percentage of total Navy budget.....	11
Figure 8.	Budget activities' actual, enacted, and estimated price and program growth and budget appropriations. Adapted from OUSD (C) (2020a).....	15
Figure 9.	O&M, N total budget information shown in Department of the Navy FY 2021 budget estimates. Source: OUSD (C) (2020a).....	16
Figure 10.	Total O&M, N increase/decrease (\$ in thousands).....	20
Figure 11.	Total O&M, N increase/decrease with years of significant growth and outliers bracketed (\$ in thousands)	21
Figure 12.	Price growth as a percentage of total growth.....	23
Figure 13.	Price growth and total budget change (\$ in thousands)	25
Figure 14.	Program growth as a percentage of total growth	26
Figure 15.	Program growth and total budget change (\$ in thousands).....	28
Figure 16.	Price and program growth as a percentage of total growth	29
Figure 17.	Price and program growth by year (\$ in thousands).....	31

Figure 18.	Object class price growth (\$ in thousands)	36
Figure 19.	Object class program growth (\$ in thousands)	37
Figure 20.	Price and program change from 2001 to 2020 (\$ in thousands)	41

LIST OF TABLES

Table 1.	The goals of each PPBE phase. Adapted from Candreva (2017, p. 209).	3
Table 2.	Total O&M increase/decrease for years of significant growth (\$ in thousands)	22
Table 3.	Price growth as a percentage of total growth (\$ in thousands)	24
Table 4.	Program growth as a percentage of total growth (\$ in thousands)	27
Table 5.	Price and program growth as a percentage of total growth (\$ in thousands)	30
Table 6.	O&M, N budget change differences (\$ in thousands)	32
Table 7.	Budget activity average annual rate of change (\$ in thousands)	33
Table 8.	Object class average annual rate of change (\$ in thousands).....	34
Table 9.	Budget activity (\$ in thousands)	35
Table 10.	O&M, N estimated, enacted, and actual amounts (\$ in thousands).....	40

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LIST OF ACRONYMS AND ABBREVIATIONS

BA	budget activity
CBO	Congressional Budget Office
DOD	Department of Defense
DON	Department of the Navy
FY	fiscal year
MFP	major force program
O&M	Operation and Maintenance
O&M, N	Operation and Maintenance, Navy
OCO	Overseas Contingency Operations
OMB	Office of Management and Budget
OUSD (C)	Office of the Under Secretary of Defense, Comptroller
PE	program element
PPBE	planning, programming, budget, and execution
WCF	working capital fund
WCF S&M	working capital fund supplies and merchandise

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I. INTRODUCTION

The share of the defense appropriation for Operation and Maintenance (O&M) programs across all branches of the military has steadily increased over the past 20 years, displacing funds for research, development, testing, and evaluation (RDT&E), military personnel, procurement, and military construction. The appropriation made for the O&M category has consistently grown in its share of the Department of Defense (DOD) budget compared to the other appropriation groups.

Year over year changes in expense-type budgets such as O&M fall into one of two categories, price growth and program growth. “Price growth captures the effects of inflation on the items being purchased. Included in price changes are factors like annual costs of living pay adjustments. The second category, program changes, reflects that the program is engaged in a different level of activity compared to the year before” (Candrea, 2017, p. 228). The Operation and Maintenance, Navy (O&M, N) appropriation has doubled over 20 years. The year over year increases are comprised of a combination of price and program growth. In an effort to understand the increasing O&M costs inside the Navy, this research analyzed appropriations for the last two decades to determine which categories have experienced the most and least price and program growth, and we continued to explore the trends associated with Operation and Maintenance, Navy (O&M, N) appropriation. This research attempted to understand where the growth is, both functionally and what things were acquired by breaking down the year to year changes. For reasons to be discussed later, we were unable to accomplish that goal and instead make recommendations for the improvement of budget documents to provide critical transparency.

A. BACKGROUND

In 2017, the Congressional Budget Office (CBO) conducted a defense-wide analysis on the growth of O&M funding and common trends associated with that growth. Using data made available from the 2000–2012 budget requests to Congress from the DOD, the CBO was able to group data elements into broad categories to help identify

causes of growth and common spending trends. The purpose of the study was to help identify categories within O&M that are causing the spending increases. By doing this, the CBO was looking to shed light on programs that may need to become leaner, potentially allowing the DOD to spread the funding to the other appropriation groups.

The project followed the CBO's research methods, but focused less on identifying causes for growth and more on describing the categories that are experiencing price and program growth. The scope is narrow, which allowed the focus to be only on the Navy—enabling a better description of price and program growth, specifically. We attempted to identify trends in object classes that drive budget activities and contribute to price or program growth in O&M, N. The trends can be used to describe the growth and write better justifications in the budget submitted to Congress. The identified trends can also be used for predictions, therefore providing the DOD with vital information that can help the department create a more effective, efficient, and accurate budget.

B. BUDGET PROCESS AND STRUCTURE

It is important to understand the budget process and how the DOD submits and proposes the defense budget. Guidance from Congress, the President of the United States, and the National Security Council is given to the military regarding policies and force structure. This is presented in the form of the National Security Strategy (NSS). The DOD submits a budget annually to Congress for approval with justification of the funding requested to deliver the capabilities identified to train, maintain, and equip the different military branches in order to successfully execute the mission. The DOD evaluates the current force structure and the required programs or program changes needed to achieve the goals set forth in the NSS. This proposal is created using the Planning, Programming, Budgeting, and Execution (PPBE) process. The following list is from the DOD Directive 7045.14 of 2013, which explains the five goals of the PPBE process.

- Supports the objective to provide the DOD with the most effective mix of forces, equipment, manpower, and support attainable within fiscal constraints.
- Facilitates the alignment of resources to prioritized capabilities based on an overarching strategy and requires balancing necessary warfighting capabilities with risk, affordability, and effectiveness.

- Provides mechanisms for making and implementing fiscally sound decisions in support of the NSS and National Defense Strategy.
- Facilitates execution reviews of past decisions and actions. The reviews shall assess actual execution performance based on goals and strategic objectives. Recommendations from these reviews shall be linked to decisions on future resource allocations; and
- Accepts, as inputs, products of the acquisition and requirements processes. (DOD, 2013, p. 2)

Table 1 provides the goals of each phase of the PPBE process and Figure 1 provides a summary of the actions that occur during the phases.

Table 1. The goals of each PPBE phase. Adapted from Candreva (2017, p. 209).

Phase	Goal
Planning	“Identify gaps or overmatches between strategy and capabilities and produce objectives for programming.”
Programming	“Allocate resources among programs across a mid-range time horizon that best achieves the planning objectives.”
Budgeting	“Justify the programming decisions” [and request resources in a format that serves the congressional authorization and appropriation processes.]
Execution	“Implement the policy direction and create the desired capabilities.”



Figure 1. Summary of the phases of the PPBE process. Source: P. Candreva (PowerPoint slides, August 23, 2017).

Since the research was focused only on incremental changes in O&M from year to year, it is necessary to provide a thorough explanation of the budget and execution phases. The budgeting phase begins with The Office of Management and Budget (OMB) issuing the OMB Circular A-11, Preparation, Submission and Execution of the Budget. Circular A-11 delivers guidance of the overall process and how to prepare and execute the budget to meet OMB requirements. Additionally, it “discusses sequestration, supplementals and amendments, deferrals and Presidential proposals to rescind or cancel funds, and investments.” (OMB, 2019). During this phase the DOD Components and their respective Budget Submitting Offices create and submit their detailed budgets to OMB following the guidance in the circular. These detailed budgets incorporate the price and program growth of the respective programs in order to achieve the mission. With respect to price growth; inflation factors for various commodities (fuel or services), changes in rates in WCF activities, and COLA pay adjustments for civilians all play a role in how individual programs make their computations . In regards to program growth; changes in the levels of activity (+ or -), or shifting strategies (e.g., civilian substitution of military billets or using service contracts in lieu of full time employees) are major factors that contribute to how program make their computations. The result of the budgeting phase is the President’s Budget.

The final phase of the PPBE process is the execution phase. During this phase the DOD components implement the programs and policies from the budget. There are two ways to execute the budget. First, there is the program execution which entails making the authorized changes to the individual programs of the DOD. Second is the budget or financial execution portion. This includes financial transactions such as allocations of appropriations, outlays, commitments, obligations, and expenditures.

Also, during the execution phase there are a series of reviews to ensure the budget is being executed properly. According to DOD Directive 7045.14 of 2013, DOD components shall:

- Conduct annual reviews to determine how well programs and financing have met joint warfighting needs.
- Assess compliance with priorities in the planning and programming guidance.

- Assess compliance with the Secretary of Defense decisions and guidance.
- Assess program results, as measured by established performance metrics.
- Assess other results critical to successful program execution.
- The Office of the Secretary of Defense staff offices shall assess the findings of the DOD Components and recommend program and budget adjustments where applicable, in coordination with the Chairman of the Joint Chiefs of Staff. (DOD, 2013, p. 11)

The basic structure of the defense budget includes program elements (PE), major force programs (MFP), and appropriations. MFPs are comprised of PEs. Figure 2 shows the dimensions of how the Future Years Defense Plan is structured. Each of the Components has PEs that fall into one of the MFPs. Each is further organized by the types of appropriations.

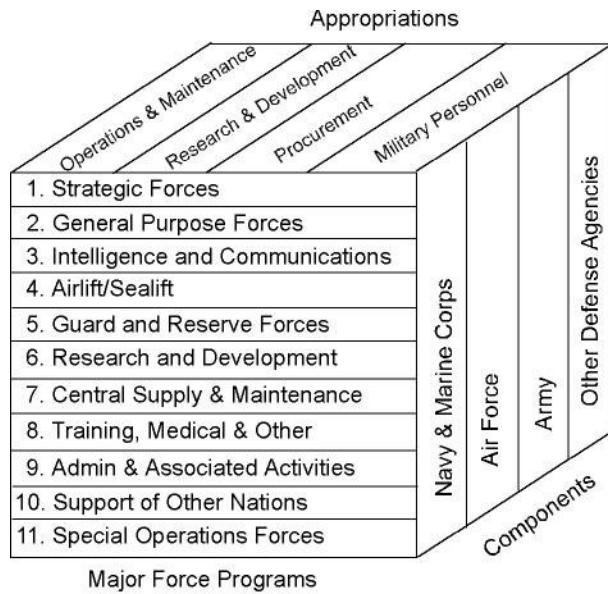


Figure 2. Future years defense plan program structures. Source: Candreva (2017, p. 206).

