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Navy Recruiter Productivity and the Freeman Plan

Beth J. Asch

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PREFACE

This report describes an analysis of the incentive and potential disincentive effects of a Navy recruiter incentive program called the Freeman Plan. It should be of interest to policymakers concerned with the effectiveness of Navy recruiting resources, those who manage recruiters, the defense manpower research community, and individuals with a general interest in the use of incentive plans in motivating workers to increase productivity.

The research was sponsored by the Assistant Secretary of Defense (Force Management and Personnel). The report was prepared within the Defense Manpower Research Center, part of RAND's National Defense Research Institute, a federally funded research and development center sponsored by the Office of the Secretary of Defense and the Joint Chiefs of Staff.

SUMMARY

In the coming years, the Navy's pool of potential 17- to 21-year-old recruits is expected to diminish as the youth population declines and civilian wages increase relative to military wages. To meet its future recruiting objectives, the Navy must therefore effectively manage its limited recruiting resources. One potential strategy for aiding the Navy's future recruiting effort is to alter its recruiter management techniques, particularly its incentive program.

The Navy has both a quota system and an incentive program for its recruiters. Recruiters are assigned a monthly quota that emphasizes high quality recruits;[1] they are required to meet their high quality quotas first (so that if they underproduce, they will underproduce low quality recruits). However, no rewards are given for meeting or exceeding quotas.

To motivate recruiters to increase the quantity and quality of enlistments, the Navy instituted in the 1970s a national incentive program, the Freeman Plan, which is tied not to quotas but to a point system. The Freeman Plan awards recruiters different points for recruiting high and low quality enlistees. More points are earned for enlisting high-quality recruits because they are thought to be more productive in the military and because they tend to be more difficult to enlist since their private sector opportunities are often better. The points are accumulated over a 12-month period, called a production cycle. If a recruiter's average accumulated points at the end of the cycle exceed predetermined reward levels, a reward is given, ranging from a certificate of commendation to promotion to a higher paygrade, depending on the number of points.

The recruiters' objective is to maximize their chances of winning a reward, and to that end they develop a strategy for earning points. They decide on their level of effort over a production cycle and over their tenure (usually 36 months), allocate their time to various recruiting activities, and, in each month of the 12-month cycle, choose the combination of high and low quality enlistments that maximizes their points. There is a tradeoff between high and low quality recruits: high quality recruits earn them more points, but low quality recruits take less effort to recruit.

[1]The quality of a recruit is determined by whether or not an individual is a high school graduate and by his or her score on the Armed Forces Qualification Test (AFQT). High school graduates who score in the top 50th percentile on the AFQT are considered high quality recruits. All other recruits are considered low quality.

PURPOSE OF THE STUDY

The objective of this study was to determine whether the Freeman Plan results in a pattern of behavior in recruiters consistent with the Navy's recruiting goals. Some of the questions explored were: Is there a conflict between the quota system and the incentive program? (For example, do the incentives in the Freeman Plan encourage recruiters to enlist more low quality recruits?) How does the Freeman Plan affect recruiters' choices concerning level of effort and allocation of effort? And finally, what is the Freeman Plan's effect on the time pattern of enlistments? By examining enlistment outcomes over time in light of the Freeman Plan, two life-cycle phenomena can be explored. First, the relationship between productivity and recruiter experience can be determined under the Freeman Plan and compared to the relationship found in past studies when workers did not participate in an incentive program. Second, insights can be gained into how recruiters, in their attempt to win rewards, vary productivity over the 12-month production cycle.

APPROACH

A theoretical construct was developed to analyze how the Freeman Plan affects productivity. This construct provides a framework for interpreting the empirically observed enlistment patterns in light of the Freeman Plan. In particular, we analyze how recruiters choose their effort and enlistments at a point in time and over time to increase their chances of winning a Freeman reward. The analysis specifically accounts for the role of quotas and the interaction between the Freeman Plan and quotas in affecting recruiter choices.

We examine recruiter productivity using data from the Chicago Navy Recruiting District for five months in FY 1986.[2] During this time period, the Chicago District was one of the most successful districts in the country in meeting its quotas. Thus, recruiter productivity and the Freeman Plan are examined in an environment where overall performance was more than satisfactory.

