

The Officer Structure in the 21st Century

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Summary

Background

At the beginning of the new century, the Navy is undergoing a series of major changes in the way it fights. Changes in the force structure have altered the demands on personnel. New technologies are revolutionizing Navy platforms and concepts of operations. Business practices have shifted some work previously done by military personnel to civilians in both the civil service and the private sector. Organizational changes for all the armed forces, first initiated with the passage of Goldwater-Nichols in 1986, have placed increasing control in the hands of the joint arena.

This paper explores why and how an efficient military might include an increasing proportion of senior officers over time. The argument rests on four main pillars:

- **Force structure.** In today's forces, more power and lethality are concentrated in fewer operating units. Thus, even as the structure has decreased, its capabilities and reach have increased. No corresponding reduction has occurred in the decision-making requirements associated with those units; in fact, they may be increasing.
- **Technology.** Modernization of the forces continues to reduce enlisted types of jobs at a much greater rate than officer jobs. As enlisted billets disappear, the demand for their direct line management also decreases—that is, junior officers. Moreover, senior officer oversight of these new technologies will likely be needed.
- **Outsourcing.** Competition and privatization are also likely to reduce enlisted functions much more rapidly than senior officer functions. Outsourcing might actually increase the need for senior officers to oversee outsourced functions.

- **Joint, interagency, and international coordination.** There have been and will continue to be increasing demands for joint tours. More recently, there is also increasing demand for interagency and international billets. These billets will likely require officers with significant warfighting and other skills.

Other pressures on senior officers include acquiring postgraduate education. In many cases, continuing education (military and/or nonmilitary) is an effort to keep pace with increasingly complex jobs. Moreover, some argue that the rate of change of job complexity is also increasing. To meet these changes, some feel that postgraduate education has become practically a necessity for the current Unrestricted Line (URL) career, and calls for making it mandatory for due course officers—however controversial—have become more pronounced.

Conceptually, we believe that the combined pressures will make the officer pyramid more funnel-shaped.¹ The first three pressures decrease the relative need for junior officers; the rest create outward pressure on the top of the pyramid, especially in the O4 through O6 grades of officers.²

Objectives

As the Navy makes the transition from its downsizing mode to a more stable force size and structure, it needs to review various aspects of its personnel system to ensure that it is ready for the challenges ahead. Because the enlisted force is such a large part of total endstrength, it has frequently been the focus of analysis. Downsizing has already affected the officer corps, and we believe that changes will continue to reshape the officer pyramid.

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1. Although the main focus of this study is to identify and analyze changes within the officer pyramid, we can expect these changes to affect the officer-to-enlisted ratio (i.e., the shape of the overall Navy personnel pyramid). In this paper, we will point out important changes in the officer-to-enlisted ratio.
 2. We use the term “field grade” to represent Lieutenant Commanders (O4), Commanders (O5), and Captains (O6).

This study examines these indications and trends and analyzes their implication for the future of the officer corps. The extent to which the Navy personnel system will need to adapt to these changes is controversial, in part because forecasting the needs of the future force is an inexact process. The only formal statement of Navy officer requirements is embedded in the Fiscal Years Defense Plan (FYDP). Longer term trends, such as reductions in manning on ships among junior officers and enlisted, seem likely to continue. Thus, the focus of the study is on broader, longer term policy issues rather than on detailed plans for changing the officer corps over the next year or so. The objectives are to:

- Review emerging demands for officers, whether formal requirements or goals, to determine how these demands might affect the officer structure in the future.
- Analyze existing laws and policies that constrain changes in the officer structure, and provide reasons for relaxing these constraints in light of the emerging demands.
- Lay out possible alternatives for achieving proposed changes in the officer structure.
- Set up criteria for selecting among the most promising alternatives for achieving proposed changes in the officer structure and to identify the tradeoffs inherent in each.

In reviewing alternatives that could achieve a more senior billet structure, we include those that meet current officer management constraints as well as those that do not. We compare the models with respect to the minimal additional accessions, manning (how many people will be needed to perform a work-year), and outlays needed to fill a more senior billet structure. We also analyze the alternatives for compatibility with the Defense Officer Personnel Management Act (DOPMA) and the Navy's "youth and vigor" standards. Next, we examine a narrowed list of alternatives by comparing some of the costs and benefits of officer specialization versus well-roundedness. We summarize the incentives for officers to choose and for the Navy to offer particular career paths.

Findings

We identified several basic approaches to reshaping the officer pyramid and evaluated each model by how costly it would be to fill a new billet structure. Two approaches fared best:

- **The specialist model.** This approach broadens the number of senior-level career paths with new specialist tracks.
- **The generalist model.** This approach lengthens the careers of some officers in the warfighting tracks to allow for training and tours in a new subspecialty.

We also identify barriers to changing the officer structure under each model. For example, DOPMA will have to be reformed for either officer structure to be viable. Also, extending careers in the generalist model will violate the current “up-or-out” officer management system that is based on a 20-year voluntary, 30-year mandatory retirement system. The system was put in place years ago to ensure that the officer corps was sufficiently fit to carry out its required duties (i.e., the youth and vigor standard). Finally, the promotion system may have to be modified to identify front-running generalist officers whose promotion path may be slower than that of due course officers under the current 30-year system.

We believe that the barriers to the models can be alleviated. In addition, further evaluation of the specialist and generalist career paths by such factors as return on training costs, compensation requirements, and the effectiveness of each type of officer lead us to three main conclusions:

1. **The generalist model is likely to be more costly.** Any plan that increases the proportion of field grade officers will clearly raise the cost per officer. However, the generalist model, by extending careers, will increase the average experience level more than the specialist model.
2. **Extending the careers of some specialists may not be cost-effective.** It is costly to delay retirement, and productivity gains near the end of many specialist careers are likely to be small.

3. **The relative value of depth and breadth of experience is the key variable in choosing between the generalist model and the specialist model.** In particular, the Navy must weigh the benefits of the variety of experiences that generalist officers bring to the new billets versus the cost of longer careers.

Implications and recommendations

We see that the current officer structure, or pyramid, is facing substantial pressure to change over the next several decades. Many of these changes are environmental—that is, both the civilian and military sectors are experiencing them (outsourcing, adoption of technology, and increasing returns to education and experience over time). Other changes, however, are unique to the military, such as joint operational requirements, interagency coordination, and specific advanced education.

We have presented several models of officer structures that could meet these new demands. The best alternatives, the specialist and the generalist models, vary in the type of officer each produces and in the cost of producing such an officer. The Navy needs to consider carefully what type of officer will make the best field grade leader. If officers with a variety of experiences over longer careers will be the most effective leaders, the Navy must decide if the cost of retaining these officers is worth it.

Regardless of which officer pyramid model the Navy chooses for the future, this is an opportune time to reevaluate the role that current constraints play in shaping the officer pyramid. In particular, the Navy should examine whether DOPMA is still an appropriate management tool. It also needs to consider whether the current length of officer careers which are dictated by youth and vigor standards set years ago should apply to future forces. Finally, it needs to review how officers are selected for promotion and perhaps explore alternative methods for signaling due course officers.

Our analysis suggests several important courses of action for senior Navy leadership:

- Facilitate a more senior officer corps.
- Prepare now for longer officer careers. This includes revisiting legal and other constraints on current officer careers.
- Examine carefully the relationship between experience and effectiveness in the field grade officer corps.

Background

Critics of the Pentagon often complain that there are too many senior officers.³ They fear that excessive numbers of senior officers lead to an inefficient bureaucracy that wastes money in times of peace and is unprepared for times of crisis. They have argued for strict limits on the number of senior officers and for additional cuts in these limits if the military budget is cut further.

The debate is not new. The passage of the Defense Officer Personnel Management Act (DOPMA) in 1980 was in part a reflection of this concern. The law carefully regulates the number of field grade officers relative to endstrength. It does allow for a higher proportion of field grade officers as endstrength declines to maintain depth and breath of experience in the officer corps. However, it was not written to incorporate some of the environmental changes confronting the Navy (and perhaps the other services) today.

We are concerned that the debate has become skewed and that there are indeed factors that are creating a need for more senior military expertise. Much has changed, and continues to change, since the advent of an all-volunteer force. Changes in the security environment, technology, organizational structure and theory, and the legal and regulatory environment all have a different impact on the requirement for officers and enlisted personnel.

Specifically, we have identified force structure, technology, outsourcing, and increasing numbers of joint, interagency, and international billets as four factors that are likely to increase the need for field grade officers over time. In addition, we see that calls for advanced education have become more persistent, in part to meet some of these demands. The discussion that follows examines in more detail

3. The complaint is frequently levied at flag and general officers, but it is extended to field grade officers as well. See, for example, [1].

the reasons why field grade officers may need to be a larger component of military strength.

Forces reshaping the officer pyramid

Force structure changes

The Navy experienced a substantial decline in its force structure during the drawdown in the 1990s. Many capabilities of the Navy have remained the same, however, by concentrating power and lethality in a physically smaller, more dispersed force. As a result, the need for experienced decision-making is unchanged even as the force structure has been reduced. For example, the numbered fleets have actually increased by one since pre-drawdown times (from 4 to 5), even as the size of each fleet has declined. Fleet hierarchy, however, still requires flag and senior field grade officers, so a change of this kind requires a relative increase in senior officers.⁴

The force structure of the Marines shows a similar pattern. Although Marine manpower has declined by more than 24,000 since the end of the Cold War, the basic structure of divisions and wings has remained constant, albeit smaller in size.

Finally, much of the naval fleet downsizing has come from smaller ships, which translates into a shift toward more senior leadership. For example, the number of carriers has been cut from 14 to 12 while the number of frigates has been cut from 100 to 49 over the same period, and the expectation is that they will be phased out entirely over the next 7 years. This increases the relative need of senior to junior officers. A carrier is commanded by an O6 and has overall a more senior rank structure than does a frigate, which is commanded by an O5.

To some degree, the Navy has responded to this change by shifting some commands from O6 to O5 commands. Such a shift enabled decision-makers to maintain the same level of selectivity for the O6

4. Requirements of Goldwater-Nichols and the realignment of areas of responsibility under regional Commander-in-Chiefs (CinCs) have added more senior billets relative to endstrength.

commands. Perhaps the real implication of the change is that the Navy has reduced the average experience level on some platforms, which may increase some types of risk.⁵

Because of time constraints and by career design, such experienced decision-making skills are not likely to be found among junior officers. Thus, we have emphasized that the relative size of the field grade officer corps must increase to keep pace with the relative increase in experienced decision-making requirements.

Technology

Information technology (IT) is proliferating in both the civilian and military sectors, resulting in far more efficient communications, data acquisition and analysis, and general business practices. IT systems, however, frequently require a few highly skilled workers for operation in place of many less-skilled workers. In addition, the IT systems need oversight by experienced workers, and experienced senior leadership in IT is crucial for the coordination of acquisition, implementation, and maintenance of systems. We can expect that IT in the Navy will require more senior officer billets.

Perhaps nowhere is the changing billet structure more evident than in the evolution of ship manning in recent decades. Examples are the IT-laden Aegis Cruiser and planned destroyer, DD-21. The recent move to employ Smart Ship technology is one of the most tangible examples of billet-replacing technology.

Table 1 shows the effect on crew size and seniority of IT and other labor-saving devices, such as replacing steam with gas turbine engines. Table 1 includes data on battleships, destroyers, and cruisers to illustrate how the Navy's largest surface combatants have incorporated

5. The future force structure is uncertain, and the argument we make here may not hold for every possible outcome. For example, if the "street-fighter" concept is adopted, a large number of much smaller craft may be deployed, which would result in more O3/O4 commands. However, there is a significant probability that force structure changes, at least through the FYDP, will disproportionately decrease the demand for smaller commands.

these devices over time. In particular, the comparison of the Belknap and Aegis cruisers shows the most recent effect of IT systems on cruisers. M+1 requirement and billets authorized data show that the enlisted-to-officer ratio dropped from 15.5 to 13.9 (an 11-percent decline), and the entire crew became relatively more senior and/or filled more skilled billets. The percentage of the most senior crew increased from 38 to 45 percent, an increase of more than 18 percent.