For the purpose of the research the focus was on the O&M appropriation regarding the Navy component. Each O&M, N is divided into budget activities (BA), which comprises of (1) Operating Forces, (2) Mobilization, (3) Training and Recruiting, and (4) Administrative and Service-wide Support (Office of the Assistance Secretary of the Navy, 2019). These BA categories identify the purposes, projects, or types of activities financed by the appropriation.

Because budget cycles overlap (the FY2021 budget is submitted during FY2020), BA data is provided for each of the four activities separately and includes: a base year actual budget amount, calculated price growth between the base year and the budget in execution, calculated program growth between the base year and the budget in execution, enacted budget in execution amount, calculated price growth between the budget in execution and the next year budget estimates, calculated program growth between the budget in execution and the next year budget estimates, and next year budget estimate amount. Figure 3 is from the Office of the Under Secretary of Defense, Comptroller’s (OUSD (C)), Department of the Navy (DON) budget estimates for FY 2021. The figure displays the price and program growth for the Operating Forces budget activity from FY 2019 to 2020 and the estimated total for FY 2021. The budget estimates have similar figures for each BA. Figure 4 is a breakdown of the O&M, N appropriation BAs by activity group.

Department of the Navy
Operation and Maintenance, Navy
FY 2021 President’s Budget

(S in Millions)

	FY 2019 Actual¹	Price Growth	Program Growth	FY 2020 Enacted²	Price Growth	Program Growth	FY 2021 Estimate³
Budget Activity 1: Operating Forces	46,343.9	977.0	-7,492.4	39,828.5	824.9	47.9	40,701.3

Figure 3. Budget activity information shown in Department of the Navy FY 2021 budget estimates. Source: OUSD (C) (2020a).

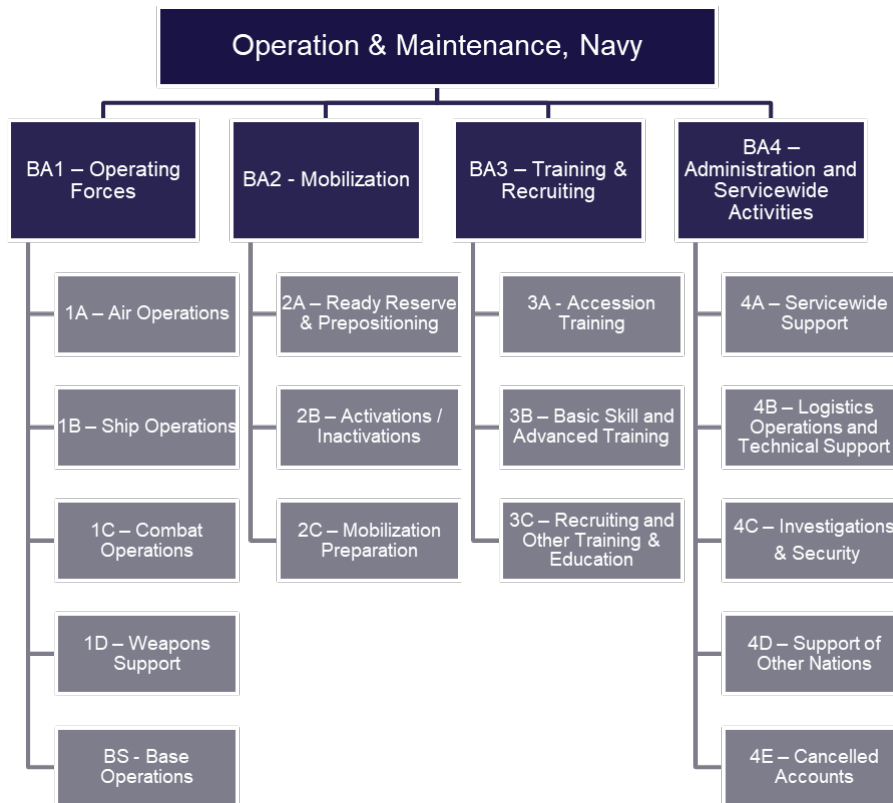


Figure 4. O&M, N budget activities and activity groups. Source: P. Candrea (PowerPoint slides, August 23, 2017).

Activity groups are further broken down into subactivity groups. “A sub-activity group is an accounting designation used by DOD for purposes of budget and appropriation execution. Congress generally specifies in conference reports or explanatory statements accompanying each appropriations act, the amount designated for the sub-activity groups that make up each appropriation account” (GAO, 2019, p 2). Figure 5 displays the sub-activity group breakdown under the Operating Forces BA.

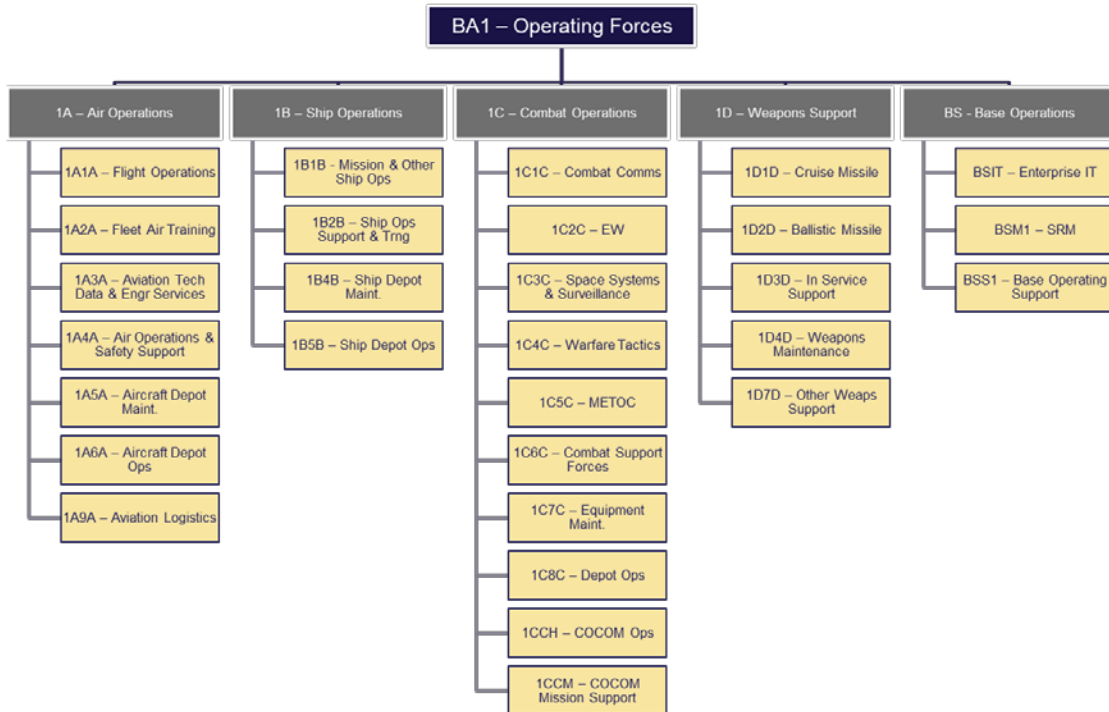


Figure 5. Operating forces sub-activity groups. Source: P. Candreva (PowerPoint slides, August 23, 2017).

While the BA identifies types of activities financed, the appropriations are also divided into Object Classes. Object Classes are defined as “a system of budgeting that consists of a simple listing of what the funds will procure without regards to the output of the agency” (Candreva, 2017, p 439). These classes include: (1) Civilian Personnel Compensation, (2) Travel, (3) Working Capital Fund (WCF) Supplies and Materials Purchases, (4) Stock Fund Equipment, (5) Other WCF Purchases, (6) Transportation, and (9) Other Purchases. Object classes describe what the funds bought, or the inputs to the activities funded. This is not specific to the Navy, however, this is a federal-government-wide structure. Therefore, they are not linked to any one BA. Object class data is presented budget estimates in a similar format as the budget activities described above. Figure 6 is from the OUSD (C), DON budget estimates for FY 2021 and shows how the price and program growth data for a particular object class is presented to Congress.

Department of the Navy
 FY 2021 President's Budget Submission
 Operation and Maintenance, Navy
 Budget Activity: Operating Forces
 Activity Group: Air Operations
 Detail by Subactivity Group: Mission and Other Flight Operations

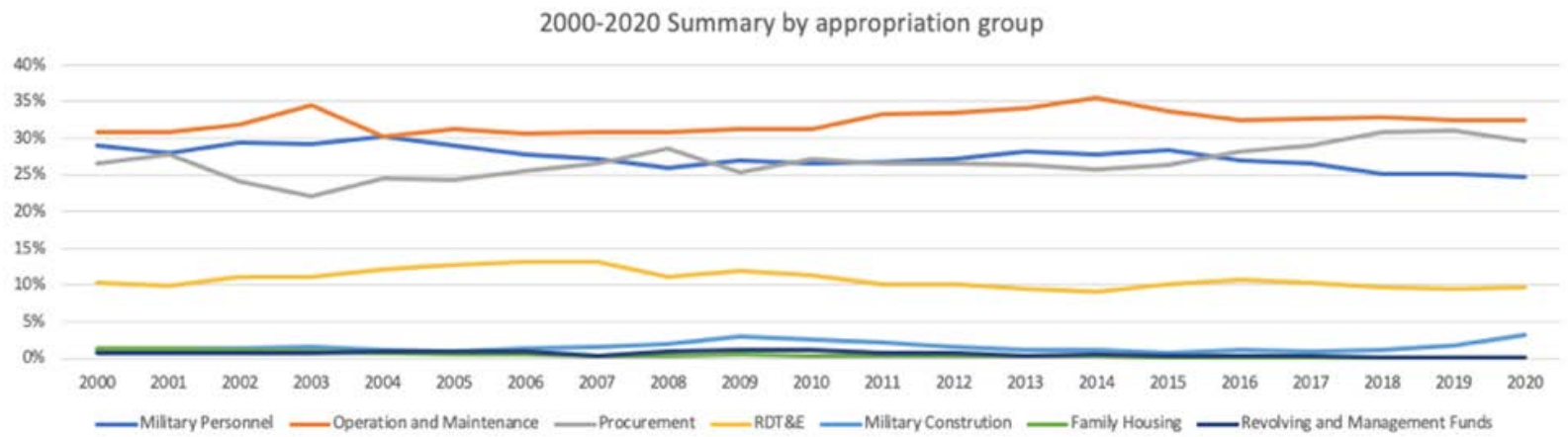
VII. OP-32 Line Items as Applicable (Dollars in Thousands)

