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The Time Is Now: Proposals for Two Enlistment Incentive Experiments

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Summary

Background

In the second half of the 1990s, recruiting became increasingly difficult for the Navy and, as a result, the Service sharply increased its use of enlistment bonuses (EBs) and the Navy College Fund (NCF).[1] Although the Service's use of these programs has moderated since the beginning of the current decade (the weaker civilian labor market has improved recruiting conditions), it seems likely that the Service will become increasingly reliant on enlistment incentives to attract personnel over the long term. Many of the jobs performed by Navy enlisted personnel are becoming increasingly technical, but a growing proportion of the more capable high school students are choosing to go on to college. In addition, fewer young people are being directed toward military service because fewer have family members, or other role models, with military experience. If the Service is to attract a sufficient number of technically capable recruits without increasing basic pay for all enlisted personnel, it will need to make greater use of recruiting incentives and other types of flexible compensation.

It is possible that the Navy will also need to make greater use of enlistment incentives to guide recruits toward critical ratings, off-peak ship dates, and longer terms of service. The Navy has concluded that, in order to compete for personnel with civilian employers, to improve retention, and to enhance workforce efficiency, it will need to offer recruits greater discretion in selecting both their rating and the terms of their enlistment. The Service's Rating Identification Engine (RIDE) and Job and Occupational Interest in the Navy (JOIN) initiatives will offer

[1] The budget for EBs increased from $17 million to just under $100 million, and the number of accessions promised the NCF rose from 2,000 to more than 10,000.

recruits more information about the enlistment options for which they are eligible, and will give them greater choice during the classification process. Under RIDE/JOIN, recruits may make different choices about their terms of enlistment than under the current system. If the Navy wishes to maintain the current pattern of accessions under these new initiatives, it may have to make greater use of enlistment incentives to influence how recruits select their ratings, ship dates, and lengths of service.

Shortcomings of existing research

As the Navy has been expanding the ratings for which it offers enlistment incentives, and has been using enlistment incentives to meet a wider range of objectives, administering these incentives has become increasingly complex—and the need for analytical work to support enlistment incentive policies has grown. Unfortunately, due to limitations of the available data, research has not kept pace with the Service's need for policy analyses, and the Navy currently has an incomplete picture of how these incentives influence recruit behavior.

When the Service began its enlistment incentive programs in the early 1980s, it offered incentives to only high-quality recruits who were entering a handful of more technical communities. At that time, the Navy had good analytic support for the administration of these policies because the Department of Defense (DOD) had commissioned careful tests of how enlistment incentives affect various aspects of recruit behavior.[2] An important aspect of these analyses was their use of experiments—recruits were assigned to different types of enlistment incentives in what were essentially random processes. Using experiments allowed researchers to separate the effects of enlistment incentives from all the other factors (e.g., economic conditions) that can influence recruit behavior. Moreover, the experimental data yielded results that were both specific and reliable: the analyses provided the military with precise estimates of the amount of additional funding that would be necessary to attract a specified number of high-quality recruits.

2 See Polich, Dertouzos, and Press (1986) and Fernandez (1982).

It has been 20 years since the enlistment incentive experiments were undertaken, and over this time there have been many changes in the military demand for Service personnel, in recruiting processes, and in the characteristics of the pool of potential recruits. As a result, it is unlikely that the findings from the initial enlistment-incentive experiments are valid in the current recruiting environment. More recently, several researchers have used nonexperimental data to explore the effects of enlistment incentives, and their analyses have suggested that these incentives may be effective in routing recruits among ratings, inducing personnel to accept longer terms of service, persuading recruits to delay their ship date, and reducing attrition.[3]

Several of these researchers, however, have pointed out serious limitations in analyses of enlistment incentives that employ nonexperimental data, and I argue throughout this paper that these limitations are severe. A fundamental issue is that, in analyses based on nonexperimental data, it can be very difficult to separate the effects of enlistment incentives from the other important determinants of recruit behavior.[4] One example that I discuss in detail in this report is the difficulty of separating the effect of classifiers from the influence of enlistment incentives. There is significant evidence that classifier effort has an important impact on recruits' enlistment decisions but, in the great majority of studies, this impact has been erroneously attributed to enlistment incentives. Other problems with using nonexperimental data can arise from errors in variables, high correlation among the values of enlistment incentives for various ratings, and/or small variation in enlistment incentives over an extended period: any of these problems can make it difficult to use statistics to determine how enlistment incentives affect recruit behavior.

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3 See Cox (2003), Golfin (2003), and Warner, Simon, and Payne (2001).

4 Murray and McDonald (1999, p. 52) describe the shortcomings of using nonexperimental data in analyses of enlistment supply and explicitly recommend that the Services undertake new experiments on enlistment bonuses and the Navy College Fund akin to those conducted in the 1980s. Warner, Simon, and Payne (2001, appendix B) provide detailed descriptions of many of the econometric problems associated with the use of nonexperimental data.

The need for better data

It is possible that the recent analyses have forgone the use of experimental data out of concern that collecting these data might be expensive, or could be disruptive of the enlistment process. However, the Navy could substantially improve its understanding of enlistment incentives by initiating a small set of experiments that could be undertaken without expanding the budget for recruiting resources and without creating obstacles to making recruiting goal.

The two types of information that the Navy would find most useful in setting the value of enlistment incentives would be how many more recruits are drawn into the Navy as a result of increasing incentives (the market-expansion effect) and how many shift from one rating to another (cross rating effects). If the Service had reliable data on both these effects, it would be able to quickly and effectively adjust enlistment incentives to alter the number of personnel entering the Service, and to more precisely redirect recruits from less critical ratings to more critical ratings.

Unfortunately, it is possible to obtain only one of these types of information from experiments that the Navy could undertake by itself. Gathering data on own-price supply responses would have to be undertaken across Services because such an experiment would require randomly altering enlistment incentives for different branches in different recruiting districts (very much as was done in the enlistment incentive experiments conducted in the 1980s).

Experiments on cross-rating effects, however, could be undertaken solely within the Navy, and analyses based on these data could yield significant improvements over the current methods used to set enlistment incentives. For example, if the Navy knew that there were strong cross-rating effects between the Aviation Structural Mechanic (AMS) rating and the Aviation Hydraulic Mechanic (AMH) rating, such that increasing the incentives for one would draw recruits from the other, the Service would know that it should coordinate changes in these incentives to minimize unwanted borrowing of recruits from one rating to the other. On the other hand, if the Service knew that there was no such cross-rating effect, it could adjust the incentives for these two ratings independent of each other.

