Improving Reenlistment Incentives and Processes
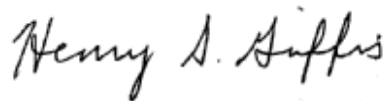
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Executive summary

The Navy is intent on maintaining and improving retention of its most qualified Sailors. As part of this effort, the Director, Military Personnel Plans and Policy Division (N13) requested an analytical review of the reenlistment program. The objective of this study is to evaluate the effectiveness of the current process and to identify changes that would result in a more responsive and cost-effective system.[1]

Goals and criteria

Before examining particular policies, it is useful to specify some overall features that would define a good reenlistment system. Goals that an ideal system should meet include the ability to increase or decrease rates when they are not producing the right number of people relative to requirements. Also, the system should ensure that the highest quality people are allowed to reenlist and transfer, and it should have a mechanism for conversions. Finally, the program's benefits should be balanced against its costs.

In addition to these goals, we defined more detailed criteria for judging a reenlistment program. The first is that policies should be flexible and targeted. Second, quality should be taken into account so that the most qualified Sailors are the first considered for reenlistment and/or conversion. Third, different policies should be aligned so that as a whole they meet the goals of a reenlistment program.

Another point is that supply- and demand-based reenlistment structures should be balanced against centrally controlled policies. Compensation systems should provide incentives for members to make

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1. Although this paper focuses on enlisted reenlistment, some of the observations and conclusions might be relevant for officers since retention of quality Servicemembers is also a concern in the officer ranks.

voluntary choices that match the Services' desires. One possible drawback of market-based incentives, however, is that policies may not provide a sufficient screen to ensure that low performers leave the Navy. This drawback may be countered by a centralized policy in which the Navy collects data and then decides on outcomes. In any case, the benefits of any program should be weighed against its cost.

Other criteria are that policies should not only ensure that overall endstrength goals are met but also influence skill and paygrade distributions. Finally, a reenlistment system should be judged by whether it is producing the required results as opposed to being judged by outside factors, such as whether military and civilian wages are equal.

Improving the Perform-To-Serve program

Perform To Serve (PTS) is a recently adopted policy intended to improve the quality of reenlistments and level manning. The current PTS program has several problems with design and implementation. One problem is that the algorithm used to measure quality is cumbersome, and the limited evidence indicates that few people have been denied reenlistment. We suggest some improvements that might make the system more effective.

Although the current PTS program has flaws, we have argued that the Navy needs a means to get poorer performers out of the force before they reach mid-grade. If PTS is improved, it may be able to help do this. Some possible improvements to the PTS policy include applying a better quality measure over a wider time frame and reference population. Currently, Sailors are compared only with others in the same occupation who applied in the same month.

Conclusions and recommendations

We examined a variety of nonmonetary and monetary reenlistment policies to assess whether they are aligned with the goals and criteria for a good reelistment program. Some of our conclusions follow:

- Reenlistment policies may be dwarfed by the high proportion of military compensation that is devoted to across-the-board

pays. Of particular concern is the fact that retirement pay dominates the effect of any other policy on the retention of mid-grade personnel. Because of this, the Navy needs some way to separate poor performers before they reach this point.

- The Selective Reenlistment Bonus is an effective, flexible, cost-effective tool for targeting reenlistment incentives by occupation. The drawback is that Navy occupational pay differentials remain smaller than those in the civilian sector.

- Few reenlistment policy tools facilitate maintaining the highest quality force. The main tool, the promotion system, is limited by its share of total pay and because it does not consider every factor that reflects quality. So far, the PTS system has led to few people being denied reenlistment. All methods of retaining the best people require a good measure of quality.

- Expanding the use of Variable Separation Pay (VSP) may provide a way to counteract the strong pull of the retirement system. VSP is flexible and can be targeted by skill and years of service. A quality dimension could potentially be added as well.

- For the most part, reenlistment policies do not take into account the full costs of reenlistment or conversion.

Our recommendations include the following:

- Push for pay increases being devoted to incentive pays.

- Install policies that can influence reenlistment rates dominated by retirement pays.

- Use a time-to-promotion quality measure.

- Incorporate other pays and use them to develop an integrated reenlistment program.

Finally, VSP, a restructured PTS, new quality measures, and any new incentive pay will be relatively new policies. Therefore, they should be closely monitored and assessed to see if they have the proper effects, how large those effects are, and if any adverse results are shown.

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Introduction

The Navy is intent on maintaining and improving retention of its most qualified Sailors.[2] As part of this effort, the Director, Military Personnel Plans and Policy Division (N13) requested an analytical review of the current reenlistment program. The objective of this study is to evaluate the effectiveness of the current process and to identify changes that would result in a more responsive and cost-effective system. The study will also identify alternatives for better integrating specific reenlistment policies with other policies that influence reenlistment, such as retirement pay, incentives to accept undesirable assignments, and policies to assist transitions out of the force.[3] This study focuses on enlisted reenlistment. Even so, some of the observations and conclusions of this study are also relevant to officers because retaining a high-quality force is also of concern in the officer ranks.

Reenlistment policies can be defined as any policy that works to either increase or decrease reenlistment rates. Some are explicitly designed for reenlistment. The prime example of this is the Selective Reenlistment Bonus. Other policies also affect reenlistment, even though they were not designed specifically for that purpose. For example, the main purpose of sea pays is to increase the manning of sea billets, but they also provide incentives to stay in the Navy.

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2. *Reenlistment* is the rate at which Sailors reaching the end of their enlistment contracts decide to stay in the Navy. *Retention* is a more general term that includes both reenlistment rate and the rate at which Sailors who are not at reenlistment points stay in the Navy. The difference between the two is the *attrition* rate. Policies that increase or decrease reenlistment, therefore, must by definition affect retention rates.

3. Another paper in this study gives a more detailed analysis of the recent Perform-To-Serve (PTS) policy [1].

Why are reenlistment/retention policies important?

The size of the force (endstrength), the relative mix of junior and senior personnel (shape), the quality of Sailors, and the number of Sailors in different occupations are primarily determined by enlistment and reenlistment policies. All of these factors—size, shape, quality, and occupational distribution—affect readiness. Since the Navy's goal is to be ready to meet its mission, enlistment and retention policies are essential parts of manpower policy.

The importance of reenlistment policies in general and reenlistment bonuses in particular is reflected in the following quotation from one of the seminal academic papers on reenlistment rates [2]:

> Military retention is a major topic in the economics of military manpower. The military controls the size of its force and the relative mix of senior and junior personnel not only by controlling the rate of new enlistments but also by altering compensation incentives for reenlistment after certain fixed terms. Reenlistment bonuses are often offered explicitly for this purpose since they are a more flexible method of altering reenlistment incentives than changes in basic military pay or retirement benefits.

Issues to consider in designing a reenlistment program

This paper considers several issues:

- How well do existing reenlistment policies work?

- What other policies or changes to existing policies might increase the Navy's ability to retain high-quality personnel?

- How do policies not specifically designed for reenlistment interact with reenlistment policies, and how can these various policies be aligned to meet the Navy's goals?

- What role should costs play in designing reenlistment policies that will result in increasing personnel quality?

We will analyze existing Navy reenlistment incentives and processes, as well as possible alternatives, using the framework outlined. This analysis will include material from the policy and economics

literature, subject matter experts, and the practices of private industry and other Services.

Incorporating quality

Broadly speaking, two types of policies could be used to improve the quality of Sailors who reenlist. The first would be to offer some sort of incentive pay that varies by quality, giving the best Sailors an inducement to stay. The second would be to have a centralized system to which Sailors apply and reenlistments are rationed by quality.

Both types of policies have advantages and disadvantages. On one hand, the incentive pay may induce the best Sailors to stay but not provide a sufficient mechanism to get lower performers to leave the Navy. On the other hand, the application policies do not provide an incentive for the best Sailors to stay but may be a better means of cutting lower performers out of the Navy. Also, there is likely a cost difference because incentive pays should require less overhead than application-based systems.

In either case, some measure of Sailors' quality is needed. We will investigate current metrics and assess whether they are capable of adequately distinguishing the Sailors that the Navy wishes to retain and those it wishes to separate. If not, what mix of information would yield a defensible definition of quality?

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Designing reenlistment incentives and processes: Goals and criteria

Before examining particular policies, it is useful to specify some overall features that would define a good reenlistment system. It is important to notice, however, that more than one policy will be needed in this system because no single policy can meet all goals for a good reenlistment program.

Later we discuss in more detail the desired structure and goals of a reenlistment program. In short, though, a good reenlistment system should be able to:

- Decrease reenlistments when quit rates are low and increase reenlistments when quit rates are high[4]

- Ensure that the highest quality people are allowed to reenlist and transfer, taking into account how to measure quality, the benefit of increased "quality," and the cost of implementation

- Manage conversions so that reenlistments can shift Sailors from oversubscribed to undersubscribed ratings

- Balance the program's benefit with the costs of increasing or decreasing quit rates, along with improving fit by facilitating conversion.

Criteria for a good reenlistment system

To accomplish these goals for a good reenlistment system, we start out with the following observations regarding the specific policies.

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4. Quit rates are too low if they produce more people than are required to fit the needs of the Navy and too high if they produce fewer people than required.

Reenlistment policies should be flexible and targeted

The optimal reenlistment policy should be *flexible* so that it can be easily modified as conditions change and *targeted* so that it influences the people whom the Navy most wishes to reenlist. Sometimes Sailors' desire to reenlist is not compatible with the levels of reenlistment needed to maintain the force. It should be easy to adjust incentives since reenlistment rates can shift quickly. Monetary incentives usually are easiest to adjust quickly. Ideally, the Navy would want a policy that is flexible enough to address times of both low and high quit rates.

Reenlistment policies should be as closely targeted as possible to the people that the Navy wishes to keep. If a policy is less targeted, it will be less cost-effective because it will provide pay to people who would have reenlisted anyway or to people whom the Navy does not wish to provide an incentive to reenlist.

Quality should be taken into account

Ideally, the most qualified Sailors—however quality is measured—should be the first considered for reenlistment and for converting ratings. Currently, the only consistent reward for superior performance is the promotion process, which is meant to identify superior performers and reward them by advancement to higher ranks.

It is difficult to measure the quality of Sailors and thus to decide who gets to reenlist or convert, or is denied either option. Problems with defining and measuring quality are discussed in a later section on measuring quality.

Different policies should be aligned to meet the goals of a reenlistment program

Since a reenlistment program has several different goals, it is unlikely that one policy will be sufficient to meet all the goals. Having more than one policy, however, requires that the goal (or goals) of each policy be clearly identified. Once this is done, it will be easier to create a program in which incentives are aligned with the needs of decision-makers. Also, it will minimize the extent to which policies are working at cross purposes.

Supply- and demand-based reenlistment structures should be balanced against centrally controlled policies

Compensation systems should, to the greatest extent possible, provide incentives for members to make voluntary choices that match what the Services desire. There are certain decisions in which members may value having a choice and for which the military has no reason related to its mission to deny choice. Furthermore, direct competition with the private sector has increased the need to provide opportunities for Sailors to exercise choice. One possible drawback of market-based incentives, however, is that policies may not provide a sufficient screen to ensure that low performers leave the Navy.

Unless prices of different options are set correctly, however, Sailors may choose options that are not optimal for the Navy. In this case, a centralized policy may be necessary in which the Navy collects information and decides outcomes based on this information. A problem with this system is that, although it may screen out lower performers, it does not provide any incentive for high performers to stay. Also, it is necessary in this case that the costs and benefits of a centralized reenlistment program be balanced against the outcomes of a market-based system. Centrally managed programs tend to have high costs, so they need to have high benefits relative to systems in which members make free choices given market prices.