Table 1. The effect of technology on crew size

Surface combatants	Crew size	Enlisted-to-officer ratio	Crew in top 5 grades (%)
Battleships/cruisers			
lowa-class battleships	2,220	--	--
Recommissioned lowas	1,500	22.4	25
Belknap cruiser	494	15.5	38
Aegis cruiser	416	13.9	45
Destroyers			
DDG-2	357	17.1	39
DDG-51	323	13.0	47
DD-963	320	15.9	39
DD-21	95 ^a	--	--

a. Design goal. Includes embarked detachments.

The newest destroyers also have smaller and more senior crews. The three versions of the DDG-51 have 46.3 to 48.4 percent of the crew in the top five paygrades. The DD-21 has a targeted crew size of 95, a sizable decline from the 323-person crew (23 officers, 300 enlisted) from the guided missile destroyer (DDG-51), and a similar decline from the Spruance class destroyer (DD-963). To decrease the entire crew size by more than two-thirds, the enlisted crew size must be cut significantly. Fewer cuts can be made in the officer billets, and those cut will likely be related to the enlisted cuts—usually junior officers.

Outsourcing

Outsourcing has been a key feature of a changing military management in the last two decades. The Navy eliminated 6,854 military billets through completed A-76 competitions from 1990 to 1999.⁶ Most of the eliminated billets were base supply, aircraft maintenance, and installation support functions—all largely enlisted functions.

Elimination of enlisted military billets through outsourcing is not new. The Navy competed 3,500 military billets from 1985 to 1990. Of the 1,381 military billets that were eliminated in completed competitions over this period, 1,367 were enlisted billets and 14 were officer billets. Although outsourcing will most likely continue to reduce enlisted billets more than officer billets, we expect that the reductions in officer billets will come from the more junior of the officer corps because they are the direct line management for sailors.

At the same time, the need for oversight of the outsourcing contracts is increasing. Experienced decision-makers who have expertise in the outsourced activity, financial management, and project administration could oversee the contracts most efficiently.

Other demands on field grade officers

We see that the demand for joint, interagency, and international assignments is on the rise. The Goldwater-Nichols Act of 1986 formalized the demand for joint service activity. The effect of Goldwater-Nichols on the Navy was not immediate. Over the last decade, however, it has had an increasing influence on the assignment of upwardly mobile officers within the Navy. The prescribed tour lengths in Goldwater-Nichols tend to deepen officers' joint opportunities but may limit the breadth of experience.

Table 2 shows how the amount of joint activity has increased substantially, even in the era of downsizing. The Joint Duty Assignment List (JDAL) is a list of billets with the Joint Chiefs of Staff, Department of Defense, Unified Commands, and others that involve interaction

6. Data are from the Commercial Activities Information System (CAMIS).

among the armed services. One requirement of Goldwater-Nichols is that officers serve in a JDAL billet before being promoted to flag rank. JDAL billets require a rank of O4 and above.⁷

Table 2. Pre- and post-drawdown JDAL billets

Year	Total JDAL billets	Total Navy JDAL billets	Navy endstrength ^a	Navy O4-O6 endstrength ^a
1989	8,325	1,666	57,222	17,506
1999	9,162	1,996	40,317	14,963
Percentage change	10%	20%	-30%	-16%

a. Excluding health care communities, LDOs, WOs, and TARs. If the health care communities are included, the Navy endstrength and the O4-O6 endstrength decline by 25 and 17 percent, respectively, over the period.

In 1989, there were 8,325 JDAL billets, of which the Navy had 1,666, or 20 percent [2]. By 1999, there were 9,162 JDAL billets, of which the Navy had 1,996, or 22 percent.⁸ While the number of JDAL billets was increasing by about 10 percent (and the Navy portion by 20 percent), Navy officer endstrength (excluding health care communities, Limited Duty Officers (LDO), Warrant Officers (WO), and officers in the Training and Administration of Reserves (TAR) program) declined by almost 30 percent. Navy O4-O6 endstrength (excluding the groups listed above) declined by 15 percent from 1989 to 1999.

The 1986 Goldwater-Nichols Act was a starting point for increased demand for joint military experience. Since then, a 1997 National Defense Panel report extended this idea by promoting interagency (military, diplomatic, and economic) cooperation [3]. Movement in this area is often called Goldwater-Nichols II. These interagency and international (I&I) assignments may reach across other non-defense U.S. government agencies (i.e., assignments made in cooperation at

7. Some of the billets can be assigned to a senior O3.

8. The number of billets on the JDAL as of the end of FY 2000 was 8,737, of which the Navy had 1,941. This represents increases over 1989 levels of 5 and 16.5 percent, respectively.

the Commerce Department) or may be with non-governmental organizations (NGOs).⁹

A key feature of these types of billets is the nature of the work required. Many of these new billets are likely to require significant experience. Moreover, there will likely be a premium placed on senior warfighting experience. These joint or I&I tours could be an addition to the current URL career path, or the career path could be reworked to include these tours while remaining the same length. It is important to understand the value of these joint or I&I tours to the Navy in order to incorporate them most efficiently into the warfighting career path.

Advanced education is another area of growing requirements for senior officers, and in some cases, it is related to the increasing number of joint and I&I billets. The CNO articulated his position on increasing the education of the Navy's future leadership in a vision statement that said:¹⁰

My vision is simple: each career unrestricted line officer will be afforded the opportunity to attain both a relevant graduate degree and appropriate Professional Military Education.

Civilian sector experience

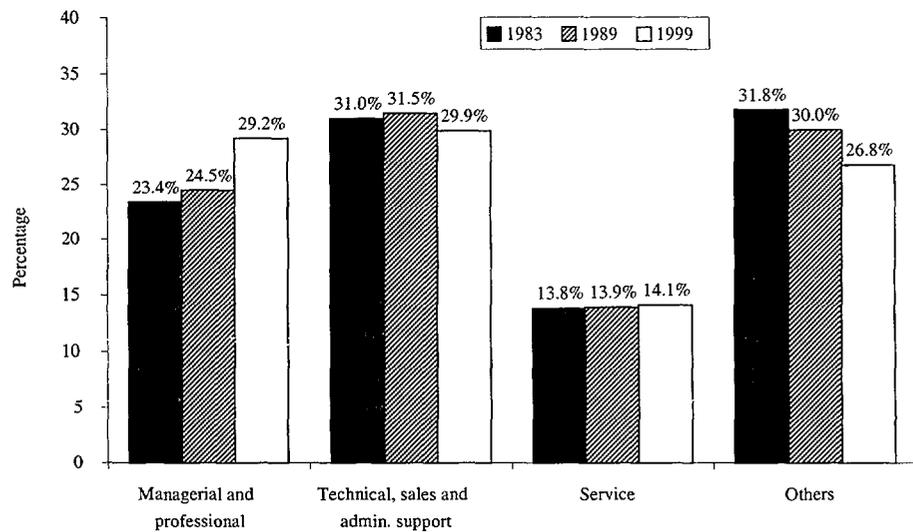
The civilian sector has experienced many of the same changes that the Navy has. Businesses and civilian government entities have in many cases downsized, outsourced, and required a higher level of education and experience of its workforce in an effort to become more efficient. The officer corps reflects the more skilled workforce in the civilian sector. That is, officers would most likely be classified in the professional/managerial category. Some Navy officers are professionals (e.g., lawyers and doctors), and many others are either managers or managers-in-training.

9. For a detailed treatment of interagency and international assignments in officer career paths, see [4].

10. Admiral Johnson, *Navy Education Vision*, 1999.

Figure 1 displays data from the Bureau of Labor Statistics (BLS) that show similar trends in the U.S. labor force as in the military over the last two decades [5].¹¹ There has been a substantial shift in the U.S. workforce toward the professional and managerial jobs and away from manufacturing jobs, which are counted in “others.” The labor force data reflect a relative shift to jobs requiring more skills and more decision-making capabilities.¹²

Figure 1. Wage and salary employment by occupation



In addition, the managerial/professional workforce is more experienced now than in 1979. Analysis of data from the BLS shows that even as managerial/professional jobs have become a much larger portion of all employment, the probability of a young worker

11. We start the series in 1979 because BLS changed some occupational definitions at around that time. This period also starts with the passage of DOPMA in 1980.

12. Although these data represent equilibrium points (i.e., jobs filled, not labor demanded), they still show the *market shift* toward jobs that require more skills and experience than in the past. The data exclude self-employed workers.

entering the managerial ranks was lower in the mid 1990s than in the late 1970s, after correcting for the cohort size difference [6]. This implies that the larger professional/managerial corps is also more senior than it was in the past, which reflects the need for more experienced decision-makers.

The adoption of technology in the civilian sector has different effects on production (non-managerial) and non-production (managerial) ranks [7]. For example, it is well established that computer investments reduce production workers (i.e., enlisted types of jobs) more than non-production workers [8]. Not surprisingly, this phenomenon has also occurred in the Navy, and we expect this differential effect of technology on production and non-production workers to continue in all workplaces.

Examining how private sector firms downsized in the 1990s is also instructive. Results presented in [9] show that firm downsizing did not target mid-level tenured employees. Instead, the retention rates of long-tenured workers (most senior and close to retirement) and very short-tenured workers were most sensitive to downsizing.¹³ A key implication of these findings is that if these firms downsized optimally, it suggests that maintaining mid-level management (or even growing its relative size) is imperative for firm viability.

Finally, anecdotal evidence suggests that the way firms downsize today defies the conventional wisdom of "cutting middle management." Alex Markels reviewed a number of companies recently downsizing and observed three factors driving the increase in the professional and managerial labor force [10]. First, when technology replaces workers, it still requires managers to oversee the activities. Second, outsourcing also requires managerial oversight. Third, the increasing

13. Reference [9] uses a sample of 51 large firms. The authors find that 5-year retention rates for workers with 10-19 years of service are about the same in downsizing and growing firms. The 51 firms are all for-profit entities who were clients of the benefits consulting firm Watson Wyatt Worldwide in the 1990s. Firm size ranged from 1,000 to 200,000 employees. They all offered very competitive wage and benefits packages and had longer average job tenures than the labor market as a whole. The majority, 63 percent, downsized over the sample period.

complexity of white-collar jobs is likely to increase the need for oversight (i.e., managers).

Markels cites a number of examples in which firms supposedly going through corporate downsizing and elimination of layers of middle managers had little or no reductions in the size of their managerial labor force. As layers are eliminated from traditional lines within a corporate structure, new managerial slots are created in the new areas of responsibility. One example he cites is that of Xerox, which eliminated 9,500 jobs but found that the number of people truly considered middle managers was nearly unchanged. One Xerox manager explained, "The reality of re-engineering is that many more people are in a decision-making mode. So more people get elevated to a management category."

Current management of the officer corps

DOPMA

In an effort to control the number of field grade officers relative to endstrength, Congress passed the Defense Officer Personnel Management Act of 1980 (DOPMA) (10 USC Sec. 523). The law sets specific limits on the number of O4 to O6 officers allowable relative to the number of O1 to O6 officers. The limits apply at the end of the fiscal year.¹⁴

DOPMA allows for the officer corps to become more senior as endstrength falls and vice versa. The logic is that as the force gets smaller, it needs to maintain enough experienced leaders for current operations and for the possibility that future operations may expand very quickly. However, the law is less flexible with respect to a more senior force beyond what it currently allows for during drawdowns. Our concern is that DOPMA does not allow the Navy to respond to environmental changes that we have described.

14. Not all O1–O6s are "DOPMA countable." When calculating DOPMA limits on field grade officers, the Navy is allowed to exclude flag, medical, dental, warrant, and TAR officers, as well as those officers on the retirement lists.