The Navy could also greatly benefit from implementing experiments to determine the effect that classifiers have on channeling recruits among ratings. Asch and Karoly (1993) show that classifiers can exert more of an impact on recruits' decisions than a sizable enlistment bonus. However, they also point out that virtually every study of the enlistment process has failed to account for the effect of classifiers, and many have erroneously credited classifiers' influence to enlistment incentives. An experiment could determine the circumstances when classifiers are most effective in channeling recruits, and could also predict the effects of current RIDE/JOIN initiatives that might lessen classifiers' control over the enlistment process.

In this analysis, I offer detailed proposals for experiments that could determine (1) the cross-rating effects of enlistment incentives and (2) the impact of Navy classifiers on directing recruits' enlistment decisions. I also demonstrate that these experiments could be undertaken at low cost and with little disruption of the classification process. Given the sizable budget for enlistment incentives, the potential for improving efficiency in the use of incentives, and the modest cost of experiments, it seems likely that gathering better data on enlistment incentives could have a very high return on investment for the Navy.

The time is now

Undertaking experiments on enlistment incentives may now be especially timely. The Deputy to the Chief of Naval Personnel has observed that, with the recent improvements in the recruiting environment, the Service should now undertake longer term studies to disentangle the effects of various recruiting resources.[5] Moreover, Navy Personnel Research, Studies, and Technology (NPRST) is currently undertaking broad-based reforms of the computer and operational systems employed in the classification process, and CNRC may be able to "piggyback" on these efforts to develop the systems necessary to carry out experiments on enlistment

[5] Capt. Scott Slocum (USN Retired), N1B, in an address to CNRC staff, October 8, 2002, Millington, TN.

incentives and classification processes. Finally, CNA believes that the Navy's senior policy-makers are becoming increasingly receptive to the idea of conducting experiments: the Chief of Naval Operations, ADM. Vern Clark, recently stated that the Navy must "refine [its] requirements; optimally allocate resources; aggressively assess, train, and assign our people; and ***conduct focused experimentation*** to rapidly deliver new concepts and technologies to the fleet" (emphasis added).[6]

[6] See the January 2003 message that accompanied the release of the "CNO's Guidance for 2003."

Background and policy issues

Changes in the Navy's use of enlistment incentives

The last 10 years

Over the last decade, the Navy has greatly expanded its use of EBs and the NCF, and has changed the way it employs enlistment incentives. In the early 1990s, the Navy made modest use of these incentives, principally for attracting and routing high-quality accessions into the hardest to fill occupations: most bonuses were offered to recruits entering high-skill ratings who agreed to extended terms of enlistment (to 5 or 6 years) and who shipped in peak season (i.e., June through September). The Navy College Fund was targeted in a similar fashion.

In the mid-1990s, the Service began having more difficulty in meeting its recruiting goals and, as a result, greatly expanded its enlistment incentive programs. The Navy increased its budget for enlistment bonuses from less than $15 million in 1994 to just under $100 million at the end of the decade. This increase reflected both larger EBs being offered to recruits and a significant expansion in the number of recruits being promised bonuses. Use of the NCF expanded even more rapidly: between 1993 and 1994, the number of recruits promised the NCF increased from 2,000 to more than 10,000.

Longer term trends likely to drive enlistment incentives

While there has been some recent moderation in the use of incentives, as weakening in civilian employment conditions has improved the recruiting environment, other factors are likely to drive greater long-term use of enlistment incentives. Among these are changes in the youth population and the increasingly technical nature of many jobs performed by Navy enlisted personnel. Over the last two decades, more high school graduates have been going to college and fewer have had role models who have served in the military. At the same time, the Navy has been requiring greater technical capabilities of personnel in many enlisted ratings. If the Service is to attract increasingly scarce high-quality recruits without raising basic pay for all enlisted personnel, it will have to make greater use of flexible compensation mechanisms, such as recruiting incentives.

Changes that the Navy is considering in its classification processes could also increase the Service's reliance on recruiting incentives. Under the RIDE and JOIN initiatives, the Navy will allow recruits greater information about the enlistment incentives for which they are eligible, and more discretion in selecting their ratings, their ship dates, and the length of their initial terms of service.

While these reforms are expected to improve job satisfaction and retention, they may have significant and unpredictable effects on the classification process. At present, classifiers control the information that is available to recruits and can use this control to steer accessions into the most critical ratings and ship dates: a classifier may reveal information on only one or two of the most critical ratings for which a recruit is qualified. The only constraint on a classifier doing this is if the recruit refuses enlistment unless he or she is offered additional choices.

It is possible that, if recruits were allowed greater discretion over the classification process, they would select a distribution of ratings, ship dates, and lengths of obligation that would be less desirable to the Navy than that produced under the current system. If this were to happen, it would be necessary to use inducements, such as enlistment incentives, to steer recruits into choices that are more appropriate for the Navy's needs.

Greater complexity in administering enlistment incentives

As the Navy has expanded its use of enlistment incentives, it has offered EBs and the NCF to an increasingly diverse group of sailors, and has used these incentives to meet an increasingly complex set of goals. As a result, it has become a more complicated task for the Navy to set incentives at the right level—avoiding overspending (offering incentives greater than necessary to attract recruits and to steer them into desired terms of enlistment) and underspending (offering incentives that are insufficient to attract accessions into critical ratings, smooth lumps in the training pipeline, or induce recruits to sign for extended terms of service).

The Navy offices responsible for setting enlistment incentives have been struggling with the increased complexity of their tasks and have been seeking analytic support for their efforts.[7] One important issue with which they have been dealing is the changing character of those offered enlistment incentives. By 2000, the Navy was offering enlistment incentives of some type to the majority of recruits: in a departure from previous policy, the Service offered incentives to many lower-quality recruits and to off-peak accessions.[8] While the enlistment experiments of the early 1980s yielded good empirical work on how enlistment incentives affect high-quality accessions who enter high-tech ratings, these findings are now dated and there is little recent information on how other Navy recruits respond to EBs and the NCF.

Navy policy-makers are also having to determine enlistment incentives for a larger number of ratings, and little is known about either the "own-price response" or the "cross-rating effects" for the majority of job classifications. When policy-makers increase a set of enlistment incentives, they have little idea about how many more recruits will enter a particular rating, and whether any additional recruits who are entering a rating are being brought new to the Service or are being shifted from different ratings.

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7 The Commander Navy Recruiting Command (CNRC) and Military Personnel and Plans Policy (N13) have commissioned several analyses of enlistment bonuses over the last few years. See the sources listed in the bibliography.