A program that is centrally managed, rather than being a supply- and demand-based structure, means that decisions are made at a level once removed from what is known about a Sailor at a lower level of authority. In other words, people with the greatest ability to know about a Sailor's quality are not the primary influence on who gets to reenlist. In market-based policies, agents with the best information about a Sailor's ability make the reenlistment decisions.

Policies should influence both the *fill* and *fit* of the force

In relation to reenlistment, the Navy uses the terms *fill* and *fit*. The Navy as a whole is considered to be full if its inventory is equal to its endstrength. Even in this case, there may be, or probably are, problems with fit. A good fit means that the available people match up well to the required billets. In other words, mismatches by skill or

paygrade should be minimized. A good reenlistment system, then, must address problems of fit as well as fill.

To correct imbalances by paygrade, the system would attempt to speed up or slow down promotions. To correct imbalances by skill (rating and/or NEC for enlisted personnel), the system would have two possible remedies. The first would be to use bonuses that result in different quit rates in different occupations. The second would be to adopt a system that explicitly attempts to move people from under-manned to overmanned skills. Note, however, that the reenlistment system does not have to rely on just one policy. That is, not all policies will address only one goal.

Policies should have a good return on investment (ROI)

The issue here is to trade off the number, quality, and occupational mix of reenlistments against the cost of a program. A program's ROI depends not only on cost but on how many and what kinds of Sailors change their reenlistment decision because of the policy. On one hand, some programs have such high costs that to be cost-effective they must get many people to reenlist (or choose not to reenlist), switch occupations, or induce more high performers to reenlist. On the other hand, programs that are less costly, but result in the same or more high-quality people reenlisting or changing rating and more low-quality people leaving, should have a higher ROI.

Reenlistment systems should be "result based"

Low reenlistment rates should lead to more money being directed at that problem with the money being targeted as finely as possible. One must recognize, however, that there are costs of increasing the reen-listment rate. These include not only the marginal cost of extra pay, but also having a more stagnant workforce so that chances for growth and advancement are lower. Thus, the optimal quit rate is not zero, and it varies by community.

Reenlistment programs that are not based on results include those that attempt to infer where problems will occur on the basis of differ-entials between the pay of Navy personnel and their civilian counter-parts. First of all, both Navy and civilian pay are measured

imperfectly. Second, due to other factors, it is not always the case that skills with greater measured pay differential will have more pronounced reenlistment differences. It is only when quit rates become out of line with what is necessary to maintain the desired fill, fit, and quality of the force that incentives should be adjusted.

Tracking reenlistment or quit rates and building a system that balances their costs and benefits are essential parts of good reenlistment policy.[5]

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5. Reference [3] describes a quit-rate system as a basis for evaluating compensation in the context of the employee turnover in the Federal Government. This study also provides comparisons with the private sector.

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Policies that are examined

The following are the major policies we will examine as part of the Navy's reenlistment system and the categories to which we assign them:

- Nonmonetary policies

  — The Perform-To-Serve (PTS) program

  — High-Year-Tenure (HYT) limits

  — Access to favorable assignments

- Compensation policies

  — Those explicitly designed for retention

    – Selected Reenlistment Bonuses (SRBs)

    – Variable Separation Pay (VSP)

  — Other policies that influence retention

    – Basic pay, Basic Allowance for Housing (BAH), and Basic Allowance for Subsistence (BAS)

    – Retirement pays

    – Thrift Savings Plan (TSP) and TSP matching

    – Distribution incentive pays

    – Selected Reserve (SELRES) affiliation bonus.

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Nonmonetary factors and reenlistment policies

Many of the Navy's reenlistment incentives and processes are based on compensation. There are, of course, many non-compensation-related elements in a Servicemember's decision to stay in or leave the Navy. Taste for Navy service, quality of life, and quality-of-work issues all influence the decision to stay or leave, but many of these are hard to analyze or play into the total amount of compensation. We can, however, look at some explicit reenlistment and conversion policies, such as the PTS program, HYT rules, and access to desirable assignment, such as educational opportunities. In this section, we discuss these nonmonetary policies—specifically, their definitions and how they might influence reenlistments.

The Perform-To-Serve program[6]

Implemented in March 2003, PTS is a centrally controlled, application-driven reenlistment system. Its goals are to shape the force by moving Sailors from overmanned to undermanned ratings and to manage the quality of those who reenlist by controlling the authority for reenlistment. In other words, based on the needs of the Navy, only the best Sailors are approved for reenlistment into select ratings.

The process begins with a Sailor submitting his or her application for reenlistment up to 12 to 15 months before the End of Active Obligated Service (EAOS). Regardless of reenlistment intentions, every first-term Sailor—with the reenlistment recommendation of his or her Commanding Officer (CO)—must submit a PTS application.[7]

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6. This section draws heavily from [1].

7. The initial phase of PTS involved only first-term Sailors in CREO 3 (Career Reenlistment Objective 3) ratings. In December 2003, PTS was expanded to include first-term Sailors in CREO 2 ratings with an EAOS of February 2004 and beyond. As of October 2005, all first-term Sailors with an EOAS of February 2006 and beyond must submit applications.

The PTS application collects several pieces of information about the Sailor, such as whether he/she has been selected for advancement to the next paygrade and his/her promotion recommendation on the last two evaluations. The majority of this information is used in the algorithm that serves as the quality cut in the reenlistment.

In their applications, Sailors choose one of three reenlistment options based on their desires and qualifications. Sailors may opt to apply for reenlistment-in-rate, reenlistment-in-rate or convert, or convert only. Then, Sailors are compared against all other eligible applicants within the same Enlisted Manning Community (EMC) in a given month. After submitting an application, the Sailor enters a stacking algorithm that includes a measure of quality. To be considered in the stacking process, the Sailor must receive his or her CO's recommendation for reenlistment. Then, they are ranked competitively based on the following criteria:

- Sailors in the highest paygrades

- Sailors selected for advancement but not yet advanced

- Sailors who passed their last advancement exam but were not advanced

- Sailors who hold critical NECs

- The Sailor's last two promotion recommendations.

There are five possible outcomes for Sailors in the stacking algorithm each month:[8]

1. Approval to reenlist-in-rate

2. Tentative approval to convert to a new rating

3. Notice to reapply within 12 months of their soft EAOS

4. Notice of rollover status

5. Notice to separate at EAOS.

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8. We are omitting General Detail (GENDETs) from this discussion since the PTS process for them works differently.

Those applicants who opted to reenlist in their current rating or to convert are first considered for in-rate reenlistment. If not approved for reenlistment in their current rating, they are considered for transfer to one of the three choices. If no quotas are available for any of these conversion choices, they may reapply later or have their application rolled over for review the next month. Applications are considered until they are approved for in-rate reenlistment or for a conversion or until 6 months before their EAOS. Once the Sailor is within 6 months of EAOS and still has not been chosen for in-rate reenlistment or conversion, the Sailor is told to separate at EAOS.

High-Year-Tenure limits

The Navy's enlisted HYT program is essentially an "up-or-out" program that does not allow Sailors to stay in the Navy if they haven't been promoted to a certain paygrade by the specified years of service (YOS). Table 1 shows the current HYT rules. This means, for example, that someone who is an E4 will not be allowed to stay in the Navy past 8 YOS.

Table 1.   HYT limits

Paygrade	YOS
E4	8
E5	14
E6	20
E7	24
E8	26
E9	30

The HYT policy is a retention policy in that it limits the retention of people based on paygrade at YOS. It mostly works as a negative incentive to make lower quality people leave the Navy. However, it can encourage higher quality people to reenlist because they will have faster promotion opportunities.

The stated purpose of the HYT program is to ensure healthy promotion opportunity for rising career-minded Sailors. By making Sailors

who have been extremely slow in earning promotions leave, it opens up spaces for people who are rising through the ranks more quickly. This policy is obviously a quality screen, in which quality is defined by speed of promotion. The problem with HYT is that it screens relatively few people at E4 and E5 because so few people advance slowly enough to push up against these limits. Figure 1 shows, for paygrades E4 through E6, the distribution of people by YOS and how many hit the HYT limit. It demonstrates that E4 and E5 populations fall dramatically even before the YOS at which HYT limits are effective.

Figure 1.   HYT limits on percentage of E4–E6 personnel based on YOS[a]
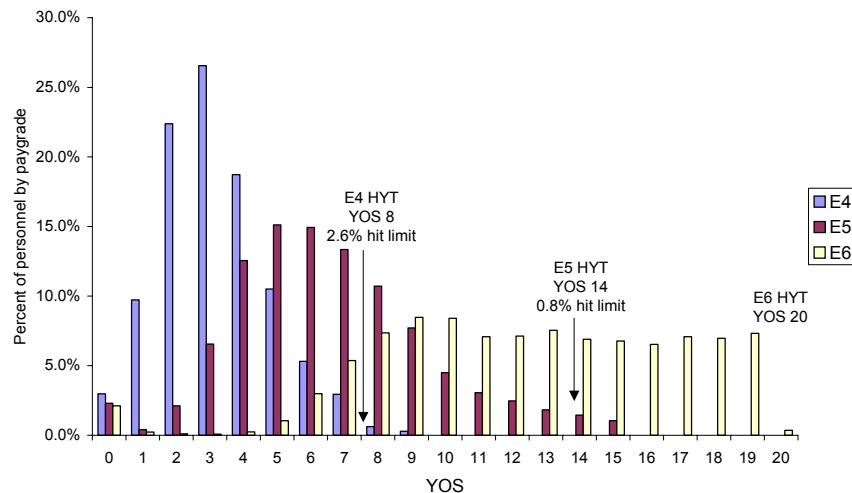
a. The percentage of people hitting the E4 HYT limit is defined as people in YOS 7 minus people in YOS 8 plus people in YOS 8 minus people in YOS 9. A similar definition was used for people hitting the E5 HYT limit. These data come from the September 2006 Enlisted Master Record (EMR).

HYT limits also interact with the retention rates encouraged by the retirement policy, which we will describe in more detail later. In essence, the retirement policy provides a strong pull for people with 10 to 12 years of service to stay in the Navy until they qualify for retirement at year 20. The HYT rule prohibits people from reaching 20 years if they have not reached E4 by 8 years or E5 by 14 years. The figure also illustrates that the percentage of people in paygrade E6 is

virtually constant from YOS 11 on, until it drops dramatically at YOS 20. The constant populations reflect the close-to-100-percent retention rates after people reach YOS 11. Furthermore, the drop at YOS 20 cannot be attributed to the HYT limit as much as people leaving when they are eligible for retirement.

Access to favorable assignments

The Navy has a variety of billets that it must fill to the greatest extent possible with its inventory of Sailors. To get billets filled with the right people, it will invariably be necessary for some people to be "ordered" to take an assignment that they would not chose on their own. In some cases, the Navy tries to compensate people for taking hard-to-fill billets. These compensation policies will be discussed in the section on monetary policies. This approach can be complemented by minimizing the extent of mismatches between peoples' desires and the assignments they get. Increasing the quality of assignments or allowing more choice of assignments can be powerful tools in a reenlistment program.

Many of these incentives can be given at the Enlisted Community Manager's (ECM's) discretion and are more likely to be offered to people whom the Navy most wants to retain. In this way, they operate as an informal quality screen.