Inflation Categories	Change from FY 2019 to FY 2020				Change from FY 2020 to FY 2021				FY 2021 Est.
	FY 2019 Actuals	For Curr	Price Growth	Prog Growth	FY 2020 Est.	For Curr	Price Growth	Prog Growth	
100 Civilian Personnel Compensation									
101 Executive, General and Special Schedules	48,341	0	1,345	14,980	64,666	0	996	1,507	67,169
103 Wage Board	13,459	0	375	-7,188	6,646	0	102	572	7,320
104 Foreign National Direct Hire (FNDH)	0	0	0	188	188	0	3	-1	190
300 Travel									
308 Travel Of Persons	275,349	0	5,506	-55,103	225,752	0	4,515	-46,282	183,985
400 WCF Supplies									
401 DLA Energy (Fuel Products)	1,175,262	0	-7,874	-433,506	733,882	0	-37,209	438,206	1,134,879
411 Army Managed Supplies & Materials	33	0	0	-33	0	0	0	0	0
412 Navy Managed Supplies & Materials	675,857	0	-11,085	-324,031	340,741	0	5,656	149,659	496,056
414 Air Force Consolidated Sustainment AG	164	0	14	-178	0	0	0	0	0
416 GSA Managed Supplies & Materials	10,137	0	203	-414	9,926	0	199	-2,621	7,504
417 Local Purchase Managed Supplies & Materials	577	0	12	-222	367	0	7	353	727
421 DLA Material Supply Chain (Clothing and Textiles)	5,221	0	-6	-221	4,994	0	-3	997	5,988
424 DLA Material Supply Chain (Weapon Systems)	556,722	0	1,504	-246,076	312,150	0	-437	107,158	418,871

Figure 6. Object class information shown in Department of the Navy FY 2021 budget estimates.
 Source: OUSD (C) (2020a).

C. O&M, NAVY FUNDING

In Figure 7, a summary by appropriation group from year 2000 through 2020 is provided with data adapted from OUSD (C) (2020b). Military construction, family housing, and revolving and management funds as a group have remained below 5%. RDT&E has remained around 10%. O&M, Procurement, and Personnel have consistently made up approximately 85% of the Navy's budget. Personnel started at 29%, peaked in 2005 at 31% and ended at its lowest point of 25% in 2020, seeing a downward trend for the past 5 years. Procurement started at 28%, dropped to 22% in 2003, and is up to 30% in 2020. Lastly, O&M began in 2000 at 30%, reached its lowest point in 2004 and has displayed a continuous positive trend for the last decade, finishing out at 32% in 2020, the largest appropriation group of all. Figure 7 was constructed by pulling the total Navy budget by appropriation group from the National Defense Budget Estimate for 2021, OUSD (C) (2020b), otherwise known as the Green Book. By making each appropriation group a percentage of the total, and translating those numbers into a line graph, the make-up of the Navy budget and trends can be observed, specifically O&M's portion of the budget.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020b).

Figure 7. Appropriation groups as a percentage of total Navy budget

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II. METHODOLOGY

The methodology used in this project was designed to answer the following primary and secondary research questions. Primary research question: Which object classes and budget activities of the O&M, N appropriation are driving program and price growth?

Secondary research questions:

- Which years showed significant growth or were outliers regarding total growth?
- How much of the total growth can be attributed to price growth in each year?
- How much of the total growth can be attributed to program growth in each year?
- Have trends in growth been consistent?
- How much of the Navy's funding is for O&M?

A. IDENTIFYING THE DATA

In order to accurately answer the research questions, we used the OP-32 and OP-32A Summary of Price and Program Changes from the Navy's annual budget requests, made available to the public by OUSD (C) on their website. It provides the appropriation summary of price and program change for each fiscal year. The DON budget estimates contain two different Summary of Price and Program Changes, OP-32 and OP-32A, that provide price and program growth by object class for each sub-activity group within O&M appropriations. The base OP-32/OP-32A exhibits include Overseas Contingency Operations (OCO) amounts for the prior year column for all O&M appropriations, using actual cost of war data. The OP-32A exhibit includes the OCO amounts. For budget years before fiscal year (FY 2007), OP-32A data was not provided and OP-32 data was the only type available. For budget years beginning with FY 2014, OP-32 data was no longer provided and OP-32A data was the only type available. This means that for FY 2000

through FY 2013 budgets, OP-32 data is used. For FY 2014 through FY 2021, OP-32A data is used. The research analyzed data from FY 2001 to FY 2021. FY 2000 data is only used to set base year data for comparison of FY 2001 and forward. The reason 20 years of data was analyzed is because this sample size would provide enough data in order to accurately answer the research questions, while also allowing for varying levels of operational tempo, force structure, or other economic or political factors that would have had meaningful impacts on growth. To answer the final research question, the data from the comptroller's website, specifically the FY Defense Budget Overview was used.

B. ORGANIZING THE DATA

The data was organized in order to manipulate, analyze, and make conclusions from the OP-32 and FY Defense Budget Overview data. The first step was to transcribe the data from the downloaded PDF versions, into Microsoft Excel spreadsheets. The workbook is broken down into total year over year growth, price year over year growth, and program year over year growth, and a tab for object class analysis, for each FY from 2001 to 2021. Years 2004, 2006, and 2008 were uniquely formatted by the OUSD (C) to include four years worth of data vice three, as the rest of the budgets. The data pulled from each OP-32 was the prior year's actual O&M budget appropriation, actual price growth and actual program growth, in addition to the current year's total enacted O&M budget appropriation, forecasted price growth, and forecasted program growth, and finally the next year's estimated total O&M budget appropriation. The given values were used because it was believed to be a reliable way to separate between baseline, OCO, and reprogramming funding under total obligations. Figure 8, adapted from OUSD (C) (2020a), shows what this looked like for the FY 2021 budget request.

(\$ in Millions)							
Budget Activity	FY 2019 Actual	Price Growth	Program Growth	FY 2020 Enacted	Price Growth	Program Growth	FY 2021 Estimate
Operating Forces	46,344	977	-7,492	39,829	825	48	40,701
Mobilization	956	277	602	1,835	-75	-63	1,697
Training and Recruiting	1,946	43	101	2,089	46	231	2,366
Administrative and Servicewide Support	4,643	103	-449	4,297	90	541	4,929

Figure 8. Budget activities' actual, enacted, and estimated price and program growth and budget appropriations.
Adapted from OUSD (C) (2020a).

C. ANALYZING THE DATA

To answer the primary research question, the secondary questions had to be answered first. Starting with the question, “Which years showed significant growth or were outliers regarding total growth?” By arranging the data in a waterfall graph, visual cues are available making it easier to identify outliers in growth. To arrange the data for this graph we found the difference between each year of actual budget reported and displayed it for total O&M. Because actual budget data is provided two fiscal year budget documents in arrears, the FY 2000 through FY 2019 actual budget data was displayed.

Next was the secondary research question, “How much of the total growth can be attributed to price and program growth in each year?” After identifying outlier years, additional analysis was performed to investigate how price and program growth were combining to contribute to total growth. To identify the impact price and program growth had, the difference between the prior fiscal year actual budget total and the current fiscal year projected budget total was compared to the price and program changes provided by the Office of Budget. Figure 9 is from the FY 2021 budget estimate from OUSD(C).

Department of the Navy
Operation and Maintenance, Navy
FY 2021 President’s Budget

(\$ in Millions)

FY 2019 Actual¹	Price Growth	Program Growth	FY 2020 Enacted²	Price Growth	Program Growth	FY 2021 Estimate³
53,888.1	1,399.9	-7,238.5	48,049.5	886.1	757.1	49,692.7

Figure 9. O&M, N total budget information shown in Department of the Navy FY 2021 budget estimates. Source: OUSD (C) (2020a).

Using Figure 9, comparing the second and third columns labeled “Price Growth” and “Program Growth” to the difference of “FY 2020 Enacted” less “FY 2019 Actual” allows for proportional contributions to determine for the total budget. The sum of price and program growth, as well as the price and program growths individually were compared to this difference. By comparing the sum of price and program growth to the total change,

change not attributable to price or program growth could be identified. Further, by comparing the price and program growth individually to the yearly difference, the impact of each on the change in projected budget requests was identified. This allowed, not only the determination of the major driver for a given year, but identified whether price or program growth, was the major driver for changes in the O&M, N budget and whether it explained all of the change.

After identifying the extent to which price or program growth are driving total growth in each year, the primary research question, “Which object classes and budget activities of the O&M, N appropriation are driving program and price growth?” could be addressed. An analysis was conducted to determine the price and program growth of each fiscal year to find the primary drivers of growth within the object classes. To arrange the data for these graphs, the process described above was replicated for the total O&M, N budget to each object class. The data was displayed in waterfall graphs to pull visual cues from the data and identify trends.

To determine whether trends in growth by category were consistent, first categories that grew the most were identified and plotted in graphs. Then the rate of change was calculated.

Lastly, the budget data from the comptroller was used to discover how much of the Navy’s funding is allocated to O&M. Here each of the five appropriation groups were made into a percentage of total O&M and tracked from 2000 to 2020. The data was used to show how much of the Navy’s funding is allocated to O&M annually by taking the O&M for the respective year and dividing it by the total Navy budget for the year.

