An analysis of Naval Officer accession programs

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THESIS

AN ANALYSIS OF NAVAL OFFICER ACCESSION PROGRAMS

by

William D. Lehner

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AN ANALYSIS OF NAVAL OFFICER ACCESSION PROGRAMS

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Submitted in partial fulfillment of the
requirements for the degree of

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TABLE OF CONTENTS

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LIST OF FIGURES

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LIST OF TABLES

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I. INTRODUCTION

The United States Navy spends hundreds of millions of dollars annually to educate and train candidates for commissioning as officers. The United States Naval Academy (USNA), Naval Reserve Officers Training Corps (NROTC), and Officer Candidate School (OCS) are the three major commissioning sources of Unrestricted Line Officers (URLs), the primary war-fighting community of the service. The Navy strongly desires to procure officers with the highest potential of success as leaders in combat.

Instruction in the art and science of warfare through training and education is the time tested method for molding combat leaders. Training provides the means to complete a job or an assignment. It can be given directly to an individual or to a larger group or unit. Education provides for intellectual development and the cultivation of wisdom and judgment in an officer. It also provides the ability to deal with situations unrelated to job assignment and prepare officers for even greater future responsibilities (Masland and Radway, 1957).

In our nation's history, periods of intense debate have occurred over how to most effectively educate and train midshipmen to become commissioned officers. Over time, the Naval Academy, ROTC, and OCS became the three major commissioning programs. The current period of debate, starting with the Cold War drawdown, has prompted various government agencies to investigate which of the three commissioning sources is the "best" program from which to acquire officers. Additionally, the post-war drawdown immediately reduced the number of officers graduating from ROTC and OCS, which shifted the composition or "mix" of officers in the fleet to a larger percentage of Academy graduates. The two-fold debate continues in the Navy and federal government: what is the most efficient way in which to commission officers, and what comprises the proper "mix" of officers in the fleet from the three commissioning programs.

A. BACKGROUND

Each of the three major commissioning sources has different roles in officer production. When comparing the three sources, these different roles provide each program with distinct advantages and disadvantages in cost, proficiency, and

organization. Ideally, after completing a four year commitment to rigorous physical trials and a difficult educational course load, individuals who graduate from the Naval Academy will hold aspirations to remain in the Navy for long-term careers. ROTC provides future officers the freedom to choose the college or university of their choice, yet still graduate from that institution as a commissioned officer in the United States Navy. After receiving a college degree from the institution of their choice, OCS provides future officers with a short, rigorous training program designed to move officers quickly to the fleet. The flexibility of the OCS program allows officer production to be raised or lowered at a moment's notice, especially during periods of national emergency (Parcell, 2005). Ultimately, each of the commissioning sources plays a different, but vital role to the nation's defense.

As work continues to determine which is the most effective and efficient commissioning source, the importance of this search will only intensify in the coming decades. The growing cost of Social Security, Medicare, and interest on the national debt will put severe future strains on the federal budget. Only comprising 10% of the Gross Domestic Product (GDP) in 2004, these expenses are forecasted to reach 35% of the GDP by 2040 with the extension of the current tax laws (GAO, 2006). Therefore, the three commissioning sources should be prepared to justify their existence and importance to our national defense.

To be sure, governmental and "watch-dog" organizations are constantly evaluating the cost effectiveness of programs such as the three commissioning sources. In the end, these watch-dog groups, as well as the Federal government, are interested in the answer to one question: how efficient are these three sources in producing naval officers? The Naval Academy, which provides a four year degree, housing and other living expenses, as well as a small monthly stipend, requires a hefty expense in order to produce naval officers. The Federal government also pays for a four year degree for ROTC scholarship students, including room and board. Some ROTC programs at private colleges come with a large price tag. However, ROTC students at public universities, which are heavily subsidized by the respective state governments (through taxes, lotteries, and even oil/mining royalties in some cases), have their tuition somewhat reduced, which in turn further reduces the cost to the Federal government. Because there

will always be agencies, watch-dog groups, and Members of Congress looking for ways to reduce federal expenditures, the Navy's commissioning programs will remain in the spotlight for reduction or removal well into the future.

Our country, however, must acquire future leaders to defend the nation. Because the Navy is competing directly with the corporate world for officer candidates, it needs a reliable framework to provide strategies, insight, and information in order to compete for, produce, and retain, officers. A number of scholars have completed research on the commissioning programs to provide such a framework by assessing whether or not the programs are attaining their goals. Prior research includes historical and economic analyses, as well as analyses of the job performance of officers produced by each program. During wartime, producing many officers quickly was the main goal. At present, officer quality, with retention being a close second, appears to be the goal.

History remains a critical component when studying the fluctuating debate within the Navy regarding the best source for commissioned officers. Often, the results depended on presidential administrations, Congress, public opinion, and the needs of the Navy. Further, the role of education helped shaped the debate, because the percentage of the officer corps with college degrees changed as well. In 1925, almost the entire officer corps had a bachelor's degree. However, in 1956, only 56% of commissioned officers had a bachelor's degree, and this rate would not break 95% again until 1980 (Thirtle, 2001).

In the civilian world, graduates of colleges and universities work for a vast range of companies with extremely diversified pay scales, promotion schedules, and performance evaluation systems. In contrast, all graduates of the commissioning programs serve the same employer: the United States Navy. Therefore, with established performance measures across the organization, job performance in the fleet can be evaluated. Despite having diversified personnel (i.e. in terms of college backgrounds), the Navy levels the playing field by holding each officer accountable to the same standards and performance measures. Thus, the Navy makes for a great environment in which to study the impact of college selection as it relates to future job performance.

Finally, new economic comparisons of the commissioning programs have been developed, which compare marginal and average costs with post-commissioning costs. During the early 1990s, significant congressional debate focused on the total cost of each commissioning source. The Congressional Budget Office (CBO) and the General Accounting Office (GAO) (now called the Government Accountability Office) deemed the service academies to be cost-ineffective commissioning sources. The substantial lower pre-commissioning costs of NROTC and OCS led to proposals in Congress to close the Naval Academy. Upon further consideration, Congress decided to limit the size of the Naval Academy to 4,000 midshipmen (GAO, 1992).

In 1995, William Bowman changed the direction of the economic analysis of the commissioning sources with a "steady state" model of retention and promotion coupled with pre-commissioning and *post*-commissioning costs. His model, with follow-on research by Steve Mehay at the Naval Postgraduate School and Ann Parcell at The Center for Naval Analyses, analyzed the cost-effectiveness of each commissioning source. First, they evaluated the upfront costs of commissioning. Next, they projected the effectiveness of each source by predicting the job performance of its officers with a methodology based on the theory of human capital investment. Their findings changed the policies of the Department of the Navy and Congress, with a return to the Cold War maximum of 4,400 midshipmen at the Naval Academy, starting under the National Defense Authorization Act of 2003.

B. OBJECTIVES AND RESEARCH QUESTIONS

1. Objective

The primary objective of this thesis is to analyze the three major accession programs for the United States Navy. It is critical for the post-Cold War Navy to determine the most effective way to educate, train and retain its officers. Failing to do so will have dire consequences. For example, due to the Global War on Terror (GWOT), the military is currently struggling to meet all manpower requirements. Finally, commissions from the USNA have increased and ROTC and OCS commissions have decreased. The Navy is placing more Academy graduates in the fleet, thus altering the traditional equal shares of Academy, ROTC, and OCS graduates found during the Cold War.

2. Primary Research Question

This thesis will conduct an extensive literature review of prior studies on the three major commissioning programs for naval officers. Three areas will be covered: historical patterns in officer accessions and historical changes in pre-commissioning training and education philosophy and policy; cost comparisons of the three major commissioning programs; and comparisons of job performance of junior and field grade officers from each program. The primary purpose of this research is to derive the implications of the results of the literature review for current Navy accession policies with respect to officer commissioning programs. The broad-based insight provided by these comparisons will assist decision makers in reevaluating current policy toward the major commissioning programs. Contrasts and comparisons are made among the many prior studies, and they are synthesized to generate recommendations for Navy policy makers.

3. Secondary Research Questions

Following the initial primary research question, secondary questions will be analyzed. These questions include:

a. How did Naval Officer accession policy evolve over time? What training philosophies guided officer accessions policy?

b. Historically, what proportions of Naval Officers were provided by the Naval Academy, Naval ROTC, and OCS?

c. How does performance vary by commissioning source?

d. What different economic indicators of cost-effectiveness are available and how do they vary among commissioning sources?

e. Do historical, performance, and economic analyses lead to recommendations regarding how to assist decision makers in officer accession policy?

C. METHODOLOGY

The methodology used in this thesis consists of: (1) an extensive literature review, and (2) an evaluation of the research results on officer accession programs. The implications for accession policy will be derived from historical, performance, and economic data on the commissioning programs obtained from the prior studies. Each element provides a wealth of information, which provides decision makers with a through

analysis regarding the most effective and efficient way to train future officer candidates. There are only a few historical, performance-based, and economic analyses regarding officer accessions, but collectively, they offer a large reservoir of insight for decision makers.

1. Historical Analysis

The historical comparison will examine the histories of the Naval Academy, ROTC and OCS programs, which will explain the reasoning for their development. Additionally, the comparison will determine whether or not each source is still being employed according to its established goals, or if it experienced a change in goals over time. Compared to the Naval Academy and ROTC, there are few historical resources available on OCS, which creates a bias in the research. Further, Department of Defense and Bureau of Naval Personnel records on commissioning sources only go back to 1949. Therefore, prior to 1949, historical studies will provide the primary source of information on the commissioning sources.

The historical comparison will first examine the British and early American Navy in order to study pre-Naval Academy education and training of naval officers. The historical analysis will conclude with present day education and training programs. All available research will be assembled, with the goal of enlightening decision makers regarding previous studies of commissioning sources. The research will also evaluate historical documents and Department of Defense data in order to study the historical "mix" of USNA, ROTC, and OCS graduates in the fleet.

2. Performance Analysis

The performance analysis will first provide background information on military and civilian performance indicators used in the context of internal labor markets of an organization. This will highlight the ways in which Navy performance has been evaluated: e.g., based on retention, promotion, fitness reports, and post-commissioning training success. Studying these performance measures will enable decision makers to determine if the ways in which each commissioning source prepares their graduates for service as commissioned officers are effective.

The thesis will gather available research that addresses each performance indicator for each commissioning program. The data will be limited to studies completed

after 1994 and include analysis of officer performance after the end of the Vietnam War in order to limit the focus solely on the All-Volunteer Navy. The results of each report will be discussed. Finally, the comparison will present the results of the collection of reports.

3. Economic Analysis

The economic analysis will be based on the "theory of human capital investment" in order to provide the framework for evaluating the commissioning programs. Commissioning programs provide education and training for employees with the promise of a payoff in terms of improved productivity over a long period of employment. Improved worker productivity and the associated monetary savings constitute the economic benefits of the education or training program. The analysis will first address the importance of this model. Next, it will discuss the research available on the costs of the commissioning programs, and how those costs are estimated. The comparison will present the overall results of the collection of reports. A possible bias is the lack of comparability in the methodology of each research study.

Additionally, the report will analyze other education programs funded by the Federal government and the Department of Defense. Although the responsibility of education is delegated to the states by the Tenth Amendment, Federal educational spending allows further assistance to states to boost national primary/secondary/post-secondary educational goals, as a human capital investment to improve the U.S. workforce. The three commissioning sources are part of the Federal government's expenditures on education, and Chapter Two will illustrate the vital role of education in America's national defense. The Constitution assigns the responsibility of national defense to the Federal government. Therefore, theoretically, commissioning education becomes one of the priorities of federal educational spending.

D. SCOPE AND LIMITATIONS

This thesis will focus solely on the United States Navy, despite the fact that the Naval Academy provides 15%-20% of each graduating class to the United States Marine Corps. Additionally, the thesis will limit the commissioning source evaluation to only the URL graduates of the Naval Academy, ROTC, and OCS, and will omit other enlisted commissioning programs. Generally, URL officers are the main combat body of the

officer corps, so the primary mission of the Academy, ROTC, and OCS is to produce large numbers of this officer type. Although several enlisted-to-officer programs exist, they mainly funnel their graduates into technically specific groups in the restricted line community as Warrant Officers and Limited Duty Officers. Typically, enlisted personnel desiring commissions in the URL are encouraged to apply to the main three commissioning sources.

The important effect of direct enlisted commissions will be looked at in the historical review, but not analyzed in the performance or economic comparison. These types of commissions are popularly known as "battlefield commissions," and they provide direct commissions of enlisted directly into the unrestricted line. Generally, they are only in effect in a time of war, and done in large quantities. However, after Korea, they Navy allowed a number of enlisted personnel to be commissioned without entering a commissioning program. By the end of the Cold War, all enlisted personnel desiring commissions were required to enter some type of commissioning program.

The main limitation on this report is the lack of availability of research that addresses each individual element of study in the history, performance, and economic categories. The principles and models are relatively new and have had few follow on studies, particularly in the areas of job performance and economics. However, the research is sufficiently detailed and comprehensive to provide decision-makers with a broad view of accession implications based on several perspectives.

E. ORGANIZATION OF STUDY

The historical background and analysis will be reviewed in Chapter II. Secondly, the job performance background and analysis will be reviewed in Chapter III. Next, the economic background and analysis will be reviewed in Chapter IV. Finally, Chapter V will synthesize the results of the three different comparisons, integrate generalizations, and provide conclusions and recommendations that can be derived from the analysis of prior research.

II. HISTORICAL ANALYSIS

This thesis chapter will analyze past patterns in officer accessions. It will explore chronological changes in pre-commissioning training and education philosophy and policy. Included in this analysis are the factors and events which drove senior policy makers to formulate those changes. A historical graph is presented that compares the accession sources during periods of peace and war. The intent is to derive lessons from the past with regard to how officer accession programs have evolved over time.

Technology and mass mobilization appear to steer naval history and strategic policy (Hacker, 1994). Therefore, this chapter is focused on these two key items. As it emerged from the age of sail to the advent of nuclear power and computers, it became clear that there would always be a complex, symbiotic relationship between technology and the success of the Navy. The nature and advancements of technology is ever-changing. Therefore, the Navy must require that officers have a high level of intelligence and education. Additionally, mass mobilization during times of crisis requires the means to rapidly acquire officers. During some wars, the Navy underwent phenomenal transformation by rapid expansion due to the need to quickly acquire officers. Thus, technology and mass mobilization play a large role in the historical analysis.

A. OFFICER ACCESSIONS IN THE PRE-MODERN ERA (1500 – 1850): THE DECLINE OF TARPAULIN SAILORS AND THE RISE OF THE EDUCATED OFFICER

The navies of the Pre-Modern Era were the precursors to the modern navies of today. The European powers gradually recognized the necessity of a standing, professional Navy to provide constant protection for the homeland, support for distant colonies, and safe passage of seaborne trade. This recognition led to the development of a professional officer corps to lead the new navies. As the era progressed, the navies became less dependent on experienced sailors, and more dependent on the educated class to become officers. During this time, only nobility or gentry could afford any kind of education.

This era ushered in early technological advances such as improved naval architecture, ship handling, gunnery, and navigation. It grew very slowly during this era,

not at the rapid pace seen later during the Industrial Revolution. The strategic process of mass mobilization (total war) would not be developed until the American Civil War. Instead of the entire nation, only armed service members participated in war. Battles and wars were fought by large armed forces on the European continent or in localized regional actions to support colonies. Either on the continent or out in distant colonies, the navies fought with minimal civilian participation or impact (Karsten, 1972).

1. British Naval Influence (1500 – 1800)

In the early 16th century, the modern navies acquired officers from the ranks of enlisted sailors, who had worked their way up to command. These officers are known as "tarpaulin" sailors. They were from very modest families, but were highly experienced with ship handling and naval warfare. The respective navies of the world powers grew in size and importance as colonial interests expanded all over the world. With the naval growth in the 16th century, the nobility and gentry felt compelled to increase their presence in the officer corps. Due to distrust and the perceived equalization of the social classes, they disliked the "lower sort of men" in charge of the maritime force (Karsten, 1972).

The Puritan Revolution (1640-1660) and the Dutch Wars (1652-1678) led England to establish a permanent national navy with a professional officer corps. It became the Royal Navy in 1660 under Charles II. The Royal Navy became essential in the defense of the island nation and the protection of merchant interests across the globe. Though a law issued in 1677 created minimum qualifications for a commission in the Royal Navy, all officers' training was still completed at sea. By the late 1600s, England had become a world leader in trade, with vast colonial interests supported by the Royal Navy (Karsten, 1972).

In the early 18th century, the "tarpaulin" sailor found it ever increasingly difficult to advance in the Navy of the British Empire (Karsten, 1972). Most officer candidates were coming from the more educated class of the nobility and gentry because they could provide for their own education. However, to further enhance naval officer education and prepare officers for naval service, the British Navy established the Royal Navy Academy in 1733. It was formed at Portsmouth, and became the Royal Navy's first officer training school ashore (Simons, 2000).

By the start of the American Revolution, "tarpaulin" sailors were almost eliminated. New officers were trained either directly in the fleet or they entered the Royal Navy Academy at Portsmouth. Some merchant captains could receive commissions, but only with political influence. The Napoleonic Wars and other national emergencies forced the British Navy to commission more "tarpaulin" sailors, but only for the duration of hostilities.

By 1800, the percentage of nobility and gentry in the British Officer Corps climbed to 93.3 percent (Karsten, 1972). Only wealthy families could afford the education required to become an officer. The professional officer corps led the British Navy to become the undisputed naval superpower by 1805. Ultimately, this naval strength enabled the British Empire to become the most extensive empire in world history.

2. The Early American Navy (1776 – 1812)

The American Navy was heavily influenced by the British Navy. It incorporated many of the British Navy's values and traditions (Karsten, 1972; Simons, 2000). The ships of the War of Independence were officered by veterans of the Royal Navy or the merchant service, including some officers from the lower social classes. As in the British Navy, the "tarpaulin" officer was a rare commodity in the new United States Navy, particularly during periods of peace (Karsten, 1972).

Like the British Navy model, the United States Officer Corps was limited to those who had financial and political influence. Many of the Federalist founders believed that only suitable individuals, who had developed the "right habits, principles, and feelings (Karsten, 1972, Pg 4)" should be appointed to positions of authority in the Naval Service. Often, senior naval officers would bring their nephews, sons, or grandsons up the ranks with them. Further, fierce competition for limited midshipmen appointments led directly to the requirement for political influence. The struggle for an appointment was so great, that by 1833, Secretary of the Navy, Levi Woodbury, reported that with only 35 midshipman vacancies available, there were more than 1,300 applications on file (Karsten, 1972).

Following the American Revolution, midshipmen were appointed by the President, Secretary of the Navy, or members of Congress (Simons, 2000). Unlike in the British Navy, the importance of shore-based training was not immediately recognized. The early American Navy mandated that both naval skills and regular academics be done at sea where personal experience could be amassed. When studies were not taking place, midshipmen were rotated among various duty stations and assigned jobs under the close supervision of the Captain (Simons, 1965). After sea training commenced, midshipmen would earn their commissions as naval officers. Initially, chaplains were responsible for teaching general academics, but by 1812, Congress authorized that a schoolmaster be assigned to every ship to educate midshipmen (Simons, 2000).

For the most part, midshipmen could only be appointed from wealthy families who could afford private education and wield political influence. Like the British Navy, these practices kept control of the Navy in the hands of the upper social classes. A critic of the time noted that the naval service was attempting to continue the linage and privilege of an aristocracy into the young democratic republic (Karsten, 1972). Nevertheless, the well-established practices of the British Navy influenced the American Navy to keep the traditional commissioning method of officers among the elite, with "tarpaulin" sailors filling vacancies during times of war.