8 Off-peak accessions are those who ship between October and May. Typically, they have been out of school for some time and have worked in civilian employment. Studies have suggested that these accessions are less likely than peak season accessions to complete their first term in the Navy. This may be because, for off-peak accessions, the military is probably not their first choice of career and these personnel may be entering the Service after having problems holding civilian jobs.

The job of those who set the value of enlistment incentives is further complicated by the fact that they must consider still other functions of enlistment bonuses and the NCF. The Navy has tried to use EBs to encourage recruits to delay (or accelerate) their accession and to induce recruits to accept longer obligations for the first term of service. Moreover, the Navy has also been studying the possibility that these incentives affect retention after accession.[9]

Unfortunately, as the Navy has been expanding the uses to which it applies enlistment incentives, there has not been corresponding growth in analytic work to help the Service administer these policies. The most carefully constructed work on enlistment incentives is dated: this work was based on experimental data that are now 20 years old. More recent studies of enlistment incentives have been based on non-experimental data and, as we will argue below, have produced findings that are less reliable and that offer poor policy guidance.

Better policy guidance will require better data

When Congress first authorized the EB and NCF programs in the early 1980s, it required that the Department of Defense conduct a careful test of how enlistment incentives affect various aspects of recruit behavior. This requirement resulted in the "Army College Fund Experiment" and the "Enlisted Bonus Experiment."[10] A critical element of these analyses was the use of experiments; recruits were assigned different types of enlistment incentives in what were essentially random processes. This is important because randomly generated enlistment incentives are uncorrelated with (unrelated to) any other characteristics of the recruit or the recruit's circumstances. Experimental data allow researchers to examine the effects of enlistment incentives on enlistment decisions in isolation from the many other factors that can influence recruit behavior.

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9 Many researchers have observed that to get the greatest advantage from the Navy College Fund, Service members must leave the military. On the other hand, Cox (2002) reports findings that suggest that the size of enlistment bonuses offered to recruits *may* be positively correlated with the probability that the recruits complete their first term of service.

10 See Polich, Dertouzos, and Press (1986) and Fernandez (1982)

Since these initial studies, however, several researchers have attempted to analyze the effects of enlistment incentives using nonexperimental data—administrative data that have been generated from the day-to-day operations of the EB and NCF programs. The use of nonexperimental data has produced several severe empirical problems for these analyses: endogeneity bias, omitted variables bias, errors in variables, and other difficulties. The authors of the recent research have employed a number of sophisticated econometric methods to overcome the difficulties associated with using nonexperimental data. Most of these authors readily admit, however, that the available econometric techniques have not been able to overcome the estimation problems associated with using nonexperimental data, and several suggest that their empirical findings must be viewed as inconclusive.

Among the authors who have used nonexperimental data, Murray and McDonald (1999) are particularly explicit in their discussion of the limits of econometric tools in overcoming the difficulties associated with analyzing how enlistment incentives affect enlistment supply. They write:

> Better estimates of enlisted supply will require better data. We recommend that the services consider experiments, akin to those conducted in the 1980s, to assess the effects of enlistment bonuses and educational benefits. Such experiments could insure independent variation in enlistment bonuses and education benefits, and hence allow a disentangling of their separate effects.

Structure of the paper

In the next sections, I discuss many of the empirical problems that arise from using nonexperimental data to analyze the effects of enlistment incentives, describe some of the econometric tools that researchers have used in their attempts to overcome these problems, and indicate the shortcomings of these tools. I also give further details of the benefits and costs of the two experiments that I am proposing.

Problems with using nonexperimental data

For more than a decade, the only policy guidance for those who set enlistment incentives has come from analyses based on nonexperimental data. These analyses have employed widely recognized statistical estimators and, in many instances, have produced findings that seem both plausible and precise. Unfortunately, the statistical estimators employed in these works have significant potential for bias when they are applied to the type of nonexperimental data that are available on enlistment incentives. As a result, both the estimated effects of enlistment incentives suggested in these works, and the statistical significance of these findings, are likely to be spurious. Several authors of recent studies have recognized the shortcomings of their analyses and have suggested that conducting experiments is the only way to ensure reliable and precise estimates of the effects of enlistment incentives.

The basic statistical tool: regression analysis

When researchers assess the effects of enlistment bonuses, they try to answer a simple question: "how does some aspect of recruit behavior respond when the Service changes an enlistment incentive, *holding all else constant*?" All the analyses that have addressed this question have used a simple, but effective statistical technique: multivariate regression analysis. This tool allows a statistician to define a dependent variable (perhaps a zero/one measure that indicates if a recruit enters a particular rating) and a set of independent variables (e.g., the value of various enlistment incentives, the unemployment rate, and demographic characteristics of the recruit), and to estimate how the dependent variable would respond if there were a change in *only one* of the independent variables.

This technique, however, can only be applied in a straightforward fashion if the data on which it is to be employed meet particular criteria:

- All explanatory variables are exogenous—that is, the values of the explanatory variables are determined independent of the values of the dependent variable. (If the values of an explanatory variable are determined *jointly* with the values of the dependent variable, the explanatory variable is said to be *endogenous*.)
- A researcher has data on *all* the factors that exert substantial influence on the behavior that is being analyzed. (There are no omitted variables that exert an impact on the dependent variable and that are correlated with the regressors.)
- The explanatory variables are measured with an acceptable level of precision (there is not a serious potential problem of measurement error).

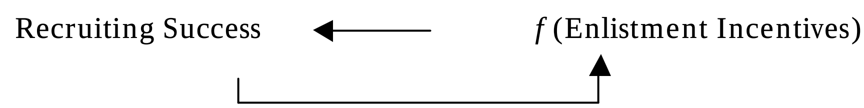
If these criteria are not met, there are various “work arounds” that researchers can apply to multivariate regression to compensate for inadequacies in data. These remedies, however, have significant limitations and researchers need to be aware that there may be no appropriate statistical “fix” to dealing with bad data—short of gathering better data. In this section, I describe four problems that arise from using nonexperimental data in analyses of enlistment incentives: endogeneity bias, omitted variables bias, errors in variables, and intractable data structure. In the following section, I discuss various remedies that researchers have applied in attempts to compensate for the shortcomings of nonexperimental data on enlistment incentives, and I argue that these “fixes” have not been adequate to the job. These fixes include the use of instrumental variables, fixed effects models, and “signing the bias.”

Simultaneity (endogeneity) bias

Several of the more recent studies of enlistment bonuses have used nonexperimental data to explore how *groups* of potential recruits respond to changes in enlistment incentives. For example, researchers have examined how the value of enlistment incentives awarded in various recruiting districts affects the number of people accessing from these recruiting districts. Group studies that use nonexperimental data face particular statistical problems because the *causal relationship* between enlistment incentives and enlistment behavior can run in either direction: recruits’ enlistment choices can depend on the value of enlistment incentives, but the value of incentives can also be driven by enlistment behavior.