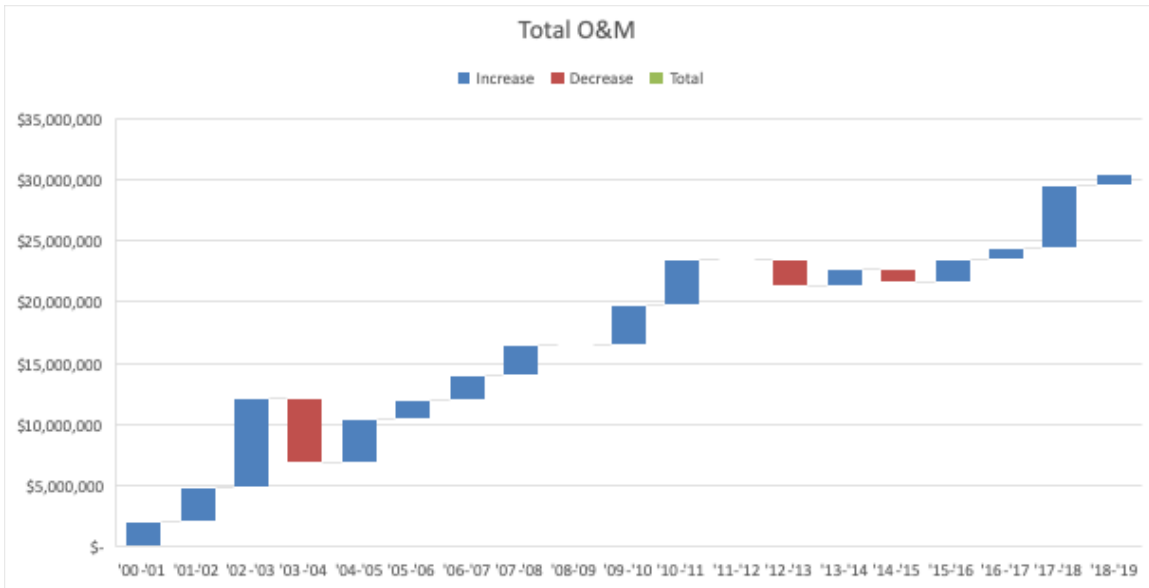
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III. ANALYSIS

This chapter explains how the data was interpreted, evaluated, analyzed, and displayed to answer the research questions. The data was analyzed at the total O&M funding, budget activity, and object class level. A brief overview of varying levels of operational tempo, force structure, or other economic or political factors was provided since these factors may have had meaningful impact on growth and the fiscal climate during the period covered by the research. However, these factors were not attributed to the causation of growth in order to remain within the bounds of the research questions. Next the analysis moved to the secondary research questions—once those questions were answered, insight was gained to investigate the primary research question. Importantly, unless otherwise noted, all numbers in tables and graphs are stated in thousands.

A. TOTAL O&M INCREASE OVERVIEW

Figure 10 displays actual annual increases and decreases of total O&M from FY 2000 through FY 2019 as reported in the FY 2002 through FY 2021 budget justification documents. The United States had three different presidents, two of which were Republican and one Democrat. Starting in 2001, the War on Terrorism, with major combat operations ending in 2011. In 2008, the U.S entered a recession and a bear market for approximately four years. Additionally, the DOD saw across the board budget cuts in 2013 due to sequestration, followed by flatter budgets caps on military spending due to the Budget Control Act. O&M funding typically has a positive slope and increases, apart from a large pull back in FY 2003 and smaller shrinkage in FY 2008, FY 2012, and FY 2014. Between FY 2000 and FY 2019 the budget grew by \$30 billion, an average of \$1.6 billion per year.

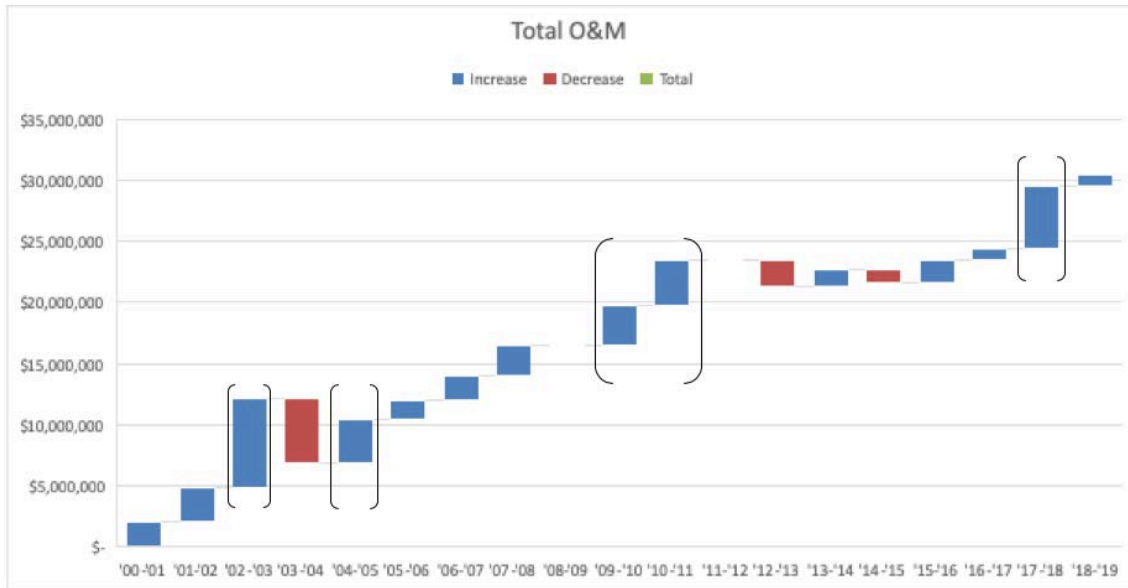


Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 10. Total O&M, N increase/decrease (\$ in thousands)

B. SIGNIFICANT YEARS OF GROWTH

To visually display the years of above-average or significant growth, the same data from Figure 10 was used with brackets in Figure 11. The data shows that the average increase or decrease was \$1.6 billion for FY 2001 through FY 2019 and the standard deviation was \$2.7 billion. These statistics were found by running descriptive statistics on the increase and decreases for FY 2000–2019. Five years were identified that were far enough from the average to qualify as years of above-average or significant growth and they are bracketed.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 11. Total O&M, N increase/decrease with years of significant growth and outliers bracketed (\$ in thousands)

Figure 11 and Table 2 helps to answer the secondary question, “Which years showed significant growth or were outliers in regard to total growth?” Data shows that FY 2002, FY 2004, FY 2009, FY 2010, and FY 2017 were all close to or more than one standard deviation from the average. With FY 2002 being just over two standard deviations from the mean and FY 2017 being just over one standard deviation from the mean. Lastly, FY 2003 was a year of significant negative growth – which we did not anticipate, considering that we invaded Iraq and there were significant supplemental appropriations made.

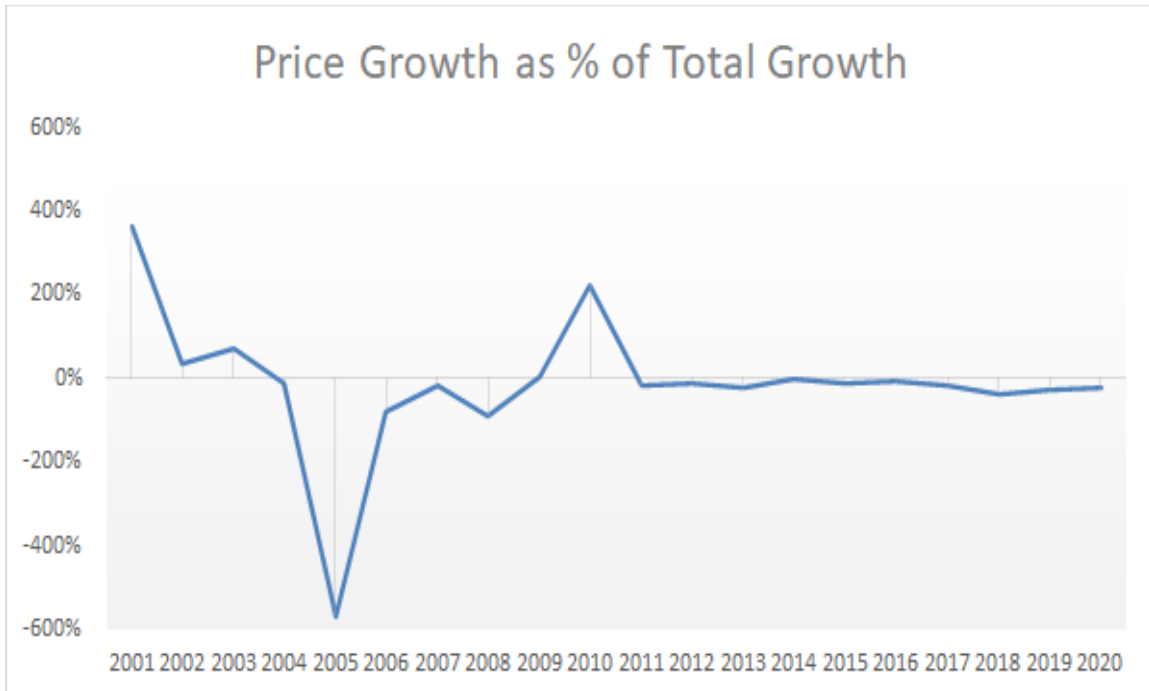
Table 2. Total O&M increase/decrease for years of significant growth
(\$ in thousands)

FY	Increase/Decrease
2002	\$ 7,270,727
2004	\$ 3,604,175
2009	\$ 3,282,450
2010	\$ 3,835,278
2017	\$ 5,081,594

Adapted from OUSD (C) (2002, 2004, 2009, 2010, 2017).

C. PRICE GROWTH CONTRIBUTION TO TOTAL GROWTH

While the overall budget growth shown in the previous section compares actual budget figures as reported in Budget Justification Documents, price growth is presented and discussed only by comparing prior year “actual” data to current year “enacted” data. Figure 12 and Table 3 show price growth as a proportion of total budget change by FY year. The budget change is found by subtracting the prior year actual budget total from the current year enacted budget total for each year. The proportion does not show the direction of change, positive or negative, only the size of the contribution relative to the total change. That is to say, in years where price growth is positive and total budget growth is negative, price growth will contribute negatively to the total change. Years where the proportion is positive above 50% can be interpreted as price growth being the major driver of budget change. As seen below, price growth only contributes positively in FY 2001, FY 2002, FY 2003 and FY 2009.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