3. The Need for an American Naval Academy (1812 – 1845)

The War of 1812 led to the necessity for a firmer establishment of the naval service and a professional officer corps to lead it during peace time. The naval victories at the Battles of Lake Erie and Lake Champlain, coupled with the numerous successes on the Atlantic, helped saved the young American democracy from defeat. Beginning in 1814, a succession of Navy secretaries, with the support of senior naval officers, proposed to Congress the creation of a shore-based naval academy. Between 1814 and 1842, three separate proposals to establish a Naval Academy died in Congress. Lack of congressional support from the inland states prevented passage of the respective bills (Lovell, 1979).

The impetus behind a move for a shore-based naval academy had its roots in practicality. Too few competent educators sought to become schoolmasters at sea (Simons, 1965 and 2000). Conditions on-board ships were not conducive to receiving a

formal education. Midshipmen had little time for studies, as they were busy standing watches and completing other professional duties. Classes could only be held behind canvass screens on the gun-decks, or in the poorly lit berthing decks. Schoolmasters had little authority. As a result, their students were constantly being interrupted to handle the ship's duties, which were frequent on a bustling warship (Simons, 1965).

Despite congressional resistance to another service academy, recognition of these problems urged the Navy to act independently and establish shore-based education. The Navy set up temporary schools at Navy yards in Boston, New York, and Norfolk, and urged midshipmen to attend them while in port. Beginning in 1838, midshipmen approaching their examinations for lieutenant reported to the Naval Asylum in Philadelphia for eight months of study. At this first shore-based naval educational institution, the schoolmasters would educate midshipmen in academic and professional seamanship courses (Simons, 1965 and 2000).

In the 1840s, public pressure mounted for the creation of a Naval Academy, but Congress continued to resist. West Point's critics had dubbed it the "Nursery of Aristocrats", and Congress was reluctant to create another such institution (Simons, 1965). Again, the Navy was forced to act independently. Bypassing Congress in 1845, Secretary of the Navy, George Bancroft, teamed with Secretary of War, William L. March, and designated that Fort Severn in Annapolis be used as a naval school. President Polk, who had demonstrated his pro-military and pro-Manifest Destiny leanings in a war with Mexico, approved the transfer. His endorsement proved essential. In October 1845, the Naval School was opened, and was subsequently renamed the United States Naval Academy in 1850 (Lovell, 1979).

The Naval Academy finally gained Congressional recognition and appropriation on August 13th, 1846 due to three circumstances. First, the American public became much more vocal in their disapproval of the alleged brutal and inhumane conditions on-board ships. Officers, who were often abused as midshipmen, became abusive to others as they climbed in rank (Simons, 1965). Many saw enlightenment and education as the cure to ignorance. The goal was to break the cycle by preventing those abuses from perpetuating themselves into the future with a new breed of naval officers.

The second circumstance which enabled the formation of the Naval Academy was also in regard to public opinion. Public attention fell on a highly controversial punishment of a midshipman who was hanged for allegedly inciting mutiny on-board the USS Somers with two other enlisted seamen. A midshipmen / enlisted-recruit training ship, the USS Somers was crossing the Atlantic when rumors spread that Midshipman Phillip Spencer and other seamen planned to murder the officers and establish a pirate ship. The midshipman turned out to be the son of Secretary of War John Spencer, and his subsequent execution ignited a wave of government and media criticism when the ship returned to port (Simons, 2000).

Thirdly, as the intensity of the Industrial Revolution began to grow, the United States Navy was commissioning more steam-powered ships. Many felt a strong technical education would be essential for commanding and operating these ships (Simons, 1965 and 2000).

4. The Foundations of the Naval Academy (1845-1850)

The early curriculum at the Naval Academy incorporated many of the academic and administrative features developed by the Military Academy at West Point. In 1851, the program was extended from two to four years, and control over most appointments was taken away from the executive branch and allocated among the congressional districts and territories (Simons, 2000). While this division of appointments did distribute the benefits of a Naval Academy education among all of the states, it did not alleviate the criticism that control of the Navy was still in the hands of the social elite. As the upper-class maintained the greatest proportion of midshipmen appointments, political patronage was still considered essential for a career in the Navy.

B. OFFICER COMMISSIONS IN THE EARLY MODERN ERA (1850 – 1941): THE NAVAL ACADEMY, THE DEVELOPMENT OF OFFICER CANDIDATE SCHOOL, AND THE REEMERGENCE OF THE "TARPAULIN" SAILOR

With the establishment of the Naval Academy, formal education was now firmly implanted as the foundation in the making of a Naval Officer. The educational foundation would grow exponentially as the as the Industrial Revolution gained strength during this period. However, it was not until this period that the effects of mass mobilization would be felt. Previously, nations kept small standing armies and navies to

handle lesser wars and support colonial and imperial interests. During this period, history saw the development of mass mobilization, where all of the nation's resources, including population, factories, and machines were mobilized to fight.

Because the American Civil War employed mass mobilization, it is considered by many historians to be the first modern war in history. Although mostly a major land battle fought between armies, the Navy saw its mass mobilization. Additionally, it was evident during this time period with the rapid expansion of the officer corps: 200 percent in the Spanish-American War, 600 percent in the Civil War, and 700 percent for WWI. However, when each of the respective hostilities ended, the Navy immediately returned to its pre-war strength of officers. Despite a limited role in these wars, the United States recognized the ever increasing role of the Navy for national defense, and the need for a reserve Navy to augment during an emergency. Most importantly, the Navy needed a source from which to draw naval officers in the event of a crisis.

1. The Civil War and the Spanish - American War Period (1850-1899)

The Naval Academy immediately became the sole provider of commissioned naval officers up to the Civil War (Karsten, 1972 and Simons, 2000). By the beginning of the Civil War, most officers from the old "train at sea" Navy were replaced by Academy graduates. All line officers came from the Naval Academy, while the Medical, Dental, and Chaplain Corps were manned with direct appointments from their respective professional schools. The other staff communities (Supply Corps, etc) were manned by Naval Academy graduates, either directly from graduation, or after an initial tour as a line officer. Less than one percent of the US Naval Officers between 1845 and 1901 rose from the enlisted force, but they were all pushed into the staff communities as pay masters, supply clerks, and other administrative jobs (Karsten, 1972).

At the onset of the Civil War, weaknesses in the Naval Academy supply system were immediately recognized. Many midshipmen and officers left the service to join the Confederacy, which created a large officer deficit. Additionally, a town insurgency forced the Naval Academy to temporary close and move to Rhode Island, further delaying production (Department of the Navy [DoN], 1863). The Navy asked Congress to supply money for more infrastructure and midshipmen to correct the "deficiencies caused by the rebellion" (DoN, 1863, pg xxviii).

As the war continued to escalate in size and strength, the Navy, and the world, saw the beginning of mass mobilization. The officer corps would grow from 1,114 in 1861 to 6,759 by 1865 – a growth rate of 606 percent in only four years (Bureau of Naval Personnel [BUPERS], 1960). With the four year procurement of an officer, the Naval Academy could not come close to meeting the war time demands of the Navy (Karsten, 1972).

To compensate for the shortage, by Act of Congress, the Navy gave civilians temporary or "acting" appointments as commissioned officers (Karsten, 1972). With deeply established maritime roots, New Englanders from the commercial and whaling fleets were recruited heavily for this new fighting force. Close parallels can be seen between the recruitment, education, and training of the Merchant Marines and the modern-day Officer Candidate School. In order to train the men recruited, the Navy set up schools to teach naval operations and gunnery. By 1865, about 7,500 commissioned officers were comprised of either commercial sailors or civilians (DoN, 1865, pg xiii). In 1863, in their annual report to Congress, the Navy Department praised the volunteer officers for their courage and skill (DoN, 1863).

Even though the officers fought with "zeal and fidelity" (DoN, 1865, pg xiii), most of the temporary appointments were withdrawn after the war (Karsten, 1972). The Navy was resolute that the Naval Academy should be the only source for the procurement of officers, and the post-war Navy would continue the Naval Academy foundation (DoN, 1863). Strangely, the board of visitors at the Naval Academy became a surprise critic in recommending the disestablishment of the Academy into seven smaller schools. Perhaps due to the regional nature of the Civil War, the board felt that having seven schools situated in different parts of the country would alleviate the problem of supply system break-down in the event of another regional crisis. However, Congress authorized the return of the Naval Academy back to Annapolis in 1864, (Lovell, 1979) and it continued to be the sole source of commissioned officers at the war's end (Karsten ,1972).

The Spanish-American War was far less lengthy and significantly less bloody than the Civil War. Nonetheless, the need to mobilize and expand the mobilization of the armed forces still led to a shortage of naval officers. Some states had created naval

militias (as did the Army in the Civil War) as a rudimentary naval reserve, but only a few existed. The state governors released all of their militia officers into the regular Navy, but the manpower was only a fraction of what was required (DoN, 1898). The Navy was forced to bring in a number of volunteer officers into the service again for the duration of the war (Karsten, 1972).

Once again, the Navy was forced to recruit officers from among the civilian population. Instead of recruiting commercial sailors as during the Civil War, they looked for individuals with higher levels of education and intelligence (DoN, 1898). The Industrial Revolution ushered in increasingly complicated technology. Therefore, the officer of that era had to possess not only the sailing and battle skills of the previous era, but the education and intellect to master new technology. Though the new recruits lacked the experience to be of immediate valuable importance, they quickly acquired the knowledge they needed after their initial training. The Navy Department found that all volunteer officers performed with great zeal and success during the war (DoN, 1898).

After the close of the Spanish-American War, all volunteer officers were discharged from the service (DoN, 1899). The Department of the Navy appreciated the service of the volunteer officers, but continued to believe that officers must be trained at the Naval Academy. The department found that the volunteer officers performed to the best of their ability, but would have been "really efficient" with more training and time in service. At the time, the Navy believed that the Academy graduate, with experience as a career officer, laid the foundation for success in the war (DoN, 1898).

2. Post Spanish - American War to Pre-WWI (1899-1914)

The Civil War and the Spanish-American War taught the Navy that the Naval Academy undoubtedly could not supply all of the officers needed during a major war. The volunteer forces proved to be an invaluable asset, but the Navy was not prepared to make them a permanent part of the Navy framework. Once the hostilities ended, it was back to business as usual. Once the war time commissions were terminated, the Naval Academy always emerged as the dominant commissioning source. Undoubtedly, however, the seeds of change for the establishment of other commissioning sources had been planted by the successes of the volunteer officer.

Because the role of the Navy was paramount during the Spanish-American War, a "new-Navalism" swept through American culture. The United States emerged from the Spanish War as a major world power with extensive colonial interests all over the world (Lovell, 1979). New ships, and officers to man them, were required to supply and protect the new-found colonial interests (Karsten, 1972). Theodore Roosevelt, an ardent supporter of the Navy, held the presidency at this time. In 1890, the American Navy was negligible as a naval power. But by the end of the Roosevelt administration in 1909, the United States had one of the top three Navies in the world. The Naval Academy mirrored this impressive naval expansion with large numbers of midshipmen and aggressive building projects (Lovell, 1979).

During this build-up of naval strength, the Naval Academy could not keep up with the manpower requirements of the fleet. The Navy continued to fight for more officers from the Academy, but started to look elsewhere (DoN, 1901 – 1905). In the mean time, the aristocratic British and other European navies started to commission a growing number of "tarpaulin" sailors again. The Navy of the American democratic republic continued to stall the commission of the "common man" (Karsten, 1972) as naval officers. Finally, the shortage crisis led the Navy to request that enlisted personnel be granted commissions.

In 1901, the government allowed the direct commission of six warrant officers, and that number was expanded to twelve two years later. The "tarpaulin" sailors were receiving commissions again, but it still proved difficult. The commissioning examinations were very difficult for the warrant officers who had no formal education. Most years, the twelve warrant officer commissions were under-filled or not filled at all due to examination failures (DoN 1901, 1903, 1905, 1906). One critic of the time pointed out that an enlisted man could never hope to become a commissioned officer (Karsten, 1972). The lack of a formal education clearly prevented the initial success of the program.

3. WWI and the Creation of the Naval Reserve. (1914-1918)

Following the Civil War, the Navy recognized the importance of mass mobilization and the significant need for a Naval Reserve for periods of crisis. The officers and enlisted of such a reserve would become a quick source of trained and

educated manpower ready to serve in the regular Navy. Many attempts, beginning as far back as 1887, were made to establish a permanent national naval reserve, but all failed in Congress (DoN, 1887; DoN, 1901; DoN 1912-1914). A few states created their own naval militias, some of which saw action in the War with Spain.

After hostilities erupted in 1914 in Europe, the importance of a naval reserve quickly gained recognition. The Naval Militia Act of 1914 was passed to bring all state naval militias under the Navy Department. Additionally, in 1916, the United States Naval Reserve was formed, but only included former active-duty officers and enlisted. Initially, the goal of the Naval Reserve was to organize prior active duty service members for immediate recall. If the United States enters war, the naval reserve provides experienced officers to fill more senior positions (DoN, 1912-1916).

The start of the European war led to the minor expansion of the active regular Navy. Secretary of the Navy Josephus Daniels allowed the selection of fifteen enlisted men per year for entry to the Naval Academy in 1914 (Karsten, 1972). This remarkable policy change would permit the enlisted to receive the education necessary to become an officer, something virtually unattainable prior to the policy change. Again, the Secretary of the Navy requested that the size of the Naval Academy double and warrant officer commissions expand to 45 (DoN, 1916). The length of the Naval Academy program was reduced to three years. "Officer material schools" (candidate schools), whose curriculum lasted only four months, were established on Naval Academy grounds and on the campuses of several schools and universities (DoN, 1917).

Following the declaration of war in 1917, the United States Navy began producing officers on a massive scale: the Navy would grow from 4,000 officers in 1916 to 28,000 officers in the beginning of 1919 (DoN, 1919). Once again, the Navy realized that it could not solely rely on the Naval Academy for production of officers. The Navy trained its expanded officer corps at its own instillations and at "officer material schools", located at fourteen different colleges and universities around the nation (Lyons and Masland, 1959; DoN, 1918). The intense courses offered by the material schools provided the officer candidates with just enough information to begin their naval careers.

Building on previous successes, direct enlisted commissions became a major accession source. After some initial training, the enlisted force provided 11,000 commissioned officers during the war (DoN, 1918).

The performance of the OCS graduates and enlisted during the war stood out significantly. The Navy Department pushed to allow many OCS graduates to serve the duration of a career in the post-war Navy as regular commissioned officers. For most, the temporary commissions were lifted and the officers were returned to the reserves and civilian life during the drawdown. Even during hostilities, the Navy still considered the Naval Academy as the most important source of officers, "but the next best material is being provided [by the officer candidate schools]" (DoN, 1918) to the fleet.

4. Between the World Wars

At the end of the First World War, the Naval Academy again became the sole accession program of active duty line officers, which would last until 1941 (DoN 1920, 1926; BoN, 1930-1941). The only exception to this rule was the twelve annual warrant commissions, which were required by law (DoN, 1920). Additionally, the Naval Academy had the production strength to make most staff officer requirements, except those physicians, dentists, and chaplains who were commissioned from their professional schools.

However, the First World War signified the importance of education, even under the exceptional growth of mass mobilization. Even though only twelve direct commissions existed, by 1918, one hundred enlisted men a year were entering the Naval Academy. Additionally, the creation of the Naval Academy Preparatory School in 1920 by then Undersecretary of the Navy Franklin D. Roosevelt helped prepare Sailors and Marines for entry into the Naval Academy. This school would enable the "common man" to earn commissions in the Navy by fulfilling the education prerequisite required for entrance into the Naval Academy.

Furthermore, the Knox-King-Pye Board of 1919 stressed the importance of education as a platform on which to build experience and knowledge. The board evaluated the need for education and training of line officers, and how it could be accomplished. Many officers believed that the prewar patterns of education and career

progression were not satisfactory. They found that the Naval Academy should be the initial foundation for the career officer, focusing on training graduates to be division officers. More intense and specific education, for expanded responsibilities, would be provided if the officer climbed in rank. While the board recognized the importance of traditional at-sea, on-the-job training, education would be the foundation of the naval officer (Simons, 2000).

Alerted by Japanese designs on China and the Western Pacific, the Navy became watchful of the officer manpower situation as early as 1926. The Navy was convinced that Japan could become a major opponent in a large-scale naval war in the Pacific (Simons, 2000). The Navy felt that an expanded reserve force would be the best route for traditional mobilization in the event of a major war. As before, the more senior billets in the reserve could be filled by retiring and separating officers. However, the expanded reserve would require educated officers for many junior billets. At this point, education had become a regular and legitimate function of the armed services (Masland and Radway, 1957).

As a result, the Naval Reserve Officer Training (NROTC) Program was established at six universities across the country to prepare reserve officers to lead a citizen navy mobilized in an emergency (Lyons and Masland, 1959). A simple addition of naval science courses to their regular undergraduate degree programs would qualify students for a commission in the Naval Reserve (Simons, 2000). All ROTC graduates entered the reserve, but had opportunities to pick up experience at sea for short durations. The only opportunities for regular commissions were after 1931, in which six accessions were granted into the Supply Corps (Bureau of Navigation [BoN], 1932, Masland and Radway, 1957).

Even after the creation of the NROTC, the several Secretaries of the Navy continued to believe that the Naval Academy should be the only source for all line commissioned officers for the regular Navy. Therefore, the Naval Academy would remain the sole source for officers. The only exception, however, was the twelve warrant commissions (BoN, 1930-1940). Most officers in the staff corps entered from the Naval Academy as well, either immediately after graduation or after building experience as a

line officer. The only exceptions were six ROTC graduates entering the Supply Corps, one to three pay clerks commissioned into the Supply Corps, and officers entering the Medical Corps, Dental Corps, or the Chaplain Corps from their advanced professional training (BoN, 1930).

By 1938, it became increasingly probable that the United States would enter the European war. As a precaution, Naval Reserve began a major expansion as the United States entered the pre-mobilization phase of World War II. In turn, NROTC grew with the addition of two more units. By the end of 1941, the ROTC program had grown to 27 units across the country (Lyons and Masland, 1959). Despite massive growth, the Navy realized that even the NROTC program was not producing the amount of officers required for full-scale war (Thompson, 1943).

Beginning in the spring of 1940, officer candidate schools were established all over the country, similar to what was constructed in the First World War. These were called reserve midshipman schools, and consisted of a month of sea duty, followed by a three month period of instruction (BoN, 1941). The V-7 program was formed to help funnel college graduates into these reserve midshipman schools. The V-5 program would place graduates into reserve flight programs. The V-1 program included working with V-7 or V-5 candidates who would pay for college at their own expense. Originally, a two-year college degree was required for admittance to the reserve midshipman school. However, the Navy changed the policy to a four-year college requirement, which cut the failure rate in the midshipmen schools by fifty percent (Navy V-12, 1996).

A formal declaration of war had not yet been made, therefore the regular Navy grew at a much slower pace. All of these new officers from NROTC and OCS were entering directly into the reserve Navy (BoN, 1940, 1941). As early as 1939, the Naval Academy could not meet expanding fleet requirements, even with an increase in the number of midshipmen (Lovell, 1979). NROTC graduates began to take an increasing number of staff corps billets in the regular Navy, leaving the Academy to fill expanding line billets (BoN, 1939). By early 1941, graduation was accelerated by four months, and the Academy once again moved to a three-year program (BoN, 1941).

C. THE TRANISTION OF THE OFFICER ACCESSIONS DURING WORLD WAR II AND AFTERMATH (1941-1949): ROTC AND OCS GAIN A PERMANENT FOOTHOLD IN THE REGULAR NAVY

World War II, and its immediate aftermath, altered the Navy's officer procurement system to closely resemble that of today's Navy. The Naval Academy ceased to be the sole commissioning source either in peacetime or war. The two main, closely related factors that led to this change were education and mass mobilization.

The idea that officers should be well-educated was firmly established prior to World War II. However, the swelling of the ranks with non-Academy graduates during the war created a varied landscape of naval officers. Officers now came from a diverse background of educations. At the time, the perception was that civilian institutions would generate creative and free-thinking officers, thus reducing the authoritative traits typically found in the Academy graduate. Some wanted this diversity to be continued after the war, even at the expense of the service academies themselves (Holloway Plan, 1945; Masland and Radway, 1957).