Educational opportunity

The Navy College Program (NCP) provides opportunities to Sailors to earn college degrees by providing academic credit for Navy training, work experience, and off-duty education. The NCP mission is to enable Sailors to obtain a college degree while on active duty. The NCP combines many components of Voluntary Education (VOLED), integrating them into a single system. NCP supports the incorporation of education into each Sailor's career as part of life-long learning by providing a number of opportunities for Sailors to pursue their educational goals during their off-duty time. The Services also have a Tuition Assistance (TA) program that helps Servicemembers pay for their education.

Some assignments include explicit time off for pursuing voluntary education, while others—by virtue of their location and type—allow for more opportunities to use the VOLED and TA programs. Some reenlistment contracts include guarantees of schooling. Since many recruits cite educational opportunities as a major reason for joining the Services, it stands to reason that a tour after the reenlistment point that offers more ways to improve their educational status will improve reenlistment rates. In addition, the Navy encourages voluntary education because investment in education is seen to be an investment in readiness.

Other assignment factors

In addition to assignments that improve access to educational opportunities, there are many other aspects of assignments that make them more (less) desirable and thus increase (decrease) the probability that someone will reenlist.

Choice of follow-on tour

As an incentive to reenlist, the ECMs may offer the Sailor a choice of follow-on assignments. Allowing the member some choice in determining his/her future assignment will increase satisfaction and hence encourage reenlistments.

Geographical choice (homebasing)

Geographical choice, or homebasing, can be seen as a subset of the choice of a follow-on tour. In this policy, it would be made more feasible for a Sailor to have future assignments in the same location. This would increase family stability and the Sailor's satisfaction with Navy life and hence increase reenlistments.

Length of new contract

Sometimes reenlistment is encouraged by offering selected Sailors shorter obligated terms for the next enlistment. For example, a 2-year rather than 4-year additional commitment may encourage some of the selected Sailors to reenlist. Most of the factors controlling contract length are based on factors other than offering a reenlistment incentive. Within these limits, however, there is sometimes some discretion in setting contract lengths.

Military compensation and reenlistment policies

In the previous section, we discussed some of the non-compensation-related policies that influence retention. Many of the Navy's reenlistment incentives and processes, however, are based on compensation. In this section, we turn to monetary incentives, which are the main focus of this paper.

Relatively few policies are designed specifically to influence reenlistment, but many policies with different explicit intents also have major implications for reenlistment rates. In fact, other than purely enlistment pays, almost every policy that increases (decreases) the value of military compensation will increase (decrease) reenlistments. That is because all represent a level of pay, and any change in pay will influence reenlistment rates. This effect will be high for policies that are a major component of compensation. For some pays that are a small component of total compensation or that are paid to only a small fraction of Sailors, the effect will be small for the average Sailor.

The structure of military compensation

Before discussing individual pays that affect reenlistment in some way, it is useful to have an overall view of military compensation.[9] The largest component of military pay is basic pay, which varies by rank and length of service, with separate tables for officers, warrant officers, and enlisted. Basic pay is the principal form of compensation provided to people in exchange for their military service. The next largest are the Basic Allowances for Housing (BAH) and for Subsistence

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9. Reference [4] describes the basic structure of the military compensation system and the major compensation tools. It contains an excellent history and description of each of the existing pays. For an online version, see http://www.loc.gov/rr/frd/pdf-files/Military_Comp.pdf.

(BAS), which vary by rank, length of service, dependency status, and location. The final large components are retirement pay and the health care benefit. These components, plus Social Security payments, accounted for 87 percent of the Department of the Navy (DoN) military personnel budget in FY 2004.[10] Most of this 87 percent of compensation affects reenlistment sometimes strongly but usually not specifically.

The remaining 13 percent of compensation includes a complex collection of enlistment and continuation bonuses, special and incentive pays, allowances, quality-of-life programs, and other compensation tools. In this set of pays, a subset is either designed as a reenlistment tool or affects reenlistment indirectly.[11]

Because so many pays influence reenlistment rates, in this section we will describe how these pays work and how well they are currently aligned with the goals and criteria for a good reenlistment program. We will start with the pays that make up the greatest fraction of compensation and then turn to bonuses and special and incentive pays.

The larger components of pay

Basic pay, BAH, and BAS

The level of basic pay certainly influences why Sailors remain in the Navy because it is such a large portion of total compensation. Some recent changes to the pay table, in fact, were targeted at the middle ranks since that was where it was perceived that manning levels were worst. This change was meant to increase manning at those levels, and one way was by lowering quit rates in this group.[12] One problem

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10. The 87-percent figure is based on appropriations in the MilPers account from the FY 2006 Presidential Budget. We used the 2004 numbers, which are the most recent actual numbers available. The percentage combines Navy and Marine Corps, but it is the same for each Service.

11. Reference [5] contains a more comprehensive list of pays as well as assessments of how well some of these pays work and suggestions for improvement.

12. Arguments for changing the pay tables in this way are presented in [6].

with using basic pay as a retention tool is that it is inflexible; it takes an act of Congress to change. A second problem is that it is not specifically designed to change reenlistment rates and cannot be targeted at specific occupations, quality levels, or other factors.

One positive aspect of basic pay is that the pay tables and promotion system do provide a quality incentive. To the extent that the best people receive promotions more quickly, they will receive higher pay and thus be more likely to reenlist. This effect is reinforced by BAH and BAS, which also vary by rank.

The other components of the large pays that make up the 87 percent of pay also influence retention. To the extent that they contribute to making the overall military compensation more competitive than civilian compensation packages, they will increase reenlistment. The problem is that these pays may not be precisely targeted at the populations that the Navy wants most to influence. For example, BAH varies by dependency status but not by occupation. Suppose the Navy does not care to influence the mix of dependency statuses, but does want to encourage Sailors in particular occupations to stay (or leave). In this case, BAH is not the proper tool.

Retirement pay

The current military retirement system dates back to 1947, when Congress implemented a common 20-year system for all the Services and for officers and enlisted personnel alike.[13] A report by the 1948 Advisory Commission on Service Pay (the Hook Commission) shows that the system was controversial from the start. Since the advent of the All-Volunteer Force (AVF), Department of Defense (DoD) commissions, study groups, and researchers have recommended overhaul of the system.

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13. Reference [4] contains general background on retirement pay. See [7] for a discussion of the history of the retirement system and reform attempts, its current structure, and theoretical and empirical research regarding many aspects of its feasibility and how to improve it. References [8], [9], and [10] also discuss the military retirement system, criticisms, and reform attempts. In addition, [5] provides a summary of the literature on the retirement system.

The military retirement pay has some unique features compared with civil-service and private-sector plans. These other plans typically have defined-contribution rather than defined-benefit plans, offer earlier vesting, do not start paying benefits at 20 years of service, and are less generous. The pay is not an annuity designed to be paid upon reaching old age; instead, it is a benefit that begins when the person leaves the Service. This means that in the extreme case of entering at age 18 and serving 20 years, such a person would qualify for retirement benefits at 38 years of age.

A striking feature of the current retirement pay system is its role in retaining personnel between 10 and 20 years of service. The retirement system has an increasingly strong pull effect on personnel in the mid-career range. After the 20-year point, however, the retirement system has a very strong "push" effect, making retention beyond this point very difficult.

The consequences of the cliff-vesting structure of military retirement pay on retention cannot be overstated. The military retirement package is the reason that, of those who reach around 10 years of service, most stay until 20 YOS. Very few choose to leave as they approach retirement eligibility, and most remain with the expectation of entitlement to full retirement benefits [8]. The Services accommodate these expectations and are reluctant to involuntarily separate senior personnel. The current structure of benefits is also the reason many enlisted personnel leave within a year of reaching 20 years.

As a whole, then, the unique features of the current retirement system dominate reenlistment patterns from YOS 10 through 30. The literature is clear that this inflexibility limits the cost-effectiveness of the retirement system as a compensation tool.

Challenges imposed by structure of military compensation

The fact that 87 percent of compensation goes to basic pay, BAH, BAS, retirement pay, health care, and social security payments means that a relatively small share is left for bonuses and special and incentive pays. Moreover, this 13 percent must cover a range of purposes, so only a fraction of it is available for reenlistment policies. This constrains the opportunity for discretionary pays to act on reenlistment.

There is, however, within the basic pay element, still the quality-based reenlistment incentive provided by the promotion system.

The limited ability of discretionary pays to influence retention is especially true for ratings in which the 87 percent of regular pay is so high that it results in reenlistment rates that are already adequate or even too high. For example, since the 87 percent of pay is inflexible across occupations, occupations that receive lower compensation in civilian markets receive the same level of this pay as relatively higher paid occupations. It could be that this pay differential is such that even the 87 percent of pay is enough to retain as many people as needed in the occupations that receive low pay in the civilian economy. Then, any bonus or special pay that cannot be targeted by rating will only entice more reenlistments in ratings that are already oversubscribed.

Another way that the bulk of pays overwhelms the use of bonuses, special pays, and incentive pays is through the operation of the retirement system. An effective retention system would have to deal with the dominant influence of the cliff-vested retirement pay's pull and push effects on mid-careerists.

Reenlistment, continuation, and special and incentive pays

We have discussed the large elements of compensation that most influence reenlistment decisions—that is, those included in the 87 percent of compensation. The remaining 13 percent of compensation includes a complex collection of bonuses, special and incentive pays, allowances, quality-of-life programs, and other compensation tools. In this set of pays, a subset is either designed as a reenlistment tool or affects reenlistment indirectly. Since these pays altogether compose only 13 percent of compensation, the portion that most strongly affects reenlistment is an even lower fraction of compensation. Furthermore, pays that can be changed at the discretion of the Secretary of the Navy are most useful. Altogether, then, there are relatively few levers by which the Navy can target compensation at precisely the populations they wish to reenlist.

Some of the major pays that are explicitly targeted at reenlistment include Selective Reenlistment Bonuses (SRBs), location-specific

reenlistment bonuses, officer continuation and career incentive pays, and bonuses and continuation pays for health care professionals.[14] There is also a new authority for a Variable Separation Pay (VSP) that can be used to increase quit rates.

Other pays in this 13 percent that are not specifically designed as reenlistment pays but can influence reenlistment rates include sea pay, Assignment Incentive Pay (AIP), a range of pays designed to compensate for difficult working conditions, and conversion bonuses for the Selected Reserves.

Pays specifically designed as reenlistment policies

The previous section discussed the structure of compensation and the effect of the major pays that influence reenlistments. Here, we will look at elements of the remaining 13 percent of compensation: their definitions and how they might influence reenlistments.

SRBs

The SRB is intended to offset one of the limitations of basic pay by allowing the Services to offer different levels of compensation to people in different occupations. As the name of the compensation tool implies, the SRB is offered to members at a reenlistment point who agree to stay for an additional term of service. In addition, these personnel must meet certain eligibility criteria and agree to reenlist for at least another 3 years of service.

SRBs are computed by multiplying a person's "skill criticality level" (possibly zero) by monthly basic pay, and multiplying that product by the number of additional years of obligated service. The skill criticality level allows the SRB to vary by occupation; each Service has the discretion to set these levels as it sees fit, subject to an annual ceiling on the SRB budget.

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14. Since this study focuses on enlisted personnel, we will not discuss the officer bonus and career incentive pays. Many of the principles for good enlisted reenlist pays, however, would hold true for officers as well.