Figure 1 presents an example of simultaneity bias. The illustration suggests that when enlistment incentives are increased, more persons are likely to enlist. When the general recruiting environment improves, however, policy-makers are likely to reduce the value of enlistment incentives. If researchers were to ignore the joint determination of enlistment decisions and enlistment incentives, their findings might suggest that smaller incentives actually improve recruiting conditions.

Figure 1. Simultaneous determination of recruiting success and enlistment incentives



Suppose we are trying to estimate the effect of enlistment bonuses on the ability to make goal (the left-facing arrow). We would need to recognize the effect of the recruiting environment on enlistment incentives (the right-facing arrow). Failing to do so could result in incorrectly assigning both effects to the action of enlistment incentives on recruiting success.

Omitted (missing) variables bias

Analyses of enlistment incentives based on either individual or group data are subject to a second estimation problem—omitted variables bias. If researchers are unable to include factors among their explanatory variables that have substantial influence on enlistment behavior and that are correlated with enlistment incentives, they may attribute to enlistment incentives the effects of these omitted variables. For example, during periods of difficult recruiting, the Service may increase a wide range of recruiting resources, including advertising, the number of recruiters, and enlistment incentives. If a researcher is able to include only enlistment incentives among his or her explanatory variables, the effects of the other, omitted recruiting resources might be attributed to enlistment incentives.

Almost all of the analyses that have been conducted on enlistment incentives are likely to have suffered from serious omitted variables bias. The greatest potential for this type of bias results from researchers having insufficient information on the role of military classifiers and on the economic factors that determine young peoples' willingness to enlist.

Omitting the classification process

Asch and Karoly (1993) provide strong evidence that classifiers exert a powerful influence over recruits' enlistment decisions: they show that classifiers can exert more of an impact on recruits' decisions than a sizable enlistment bonus. However, almost every study of the enlistment process has failed to account for the effect of classifiers and it is likely that many studies have erroneously credited classifiers' influence to enlistment incentives.

Classifiers play a central role in ensuring that recruits are matched with the ratings, ship dates, and lengths of service that provide the greatest benefit to the Navy. In a very short interview (often less than 15 minutes), the classifier must determine the ratings for which a recruit is eligible (based on ASVAB scores and the results of the medical exam), assess the recruit's career interests, and establish when the recruit will be available to ship. The classifier then discusses with the recruit a sequence of offers—each of which includes a rating, a ship date, a term of obligation, and enlistment incentives.

This process is often compared to negotiating with a retail salesperson, such as a car dealer: like the dealer, the classifier uses his or her control over the sequence in which offers are made to guide a customer (the recruit) to the choices that are most beneficial to the seller (the Navy). Just as manipulating negotiations in this way can increase profits in retail trade, it can significantly benefit the Navy by guiding the choices made by recruits.

Unfortunately, existing data do not reveal much about how classifiers sell enlistments to recruits: data taken from the day-to-day operations of the EB and NCF programs do not reveal the precise ratings, incentives, and terms of accession with which a recruit is presented. A recruit might qualify for a dozen ratings, each of these ratings might have different values of enlistment incentives associated with them, and each of these incentives might vary by both the length of obligation and ship date. Nevertheless, it is possible that a classifier might present this recruit with only a single rating, a single term of obligation, a single ship date, and a single enlistment incentive. The recruit might sign a contract without being aware of any of the other options from which he or she might have chosen. This has serious implications for analyses of enlistment incentives, because failing to control for the classification process can distort empirical results.

What biases result from omitting the classification process?

Omitting the classification process from among the variables that explain recruits' enlistment decisions can result in either understating or overstating the financial effects of enlistment incentives.

Understating the financial effects of incentives

Some studies of enlistment incentives have implicitly assumed that recruits are presented with all the ratings and all the enlistment incentives for which they are eligible. If, in actuality, recruits are presented with only a portion of the options for which they qualify, these studies may underestimate the impact of financial incentives on the behavior of recruits. To see this, consider a researcher who wishes to assess how a large increase in the enlistment bonus for a particular rating has affected the number of recruits who entered that rating. Suppose that, unknown to this researcher, only a small portion of eligible recruits were ever presented with the rating or told of the large enlistment bonus but that, among those who *were* told of the bonus, a large percentage chose to enter the rating. If the researcher were to incorrectly assume that all eligible recruits were told of the rating and the enlistment incentive, he or she might erroneously conclude that the bonus had only a modest impact on the choices made by recruits.

Overstating the financial effects of incentives

Because classifiers have significant discretion over how they present ratings, terms of enlistment, and incentives, their actions have a large impact on the choices made by those entering the military. The decisions that classifiers make are, in turn, formed by both the incentives that they face and the information that the Service provides to them. One way that the Navy communicates with classifiers is through changes in enlistment incentives: a sharp shift in the enlistment incentives offered for a particular rating, ship date, or term of obligation tells a classifier that the Navy wants recruits to be steered in a different direction.

Classifiers can be expected to change the options that they "push" in their interactions with recruits as a result of changes in enlistment incentives. In analyses based on existing data, it is not possible to determine how much of recruits' response to changes in enlistment incentives results from a change in classifiers changing the options that they "push" and how much results from changes in the financial choices with which they are presented.

Omitting important economic variables

Analysts who explore how enlistment incentives affect recruiting decisions often include measures of labor market conditions among their explanatory variables. These may include the unemployment rate for teenagers and a measure of how civilian pay compares with military pay. For several reasons, these measures of labor market conditions can do a poor job of representing the economic factors that recruits weigh when making enlistment decisions.

Comparing military apples with civilian apples

One difficulty arises from the way economists evaluate military and civilian pay. The usual method is to compare the estimated lifetime pay of Service members in a particular rating with lifetime earnings of similar workers in the private sector. For example, one would compare the career earnings of an NF with earnings of civilians performing similar functions in a civilian nuclear facility. This is a reasonable method for comparing military and civilian pay for those who are already firmly established in a Navy rating and who, if they were to leave the Service, would likely take a civilian job that is similar to that which they had in the Navy.

This approach, however, is less useful for comparing civilian and military alternatives for those who are completing high school and who are considering entering the military. These people will decide on military Service by comparing the career pay for particular ratings with a wide range of civilian alternatives, such as attending college or pursuing a private sector career for which there may be no close substitute in the military.