The effects of mass mobilization were highly significant to the accession programs during this time period. Between 1939 and 1945, the Navy officer corps had a phenomenal growth rate of 2,600 percent (DoD, 1997; BUPERS, 1960). Despite massive growth, the Navy did not revert back to its original size due to a new threat from the Soviet Union. The Navy departed from its historical pattern of growth and reduction, and never came close to downsizing to its pre-war strength. The Navy officer corps remained approximately 400 percent higher than its pre-1939 strength, ending the cycle of demobilization following full-scale war.

Subsequent to World War II, it was determined that the traditional method of transitioning a large naval reserve into a war-time Navy was no longer fast enough to counter a possible invasion. The threat of invasion or attack from the Soviet Union led to the idea that a large peace-time navy was now required to deter an attack on the United States (Lyons and Masland, 1959). With this mode of thinking, it was clear that the Naval Academy was no longer able to meet the manning requirements to maintain a large peace-time Navy. Therefore, the Navy became dependent on ROTC and OCS, in addition to the Naval Academy, for manpower.

1. The Second World War

As the most lethal and devastating war in world history, World War II required a huge naval force to fight the Axis forces in the Atlantic and Pacific, as well as a large number of officers to lead it. Half of the nation's income, and a vast portion of its population and resources, were diverted to meet the challenge (Masland and Radway, 1957). Hastily commissioned officers and millions of draftees rose to the occasion and performed the same jobs that regular Navy personnel had completed on a much small scale prior to the war. The Navy utilized OCS, direct enlisted commissions, and, to a much lesser extent, ROTC, in order to reach such a massive level of growth in the officer corps.

Following the attack on Pearl Harbor, the immediate growth came from the activation of the Naval Reserves. The active officer corps immediately doubled in size, and the Navy's foresight in creating the reserve OCS and ROTC programs paid off. For example, NROTC produced over 2,000 officers who entered the service immediately. Many advocates of the ROTC program hail this achievement as a path for success in the war because of the immediate manpower pool provided (Lyons and Masland, 1959). However, the 28,000 officers of the active Navy at the time immediately following Pearl Harbor was only a fraction of the 317,000 officers the Navy would have by 1945 (BUPERS, 1949). Throughout the war, reserve midshipmen schools (later OCS) would by far play the largest role in providing officers.

When America entered the war, there were three main ways to become a commissioned officer in the line: USNA, ROTC, and OCS. OCS consisted of two types of schools: reserve midshipmen schools, and officer indoctrination schools. The V-1, V-7, and V-5 programs were responsible for providing the OCS officers with enough military education to enter the reserve midshipmen schools for commission (Navy V-12, 1996). The indoctrination schools took established civilian professionals from every vocation and shaped them into line officers. Such schools existed previously in the Navy, but were only for staff officers in the medical and chaplain corps. Indoctrination school graduates would receive further education in a warfare specialty before active operational duty afloat. Officers were also procured from the enlisted force, but many were

encouraged to participate in the variety of available OCS educational programs in lieu of a direct commission (Thompson, 1943).

A major obstacle to the educational commissioning programs was the lowering of the draft age to eighteen in November, 1942. Individuals who might have entered college and become officer candidates were now being drafted directly out of high school. The Navy's smaller war-time reserve programs, the V-1 and V-7, were allowed to keep their students, but the draft ultimately curtailed a major contribution of the ROTC to the wartime effort (Lyons and Masland, 1959). The Navy did, however, recognize that the draft was reducing the pool of potential officer candidates.

In March of 1943, the Navy established the V-12 training program at 131 local colleges and universities. The program was made more efficient by combining the NROTC, V-1 and the V-7 programs, and ensured a flow of students through college who were compatible with the selective service board. The V-12 program provided a very minimal college education to officer candidates. However, it was enough to aid graduates in the more specialized training they would receive as officers at the midshipmen schools.

Because the NROTC program was created by a specific law in 1926, it was allowed to keep its identity. Additionally, some V-12 graduates were allowed to complete their degrees under the ROTC program (Navy V-12, 1996). ROTC graduates could earn their commission into the regular Navy after a year of service, thus enabling them to continue as career Navy following the war (Smith, 1942). Because they were deemed successful, the V-12 program, and the naval aviation V-5 program, allowed for the survival of NROTC after the war (Lyons and Masland, 1959). Over all, 60,000 officers graduated from the V-12 program and went on to reserve midshipmen school. Five thousand of those graduates continued on to full time ROTC programs (Navy V-12, 1996).

The success of the war manning effort, like World War I, was highly dependent on the organization and production of students at the nation's Officer Candidate Schools. The roles of both the Naval Academy and ROTC respectively were reduced due to the very nature of their respective curriculums. Both programs have a lead time of four years

in order to produce officers. The unpredictability of threats and warfare often does not give such lead time. The Naval Academy did not have the resources or ability to dramatically increase the size of its graduating classes. The ROTC, with its lead time requirements, also could not meet a rapidly fluctuating bill of manpower requirements. Only an Officer Candidate School can be increased or decreased at a moments notice to meet the spectacular speed of mobilization following a Pearl Harbor scenario, or the mid-1943 leveling of officer requirements after the bulk of the build-up. In the debate as to which entity can produce officers quickly and efficiently enough to meet Navy requirements, the successes of the Officer Candidate Schools particularly in WWII, outweigh the Naval Academy and ROTC. The various OCS schools do not require much lead time, and are relatively easy and inexpensive to run (Lyons and Masland, 1959).

The debate over whether or not to maintain a Naval Academy was brought into question after observing the successes of the OCS program. In 1943, Secretary of the Navy, Frank Knox, named a board headed by RADM William Pye (from the 1919 board) to consider two questions: (1) Should we combine the service academies into one institution, providing the first two years of education, then have our candidates finish their education at a civilian institution?, or (2) Should we close the Naval Academy altogether? The Pye board rejected both notions.

Instead, the Pye board came up with a completely different conclusion. The Naval Academy, even with twice the pre-war capacity, could only produce 1,600 ensigns, or half of the 3,200 ensigns required every year. Despite that fact, the board recommended that the Naval Academy continue as the primary commissioning source after the war. However, the remaining junior officer billets would be supplied by Naval Reserve Officer Training Units in civilian colleges and universities. To achieve this, the best V-12 programs were being converted back to NROTC units, and plans were made to establish a total of 50 NROTC units (Lyons and Masland, 1959).

2. Post-World War Two Transition and Requirements

At the war's end, the future of the military and the officer accession programs lay in a field of uncertainty. After a successful European campaign, the Army desired a "one military" concept, modeled after the unified commands established in Europe. Additionally, questions about unified military officer training or individual service

training, either at a service academy, at a ROTC unit, at an OCS unit, or a combination of all three bounced around the services. The role of these commissioning programs, for the active forces or the reserves, was questioned as well (Lyons and Masland, 1959).

The Navy was not prepared to wait for the government to make a decision. As in previous wars, the role of the Navy underwent another major transition. The war in the Pacific emphasized the importance of strong, flexible naval power. The Navy was no longer confined in the establishment of blockades, patrolling or supplying colonies, or guarding supply lines to Europe. The Navy had participated in a major war, which directly and destructively attacked the enemy's land and sea forces. With its newly established mission, the Navy did not want its Marine force absorbed into the Army or its naval aviation arm absorbed into the new Air Force. In an effort to maintain the separate identity of naval power, the Navy opposed unification early and provided a counterproposal to ensure that the three services remain separate (Lyons and Masland, 1959).

a. The Holloway Plan

The Holloway Board, and the subsequent Holloway Plan, forced the Navy to plan for the future of the Navy accession sources, including the possibility of unification. The purpose of the board was to address the future of the officer corps, and weigh the effectiveness of the commissioning sources. After the war, Annapolis was among the most firmly established institutions in American society. The Academy had deep roots in history, sustained by rich traditions and customs, and was maintained by an intensely loyal body of graduates (Masland and Radway, 1957). However, the Academy could not provide enough ensigns to meet naval requirements, and other officer sources were required. The Holloway Report, named after the Board's Chairman, Rear Admiral James L. Holloway, was approved by the Secretary of the Navy on October 30th, 1945. The Holloway Board became known as the foundation of Naval Officer training (Lyons and Masland, 1959).

The board began its work by addressing trial balloon plans such as the Jacobs-Parker plan, which would require all officer candidates to attend NROTC for two years, followed by three years at the Naval Academy. The Board felt that this particular plan would disrupt the four-year pattern of education at a single institution, and "would

eliminate intra-service differences to only a minor degree (Holloway Plan, 1945, pg 3)." The board eventually dismissed all of the trial balloon plans.

The Board recommended positive training, equal opportunity in promotion and responsibility, and equal designation among officers. Further, and most importantly, it recommended adjusting "the supply of permanent commissioned officers taken into the Navy so that approximately one-half come from the Naval Academy and one-half from other sources (Holloway Plan, 1945, pg 3)." Additionally, the board rejected the proposal of building a second Naval Academy, or any other action that would weaken the esprit or discipline produced by the traditional Naval Academy experience (Lyons and Masland, 1959).

The board operated under the premise of the Pye report, which stated that the Naval Academy would remain the primary source of officer accession, supplying 50 percent of the yearly accessions. The Pye Report continued that the remaining 50 percent would be procured from the NROTC programs in civilian colleges and universities. Students in the "regular" ROTC (later known as Scholarship ROTC) would be selected prior to entering college, and receive the cost of tuition and books, as well as a monthly stipend. After two to three years, the ROTC graduates would be commissioned into either the active or reserve Navy. The arrangement was two-fold. It would provide the necessary amount of junior officers in the active force, while reducing the proportion of officers embarking on a permanent career in the Navy. Further, the reserve force would have a steady supply of officers with fleet experience (Masland and Radway, 1957).

The Holloway Plan, which seemed to affirm the Pye Report, provided a clever answer to the critics of the service academies who felt that a civilian college education would produce a less technical and less authoritarian officer. Instead of training the entire officer corps at one institution, the plan diversified the Navy by enabling officers to be educated at either the Academy or a civilian institution. By broadening the range of officers, the plan met the demands of critics without altering the traditional role of Annapolis (Masland and Radway, 1957). In addition, the Navy began educating new officers on the interrelations of the Navy with other military services. New officers were taught how the various services work together and compliment each

other. This cooperative effort appeased critics who felt that academy graduates continued to play the Army-Navy game throughout their lives (Lovell, 1979).

The Holloway Plan was fully consistent with the Navy's position against unification, and Secretary Forrestal and Admiral Nimitz prepared to fight for its adoption. The Army was bitterly opposed to the plan, however, and desired unified training. The Army could not afford ROTC programs of the same caliber as the Navy, and feared that it would not attract the best officer candidates. The Navy insisted that the education of naval officers was inherently different to the training of army officers and anything less than the Holloway Plan would prevent the ascertainment of postwar officer requirements. Congress finally passed the Holloway Plan in July of 1946. Despite heavy pressure to veto, President Truman, after much personal lobbying by Secretary Forrestal, signed the plan into law (Lyons and Masland, 1959).

b. The Implementation of the Postwar Programs

Although signed into law, the Holloway Plan did not guarantee the future of any naval commissioning source for any significant amount of time. The following year, amidst the debate of the National Security Act, the unification issue was again brought up by Congress. Many Members of Congress complained that the dual service academies obstructed inter-service cooperation, and caused unnecessary duplication. The respective services restated their determination to preserve the institutions, based on two arguments:

1. The academy graduates exemplified the highest ideals of the service, which set the standard in professionalism, personal character, loyalty and service to country for other personnel.

2. The academies were known quantities, virtual magnets for officer candidates who, in large numbers, graduate and serve as career officers (Masland and Radway, 1957).

The fight to establish an Air Force Academy brought the Naval Academy into question again in 1949. Prior to leaving office, Secretary of Defense Forrestal established the Service Academy Board, which would decide how, and if, to manage the service academies. The Air Force desired a reliable source for officers. The Army and Navy, however, sought to retain their full output of respective graduates to meet their own service needs. Critics felt that unification of the service academies provided the best

solution to prevent duplication and save money. The five civilian educators on the board rejected unification regardless of whether Annapolis or West Point could expand to support the Air Force, and recommended three separate service institutions (Masland and Radway, 1957).

In August, 1949, the new Secretary of Defense, Louis Johnson, tried again to dissolve the service academies. The Joint Chiefs of Staff prepared a powerful argument in favor of three separate service academies. They felt the service academies well prepared their students for career service and were worth the cost. The argument, with the full endorsement of the three service secretaries, defeated five proposed alternative plans to change the service academies (Masland and Radway, 1957).

The Naval Academy successfully survived many attempts to close its doors following the conclusion of the war. With a vast pool of reserve officers from the drawdown, the Naval Academy and ROTC managed with ease to supply all active line officers in 1946 and 1947. However, the even split of the Holloway Plan is short lived. In 1947, OCS is resurrected in the form of the Naval Aviation Cadet (NAVCADS) program (DoN, 1947). By 1949, this precursor to Aviation Officer Candidate School (AOCS) is producing 30 percent of the line officers.

D. THE COLD WAR AND THE MODERN ARMED CONFLICTS (1949-1992)

The Cold War continued to assert the necessity for a large peacetime Navy. A large Navy would continue throughout this period, with three main build-ups: Korea, Vietnam, and President Reagan's 600 ship Navy. The Naval Academy, ROTC, and OCS would simply expand or decrease their numbers based on necessity. In this era, Officer Candidate School was resumed, and became known as the Naval Cadet program. The modern day Officer Candidate School and Aviation Officer Candidate schools were permanently formed in 1955 and 1959 respectively.

In response to Soviet aggression, new technologies were quickly developed in the fields of radar, jets, atomic weapons, submarines, and rocketry. In addition to new weaponry, and contemporary leadership and management techniques, the military found itself working directly with other nations, managing occupied territories, and mobilizing a massive amount of troops. Many military professionals in the Cold War Navy now

understood that education was the key to capitalizing on new technologies and managing mounting responsibilities (Lovell, 1979).

1. The Korean War and Aftermath

The swift attack on the Republic of Korea proved the theory that rapid deployment of reserves, prepared for mobilization, was no longer feasible. As the United States hastily entered the war, the Navy had no time to reestablish officer candidate schools as it had during the Second World War. Time constraints made it impossible to increase USNA and ROTC production, so the Navy turned directly to the enlisted community for commissioned officers. Between 1952 and 1954, 60 percent of commissioned officers came directly from the enlisted force (BUPERS, 1952-1954). As a result, the Navy established permanent Officer Candidate Schools to meet future needs.

The NROTC program remained steady, and kept its fixed number of fifty-two units. The Navy retained its ROTC program as a small, stabilized organization. The Army and Air Force increased the number of cadets in their respective ROTC programs, despite the long lead time for the classes entering between 1950 and 1952. This created large officer classes from 1954 through 1956. Most of the heavy fighting occurred in the first year of the war, and the war was over by 1953. Therefore, the Army arranged to accept only 60 percent of each class into active duty, while the remaining 40 percent entered the reserves (Lyons and Masland, 1959).

Following the Korean War, the Navy began to focus heavily on the education of officers. In 1956, only 56 percent of the officer corps possessed a bachelor's degree (Thirtle, 2001). Certainly, this was due in part to the heavy reliance on the enlisted community during the Korea War. The formal educational institutions of the Naval Academy and ROTC continued to foster intellectual development, and prepare graduates for a career of service. Officer Candidate School, a vital instrument during wartime, was only to be relied upon in peacetime when the *principal* sources failed to meet requirements (Masland and Radway, 1957).

The inability of the respective academies to meet service requirements during the Korean War, and a West Point cheating scandal in 1951, did not strengthen the case for service academies in general. Fiscal concerns also mounted, as the pricetag of the

Korean War increased, and the construction of the Air Force Academy loomed. President Truman was so livid regarding the cheating scandal that he considered appointing a Presidential Commission to evaluate the need for the service academies and the proper education of career officers in a democratic society. Further, commissioning sources other than the Naval Academy were producing a greater share of officers (Masland and Radway, 1957). During the Korean War, the Naval Academy could only produce six percent of the annual requirement of officers (BUPERS, 1952-1954).

President Eisenhower won the White House in 1953, and secured an armed peace in Korea. He also protected the service academies. The new administration required a draw-drown of forces, (Lyons and Masland, 1959) so the Navy simply lowered the number of candidates entering Officer Candidate School. President Eisenhower's pro-military, pro-academy stance led him to secure legislation to authorize the construction of the Air Force Academy in 1954. This stance also led the Naval Academy graduates fill up the ranks of the Navy again. By 1957, the Naval Academy reached a student population of 3,700 students (Masland and Radway, 1957).

2. Vietnam Conflict and the Reagan Naval Expansion

The Vietnam Conflict, and the major naval build-up of the 1980's, required an increase in officer production. The pipeline for new officers was already in place, and needed only to be increased. ROTC production was slightly elevated, and OCS enrollment was increased. The enlisted community was no longer needed to provide direct commissions for officers. Virtually all enlisted commissions into the line community were produced from the three major commissioning programs, with the small exception of the Naval Enlisted Science program, which was established in 1969.

During this period, the Naval Academy climbed to an approximate student population of 4,400, which remained steady until the end of the Cold War. The Naval Academy's share of officer production dropped during the Vietnam War and the Reagan build-up, as OCS was used to meet fleet demands. However, the Naval Academy saw an overall increase in its share of officer production throughout the entire period. This was mostly the result of a reduced demand for officers by the end of the Reagan Administration. Also, the Naval Academy increased its graduation rate over this period.

The attrition rate was generally in the 30 percent range in the 1970s and dipped to the 20 percent range in the 1980s (General Accounting Office [GAO], 1992a).

E. THE POST COLD-WAR ERA AND THE GLOBAL WAR ON TERROR (1992-PRESENT): THE UNCERTAIN FUTURE OF OFFICER COMMISSIONS

Once again, a cheating scandal, and various other serious conduct violations brought the Naval Academy before Congress to determine the necessity of the institution. The cost of commissioning officers from the Naval Academy, and their performance in the fleet, were brought into question. Arguments were heard on both sides of the issue, and will be addressed later in this thesis. In this period, naval forces were drawn down, and the Academy was reduced to 4,000 midshipmen. OCS experienced the most immediate reduction. In 1993, it produced only 13 percent of the officer corps, as opposed to 47 percent seven years earlier (BUPERS, 1986; BUPERS, 1993).

As the officer population dropped from 70,000 in 1990 to 52,000 in 2004, the population of the Naval Academy did not significantly decrease. On the contrary, in 2003, the Navy requested that the Academy be increased by 100 midshipmen a year in order to bring the Naval Academy back to a Cold War level of 4,400 midshipmen. Over the past fifteen years, numerous studies have been conducted on the respective commissioning sources with regard to economics and job performance. Many of these studies favored the service academies, which influenced the increase in enrollment. These studies will be analyzed later in this thesis.

History will continue to compare and scrutinize the military and commissioning policies of the three post-Cold War U.S. Presidents: George H.W. Bush, William Jefferson Clinton, and George W. Bush. The previous two administrations chaired the majority of the drawdown following the Cold War and choose to reduce the size of the Naval Academy, but stayed out of the fray with the numerous congressional investigations into the service academies' scandals.

The current administration signals a very pro-Naval Academy stance. President George W. Bush unofficially endorsed this stance with giving a key 2005 Global War on Terrorism speech and hosting the 2007 Annapolis Mid-East Peace Summit at the Naval Academy. His 2003 Academy population increase will unquestionably continue to raise

the proportion of Naval Academy graduates in the fleet. Additionally, in 1997, a commission of inquiry was created by the Center for Strategic and International studies to evaluate professional military education. Soon to be Vice President of the United States, Richard Cheney, chaired the commission, and stated that eliminating the service academies would jeopardize the nation's defense and eliminate the base of all professional military education (Cheney, 1997).