Theoretical models and empirical findings both suggest that SRBs influence reenlistment.[15] In theory, an SRB should have the same effect on reenlistments as a similar amount of basic pay because both represent cash compensation to the Servicemember. For the Navy, empirical results show that ratings with relatively large manning shortfalls also have high SRBs. This suggests that the Navy has a good sense of where its manning problems lie and that it attempts to alleviate these problems by providing compensation to people in these skills [11]. This is a reasonable example of a targeted pay. Both theoretical and empirical findings, then, indicate that SRBs are important reenlistment tools.

An advantage of SRBs is that they are flexible. A comparison of bonus levels within the same skill across the Services, of levels across skills at a given point in time, and of levels within the same skill over time all reveal a substantive amount of variation in the use and magnitude of the SRB. There is some evidence, however, that the Services could make greater use of this tool. While the SRB introduces some variation in military compensation by skill, SRB payments still represent an extremely small percentage of total compensation.[16] In technical skills, there is evidence that military pay differentials fall far short of those observed in the private sector [11]. In other words, while the SRB is designed to be flexible, the Services have not maximized this flexibility. Part of this inability to provide sufficient variation in pay by occupation may result from constraints on the total size of the SRB budget.

SRBs are also considered to be relatively cost-effective, especially when compared with basic pay. Increases in reenlistment bonuses for a skill that has a retention problem can reduce manning shortages in that skill without increasing compensation for personnel in skills without shortages. However, recent research has suggested that, in the current recruiting and retention environment, even SRBs are not a cost-effective way to raise reenlistment further. Some researchers

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15. See [5] for a survey of the literature on the effectiveness of SRBs.

16. See figures 3-1 and 3-2 of [6].

have concluded that higher SRBs are only cost-effective for a small group of highly technical ratings [12].

One reason that SRBs are not more cost-effective is that, within a skill, it is difficult to identify the people who need higher pay to prevent them from leaving and to separate them from those who would be willing to reenlist without further pay increases. Consequently, the Services must pay all qualified personnel the same bonus. Even though increases in SRBs encourage new reenlistments, they increase compensation to people who would stay without it. When reenlistment levels are already high, the number of Servicemembers to whom "unnecessary" increases in compensation are paid is also high.

This defect of not being able to target SRBs to the people the Navy most wants to retain, even in a case of high overall reenlistments, could be mitigated if SRB payments were also tied to quality. It still might be the case that you are paying SRBs to people who would stay anyway. A quality screen, however, could be placed on who goes and who stays.

Voluntary Separation Pay (VSP)

For mid-grade and senior personnel, the structure of the military retirement system provides a strong incentive to remain until 20 years of service. Given a reluctance to involuntarily separate these personnel, the DoN has provided a new force-shaping tool, VSP, to encourage people to voluntarily separate before 20 years. The goal of VSP is to facilitate transitions from the Service.

In general, it is thought that VSP will be offered to Sailors at YOS 8-12 where the pull of retirement is getting so strong that an additional force-shaping tool is needed. The separations generated by VSP should come at a point where both the Navy and the Sailor feel it is advantageous. This ability to influence retention rather than have the entire population continue to 20 YOS could be an important force-shaping tool to counteract the incentives of retirement pay.

Since VSP is a new pay, there is no empirical literature about its effectiveness. Economic theory, however, predicts that there should be an effect on reenlistments. Examining the use of voluntary separation

incentives by private-sector and government employers, and even the military's own use of these tools during the drawdown of the 1990s, provides some insights [13 and 14]. The consensus of this literature is that separation incentives do induce early separations and that, in general, the larger the incentive, the larger the population that will agree to separate or retire early.

VSP can also provide a great deal of flexibility. The only current restriction is a relatively wide range of years of service to which VSP can be offered. The Services will have the flexibility to offer VSP to different skills/ratings, specific years of service within these boundaries, rank, or remaining periods of obligated service. Furthermore, the Services can offer different levels of VSP to different groups within the population of personnel that it wishes to voluntarily separate.

Finally, VSP has the potential to be cost-effective. Since people prefer immediate over deferred compensation, VSP can be set at a level lower than the cost to the government of the military retirement benefit. In application, the cost-effectiveness of VSP has yet to be demonstrated. A number of pitfalls are associated with setting the level of VSP. VSP rates would have to be set so that they generate enough separations yet not so high that many excess people apply for separation. How closely the pay is set will influence the ROI of the pay. This suggests that restricting eligibility for VSP is an important consideration.

Other policies that influence reenlistment

Distribution incentive pays[17]

A variety of special pays and in-kind benefits can be used to provide incentives for Servicemembers to accept assignments that are "hard to fill." Some of these pays are in the special and incentive pay category; others are sea pay, Assignment Incentive Pay (AIP), Special Duty Assignment Pay (SDAP), Cost-of-Living Adjustments, and allowances, such as Family Separation. The Navy also offers additional in-kind compensation, including sea duty credit for overseas shore

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17. For a more complete discussion of deployment and distribution pays, see [4, 15, and 16].

tours, promises of attractive follow-on tours, and special quality-of-life programs for members or their families.

Sea pay

Sea pay provides incentives to improve sea/shore balance, increase retention, reduce crew turnover, and improve overall fleet readiness. At present, it consists of two parts: Career Sea Pay (CSP) and Career Sea Pay Premium (CSPP).

CSP rates increase with rank and with cumulative time on sea duty. The magnitude of sea pay differentials can be substantial, especially for enlisted members. For an E4 with 3 years of sea duty, CSP is about 14 percent of basic pay, and about 5 percent for an O4 with 6 years of sea duty.[18]

The CSPP is a fixed monthly payment (unrelated to paygrade or amount of sea duty) that is paid to those who serve more than 36 consecutive months at sea. This CSPP, however, isn't available to Sailors in paygrades E5 and above with over 8 years of cumulative sea duty. These Sailors have a premium embedded in the CSP table instead.

The primary justification for CSP is to help with assignments to sea duty. Since it can increase pay substantially, however, it can also influence reenlistment rates of people who are or expect to be on sea duty. As with basic pay, BAH, BAS, and retention bonuses, most tools that provide substantial cash compensation will, in theory, have a positive effect on reenlistments. The same is true for sea pay, and a number of studies have discussed the theoretical relationship of sea duty, sea pay, and retention and have gone on to estimate the empirical relationship.[19] In general, studies have found that Sailors react negatively

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18. The E4 is assumed to have 6 years of service (YOS), but monthly basic pay is the same for 6 or more years. The O4 is assumed to have 12 YOS. While monthly basic pay does vary substantially by YOS for O4s in this range, the monthly CSP payment doesn't change substantially depending on the number of years of cumulative sea duty.

19. See [17] for a review of the theoretical and empirical studies of effect of sea pay on reenlistments. They also provide the most recent empirical results.

to more sea duty; that is, retention falls if they expect more sea duty, longer tours, or are about to roll from shore to sea. This effect is much smaller than the effect of SRBs, however.

Since sea pay is not specifically targeted at Sailors who are at the end of a contract, sea pay should not be as effective in increasing reenlistment as an equivalent amount of money spent on reenlistment bonuses. A CNA study contrasted the retention effects of sea pay and SRBs [18]. The authors found that, in general, SRBs targeted to the first-term reenlistment point would be about twice as effective as sea pay at keeping Sailors in the Navy.

Sea pay is a relatively flexible compensation tool since the FY 2001 National Defense Authorization Act moved the authority to change sea pay rates from Congress to the Service Secretaries, within specified statutory maximums. Recent initiatives, however, have demonstrated that these legal maximums are not flexible enough for the Navy to address its sea manning problems. Another notable lack of flexibility in current sea pays is that they do not vary by occupation, while sea manning shortages are often concentrated in certain ratings or specialties.

Assignment Incentive Pay (AIP)

The purpose of AIP is to provide an additional monetary incentive to encourage members to volunteer for hard-to-fill or less desirable assignments, assignment locations, or certain assignment periods.[20] The National Defense Authorization Act for Fiscal Year 2003 provided for this new type of special pay to be offered to volunteers for positions designated by the Secretary concerned. The amount of such pay can vary within specified limits by Service, duty station, occupation, and length of assignment.

The Navy has traditionally used a variety of methods to alleviate manning shortages in critical billets, including sea duty credit for rotational purposes and a patchwork of special pays and quality-of-life programs. The existing monetary and nonmonetary assignment

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20. Reference [4] is the source of this background information. As of the 2005 printing, the maximum value of AIP was $1,500 per month.

incentives often fail to attract volunteers for all hard-to-fill billets, in which case the Navy must order members to take assignments. Using AIP may allow the Navy to simplify the complex current patchwork of distribution incentive pays and to provide incentive pays that would minimize the number of involuntary assignments.

To date, there has been only limited use of AIP. In a pilot program, AIP levels are determined by a market-based system.[21] Sailors submit the amount of pay they require to volunteer for less preferred locations along with job applications in the Job Advertising and Selection System (JASS). Submitted bids are constrained only by Navy-set AIP caps, which can vary by location, paygrade, and rating. This AIP system is essentially an auction in which Sailors bid on jobs and the winner is the lowest bidder out of all qualified applicants. The Navy, however, can take into consideration any factor in the job application, such as whether the member is approaching a critical reenlistment decision point or his/her Projected Rotation Date (PRD) and what permanent-change-of-station (PCS) costs would be.

The additional monetary compensation provided by AIP can make it a reenlistment tool even though this is not its primary objective. First of all, it can provide additional compensation. Also, to the extent that AIP can create a more voluntary assignment system and help lessen the negative feelings associated with involuntary orders, it could have substantial positive effects on reenlistments.

AIP is a very flexible tool that can be finely targeted in many different ways. The structure of AIP and the purposes it is put to can vary widely. So far the Navy has used AIP to only a limited extent, but its application to different purposes in other Services demonstrates its flexibility.

The Assignment Incentive Pay is an example of a new type of flexible, market-based pay: it was designed to provide a cost-effective and flexible compensation tool. If an effective AIP program can be designed, it will can help with both assignment and reenlistment problems. The main problem with AIP is that it has not been tested in a variety of different settings.

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21. See [19] for a description and assessment of this pilot program.

Trift Savings Plan (TSP) and TSP matching

TSP and TSP matching provide an alternative to the existing retirement system. TSP is a voluntary vehicle for saving and investing for retirement that is similar to "401(k)" plans offered by private-sector employers. It adds to the retirement package an option that, when members separate from service, they retain ownership of the funds in their TSP accounts.

The legislation authorizing military participation in the TSP also provided the Secretary of each Service the authority to designate "critical specialties" that would be eligible for matching contributions (TSP matching). If the full amount of the matching is taken, people in critical specialties have the opportunity to earn an additional 4 percent of basic pay. While each Service has TSP matching authority, it has not been used by any Service.

In theory, the TSP plans could have a moderate effect on reenlistments. In practice, the amounts generated by TSP may be dwarfed by the current retirement system. For those who do not expect to serve 20 years, the Navy could see an increase in retention. TSP provides a benefit that was previously available only in the private sector. If people were choosing to separate from the military because of more attractive pensions in civilian jobs, TSP removes that incentive to separate. Otherwise, it should have little effect on reenlistments because Sailors are making equal tradeoffs for current and deferred earnings based on their evaluations regarding the reduction in current earnings vs. the tax advantage and uncertain changes in future earnings.