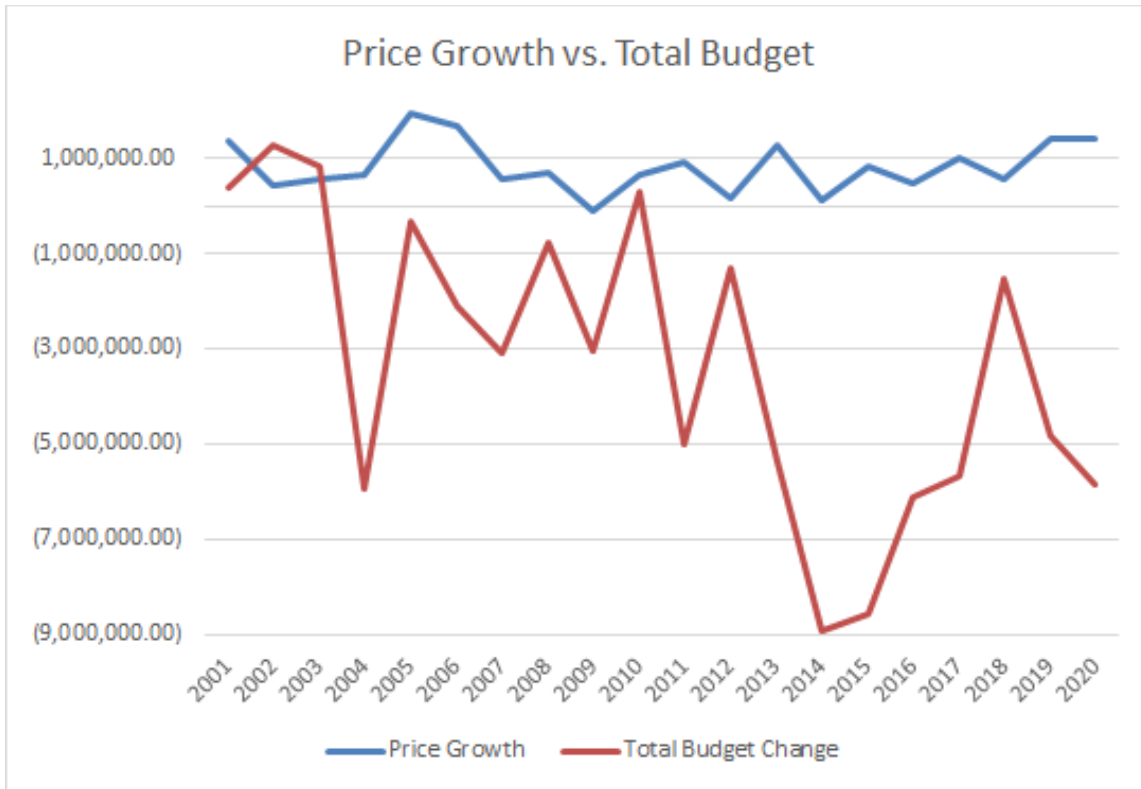
Figure 12. Price growth as a percentage of total growth

Table 3. Price growth as a percentage of total growth (\$ in thousands)

Year	Price Growth	Total Budget Change	Price % of Change
2001	1,356,659.00	370,906.00	366%
2002	433,765.00	1,275,812.00	34%
2003	577,988.00	820,005.00	70%
2004	658,738.00	(5,940,648.00)	-11%
2005	1,932,006.00	(340,054.00)	-568%
2006	1,666,486.00	(2,122,458.00)	-79%
2007	555,503.00	(3,111,512.00)	-18%
2008	713,544.00	(789,900.00)	-90%
2009	(105,345.00)	(3,059,423.00)	3%
2010	663,321.00	299,560.00	221%
2011	934,484.00	(4,995,244.00)	-19%
2012	176,366.00	(1,325,561.00)	-13%
2013	1,254,104.00	(5,372,830.00)	-23%
2014	115,866.00	(8,944,718.00)	-1%
2015	813,645.00	(8,560,644.00)	-10%
2016	459,255.00	(6,121,929.00)	-8%
2017	1,025,327.00	(5,691,187.00)	-18%
2018	571,246.00	(1,541,457.00)	-37%
2019	1,422,877.00	(4,824,083.00)	-29%
2020	1,400,266.00	(5,838,542.00)	-24%

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 13 displays price growth in relation to total budget change by year. The budget change is found by subtracting the prior year actual budget total from the current year enacted budget total for each year.



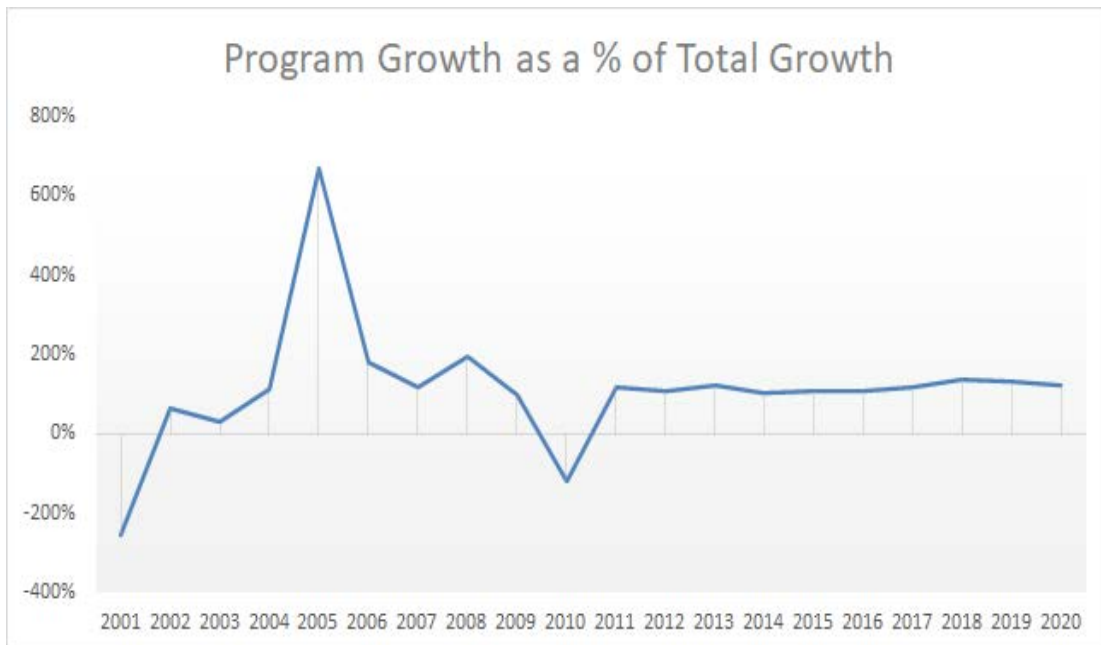
Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 13. Price growth and total budget change (\$ in thousands)

While we expected price growth to be positive due in part to positive inflation, when looking at total budget change in Table 4 and Figure 13, we see that it is negative. This was not what we expected to see, as the actuals data from the O&M, N overview was clearly increasing.

D. PROGRAM GROWTH CONTRIBUTION TO TOTAL GROWTH

While the overall budget growth shown in the total O&M section compares actual budget figures as reported in Budget Justification Documents, program growth is presented and discussed only by comparing prior year “actual” data to current year “enacted” data. Figure 14 and Table 4 display program growth as a proportion of total budget increase by year. The budget change is found by subtracting the prior year actual budget total from the current year enacted budget total for each year. The proportion does not show the direction of change, positive or negative, only the size of the contribution relative to the total change. That is to say, in years where program growth is positive and total budget growth is negative, price growth will contribute negatively to the total change. Years where the proportion is positive above 50% can be interpreted as program growth being the major driver of budget change. Because all growth is the net sum of price and program growth, the graph in Figure 14 is the inverse of the graph in Figure 12.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

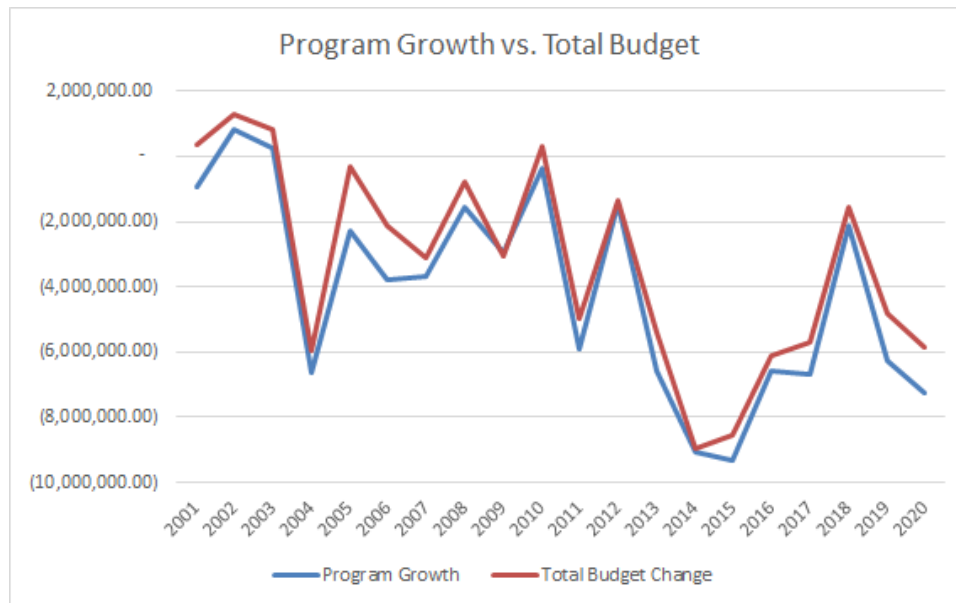
Figure 14. Program growth as a percentage of total growth

Table 4. Program growth as a percentage of total growth (\$ in thousands)

Year	Program Growth	Total Budget Change	Price/Prog % of change
2001	(954,716.00)	370,906.00	-257%
2002	839,453.00	1,275,812.00	66%
2003	238,491.00	820,005.00	29%
2004	(6,643,748.00)	(5,940,648.00)	112%
2005	(2,275,344.00)	(340,054.00)	669%
2006	(3,794,543.00)	(2,122,458.00)	179%
2007	(3,667,951.00)	(3,111,512.00)	118%
2008	(1,545,539.00)	(789,900.00)	196%
2009	(2,954,377.00)	(3,059,423.00)	97%
2010	(365,506.00)	299,560.00	-122%
2011	(5,913,647.00)	(4,995,244.00)	118%
2012	(1,455,865.00)	(1,325,561.00)	110%
2013	(6,602,102.00)	(5,372,830.00)	123%
2014	(9,083,340.00)	(8,944,718.00)	102%
2015	(9,347,585.00)	(8,560,644.00)	109%
2016	(6,593,299.00)	(6,121,929.00)	108%
2017	(6,695,666.00)	(5,691,187.00)	118%
2018	(2,125,467.00)	(1,541,457.00)	138%
2019	(6,254,882.00)	(4,824,083.00)	130%
2020	(7,238,428.00)	(5,838,542.00)	124%

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a)

Figure 15 shows program growth in relation to total budget change by year. The budget change is found by subtracting the prior year actual budget total from the current year enacted budget total for each year. This visually indicates that total change and program growth are closely correlated.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 15. Program growth and total budget change (\$ in thousands)

When considering Figure 15, we notice that Program growth is highly correlated to total budget change from actuals to enacted. Since we know that the actual budget is increasing by over \$30 billion since FY 2000, we believe that program growth represented in the budget justification for O&M, N provided to Congress is misleading when taken by itself.