The continuing Global War on Terrorism and the economic and military development of other nations such as India and China will no doubt play a major role in the future of the commissioning sources. Recently, the Naval Academy expanded the number of Marine Corps billets from its graduating class to aid in the War on Terror in Iraq. China continues to develop a "blue water" Navy, which is seen as an attempt to challenge the supremacy of the United States over the world's oceans. Finally, fiscal constraints caused by budgetary crises such as the solvency of Social Security and financing the growing National Debt will continue to raise questions regarding the necessity of the service academies. It is likely that all of these issues will have a significant effect on the future of the Navy's commissioning sources.

Finally, as technology continues to develop in the information age, it will further reduce the demand for manpower in general. Even though civilian outsourcing and joint/international operations will require more officers for oversight, the trends signal for extended officer careers rather than more officer accessions (Mehay, 2007). As pointed out during this chapter, technology continues to influence manpower requirements.

The Naval Academy, ROTC and OCS remain the current commissioning sources. All work to support the collaborative pursuit of specified goals. As the requirement for officers continues to decline, questions arise as to whether or not the commissioning sources will be able to meet their established goals. Perhaps the goals need to be readjusted in order to ensure their survival (Scott, 2003).

If it is decided to eliminate a commissioning source, there will be an exhorbitant amount of dissent from the numerous members and alumni of each program. Members of an organization often have a vested interest in the survival of the organization. Preservation of the organization is critical, and members and alumni make it a priority to

protect and strengthen it. Originally, the Naval Academy had the largest and strongest alumni ties and loyalty. However, all three commissioning sources have now existed continuously for almost seventy years. All three sources now have thousands of graduates who may wish to see these respective organizations protected, if not strengthened (Scott, 2003).

F. HISTORICAL DATA

Figure 1 depicts the historical proportion of officer accessions into the active duty unrestricted line Navy from fiscal year 1845 to 2005. The figure compares the percentages from each of the three main sources of the US Navy (USNA, ROTC, and OCS), while taking into the account the contribution of the enlisted force. The enlisted numbers are direct commissions only and do not account for the enlisted members who enter the three major commissioning sources which started in 1914. Subsequent to the Korean War, most enlisted desiring commissions into the active line Navy had to enter through OCS, ROTC, or USNA. Figure 2, the annual officer population of the Navy, depicts how quickly the Navy grew and declined in periods of peace and war

The objective of the illustration is to compile a broad picture regarding naval commissioning sources over time. Before 1949, official numbers were not directly reported every year. However, the Bureau of Navigation or the Secretary of the Navy mentioned officer procurement in almost every annual report to the President and Congress. These Navy reports proved essential in the estimation of where commissioned officers came from. Unfortunately, the World War II data is not readily available since the annual reports were classified during the war. However, a host of other sources allowed for estimation during the war. From fiscal year 1949 forward, the annual report from the Bureau of Naval Personnel or the Department of Defense provides this information. The illustration is the author's best attempt to paint a picture of commissioning sources as part of the Navy's commissioning equation.

Figure 1. Historical Officer Accession Sources into Active Navy URL, FY 1845-2005

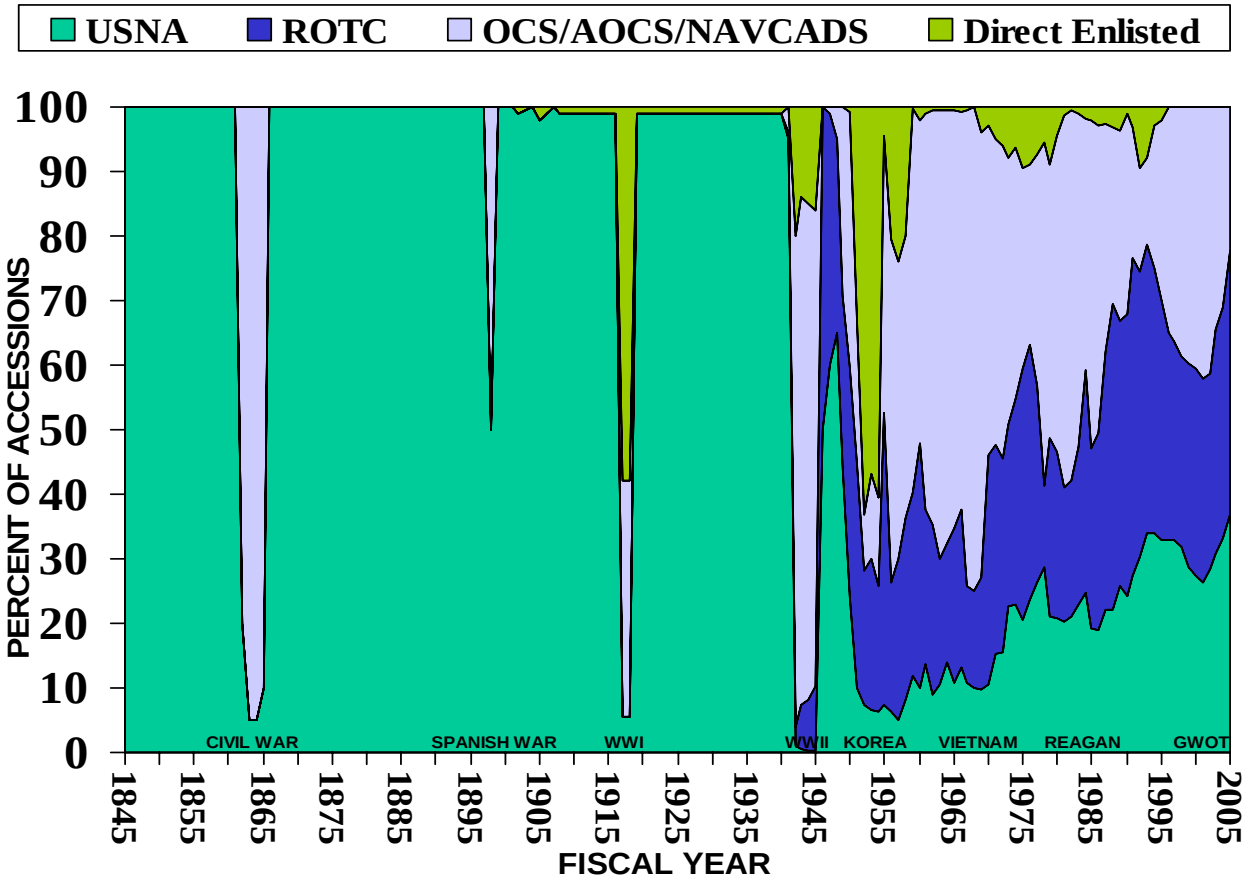


Figure 2. Active U.S. Navy Officer Population, FY 1845-2005.

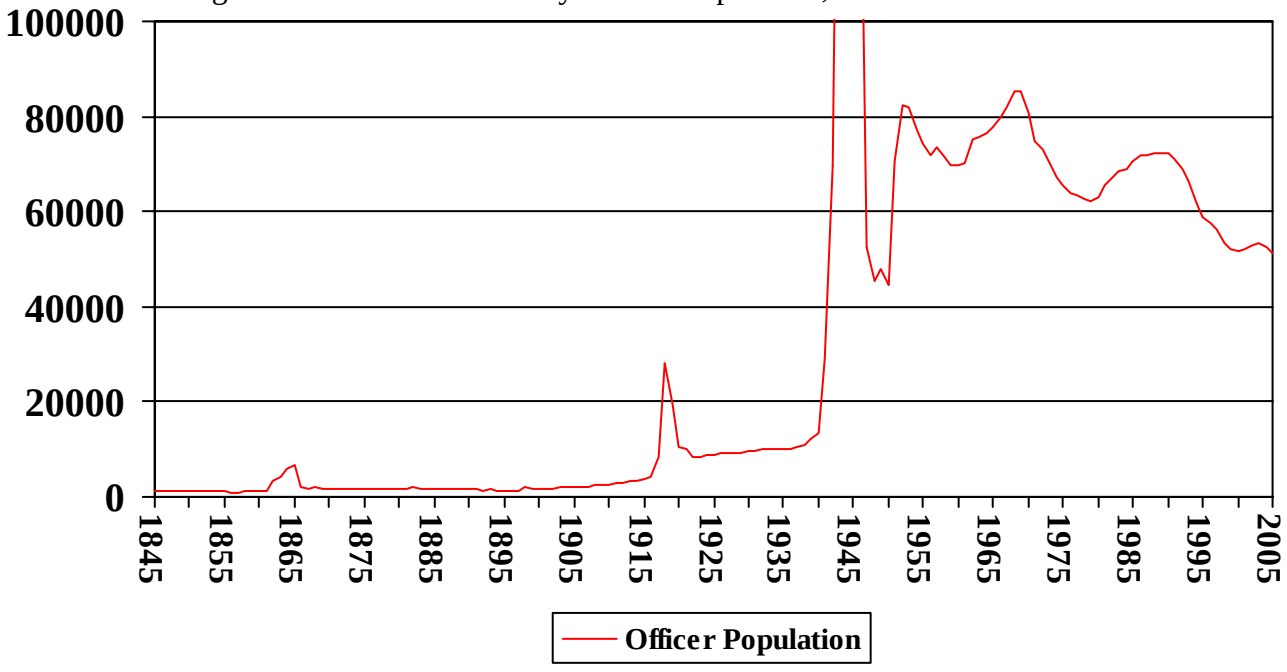


Figure 1 Citations:

1. 1845-1861: Karsten, 1972 and Simons, 2000.

2. 1861-1865: Estimate from Karsten, 1972, Simons, 2000, and DoN, 1865. Based on a 600% growth of the US Navy Officer Corps between 1861-1865 from DoD, 1997.

3. 1866 – 1897: Karsten, 1972, and Simons, 2000.

4. 1898 – 1899: Estimate from DoN 1898, DoN 1899.

5. 1900 – 1916: Estimate from DoN reports from FY1900 through FY1916, Karsten, 1972, and Simons 2000.

6. 1917 – 1920: Estimate from DoN 1917-1920, Lyons and Masland, 1959. Based on a 700% growth of the US Navy Officer Corps between 1917-1919 from DoD 1997.

7. 1920 – 1941: Estimate from DoN 1926, Bureau of Navigation Annual Reports FY1930 through FY1941, Lyons and Masland, 1959.

8. 1942 – 1948: Estimate from USNA output from BUPERS, 1960. Based on the 2700% growth of the US Navy Officer Corps from 1941-1945 and the following drawdown from 1945-1948.

9. 1949 – 1958: Data from a time series graph from BUPERS Annual Manpower Report, 1958. Gathered from the same source as Lyons and Masland, 1959 and verified accordingly as the book.

10. 1959 – 1993: Data from BUPERS Annual Manpower Report, FY1959 through FY1993.

11. 1994 – 1996: Estimation through interpolation.

12. 1997 – 2004: Data from DoD Population Representation in the Military Services, FY1997 through FY2005.

Figure 2 Citations and Notes:

1. Department of Defense, 1997. Selected Manpower Statistics for FY 1997.

2. WWII officer manning rises to a peak of 317,000 officers on active duty by FY1945.

There is much information to be gleaned from Figure 1 and Figure 2. First, the Naval Academy has been the primary source of naval officers during times of reduced officer requirements, such as peacetime. Secondly, in every circumstance, when the demand for officers increases, the proportion of Naval Academy graduates to fill the demands decreases. The GWOT is the first war in history in which the Naval Academy has even seen an overall increase in production compared to the other sources. However, this is due to a steady reduction in the overall amount of required naval officers. Thirdly, the graph shows an overall positive slope for the last 50 years for increasing Naval Academy accessions. Conversely, the graph shows an overall negative slope for officer personnel for the same time span.

Further, the fourth point is that ROTC, while continuing to provide a four-year education, has proven essential in keeping the post-WWII Navy manned. Fifth, due to the accessibility of the WWII commissioning programs which provided college opportunities, there was little need to tap the enlisted pool for officer candidates. Sixth, because the WWII-era OCS schools were closed down with the Holloway plan, enlisted personnel were directly tapped to fight as officers in Korea. This led to the permanent establishment of OCS. Seventh, the graph displays the significant role played by OCS and Direct Enlisted Commissions during national emergencies. Finally, today's officer population is only 4,000 to 7,000 members shy of the inter-war population between WWII and Korea, in which the Navy initiated the Holloway Plan. These figures raise the obvious question as to whether three separate commissioning sources are either justified or sustainable.

G. SUMMARY AND REVIEW

The following are lessons learned from the past with regard to how accession programs have evolved over time.

1. Aristocratic Argument, Technology and Education Argument, and the Need for Rapid Expansion

This chapter highlights the development of capable, educated officers to handle the rapidly developing technological advances of the time period. These new advances, and the need for officers who could manage them, were key in the establishment of the Naval Academy and eventually ROTC, while requiring more college background for

OCS. Originally, higher education could only be afforded by the upper classes. Thus, the naval officer corps was considered an aristocratic organization. Over the last century, as primary and secondary education improved and became more accessible, non-aristocratic individuals broke down barriers by attending the Naval Academy and other colleges and universities. World War II greatly accelerated this advancement, as the Navy desired educated officers. The Navy decided it would even pay for it if necessary. In the current Information Age, technology will only continue to demand highly educated officers.

The requirement for rapid expansion set the precedent for an Officer Commissioning School in times of national crisis. OCS remains because of its ability to quickly churn out officers. ROTC was originally designed to provide more educated officers during periods of rapid expansion. However, it was quickly overwhelmed during WWII. Despite its limitations, naval leaders appreciated ROTC's ability to deliver officers from diverse educational backgrounds with four years of naval training and cultivation. ROTC earned a strong endorsement from the Holloway Plan, which made it a permanent fixture in the Navy.

2. The Naval Academy: The Foundation for the Officer Corps

The Naval Academy serves as the foundation for the officer corps, which is the bedrock upon which professional armed forces are built. At the conclusion of each major conflict, the nation has turned to the Naval Academy to provide educated officers. As officer requirements dwindled, the Naval Academy provided the greater share, if not all of the Navy's officers. Whenever the Naval Academy has been unable to meet the demands of the service, the nation turned to other available sources. ROTC, which provides fully educated officers, has proven to be the preferred alternate to the Naval Academy. In times of crisis, the nation has also turned to both OCS, and the enlisted force, to meet demands.

3. Sociological Insights: Established Organizations

The Naval Service is now quite accustomed to acquiring officers from each of the respective commissioning sources, and has been for over 80 years. Naval policymakers would face critical resistance and opposition, both internally and externally, to any effort to end one of these institutions. The organizational fight for survival cannot be

discounted. It would prove easier to allow these institutions to modify their organizational goals, as long as they stay in line with Navy policy (Scott, 2003).

III. PERFORMANCE ANALYSIS

This analysis compares the results in prior research studies on the performance of the graduates of the three major commissioning programs. This "product analysis" will help decision-makers determine the value of each institution based on the success of their respective graduates in the fleet. Navy accession policy, and the standard used in this analysis, is to procure officers with the highest potential for success in the service. The definition of success for future naval officers is those candidates who can become excellent leaders in the art of warfare (Parcell, Hodari, and Shuford, 2003). Each of the three commissioning programs shares this procurement goal. This chapter will compare the relative performance of officers from each program.

Determining performance, in terms of officer accession programs, can be difficult. Traditionally, it has been measured in terms of retention and promotion (GAO, 1992b). More recent studies, utilizing fitness reports and surveys, have looked at the success of graduates from each commissioning source at their follow-on training or their actual execution of duties in the fleet. In the civilian world, most studies have used salary or earnings to determine employee on-the-job productivity, since economics assumes that workers are paid the value of their marginal productivity (Bowman and Mehay, 2002). However, because all military officers in the same grade receive the same pay, analyses of military performance cannot use pay to gauge productivity. Instead, by studying the retention, promotion, training, and fleet performance of sample candidates, we can examine the quality of the commissioning source from which they come (Bowman and Mehay, 2002, Wise, 1975b). The following sections address each of these indicators.

A. RETENTION

Retention has always been a managerial challenge for military leadership and civilian organizations (Korkmaz, 2005). When an employee separates from an organization, costs are usually incurred related to the separation. Because the disruption caused by separation is costly, organizations focus considerable attention on the problem (Clemens, 2002).

1. Civilian Studies

Hundreds of studies have been conducted in recent decades on the effects of turnover in organizations. One major study conducted in 1986 by Cotton and Tuttle gathered over one hundred published, quantitative turnover studies between 1979 and 1984. This meta-analysis categorized the determinants of turnover into three categories: external, work-related, and personal. The report then analyzed the data to statistically summarize the gathered information. The results of the study uncovered over 26 variables from the three categories that had a definite impact on retention. Among the variables, education was found to be a positive and highly significant predictor of turnover. That is, more highly educated employees are more likely to leave (Cotton and Tuttle, 1986). This presents a problem for military decision-makers; they spend money to develop highly educated officers, but cannot keep them in the service.

2. Military Studies

For the Navy, because of its hierarchical personnel system, personnel separations have a much greater impact on organizational performance and stability than separations in a civilian organization. Middle and senior grade officers cannot be directly replaced from the civilian world, but must work their way up from the junior officer ranks. It takes time and money before and after commissioning to produce a qualified officer, not to mention the time and money it takes to make an *experienced* officer. Additionally, personnel separation reduces officer quality, productivity, and recruitment (Clemens, 2002). In other words, the same workload must still be completed by fewer personnel. Thus, many studies have been completed to see which commissioning source is most effective in retaining officers.

For the purposes of this thesis, studies by Bowman, Mehay and Parcell will be analyzed. Three different studies on commissioning sources by Bowman, Mehay, and Parcell have found that USNA is the source with the highest rate of retention, followed by ROTC, and then OCS. These reports look at the number of officers who remain in the Navy up to their LCDR promotion board, which is approximately at the ten year point for officers. The premise is that if officers stay to the half-way point to retirement, it is likely that they will remain to collect the pension.

B. PROMOTION

While analysts have debated the best measures of work performance, promotion is one clear indicator of successful performance. Salary has been used in the past to measure performance in civilian firms, with the assumption that salary reflects productivity. However, while many large organizations base salary on a grade level, salaries are often supplemented with longevity pay, bonuses, and stock options, which are difficult to compare across firms. Upward mobility of an individual in the organizational hierarchy may be a more accurate indicator of job performance (Wise, 1975a, 1975b).

As economists continue to develop an understanding of the relationship between internal labor markets and promotion, a growing amount of research has looked into the role of education. The specific characteristics of colleges and universities have been analyzed to determine the labor market success of their graduates. Often, the research looks at the effectiveness of attending more selective post-secondary institutions (Bowman and Mehay, 2002). The goal of these studies is to analyze if, and why, these relationships exist and the labor market value of attending highly selective institutions (Wise, 1975a).

1. Civilian Studies

Most studies have analyzed the effect of college type on salaries for cross sections of workers. For the reasons stated above, David Wise was one of the first authors to look at the effects of college selectivity on worker productivity within a single organization (Bowman and Mehay, 2002). He found that the rate of promotion increased with college selectivity (Wise, 1975b).

2. Military Studies

Unlike the civilian world, the Navy organizational hierarchy provides a unique micro-level database with which to explore the effects of college selectivity on job performance (Bowman and Mehay, 2002). Large civilian organizations vary greatly in promotion requirements, precepts, and promotional timing throughout the company. The Navy, however, has an established hierarchical structure and personnel system, and set promotion requirements which are established by the Defense Officer Personnel Management (DOPMA) Act of 1980. Due to this structure, a study of Navy job

performance can take place in a controlled environment with regard to climbing the career ladder, job assignment policies, and incentives (Schirmer, et al., 2006).

In this section, this thesis will compare various promotion studies conducted on the three major commissioning sources. The Navy spends a great deal of money on the commissioning of officers. Therefore, the study will analyze whether these investments enhance worker productivity.