TSP has no direct cost to the Navy since it allows people to take only some of their salary as tax-free contributions to a retirement savings account. Thus, the cost is in the form of reduced tax revenues, but this is true for any 401(k) type of program, including that offered to civil servants. TSP matching, however, does cost the Navy the matching amounts. It could still be cost-effective since it can be targeted specifically at those ratings and YOS that the Navy wishes to retain.[22]

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22. It is unclear whether the legislation authorizing matching contributions precludes the Services from imposing more restrictions on eligibility than working in a critical specialty and agreeing to a longer obligation.

TSP offers little flexibility in compensation from the Navy's perspective because it is a benefit that is offered to all Servicemembers. TSP matching provides a bit more flexibility since it can be targeted to skills that the Navy wishes to retain. The Services, however, do not have the ability to adjust the level of matching contributions.

Selected Reserve (SELRES) affiliation bonus

There is a SELRES affiliation bonus for people on active duty who choose not to reenlist or continue and who otherwise would have an Individual Ready Reserve (IRR) obligation. This bonus can be targeted by occupation.[23] After the 2005 National Defense Authorization Act (NDAA), significant changes were made to SELRES bonus amounts and how the program was administered. The process of setting bonus amounts includes consulting with the enlisted community manager in regard to what skill areas the bonuses should target.

Sailors are not allowed to take affiliation bonuses while they are on active duty. The purpose of the bonus is to attract people who have already left the Navy out of the IRR and into the SELRES. Most of the analyses of the bonus have to do with its success in accomplishing this purpose and in maintaining continuation rates within the SELRES. No empirical work has been done on any effect that the bonus might have in pulling people off active duty and into the Reserves.

For the most part, Navy SELRES bonuses are set too low to realistically have much effect on people deciding whether to leave active duty. If the Navy increases bonus amounts and changes the policies (to allow for lump sum payments), SELRES bonuses being too attractive in comparison to active duty bonuses might become more of a concern.

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23. Reference [20] presents evidence on how affiliation bonuses were administered and on maximum levels and take rates both before and after the 2005 change.

Improving the reenlistment program

In this section, we examine how the individual pays discussed earlier could be made to better align with the goals and criteria for a good reenlistment program. Even though individual pays could be improved, however, we stress the point that no reforms should be made without considering the effect on the reenlistment program as a whole. There are two specific aspects of this integration. First, all goals cannot be met by a single pay. It is necessary to consider how the pays interact to accomplish the goals and meet the criteria for a good reenlistment program. Second, sometimes policies are set without considering how they will affect other policy tools. Although it may not be possible to avoid all conflicts, the different pays should be aligned as closely as possible toward meeting overall goals.

Another set of improvements to the reenlistment program involve applying quality measures so that the Navy maintains the highest quality workforce possible. We will discuss most of the ways in which policies can be improved by incorporating more quality dimensions in the subsection on quality-based policies.

Perform To Serve

Since PTS is explicitly designed to let the highest quality Sailors reenlist or convert, it is difficult to separate a discussion of improving the policy from a discussion of how best to incorporate quality. In this subsection, however, we will try to identify overall problems with how PTS has been implemented and ways to improve its implementation.

Problems with PTS

The PTS system does not meet the goals and criteria for a good reenlistment policy for the following reasons:

- The algorithm used to measure the quality of Sailors—and thus to decide who gets to reenlist or convert and who is rejected—

is so complex that it may not be transparent to Sailors. Furthermore, reference [1] concludes that, given existing evidence and the short time the present program has been in place, there is no guarantee that the best Sailors actually reenlist. Since there is limited empirical evidence that this cumbersome algorithm improves the quality of the force, it is possible that a better quality measure could be developed.[24]

- The system results in relatively few people being denied reenlistment or being made to convert, thus bringing into question the cost-effectiveness of the program. Another reason that PTS may not be cost-effective is that it does not take some costs into account. For example, ratings that have longer training pipelines cost more to train. These costs should be considered when making decisions about who can reenlist and convert.

- PTS cannot help keep above-average Sailors unless the ability to stay or switch appeals more to those who are of higher quality.

- The program is centrally managed as opposed to being a supply- and demand-based structure. Economic theory indicates that the best structures set prices that depend on costs and whom the Navy most wants to stay or convert. Sailors then make individual decisions based on these prices. This free-market system, in which Sailors have more choice, maximizes their satisfaction while providing the Navy with its desired force. A centralized structure usually costs more. Furthermore, the agents with the best information about a Sailor's ability are not being allowed to make the reenlistment decisions.

Ways to improve PTS

Although the current PTS program has flaws, we have argued that the Navy seriously needs a means to get poorer performers out of the force before the draw of retirement gets so strong that everyone wishes to stay to 20 years. If it is decided that PTS can be used in part to meet this objective, there are several ways that PTS could be

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24. The subsections that follow on measuring quality and how to introduce quality dimensions into reenlistment policies will investigate in more detail how quality might be measured and used.

improved.[25] Also, it would probably be best to couple the use of a quality screen for lower performers with a bonus pay for high-quality personnel. In this way, the Navy would have a reenlistment program that both provides an incentive for good people to stay and a mechanism to deny reenlistment to the worst performers.

Some possible improvements to the PTS policy include:

- Leverage information technology by connecting PTS to other Navy personnel systems. Suppose, for example, that information on quality could be sent to PTS and the SRB program simultaneously. Since SRB provides good incentives for high-quality Sailors to stay in the Navy and PTS could be a good method for preventing the lowest quality to reenlist, having these two systems operate together would accomplish both goals.

- Once a better quality measure is defined, it should be used in a more accurate way. This could be done by widening the screening time frame and reference population. The current quality screen suffers from Sailors being compared only to others in their own EMC who applied in the same month. Thus, a Sailor who was judged to be good relative to others in his EMC and the particular month in which he happened to apply may be judged less well relative to other populations.

- The conversion mechanism could be improved in a number of ways. Low rates of conversions being approved and of conversion quotas being taken indicate that the conversion mechanism in PTS is underused. The use of Career Reenlistment Objective (CREO) categories for deciding which ratings are undermanned so that Sailors can convert into them may result in measures that are too broad or outdated. Enlisted Community Managers (ECMs) have the most current information on manning needs. Incorporating this information into the CREO system would allow them to better signal their needs.

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25. Reference [1] goes into greater detail on how well PTS is working and possible ways to improve the implementation of the policy.

- Currently, different CREO ratings for different paygrades sometimes undermine the quality screen. In a number of instances, a rating is CREO 3 (overmanned) for an E5 but CREO 2 or 1 (appropriately manned or undermanned) for E1s through E4s. In such cases, a high-quality Sailor who has advanced quickly to E5 may not be allowed to reenlist, while a slower promoter is allowed.

Selective Reenlistment Bonuses

SRBs provide a very good incentive for reenlistments. In addition, they are relatively flexible and cost-effective, especially compared with other compensation tools that we have discussed. Their flexibility allows them to be targeted to specific ratings and Navy Enlisted Classifications (NECs). They can also vary over time as occupations develop different degrees of personnel shortages or excesses.

SRBs, however, could be made more flexible and cost-effective. Most important, the way in which SRBs have been administered, or the constraint of the total budget for SRBs, has not produced sufficient variation of pay across occupations. This is reflected by the occupational differentials in the Navy due to SRBs being much smaller than occupational differentials in the private sector. Thus, even with SRBs, highly paid occupations in the private sector are underpaid in the Navy, while occupations with lower pay in the private sector are overpaid. As far as a result-based program, the Navy typically has greater problems manning high-tech as opposed to low-tech occupations.

Retirement pay, HYT, VSP, and TSP

The cliff-vested retirement system affects the ability of the Services to shape the experience level of its force. Experience profiles beyond the 10th or 12th year of service are driven by the retirement system and are quite similar for both officers and enlisted and across all Services and occupations [21]. Experience profiles driven by the retirement system will only coincidentally align with the real needs of the Services. For some skills, a relatively junior experience profile is desired, whereas longer career lengths would have more value in other skills.

Retirement pay

Reference [7] shows that, as a whole, the current retirement system is cost-effective in generating an across-the-board endstrength and experience profiles that are similar to today's Navy. The problems arise when the goal is a retirement system that would allow for more flexibility. An ideal compensation system would support a personnel system that can separate mid-careerists in skill groups that have excess supply and provide variable career lengths for different occupations. As is, retirement pay does not have the flexibility to manage the force by Service, occupation, time, performance, and other parameters. Many researchers have noted the consequences of this inflexibility in retirement pay, and some have done empirical work that shows that differences in career lengths by occupation would be more cost-effective [12].

Despite these shortcomings, and almost universal criticism of the system by commissions and analysts, retirement pay has proved to be remarkably resilient. Any changes to the retirement system will be difficult and will require a great deal of cooperation among the Services, DoD policy-makers, advocacy groups, and Congress.

If retirement pay is unlikely to be reformed, perhaps other pays and policies could be added to the retirement system that would help to improve how it influences reenlistment decisions. This was part of the motivation behind introducing some relatively new pay tools: VSP, TSP, and TSP matching. In addition, HYT policies can interact with the retirement system

HYT

As we have seen, the current HYT limits result in relatively few people being denied reenlistment. In September 2006, only 2.6 percent of the E4 population hit the 8-year HYT limit; only 0.8 percent of E5s hit the 14-year limit. The HYT system, in addition to being a relatively ineffective screen, has other problems. First, it fails to distinguish between ratings or communities that have fast promotion rates and those for which promotions come slower. In some communities, almost everyone would be promoted to E4 before 8 years and to E5 before 14 years. For these communities, up-or-out limits may have to

be set earlier to have any effect. For other communities with slower average promotion rates, the current limits or only slightly lower limits may still be best.

Another problem is that, like any system that works just to cull out poorer performers, the HYT system does not provide any incentive for good performers to stay in the Navy. Thus, even if HYT could be improved as a quality screen for reenlistments, it would have to be coupled with another policy that provides incentives for more successful Sailors to stay.

Voluntary Separation Pay

Since VSP has only recently been implemented, there is no empirical literature on the extent to which it helps the Navy improve its reenlistment program, but economic theory predicts that there could be a modest effect on reenlistment. The goal of VSP, however, is to facilitate transitions from military service. The consensus of the literature is that attempts by other employers to offer separation incentives have been quite successful at achieving this goal. In this respect, VSP represents a significant improvement over the current retirement system because it provides opportunities for Servicemembers to separate (with compensation) at a point in their careers where both the Navy and the Servicemember feel it is advantageous.

VSP is potentially well aligned with the Navy's overall force-shaping goals. In particular, if the Navy uses the discretion provided in legislation, it provides a great deal of flexibility. This compensation tool also has the potential to be cost-effective. The cost-effectiveness of VSP, however, has yet to be demonstrated.

There are a number of pitfalls associated with setting the level of VSP; in particular, it is possible that a poorly implemented program could negatively motivate performance. The Navy should begin to use this pay so that it identifies populations to which this compensation tool can be targeted. At the same time, however, the Navy needs to gather empirical evidence on the efficacy of VSP as it is implemented. Obtaining precise estimates of the effects of VSP, and identifying any unintended consequences of offering it, will allow the DoN to more effectively target this tool and to more efficiently set rates.

TSP and TSP matching

Because of their magnitude and implementation, TSP and TSP matching are unlikely to provide substantial reenlistment incentives. Since TSP involves no direct expenditures on the part of the DoN, however, there is no reason not to give Servicemembers the opportunity to participate in the program and save/invest for retirement. Defined contribution retirement programs have become increasingly popular in the private sector, and TSP may allow the Navy to better compete with the private sector for personnel. If amounts deposited to TSP are sufficient, this could increase reenlistments in a way that costs little or nothing. It might also help to alleviate some of the worst features and inflexibilities of the current retirement system by allowing mid-grade Sailors to leave without sacrificing all their retirement pay.