The economic conditions of the late 1990s vividly displayed the shortcomings of the standard apples-to-apples approach of comparing military and civilian pay. There was a significant rise in the returns to attending college. Moreover, many technically minded high school graduates were able to find high paying positions in such fields as web-page design for e-commerce firms. Because they did not reflect the full range of options that were open to the recruit-age population, the standard measures of military and civilian pay may have done a poor job of capturing how the labor market of the 1990s affected enlistment decisions.

Recruits care more about immediate payoffs

Another shortcoming of the standard measures of military and civilian pay is that they do not take into account that young people—those in the recruit age population—often place a very high value on near-term income.[11] Policy-makers might view a heating-up of wages in a period of low unemployment as being a short-term phenomenon that would produce only a modest increase in lifetime earnings in civilian employment. The Services might respond to such a change with a modest rise in military basic pay. The recruit-age population, however, would likely be more impressed with the short-term change in civilian wages than with the modest change in basic pay, and would place a greater value on civilian employment.

[11] See Warner and Pleeter (2000).

What biases result from omitting economic variables?

Since it is not possible to include adequate measures of the economic factors that drive recruits' enlistment decisions, it is useful to consider the direction of bias that would result from these unobserved variables. The scope and sign of omitted variables bias will vary by the type of enlistment behavior we are considering. However, it seems likely that, in an analysis of the market expansion effects of enlistment incentives, omitting relevant economic variables would result in *understating* the effects of enlistment incentives: any unobserved economic factors that work against accessions are likely to be positively correlated with the value of enlistment incentives. As a result, any positive effects that these incentives have on market expansion are likely to be obscured by unobserved economic factors.

Other problems with using nonexperimental data

Errors in variables and attenuation

In addition to the potential for endogeneity bias and omitted variables bias, researchers who use nonexperimental data on enlistment incentives must also be concerned about errors in the measurement of enlistment incentives. Murray and McDonald (1999) indicate that poor measurement of the value of enlistment incentives is likely to have had severe effects on the results of their analysis; they suggest that data derived from experiments would be less prone to measurement error. Golfin (2003) provides a useful and detailed description of the many problems involved in using administrative data to determine the type of enlistment incentive that a recruit is offered.

In practice, the problem of measurement error is very similar to the problem of omitted variables. Greene demonstrates that when one of the explanatory variables in a multiple regression analysis is measured with error and this error is random, the estimated coefficient on the badly measured variable is biased toward zero.[12] The estimated coefficients for all of the other variables in the regression (variables that are measured without error) are also biased, but the sign of this bias is unknown.

[12] This is known as attenuation: see Greene (2000) p. 378.

Problems with data structure

Another problem with using data taken from the day-to-day operation of the EB program is that the Navy often implements lockstep adjustments of EBs across ratings: when it changes incentives, the Navy often adjusts the EBs for all ratings by some fixed proportion.[13] This is especially problematic when analyzing the "cross-rating effects" of enlistment bonuses—the effects of changing the value of the incentives for one rating on the number of accessions going into other ratings. An analyst may observe significant variation in the EBs offered for a particular rating, but virtually no change in the *relative* value of EBs across ratings. As a consequence, he or she may be able to say little about how changes in the relative value of EBs affect accessions across ratings.

Similarly, variation in enlistment incentives over extended periods is often very low. For example, among those who accessed into the nuclear field during the peak season of FY97, the average EB was $3,300, but the standard deviation was only $113. This lack of variation hampers evaluation of both own-price supply effects and cross-rating supply effects. These problems would not exist with experimental data, however, because one can design into the experiment the desired variation and correlation of incentives.

[13] Golfin (2003) discusses in detail how the Navy often makes simultaneous, proportionate changes in the enlistment incentives for different ratings. In their analysis of Army incentives, Murray and McDonald (1999) observe that "bonuses and the Army College Fund have generally been changed in tandem, making it difficult to estimate their separate effects on enlistment behavior."

Tools for dealing with estimation problems

Instrumental variables

Various statistical techniques can be used to try to overcome problems of endogeneity bias, omitted variables bias, and errors in variables. In the recent analyses of enlistment incentives that have employed nonexperimental data, the instrumental variables (IV) technique has been commonly used.[14] To apply this technique in an analysis of the effect of enlistment incentives on recruit behavior, a researcher would have to find some variable (or group of variables) that affects the size of the enlistment incentive that is offered to a recruit, but that otherwise has no impact on the choices made by the recruit. As discussed in Cox (2003), it seems unlikely that such "identifying variables" exist in cross-sectional data: because the offer of an enlistment incentive is determined jointly with a recruit's enlistment decision, it seems improbable that there could be factors that would affect the enlistment incentive without also affecting the enlistment decision.

In an analysis of various enlistment incentives that employs *panel data*, Warner, Simon, and Payne (2001) attempt to use IV to overcome potential bias resulting from the endogeneity of enlistment bonuses in panel data. The instrument that they use is lagged values of recruiting shortfalls: the difference between contract mission in a month and the number of contracts achieved. The authors point out, however, that this approach is problematic. In fact, they use this instrument only in their analysis of Army data and reject its use in their analysis of Navy enlistment incentives (in

[14] Davidson and MacKinnon (1993) provide a rigorous and very complete discussion of instrumental variables. Other solutions that have been attempted for errors in variables include weighted regression and latent variables models (linear structural relations models): see Greene (2000). For an intuitive discussion of the solutions that have been attempted for endogeneity bias, see Kennedy (1998).

their analysis of the Navy data, they are unable to find any appropriate technique to address the problems of potential endogeneity bias).[15]

Fixed effects models

A technique that has been used to reduce the potential for missing variables is using a "fixed effects model" (or two-way fixed effects model). In both Cox (2003) and Warner, Simon, and Payne (2001), this approach entails including binary explanatory variables that represent the year of accession and the month of accession (or the season of accession). At first glance, it would appear that this approach would go a long way towards eliminating the potential for estimation bias. Warner, Simon, and Payne (2001) write that college benefits and enlistment bonuses "vary over time, but not [across] state[s]. By definition, then, neither of these variables can be correlated with… omitted state effects. The possibility that they are correlated with omitted time effects is reduced considerably by the inclusion of dummy variables for fiscal year and for month."