C. FITNESS REPORT EVALUATIONS

As stated above, promotion rates within the military are a satisfactory measurement of performance because officers enter a level playing field directly after graduation. Annual work appraisals, better known as Fitness Reports or "FITREPS" will be discussed in the data section. FITREPS are used by Navy commanders to grade the job performance of their subordinates. FITREPS are utilized by the entire military, thus enabling researchers to compare these reports in any manner they choose. In this report, we will compare the FITREPS of Navy officers from each of the three respective commissioning sources.

While FITREPs are undoubtedly a very acceptable method of comparison in determining success, they are not without criticism. FITREPs are subjective and localized. They tend to have overtly inflated written reports and scores with little variation among recipients. However, the FITREP has very rigid rules on ranking within a command. The highest ranked individual(s) will receive a "recommended for early promotion" based on the amount of performers under the commanding officer. Even though the commanding officer alone makes the subjective decision on ranking, many organizations would rather use subjective promotion guidelines over objective promotion guidelines (Bowman and Mehay, 2002).

D. FLEET QUALIFICATIONS

After commissioning, graduates from the Naval Academy, ROTC, or OCS prepare for their jobs in the fleet with follow-on training. Types of follow-on training include attending either flight or nuclear power school, or earning your warfare qualification on-board ship. As all officers must complete some type of follow-on training to earn their warfare qualifications, this period is a constant in performance studies (Mehay and Bernard, 2003).

The cost of follow-on training for individuals in the aviation and submarine communities outweighs the actual commissioning costs for those graduates. For example, the post-commissioning cost of training an officer to become a pilot or Naval Flight Officer (NFO) is ten times more expensive than commissioning the same officer at OCS. Additionally, the cost of flight school for a Naval Academy graduate is five times more expensive than the graduate's Academy education. Attrition during these critical time periods is costly, particularly as training concludes. A significant goal of the commissioning sources is to have their graduates succeed in follow-on training (Bowman, 1995).

The "command at sea" screen is another qualification worth studying. For the purposes of this study, the screen will be considered a qualification instead of a promotion. Officers who obtain positive early FITREPs often receive highly sought after jobs. Superior performance in these jobs often leads to what is considered a "command path". An individual on this command path can often be identified as early as the rank of mid-grade lieutenant. Acquiring key jobs and positions makes them competitive for screen boards. High performers are pitted against others who have not received such competitive positions. Promotion boards accept and promote officers to higher ranks, regardless of whether or not they are on the command path.

E. PRIOR STUDIES

1. Bowman (1995): Retention and Promotion

In 1995, William Bowman developed a model to determine the cost-effectiveness of the three major commissioning sources. The overall results of his report will be discussed in the economics analysis section of this thesis. The measurement of output will be discussed in this section. Bowman's output model was based on maintaining a "steady state flow" of officers in the fleet. He analyzed the number of newly commissioned officers required to replace those who left active duty. Bowman analyzed retention and promotion rates in order to determine the flow of officers from each commissioning source needed to "man the rails" of a hypothetical force structure.

The analysis used two data sets based on the Officer Data Card and the Officer Loss File, which are databases maintained by the Navy Department. A total of 37,717 officer records, representing all of the active duty URL population who entered the Navy

between 1985 and 1994, were merged, and then used to analyze retention to the respective O-4, 0-5, and 0-6 boards. The author addresses the selection bias arising from officers separating from the Navy prior to a promotion board, which would work against Naval Academy graduates. Only the best ROTC and OCS graduates stay in to compete for promotion boards. This is not true for Academy graduates, since the primary function of the institution is retention.

The Bowman model uses non-linear (probit) regression models of retention and promotion to estimate the independent effect of accession source from personal demographic characteristics and undergraduate schooling factors. Some of the additional factors included a graduate's major, grades, and science and mathematical background. For ease of presentation, the estimated coefficients of the accession source variables are presented in Table 1. They are the estimated effect of each commissioning program on the probability of retention and promotion for each URL community; the effect of being a graduate of ROTC or OCS is compared to being a Naval Academy graduate.

As illustrated by Table 1, the retention and promotion rates of Navy Officers vary significantly by commissioning source. For all URL officers, ROTC graduates are 6.2 points less likely to stay to the O-4 board than USNA graduates. OCS graduates are 14.9 points less likely to stay than USNA graduates. When analyzed by community, the Naval Academy had significantly higher retention rates than the other two commissioning sources, except in the NFO community, in which there was no significant difference. With regard to the higher ranking boards, the only significant result for URL officers was that, compared to the Naval Academy, OCS had a 6.5 point lower probability of retention to the O-6 board. The bottom line is that most officers who stay to the O-4 board will stay until their 20 year retirement.

In addition, Bowman estimated in Table 1 that Academy graduates promote at significantly higher rates than ROTC and OCS graduates. On the O-4 board, compared to their Naval Academy peers, ROTC graduates were 6.5 points less likely to promote, while OCS graduates were 3.4 points less to promote. The O-5 board revealed that, compared to Naval Academy graduates, ROTC promoted at 9.9 points less and 15.5 points less for OCS. The O-6 board results showed that ROTC was 5.1 points and OCS

was 7.8 points less likely to promote than USNA graduates. When dissected by community, the overall results were similar, although the coefficients for aviators were insignificant.

Table 1. Estimates of Probability that Graduates of Officer Commissioning Programs Will Stay on Active Duty to a Selection Board and Promote on "First Look" (Compared to Naval Academy Graduates)

	URL		**SUB**		**SURFACE**		**PILOT**		**NFO**	
	ROTC	OCS	ROTC	OCS	ROTC	OCS	ROTC	OCS	ROTC	OCS
RETENTION:										
ENS TO LCDR	-.062**	-.149**	-.085**	-.184**	-.069**	-.107**	-.038*	-.230**	+.019	-.036
LCDR TO CDR	+.001	-.004	-.019	-.060*	+.007	-.005	-.024	-.027	+.041**	+.050**
CDR TO CAPT	+.004	-.065**	-.009	-.032	-.000	-.075**	+.007	-.046*	+.015	-.066
PROMOTION:										
ENS TO LCDR	-.065**	-.034**	-.050*	-.087**	-.056**	-.032	-.079**	-.012	-.093**	-.040
LCDR TO CDR	-.099**	-.152**	-.139**	-.159**	-.112**	-.150**	-.056**	-.088**	-.087**	-.162**
CDR TO CAPT	-.051**	-.078**	-.101*	-.278**	-.085**	-.090**	+.004	+.025	+.093	-.010

Bowman, 1995
* = 90% significance
** = 95% significance

2. Mehay (1995): Retention, Promotion, Fitness Reports, and Training

The purpose of this study was to analyze differences in measured performance between minority and majority officers. The goal was to analyze the direct and indirect effects of race and ethnicity on observed performance. The study examined the job performance indicators of retention, promotion, fitness report evaluations, and Surface Warfare qualifications for junior officers. The study looked at the Promotion Board History Files (1985-1990), and merged them together with fitness report history files for each officer prior to each board at which he/she appeared. The analysis matches productivity models with multivariate analyses and includes controls for Navy background and experience factors, as well as demographic characteristics (Mehay, 1995).

The analysis of retention and fitness reports examined a population of 9,777 officers and the study of qualifications examined 3,959 Surface Warfare Officers (SWO's). The promotion analysis included only 4,471 officers who remained in the Navy and were reviewed at the O-4 promotion board. The time period limits any

fluctuations from the 1991 Gulf War and the Post-Cold War drawdown. With the binary dependent variables – retention, promotion, and SWO pin qualification – multivariate probit models are estimated with maximum likelihood techniques. In the fitness report analysis, ordinary least squares techniques are used, since the dependent variable fitness report score is continuous.

Table 2 shows that ROTC and OCS graduates were generally less likely to retain, to promote, to achieve SWO qualifications and tended to score lower on FITREPs compared to USNA graduates. ROTC graduates were less likely to retain to an O-4 board compared to a Naval Academy graduate, but the coefficient was insignificant. OCS graduates were less likely to retain to an O-4 board and this effect was significant. ROTC graduates were less likely to promote, while OCS graduates were less likely to promote compared to USNA graduates. These results were significant. The fitness report analysis showed ROTC graduates received 8.8 percent fewer early promotion recommendations, while OCS graduates received 9.6 percent fewer such recommendations compared to USNA graduates. Finally, ROTC graduates were 20.1 points less likely to receive their SWO pin, compared to a USNA graduate. There were no significant results on SWO qualification for OCS graduates. In his conclusions, Mehay states that colleges vary in their resources, facilities, and quality, and that these factors determine the quality of education and skills the graduates receive, which ultimately affects career success (Mehay, 1995).

Table 2. Summary of Basic Results from Mehay (1995) (ROTC and OCS compared to USNA Graduates)

ACCESSION SOURCE	RETENTION	PROMOTION	FITNESS REPORT	SWO QUAL
ROTC	-.037	-.303	-.088	-.201
	(1.043)	(5.397)*	(11.613)*	(3.514)*
OCS	-.195	-.145	-.096	-.038
	(4.978)*	(2.229)*	(11.753)*	(0.610)

Mehay, 1995; t-statistics in parentheses
* = statistical significance

3. Mehay and Bernard (2003): Retention and Promotion

The purpose of this study was to examine the various commissioning programs, providing a framework for defense leaders to make decisions on future accessions. These decisions inevitably include formulating the optimal "mix" of officers from each of the respective commissioning sources. As with the other models, this report utilizes the retention of graduates from the three commissioning programs, as well as promotion to the 0-4 board. However, a major difference with this study is the separation of ROTC Scholarship and Contract students. Scholarship students receive funding for their full tuition, but owe four years active duty. Contract students receive funding for their naval science courses only, but only owe three years active duty.

The analysis looks at 17,134 URL officers and their promotion board results between fiscal years 1986 through 2001. This information is gleaned from a database built from Officer Data Card information and promotion board results. Multivariate non-linear logit models of retention and promotion are developed to estimate the effectiveness of the respective commissioning sources, controlling for other determinants such as academic background and achievement.

Retention rates for ROTC Scholarship, ROTC Contract, and OCS graduates, as compared to USNA graduates, are shown in Table 3. It shows that ROTC-Scholarship and OCS graduates are significantly less likely to continue in the Navy to O-4 than USNA officers – 9 percent and 17 percent less likely, respectively. There were no significant retention differences between ROTC-Contract graduates and Naval Academy graduates.

Table 3. Summary of Retention Results for URL Officers (ROTC and OCS Compared to USNA Graduates)

ACCESSION SOURCE	PARAMETER ESTIMATE	% CHANGE FROM BASE
ROTC-S	-.1764**	-9.2%
ROTC-C	.0577	3.0%
OCS	-.3193**	-16.7%

Mehay and Bernard, 2003
** = significant at .05 level

Table 4 compares the promotion rates to O-4 for the three commissioning programs. Table 4 shows that ROTC-Scholarship graduates are 8.1 percent less likely to be promoted than USNA graduates at the overall URL O-4 board, significant at the .05 level. The only other results at this significance level were ROTC-Scholarship graduates were 9.0 percent less likely to promote in the Surface community and 6.3 percent less likely in the Aviation community. But, on average, for the entire URL, there were no differences in promotion between ROTC Contract and the OCS programs, as compared to USNA (Mehay and Bernard, 2003).

Table 4. Summary of Basic Promotion Models (ROTC and OCS Compared to USNA Graduates

	URL		**SUB**		**SURFACE**		**AVIATION**	
	Para-Meter Est.	% Change	Para-Meter Est.	% Change	Para-Meter Est.	% Change	Para-Meter Est.	% Change
ROTC-S	-.292**	-8.1%	-.1182	-1.6%	-.460**	-9.0%	-.201**	-6.3%
ROTC-C	-.167	-4.4%	N/A	N/A	+.055	-1.0%	-.296*	-9.2%
OCS	-.0414	-1.1%	-.442*	-6.6%	-.320*	-6.0%	.137	4.0%

Mehay and Bernard, 2003: A compilation of basic promotion models from Tables 19, 20, 23, and 26.
* = significant at .10 level; ** = significant at .05 level
SUB N/A = No ROTC-C officers remained in service to the promotion board.

4. Parcell, Hadari, and Shuford (2003): Promotion and Qualification

This study uses officer accession data to analyze promotion and training. The Office of the Chief of Naval Operations requested that the Center for Naval Analysis assist in setting officer accession policies which would achieve long-term planning goals and aid in predicting career success. The Navy recognizes that in order to be successful in all aspects of warfare, it requires an officer corps of diverse educational backgrounds.

The study uses probit regression analysis to estimate the effect of accession source on the probability of achieving various milestones. This study looks at promotion to O-4, O-5, and O-6, using the URL officer accessions from Fiscal Year 1976 through Fiscal Year 1996. Additionally, the command screen probabilities were analyzed. The results were further broken down into the aviation, SWO, and submarine communities.

Table 5 illustrates very little statistically significant advantage of commissioning source in promotion boards. The only significant advantage was at the O-4 promotion board. In the submarine community, USNA graduates were 9.0 points more likely to be promoted than OCS graduates. In the aviation community, USNA graduates were 6 points and 3 points more likely to get promoted than their ROTC and OCS counterparts, respectively. In the qualification category, Table 5 shows very little significant advantage in the command screens, except for the aviation community. Aviators from USNA had a 10 point higher chance of making the command screen than OCS graduates.

Table 5. Summary of Predicted Probability Rates of Promotion (Points).

	PROMOTION			QUALIFICATION
COMMUNITY AND SOURCE	**O-4**	**O-5**	**O-6**	**COMMAND SCREEN**
SUBMARINE:				
USNA	95	-	N/A[3]	-
ROTC	-	-		-
OCS	86	-		-
SURFACE:				
USNA	-	-	-	-
ROTC	-	-	-	-
OCS	-	-	-	-
AVIATION:				
USNA	89	-	-	50
ROTC	83	-	-	-
OCS	86	-	-	40

Parcell, Hodari, and Shuford, 2003. Summation of Tables 5-19
Dash represents statistically insignificant.
No test results available on the Submarine O-6 Promotion Board .

5. Parcell and Macllvaine (2005): Training

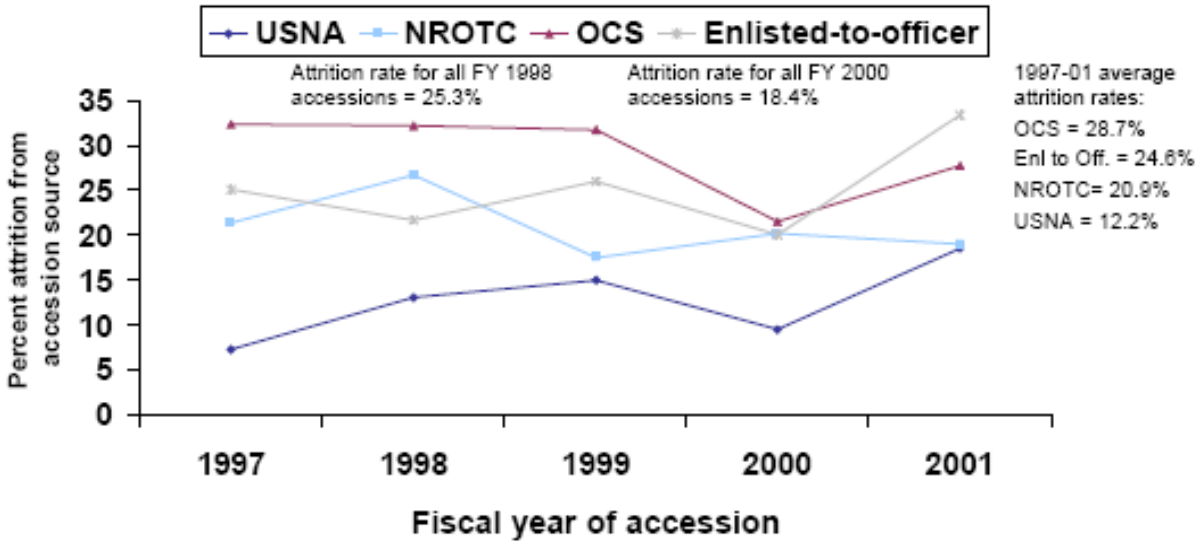
The Director of Naval Education and Training (N00T) requested this study to determine the cause of a rise in attrition in the NFO pipeline during the 1990s. NFO training is quite costly, and the higher than expected attrition rate made it difficult to fill fleet requirements. The pilot training pipeline was analyzed to determine any significant similarities with NFO training. Additionally, the study tried to determine if a permanent increase in recruiting was needed to offset the higher attrition rate.

The study gathered the records of 1,639 NFO and 3,538 pilot trainees who began flight school between fiscal years 1997 and 2001. Studying this time period allowed all of the candidates enough time to complete the aviation training pipeline, from initial aviation pre-flight indoctrination (API) to the completion of advanced training. The study then estimated the probability of attrition with a logistic regression, using characteristics such as commissioning source, academic performance, and demographic information.

Figures 3 and 4 show the NFO and pilot attrition rates over this period. On average, in both communities Academy graduates were more likely to complete flight school. In NFO flight school, Academy graduates had an 8.7 point better completion rate than ROTC graduates and a 16.5 point better rate than OCS graduates. In pilot flight school, Academy graduates had a 9.7 point better completion rate than ROTC graduates, and a 10.0 point better completion rate than OCS graduates.

The results of the multivariate analysis are presented in Table 6, by presenting the marginal effects on the estimated probability of attrition. The table shows that attrition is significantly lower for USNA graduates than OCS graduates in both the NFO and pilot training pipeline. In the pilot pipeline, ROTC students have the highest predicted attrition rate. Based on this analysis, the authors recommended that more USNA graduates should be recruited in both communities to ensure production results and cost savings (Parcell and MacIlvaine, 2005).

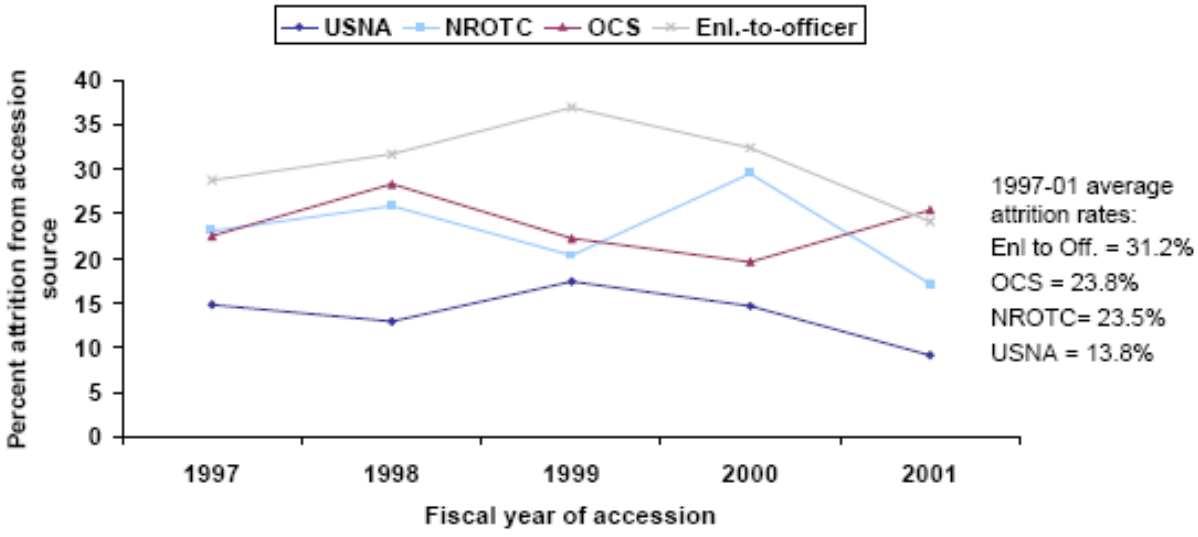
Figure 3. NFO Flight School Attrition



NROTC includes scholarship and nonscholarship students. OCS includes OCS, AOCS, Naval Flight Officer candidates, and Merchant Marine Officer candidates. Less than 1 percent of each accession cohort accesses via commissioning in another service.