Moreover, the O4–O6 endstrength limitation is not the only constraint that DOPMA imposes on officer management. Interpretation of DOPMA has also set promotion probability guidelines to O4 to O6 (80, 70, and 50 percent, respectively) and years of service (YOS) guidelines for when the promotion is considered “in zone” (YOS 10+1, 16+1, and 22+1, respectively, for promotion to O4 through O6.)

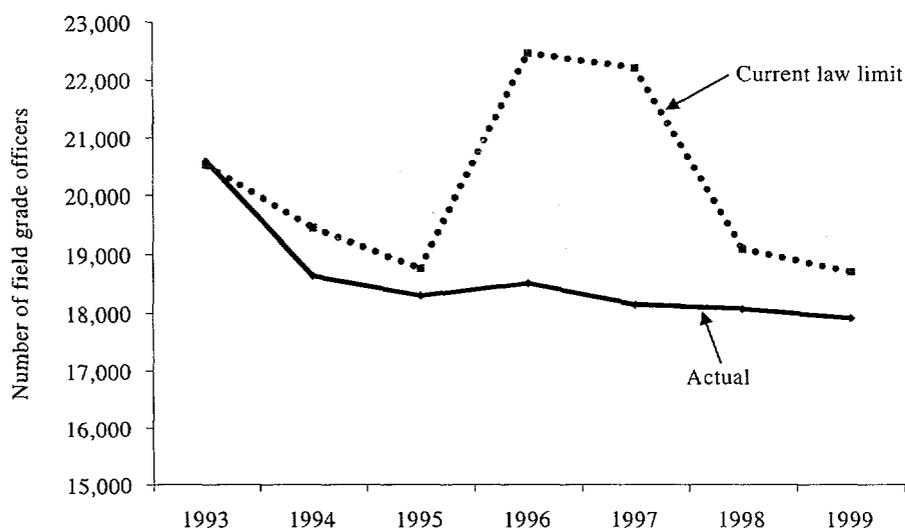
The services are allowed some flexibility in the definition of the “promotion probability.” That is, they can define what it means to have a promotion probability to O4 of 80 percent. The Navy chooses to meet the promotion probability guidelines by creating a promotion zone of officers’ YOS. The zone is widened or narrowed to try to accommodate the guidelines (80 percent in the O4 case) given an estimated number of O4–O6 openings that result from promotions, retirements, and other losses to the Navy. The zone is also carefully chosen not to violate the YOS windows set by DOPMA. It is Navy policy to hold field grade promotion boards every year.

The result has been that the Navy has not always used its full allocation of field grade endstrength, and, in some years, the Navy has not been able to meet the promotion probability target. For example, in the late 1990s, the promotion probability to O4 has been closer to 70 than to 80 percent.¹⁵ When retention increases, the zone tends to narrow and the promotions tend to occur later in the window. When retention falls, the opposite tends to happen. Because the Navy downsized its overall strength through disproportionate cuts in recruiting, promotions were delayed during the downsizing era. The joint requirements for field grade officers prescribed by Goldwater-Nichols put additional pressure on the DOPMA limits. Eventually, the Navy and the other services asked for DOPMA relief.

15. The Army does things differently. It keeps YOS cohorts together and only holds a promotion board for cohorts when there are enough estimated openings in the field grades to meet the DOPMA guidelines for promotion probabilities and YOS. As a result, field grade promotion boards have not convened every year, and the DOPMA guidelines for promotion probabilities and YOS have not always met the letter of the law. The Air Force uses a mix of the Navy and Army systems.

With DOPMA tightly controlling endstrength and flow points, it is not surprising that the Navy has had a difficult time achieving all of these goals simultaneously.¹⁶ Even when Congress relaxes a subset of the DOPMA requirements, the Navy may still find it difficult to take advantage of them. Figure 2 shows the number of field grade officers allowed under the DOPMA law in the 1990s along with the actual O4–O6 DOPMA endstrength that the Navy recorded at the end of the fiscal year. Congress granted temporary DOPMA relief for the number of O4–O6 officers allowable by the end of the fiscal year. However, Congress did not indicate relief for either the promotion probability guidelines or the YOS guidelines.

Figure 2. DOPMA limits and actual inventories



Congress then granted more modest but permanent field grade endstrength relief starting in FY 1998. The current number of allowable field grade officers for a given endstrength is about 6 percent higher than the law that applied in FY 1995 and earlier, but, as the graph shows, it is well below the temporary field grade endstrength relief

16. For a good description of the effects of DOPMA during downsizing across all the armed services through 1996, see [11].

granted in FY 1996-97.¹⁷ Perhaps more importantly, we see that ad hoc modifications to DOPMA can aid in officer management over time, but real reform may be necessary to address some of the changes we expect in the future.

We contend that, with the possibility of disproportionate increases in field grade billets, meeting DOPMA guidelines is not likely to get easier in the future. As far back as 1993, Rostker et al. [12] summarized the argument as follows:

Is DOPMA right for the decade and environment of the nineties and beyond? When one looks beyond the drawdown period, changes may be needed for officer management that preserve some of the recent traditions yet break with others. Given a changed environment, are the same objectives for officer management and the assumptions underlying them still valid? The two most significant environmental challenges to be accommodated are already in motion: exploding technology and an older but more vigorous population in and out of the force. The most significant organizational challenges—reduced size and jointness—are also playing out.

While in the immediate future it may be necessary to keep DOPMA intact, the Department of Defense and the Congress should point to 1997, the end of the currently programmed contraction, to consider the need for fundamental changes in the way officers will be managed in the new century. Any new officer management legislation should be based not on how serving officers are used to being managed or as a reaction to past practices and outdated situations, but on how future officers will need to be managed to maintain requisite quantity and quality and to confront the dynamics of the future environment.

17. Given the inventory of officers in FY 1996-97, and adhering to the promotion probability and YOS guidelines, the Navy could not use the temporary O4-O6 endstrength relief granted in FY 1996-97. The Navy is responding to the permanent relief that was granted in FY 1998.

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Alternative officer pyramid models

Four possibilities

We reviewed several models of how the Navy might adapt to a more senior officer pyramid. We evaluated four basic approaches, which are not mutually exclusive:

- Expand the base of the officer pyramid.
- Intensify billet scrubs.
- Broaden with specialists.
- Lengthen with generalists.

The first option, expanding the base of the pyramid, is a familiar way of doing business in the military. For example, some communities in the URL size their accession cohorts to future department head requirements (O3 or O4, depending on the community.)¹⁸ Expanding the base of the pyramid means bringing in more junior officers and growing them to fill the new senior requirements in later years. The advantage is that it would spare the Navy the burden of reshaping career paths. It can also be compatible with current officer management rules as long as an increase in officer endstrength is granted.

The second alternative is to intensify billet scrubs. This option can move the Navy toward meeting the new requirements while keeping costs down. Billet scrubbing also adheres to current officer management constraints and would not necessarily require additional endstrength to fill the new billets. Indeed, the Navy has already

18. The URL exception is the aviation community, where accessions are based on future squadron requirements. Obviously, though, the size of the accession cohort will ultimately affect the officer inventory available for department head tours.

responded to some degree to external pressures by scrubbing billets. This has entailed selecting which ones should be URL-coded, which can be held by Restricted Line (RL) officers, and which can be outsourced.

The third option proposes broadening the upper part of the pyramid with specialists. Specialists are URL officers who become subject matter experts through a combination of education and closed-loop detailing. Ideally, officers would spend their junior years in warfighting billets and then move into a specialty. Specialization might entail a transition to a restricted line or staff community in mid-career, or it could result in migrating to a non-warfighting specialty track within the URL. The career and managerial implications differ in each case; our analysis examines continued affiliation with the URL community. Regardless of whether the Navy decides to put the specialists in the URL or the RL, it can create specialty career paths that start during the O4 years, or perhaps as early as O3, then promote only within that specialty.

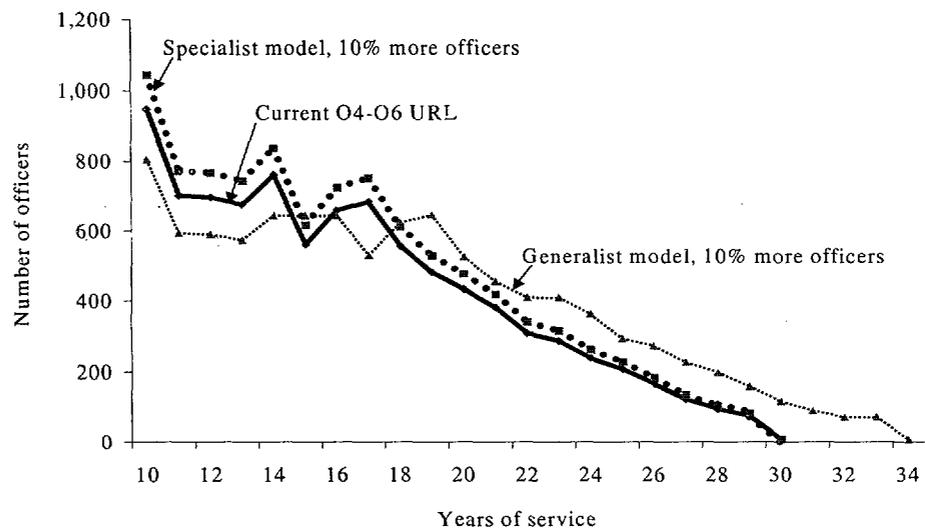
The final approach is to extend the allowable length of the officer career. This would create additional time for URL front-runners to fill an expanding range of specialty and educational billets. Lengthening careers would allow for more and/or longer tours. It is a step that many feel is needed to accommodate today's career requirements. As the number of "must-have" tours increases, the pressure to lengthen the career will be even greater.¹⁹

Both the specialist and generalist models would add more O4-O6 officers. However, the specialist model would increase the number of officers with the same career length as under the current system (30 years). By contrast, the generalist model adds career length to those additional O4-O6 officers, while possibly making each year cohort smaller. Therefore, the two options may produce similar paygrade distributions, but the average levels of experience and seniority within the O4-O6 group will differ.

19. For a more general treatment of alternative career paths for officers, see reference [13].

For example, suppose there is a 10-percent increase in the current O4-O6 URL officer inventory. Figure 3 shows the current O4-O6 URL inventory, a specialist approach to the inventory increase (more officers, larger YOS cohorts, 30-year careers), and a generalist approach to the inventory increase (more officers, smaller YOS cohorts, 34-year careers.) In this example, we assume that officers are retained over a 34-year career in the same pattern as over a 30-year career. The number of officers added to the URL inventory is the same in the specialist and generalist models, but the average YOS for these field grade officers is 16.4 years for the current inventory and the specialist model and 18.0 years for the generalist model.

Figure 3. O4-O6 URL inventories



Another key distinction between the specialist and the generalist model is the type of officer that each yields. The specialist model will effectively end a warfighting career by not allowing the specialist officer to expand on those skills beyond about YOS 10. At that point, the specialist will begin to acquire a concentrated set of skills and abilities and will fill billets and promote only along the specialist path. By contrast, the generalist model, which spreads careers over a longer period, produces an officer with a continued accumulation of

warfighting skills along with a progression of subspecialty skills. We elaborate on this difference later in the paper.