The problem with this approach is that it assumes that the de jure values of enlistment incentives—the current value of enlistment incentives as reported in Navy messages sent to classifiers at MEPS—are the values of enlistment incentives that are actually presented to recruits. In a previous section, I indicated that classifiers are likely to reveal information on only some of the ratings

15 There may also be problems with their use of this instrument in their analysis of the Army data. Several researchers have pointed out that recruiting goal is endogenous; this is discussed in Appendix B of Warner, Simon, and Payne (2001) and in Berner and Daula (1993). Despite the fact that Warner, Simon, and Payne (2001) use *lagged* values of recruiting goal in their instrument for enlistment bonuses, their estimations may still be subject to endogeneity bias. Deaton (1997) writes "it is important to realize that … simultaneity cannot usually be avoided by using lags to ensure that the right-hand side variables are prior in time to the left-hand side variables. If x precedes y, then it is reasonable to suppose that y cannot affect x directly. However, there is often a third variable that affects y today as well as x yesterday, and if this variable is omitted from the regression, today's y will contain information that is correlated with yesterday's x."

for which a recruit is qualified. Many ratings that carry enlistment bonuses are likely to be mentioned to only a fraction of eligible recruits (this is particularly true of ratings that are *not* the most critical and ratings that have only a small community of Service members). When a recruit is not informed of a rating that carries an enlistment incentive, the de jure incentive is meaningless to the recruit.

In some instances, the difference between the de jure and de facto values of enlistment incentives will be random—a simple consequence of different classifiers choosing to "push" different ratings to different types of recruits. In such cases, the "errors in variables" are likely to be uncorrelated with any important omitted variables, and the estimated effects of enlistment incentives will be biased towards zero.[16]

In other situations, however, the difference between the de jure and de facto values of enlistment incentives may be correlated with potentially important omitted variables, such as classifier effort. To illustrate this, recall that Navy Recruiting Districts (NRDs) are issued with both goals and ceilings for the number of recruits that should be classified into various high priority ratings and programs. In an NRD that has traditionally hit its ceiling for a particular rating, classifiers are less likely to discuss this rating with a recruit or to mention any enlistment incentive associated with this job. However, in an NRD that has usually had difficulty hitting its monthly goal for this rating, classifiers could be expected to "push" eligible recruits into this job. This suggests that the difference between the de jure and de facto enlistment incentives may be correlated with classifier effort.[17]

The findings in Golfin (2003) imply that there may be *many* instances in which the de jure values of enlistment incentives differ from the incentives that are actually offered to recruits. The

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[16] Attenuation bias (bias resulting from errors in measurement of explanatory variables) is discussed in a previous section.

[17] As discussed earlier, in analyses of enlistment incentives, it is not possible to predict the sign of the estimation bias that results from ignoring the impact of classifiers.

analysis shows that, among NRDs, there are large differences between (1) the predicted proportion of recruits who access into the NF program and the AECF rating and (2) the actual proportion who access into these communities.[18] Perhaps the most plausible interpretation of these results is that, across NRDs, there are large differences in the proportion of eligible recruits who are presented with a particular rating (and its enlistment incentive).

Signing the bias

Another approach to analyzing the effects of enlistment incentives when facing the possibility of endogeneity bias, omitted variables bias, or attenuation bias is to undertake standard multivariate regression analysis, to recognize that the results of this analysis may be biased, and to estimate the likely sign of this bias. When analyzing a *continuous* dependent variable, one can determine the bias that would result from omitting an important variable *if* one is confident about how the omitted variable is correlated with the dependent variable and how the omitted variable is correlated with the independent variables that are included in the regression. If one can "sign the bias" in this way, regression results can be interpreted as providing either a floor or ceiling for the true relationship that we wish to estimate. If a researcher can apply this approach, he or she could assert that the true relationship between two variables is *at least* that suggested by the regression results, or *at most* that suggested by the regression results.[19]

[18] These predictions are derived from regressing the proportion of recruits accessing into these communities against various personal characteristics of the recruits and the unemployment rate in the recruits' home states.

[19] Yatchew and Griliches (1984) show that it is typically *not* possible to sign omitted variables bias in regressions with binary dependent variables. Cox (2003) shows a narrow set of circumstances when it is possible to sign estimation bias in regressions with binary dependent variables.

A proposed course of work

In this section, I propose two experiments that the Navy could undertake that would reveal important information about the enlistment process, that would be low cost, and that would not hamper the Service's ability to meet its accession goals. The first of these experiments would allow the Navy to measure the effect that classifiers exert in directing recruits to terms of enlistment, and to develop better policies for directing classifiers' efforts. (What little analysis currently exists on this topic suggests that classifiers play a critical role in the enlistment process, but that their influence is often spuriously attributed to enlistment incentives.) The second experiment that I suggest would allow the Service to quantify the cross-rating effects of enlistment incentives. Such experiments would give the Navy greater insight on how it should coordinate enlistment incentives across different ratings and could reduce unwanted "borrowing" of recruits from one rating to another.

It seems likely that there would be large returns on investment if the Navy were to undertake these experiments: their costs are so low that they could be recouped in a short period with even small improvements in the management of enlistment incentives. I describe some of the costs of experiments in this section. I have intentionally kept these observations rather general because it is not possible to give a closely defined estimate of the costs of an experiment unless one has decided *exactly* what question one is trying to answer, from what population of individuals one is one seeking this answer, and at what level of precision one requires the answer. Following the description of costs, I offer detailed discussions of the experiments, how they would be carried out, and their associated benefits.

The most critical costs

Advertising

If DOD were to use experiments to assess the effects of enlistment incentives on attracting personnel to the Navy (market expansion effects), it would need to ensure that the target population from which it draws its recruits would be informed about the incentives for enlisting. If the Service believes that its current level of advertising is inadequate to inform potential recruits of expanded incentives, it would need to increase its advertising budget in the markets in which it was conducting experiments.[20]

For most types of experiments, however, it would not be necessary to expand advertising. If the Navy were to use an experiment to assess the impact of enlistment incentives on inducing recruits to select a specific rating, classifiers could simply inform recruits of different levels of enlistment incentives during the classification process.

The budget for incentives and disruptions in classification

The central idea of an experiment on enlistment incentives is that the recruits who make up the "control group" are offered one level of incentive, while those who are in the "study group" are presented with a different level of incentive. On first thought, one might worry that, in order to undertake an experiment, the Service might have to bear the cost of increasing incentives—this would be the case if the incentives for the "control groups" were to be kept at their current levels while those for "study groups" were to be increased. Conversely, one might be concerned that implementing an experiment could significantly hamper the Service's ability to make goal: if incentives were kept at their present level in the

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[20] Because experiments on market expansion effects would require the levels of incentives to be advertised, these experiments would have to vary enlistment incentives across geographic regions and keep incentives consistent within specific advertising areas. When advertising is not required for an experiment, different enlistment incentives could be offered to similar individuals within a region.

control group and *decreased* in the study group, few recruits might access from the study group (or recruits in the study group might be less inclined to the terms of enlistment that are most advantageous to the Navy).