Parcell and MacIlvaine, 2005

Figure 4. Pilot Flight School Attrition



NROTC includes scholarship and non-scholarship students. OCS includes OCS, AOCS, Naval Flight Officer candidates, and Merchant Marine Officer candidates. Between 0.6% and 2.6% of each accession cohort accesses via commissioning in another service.

Parcell and MacIlvaine, 2005

Table 6. Predicted Probability of Attrition from Flight School

COMMUNITY AND SOURCE	ATTRITION RATE
NFO:	
USNA	16.2%
ROTC	-
OCS	24.0%
PILOT:	
USNA	15.8%
ROTC	25.0%
OCS	20.3%

Parcell and MacIlvaine, 2005. Summary of Tables 4 and 8.
Dash indicates statistically insignificant

F. ANALYSIS

This chapter examined five different studies on how commissioning source affects job performance. In the tables below, the results of each study are compared against each other. Each source is given a rank based on the result. The source with the "best" performance measure is ranked with a number one, whereas the source with the "worst" performance measure is ranked with a three.

1. Retention

Table 7 shows the three studies that analyzed retention to O-4. Each source is ranked by the probability of success with regard to retention to the O-4 board. In all three studies, the Naval Academy was ranked as having the highest retention probability. ROTC was ranked second across in two studies, with an insignificant result in a third study. OCS fell in third place for two of the three studies.

Table 7. Ranking of Commissioning Programs by Probability of Retention

	O-4		
SOURCE	Bowman	Mehay	Mehay and Bernard
USNA	1	1	1
ROTC	2	-	2*
OCS	3	2	3

Compilation of findings in relative rank from each report.
- = Insignificant result.
* = Only ROTC Scholarship was significant. ROTC Contract graduates statistically insignificant.

2. Promotion

Table 8 compares relative promotion probabilities of each accession source for four studies. Bowman found that the Naval Academy was the best source of promoting officers to O-4, O-5, and O-6. Mehay deduced the same results at the O-4 level. Mehay and Bernard's only significant results were that ROTC-Scholarship graduates had lower promotion probabilities compared to their Naval Academy peers. Parcell only found significant results at the aviation O-4 board.

Table 9 shows similar results when ranking with regards to community. All the tests show that the Naval Academy had a statistical advantage for promotion to O-4, especially in the Submarine and Aviation communities. Only Bowman found statistically significant results for the Naval Academy on the O-5 and O-6 board. The only exception to this was the O-6 Aviation board, where both Bowman and Parcell saw no statistical advantage in regards to commissioning program.

Table 8. Ranking of Commissioning Programs by Probability of Promotion (URL only)

	O-4				O-5		O-6	
SOURCE	Bowman	Mehay	Mehay and Bernard	Parcell[3]	Bowman	Parcell[3]	Bowman	Parcell[3]
USNA	1	1	-	-	1	-	1	-
ROTC – S/C	3	3	S: Lower than USNA	-	2	-	2	-
OCS	2	2	-	-	3	-	3	-

Compilation of findings in relative rank from each report.
Dash signifies statistically insignificant
Parcell's study looked at each warfare community only and not collectively at all URL officers. Only the aviation community had significant results for all three sources.

Table 9. Ranking of Commissioning Programs by Probability of Promotion (Compared by Community)

	O-4			O-5		O-6	
SOURCE	Bowman	Mehay and Bernard	Parcell	Bowman	Parcell	Bowman	Parcell
SUBMARINE:							
USNA	1	1	1	1	-	1	N/A
ROTC – S/C	2	-	-	2	-	2	
OCS	3	2	2	3	-	3	
SURFACE:							
USNA	1	1	-	1	-	1	-
ROTC – S/C	2	3/-	-	2	-	2	-
OCS	-	2	-	3	-	3	-
AVIATION:							
USNA	1	1	1	1	-	-	-
ROTC – S/C	2	2/3	3	2	-	-	-
OCS	-	-	2	3	-	-	-

Compilation of findings in relative rank from each report.
Dash signifies not statistically significant
Parcell's study looked at each warfare community only and not collectively at all URL officers. Only the aviation community had significant results for all three sources.
N/A = Results not available

3. Fitness Report

Table 10 shows that Naval Academy graduates tended to have better fitness reports. Unfortunately, the author could not find more studies on this performance area. However, fitness reports should be highly correlated with promotion results.

Table 10. Ranking of Commissioning Programs by Relative Success of Receiving Higher Fitness Reports.

Source	Mehay
USNA	1
ROTC	2
OCS	3

Compilation of findings in relative rank from report.

4. Qualifications

Table 11 shows that compared to ROTC and OCS graduates, Naval Academy graduates are more likely to earn their warfare pins. In pilot flight school, OCS students performed better, but the reverse was true in the SWO community. There were no significant results for ROTC graduates in the NFO community. Additionally, Parcell's command screen study revealed only Academy graduates in the aviation community were more likely to make command.

Table 11. Ranking of Commissioning Sources by Probabilities of Achieving Qualifications.

	Warfare Pins			**Command Screen**		
SOURCE	Mehay SWO	Parcell NFO	Parcell Pilot	Parcell Surface	Parcell Sub	Parcell Aviation
USNA	1	1	1	-	-	1
ROTC	2	-	3	-	-	-
OCS	3	2	2	-	-	2

Compilation of findings in relative rank from each report.

G. CONCLUSIONS

The analysis of prior studies in this chapter concludes that Naval Academy graduates tend to have higher performance results in the regular line Navy. In all four categories - retention, promotion, fitness reports and qualifications – Naval Academy graduates maintained an edge over their peers from the other sources. Not all results in all studies were statistically significant, but several patterns are clearly discernable. In general, USNA graduates tend to outperform ROTC graduates, who in turn tend to outperform OCS graduates.

There are too few studies that have dealt with overall performance, which detracts from the validity of this report. However, the studies reviewed here analyzed very large populations of officers over a lengthy period of time. Additionally, the authors of the various respective studies utilize numerous variables, databases, and methodologies to determine the effectiveness of the commissioning sources. The common thread, however, shows a more successful rating for the Naval Academy across a broad spectrum, even when academic achievement and other background characteristics are held constant.

IV. ECONOMIC ANALYSIS

The methodology for analyzing the efficiency of the three commissioning sources is based on the "human capital model" – investing in the training and education of employees to enhance their productivity and job performance. In this case, the Federal government spends money on education and training. In return, it expects that its investment, in the form of commissioned naval officers, will retain and perform at a high level. This study, however, will not only look at the government's investment in the three major commissioning sources, but also at other educational institutions in which the Federal government is investing.

A. INVESTMENT IN EDUCATION AND TRAINING

Many studies have been conducted to determine whether or not education is a worthy investment. Over 200 years ago, Adam Smith wrote in *Wealth of Nations*: "The work which he learns to perform, it must be expected, over and above the usual wages of common labor, will replace to him the whole expense of his education, with at least the ordinary profits of an equally valuable capital" (Smith, 1764). Smith's insight provides the backbone of the human capital model. An investment in human capital should pay back the initial costs, and yield a rate of return at least as high as an alternative investment of one's time and money (Kaufman and Hotchkiss, 2000). Any investment in human captial can be analyzed within the framework of investment theory (Becker, 1975).

1. Human Capital Theory

The theory of investment is implemented when an organization decides to invest in physical capital to enhance productivity and profitability. Boosting physical capital, including the purchase of computers, machinery, or infrastructure, promises to increase profits by cutting production costs and enhancing productivity. The immediate capital expenditure is justified by future expanded profits. An organization should continue to make capital expenditures as long as there is a continued positive internal rate of return. The estimated rate of return should be determined in the initial decision process (Bowman, 1995).

Human capital theory shares the same basic principles as the general theory of investment: an immediate capital investment is justified by future profits. For example, workers invest in themselves by seeking education, migration, health care, and better jobs (Kaufman and Hotchkiss, 2000). Organizations make the decision to invest in their employees, which in turn enhances their productivity. This investment includes the education and training of employees.

Successfully implementing human capital theory in an organization can be difficult. The organization's primary goal is to provide incentives which will both motivate employees and enhance productivity. At the same time, the organization must keep an eye on the market and overall economy to determine productivity levels. The greatest obstacle to successfully implementing human capital investment theory is, of course, the ability of employees to voluntarily leave the organization, particularly prior to fulfilling the return on the human capital investment made by the organization (Bowman, 1995).

2. Rates of Return

Economists estimate that there are two separate rates of return to college education: private and social. The private rate of return is the yield on the educational investment received by the person or organization making the investment. The social rate of return measures the yield to society from the investment, for example, in a college degree (Kaufman and Hotchkiss, 2000). The cost of educating a commissioned officer is mostly paid by the Federal government, which obtains a "private" or internal rate of return based on the obligated service of the newly commissioned officer. Society's rate of return may include a new, highly educated taxpayer whose job includes the defense of the nation.

3. Commissioning Source Costs to U.S. Taxpayers

The Naval Academy is clearly the costliest venue for commissioning, as the Federal government pays for each student's college education and military training in its entirety. ROTC candidates who attend state-sponsored colleges or universities tend to cost less than other commissioning sources because the Federal government does not bear the full brunt of the educational expenses. At state-sponsored colleges and universities, state taxpayers pay for a significant portion of the education. Also, ROTC students who

attend private colleges have a small portion of their education paid by private grants or endowments, while the Federal government covers the tuition. ROTC Contract and OCS students are responsible for their own education costs, thus costing the government only the expense of their military education and training.

In 1990, Marvin M. Smith analyzed the program cost and performance of officers commissioned from sources alternative to the Naval Academy. As expected, the average cost to produce a new naval officer was highest for an academy graduate, followed by a ROTC Scholarship graduate, and then an OCS graduate. Smith acknowledged that he based his comparison solely on financial costs to the federal government, and that some of the costs of the three commissioning sources are paid in other ways by society in general, which he did not study. For example, he did not attempt to study how state taxpayers help defray college expenses for some ROTC candidates.

The studies in this chapter scrutinize only pre-commissioning costs paid by the Federal government. This does not take into account all costs absorbed by the American taxpayer, which greatly skews the actual costs of ROTC and OCS, and makes it difficult to calculate the actual cost-effectiveness of these two programs. At first glance, ROTC and OCS appear to be less expensive human capital investments to the Federal government than the Naval Academy. However, with regard to societal costs, state-level taxes often factor into the equation. Despite the fact that the Federal government may not be the only investor, it inherits all of the internal rate-of-return when an ROTC or OCS student is recruited. There are clearly societal benefits to all taxpayers, whether they are paying federal or state taxes, for educated naval officers. However, omitting the portion that state taxpayers subsidize skews the results in determining which source is the most cost-efficient from a social perspective.

B. FEDERAL COMMISSIONING SOURCE COST STUDIES

Several studies have attempted to determine the most cost effective methods to provide commissioned officers to the fleet. They use two measures of cost: average and marginal. The average cost of commissioning a new officer is based on the total cost per program divided by the number of graduates. The average cost is a measure for consideration in determining whether an institution should remain open or be closed down (Mehay and Bernard, 2003). The marginal cost of commissioning a new officer is

based on how much the total cost changes because of modification in the production level by one unit. The marginal cost is a measure for consideration in determining whether an institution should increase or decrease production.

1. Average Costs

The average cost per officer for the three programs in 1990 was: $153,000 for USNA; $53,000 for ROTC; and $20,000 for OCS (CBO, 1990). Since the Naval Academy was much more expensive, the CBO report put the Naval Academy's future into question at that time. Additionally, this cost did not consider the quality of the officer each source was producing.

2. Bowman (1995): Cost-Effectiveness of Service Academies

William Bowman (1995) analyzed the cost of different commissioning programs in a steady state environment. His measure of effectiveness is the number of accessions required to replace one officer at a given career point [Years of Commissioned Service (YCS) = 10]. Bowman derived the required accessions from the published retention and promotion rates of each officer community to produce one officer at YCS 10. This accession number is multiplied by the total pre-commissioning and post-commissioning costs to provide the discounted lifecycle costs of each source. The Navy heavily front-loads its human capital investment, therefore the report expects the Navy will see economic returns based on higher longevity and productivity (Mehay and Bernard, 2003).

Table 12 shows the results of Bowman's cost analysis in fiscal year 1994. By each community, Bowman adds the pre- and post-commissioning costs of each source, and multiplies it by the required accession rate to give the product in the right column. The Naval Academy requires the most initial investment: $111,000 more than ROTC, and $150,000 more than OCS. However, the post-commissioning costs vary depending on the graduate's community with some being quite costly. For pilots and NFOs, flight school training is six times more expensive than a Naval Academy education, and 35 times more expensive than initial OCS training.

The last column in Table 12 shows the following pertinent information: USNA graduates were the most cost-effective source for Pilots and Submariners; OCS graduates were most cost-effective for SWOs; and ROTC graduates were most cost-effective for NFOs. In the Submarine Force, for example, Table 12 shows that the Naval Academy

graduate is $110,000-$150,000 more expensive to educate, but the long term savings is ten-fold. The Academy saved the Submarine Force $1.4 million compared to OCS, and $170,000 compared to ROTC over a ten year period per graduate following commissioning.

Table 12. Discounted Lifecycle Costs of URL Officers by Community and Commissioning Source, 1994 Dollars

COMMUNITY AND SOURCE	PRE-COMM	POST-COMM	TOTAL	NUMBER OF ACCESSIONS	DISCOUNTED LIFECYCLE COSTS
SUBMARINE:					
USNA	187,808	130,519	318,327	5.42	1,725,332
ROTC	76,731	120,757	197,488	9.58	1,891,935
OCS	35,951	110,761	146,712	21.45	3,146,972
SURFACE:					
USNA	187,808	94,708	282,516	6.91	1,952,186
ROTC	76,731	84,578	161,309	11.82	1,906,672
OCS	35,951	79,251	115,202	14.76	1,700,382
PILOT:					
USNA	187,808	1,124,102	1,311,910	7.49	9,708,134
ROTC	76,731	1,102,705	1,179,436	9.96	11,747,183
OCS	35,951	1,075,021	1,103,544	14.12	15,582,041
NFO:					
USNA	187,808	1,270,529	1,458,337	8.97	13,081,283
ROTC	76,731	1,262,641	1,339,372	8.65	11,585,568
OCS	35,951	1,260,213	1,260,213	13.73	17,694,345

Bowman, 1995.

Table 13 shows the discounted lifecycle costs from Table 12 in the form of a cost-effectiveness index ratio. The Naval Academy and ROTC are compared to OCS graduates, with the OCS ratios fixed at the number one. According to Table 13, the Naval Academy was the most costly source per graduate in the Surface community, but with little relative difference. However, the Submarine, Pilot, and NFO communities show drastic differences based on accession source. ROTC and USNA were at least 25% more cost-effective in producing aviators and submariners than OCS. Thus, Bowman concluded that continuing the Naval Academy, and maintaining ROTC units was the most cost-effective method for maintaining a steady state flow of career officers to YCS 10.

Table 13. Cost-Effectiveness Ratios

ACCESSION SOURCE	SUBMARINE	SURFACE	PILOT	NFO
USNA	0.55	1.15	0.62	0.74
ROTC	0.60	1.12	0.75	0.65
OCS	1.00	1.00	1.00	1.00

Bowman, 1995.

3. Parcell (2001): Optimizing Officer Accession Sources

This study investigates the Chief of Naval Operations' request to compare the long term costs of an incremental change in accessions from each of the three major sources. The report utilizes two methods in which to analyze the addition of 100 new accessions from each source. The first method uses current retention rates in order to calculate the resulting end strength at 20 years of service of an additional 100 USNA accessions. The method then calculates the amount of accessions needed from OCS and ROTC to achieve the same end strength. The second method relies on the same end strength level as the first method. However, it utilizes ROTC and OCS to determine the number of accessions needed to achieve the same total end strength over the entire period.

The study calculates the marginal costs of an officer accession based on an incremental change in the size of each commissioning program. The marginal costs per graduate were calculated to be $121,000 for USNA, $132,000 for ROTC and $58,000 for OCS (Parcell, 2001). These numbers are based on a 100-officer accession increase. This approach is an excellent method for determining the efficiency of expanding or contracting a program (Mehay and Bernard, 2003).

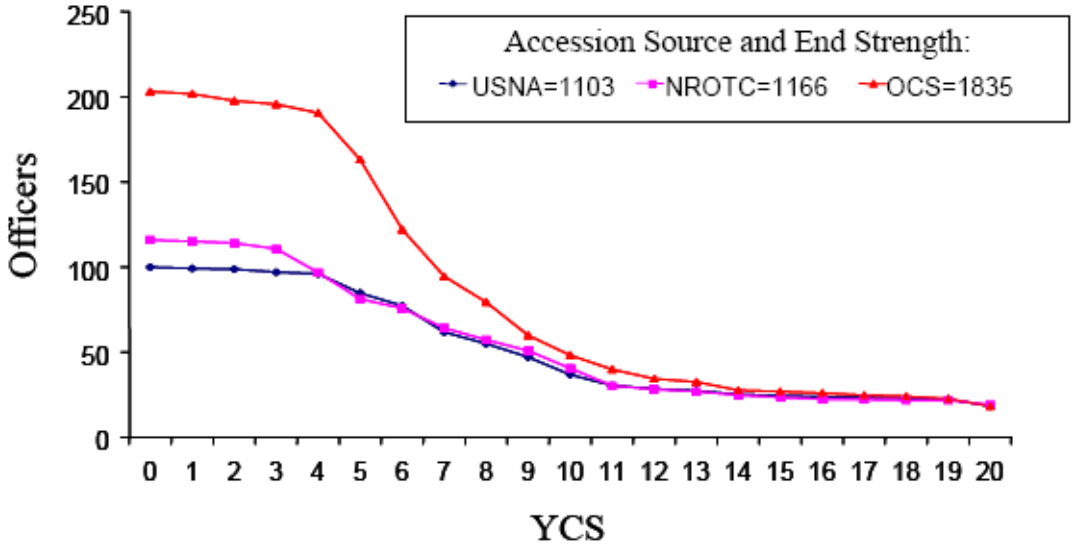
In order to compare the alternatives, the study makes the assumption that the extra officers will be required to ultimately fill senior officer positions. In other words, these extra officers are not being recruited merely to temporarily fill junior officer positions, only to be terminated at the conclusion of their initial commitment. Fortunately, this assumption is correct. As technological advancements continually move forward, the demand for experienced URL officers will remain constant (Mehay, 2007).

Based on Figure 5, results from the first method show that OCS must access 200 officers for every 100 produced by USNA. According to the author, it will cost $0.4 million less to produce the OCS accessions than the USNA accessions. However, it will cost a total of $54 million more than USNA to produce and maintain the OCS end-strength distribution.

Figure 6 shows that, using the second method, accessing 100 USNA graduates per year in the steady-state generates 1,103 officers with YCS 0-20. OCS and ROTC would have to produce 120 and 110 officers, respectively, per year in order to maintain a total steady-state environment of 1,103 officers. It will cost $5 million less to produce the OCS accessions. However, bumping up OCS accessions in order to maintain its end-strength will produce junior officer surpluses and senior officer shortages at a cost of about $21 million.