A concrete example of these last two types of models is useful. The Army Foreign Area Officer (FAO) program recently moved from a generalist approach (albeit without a lengthened career) to a specialist approach. The Army allows accession into its FAO program at YOS 5. Candidates must display an excellent aptitude for foreign language and have strong Graduate Record Examination (GRE) scores. Army FAO training occurs in a YOS 8-12 window to ensure that most candidates will promote to O4.²⁰

Until recently, the Army allowed its FAOs to promote in their branch of original accession and to attempt to meet the branch milestones along with acquiring FAO experience. Apparently, this proved difficult; the Army has more recently decided on a specialist track for its FAOs. At YOS 11, the officer must choose a career field designation either as an FAO or from his/her branch of original accession. An officer who chooses the FAO designation will serve and promote as an FAO for the rest of his/her career.²¹

Example of additional accessions and costs under various models

Doing business in the usual way (e.g., by expanding the base of the pyramid) to achieve a new billet structure may be sub-optimal. A simple exercise illustrates the point. As in figure 3, we assume a 10-percent increase in field grade URL requirements (which we denote with inventory). We then estimate the minimal additional

20. The currently serving Army FAOs come from Combat Arms (the Army's equivalent of the URL) (62 percent), Combat Support (29 percent), and Combat Service Support (9 percent).

21. A recent Navy FAO plan is similar to the Army "generalist" model. It would not create an FAO community but would allow officers with FAO training to remain and promote in their original community. The hope is that careful detailing and monitoring of promotion for these officers will allow them to serve in FAO billets during the course of a 30-year URL career without a hindrance to either.

accessions, manning (how many people will be needed to perform a work-year), and outlays needed to fill a more senior billet structure under the various models. We use a pay structure for each model that is assumed to keep retention at its current levels.²² For the specialist model, we assume a 30-year career; for the generalist model, we assume a 34-year career. Table 3 shows the flow points for the specialist and generalist models. Table 4 displays the results. Appendix A describes the exercise in more detail.

Table 3. Example of specialist and generalist career paths

	Time in grade (years)	LOS at end (years)	Promotion % relative to current	Jobs
Generalist				
O4	7.5	17.5	Lower or same	Mix
O5	7.5	25	Lower or same	Mix
O6	2 to 11	25 to 34	Lower or same	Mix
Specialist				
O4	6	16	Higher	Specialty
O5	6	22	Higher or same	Specialty
O6	2 to 10	22-30	Higher or same	Specialty

Table 4. Outlays, manning, and accessions: a 10-percent increase in field grade requirements

Model	Percentage change from O1-O6 baseline in:		
	Additional accessions	Additional officer manning	Additional outlays
Specialist	N/A	3.5	2.9
Generalist (fix promotion rates, extend O4 by 6 months)	N/A	3.5	3.1
Generalist (lower promotion rates, extend O4 by 1.5 years)	N/A	3.5	3.9
Expand the base	15.4	13.5	13.7
Billet scrubs	N/A	N/A	N/A

22. The pay streams chosen for the exercise are quite generous to the specialist track. However, the generalist turns out to be more expensive.

Not surprisingly, the exercise shows that expanding the base of the pyramid by bringing in more junior officers would be unduly expensive; given current retention rates, accessions would need to increase by more than 15 percent above current levels, and MPN and initial training expenses would increase by more than 13 percent above the current levels for URL officers.²³ Yet we believe that there is little reason to predict an expansion of junior officer billets. Moreover, increasing accessions without significantly increasing platforms and infrastructure would dramatically increase turnover in each billet, effectively cutting tours so that everyone gets a chance to serve in them. This reduces career development for young officers and adversely affects long-term readiness. For these reasons, this first option is the least feasible alternative.²⁴

Table 4 also shows that the generalist and specialist models would have similar impacts on total officer manning, but the specialist model has a cost advantage over the generalist model. Each requires about one-fifth the additional manning as a model that expands the base. In addition, the specialist and generalist models would generate about one-fourth and one-third the cost of a model that expands the base, respectively.

We contend that billet scrubs should continue on a regular basis, no matter what the specific challenges to the officer structure. However, although billet scrubbing is an important step, we would argue that it will not substitute for a force-shaping strategy. As we have seen, outsourcing more billets does not eliminate the need for more senior officers to oversee and manage contracts. It is also possible that eliminating billets altogether will disrupt the normal flow through the career pipeline (e.g., reducing shore duty billets for officers raises sea-shore rotation issues.) In fact, an outsourcing policy targeted at officers (or even senior officers) is likely to have an overall negative impact on readiness.

23. It is not clear how billet scrubs might affect career paths and outlays. It is beyond the scope of this study to evaluate large-scale officer billet scrubbing alternatives.

24. By design, the specialist, generalist, and billet scrub models do not increase accessions.

Comparison of the specialist and generalist models

The two most promising approaches to filling the new billet structure are the specialist model (broadening the top part of the pyramid with officers in specialties) and the generalist model (lengthening field grade careers). To analyze these choices further, we first discuss barriers to change. Both models will require statutory (DOPMA) relief. The generalist model will also require suspending the current “youth and vigor” standards, which are described below. Both models will probably require a change in the traditional way that the Navy identifies its best officers. Finally, we lay out additional criteria for evaluating the efficiency of the specialist and the generalist models.²⁵

Barriers to change

DOPMA

Both the specialist and generalist models need changes in the continuation rates to meet requirements. The results of our exercise show that the specialist model would require an increase in the O4 continuation rate of about 11 percent.²⁶ The generalist model also conflicts with DOPMA in several ways. Obviously, it would require a suspension of the maximum number of years of service. In addition, the promotion rate would have to fall as the O4 career lengthens to decrease the size of each O4 YOS cohort. Otherwise, we will create an O4 inventory

25. Lengthening field grade careers will also affect the promotion time to flag officer. Data presented in [14] suggest that lengthening field grade careers by 4 years would delay the average promotion to flag officer from approximately YOS 26 to YOS 29. In a related study, [15] discusses the pros and cons of lengthening flag careers.

26. In our exercise, which used an average of O4 URL promotion rates from the 1990s, the promotion probability required to meet the new billet structure increased from approximately 68 percent to 75.5 percent. Neither of these figures violates the 80-percent DOPMA guideline. However, the Navy has moved back toward an 80-percent promotion probability to O4 for the URL, and the forecast through the FYDP for the O4 URL rate is at least 80 percent per year. As a result, DOPMA guidelines would have to be increased to meet the demands of the new billet structure.

that exceeds our assumed 10-percent increase in requirements.²⁷ Results from our exercise show that the O4 promotion probability would have to fall by about 15 percent to lengthen careers to 34 years.

Broadening the DOPMA in-zone promotion windows could be used to lengthen careers. Some have considered widening the in-zone promotion window to as long as 3 to 5 years. There are financial costs to slowing promotions for officers, as well as the potentially more difficult issue of the perception of slower promoting officers in the Navy. We discuss both of these issues below.

Youth and vigor standards

The generalist model requires a longer military career. One criticism of this is that the strenuous job requirements are incompatible with the natural effects of aging. That is, some argue that longer serving officers cannot meet “youth and vigor” standards. We believe that it is worth revisiting this debate.

The current 20-year voluntary, 30-year required retirement system was established in the 1947 Officer Personnel Act (OPA). It was as much a reaction to the past as it was to the then-current average male longevity. DOPMA, passed in 1980, did little to change this feature of the “up or out” retirement system. The arguments for this system are well described in [16]:

Since the end of World War II (1945), the central paradigm of the military retirement system, and of military career personnel management, has been retirement at any age, after at least 20 years of service, with an immediate annuity, in support of an up-or-out personnel management system designed to insure that most career military members spend only a few more than 20 years on active duty. The personnel management system requires retirement upon failure of selection for promotion or upon reaching a certain number of years of service. The interaction of the two systems insures that large numbers of career members will have to retire, or face a strong incentive to choose to voluntarily retire, within

27. Our simulation shows that the generalist model would meet a 10-percent increase in O4 requirements if only 6 months were added to the current O4 due course career.

a few years after reaching the 20-year mark. This paradigm is embodied in detailed statutes for officers.

The dominant rationale for shorter careers has been the need to prevent the military effectiveness of the armed forces from being impaired by the presence, on active duty, of people physically incapable of performing their military duties. Frequently, of course, physical incapacity was, and is, related to age. Thus, although many speak of the shorter career concepts as assuring "youth and vigor" in the military career force, "vigor" is the fundamental concern. "Youth" is merely one characteristic which can relate, in the aggregate, to vigor. A major secondary rationale for allowing, and requiring, retirement at comparatively earlier ages than most civilian retirement systems is providing a strong career retention incentive. Other rationales that have been stated, such as assuring a rapid promotion flow to replace career members who are retired, can ultimately be traced back to the up-or-out concept and its purpose of insuring "youth and vigor."

Much has changed in the intervening 50-plus years since OPA was drafted, including the nature of war (e.g., the declining physicality of combat), the nature of the increasing requirements for officers (summarized earlier), and the increase in life expectancy. These factors make longer careers not only viable but possibly the preferred career path for a truly experienced senior military leadership.

From 1929 to 1997, the life expectancy at birth for both men and women increased by 20 years; for newborns in 1997, the life expectancy is approximately 74 and 79 years for men and women, respectively.

Recent evidence cited in [17] also suggests that the health of middle-aged and older Americans has increased during the 1980s and 1990s [18-21]. Research shows that this is especially true for people in the upper socioeconomic levels. Longevity experts also predict that this trend is likely to continue as medical technology is refocused from reducing mortality from chronic diseases to increasing the age of onset of chronic disease.

Officers must be able to perform on-the-job tasks in a safe and effective manner. Consequently, we do not advocate the elimination of a

youth and vigor standard. Instead, we suggest that the standard set some 50 years ago may be less appropriate for today's population, and even less so in the future. It may well be worth setting standards based on more recent trends on aging and health. The evidence from the general population bodes well for a longer military career that is not necessarily impeded by the natural effects of aging.

Signaling due course officers

Another potential barrier is the transformation of career management to accommodate the new officer structures. In an "up-or-out" promotion system, the Navy has developed ways to identify and encourage front-runner officers. If the officer structure changes in a way that slows promotions (i.e., the in-zone promotion windows are wider), the Navy will have to revise the way it defines due course officers. As we have suggested, modifications are likely needed for either the specialist or the generalist model. A key consideration is now to compensate front-runner officers who promote more slowly because they acquire a subspecialty. We discuss this issue in greater detail below.

Traditionally, the Navy has relied on a tight relationship between assignments and promotions to signal the officers it most wants to keep. Front-runners are detailed to prestigious assignments as early as possible in their careers. The due course officers are rotated in and out of career billets so as to pass through all the needed "wickets" by the time they are scheduled to face a promotion board.²⁸ Officers who are not front-runners frequently have the opposite experience (e.g., weaker or delayed assignments with consequently lower chances of promotion).

The generalist model in particular poses a real challenge to this tradition. The Navy will have to rethink how to distinguish officers who are not front-runners who promote at a slower rate (or, at some point

28. The Navy can promote front-runner officers below zone, although there are strict limits on the numbers who can be promoted in this fashion. Below-zone promotions do not always ensure a smooth career path; sometimes it impedes the ability to reach career milestones at appropriate points.

in their careers, not at all) from front-runner officers who are adding a subspecialty track to their career, thus slowing their progression through traditional command milestones.

One related example is the experience of a materiel professional (MP) community. The Navy originally created the community in the 1980s to meet congressional requests for better oversight of acquisition practices. The billets available to MPs were exclusively for O5 and above, similar to the billet changes we expect to see for the current officer pyramid.

Data presented in [22] show that, in the 1980s and early 1990s, officers in materiel UIC billets suffered from lower promotion rates than officers in other communities.²⁹ Eventually, the Navy dropped the MP community in favor of developing acquisition specialists who remain in their own communities. Thus, URL officers may obtain an additional qualification designator (AQD) for the acquisition specialty but remain in their own communities for promotion purposes. Officers in line and staff corps may also be part of the Navy acquisition corps, depending on training and experience, but they will also promote within their own community. The Navy monitors promotion boards to ensure that acquisition experience is treated fairly. In addition, until recently, Congress required that each service submit a report on the promotion of acquisition corps officers relative to other officers [23]. The issue is whether the Navy can adopt a similarly vigilant approach for promising officers in slower promoting situations, either in a generalist or a specialist model.