RESEARCH FINDINGS

Overall, the study finds that recruiting behavior is consistent with the incentives embedded in the Freeman Plan but may be inconsistent

[2]This district was chosen for analysis because of data availability and because it is a major recruiting market with a diverse economy and ethnic composition. The drawback of using a case-study approach is that results may not generalize to the national level.

with the Navy's recruiting goals and with its desired recruiter behavior. The empirical analysis indicates that, in general, recruiters who earn more Freeman points each month recruit more high quality than low quality enlistments. However, recruiters who have been more successful on the Freeman Plan in the early part of a production cycle enlist relatively more low quality enlistments in the future months of the cycle. The latter result suggests that some recruiters may have incentives that conflict with the Navy's overall recruiting objective of enlisting a high quality force.

The analysis also indicates a general pattern of recruiters appearing to increase productivity over the 12-month production cycle, and of productivity being highest when recruiters become eligible to win a reward. This pattern is explained more by the behavior of recruiters who have been less successful early in the cycle than by that of more successful recruiters (past success being defined in terms of average point accumulation). Less successful Freeman performance earlier in the cycle is associated with higher productivity in future months of the cycle. There are two possible explanations for this behavior. First, recruiters are stockpiling future enlistments at the beginning of the cycle and depleting their stock at the end; or, second, they procrastinate until they approach the reward eligibility month, at which point they greatly intensify their recruiting effort.

Those recruiters who are more successful, however, do not *further* increase their productivity in future months of the cycle; their productivity remains fairly stable. One explanation might be that the more successful recruiters in the early months pursue enlistments that they ordinarily would make in the future. An alternative explanation is that they reduce effort, consume more leisure, and "rest" on past achievements. This interpretation suggests that recruiters may value leisure more than better rewards.

In addition to analyzing patterns *within a cycle*, we analyzed patterns *within a tenure*, which also means between production cycles. Past studies on the relationship of experience and productivity have found that productivity initially rises over a recruiter's tour but then eventually stabilizes. We find that productivity generally rises over a recruiter's tour—but drops substantially in the months immediately after a recruiter wins a reward. Productivity may decline because recruiters secure contracts before the end of one production cycle that they would have obtained at the beginning of the next cycle. Alternatively, productivity may decline because recruiters reduce effort to "recover" from their previous efforts.

The Freeman Plan has seemingly had a positive effect in recruiters' end-of-tour performance. Holding Freeman Plan characteristics con-

stant, we find that recruiters who have less time remaining in their tour have lower productivity. But when Freeman Plan characteristics are allowed to vary, recruiters who have less time remaining in their tour do not have lower productivity. The rise in productivity over the Freeman production cycle accounts for the rises at the end of tour; that is, recruiters who are close to being eligible to win a reward increase their production. These latter findings, however, are more tenuous because they are based on the behavior of only a few recruiters.

Several other empirical relationships emerged from the analysis. For example, recruiters with longer tours are more productive. Net contracts are negatively associated with minority quotas. Recruiters who are also station managers have lower productivity. Finally, after controlling for variations in quota assignments across geographic locations, recruiters located in the inner city and metropolitan areas of the Chicago recruiting district are more productive.

POLICY OPTIONS

The desirability of the enlistment patterns under the Freeman Plan is a normative question for the Navy to decide. If the Navy deems the patterns unacceptable, there are several ways of changing recruiter behavior. The policy options considered in this study can be implemented relatively quickly because they only require altering the Freeman Plan, not creating and implementing a new management tool.

One option, for example, would be to increase the point differential between high and low quality enlistments. If recruiters earned even more points for recruiting high quality enlistees than they currently do, their motivation to enlist those recruits would be correspondingly greater. At present, there is some incentive to recruit low quality enlistments under certain circumstances. Moreover, since one of the Navy's first recruiting priorities is meeting its high quality quotas, increasing the point differential would further embed this objective into the Freeman Plan.

Another policy option would be to shorten the length of the production cycle. In a shorter cycle, recruiters would be less likely to reduce their level of effort—both during the cycle and during their tour—for several reasons.