On one hand, beginning to use TSP matching could be advantageous because the tool offers the flexibility to target specific ratings and YOS. On the other hand, the relatively small amounts provided and their deferred nature may result in TSP matching being a poor retention vehicle for those early on in their careers.

One of the most promising uses of TSP matching could be in increasing retention for those with more than 20 years of service if it were targeted to personnel already vested in military retirement. Targeting TSP matching in this fashion could help solve the problem of providing incentives for longer military careers.

Distribution incentive pays

The military offers a host of special pays and other incentives to those who take on the jobs that are most difficult to fill. The Navy's use of AIP has shown early promise and is an innovative example of a Service allowing its members to express their preferences and be compensated for them. Given that AIP proves to be effective, we recommend that it be expanded and used to replace the awkward, complex, and overlapping system of pays, allowances, promises of good follow-on assignments, and involuntary orders that are currently used to fill billets.

The assignment incentive, or distribution, pay system could be improved in a number of ways as far as its interactions with a good reenlistment program. It should be designed to give each Service and community the maximum possible flexibility to administer its own program. Also, there should be discretion to target the bonuses as finely as possible, at reenlistment points and by occupation, location, type of duty, moving expense, experience level, and perhaps even adding some quality measure.

If assignment bonuses are designed in this way and funded so that they form a substantial proportion of total compensation, they could not only satisfy their primary purpose of assignment but also help meet the overall goals of a good retention program. Also, when trying to coordinate the assignment and retention aspects of a single pay, AIP would be easier than assessing effects and aligning policies when there are many different assignment policies.

As it is, assignment incentive policies are administered with little consideration to retention policies. Therefore, they may not help with the reenlistment program's goals and criteria or, in the worst cases, even offer competing incentives. For example, an incentive such as a location bonus will provide a compensating differential that will increase the probability that people who are assigned to an unpopular location will continue to be satisfied with their Navy career and choose to remain in the Navy. This incentive, however, may be paid to people who happen to be in this location rather than to people whom the Navy most wants to retain. In addition, it may not be paid at the correct time to best influence reenlistment decisions.

Sea pay

The primary purpose of sea pay is to provide an incentive to generate more sea duty. The pay also has reenlistment effects since sea pay serves as a compensating differential for the arduous nature of sea duty. However, as a reenlistment incentive, sea pay falls short of the goals to have flexibility and a high ROI. Since SRBs are targeted to those making reenlistment decisions in skills with manning shortages, they are more cost-effective than sea pay at increasing reenlistment. Similarly, a market-based pay, such as AIP, is more cost-effective than

sea pay since it reduces the amount paid to those people who like sea duty and do not require additional cash compensation.

The worst aspect of the current sea pay as far as its interaction with reenlistment goals is that it cannot be targeted at ratings with the greatest sea-duty shortages. If a rating has a more severe sea-duty shortage, people in that rating are likely to serve more time at sea without receiving more sea pay compensation. This should lead to lower reenlistment in the ratings with more sea duty. In order to work well within a coordinated reenlistment program, we suggest that sea pay vary by rating.

There is also a question of aligning the timing of sea pay with reenlistment decisions. Currently, sea pay is determined by Projected Rotation Dates and not with reenlistment decision points. Also, sea pay rates increase with paygrade or, in the case of CSPP, when a certain number of months of continuous sea duty have passed. If policies were put into place that would align PRDs with EAOS, so that changes in sea pay coincided with reenlistment points, sea pay could be a more effective reenlistment tool.

AIP

In theory, AIP could be a valuable reenlistment tool if it were offered at an EAOS point to the right people who will go to the assignments that the Navy most wants to fill. While both the design and initial evaluations of AIP are promising, there is limited empirical evidence on the magnitude of its effects and how it can be applied most effectively. It is our assessment that the theoretical underpinnings of AIP are so strong as to warrant continued use and expansion of this compensation tool. However, the lack of significant data calls for caution regarding rapidly replacing existing compensation tools with this relatively unproven pay. It it is important that the Navy gather empirical evidence on the efficacy of AIP and identify the extent to which this compensation tool exceeds, or falls short of, expectations.

AIP has great flexibility: the levels, ratings, assignments, and other factors can be manipulated at the discretion of the Navy. It also has the potential to become a good reenlistment tool if, in addition to using it specifically as an assignment tool, the pay were focused more

at reenlistment points and targeted at the people whom the Navy wishes to reenlist. This could be either by targeting ratings and YOSs of people who receive AIP or even by adding a quality component to AIP payments.

Introducing quality-based reenlistment policies

Several researchers have noted that the military compensation system provides very few tools that are designed to influence the quality of the force (see [8] and [15]). Good quality-based policies would add to a quit rate reenlistment program a mechanism to induce the least (most) productive personnel to quit (stay) when there are excesses or deficits. There is empirical evidence to support the idea that Service-members will respond to appropriately structured incentives with increases in productivity [22].

One danger with quality-based policies is that, if people feel that quality is not correctly measured, changes in reenlistments will be more troublesome. Therefore, whether to use these policies depends greatly on how well quality can be measured. Defining a good measure of quality is not easy.

In addition to attaining a high-performing force, quality-based compensation could also have an influence on overall reenlistment. With reenlistment, explicitly paying for performance would alter the mix of personnel who choose to serve. In theory, those most willing to work productively will be those who are retained. It is possible that the Services would see a decrease in reenlistment rates if more people perceive that their performance is below average. As reenlistment policy becomes more targeted, however, the likelihood of retaining Sailors of a certain experience or performance level increases.

Measuring quality

Traditionally, the Services have measured quality at the time of enlistment by Armed Forces Qualification Test (AFQT) scores and High School Diploma Graduate (HSDG) status. At reenlistment points, Commanding Officers make reenlistment recommendations based on observed job performance. In addition, the Navy Enlisted Advancement System computes advancement algorithms using such

factors as passing advancement exams, past exam scores and promotion recommendations, and awards [23]. These recommendations and scores are used as quality measures that influence who is promoted. In addition, the recent PTS policy has introduced a formal algorithm to measure performance that is used at the reenlistment point [1]. Alternative measures of performance that are frequently used by researchers, however, are based on the speed of promotion.

Since speed of promotion by itself is influenced by many other factors, alternatives that use the speed of promotion relative to other control factors must be developed. Reference [24] presents an early use of a promotion speed index. The authors were looking for measures that could be used in creating an index of personnel quality for crews of surface combatants. The measure they tested was the percentage of E5s and above who have less than 4 years of service. A high percentage would mean that relatively more Sailors had promoted fast. Although this measure may be something to look at when measuring the quality of a group of people, it may not be suitable to create a measure of performance for an individual.

Another promotion speed indicator was used in [19] to evaluate personnel quality before and after the AIP pilot. Quality was measured as whether a Sailor was fast to E5. The definition of "fast to E5" was whether he or she was promoted to E5 as fast as or faster than the fastest 25 percent of all Sailors in that rating who had accessed in the same fiscal year.[26] This measure is computed separately for each rating and also controls for year of entry.

Measuring advancement speed within ratings and/or communities is an important point because promotion rates differ largely by rating. One problem with using advancement speed across the board for all first-term Sailors is that a fairly large number are in ratings with little variation in the speed to E4 (especially those in the Nuclear Field and the Advanced Electronics/Computer Field). In these and other similar ratings, virtually everyone has made E4 by the end of the first term, and a fairly significant number will be promoted to E5.

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26. The Sailor also had to have survived as many months as it took the median Sailor to promote to E5 in that rating and year.

Advancement speed can also vary by year of accession since promotions are based on the number of vacancies in the next paygrade. There can be differences in vacancies as bigger and smaller entry cohorts travel through the system and if billet requirements change over time.

Reference [25] presents a theoretical model of why time of promotion reveals more information about personnel quality as Sailors move on in their careers. This reference also provides a method for constructing a comprehensive measure of the quality of personnel.[27]

The Navy starts out with imperfect information about recruits

When Sailors enter the Navy, quality is measured by AFQT scores and HSDG status. These measures have shown to be associated with better results in virtually every study of early performance, such as bootcamp and first-term attrition. They provide, however, imperfect information about other important factors that contribute to a Sailor's quality. After observing a Sailor's job performance over time, the Navy should be able to construct a better measure of quality and fitness for naval service. In essence, it is possible over longer periods of time to gather more information about how well people do their jobs and to incorporate this information into a quality measure.

More information is revealed by the speed of advancement

Speed of advancement relative to quality at entrance reveals information about on-the-job performance that was not available when Sailors entered the Navy. For example, if someone is of high quality on entrance, you expect relatively more from him or her in terms of speed of advancement. If this prediction is not fulfilled, you have learned something more about that Sailor's quality. Conversely, if two people advance to the same rank at the same time, but one had lower entrance qualifications, this also tells you something about their performance in the military.

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27. Much of the following discussion draws from the work in [25].

In [25], the authors propose that a member-specific quality measure depends on three things: (1) ability (as measured by AFQT), (2) taste for military life, or job fit, and (3) effort.[28]

The measure they propose is speed of advancement relative to quality at entrance and within a peer group. One starts with AFQT scores and HSDG status as the imperfect measures of quality available when the Sailor enters the Navy. Add to this the knowledge that can be gained about taste for military life and about effort, which is revealed by promotion speed. These factors must be measured within the Sailor's peer group, which is rating, year of entry, and any other factor that influences speed of promotion. To quote the authors of [25]:

> The quality factor reflects the interaction of the member's taste for the military, level of effort, and aspects of ability not measured by the AFQT score. A high quality factor indicates that the member has made the effort to perform consistently well and that the service, having viewed the member in comparison with other members being judged by the same criteria in the same occupation, recognizes the superior performance.

What is constructed, then, is a measure of quality that is based on speed of promotion relative to the Sailor's quality at entrance and within his or her peer group. This measure can be referred to as a member-specific quality index.

How well does the member-specific quality index perform?[29]

There are essentially two dimensions along which the success of the index can be measured. Each has to do with whether it adds information relative to AFQT and HSDG. The first is whether this index is

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28. The authors give credit to previous researchers as being the source of the method that they extend in their paper [26].

29. The appendix contains details about the index. It discusses theoretical issues and empirical results about the member-specific quality measure. The empirical results in this section are taken from [25] because there has been limited research to date on the benefit of the fast-to-E4 and fast-to-E5 measures. That they are based on similar theoretical models, however, suggests that similar empirical results will be found.

better than AFQT alone in predicting reenlistment rates. The second is, on average across ratings, how much of the variance in quality among members can be accounted for by this index.

For the first measure, many studies of the relationship between reenlistment and AFQT have estimated that higher AFQT has no effect or is negatively related to the decision to stay in or leave the military. The member-specific quality index, however, indicates that higher quality members are more likely to stay in the Navy. Thus, the quality index is a better predictor of reenlistment than just AFQT.

The second test would be whether the quality factor accounts for much of the variation in quality. Reference [25] looked at the overall quality measure relative to a simple measure including just AFQT. The authors found that, on average across occupations, the member-specific quality factor accounts for 54 to 92 percent of the variance overall across the different Services. AFQT accounted for the remainder. The importance of the member-specific quality factor is in line with the theoretical literature that assumes that organizations have imperfect knowledge about employees' performance on the job [27].