E. PRICE AND PROGRAM GROWTH CONTRIBUTION TO TOTAL GROWTH

Figure 16 and Table 5 shows price plus program growth as a proportion of total budget change by year. The budget change is found by subtracting the prior year actual budget total from the current year enacted budget total for each year. Percentages above or below 100% indicate there is some “other” growth in the budget that is not attributable to price or program growth. This, too, came as a surprise as all growth should be attributed to one category or the other and, ideally, this should be a flat line at 100%.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

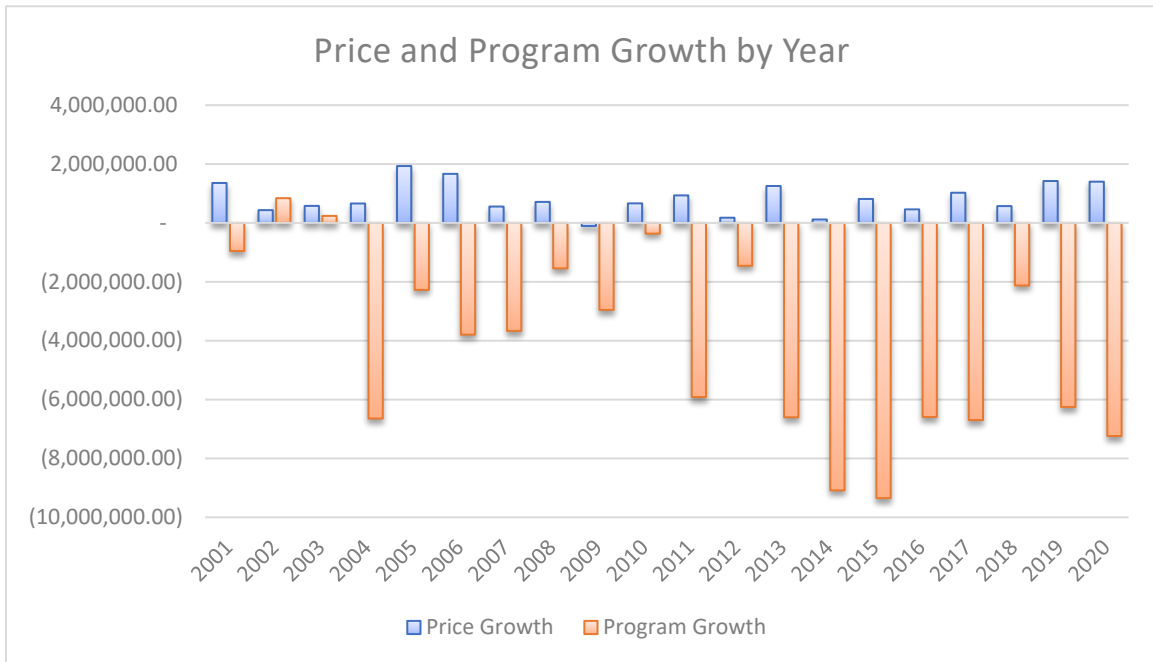
Figure 16. Price and program growth as a percentage of total growth

Table 5. Price and program growth as a percentage of total growth (\$ in thousands)

Year	Price Growth	Program Growth	Total Budget Change	Price/Prog % of change
2001	1,356,659.00	(954,716.00)	370,906.00	108%
2002	433,765.00	839,453.00	1,275,812.00	100%
2003	577,988.00	238,491.00	820,005.00	100%
2004	658,738.00	(6,643,748.00)	(5,940,648.00)	101%
2005	1,932,006.00	(2,275,344.00)	(340,054.00)	101%
2006	1,666,486.00	(3,794,543.00)	(2,122,458.00)	100%
2007	555,503.00	(3,667,951.00)	(3,111,512.00)	100%
2008	713,544.00	(1,545,539.00)	(789,900.00)	105%
2009	(105,345.00)	(2,954,377.00)	(3,059,423.00)	100%
2010	663,321.00	(365,506.00)	299,560.00	99%
2011	934,484.00	(5,913,647.00)	(4,995,244.00)	100%
2012	176,366.00	(1,455,865.00)	(1,325,561.00)	97%
2013	1,254,104.00	(6,602,102.00)	(5,372,830.00)	100%
2014	115,866.00	(9,083,340.00)	(8,944,718.00)	100%
2015	813,645.00	(9,347,585.00)	(8,560,644.00)	100%
2016	459,255.00	(6,593,299.00)	(6,121,929.00)	100%
2017	1,025,327.00	(6,695,666.00)	(5,691,187.00)	100%
2018	571,246.00	(2,125,467.00)	(1,541,457.00)	101%
2019	1,422,877.00	(6,254,882.00)	(4,824,083.00)	100%
2020	1,400,266.00	(7,238,428.00)	(5,838,542.00)	100%

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 17 displays the total price and program growth for the period covered in the research. There is significant decrease in program growth in all years except FY 2002 and 2003. The only year that had negative price growth was FY 2009.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 17. Price and program growth by year (\$ in thousands)

Table 6 shows the difference between reported actual budget numbers and the enacted budget numbers from the previous budget for a given year. For example FY 2001 actual budget numbers from the FY 2004 budget justification compared to the FY 2001 enacted budget numbers from the FY 2003 budget justification. The cumulative price and program changes reported by current estimates is -\$59,975,365K which is over \$90 billion less than we were expecting price and program growth to show because the overall O&M,N budget grew by about \$30 billion during this period. We discuss this discrepancy in the next chapter.

Table 6. O&M, N budget change differences (\$ in thousands)

Year	Actual Budget Change	Enacted (Price/Program) Budget Change	Budget Difference
2001	2,005,671	370,906	1,634,765
2002	2,845,926	1,275,812	1,570,114
2003	7,270,727	820,005	6,450,722
2004	(5,267,227)	(5,940,648)	673,421
2005	3,604,175	(340,054)	3,944,229
2006	1,552,538	(2,122,458)	3,674,996
2007	1,921,421	(3,111,512)	5,032,933
2008	2,557,037	(789,900)	3,346,937
2009	(76,134)	(3,059,423)	2,983,289
2010	3,282,450	299,560	2,982,890
2011	3,835,278	(4,995,244)	8,830,522
2012	14,943	(1,325,561)	1,340,504
2013	(2,191,327)	(5,372,830)	3,181,503
2014	1,324,244	(8,944,718)	10,268,962
2015	(1,044,471)	(8,560,644)	7,516,173
2016	1,843,433	(6,121,929)	7,965,362
2017	1,010,508	(5,691,187)	6,701,695
2018	5,081,594	(1,541,457)	6,623,051
2019	884,298	(4,824,083)	5,708,381
Total	30,455,084	(59,975,365)	90,430,449

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

F. OBJECT CLASSES AND BUDGET ACTIVITIES DRIVING GROWTH

1. Average Annual Rate of Change

Table 7 displays the average annual rate of change for O&M, N BAs. This was found using the formula $A = P (1 + r)^t$ and solving for r. A is the FY 2019 actual total for the object class, P is the FY 2000 actual total, r is the annual rate of change, and t is the time period or total number of years covered in the research. The Operating Forces BA has a significantly higher average annual rate of change compared to the other BAs. Therefore, it can be concluded that this BA is the driving force of the O&M, N budget for the last two decades.

Table 7. Budget activity average annual rate of change (\$ in thousands)

Budget Activities	FY 2000 Actual Total	FY 2019 Actual Total	Average Annual Rate of Change
Operating Forces	\$ 16,712,300,000	\$ 46,344,000,000	5.23%
Mobilization	\$ 749,000,000	\$ 956,000,000	1.23%
Training and Recruiting	\$ 7,862,300,000	\$ 1,946,000,000	-6.74%
Administrative and Service-wide Support	\$ 4,109,400,000	\$ 4,643,000,000	0.61%

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Table 8 shows the average annual rate of change for all object classes and total O&M, N. Total WCF Supplies and Materials (WCF S&M) Purchases is the highest of the individual object classes at 5.63% and Other WCF Purchases is the lowest at 2.03%. The Total WCF S&M Purchases' large rate of change means that over time this object class has contributed the most to overall growth. The Other Purchases object class is the second largest with an average annual rate of change at 5.32%. The overall rate of change for O&M, N is 4.25% which proves the appropriation has been increasing over the last 20 years.

Table 8. Object class average annual rate of change (\$ in thousands)

Object Classes	FY 2000 Actual Total	FY 2019 Actual Total	Average Annual Rate of Change
Civilian Personnel Compensation	\$ 3,888,485	\$ 9,840,951	4.75%
Travel	\$ 483,203	\$ 1,148,773	4.43%
WCF S&M Purchases	\$ 2,038,482	\$ 6,092,385	5.63%
Stock Fund Equipment	\$ 2,041,737	\$ 3,295,437	2.42%
Other WCF Purchases	\$ 6,402,575	\$ 9,574,968	2.03%
Transportation	\$ 252,500	\$ 474,307	3.20%
Other Purchases	\$ 8,325,986	\$ 23,461,231	5.32%
Total O&M, N	\$ 23,432,968	\$ 53,888,052	4.25%

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

2. Budget Activities with Price and Program Growth

Table 9 is a summary by budget activity displaying the sum of actual increase/(decrease) over all twenty years in the first column. Subsequent columns are the sum of price, program, and total budget increases/(decreases) found by subtracting the prior year actual budget total from the current year enacted budget total for each year. The final two columns provide a count of years where price and program growth respectively are the major driver for each budget activity. This table clearly shows that total growth over time is increasing in all budget activities (column 1). This is despite enacted current year budgets growth being negative (column 4). We also can see that since FY 2000 program growth is the major driver for all four budget activities.