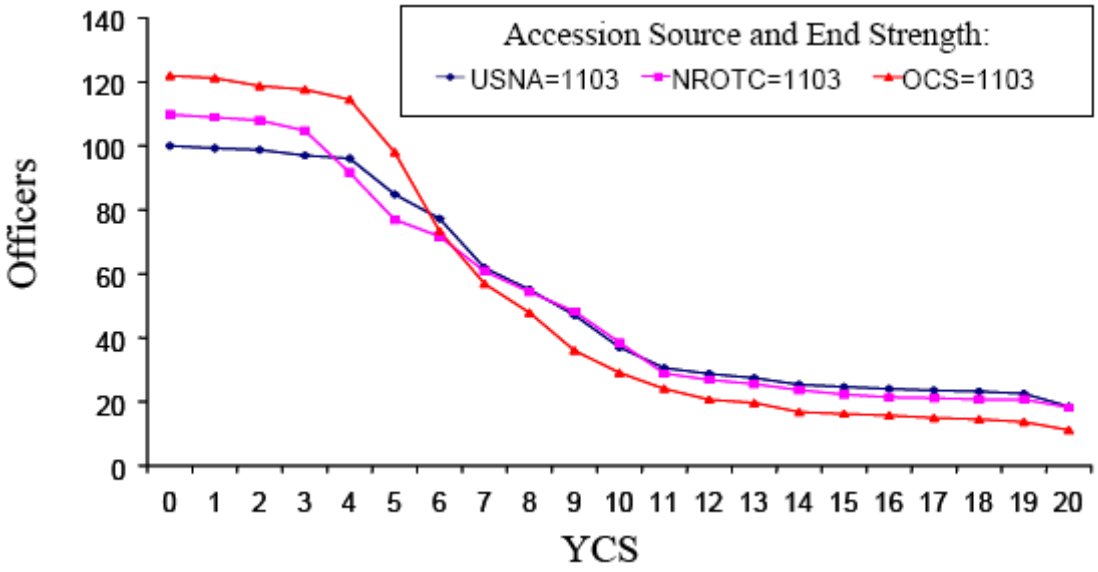
The study finds that in the long-term, USNA produces the most senior force through YCS 20 with the fewest accessions, particularly compared with OCS. Higher USNA success provides the long-term benefit of a less expensive, more senior force. The Naval Academy already has the existing infrastructure from the Cold War, therefore its marginal costs are much lower than the other commissioning programs (Parcell, 2001). A possible criticism is the results were not broken down by community, which has drastically different post-commissioning retention and promotion factors.

Figure 5. Number of URL Accessions to Achieve Given Sized YCS 20 Cohort



Parcell, 2001; YCS = Years of Commissioned Service

Figure 6. Number of URL Accessions to Achieve the Same Total End-Strength



Parcell, 2001; YCS = Years of Commissioned Service.

4. Mehay and Bernard (2003): An Analysis of Alternate Commissioning Programs for Navy Officers

This analysis is based on the same model used by Bowman, (1995). However it pairs calculations of multivariate models of retention and promotion with the independent effect of accession source on these outcomes. In order to isolate the direct effect of commissioning source, other determinants of retention and promotion, such as academic background and achievement, are included in the models. Again, the model of a "steady-state flow of officers" is used, and the total lifecycle costs are calculated to determine the basis for the cost-effective analysis. Both average and marginal costs are analyzed in this report, and ROTC-Scholarship and ROTC-Contract graduates are analyzed separately.

Table 14 shows the results of the average cost analysis in fiscal year 2002. As in Table 12 above, Mehay and Bernard add the pre- and post-commissioning costs of each source, and multiply them by the required accession rate to give the product in the right column. Unsurprisingly, the Naval Academy requires more investment: $135,000 more than ROTC-Scholarship, $175,000 more than ROTC-Contract, and $185,000 more than OCS. The last column in Table 14 shows that ROTC-Contract graduates were the most cost-effective source for Submariners and Surface Warfare Officers. The Academy was the most cost-effective source for Naval Aviators.

Table 15 illustrates the discounted lifecycle costs from Table 14 in the form of cost-effectiveness ratios. The Naval Academy and ROTC are compared to OCS graduates, with the OCS ratios fixed at the number one. In the respective Submarine and Surface Warfare Forces, there was significantly higher value from ROTC-Contract graduates, followed by OCS, ROTC-Scholarship, and finally, the Naval Academy. For pilots, there was better value with Naval Academy graduates, followed by ROTC-Scholarship, ROTC-Contract, and lastly, OCS. In the NFO community, there was little variation in cost-effectiveness among the sources.

Table 14. Average Discounted Lifecycle Costs of URL Officers by Community and Commissioning Source, 2002 Dollars

COMMUNITY AND SOURCE	PRE-COMM	POST-COMM	TOTAL	NUMBER OF ACCESSIONS	DISCOUNTED LIFECYCLE COSTS
SUBMARINE:					
USNA	229,227	131,656	360,883	4.10	1,479,621
ROTC-S	93,653	129,731	223,384	5.10	1,139,260
ROTC-C	53,620	131,319	184,939	5.00	924,693
OCS	43,880	127,293	171,173	5.72	979,107
SURFACE:					
USNA	229,227	80,044	309,271	4.47	1,382,442
ROTC-S	93,653	70,640	164,293	7.20	1,182,911
ROTC-C	53,620	82,841	136,461	4.29	585,416
OCS	43,880	79,302	123,182	6.36	783,435
PILOT:					
USNA	229,227	1,289,253	1,518,480	2.31	3,507,689
ROTC-S	93,653	1,288,707	1,382,360	2.66	3,677,078
ROTC-C	53,620	1,287,635	1,341,255	3.20	4,292,014
OCS	43,880	1,284,301	1,319,114	3.49	4,603,709
NFO:					
USNA	229,227	1,440,660	1,669,887	2.58	4,308,309
ROTC-S	93,653	1,440,120	1,533,773	3.02	4,631,995
ROTC-C	53,620	1,439,699	1,493,319	2.92	4,360,490
OCS	43,880	1,438,944	1,473,757	3.09	4,553,911

Mehay and Bernard, 2003.

Table 15. Average Cost-Effectiveness Ratios

ACCESSION SOURCE	SUBMARINE	SURFACE	PILOT	NFO
USNA	1.51	1.76	0.76	0.94
ROTC-S	1.16	1.51	0.80	1.01
ROTC-C	.94	.74	0.93	0.96
OCS	1.00	1.00	1.00	1.00

Mehay and Bernard, 2003.

Table 16 shows the results of the marginal cost analysis in fiscal year 2002. As in Table 14, Mehay and Bernard add the marginal pre- and post-commissioning costs of each source and multiply them by the accession rate which produces the product in the right column. In this analysis, ROTC-Scholarship graduates required more investment: $11,000 more than the Naval Academy, $40,000 more than ROTC-Contract, and $74,000 more than OCS. The last column in Table 16 shows that ROTC-Contract graduates were the most cost-effective source for Surface Warfare Officers. However, the Academy was the most cost-effective for aviators and submariners.

Table 17 shows the discounted lifecycle costs from Table 16 in the form of cost-effectiveness ratio. The Naval Academy and ROTC are compared to OCS graduates, with the OCS ratios fixed at the number one. There was moderate variation in cost-effectiveness across the board. For the aviation community, the Academy was significantly more cost-effective. For the submarine force, there was little variation between the Naval Academy, ROTC-Contract, and OCS. However, ROTC-Contract graduates were significantly more cost-effective in the Surface Warfare community.

Table 16. Marginal Discounted Lifecycle Costs of URL Officers by Community and Commissioning Source, 2002 Dollars

COMMUNITY AND SOURCE	PRE-COMM	POST-COMM	TOTAL	NUMBER OF ACCESSIONS	DISCOUNTED LIFECYCLE COSTS
SUBMARINE:					
USNA	121,000	131,656	252,656	4.10	1,035,890
ROTC-S	132,000	129,731	261,731	5.10	1,334,828
ROTC-C	91,967	131,319	223,286	5.00	1,116,430
OCS	58,000	127,293	185,293	5.72	1,059,876
SURFACE:					
USNA	121,000	80,044	201,044	4.47	898,667
ROTC-S	132,000	70,640	202,640	7.20	1,459,008
ROTC-C	91,967	82,841	174,808	4.29	749,926
OCS	58,000	79,302	137,302	6.36	873,241
PILOT:					
USNA	121,000	1,289,253	1,410,253	2.31	3,257,684
ROTC-S	132,000	1,288,707	1,420,707	2.66	3,779,081
ROTC-C	91,967	1,287,635	1,379,602	3.20	4,414,726
OCS	58,000	1,284,301	1,342,301	3.49	4,684,630
NFO:					
USNA	121,000	1,440,660	1,561,660	2.58	4,029,083
ROTC-S	132,000	1,440,120	1,572,120	3.02	4,747,802
ROTC-C	91,967	1,439,699	1,531,666	2.92	4,472,465
OCS	58,000	1,438,944	1,496,944	3.09	4,625,557

Mehay and Bernard, 2003.

Table 17. Marginal Cost-Effectiveness Ratios

ACCESSION SOURCE	SUBMARINE	SURFACE	PILOT	NFO
USNA	0.98	1.02	0.70	0.87
ROTC-S	1.25	1.67	0.81	1.03
ROTC-C	1.05	0.86	0.94	0.97
OCS	1.00	1.00	1.00	1.00

Mehay and Bernard, 2003.

C. COMMISSIONING COSTS SUBSIDIZED BY STATE GOVERNMENTS AND PAID BY PRIVATE CITIZENS

As mentioned in the beginning of Chapter four, the studies above analyze only the Federal government's education investment in commissioning candidates in the cost-effective analyses. No analysis exists which takes into account the complete societal

costs of producing educated ROTC and OCS graduates. This study attempts an analysis of state education investment in ROTC and OCS candidates.

This thesis assumes the following financial scenario: Total Annual Revenue needed to run an Educational Institution = Revenue financed by students (tuition) + Revenue subsidized by governmental support (taxes) + Revenue subsidized by other organizations (alumni associations, corporate grants, lotteries, charities, etc.). This equation can be divided by the total number of annual graduates to provide the average cost per graduate. At the Naval Academy, there is no student tuition; however, there is some minor support from private grants, as well as the alumni association. ROTC and OCS accessions are funded by state governments and other organizations, but ROTC-Contract and OCS students are responsible for their own respective college educations.

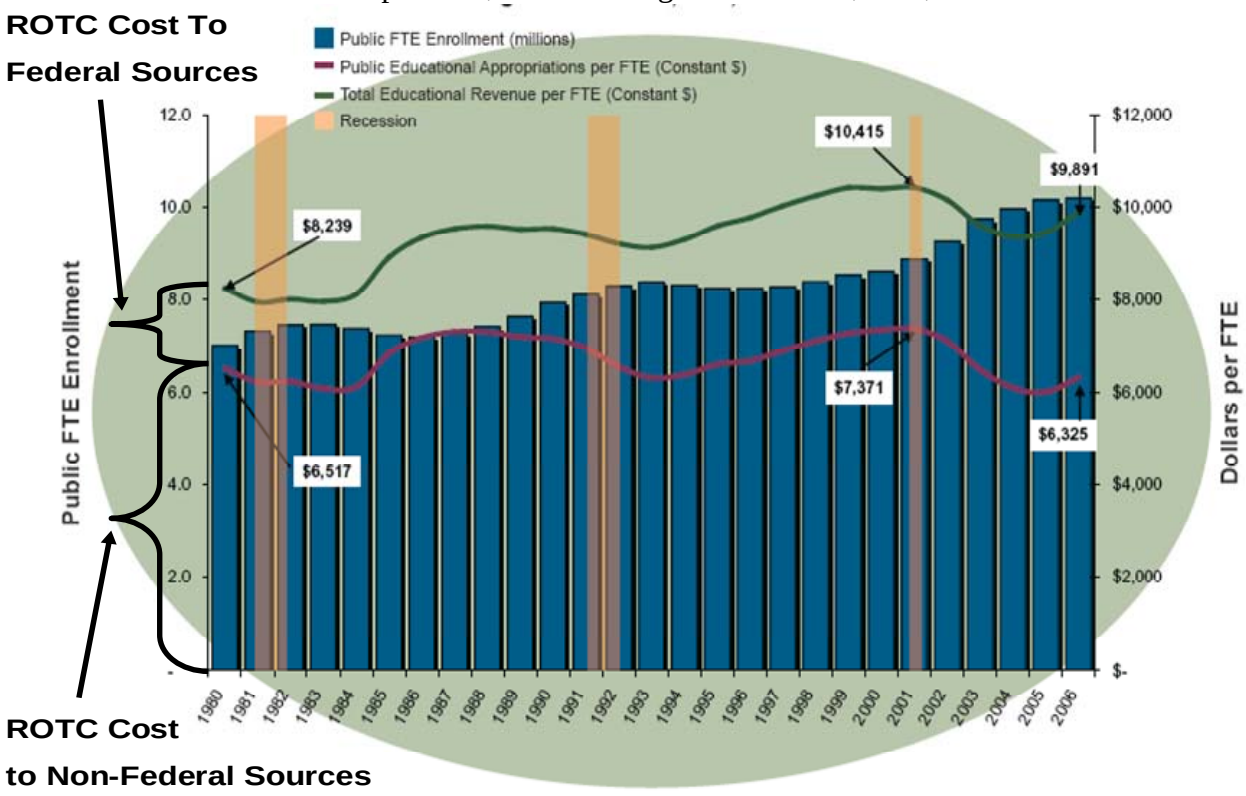
In 2007, the State Higher Education Executive Officers (SHEEO) association, a non-profit association of the chief executive officers serving state governing boards of postsecondary education, completed its annual study on State Higher Education Finance for fiscal year 2006. The report includes an overview of national trends, and the current status of state funding of colleges and universities. These analyses include the use of state tax revenue, non-tax revenue, and tuition revenue to support general education. Commissioning candidates who receive ROTC scholarships do not pay the cost of tuition. Therefore, the reader can gather the amount of non-federal subsidies that go into supporting the education of commissioning officers (SHEEO, 2007).

Figure 7 shows the national average cost per Full-Time Equivalent (FTE) student compared to the total educational revenue per FTE. Additionally, these amounts are set against the backdrop of a rising student population (SHEEO, 2007). This figure is an excellent way to show the national average of public education support from state taxpayers since 1980. The graph shows the actual Naval ROTC cost paid by the Federal government for NROTC students in public schools. In 2006, the Federal government, on average, paid only 36.1% of the actual cost to educate a NROTC-Scholarship student in a public school. The other 63.9% was paid by the state taxpayers and other school organizations.

Figure 7 illustrates a growth in public school costs throughout the time period. Additionally, the support from state taxpayers and other school organizations decreased, placing more financial responsibility on the student. In 1980, a student only paid 20% of his total education, but the number grew to 36% over the time period. This figure is important because the ROTC pre-commissioning costs listed in the previous studies are a faction of what the actual costs are to the taxpayer. This fraction depends on the breakdown of ROTC students in public and private schools.

Also, the figure shows that pre-commissioning costs are rising significantly for the Federal government (ROTC-Scholarship) or for the future officers (ROTC-Contract/OCS). This trend points to both an increasingly more expensive ROTC program, and higher out of pocket education costs for ROTC-Contract and OCS candidates.

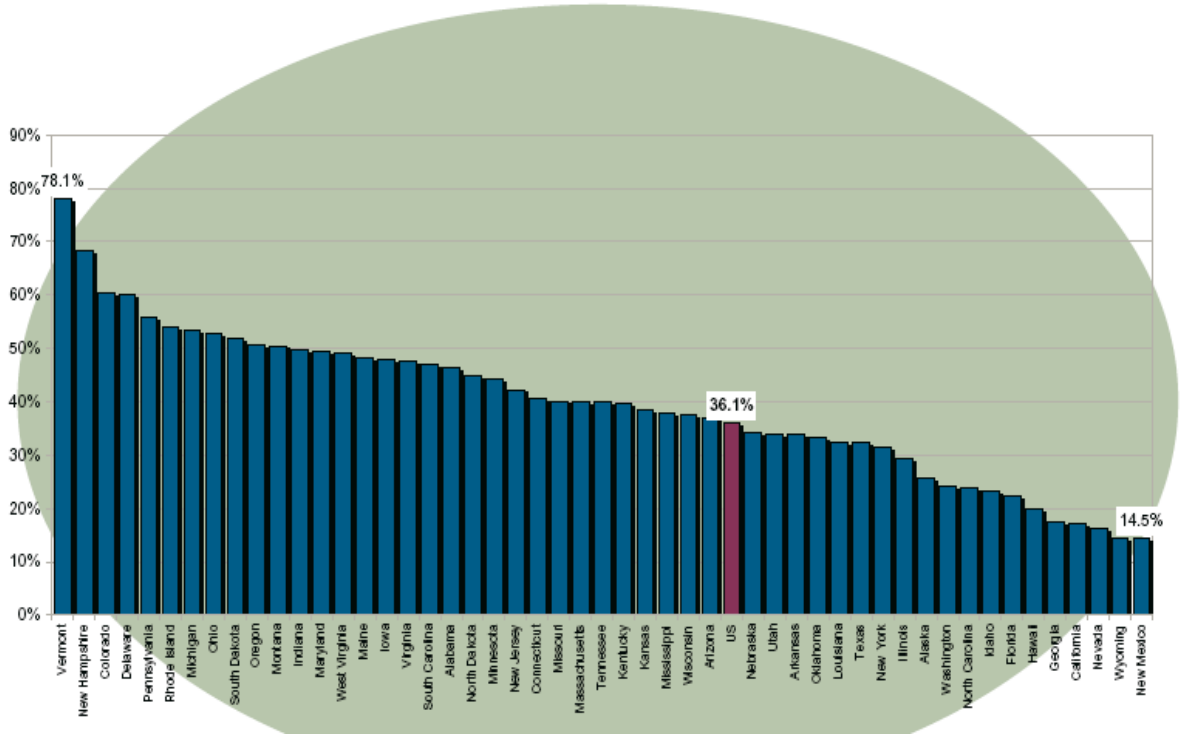
Figure 7. Non-Medical FTE, Educational Appropriations per FTE, and Total Educational Revenue per FTE, in Public Higher Education, U.S., Fiscal 1980-2006



SHEEO, 2007.

Figure 8 shows the 2006 average cost of student education broken down by state. In the center right, the United States average of 36.1% is listed, which was discussed in Figure 7. However, on a state-by-state basis, the amount of student educational responsibility varies greatly. Students assume very little of the financial burden in states on the right of the graph. States such as Florida, Georgia, California, and Wyoming have less expensive tuition. These states have significantly higher taxpayer subsidies to higher education. For example, 20% of the education bill is paid by the state lottery in Georgia, while 18% of the bill is covered by oil drilling and mining royalties in Wyoming. With gambling and oil royalties defraying a significant portion of the education costs in these two states, it would be advantageous to the federal government to increase the size of their respective ROTC units located there (SHEEO, 2007).

Figure 8. Net Tuition as a Percent of Public Higher Education Total Educational Revenue by State, Fiscal 2006



SHEEO, 2007.

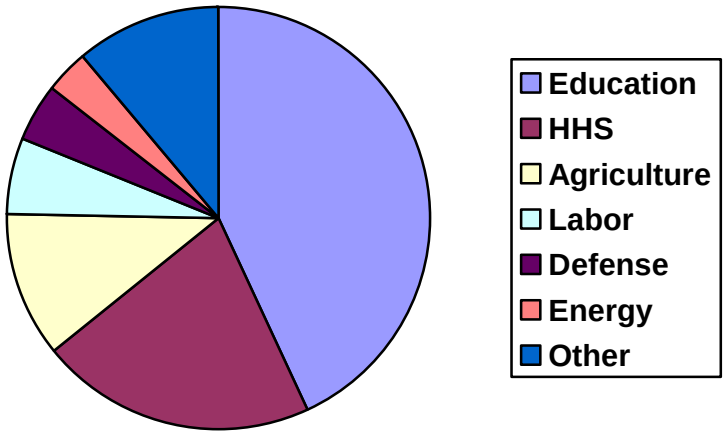
The costs of ROTC and OCS graduates are less in part because the Federal government shares the cost of a fully educated and trained Naval Officer with state taxpayers and private citizens. Most studies of commissioning costs have only looked at the Federal government's portion. However, state and local taxes, in addition to other private grants, share the burden in the education of commissioned officers.