Related to this, their measure of time to E4 was strongly related to another index they created for time to E5. This indicates that the measure is picking up an enduring aspect of quality rather than something that is just a statistical abnormality in the earlier index.

Quality should be measured by time to reenlistment

We recommend that quality be measured by time to reenlistment relative to quality at entrance (AFQT and HSDG) and adjusted for differences in peer groups (rating or occupation, time of entry, and other factors that are related to advancement speed).[30] We make this recommendation based on a solid theory of measuring quality as well as the existing empirical evidence. We also recommend that various specifications of this member-specific quality index be defined and tested to see how well they predict reenlistments and how much of total quality they explain. More details regarding different specifications and empirical tests are given in the appendix.

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30. Some studies, such as [28], have found different retention by gender.

The intuition behind measuring quality in this way is appealing, and we believe that it could be explained to Sailors fairly easily. People can relate to the fact that their quality is being gauged by how quickly they get promotions relative to how their quality was measured when they entered the Navy. Furthermore, having promotion rates be judged by comparison with other members by the same criteria and in the same peer group would add to the perceived fairness of the measure. This technique could be seen as a good measure of how superior performance is recognized in the Navy.

In fact, this measure might be seen as more transparent and appealing than the complicated algorithms and checklists that are now being used [23 and 1]. Because it estimates quality from information on a member's promotion speed relative to peers, it subsumes the factors that are used in the promotion system. Promotion criteria include duty performance, skill and knowledge, physical fitness, awards and decorations, and education [23]. This means that all the factors in the complicated promotion system are already taken into account when the qualification for the reenlistment decision is made.

How can existing pays be made more quality based?

Some of the means of emphasizing quality more as the basis of existing pays are explicitly based on the quality measure defined in the first part of this section. Others define quality intrinsically.

Basic pays BAH and BAS

Some of the largest elements of compensation that are affected by performance are basic pay, BAH, and BAS. The pay tables that vary by rank implicitly recognize and reward the quality of a person's performance or the person's productivity. Compensation that varies by rank rewards performance since it provides incentives to distinguish oneself and attain additional promotion. Rank alone is not the perfect measure of quality because it is not adjusted for other factors, such as rating, as we discussed in the previous section. The promotion system does, however, provide the largest performance incentive in the current compensation system.

Coupling promotion and compensation creates a powerful incentive to perform, but it does have its limitations. There are a finite number of ranks to which a person can be promoted, and promotions occur relatively infrequently. To the extent that the Navy can increase the link between pay and performance, it will strengthen the incentive to maintain and increase productivity, which has clear benefits for readiness.

Comprehensive changes to the basic pay tables could tighten the link between compensation and productivity. Currently, basic pay varies by both rank and length of service. As a result, people who promote more quickly than others receive a relative temporary increase in compensation; as soon as slower promoters reach the next paygrade, their compensation is identical to those who promoted more quickly. Linking basic pay with time in grade, rather than time in service, would provide an additional incentive to perform since faster promotion would create a permanent differential in compensation [29].

SRBs

A relatively minor change would be to link installment payments of SRBs to a Sailor's rank at the time the installment is paid. Currently, SRBs are based on the member's rank at the time of the reenlistment decision; once a person has qualified for a bonus, there is no additional incentive to remain productive [30]. Since SRBs are paid in installments, however, linking installment payments to paygrade would provide another method of rewarding performance using the promotion speed. For example, suppose two Servicemembers receive the same level of SRB and the same payment at the reenlistment point. If, when the next installment is paid, the first member has advanced to a higher paygrade and the second has not, the first member will receive a higher installment payment.

A more significant adjustment to SRBs would be to add a quality component to the determination of the bonus for which a person is eligible. The quality measure we suggest is the member-specific quality index defined earlier that is based on speed of promotion relative to quality at entrance and is adjusted for other factors that influence promotion rates, such as rating and time of entry. With this change,

higher quality people in a rating would receive higher bonuses than lower quality people in the same skill. Furthermore, reenlistment bonuses could be paid to high-quality personnel, even if the rating in which a Sailor is employed is not normally eligible for an SRB.

Introducing a quality component to the determination of the bonuses would improve both flexibility and cost-effectiveness. SRBs could also provide a way to improve the quality of the force if they were linked somehow to performance levels.

There are two ways, then, that SRBs could provide a quality screen:

- By linking installment payments to a Sailor's rank at the time an installment is paid

- By linking quality of personnel to the amount of SRB.

The first option has a definition of "quality" included. The definition is that increasing rank more quickly is associated with quality. The second option leaves the definition of quality more open.

Quality-based reenlistment programs to balance the effect of the retirement system

The Navy has a compelling need for a means to get poorer performers out of the force before the draw of retirement gets so strong that everyone wishes to stay to 20 years. HYT is an existing quality screen and so is PTS, although the limitations of these policies have already been discussed.

Another method that could be used is to expand the use of VSP and then screen applicants so that the lowest quality people are separated. An advantage of this is that applicants for separation are presumably less devoted to their military careers regardless of quality. Also, the pool of applicants that must be screened will be smaller than the entire population that is up for reenlistment. On the downside, the quality screen would be applied only to people in ratings that are overmanned relative to requirements.

In theory, VSP could provide a quality cut in two ways. The first would be by offering bonuses that vary by some performance measure. The

danger here is that you would have to offer greater compensation to Sailors whom the Navy wants to separate. This could also have the perverse effect of increasing quit rates of higher quality Sailors.

The second method would be to set VSP so that it generates a larger pool of applicants and then decide whom to separate by applying some quality measure. That is, if more people apply for the bonus than the Navy wishes to separate, decisions could be based on quality.

While both these policies require a good measure of quality, they differ in method. The first is a market-based pay in which Sailors make choices based on prices. The second is a centrally based system in which Sailors make applications and the Navy decides whom to separate. These two constructs differ in several ways. The market-based incentive pays are likely to be cheaper to implement and provide stronger incentives for the best people to stay, but they are likely to be relatively less effective in culling out lower performers.

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Taking costs of leaving or staying into account

Reference [3] looks at the literature of quit-rate or result-based performance systems in the private sector and applies them to the military's civilian workforce. It also has a short section on using this system in the military.

The quit-rate model begins by observing that workers decide to leave jobs for many reasons but that better financial opportunity plays a part in many decisions. Low quit rates, then, signal excessive wages and the need to limit the size of annual pay increases. High quit rates would point to the need for pay increases to maintain the firm's position in competing for workers.

Although lower quit rates are usually thought to be better, a negative consequence is that the workforce becomes stagnant; there are fewer opportunities for advancement. The quit rate could become higher than what is needed comparing its cost to its benefit.

In other words, strict application of a quit-based pay system means you cannot offer a high pay to secure an above-average workforce when high pay also means excessively low quit rates. That is, if pay is already quite high, making quit rates low, it is harder to use a quit-based pay system to secure the best workers. Furthermore, if you try to reduce pay so that this system will work, it could reduce the morale among employees, especially among long-term employees.

This strict application, however, applies to a high across-the-board pay. If the across-the-board portion of pay is kept small enough, it will allow for more flexibility in more finely targeted pays. Then, it might be possible to use a quit-based pay system, even when pay is high and overall quit rates are low, to manipulate the remaining variation in pay to secure an above-average workforce.

Any reenlistment system should take into account the costs associated with adjusting who stays and who goes. The costs of turnover include:

- Out-of-pocket costs, such as

  — Recruiting

  — Training

- Indirect costs, such as

  — The extra supervisory time required by Sailors new to the job

  — The lower productivity of new Sailors who are not fully trained.

Cost becomes more "granular" the more marginal costs by occupation, rank, and other factors are taken into account. These costs should be balanced against benefit as measured by the quit rate before making decisions regarding manipulating reenlistment or conversion rate.

Conclusions

Based on our survey and analysis, some of the notable features of the Navy's current reenlistment include the following:

- Reenlistment policies may be dwarfed by the high proportion of military compensation that is devoted to across-the-board pays. More targeted policies and compensation tools may not provide sufficient levers to manipulate reenlistment, given the magnitude of basic pay, BAH, BAS, medical care, and retirement pays. The structure of retirement pay makes it particularly difficult to influence retention of mid-grade personnel.

- The SRB provides an effective, flexible tool for providing reenlistment incentives that are targeted by occupation. SRBs can also be cost-effective because they focus money directly at the reenlistment point and are targeted specifically at ratings with manning problems. The drawback of the SRB is that occupational pay differentials remain much smaller in the Navy than in the civilian sector either because of how it is being administered or because of budget constraints.

- There are currently few reenlistment policy tools that facilitate maintaining the highest quality force. Some of the existing policies are the promotion system coupled with HYT limits and the new PTS program. Promotions in themselves are not a perfect indicator of quality because they do not hold constant other factors, such as rating, that influence promotion rates. HYT rules do not provide a good quality screen because so few people reach the limits. So far, the PTS system has led to few people being denied reenlistment, and it has a number of implementation flaws that need to be corrected.

- All methods of retaining the best people require a good measure of quality. We conclude that existing measures are not optimal and suggest an alternative method that would be based on

speed of promotion relative to quality at entrance and would be adjusted for rating, time of entry, and other factors that influence promotion speeds.

- At present, once people hit about 10 to 12 years of service, their continuation rates become nearly 100 percent. This is caused by the pull of the cliff-vested retirement pay and is true regardless of occupation. In addition, the Navy is reluctant to involuntarily separate people at or beyond this point because of the negative effect on morale. Thus, most of the people who reach 10 to 12 years of service are almost sure to stay in the Navy until they reach retirement. Because of this, the Navy needs some way to separate poor performers before they reach this point. If this is not done at the first reenlistment point, there should be some way to make a quality cut at the second reenlistment point when there is a smaller pool of people who wish to reenlist and more is known about their performance.

- The PTS program has several problems with design and implementation. Thus, we conclude that, as it currently functions, the program is not an effective mechanism for conversion or for regulating the quality of reenlistments. We suggest some improvements that might make it a more effective tool and also, if enacted, might make PTS a useful tool to cull out poorer performers at the second reenlistment point.

- An expansion of the VSP program may provide a mechanism to counteract the strong pull of the retirement system for Sailors who have 10 or more years of service. VSP can provide flexibility and also can be targeted by skills/rating, years of service, and remaining obligation. Furthermore, the Navy can offer different levels of VSP to different groups within the population that it wishes to reenlist. VSP can also be cost-effective because it can be so narrowly targeted. Since VSP is a new tool that has been used only once in a very limited way, more analysis and evaluation of this pay are needed.

- For the most part, reenlistment policies do not take into account the full costs of people staying in vs. leaving the Navy or of conversions. We can say that pays are more cost-effective

the more narrowly they are targeted because more targeting means paying less money to people you do not want to stay or who would stay even without the extra incentive. We can also say that centrally managed constructs are likely to cost more than market-based programs. The shortfall in implementing reenlistment policies, however, is that the full costs of higher or lower reenlistments or conversions are not taken into account. For example, the cost of lower reenlistments is greater in ratings with higher recruiting and training costs. Therefore, it is probably worth paying more for higher retention in, or conversions into, those ratings. Rarely, though, are costs and benefits for different reenlistment rates—or the relative costs of different policies—made explicit. In addition, certain intangible cost factors should be taken into account, such as the higher supervisory costs of new personnel, the lower productivity of Sailors who are new to the rating, and the cost of having a more stagnant workforce as reenlistment rates increase.