Other concerns about a more senior force

There are concerns about allowing the force to become more senior. Some argue that the increase in decision-making requirements can be met by officers with less than field grade rank. To a certain degree, our analysis does not preclude this possibility. For example, this

29. The data in [22] on MPs covered 1986 to 1993. Not all materiel UIC billets were filled with MPs, although most MPs were in materiel UIC billets. Other officer communities that deal directly with acquisition include engineering duty officers (EDOs), aviation engineering duty officers (AEDOs), and aviation maintenance duty officers (AMDOs).

concern is particularly relevant to changes in information technology. Specific technological expertise may in fact reside with younger officers, and they may appropriately fill some billets. However, technological know-how may be only part of the requirement that is driven by information technology. Understanding how it functions in larger systems and deciding what information is most important requires more than operational knowledge of the technology.

It was the officer billet structure changes directed by Goldwater-Nichols that in part helped to increase permanently the DOPMA field grade officer endstrength beginning in FY 1998. We contend that the trend in adding more senior officer rather than junior officer requirements will continue, and that these jobs, like many of the joint billets added in Goldwater-Nichols, will legitimately require the combination of skills, abilities, and experience that we find in more senior officers. When deciding how to fill these billets, the binding constraint may be overall experience, and there are physical limits as to how fast it can be acquired.³⁰

Compensation issues

Compensation needed for slowing down promotion schedule

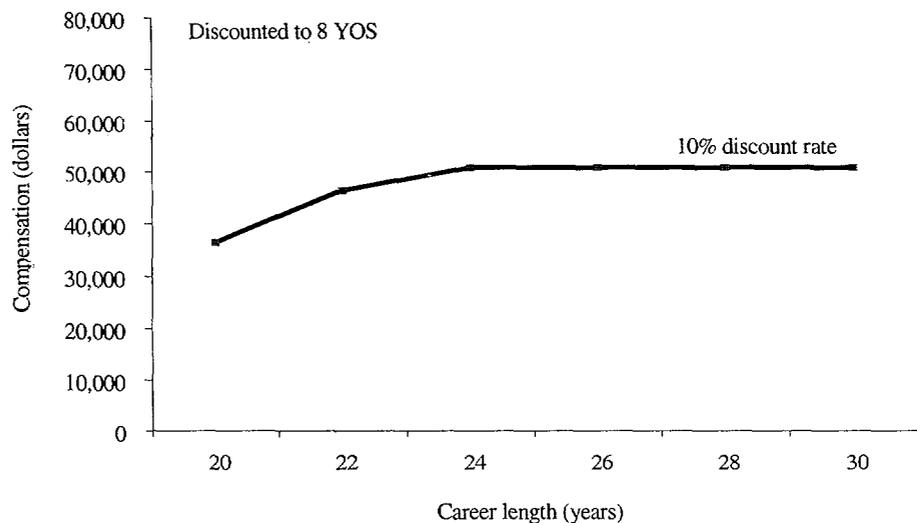
To maintain retention of the most qualified officers, the Navy may need to compensate officers who are promising but slower promoting relative to their counterparts who are on the current due course career path. This could happen under a specialist or a generalist scenario. One way to make officers financially indifferent between the current career path and a slower promoting path is to pay a bonus (or stream of payments) equal to the difference in the present discounted values (PDV) of active duty pay under each scenario. We discount the pay streams back to YOS 8, a point at which most

30. Officers in the United Kingdom's Royal Navy (RN) can have longer careers (34 years of service, counted from age 21). The Armed Forces Pension Scheme (AFPS) allows for an "immediate pension" at age 38 or YOS 16; the full career pension occurs at YOS 34. Also, the RN does not rely on an up-or-out promotion system. It appears that it uses different commissioning lengths and the financial incentives of its pay and pension system to shape its personnel profile.

(non-TACAIR) officers have reached the end of obligated service. We assume a 3-year difference beginning with promotion to O4 under the two scenarios.³¹

Figure 4 displays the results. Assuming a constant 10-percent discount rate, slower promoting officers will require \$40,000 to \$50,000 in additional regular military compensation to equalize the PDV of the pay streams over an active duty career. This covers active duty careers ranging from 20 to 30 years. In appendix B, figures 13 and 14 show the results for a 3-year and a 5-year difference in promotion rates with different discount rates, respectively.

Figure 4. Active duty compensation for slower promotion^a



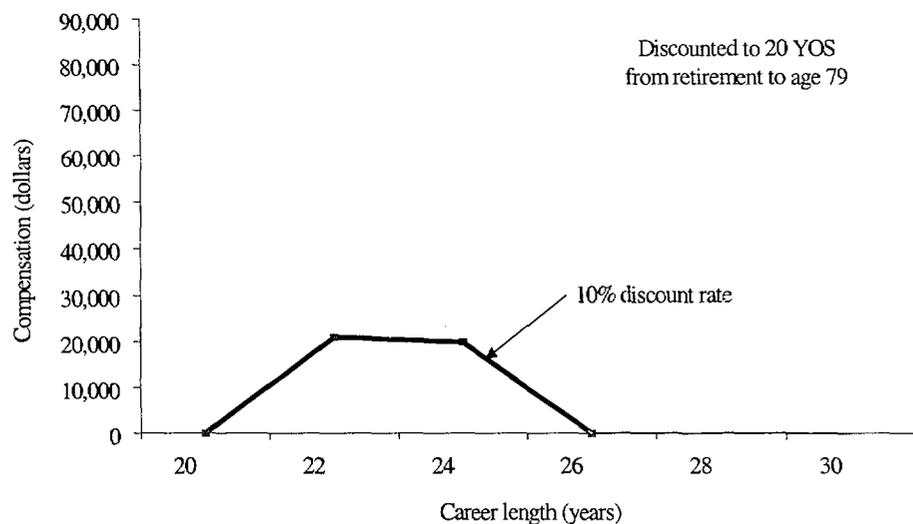
a. Promotion was -1 to +2 years relative to DOPMA midpoints.

Slower promotions may also affect the rank at which the officer retires and thus the value of retired pay. Again, we assume a constant 10-percent discount rate. We also assume that the PDV of retired pay is

31. The pay streams chosen for the simulation in the previous section were ad hoc and quite generous to the specialist track. In either case, however, the generalist turns out to be more expensive.

discounted back to YOS 20 from retirement to age 79. Figure 5 shows that slower promoting officers will also need about \$20,000 to compensate for the differences in the PDV of retired pay under the two paths. Much of this difference is in the timing of promotion to captain.³² Figures 15 and 16 in appendix B show the effect of a 3-year and a 5-year difference in promotion rates, respectively, on retired pay. Both figures also show the effect of the discount rate on the calculations.

Figure 5. Retired pay compensation for slower promotion^a



a. Promotion was -1 to +2 years relative to DOPMA midpoints.

Compensation needed to delay retirement

A lengthened career under either the specialist or the generalist model requires compensating officers for delaying retirement. We can use a similar PDV method for estimating the costs of delaying

32. As figures 13-16 in appendix B show, the assumed discount rate makes a big difference in the outcomes. A 10-percent discount rate on average for officers is a fairly typical assumption [24]. Also, lengthening the life span (e.g., from age 79 to age 90) makes little difference to the calculations.

retirement from YOS 30 to some point beyond that. We use a constant 10-percent discount rate and do not allow for a real pay increase beyond YOS 26 or an increase in the percentage of active duty pay used for calculating retired pay. Using these assumptions, we estimate that officers would have to be compensated about \$230,000 to defer retirement to YOS 34 and about \$490,000 to defer retirement to YOS 40 (about \$50,000 to \$60,000 per year of delayed retirement).³³

Compensation needed to keep specialists

The Navy may have to consider offering additional compensation to specialists at least in the YOS 20-30 career range, and possibly before that point. Specialties in such areas as information technology will almost certainly require a bonus structure to retain officers of highest quality for YOS 20-30.

Figure 6 compares military pay with the salary a retired military specialist might receive performing a similar job in the civilian world. Military pay appears to be competitive; it is at the 75th percentile of comparable specialist retirees base income.³⁴ These civilian sector occupations were chosen to align with the types of specialties we expect to see in the future force, or that already exist but are expected to grow.

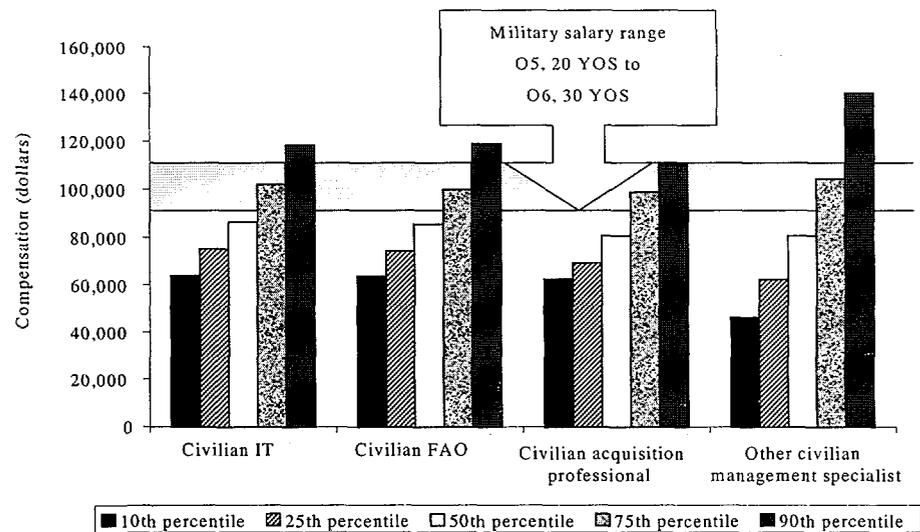
Our concern is that the CPS data represent a limited view of compensation. A more thorough comparison of the entire compensation package, including the value bonuses, stock options, and deferred compensation plans, could indicate a far bigger difference in civilian and military salaries. Most publicly available data sets on compensation

33. Instituting real pay increases beyond 26 YOS or an increase in the percentage of active duty pay used for calculating retired pay amounts (e.g., raising it beyond 75 percent) could be used to compensate for delaying retirement.

34. Figure 6 shows Current Population Survey (CPS) data on full-time wages from 1994 to 1999 (in 2000 dollars) in various occupations for college educated males with 20 to 30 years of experience *plus* the value of military retired pay (calculated for retirement at YOS 20). Civilian full-time wages exclude medical benefits, pension benefits, stock options, or bonuses. We consider this the base income amount for a retired military officer who holds a full-time civilian sector job. Military pay is regular military compensation—basic pay, basic allowance for subsistence, basic allowance for housing, and the tax advantage from untaxed allowances.

do not include such information for specific groups of employees, although proprietary data sets should have this information. It is these differences that will likely suggest a reasonable Navy bonus system for these specialties.

Figure 6. Comparison of base income for specialist active duty and retired officers



Choosing between the specialist and the generalist models

So far, we have discussed issues that would arise in changing the career structure. Here we consider issues in choosing between the specialist and the generalist career models. We can view filling the generalist or the specialist tracks as a market for high-quality field grade officers. The supply side is influenced by factors that affect the officers' desire for a particular career path, while the demand side is influenced by factors that affect whether the Navy will offer a particular career path. The goal is to determine which career structure best satisfies both supply and demand.

The supply of officers: incentives and disincentives in each model

Each career path has advantages and disadvantages for officers. To implement the specialist model, the Navy would be asking high-quality

URL officers to deviate from their warfighting careers. The implications are considerable. First, there are monetary considerations for officers who choose a specialist track, especially if it involves a slower promotion path. As discussed above, slowing promotion to O4 by 3 years will lower the PDV of active duty and retired pay by a minimum of \$60,000 to \$70,000.³⁵ It will probably also be necessary to offer bonuses, especially in the YOS 20-30 portion of the Navy career, to retain high-quality officers in the specialty track.