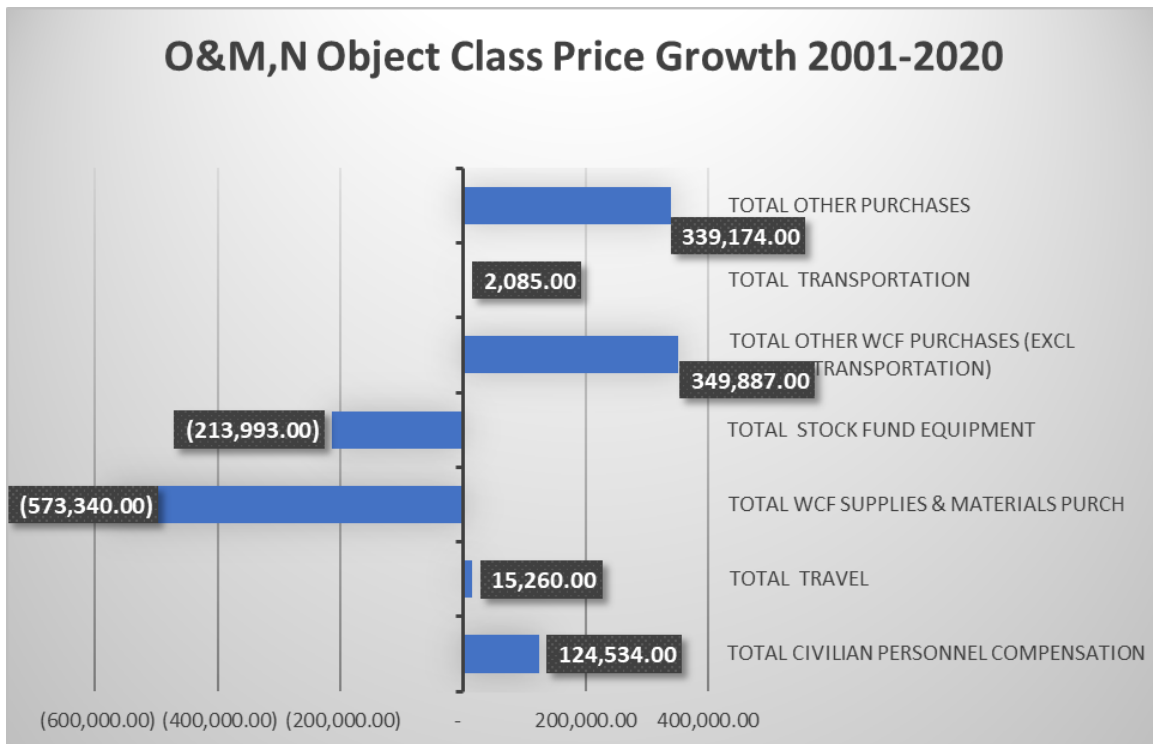
Table 9. Budget activity (\$ in thousands)

Budget Activity (\$ in Millions)	Total Actual Budget Increase / (Decrease)	Total Price Increase / (Decrease)	Total Program Increase / (Decrease)	Enacted - Actual Budget Increase / (Decrease)	Count of Price as Major Driver Years	Count of Program as Major Driver Years
Operating Forces	29,632	13,638	(95,697)	(82,045)	2	18
Mobilization	207	564	260	825	7	13
Training and Recruiting	83	828	(333)	496	6	14
Administrative and Service-wide Support	534	1,578	(13,249)	(11,700)	1	19

Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

3. Object Classes Driving Price Growth

Figure 18 shows the total price growth by object class. The totals were calculated by adding the change of each year for each object class. WCF S&M is responsible for the largest negative change at (\$573,340K). Total Other WCF Purchases (Excl Transportation) has the largest positive change at \$349,887K. The smallest change contributing to price growth is the Transportation object at \$2,085K.



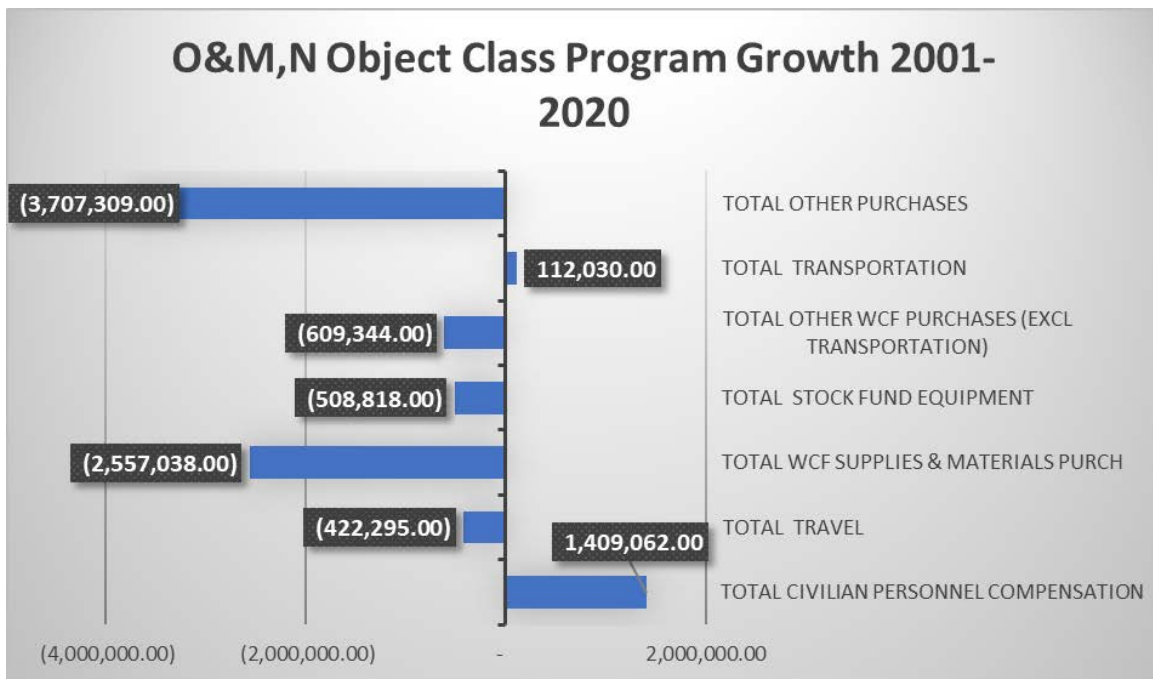
Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 18. Object class price growth (\$ in thousands)

4. Object Classes Driving Program Growth

Figure 19 shows the share of total program growth by object class. Total Other Purchases are responsible for the largest negative change at (\$3,707,309K), followed by Total WCF S&M Purchases at (\$2,557,038K). Total Civilian Personnel Compensation has the largest positive program growth. The smallest category object class being Travel at

\$112,030K. Since the majority of the change in program growth appears to be negative suggests that DOD is cutting program spending or procuring less. However this doesn't seem to be the case since the O&M, N budget has been increasing for the last 20 years and the average annual rate of change for each object class is a positive number. The numerous negative changes could be due to the issues with OCO funding and violations to sound principles of budgeting and financial management.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 19. Object class program growth (\$ in thousands)

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IV. DISCUSSION

The findings from the previous chapter are discussed in this chapter. The research found a \$90 billion discrepancy. The sizeable discrepancy prompted us to shift to a new question, “Why didn’t the accumulated price and program growth reported in the budget equate to the growth that actually occurred?” This question not only prompted us to take a deeper look into the accuracy of the data but also at the usefulness and reliability of how it is presented.

A. CONTRADICTING RESULTS

Our data contradicted itself, the first contradiction was seen in Table 7 and Table 9. Table 7 showed that Operating Forces grew at an annual growth rate of 5.23% from 2000 to 2019. However, in Table 9, Operating Forces’ aggregated total program decrease was \$95 billion (total) or \$82 billion (enacted) from 2000 to 2019. How then is it possible to have a 5.23% average annual increase rate but end up with such a large negative number? This contradiction was seen again in the Administrative and Service-wide Support BA which had an average annual growth rate of .61% from 2000 to 2019. However, in Table 10, the aggregated total program decrease was \$13 billion (total) or \$11 billion (enacted) from 2000 to 2019.

Without the contradiction of data in Table 7 and Table 9, the conclusion may have been that the budget is decreasing overall, while certain BAs see slightly positive average annual growth rates. The similar contradiction was observed at the object class level. Table 8 shows positive annual program growth rates for all object classes. However, in Figure 19, only two object classes reflected positive growth. From Figure 10, we know for a fact that the budget has increased \$30 billion from 2000 to 2019. If that is the case, then why did we see consistent program decreases in the budget?

Table 10. O&M, N estimated, enacted, and actual amounts (\$ in thousands)

FY	Estimated Amount	Enacted Amount	Actual Amount
2002	26,961,382	26,714,451	28,284,565
2003	29,028,813	29,104,570	35,555,292
2004	28,287,690	29,614,644	30,288,065
2005	29,789,190	29,948,011	33,892,240
2006	30,759,889	31,769,782	35,444,778
2007	31,330,984	32,333,266	37,366,199
2008	33,334,690	36,576,299	39,923,236
2009	34,922,398	36,863,813	39,847,102
2010	35,070,346	40,146,662	43,129,552
2011	38,134,308	38,134,308	46,964,830
2012	39,364,688	45,639,269	46,979,773
2013	41,606,943	41,606,943	44,788,446
2014	39,945,237	35,843,728	46,112,690
2015	39,316,857	37,552,046	45,068,219
2016	42,200,756	38,946,290	46,911,652
2017	39,483,581	41,220,465	47,922,160
2018	45,439,407	46,380,703	53,003,754
2019	41,434,840	48,179,671	53,888,052