- Recruiters aiming to win a reward would have less time at the end of the production cycle to compensate for lower productivity at the beginning of the cycle. As a result, their incentive to decelerate during the early part of the cycle might be reduced.

- For the same reason, recruiters would be less likely to reduce productivity after winning a reward. If successful recruiters produce less in the months after winning a reward because they value leisure more than rewards, shortening the cycle would decrease the number of months of lower productivity.
- Finally, the incentive to reduce effort at the end of the tour would be less because the chances of having insufficient time remaining in the tour to complete the production cycle are lower.

Shortening the production cycle, then, may cause recruiter productivity to be more stable over time.

Although these changes may significantly affect recruiter behavior, they may not be the total answer to improving recruiter productivity. More sweeping changes to the Freeman Plan, or even replacing it with another incentive program, are possibilities that go beyond the scope of this study, but the Navy may wish to consider such options in the future.

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I. INTRODUCTION

The Navy's primary recruiting market, individuals between the ages of 17 and 21, is expected to diminish over the coming years. The youth population is expected to continue its decline and civilian opportunities, one of the Navy's main sources of competition, are expected to increase as military wages fall relative to civilian wages. To counter potential difficulties in meeting future recruiting objectives, the Navy must effectively manage its recruiting resources. One way it can respond to the changing recruiting environment is to update its recruiter management techniques to increase recruiter productivity. The Navy may wish to reevaluate its recruiter incentive program, the Freeman Plan.

Introduced in the late 1970s, the purpose of the Freeman Plan is to motivate recruiters to increase the quantity and quality of enlistments.[1] Under this plan, recruiters can win rewards for making enlistments. Recruiters receive points for different quality levels of recruits: Higher quality enlistments are assigned higher point values because high quality youth are considered to be more productive in the military. Moreover, they have better private sector opportunities and may attend college rather than join the military. After a 12-month period, called a production cycle, the recruiter's average accumulated points are compared with predetermined point values. If average accumulated points exceed these values, the recruiter wins a reward. Better rewards are obtainable with a greater number of average points. The lowest reward is a certificate of commendation that is placed in the recruiter's service record, and the best reward is a promotion to a higher paygrade. The production cycle of recruiters who fail to accumulate sufficient points at the end of the 12 months becomes a 12-month moving window whereby the points earned in the first month of the cycle are dropped and those earned in the current month are added. Recruiters continue in this fashion until they win a reward.

Although the Freeman Plan embeds positive incentives for increasing the quantity and quality of enlistments, it may contain disincentive effects whereby recruiters may reduce productivity or enlist relatively

[1]The quality level of a recruit is determined by whether he or she graduated from high school and by his or her score on the Armed Forces Qualification Test. Those scoring above the 50th percentile on the test are considered to be in the upper AFQT categories. Recruits who have graduated from high school and are in the upper AFQT categories are considered high quality.

more low quality than high quality youths. In particular, whether the higher points assigned to better quality recruits induce recruiters to favor high quality enlistments depends on the recruiter's territory or market and on quotas. If a recruiter's territory is small or consists of primarily low quality youths, achieving a high quality enlistment may be quite difficult. If the point differential under the Freeman Plan between high and low quality enlistments is small compared with the relative difficulty of obtaining high quality enlistments, recruiters may favor low quality recruits. Also, depending on the difficulty of winning rewards, better rewards may not motivate successful recruiters to further increase effort.

In an effort to win rewards, recruiters may vary productivity over time in ways that are inconsistent with the Navy's objectives. For example, recruiters may exert less effort at the beginning of the production cycle, when the eligibility "deadline" is 12 months away, but increase effort at the end of the cycle. Moreover, as they increase effort in an attempt to win a reward, the quality level of their enlistments may fall.

Productivity may be lower after recruiters win Freeman rewards. To win rewards, recruiters may pursue enlistments at the end of the production cycle that they would have pursued in future months, thereby lowering their productivity once they have won. Alternatively, productivity may be lower because recruiters reduce effort to "recover" from their efforts in the previous months. Recruiters may also vary their type of effort over the cycle. In the first months, they may stockpile enlistments and then draw down this stock as they approach the reward eligibility month in the production cycle.