D. OTHER FEDERAL GOVERNMENT EDUCATION EXPENSES

The focus now shifts to the educational expenses of the Federal government in general. In the debate of cost-effectiveness of commissioning sources, the previous studies looked at the internal rate-of-return of the commissioning sources to the Federal government. There is, however, some Federal education spending which yields limited or no return at all. At this point in the study, the author will highlight some government education expenditures other on the commissioning of officers.

Federal education spending outside of the commissioning sources is extensive. In 2002, the total amount of Federal education expenditures was $2.038 trillion. The total amount of Federal money spent on education was $108 billion, or 5.3% of its total expenditures. Of the $108 billion, the share provided to the Department of Defense was only 4.4% of the total amount or $4.78 billion. Figure 9 shows the amount of on-budget funds for education by department.

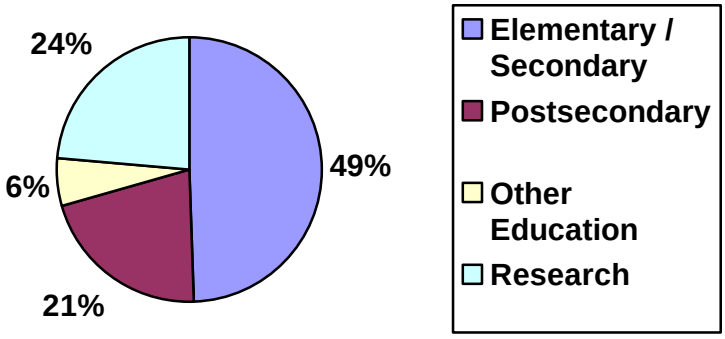
Figure 9. On-Budget Funds for Education by Department, FY2002



Synder and Hoffman, 2003

Figure 10 illustrates federal spending from an educational view. Almost half of the federal education budget supports national elementary and secondary education. Only 21% of the total education spending goes to post-secondary education. This is only slightly less than the amount allotted for governmental research.

Figure 10. On-Budget Funds for Education by Education Specialty, FY2002



Synder and Hoffman, 2003.

Federal educational funding ranges from police academies to research, from milk money to Pell grants, and from Junior ROTC to flight or medical school for commissioned officers. Often, there are direct Federal subsidies for post-secondary institutions, which require no restitution when the education is complete. These programs may, however, provide a social rate-of-return, a question that is debated continuously in American politics.

1. Defense Educational Spending

The Defense Department receives a very large share of the Federal budget; therefore, it is under constant political scrutiny. As highlighted in Chapter Two, because the commissioning sources are recipients of federal educational spending, there is constant political debate as to whether or not they should remain. However, despite the amount of attention they receive, they actually only require a small percentage of defense spending on education.

Table 18 shows the Defense Department spent $4.74 billion on education in 2002. Of that $4.74 billion, the Department of Defense spent only $680 million on educational expenses for the Naval Academy and Naval ROTC. This figure represents only 6.9% of the total amount of DOD money spent on education. Many of the programs funded by the DOD are vital to the military, such as medical training, aviation schools, and primary/secondary education for dependents of service members. Research, for example, is considered a priority expenditure because it provides the military with a technological edge over adversaries. Also, Junior ROTC has been hailed as a success in that it provides an internal private rate-of-return by gaining recruits for the enlisted ranks. These worthwhile programs, which require large amounts of money, often remain unnoticed when politicians battle over expenditures.

Table 18. DOD Education Costs, 2002 (In thousands of 2002 dollars)

EDUCATION DEPARTMENT	**PROGRAM**	**COST ($)**
PRIMARY/ SECONDARY EDUCATION	JUNIOR ROTC	234,767
	OVERSEAS SCHOOLS	889,919
	DOMESTIC SCHOOLS	360,246
POST-SECONDARY EDUCATION	TUITION ASSIST TO SERVICE MEMBERS	342,500
	SERVICE ACADEMIES*	241,564
	SENIOR ROTC	439,330
	PROFESSIONAL DEVELOPMENT**	352,918
RESEARCH	DOD RESEARCH AT UNIVERSITIES	1,887,978
TOTAL	DOD EDUCATION EXPENSES	4,749,222

Synder and Hoffman, 2003

* = Instructional Costs Only: Academics, Military Training, Physical Training, Libraries, Audiovisual, etc.

** = Includes special education programs; legal education, flight training, advanced degree programs, college degree programs (officers), and health profession scholarships.

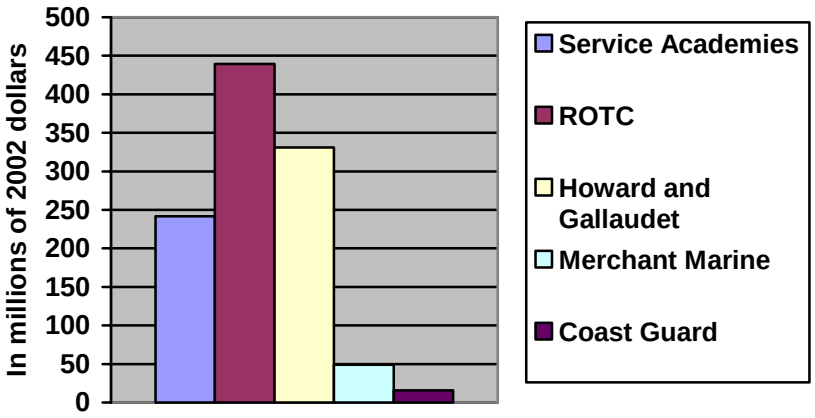
2. Non-Defense Federal Government Education Expenses

The Federal government provides educational funding and support for numerous institutions in the nation. However, as opposed to the Naval Academy and ROTC, there are very few institutions funded by the federal government in which the federal government is also the primary benefactor.

Two major universities receiving substantial support from the Federal Government are Howard University and Gallaudet University. Howard University was founded by Abraham Lincoln during the Civil War as a place at which African-Americans could receive higher education. Gallaudet University provides higher education to the deaf and handicapped.

Figure 11 shows the federal budget funds earmarked for education to the three main Service Academies, all ROTC programs, Howard and Gallaudet Universities, the Merchant Marine Academy, and the Coast Guard Academy. Howard and Gallaudet receive almost the same amount of funding as all five of the service academies combined. Additionally, their funding comes close to equaling the cost of maintaining the ROTC programs for all three of the respective military services.

Figure 11. On-Budget Funds for Education to Selected Post-Secondary Institutions, FY2002



Synder and Hoffman, 2003.

The three commissioning programs provide the Federal government with an internal and the nation a social rate of return. The internal rate of return is the benefit of

commissioned service, while the social rate of return is the education and training of a large number of citizens and an educated officer corps. Howard and Gallaudet Universities have a large social rate of return in providing higher education to African-Americans and the blind, but a more limited internal rate-of-return to the Federal government. The Federal government supports most other historically black colleges and universities, as well as handicapped programs, but not to the extent that it aids Howard and Gallaudet.

E. ANALYSIS

Table 19 summarizes the results of the earlier studies, in terms of the ranking of the cost-effectiveness of each commissioning program. The Naval Academy stands-out as the most cost-effective source for naval pilots and NFOs, and in most cases for submarine officers. OCS and ROTC-Contract graduates were most cost-effective in the Surface Warfare community. However, the overall URL analysis by Parcell still ranked the Academy as the most cost-effective on average for all URL officers.

Table 19. Summation of Economic Analysis Studies Ranked by Cost-Effectiveness

COMMUNITY AND SOURCE	BOWMAN DISCOUNTED LIFECYCLE COSTS (DLC)	MEHAY AND BERNARD AVERAGE DLC	MEHAY AND BERNARD MARGINAL DLC	PARCELL METHOD ONE URL ONLY	PARCELL METHOD TWO URL ONLY
SUBMARINE:					
USNA	1	*4	1		
ROTC or S/C	2	3 / 1	*4 / 3		
OCS	*3	2	2		
SURFACE:					
USNA	3	*4	3		
ROTC or S/C	2	*3 / 1	*4 / 1	USNA – 1	USNA – 1
OCS	1	*2	2	ROTC – 2	ROTC – 2
PILOT:				OCS - *3	OCS – 3
USNA	1	1	1		
ROTC or S/C	*2	2 / 3	2 / 3		
OCS	*3	4	4		
NFO:					
USNA	1	1	1		
ROTC or S/C	*2	4 / 2	4 / 2		
OCS	*3	3	3		

* = Ratio shows the largest differential, i.e., more than .25 from the number one rank.
Parcell did not break down her results by community, which creates a difficult comparison.

F. CONCLUSIONS

The analysis of prior studies in this chapter shows that the Naval Academy is generally, but not always, the most cost-effective commissioning source. Even though the initial investment is more expensive, the Naval Academy produces officers whose performance makes the investment more cost-effective over the long-term. Therefore, the Naval Academy provides a high rate-of-return to the Federal government.

In the aviation community, all three studies showed that the Naval Academy was the most cost-effective. In the submarine community, two out of three studies showed the Naval Academy was most cost-effective. In the Surface Community, ROTC Contract or OCS graduates tended to be the most cost-effective. The Bowman, Mehay and Bernard studies illustrate that this is most likely due to the expensive post-commissioning training graduates go through in the submarine and aviation communities.

The studies analyzed are not always completely in agreement. They can be difficult to compare due to their different variables, methodologies, and estimation techniques. Parcell analyzed the URL community as a whole, but the other three studies broke down the URL into separate officer communities. The community analysis is important with the extremely large difference in post-commissioning costs and pre-commissioning costs. Also, Mehay and Bernard analyzed the cost effectiveness of ROTC Scholarship and Contract graduates separately, which takes into account the vast difference in the initial federal investment. However, all studies provided clear trends for conclusions.

The Naval Academy, funded in its entirety by the federal government, is the most costly of the three commissioning sources on the front-end. However, the studies show that the Naval Academy on average provides the best value for the money spent. Since public school ROTC graduates and OCS graduates have their education paid by the state, the potential officer, or by a combination of both, this conclusion is further supported.

V. SUMMARY AND CONCLUSIONS

This chapter summarizes the collected and integrated information from the studies of the three different commissioning sources. Further, it focuses on integrating the conclusions and analyses in each chapter. Each study produces information which is useful in building the broader picture. The summary provides the foundation upon which effective conclusions and future recommendations can be made.

A. SYNTHESIS

This section summarizes and synthesizes the results and conclusions from previous chapters. Each sub-section lists the main points.

1. Historical Analysis

The historical chapter explored the chronological changes in the Navy's pre-commissioning training and education philosophy and policy. Included in this analysis were the factors and events which drove senior policymakers to implement various changes over time. The main findings are:

- Technology is constantly changing and improving warfighting capabilities. Education of officers is critical in effectively utilizing developing technologies necessary to ensure national security.
- History has shown that the Navy cannot rely solely on officer production from the Naval Academy and, to a lesser extent, ROTC, in times of national emergency. OCS graduates and direct enlisted accessions have pulled the nation through some of its most critical times.
- The Naval Academy is the foundation of the officer corps. It has consistently remained the primary source for officer production over time and has provided an increased accession percentage in periods of lower officer accession requirements.
- All three commissioning sources are well established in naval, as well as American, history and culture.

2. Performance Analysis

This analysis compares the performance of the graduates of the three major commissioning programs. This "product analysis" will help decision-makers determine the value of each institution based on the success of their respective graduates in the fleet. The main findings are:

- Few studies exist that deal with overall performance. Also, the studies have different methodologies and variables which make it difficult to compare them. However, the studies in this thesis study large populations of officers over a lengthy period of time.
- Not all studies were statistically significant, but clear patterns are available for analysis. In general, USNA graduates tend to outperform ROTC graduates, who in turn tend to outperform OCS graduates. Along the four dimensions of performance – retention, promotion, fitness reports, and qualifications – Naval Academy graduates maintained an edge over their peers from other commissioning programs.

3. Economic Analysis

This section of the thesis analyzed the cost-effectiveness of the three commissioning sources based on the "human capital model" – investing in the training and education of employees to enhance productivity and profitability. The findings are:

- Few studies exist that deal with cost-effectiveness. Also, the existing studies have different methodologies and variables which make it difficult to compare them. However, the studies in this thesis study large populations of officers over a lengthy period of time.
- The Naval Academy, generally, tends to be the most cost-effective source for officer production in the aviation and submarine communities. OCS and ROTC generally tend to be the most cost-effective programs in the surface community.
- Commissioning source analysis by community allows researchers to study the effect of post-commissioning training costs. The post-commissioning training costs tend to be greater than pre-commissioning costs, especially in the aviation and submarine communities.
- Commissioning source cost-effectiveness analyses do not take into account that many ROTC or OCS graduates do not have their initial educational investment fully paid by the Federal government like Academy graduates. The state government, the graduate, or a combination of both provides the initial educational investment. Thus, the ROTC and OCS programs are cheaper to the Federal government, but not to the U.S. taxpayer or to the newly commissioned officer.
- Every officer commissioning sources requires a large initial investment. However, the initial service obligation imposed on graduates of each source provides an internal rate-of-return to the Federal government.
- The Naval Academy possesses the physical facilities to offer a student capacity of 4,400 midshipmen. If the actual utilization falls below 4,400, the marginal cost per Naval Academy graduate will rise.

- The commissioning programs are often placed in the spotlight for Federal cutbacks in spending. However, the cost of educating officers at their respective service academies and ROTC programs are only a small fraction of the Defense and non-Defense educational appropriations currently made by several different federal agencies.

B. INTEGRATION

Based on the conclusions above, a set of broader generalizations can be provided.

1. A Superior Officer Corps for a Superior Navy

Naval officers have performed adeptly and heroically throughout our nation's history, and continue to do so. Historically, the Naval Academy has consistently remained the primary source for Naval Officers during periods of reduced officer requirements. Due to the physical and educational rigors required to earn a four-year bachelors degree from the Naval Academy, and the highly selective process of choosing among applicants, it was always commonly assumed by many in the Navy that these graduates would outperform graduates from other commissioning sources. Statistical analysis of officer performance data tends to support this hypothesis.

However, the importance of ROTC and OCS graduates is most evident when the Naval Academy cannot meet higher manning requirements, especially during national emergencies. These officers, from diverse backgrounds, have successfully defended the nation, often on very short notice. This is most evident with the need for mass mobilization during national emergencies including and following the Civil War. Rapid mass mobilization remains a challenge, especially when reserve components become overwhelmed.

2. Education is Essential for Naval Officers

The education of naval officers is crucial to the success of the naval service and our national defense. Centuries ago, Naval officer education was determined to be a key factor in effectively utilizing developing technologies. The need for officer education began during the "Age of Sail", intensified during the Industrial Revolution, and became critical in the "Nuclear Age". With the dawn of the "Information Age", the importance of education has only increased. Educating Naval Officers is essential in order for the Federal Government to fulfill its constitutional duty to provide for the common defense.

At times, rapid expansion prevented officers from acquiring an education. However, times of peace or lower officer accession requirements allowed the Navy to focus financial assets on training and education. ROTC was designed to diversify education and fill expansion requirements, but was quickly overwhelmed by the demands of both WWII and the Cold War. OCS provides officers on a larger and quicker scale, but must rely solely on recruitment of college graduates from the work force.

3. Education is an Expensive Initial Investment, but Yields Substantial Dividends

The initial investment in the education of Naval Academy graduates is expensive. It is, on average, less costly to produce ROTC officers who attend private schools than to produce graduates from USNA. It is even less expensive to produce ROTC officers who attend public schools because the federal government pays only student tuition, which is approximately 36% of the total cost of the education. The federal government pays nothing for the education for OCS graduates because the cost is paid by the officer candidate.

However, studies show that the Naval Academy, even with its highest initial cost, often proves to be the most cost-effective source of new officers in certain URL communities. Naval Academy graduates, on average, were ranked as more cost effective than ROTC graduates according to prior studies. However, the high initial cost has, and will always, leave the Naval Academy and other commissioning sources as targets for potential cutbacks.

C. CONCLUSIONS

1. The Naval Academy: The Primary Source of Naval Officers

The Naval Academy has been and will likely continue to be the primary source of naval officers. The Academy is well established in American culture as a premier educational institution that selects highly capable midshipmen candidates and molds them into high caliber officers. Academy graduates generally perform at higher levels than officers from other commissioning programs and tend to stay in the Navy longer, which makes the initial investment in their education cost effective.

2. The Navy Must Maintain the Ability to Expand

Although the Naval Academy meets the core requirements of officer manning, it cannot meet the needs of the Navy during national crises when officer requirements rise rapidly. ROTC augments the Academy in providing and overseeing high quality education and training, while providing a degree of academic diversity. Additionally, ROTC allows a degree of visibility for the military on college campuses. A well-integrated ROTC unit within a student body promotes a positive image of national service to other students, thus prompting other students to consider ROTC. It is imperative that OCS be able to recruit as many college graduates as possible, especially in a national emergency. However, the Navy has relied and will continue to rely on battlefield enlisted commissions, with their wealth of experience, to meet unfilled demands which cannot be met by OCS recruitment.

3. Education: Vital to the National Defense

The large initial capital investment in the education of Navy officers provides a large internal and social rate-of-return to the nation. The cost of educating new officers is a necessary expense, comparable to the cost of purchasing a warship, tank, or airplane. The nation must have prepared officers in a time of crisis. Even though the Federal government does not pay for the full cost of educating non-Academy graduates, the Academy education still tends to be more cost-effective than ROTC and OCS.

4. Educational Funds

As stated before, the cost of educating an officer is vital and necessary for the national defense. Thus, officer commissioning programs allow the Federal government to fulfill its constitutional duty to provide for the national defense. However, officer commissioning programs continue to be targets for cutbacks.

The 10th Amendment specifically delegates non-mentioned items in the U.S. Constitution, such as education, directly to the state governments. Politicians will continue to debate federal expenditures on education for the benefit of society at large. Federal lawmakers often help state governments, especially in education. Since officer commissioning programs are vital to national defense, they must be fully funded. Additionally, service academies and ROTC only account for 0.6% of federal education

expenditures. Policymakers should be prepared to analyze and debate the internal and social rate-of-return of these other programs, like the studies mentioned in this thesis.

D. RECOMMENDATIONS

Based on the conclusions, several recommendations can be provided.

- The Navy should operate the Academy at full capacity. This will allow the Navy to receive the highest value from its investment in the Academy.
- The Navy should operate all three commissioning sources. After the Academy provides its full share of officers, the difference should be shared by the ROTC and OCS programs. These two programs are also essential to the national defense and must be defended as such from lawmakers wanting cutbacks. Additionally, all three sources are so engrained into American and naval culture that it would be almost impossible to remove either one.
- The Navy should continue to recognize education as essential to national defense.
- The Naval Academy should expand the endowment. The Naval Academy must vastly expand its own endowment and reduce its reliance on the Federal budget. With the costs of the national debt, Social Security, Medicare and Medicaid soaring, these entitlements will cause the need for cuts in Federal spending. Since they are relied upon by so many voters, it will be much easier for the Federal government to attack non-entitlement spending. Since the Naval Academy has always been in the cross hairs for closure, it may become a target for budget cutters again. The inevitable future financial crisis will only add to the pressure to close the Naval Academy. Thus, Naval Academy alumni, after already serving their country in peace and war, must be called upon again to ensure the future of our national defense by ensuring the future of the Naval Academy. Howard University, which began a similar capital campaign almost ten years ago, is in the same position as the Naval Academy due to its reliance on Federal funding.

E. RECOMMENDATIONS FOR FURTHER RESEARCH

For further research, I recommend continuing the investigation of the economic and performance comparisons of naval officers based on commissioning source. In my research, there was a limited number of studies that analyze the various performance and cost measures. These new studies should be segmented over career stages, including early career (O-1 to O-2), mid-career (O-3 to O-4) and late career (O-5 and above). Additionally, a longitudinal study of society, which attempts to measure public perceptions, would provide insight on the sociological aspects of the three commissioning sources and their assumed social rate-of-return American people.

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