Some very important non-monetary considerations for the officers may dominate the monetary implications of choosing a specialist track. If promotion is slower, specialist officers may give up rank relative to peers. Although officers can be compensated financially for the slowdown, losing rank relative to peers in the current Navy career path is viewed quite negatively. Specialist officers will also give up command, a key motivator in the current career path.

Officers must weigh these drawbacks against the possibility that a specialist track may be a better occupational fit and may provide better civilian sector alternatives once the military career is over. Specializing in a particular track can be viewed as an investment decision. Officers should consider the length of specialty training and the required payback tours, as well as the effect on civilian opportunities when their Navy careers are over.

Officers deciding on a generalist track face many of the same decisions as for the specialist track. Generalist officers still must consider the financial implications of a longer and possibly slower promoting career. Perhaps the biggest difference is that, if the Navy promotion system can adapt, generalist officers should not have to give up command for the sake of acquiring a subspecialty.

35. Assuming a 10-percent discount rate, slowing promotion by 5 years lowers the PDV of active duty and retired pay by about \$100,000. See appendix B for details.

The demand for officers: what does the Navy really need?

We have indicated that the future officer billet structure will be more senior and will require certain specific skills. To describe the demand for this type of labor fully, the Navy must decide on which characteristics of officers will be most effective in filling this billet structure. That is, what is the optimal mix of warfighting and subspecialization that makes for the most effective leaders?

The generalist model rests on the idea that a more broadly trained officer brings a synergy of experiences to senior billets. A generalist URL officer not only has recent warfighting experience but, with a longer career, also has training and on-the-job experience in a subspecialty. The breadth of experiences may make a generalist more effective later on than a depth of experience in one activity does.

Unfortunately, we do not have data that show how the variety of experiences a worker has affects his or her productivity. However, we can say something about length of experience and productivity. If firms pay according to value added over time, experience/earnings profiles should suggest the path of worker productivity over the course of a career.

Real earnings data for white men with at least 16 years of schooling who work full time imply that productivity grows very quickly in the first part of a career (about 75 percent in the first 10 years, or about 5.7 percent per year) and much more slowly in the latter part of a career (about 30 percent during years 11 through 25, or about 1.7 percent per year). Earnings profiles nearly flatten beyond 25 years of experience.³⁶

36. Average earnings profiles are from CPS March surveys for 1964 through 1987. Reference [25] gives more detail on these average wage profiles. Reference [26] uses CPS data for more recent years (1978-98); the more recent data show the same trend. The CPS earnings data are "top coded" at about \$200,000. That is, earnings in excess of \$200,000 are reported as \$200,000. Because few of the observations are top-coded, we believe that this poses less of a problem for calculating a comparable civilian wage than does the omission of other types of income in the total compensation package.

Figure 7 shows the regular military compensation (RMC) and basic pay structure for due course officers. We assume that these officers have 30-year careers, promote to ranks O4, O5, and O6 at the DOPMA midpoints, and do not reach flag rank. The RMC and the basic pay profiles look similar to the CPS data; both series suggest that, if wages reflect productivity, the gains are greatest in the early part of a career (in part because initial productivity is so low) and rise more slowly until late in the career when the gains are negligible.^{37 38}

Figure 7. Real active duty compensation over a due course career

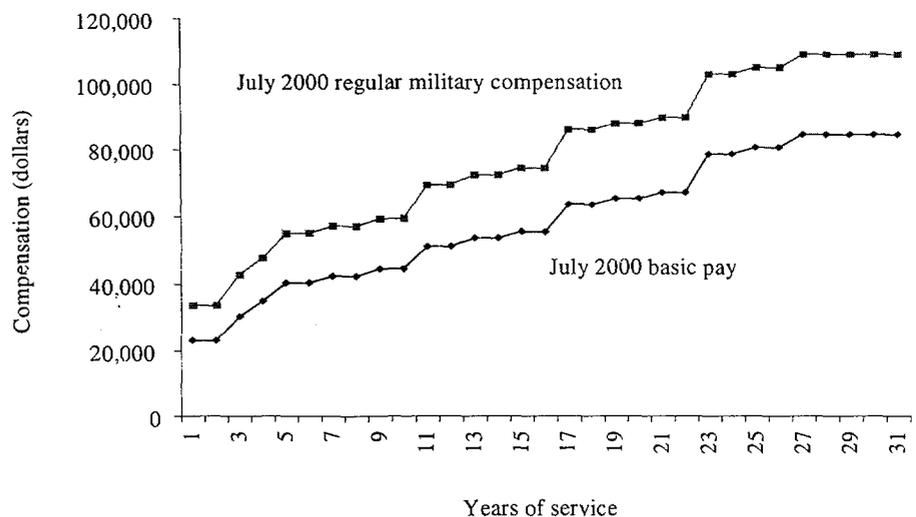


Table 5 summarizes the various wage profiles in and out of the active duty military. We might expect to see faster wage growth in the

37. Data are from the July 2000 Regular Military Compensation table. Regular military compensation includes basic pay, the basic allowance for subsistence, the basic allowance for housing, and the tax advantage from untaxed allowances.

38. Officers do add to their retired pay by staying on active duty beyond YOS 26, even if they do not receive real active duty pay increases. It is also true that the CPS wage data do not capture how retired pay may be changing as the career lengthens.

military for YOS 11-24 than in the civilian sector because the military up-or-out promotion system should be disproportionately excluding the less competitive officers. The overall shape of the wage profile, however, still suggests that productivity growth slows in the latter part of military careers.

Table 5. Summary of wage profile growth rates (percentages)

Wage growth	Experience		
	First 10 years (total)	Years 11-24 (per year)	Years 25-30 (total)
Total growth			
Civilian	75	30	—
RMC	76	77	4
Basic pay	92	82	5
Growth per year			
Civilian	5.7	1.7	—
RMC	5.8	3.9	0.6
Basic pay	6.8	4.1	0.8

Figure 8 shows a hypothetical specialty productivity curve for officers. The specialist and generalist models have slightly different implications. The curve suggests, for example, that lengthening the careers of specialists may not add much to overall effectiveness, even though it would require substantial additional pay to retain the officers beyond the current retirement point.³⁹

By contrast, it is not clear that the effectiveness of generalist officers slows down at the same rate as their specialist counterparts. Figure 9 displays possible specialty productivity paths for a specialist and a generalist. Here we assume that a generalist officer reaches a higher

39. We caution, however, that there may be certain types of specialties for which an additional year of experience—even late in a career—does add significantly to productivity. In particular, certain types of physicians may achieve better outcomes with each additional procedure performed, even in the late stages of a career.

Figure 8. Hypothetical productivity curve for a specialist officer

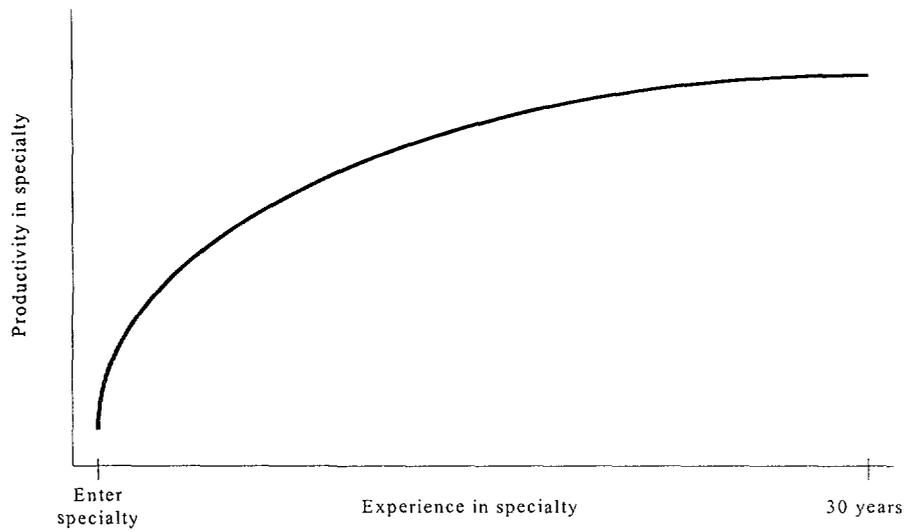
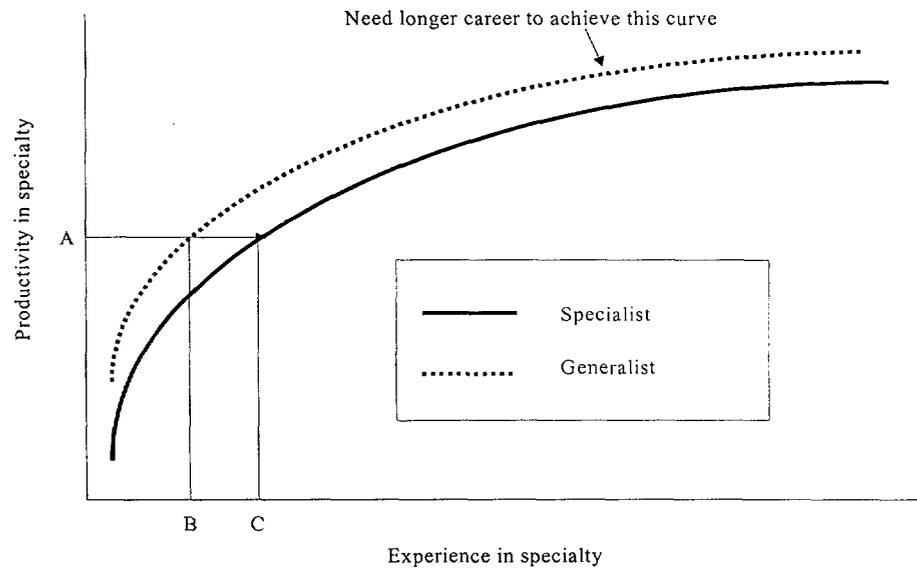


Figure 9. Hypothetical productivity curves: generalist more productive in longer career



productivity level than a specialist officer. This might occur for two reasons, both of which require a longer career to achieve the outcome:

- **A generalist acquires subspecialty experience more slowly, so that the officer is still gaining productivity late in his/her career.** It is possible that the officer could achieve a slightly lower level of productivity for some period early in his/her subspecialty career. An example would be a warfighter with a subspecialty as an FAO who has spent some portion of his/her early field grade career in FAO billets, but not as much as the FAO specialist counterpart.
- **If generalist experiences increase subspecialty productivity, the officer may reach a higher productivity level later in his/her career.** Stated another way, the generalist may accumulate fewer years in the subspecialty, but, because of his/her generalist knowledge, the generalist officer's productivity increases faster than a specialist officer's productivity. In figure 9, the generalist officer achieves productivity level A in only B years, while it takes a specialist officer more years (point C in figure 9) to achieve the same productivity level.

In our FAO example, this would come about if the effectiveness in senior FAO assignments is enhanced by recent warfighting experience. Specialists accumulate more specialty experience, but that may be offset by the interactive effects of specialist and generalist experiences. Likewise, joint or international and interagency billets may also be enhanced by recent warfighting experience. This assumes, however, that the warfighter has acquired some minimum level of training and experience in FAO billets.

Training efficiency is also an important consideration for the Navy and is dependent on the subspecialty productivity arguments described earlier. We show the effects of training costs with a simple model that assumes fixed promotion probabilities for the field grades. The inputs are field grade tour lengths in a subspecialty, the number of tours served in the specialty before the O6 level, and the O6 productivity level, which is how many assignments an O6 can cover. For a given set of inputs, the model yields the number of officers needed to be trained. Table 6 shows comparisons of various types of specialist and generalist models in a subspecialty track that has a relatively flat O4-O6 billet structure.