Many experiments could be designed, however, so that the Navy would *not* have to expand its budget for enlistment incentives or compromise its classification objectives. The Service could set the level of incentive for the control group somewhat below its current level and the level of incentive for the study group somewhat above the current level. This would be budget neutral.

Under such an arrangement, it is likely that there would be little change in the overall distribution of enlistment decisions among recruits. The recruits in the control group would be somewhat *less* likely to select the terms of enlistment that are favored by the Navy, while those in the study group would be *more* likely to choose the preferred terms of enlistment: in total, the two effects could more or less offset each other.[21]

Setup costs

Before initiating any type of experiment, the Service would have to undertake three initiatives:

- Creating computer programs to determine what offers are made to recruits. The Navy collects data on both the offers for which a recruit is qualified and the offers that are presented to a recruit. Researchers who have used these data have indicated that their structure is unwieldy and that evaluating this information would require substantial programming effort.[22] The Service's enlistment software

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[21] The experiments would be budget neutral and would not create obstacles to making goal as long as recruits' responses to changing enlistment incentives were linear around the initial level of enlistment incentives; that is, as long as an increase of $1 in an enlistment incentive from its initial level had exactly the *opposite* effect on recruits' behavior as a decrease of $1 in this incentive. Beyond this requirement, it would not matter whether recruits moved toward or away from ratings that experience an increase in enlistment incentives.

[22] David Alderton of NPRST provided information on these data.

(OCEAN/RIDE) should be modified so that researchers can more easily determine the order in which enlistment options are shown on the computer screens presented to classifiers.

- Creating computer algorithms, to be added to the software used during the classification process, that would tell classifiers what ratings and terms of enlistment they should offer to recruits. A central function of these algorithms would be adding some degree of randomization to the enlistment choices that are offered to recruits.
- Identifying and implementing incentives that would ensure classifier participation in the experiments. Perhaps the single most important element for the success of an experiment would be ensuring that classifier interactions with recruits conform to the objectives of the experiment. Those who administer Navy recruiting would have to ensure that the incentives of everyone involved in the classification process were consistent with carrying out the instructions of the experiment. For a discussion of classifier incentive plans used by different branches, see Asch and Karoly (1993).

Some of this "setup work" is already underway. The CNA Corporation is undertaking an evaluation of the incentives facing Navy classifiers and is assessing better methods for informing classifiers of the Navy's priorities in assigning recruits to ratings and ship dates.[23]

An experiment on the impact of classifiers

Purpose

The purpose of this experiment is to assess the effectiveness of methods that classifiers use in guiding the enlistment decisions of recruits and to implement improvements in these methods.

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[23] The Classifier Study, a CNAC initiative for CNRC and N-1.

Rationale for analysis

One of the few things that is evident in the classifier process is that recruits are most likely to choose enlistment options from among the first *several* options that are presented to them. It is unclear, however, how effectively classifiers can persuade recruits to choose *specific* ratings, ship dates, and other terms of enlistment. It is also unclear whether classifiers are exerting their influence in an efficient manner. Classifiers are often dealing with difficult logistics and poor information: typically, they can talk with a recruit for less than 15 minutes, they are able to give recruits only sketchy information on the enlistment options for which they qualify, and they operate with only partial data on the Navy's priorities for filling various recruiting slots.

The only credible way to assess the influence of classifiers is with an experiment that randomly assigns the sequence of offers that are presented to recruits. For example, if there were two similar recruits who qualify for both the *x* rating and the *y* rating, classifiers might be instructed to promote *x* to one and to promote *y* to the other. Without randomly determining the sequence of offers, the first options presented to a recruit would likely be those that the classifier believes will be of greatest interest to the recruit. If one cannot separate the sequence of offers from the recruit's (unobserved) intrinsic interests, it is not possible to assess the influence that classifiers have over the enlistment process.

The scale of the experiment

Once the Service has undertaken the initial setup costs discussed earlier, experiments on the role of classifiers would be "scalable." The Service could start with a very modest experiment—perhaps involving several hundred personnel—and, if it wished, could expand this over time. For example, the Service might examine whether the classifiers at a particular set of MEPS are effective in influencing the enlistment decisions of high ASVAB recruits who will enter DEP in their last year of high school. Over time, this experiment could be expanded to include other MEPS and other classifications of recruits.

Potential benefits

If, as seems likely, there is significant scope for improving the way classifiers influence the recruiting process, the Navy may be able to gain substantial benefit from identifying better methods and incentives for classifiers. While it is not possible to estimate a precise dollar value of these potential benefits, a rough frame of reference might be taken from Asch and Karoly (1993). Their study suggests that classifiers exert significant influence over recruits' decisions (i) to enter a particular rating and (ii) to accept a longer term of obligation: their influence is just as powerful as a substantial enlistment incentive.

The costs of the analysis

This would be a low-cost analysis because it would require no increase in the budgets for either enlistment incentives or advertising. Other than the setup efforts (discussed previously), the principal costs would be for research analysis and related data programming support. Costs would be minimized if this experiment were undertaken over only a single year, and involved a sample of relatively homogeneous recruits (recruits who had similar ASVAB scores and who qualified for similar ratings).

The experiment should entail no interruption in the classification process. The set of options that classifiers would be instructed to "push" would be aligned with both classifiers' incentives and the Navy's requirements for routing personnel into various ratings and ship dates. Moreover, the experiment should not result in any reduction in the number of contracts that are completed: personnel who were not receptive to the initial offers presented by their classifier would be shown alternative enlistment options.

What would this experiment look like?

The implementation of this experiment would be straightforward. Once results were available from a recruits' ASVAB and medical exams, a computer algorithm would search among all of the ratings for which a recruit is eligible and would randomly pick one of the ratings that is most critical, together with an available ship date for this rating. This rating and ship date would appear on the classifier's computer monitor. The classifier would know that he or she would receive some benefit for assigning this recruit to this rating and ship date, but would also face a penalty if the recruit should walk away without signing a contract. If the recruit is not willing to accept the specified rating and ship date, the classifier would offer other options.

What information would this experiment yield?

The data generated from this experiment would enable a researcher to assess how the number of personnel assessing into a particular rating could be influenced through the "moral suasion" of the classifier. The experiment might identify particular types of recruits or particular ratings for which this sort of moral suasion is particularly effective.

An experiment on the cross-rating effects of incentives

Purpose

The purpose of this experiment is to assess how the number of recruits entering one rating is affected by changes in the value of enlistment incentives for other ratings.