Recruiters with fewer opportunities to win Freeman rewards may supply less effort. For example, recruiters with shorter than normal tours (the standard tour length is 36 months) cannot win as many rewards and may supply less effort. Moreover, recruiters with normal tour lengths who fail to win a reward after their first year may reduce effort because they are ineligible to win the maximum number of rewards possible (three) over their tour. Also, recruiters at the end of their tour may reduce effort if they have insufficient time remaining in their tour to complete the 12-month production cycle. And recruiters with sufficient tour time remaining may reduce effort if they have too few average accumulated points to have a reasonable chance of winning a reward before rotating to their next tour.

PURPOSE OF THE STUDY

The purpose of this study is to examine enlistment patterns to address the question of whether recruiters behave in ways counter to the Navy's recruiting objectives but consistent with the incentives provided under the Freeman Plan. In particular, we examine empirically three enlistment outcomes for evidence about recruiter behavior under the Freeman Plan: the quality mix of contracts produced by recruiters to investigate whether recruiters who succeed on the Freeman Plan produce more low quality enlistments; recruiter productivity patterns over the production cycle to understand how recruiters vary productivity over time to win rewards; and enlistments over a recruiter's tour for evidence about whether the Freeman Plan affects the relationship between productivity and experience. In the process of conducting this analysis, we also examine the effect of quotas, resource availability, and market variations on enlistments.

ORGANIZATION

This report is organized as follows. Section II describes the institutional background of the Navy's quota system and the Freeman Plan. Section III presents a theoretical analysis of the effect of the Freeman Plan on enlistments to guide the empirical analysis. Section IV describes the empirical methodology, the recruiter data base, and some of its characteristics. Next, the empirical results on the quality mix of enlistments and Freeman Plan success are presented in Sec. V. Sections VI and VII, respectively, present results on how recruiters vary productivity over the production cycle and over their tour. The study's results are summarized and policy options for altering the Freeman Plan are discussed in Sec. VIII.

II. RECRUITER GOAL DETERMINATION AND THE FREEMAN PLAN

INSTITUTIONAL FRAMEWORK

The Navy's recruiting system is organized into five operational levels. The Commander of the Navy Recruiting Command (CNRC) oversees recruiting at the national level. Directly below the CNRC are six geographic areas across the United States designated as Navy Recruiting Areas. The national market is then broken down into 42 Navy Recruiting Districts (NRDs). Below the NRD level are recruiting zones. Finally, the fifth level is that of individual recruiting stations.

The enlistment process begins when the Navy's Deputy Chief of Naval Operations for Manpower, Personnel, and Training determines the national requirement for new recruits. This figure is based on two interrelated imperatives: (1) the desired manpower size of the Navy and (2) the number of enlistees that must be trained in specific occupations to meet that desired size. CNRC translates these accession requirements into recruiting contract goals for upper and lower AFQT category enlistees. It then determines annual recruiting goals for each geographic area and NRD using a regression analysis that takes into account the district's share of recruiters, the 17- to 21-year-old population, the extent of urbanization, and the minority population.

Below the district level, the goaling process is highly decentralized and diverse. The districts differ in their methods for distributing quotas at the zone level. The zone managers and station managers determine how quotas are allocated to individual recruiters. Usually the managers at each level assign quotas based on analysis of the size and quality composition of the zone's, station's, and recruiter's market. The methods they use also vary. Some managers use informal observation and others use census data or data on the quality of enlistments made in the past. District, zone, station, and recruiter quotas vary from month to month because of seasonal variations in the supply of potential enlistees.

Recruiters do not receive specific rewards for meeting or exceeding their quotas. Moreover, recruiters who fail to meet their quota can blame poor performance on poor market conditions, since the supply of enlistees is subject to random fluctuations that allow recruiters to "hide" their true effort levels. As a result, recruiter activity is extensively monitored by station managers. Managers require that re-

cruiters first meet their quotas of high quality enlistments so that if they underproduce relative to the quantity (high plus low quality) quota, they underproduce mostly low quality enlistments. Recruiters who meet or exceed their quotas may overproduce low quality enlistments. Although recruiters are monitored, activities such as visits to local high schools occur outside the station. Thus, monitoring is imperfect.