Table 6. Comparison of training requirements under different officer models

Model	Number of tours at O4-O5	Length of tour (years)	Number of assignments an O6 can cover	Officers needed to be trained at O3 level relative to one specialist officer
Specialist	2	3	2	--
Current generalist (30-year career)	1	2	1	3
Lengthened generalist (34-year career)	2	2	2	1.6
Lengthened generalist (34-year career, longer tour)	2	3	2	1

Table 6 shows the YOS 30 specialist model as the base case. Because the specialists fill only those specified billets (i.e., FAOs) for the bulk of their O4-O6 careers, the return on the training investment is substantial. Most importantly, the number and length of O4 and O5 tours are large enough to allow the O6 specialist officer to cover more than one assignment.

By contrast, a model that limits the career length of a generalist to 30 years compares unfavorably to the specialist model. An officer in this system is likely to serve at most one O4 or O5 subspecialty tour in his/her 30-year career. In addition, the tour will likely be no longer than 2 years. These two limitations lower the return on training investment the Navy can realize. More importantly, fewer and shorter tours limit the generalist officer's productivity as an O6, even in combination with warfighting experience. Under this scenario, three times as many generalists as specialists have to be trained, as the last column of table 6 indicates.

Lengthening the careers of generalists to allow for more or longer tours can mitigate the experience differential at the O6 level and substantially reduce or eliminate the training requirement differential.⁴⁰

40. Table 6 shows the results of the training requirements when the O4-O6 billet structure is relatively flat (the ratio of O4 to O6 billets is low). The results are largely the same as in the case of the more typical steeply shaped pyramid billet structure.

In third row of table 6, we show the training requirements for a 34-year generalist career model where the generalist is as productive in the O6 billets as the specialist counterpart, even though the tour lengths for the generalists are shorter. The underlying assumption is that the broader range of experiences that the generalist officer has, combined with a sufficient level of subspecialty training, yields an officer of the same specialty productivity as a specialist officer. The model shows, however, that 1.6 generalist officers would have to be trained for every specialist because of the shorter generalist tours (2 years in length rather than 3.)

The last row of table 6 shows the elimination of the training differential by allowing generalists on a 34-year career path to acquire as many O4/O5 tours of the same length as their 30-year career specialist counterparts. Although we have not presented such an outcome in table 6, we might argue that the productivity level of the generalist O6 exceeds that of the specialist O6 in this scenario because of the value that recent warfighting skills bring to the job.

Efficiency measures

By combining the minimum additional compensation required by the officers with the needs of the Navy for a more senior billet structure, we can establish some efficiency measures. Both the specialist and generalist models will cost more than the current officer inventory because they require more officers.

To illustrate the potential cost differences in the two models, we assume that generalist officer promotions are slowed and that the generalist but not the specialist career is lengthened. We also assume that the training costs are the same for the two models. That is, by slowing promotions and lengthening the generalist career, along with the additional gains in productivity that a warfighter brings to subspecialty billets, the productivity of the generalist officer in the subspecialty is at least equal to that of the specialist officers. Thus, the number of officers needed to be trained for a certain number of specialty billets is about the same in each model.

Slowing generalist promotions by 3 years could cost about \$70,000 per officer, and lengthening generalist careers costs about \$230,000

(almost \$60,000 per year) per officer to delay retirement for 4 years.⁴¹ The generalist officer inventory will also be more expensive to maintain because it is a more senior force, even within YOS 10-30. Under these assumptions, the generalist model is more expensive than the specialist model. We call the difference the “generalist cost premium.” Most plausible scenarios show that the generalist cost premium ranges from 1 to 10 percent, depending on the responsiveness of officers to the various changes in compensation.

A number of other assumptions determine the size of the generalist cost premium. First, it will decrease if specialists are paid bonuses but generalists are not. (If both groups are paid equivalent bonuses, the generalist cost premium remains the same.) Second, if specialists also face delayed promotions, the generalist cost premium decreases. Third, if flag officer salaries are increased along with those of the generalist officers with the longest careers, the generalist model becomes relatively more expensive and the generalist cost premium will increase.

By how much must *total* generalist productivity exceed specialist productivity to justify the additional cost?

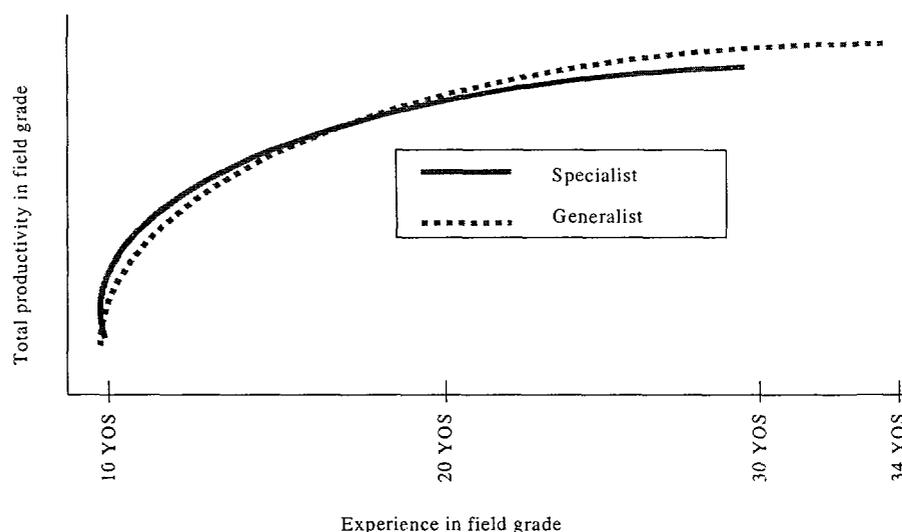
For the generalist model to be cost effective, the productivity of generalist officers *in total* (e.g., both specialty productivity and warfare (nonspecialty) productivity) from YOS 11 to 34 must exceed that of the specialist officers from YOS 11 to 30. And in fact, generalist productivity must exceed specialist productivity by at least as much as the generalist cost premium.

Figure 10 shows hypothetical total product curves for generalist and specialist models. The graph shows that, in total, specialists may be more productive in the first part of the YOS 10-30 window, but generalists may equal and ultimately exceed that productivity later in the window. At approximately YOS 20, specialists will have spent more time than generalists in specialty billets, but the generalists' subspecialty productivity will equal or exceed that of the specialists, even

41. The cost is about \$100,000 per officer to slow promotions by 5 years and about \$490,000 (about \$50,000 per year) per officer to delay retirement by 10 years to 40 YOS.

with less time in specialty billets. After YOS 20, total generalist productivity will exceed that of specialists.⁴²

Figure 10. Hypothetical total productivity curves



Deciding between the two models based on these arguments is difficult because we do not have a direct measure of productivity. However, we can calculate the additional productivity growth per year that each generalist officer needs to achieve to create a “generalist productivity premium” that is at least as high as a given generalist cost premium.⁴³ Recall that the specialist and generalist models add the same number of field grade officers to the baseline inventory, but the generalist inventory is more senior and, therefore, more productive. The question is whether the generalist model can be *sufficiently* more productive to offset its higher cost. Moreover, it is important to know if the additional productivity growth required to offset the cost premium is achievable.

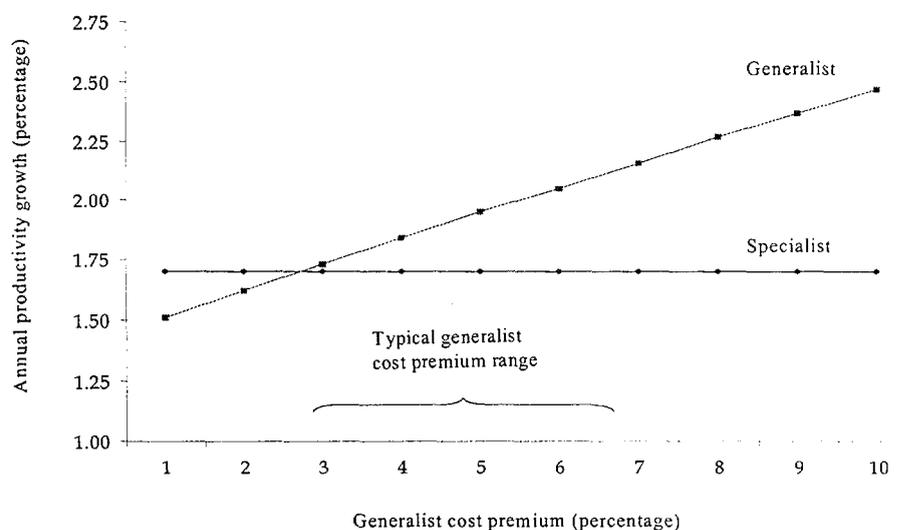
42. Figure 10 depicts the whole career from YOS 10 until the end; figure 9 depicts subspecialty product curves.

43. Reference [27] uses a similar technique.

For example, suppose generalist officers have to achieve annual productivity growth that is twice that of specialist officers in order to offset the generalist cost premium. We would not consider the generalist model to be viable in this case because productivity growth increases of that size are not likely to be achievable. However, there may be a range of additional productivity growth that appears achievable and generates enough additional total product to offset a generalist cost premium.

Figure 11 shows the annual productivity growth that generalist officers need to achieve to exactly offset a range of generalist cost premia. We assume that the annual productivity growth for a specialist officer is 1.7 percent per year for YOS 10 to 24 and is zero for YOS 25 to 30. If generalist costs are 3.5 percent higher than the specialist model, annual productivity growth for a generalist officer must be 1.8 percent per year (about 5 percent higher per year than productivity growth for a specialist officer).

Figure 11. Annual generalist productivity growth that offsets the generalist cost premium

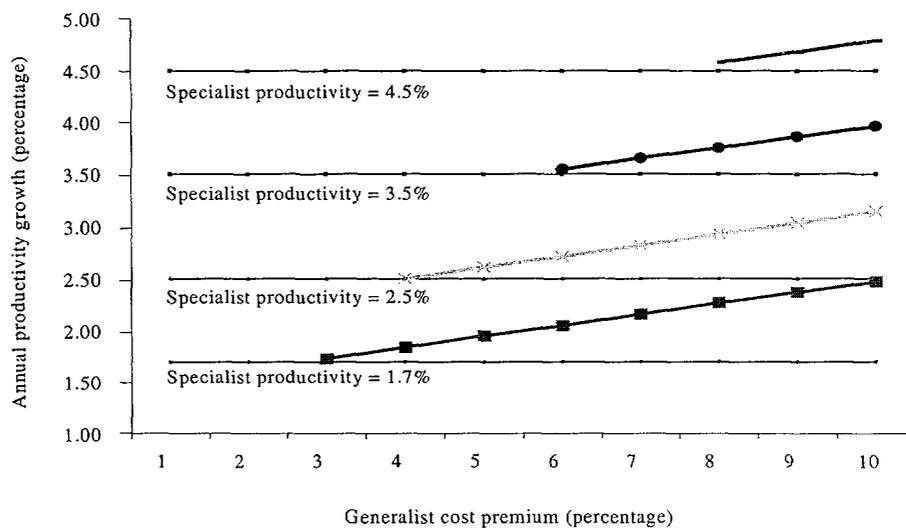


If the generalist cost premium rises to 5 percent, annual productivity growth for a generalist officer must be 1.95 percent per year—almost

15 percent higher per year than a specialist officer's annual productivity growth. Finally, if the generalist cost premium rises to 7 percent, annual productivity growth for a generalist officer must be 2.16 percent per year—more than 27 percent higher than annual productivity growth for a specialist officer.

Figure 12 shows the increase in generalist annual productivity growth needed to offset the cost premium when specialist annual productivity growth is higher than 1.7 percent. This could happen if specialist officers as a group exceed annual productivity growth for white male workers with at least 16 years of education and 10 to 24 years of experience (i.e., the previously cited CPS wage growth.) Clearly, this changes the result; the higher the annual productivity growth of specialist officers, the smaller the annual productivity growth increases generalist officers need to achieve to offset the cost premia.