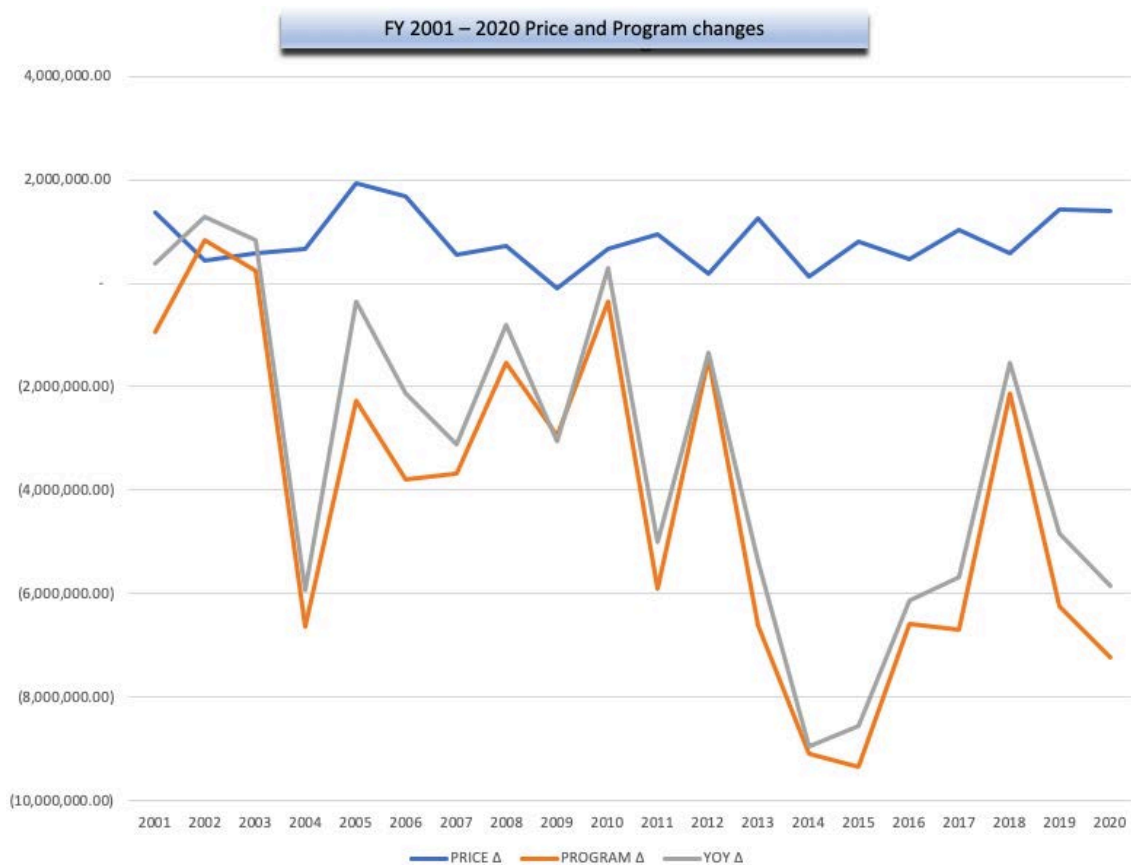
Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Table 10 shows the total O&M, N amount for a given year across three separate budget justifications side by side. Estimated amounts are from the original budget request justification, enacted amounts are from the following year's justification, and actuals are from two years post budget request. For example FY 2002 estimated amount is taken from the FY 2002 budget justification while the FY 2002 enacted amount is taken from the FY 2003 budget justification and the FY 2002 actual amount is taken from the FY 2004 budget justification.

To further illustrate why we were not able to answer the research questions due to discrepancies in the budget, we discovered that the numbers in Table 10 were highly dynamic from year to year, even though they were all talking about the same budget. To illustrate this, in the FY 2019 budget O&M,N budget justifications are for \$41,434,840K, however in the FY 2020 justification it was \$48,179,671K, almost \$7 billion more. When

actuals are reported in FY 2021 the amount is now \$53,888,052K which is over \$12 billion more than the original budget request. It is important to note that price and program growth are not provided in the justifications for actual budget data, which limits our ability to infer anything about the actual data being reported and reduces transparency and traceability.

Figure 20 shows that price growth tends to be more stable while program growth more volatile. In addition, the contrast in scope of price and program is visible—with price staying within the \$0-2,000,000K range and program growth ranging from \$838,453K down to (\$9,347,585K). This visual clearly indicates the issues with the budgeting practices. Figure 20 shows that program growth is continuously decreasing. However, as seen in Figure 10 and Table 8, we know that is not true.



Adapted from OUSD (C) (2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019a, 2020a).

Figure 20. Price and program change from 2001 to 2020 (\$ in thousands)

B. PRINCIPLES OF BUDGETING

Effective public budgeting is comprehensive, disciplined, legitimate, flexible, predictable, contestable, honest, based on reliable information, transparent, and accountable (World Bank, 1998). The discrepancies just noted in Section A illustrate the way DOD budgets violate some of these principles. In order for a budget to be comprehensive, “the budget must encompass all the fiscal operations of government and must also force policy decisions having financial implications to be made against the background of a hard budget constraint and in competition with other demands” (World Bank, 1998, p. 1). “The principle of discipline ensures that the budget utilizes only the necessary resources” (Payne, 2017, p. 2). “Legitimacy means that decision makers who can change policies during implementation must take part in and agree to the original policy decision” (World Bank, 1998, p. 1). Flexibility means the decision making authority is at the appropriate level where the pertinent information is available. Budgets need to be predictable to a certain extent. This requires that programs and projects receive the budgeted funding in a timely manner. Contestability ensures continual improvement to existing policy’s performance through review and evaluation” (Payne, 2017, p. 15). A budget should also be honest and unbiased. Budget reporting should be truthful regarding where and how the funds were expended. This also means that the budget should contain accurate information. This aids in the decision making process. Transparency requires that all information is clearly reported and available to decision makers. “Transparency demands that the reasons for decisions and the results and costs of these decisions be accessible, clear and communicated to the wider general public” (World Bank, 1998, p. 9) Finally, decision makers at all levels be held accountable.

C. BUDGET ISSUES WITH OCO FUNDING

This research has found that sound budgeting principles are being violated in the defense budget process for Operation and Maintenance expenses. The budget request does not include OCO, however, the current year estimate may, and the actuals usually do. It is in the exclusion and subsequent inclusion of OCO that caused the discrepancy. A budget should tell a complete story and these do not. These budget issues have hindered the ability

to answer the research questions. Robert Hale, a former Under Secretary of Defense (Comptroller) and Chief Financial Officer for the DOD, describes OCO funding as “a slush fund and a gimmick because it has been used to pay for defense costs not related to the wars in order to circumvent legal limits on the base portion of the DOD budget (which pays for the most investment and day-to-day operating costs)” (Hale, 2016). This violates the budgeting principles of discipline, contestability, honesty, information, transparency, and accountability. The principle of discipline was violated because the OCO funding was used for costs that were routine and not overseas contingencies merely to skirt the budget cap. Robert Hale states, “in recent years OCO has increasingly been used to finance non-war activities, which undermines the budget process” (2016). This also reduces budgetary discipline. The budget reporting does not appear to be honest and truthful since the information is not accurate regarding how the OCO funding was spent and appears was not spent properly. This also violates the transparency principle since all information was not clearly reported and available to decision makers. Lastly, the principle of accountability is not being upheld. DOD is not giving Congress a full accounting of what is going on because the request does not include OCO, the estimates sometimes do, and the actuals usually do. In addition, there is never an open reporting of price and program growth actuals. Proper reporting and adhering to the principles in the Public Expenditure Management Handbook will help to answer the research questions.

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V. CONCLUSION

A. SUMMARY OF FINDINGS

In our analysis on total O&M increase from 2001–2019, we found that O&M, Procurement, and Military Personnel appropriation groups are responsible for about 90% of the annual budget. Since 2004, O&M has grown in relation to Procurement and Military Personnel and is the largest of all appropriation groups. In, 2014 O&M peaked at 35% and makes up about 32% of the Navy’s budget today. To put the percentages into dollar amounts, the O&M budget has grown \$30 billion from 2000–2019, an average of \$1.6 billion a year. Throughout the timeframe, we found significant growth in FYs 2002, 2004, 2009, 2010, 2017. The O&M budget is influenced by what is happening in our nation, to include economics, politics, and military operations.

We found price growth to be mostly contributing negatively to the budget. Price growth only contributes positively in FYs 2001, 2002, 2003, and 2009. Interestingly enough, we found the similar trend of negative growth when analyzing program growth. Only in FY 2002 and 2003 does program growth contribute positively. Since we know that they should be positive due to the actual budget increasing by over \$30 billion since FY 2000, we believe that price growth represented in the budget justification for O&M, N provided to Congress is misleading when taken by itself. We also found interesting results when analyzing how price and program growth combine to make up total growth. Our analysis showed that price and program growth did not make up 100% of the total growth, which should be the case.

We were able to discern that Operating forces was the driving budget activity and that Other WCF funds and Other purchases were the object class drivers of overall growth. Our findings at the budget activity and object class level also proved to be contradicting. For example, the budget activity Operating Forces grew at an annual growth rate of 5.23% from 2000 to 2019. However, Operating Forces’ aggregated total program decrease was \$95 billion (total) or \$82 billion (enacted) from 2000 to 2019. Regarding object classes

only two of them reflected positive growth. However, we know for a fact that the budget has increased \$30 billion from 2000 to 2019.

B. RECOMMENDATIONS FOR GOVERNMENT

In order to correct the discipline, transparency, and accountability issue we recommend the following actions for the government when preparing and reporting the budget in the future. First, OCO funding should only be used to meet war needs and not to fund non-war activities. The major discipline problem is when OCO funding is not used for its intended purpose or used to curtail the budget caps. This also causes a lack transparency. Therefore, strict discipline in this area is necessary in order to ensure proper reporting. To improve on the principle of transparency it is recommended that the budget be reformatted so that it contains actual price and program growth. It is not clear what is happening in with the budget. When OCO funding is not separated in the budget Congress and other stakeholders are not seeing everything that is going on because the budget request does not include OCO. The estimates sometimes include OCO funding and the “budget actuals” usually do. There is never an open reporting of price and program growth actuals. This hinders the principle of accountability. To correct this transparency and accountability issues it is recommend that future budgets include accurate reporting of price and program growth which does not include OCO funding. Once the budget reports price and program growth in this way then the primary research question can be answered.

C. RECOMMENDATIONS FOR FURTHER RESEARCH

After performing the research involved in this project, it is our recommendation that a new analysis be conducted to determine the causes of the consistent increase in the O&M, N appropriation. This research should focus on the Operating Forces BA and the object classes identified that are driving price and program growth. This information may be used to better understand the major O&M, N cost drivers, where costs could be avoided, and/or duplication of effort amongst the various DON programs. Funding is a constrained resource therefore it is important to discover ways how this funding could be used more efficiently and effectively.

In order to conduct the recommended analysis of O&M, N budgeting, it is essential to recognize that only utilizing the O&M,N budget justifications to provide data is not sufficient. The researcher must also utilize the OCO budget justifications provided to congress, and further, must ensure that OCO funding for O&M, N activities is segregated whenever possible. We believe that merging the O&M, N budget justifications with the OCO (O&M, N) justifications will resolve the majority of the \$90 billion discrepancy found when trying to compare price and program growth using the O&M, N justifications alone.

We further recommend that any research conducted in the future requests for FMB to provide actual budget price and program growth numbers if possible. We recognize that this may not be something FMB currently computes or stores, and may not even be able to be computed based on the way that OCO funding is disbursed. It would be prudent to determine the relationship between actual budget numbers provided in the O&M, N budget justifications and the actual budget numbers provided in the OCO (O&M, N) budget justifications as well.

After research is conducted and object class level growth causes are identified, decisions can be made on which programs need to be tailored or further analyzed. Additionally, identifying object classes with outsized price or program growth should spur further research to identify which emerging technologies could be used or invested in to cut future costs and improve efficiencies. Lessons learned from this additional research should be shared among the different branches of the military and other government agencies in order to reap benefits across the entire Department of Defense.

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