RECRUITER INCENTIVES: THE FREEMAN PLAN

The Freeman Plan is a national incentive system that designates points and rewards for recruiting different quality categories of enlistments. More points are assigned to higher quality recruits. Differences in the value of rewards are intended to induce already successful recruiters to further increase effort. The Freeman Plan penalizes recruiters with particularly poor performance by stipulating a minimum number of contracts that must be attained each month. The minimum average number of contracts over a two-month period is two. Recruiters who do not meet this minimum at the end of the two-month period are given a warning. In the third month, a three-month average is calculated and a second warning is issued if that average is below two contracts. Finally, if in the following month the four-month average is less than two, a recruiter is nominated for a transfer from the recruiting command. This requirement is stated in terms of gross number of contracts whereas the point and reward system is based on net contracts. Net contracts equal gross contracts minus attrition.[1]

The Freeman Plan Point System

The point values, which presumably reflect the Navy's relative valuation of each quality category, are shown in Table 1. These points are accumulated over the production period, which is generally 12 months long.[2] If after 12 months, the recruiter's average points per month exceed 300, a reward is granted and the production period be-

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[1]Navy records on recruiters from the Chicago NRD, the sample of recruiters used in this study's empirical analysis, indicate that recruiters are rarely transferred. In fact, many recruiters nominated for a transfer during their tour win Freeman rewards later in their tour. Moreover, recruiters who had won rewards often were nominated for transfer at a later date. Thus, to the extent that reward winners are more productive, even productive recruiters are nominated for transfer under this system.

[2]Leave, sickness, and other absences extend the production year to 12.25, 12.50, or 12.75 months.

Table 1

FREEMAN PLAN POINT VALUES

AFQT Category	High School Graduates	Non-High School Graduates
I	116	100
II	107	90
IIIA	100	85
IIIB	90	65
IV	70	N/A

gins again.[3] If the average falls short of 300 points after 12 months, the production period then becomes a running 12-month moving average (i.e., the earliest month is dropped and the new month is added) until an average of 300 points is accumulated. Subject to quotas, the recruiter can use any mix of qualities listed in Table 1 to achieve a reward.

A recruiter is awarded the number of points associated with the quality of the recruit he or she enlists. However, if a recruit leaves either recruit training or the Delayed Entry Program (DEP),[4] the number of points associated with that recruit's quality is deducted from the recruiter's point total for the year. Points are awarded in the month that the contract is made and deducted in the month the attrition occurs. For this reason, it is possible for recruiters to have points deducted in a particular month for a contract written up to 12 months previously.[5]

The Recruiter Reward Structure

Table 2 presents the rewards and average accumulated points a recruiter must attain to receive these awards. The highest reward a

[3]If recruiters gain 300 average points before the end of the 12-month cycle, they do not win a reward unless they maintain this average until the end of the 12-month period.

[4]The DEP consists of recruits who sign a contract to join the Navy in one month but do not actually depart to recruit training until a future month. For example, often high school seniors are in the DEP until they finish high school, at which time they go to recruit training.

[5]DEP attrition is approximately 12 percent; the attrition rate for recruits who depart directly to recruit training after enlisting is approximately 22 percent. See Quester and Murray (1986).

recruiter can achieve is a nomination for a meritorious advancement to a higher paygrade. A recruiter can win this reward only if he or she meets the other requirements for promotion: the required amount of the time in paygrade and the required years of service in the Navy. Given these other requirements, a recruiter can win a promotion only once during his tour. When the recruiter wins this reward, he also receives a Navy Achievement Medal and an offer for a voluntary extension.

The second recruiting reward provides recruiters with an opportunity to voluntarily extend their tour of duty. Individuals averaging 400 points per month can extend their tour of duty by one year if they are within eight to 10 months of the date they rotate to their next tour. An extension is particularly valuable to recruiters whose occupation requires heavy sea duty because they are away from their families for extended periods of time. Individuals who can extend their recruiting tours can delay sea duty for another year. An individual can earn this award any number of times.