Figure 12. Annual generalist productivity growth that offsets the generalist cost premium



For example, if specialist productivity growth is 4.5 percent per year, generalists would have to achieve annual productivity growth of only 4.79 percent (about a 6.5-percent increase per year over specialist officers) to offset a generalist cost premium of 10 percent. The reason

is that the cost premia are not dependent on productivity growth. In this analysis, cost premia depend on compensation differentials for officer inventories of different levels of experience; cost premia remain the same no matter how productive senior officers are. Thus, as productivity growth increases for all officers, it takes less incremental productivity growth for generalist officers to offset the same cost premium.

Which of these results is attainable? We cannot be absolutely certain, but the results suggest that the generalist model is a viable alternative to the specialist model for a reasonable range of cost premia and productivity growth paths.

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Implications and recommendations

Summary

We have identified challenges and pressures that are facing today's officer structure, and we have presented alternative ways for the Navy to adapt. To meet the new demands, the Navy could either increase the general knowledge of its officers or carve out additional specialist careers. Billet scrubs will play a part in either strategy, and the resulting billet mix will be a factor in choosing how to alter career structures.

We have shown that the generalist model is likely to cost more than the specialist model, through the cost of delaying promotions, lengthened careers, and maintaining an overall more senior force. We have also shown that under reasonable assumptions, generalist officers could be sufficiently more productive than specialist officers to offset their greater cost. Ultimately, it is most important to describe what the best field grade officer looks like, and particularly what the optimal mix of warfighting and subspecialization is. Without this description, it will be especially difficult to decide whether the generalist officer is really a better fit for the more senior billet structure.

There are legal barriers to adopting alternative models of the officer pyramid. Because both the generalist and the specialist model could conflict with DOPMA, the Navy must decide if efforts to change the law are worthwhile. It has been 20 years since the basis of DOPMA law was enacted. Whichever career path the Navy decides is appropriate to meet the new demands, this is a good time to evaluate whether DOPMA as a management tool needs updating.

There are also potential barriers to longer careers in either the specialist or the generalist model. Some say that physiological factors limit a longer career, and that the premise of "youth and vigor" for the officer corps should remain unchanged. Such standards,

however, were set more than 50 years ago. We stress the importance of understanding how the nature of warfighting has changed over time and, in light of those changes, which physiological factors are truly binding for the officer populations of today and tomorrow.

Finally, allowing for slower promotion in either the generalist or the specialist models will require the Navy to redefine the signalling of due course officers. It needs a mechanism to identify due course officers in slower promoting career paths.

Limitations and areas for future studies

The Navy needs a more precise costing of the various alternatives than what we have provided here. Our paper has highlighted certain cost issues that arise under alternative models, but the treatment has not been exhaustive. In particular, one area for further study is the effect of various types of additional compensation on retention.

In addition, we have not fully defined the role of officer groups other than the active duty URL in meeting the new demand for field grade officers. Specifically, limited duty and warrant officers may play an important role in filling various types of O4 and O5 billets. For example, we can imagine a role for limited duty and warrant officers in a very steeply shaped O4-O6 billet structure for a particular subspecialty (e.g., IT). Using this same logic, however, limited duty and warrant officers are less likely to play a role in a potentially flatter, more funnel-shaped, billet structure (or may not be allowed to fill these billets at all), such as the FAO subspecialty. For any subspecialty, more work needs to be done to describe the need for limited duty and warrant officers.

Appendix A: An exercise

We evaluate the specialist model by allowing the promotion of more O3s to O4 than actually were promoted in FY 1999. To ensure that officers will specialize (and give up a traditional URL career), we assume that pay is increased to the O5 level after a year as an O4. Officer specialists then follow an accelerated pay schedule until completion of service, the longest career being an O6 with 30 YOS.

We simulate two scenarios for creating the generalist force. Both are consistent with an identical number of O4 work-years. In the first, the Navy would keep promotion rates as they are now and extend the time in O4 by 6 months (essentially, delaying the flow point into O5 by 6 months). This creates about a 10-percent increase in O4 work-years above current levels.

To retain officers in this longer O4 career path, we ran a scenario in which the Navy would pay the officers as O5s at the point at which they would have been promoted to O5 under the shorter career path. The officers then continue their due course under the accelerated pay schedule.³⁶ Although this first generalist scenario is not likely to occur because we expect that much of the “generalist” training and job experience will take longer than 6 months, the example acts as a benchmark. It allows us to assume current promotion rates and YOS cohort sizes to achieve a 10-percent increase in O4–O6 work-years, while minimizing violations of DOPMA constraints.

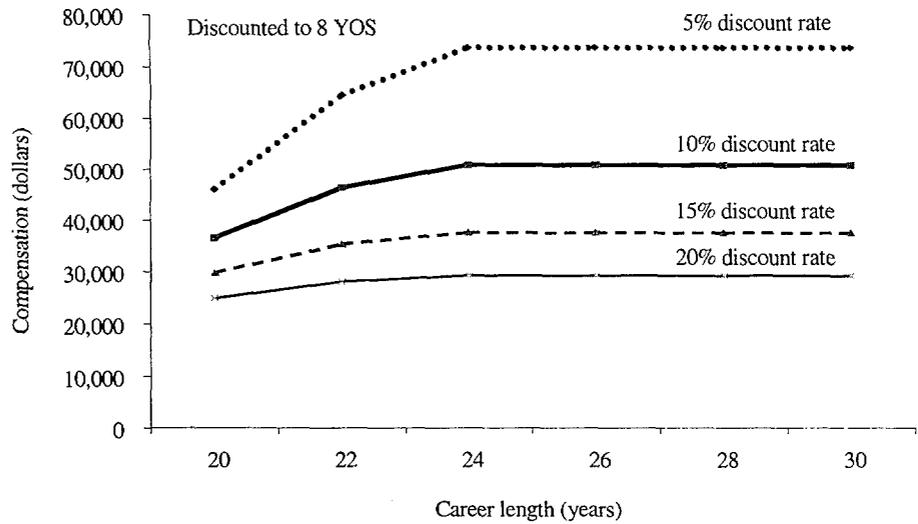
In a more plausible generalist scenario, the Navy would extend the normal time in O4 by 1.5 years, in O5 by 1.5 years, and in O6 by 1 year. This produces a due course career of 34 years and would allow more time for generalist training and experience. This scenario requires lowering promotion rates to O4 because extending the current O4 YOS cohorts by 1.5 years increases total O4 work-years well in excess

36. Note that our costs do not include an increase in the pay of flag officers.

of 10 percent. The result is more but smaller YOS cohorts in O4 (as well as in O5 and O6). This allows more time for the types of training and job experience needed for a more senior URL billet structure. Table 3 in the text displays the results.

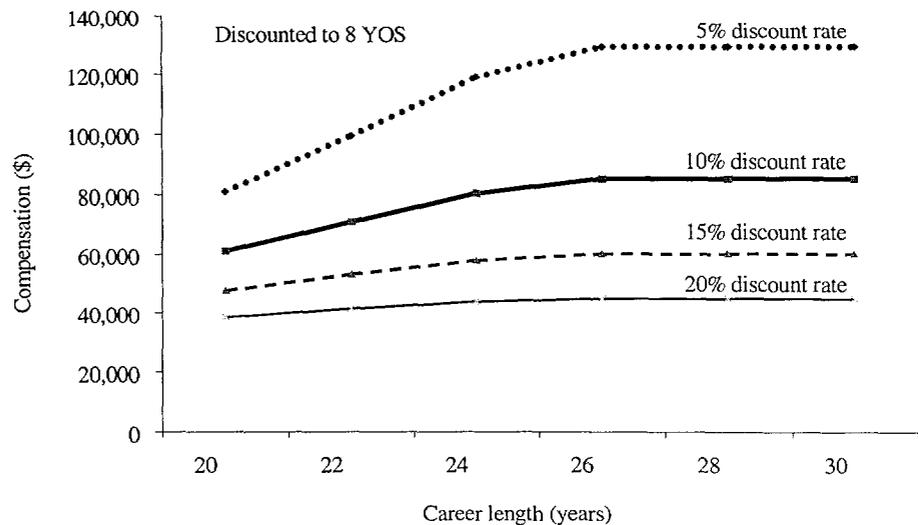
Appendix B: Additional compensation calculations

Figure 13. Active duty compensation for 3-year promotion window^a



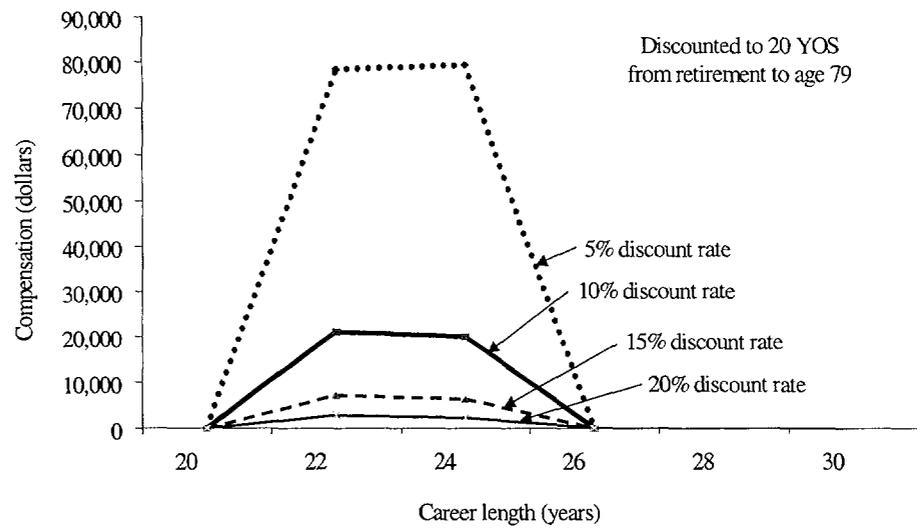
a. Promotion is -1 to +2 years relative to DOPMA midpoints.

Figure 14. Active duty compensation for 5-year promotion window^a



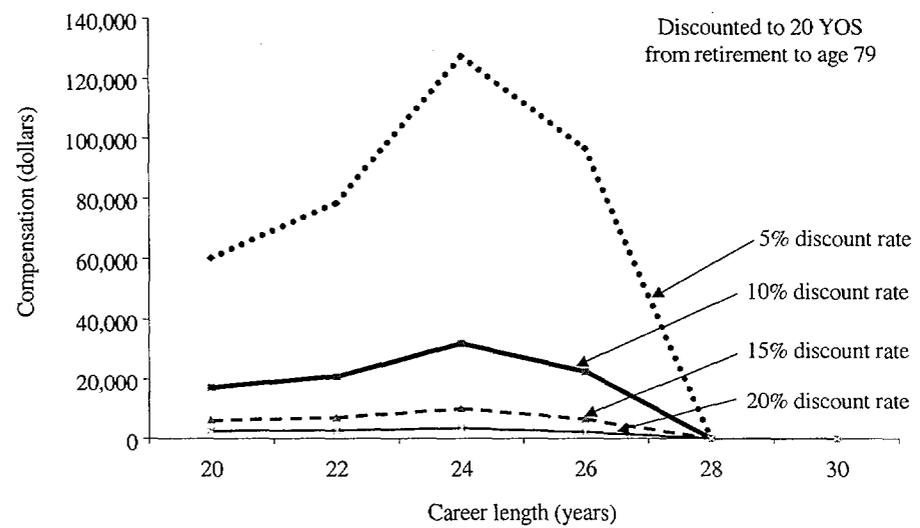
a. Promotion is -1 to +4 years relative to DOPMA midpoints.

Figure 15. Retired pay compensation for 3-year promotion window^a



a. Promotion was -1 to +2 years relative to DOPMA midpoints.

Figure 16. Retired pay compensation for 5-year promotion window^a



a. Promotion was -1 to +4 years relative to DOPMA midpoints.

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