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Recommendations

Push for pay increases being devoted to incentive pays

The larger, across-the-board pay elements are about 87 percent of compensation. The remaining 13 percent must be used not just for reenlistment policies but for many other purposes. Also, of this 13 percent, not all can be adjusted at the discretion of the Navy. It is highly unlikely that any of the large pay elements could be reduced, but we recommend that as much as possible of any pay increase or pay reform be devoted to discretionary incentive pays. If more compensation is in this form, there will be more levers to use in designing a good reenlistment policy.

Install policies that can influence reenlistment rates dominated by retirement pays

The current retirement pay system is structured so that virtually everyone who reaches 10 to 12 years of service will remain until retirement. This retention effect means that there are no policies to shape the force or to move poorer performers out of the Navy after this point. We recommend that the Navy extend the use of flexible, targeted policies that will address the need to manipulate retention for mid-grade personnel. More aggressive use of VSP would be one policy to investigate. It can serve as a force-shaping tool and, if a quality component is added, would also induce lower quality Sailors to leave the Navy.

If the PTS program were reformed, and expanded to the second reenlistment point, it could also help to improve the quality of the force by making it more likely that reenlistment and conversion opportunities would be offered to better performers.

To be effective, however, both of these policies would require a good quality measure if they are to be used to improve the quality of the

force. Also, although both have the potential to screen out lower quality Sailors, neither provides an incentive for higher quality Sailors to stay. This may require an additional policy that provides a higher pay incentive based on quality.

VSP, a restructured PTS, and any new incentive pay will be relatively new policies. Therefore, they should be closely monitored and assessed to see if they have the proper effects, how large those effects are, and if any adverse effects result.

Use a quality measure based on time to promotion

When Sailors enter the Navy, their quality is measured by AFQT scores and HSDG status. Over time, the Navy learns more about people's job performance and can add this information to its initial evaluation of quality. To the extent that this additional information is reflected by promotion rates relative to others in the same peer group, a good measure of quality can be speed of promotion relative to initial quality within the appropriate peer group. Peer groups are defined by rating, time of entry, and other relevant factors. Thus, we argue for a relatively simple quality index based on speed of promotion, holding constant AFQT, HSDG, rating, year of entry, and other relevant factors. Any new quality measure, however, must be tested for its validity, efficacy, impact on morale, and cost-effectiveness.

Incorporate other pays and use them to develop an integrated reenlistment program

No single pay can meet all the goals of a reenlistment program, but distribution incentive pays can play a large role. They can have a sizable influence on retention both because they add to total pay and because they increase choice. These pays should be set with regard to retention policy so that both work to retain the people whom the Navy wishes to retain and do so most cost-effectively. This could be done most easily using an expanded AIP because it has the greatest flexibility and ability to be targeted. Also, it would be easier to integrate one distribution pay with the reenlistment program than the whole variety of pays that are in the current system.

Appendix: Defining a new quality measure

This appendix concerns technical issues having to do with a quality measure based on speed of promotion relative to quality at entrance within the appropriate peer group.

The measure is conceptually sound and easy to understand. A person enters an organization (in this case, the Navy) with some measure of quality. Over time, the organization observes the person's performance and can use these observations to add to the initial quality measure. This procedure must be done within appropriate peer groups so that factors other than quality that affect the performance observations can be held constant.

Using the promotion system to define quality makes sense. The promotion process is meant to identify superior performers and to reward them by advancing them to higher ranks where they will receive more pay. The promotion system is the chief means by which the Navy assesses, recognizes, and rewards performance.

There are, of course, some issues with how this type of measure can be designed, implemented, and tested. These issues include what measures of initial quality and subsequent quality should be used. Also, the peer groups have to be defined so that promotion speed can be compared within the correct reference group. The model by which speed of promotion is converted into a quality index must be specified. Finally, the measure should be tested for its efficacy both in terms of how it relates to other quality measures and how well it corresponds with desired outcomes.

Quality definitions

The measure of initial quality is fairly straightforward. The Services define recruits' quality based on AFQT scores and HSDG status. In recent years, however, the number of accessions without high school

diplomas has been so low that looking at AFQT scores alone may be sufficient.

Observations regarding how well a person is performing after he enters the Navy can theoretically be measured by how fast he promotes. The promotion system bases advancement on such criteria as acquired skills, physical fitness, performance of duty, education, and training. The promotion process should reveal quality by looking at these criteria and promoting people faster who meet the criteria sooner. Since high-AFQT members are likely to promote faster, controlling for the effect of AFQT should single out a quality measure that is revealed based on performance observations after entry.

Defining peer groups

A vital consideration is that many factors other than quality can influence the speed of advancement. This means that these factors should be isolated and used to define appropriate peer groups. Advancement speeds will become more accurate measures of quality as the Navy identifies and adjusts for more of the variables defining peer groups. Some differences in peer groups will be so important that quality indices should be constructed separately for each group. Other differences can be accounted for by holding them equal within the model specification.

The most notable difference in peer groups is rating or EMC. In general, different ratings will have different promotion speeds. For many ratings, progress from E1 through E3 is lock-step and after that promotions come sooner or later based on the criteria listed above. Then, for ratings in which the majority of promotions to E4 occur before the end of the first term (but not many people advance to E5), the speed of advancement to E4 will be the best measure of quality at the first reenlistment point. There will be other ratings in which there is variation in the speed of advancement to E5 and most promotions occur before the end of the first term. In these ratings, the appropriate measure of quality at the first-term reenlistment point is the speed of advancement to E5. Even within these groups of ratings, however, speed of advancement may not be comparable across ratings because the criteria are used differently or advancement timing is different.

There will be even greater differences for some ratings or occupational groups because they are given faster or more lock-step promotions to compensate for chronic recruiting and retention difficulties or to recoup the Navy's investment in more difficult and costly training. A fairly large number of first-term Sailors are in ratings (or EMCs) with little variation in the speed to E4 (especially those in the Nuclear Field and the Advanced Electronics/Computer Field), and for these and several other ratings, a fairly significant number will be promoted to E5 before the first-term reenlistment point. As a result, there is so little variation in speed of advancement to E4 and E5 that these are not meaningful measures of quality at the first reenlistment point.

Another important consideration is the time at which a Sailor entered the Navy. The size of entry cohorts differs from year to year. Since promotions are driven by vacancies, the number of vacancies and, hence, the promotion rate will be influenced by whether openings are stalled or speeded up by sizes of preceding cohorts. Another factor that depends on time is changes in the number of billets. Cutting (adding) billets in particular paygrades when a cohort is passing through the same point will decrease (increase) promotion rates.

Other factors that influence promotion rates and should be held constant when measuring quality include race and gender. Studies have shown that promotion rates are slower for blacks and females even when accounting for any other factors that might influence advancement. If race and gender are not held constant, some of the difference in promotion speeds that we are attributing to quality may instead be due to these race and gender effects. In order to have an unbiased quality index, it is necessary to hold race, ethnicity, and gender constant.

Empirical models

The Hosek and Mattock model

One of the most complete, and also most complicated, specifications of a theoretical and corresponding empirical model for estimating quality indices comes from reference [25].

The theoretical model proposes using AFQT as the entry characteristic.[31] The quality factor represents other characteristics that bear on promotion speed. Once the quality factor is estimated, it shows the weights that should be put on AFQT relative to the unobserved quality factor. This means that it provides weights by which various inputs can be converted into a single index of quality.

The model consists of three equations. The first relates the member's quality to his entry characteristics and the quality factor. Although the member's quality and quality factor are not observed, the model's parameters can be estimated through the effect of quality on promotion times. The second and third equations define the member's promotion time to E4 and E5 as a function of quality. This relationship can be expressed in different ways, but the authors speak of promotion density functions. The promotion density gives the member's time to E4 conditional on the member's quality and a given set of parameters. They control for the effect of censoring, that is, not all promotion outcomes can be observed either because the member leaves the Navy before promotion or reaches the end of the first term before promotion.

Estimating the model has two steps:

- Step 1: Estimate a statistical relationship between AFQT, unobserved quality and promotion speed to E4 and E5 for an entire group of enlistees.

- Step 2: Use estimates from Step 1 and individual AFQT and promotion speed to E-4 and E-5 to estimate individual quality.

In step 1, an overall quality index is estimated using a specification that includes observed components (such as AFQT and education) and an indirectly observed component (quality of job match). This overall quality index in turn affects the speed of promotion. They explain this as quality being "indicated" by promotion speed and "caused" by AFQT and the unobservable quality index.

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31. They did not use education because nearly all the enlistees in their data had high school diplomas.

They model time to promotion using a hazard function. They look at months and then see whether the person has been promoted by that month. Thus, they can observe either that a person gets promoted by a certain month, with some probability (this is the "hazard" of being promoted), or that a person has not been promoted by the end of the first term, with some probability.

They model the influence of quality on the time to promotion by using the quality index to shift the hazard function up or down. If quality is higher (lower) and the hazard function is shifted up (down), the probability of promotion in any given month, given that there has not already been a promotion, is higher (lower).

Given the parameters of the baseline hazard function, a "shift" parameter, and the direct measures of a person's quality, they calculate the probability that a person is promoted in a given month. The individual probabilities are then combined into a likelihood function, and parameters of this function are chosen that maximize the probability of observing the outcomes that are actually observed.

In step 2, the parameters of the promotion-timing model are used to estimate the expected value of the unobserved component of individual quality. The authors say:

> We can think of it as using the estimated relationship to "handicap" individuals for their observable characteristics; when we see how individuals perform relative to their handicap, we can get information about the unobserved component of quality.

Discrete speed of promotion models

The best model would be based on each person's "risk" of being promoted in each month. As we have seen, however, such models are quite difficult to implement. An easier, although less rigorous, approach would be to look at promotion speed relative to others at discrete points in time. These are the "speed to E4" or "speed to E5" models. In these models, Sailors are designated as being high quality if they are promoted at some rate higher than the average person. In one such model, the measure of quality is that high quality includes people who are in the top 25 percent in their speed of advancement to E4 or E5 [19]. Other measures could be defined, or this measure

could be made more complete, by making finer cuts on quality. For example, more levels of quality could be designated by looking at the top 10 percent, second 10 percent, all the way down to the bottom 10 percent.

These speed of advancement measures could then be adjusted for entrance quality, either by a simple regression or a more complex estimation method. The speed of advancement relative to entrance quality could then be regressed on other factors relevant to advancement speed, such as time of entry, race, and gender. This equation could be done separately for different ratings or EMCs, or rating could be controlled for in a single quality equation. The coefficients from these regressions based on an entire population could then be used as weights to estimate a quality index for each person.

Testing new quality measures

New quality measures need to be tested against a number of criteria:

- Do they add any value relative to other measures? Looking at quality as measured by speed to promotion, does the member-specific quality index do a better job of predicting quality than other variables? For example, in reference [25], the authors found that their member-specific quality factor (on average across occupations) explained from 54 to 87 percent of the variation in overall quality in different services. AFQT accounted for the remainder. This type of test could also be done relative to other measures, such as test scores, that might be used to predict promotion speeds.

- Are they useful in measuring the effect of quality on desired outcomes? One way to look at this is to examine the relationship between the new measures and reenlistment. Again using the results from [25], they find that, although AFQT alone is slightly negatively correlated with reenlistment, their quality index is highly positively correlated. This indicates that, while other studies that have measured quality by AFQT concluded that the Services have trouble retaining high-quality people, the new measure indicates that a large proportion of high-quality Servicemembers are being retained.

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