Rationale for analysis

Until the mid-1990s, the Navy's principal objective in using enlistment incentives was to direct high-quality recruits into hard-to-fill, high-tech occupations (e.g., the NF field or the AECF rating). In recent years, the Service has greatly expanded the way it uses enlistment incentives, but the Navy continues to rely on EBs and the NCF to route recruits into critical ratings. Despite its reliance on this policy tool, the Service has very incomplete information about the way enlistment incentives affect recruits' selection of rating.

One open question is especially important to the Service: when the Navy uses enlistment incentives to shift recruits into a critical rating, from where are these recruits coming? The Navy intends that larger incentives will either bring additional personnel into the Service or shift recruits away from other, less critical ratings. It is possible, however, that increasing the enlistment incentive for one critical rating will simply shift recruits away from other critical ratings.

Failing to understand the cross-rating effects among various occupations could have significant financial consequences. To illustrate this, suppose that enlistment incentives for a particular set of critical ratings had weak market expansion effects, but strong cross-rating effects. If the Navy were unaware of these effects, it might respond to a difficult recruiting environment by raising enlistment incentives in these ratings. This expansion of enlistment incentives would have little impact beyond redistributing personnel within this set of critical ratings.

To get a useful picture of the cross-rating effects of enlistment incentives, one would need to undertake a range of different experiments. One reason for this is that cross-rating effects of enlistment bonuses are likely to differ among different sets of ratings: changing enlistment incentives for the CTI rating (linguists) and the MA rating (Master-at-Arms) would draw recruits from different occupational groups. Moreover, cross-price effects may also differ by the personal characteristics of recruits. For example, increasing the enlistment bonus for a particular rating might attract many persons who are overqualified for this occupation, but attract fewer personnel who are only marginally qualified (or vice versa). Finally, cross-rating effects may differ by the season in which recruits enter DEP or by recruiting district.

The scale of the experiment

The Navy could begin experiments on cross-rating effects on a small scale—initially focusing on a few critical ratings and some select groups of recruits. For example, the Service could assess whether offering increased enlistment incentives to high-quality, peak season recruits entering the AECF rating would shift recruits away from the NF field. The Navy could later expand experiments on cross-rating effects to other critical ratings and other groups of recruits.

Potential benefits

The benefits of experiments on cross-rating effects would derive from making more efficient use of enlistment incentives. If the Service had full knowledge of both the market expansion and cross-rating effects of enlistment incentives, it could set these incentives with a *joint* optimization program: the level of each enlistment incentive would be increased until the benefit of market expansion effects, minus the monetary cost of the enlistment incentive, equaled the net cost (or benefit) of drawing personnel from other ratings.[24]

Experiments on cross-rating effects would provide the Navy with only part of the information necessary for this type of ideal optimization scheme—the Service would know the monetary cost of the enlistment incentive and the net cost (benefit) of drawing recruits from other ratings. Having just this partial information, however, would permit significant improvements over the current methods used to set enlistment incentives. For example, if the Navy knew that there were strong cross-rating effects between the Aviation Structural Mechanic (AMS) rating and the Aviation Hydraulic Mechanic (AMH) rating, such that increasing the incentives for one would draw recruits from the other, the Service would know that it should coordinate changes in these incentives to minimize unwanted borrowing of recruits from one rating to the other. On the other hand, if the Service knew that there was no such cross-rating effect, it could adjust the incentives for these two ratings independent of each other.

The costs of analysis

The experiments could be implemented with budget neutral changes in incentives—recruits in the control group would be of-

[24] A net benefit (cost) would be created if the cross-rating effects of an enlistment incentive resulted in personnel moving into a rating from other less (more) critical ratings.

fered an enlistment incentive below the current level and those in the study group would be offered an incentive above the current level. Also, there would be minimal disruption of the classification process: the control group would be less likely to enter the rating under examination, while those in the study group would be more likely to enter the rating.

The largest *potential* expense would be the "setup costs" discussed earlier—the costs associated with programming, database work, and the implementation of appropriate incentives for classifiers. However, if these costs have already been expensed in a previous project (e.g., the classifier analysis), they would not have to be borne in the current analysis. The principal costs for the current initiative would be for research analysis and a small amount of project specific programming.

What would the experiment look like?

Once results are available from a recruit's ASVAB and medical exams, a computer algorithm would search among all of the ratings for which a recruit is eligible and would randomly pick one of the ratings that is most critical, together with an available ship date for this rating. The computer program would randomly assign the recruit to either the control group (those who are offered an enlistment incentive smaller than that which is currently offered) or the study group (those who are offered an incentive that is larger than that which is currently offered). This rating, ship date, and enlistment incentive would appear on the classifier's computer monitor. The classifier would know that he or she would receive some benefit for assigning this recruit to this rating and ship date, but would also face a penalty if the recruit should walk away without signing a contract.

Conclusion

In this report, I argue that findings from the analyses of enlistment incentives conducted over the last decade should be considered flawed and that the Navy should refrain from taking policy recommendations from these works. The central element of my argument is that there do not exist adequate statistical techniques for dealing with the estimation problems that arise from analyzing nonexperimental data on enlistment incentives. This assertion is echoed in other works conducted by both the Center for Naval Analyses and the Rand Corporation.[25]

I propose two initiatives that the Navy could undertake that would significantly improve the Service's understanding of enlistment incentives: (1) an experiment to determine the cross rating effects of enlistment incentives and (2) an experiment to determine the impact of Navy classifiers on directing recruits' enlistment decisions. I demonstrate that these experiments could be undertaken at low cost and with little disruption of the classification process, and that gathering better data on enlistment incentives is likely to have a high return on investment for the Navy.

Finally, I suggest that the time may now be especially propitious for undertaking experiments on enlistment incentives. NPRST is currently undertaking broad-based reforms of the computer and operational systems employed in the classification process, and CNRC may be able to combine efforts with NPRST to develop the systems needed to carry out experiments on enlistment incentives and classification processes. Moreover, senior policy-makers within the Navy have recently voiced their support for conducting experiments and for disentangling the effects of various recruiting resources.

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[25] See Golfin (2003) and Asch and Karoly (1993).

Abbreviations and acronyms

AECF	Advanced Electronics & Computer Field
ASVAB	Armed Services Vocational Aptitude Battery
CNRC	Commander Navy Recruiting Command
DOD	Department of Defense
EB	Enlistment Bonus
JOIN	Job and Occupational Interest in the Navy
MEPS	Military Enlistment Processing Station(s)
N13	Military Personnel and Plans Policy
NCF	Navy College Fund
NF	Nuclear Field
NPRST	Navy Personnel Research, Studies, and Technology
RIDE	Rating Identification Engine
ROI	Return on Investment

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