The third and fourth rewards have no intrinsic value to recruiters other than the value of recognition. However, the promotion points associated with these rewards can increase their chances of a promotion at a later date. When individuals are considered for promotion, they take several proficiency exams in their occupational specialty. If the exam point totals meet a minimum standard, and if other per-

Table 2

RECRUITER REWARDS, PROMOTION POINTS, AND REQUIRED AVERAGE ACCUMULATED POINTS OVER 12 MONTHS

Reward[a]	Average Points Required
1. Meritorious Advancement	525
2. Voluntary Extension	400
3. Navy Achievement Medal (2 promotion points)[b]	350
4. Certificate of Commendation (1 promotion point)[c]	300

[a]The highest reward is listed first.
[b]A Navy Commendation Medal (worth 3 promotion points) replaces a third consecutive Navy Achievement Medal.
[c]A Navy Achievement Medal (worth 2 promotion points) replaces a third consecutive Certificate of Commendation.

formance indicators are satisfactory, the individual receives a promotion. Promotion points earned as a recruiter are added to the exam point total. Since the variance of exam scores tends to be small, extra points can make a significant difference. Promotion points do not guarantee a promotion. Promotions also depend on the supply and demand for recruiters in higher paygrades in a recruiter's particular occupation. In contrast, a recruiter who wins the Meritorious Advancement will receive a promotion without these supply and demand considerations.

Under the Freeman Plan, recruiters have an incentive to maintain a *consistent* performance over a period of several years. For example, recruiters who attain a net point average of 350 per month each year for three years receive the Navy Commendation Medal (worth three promotion points) in lieu of a third consecutive Navy Achievement Medal (worth two promotion points). Also, in lieu of a third consecutive Certificate of Commendation (worth one promotion point) a recruiter receives a Navy Achievement Medal (worth two promotion points).

Interaction Between Recruiter Quotas and the Freeman Plan

The Navy's first recruiting priority is meeting its quotas, particularly its high quality recruit quotas. Although the Freeman Plan places a premium on high quality enlistments, recruiters may be able to win prizes under that Plan by enlisting only *low quality* recruits, counter to the Navy's high quality enlistment objectives. They simply make more enlistments than those who enlist only high quality recruits. Therefore, a conflict can arise between the Freeman Plan and Navy quotas. The Navy counteracts this problem through monitoring. Recruiters who underproduce are generally not permitted to choose a quality mix of enlistments that maximizes their chances of winning a reward under the Freeman Plan unless their choice involves maximizing high quality enlistments. However, as noted above, monitoring is imperfect. Overproducers, on the other hand, are free to choose their optimal quality mix under the Freeman Plan.

III. THEORETICAL ANALYSES OF RECRUITER BEHAVIOR UNDER THE FREEMAN PLAN

To guide the empirical analysis of recruiter behavior under the Freeman Plan, in this section we investigate what types of behavior we might expect theoretically. The section begins with an examination of how recruiters choose the number and quality mix of enlistments in light of the Freeman Plan at a point in time for given level of effort. We then examine how recruiters choose their level and type of effort over time or over the production cycle and tenure. A formal model is not developed because the number of testable hypotheses is limited. In particular, many factors can affect effort in the same way and a given factor may increase or decrease effort depending on the individual's preferences. However, by providing a range of possible outcomes, the analysis in this section will aid the interpretation of the empirical results.

Enlistments at a point in time are affected by random changes in market potential. We analyze the case of perfect certainty by assuming that recruiters make their choices after the realization of the random change.

RECRUITER CHOICES AT A POINT IN TIME

Several studies have shown that enlistments are determined not only by supply factors such as civilian opportunities and unemployment, but also by demand factors such as the number of recruiters and recruiter incentive programs.[1] In these studies, recruiters are not viewed as passively obtaining enlistments but rather as individuals allocating their scarce time to different recruiting activities and varying the amount of effort they devote to these activities.

Given the scarcity of resources available to recruiters, particularly their time and the size and composition of the market they face, they must allocate their effort at a point in time between high and low quality enlistments. The tradeoff they make can be illustrated by a production possibilities curve, shown in Fig. 1, which indicates all feasible combinations of high and low quality enlistments at a particular time, given the limited amount of recruiting resources. Curves farther from

[1]These studies include Daula and Smith (1986), Dertouzos (1985), and John and Shughart (1976).

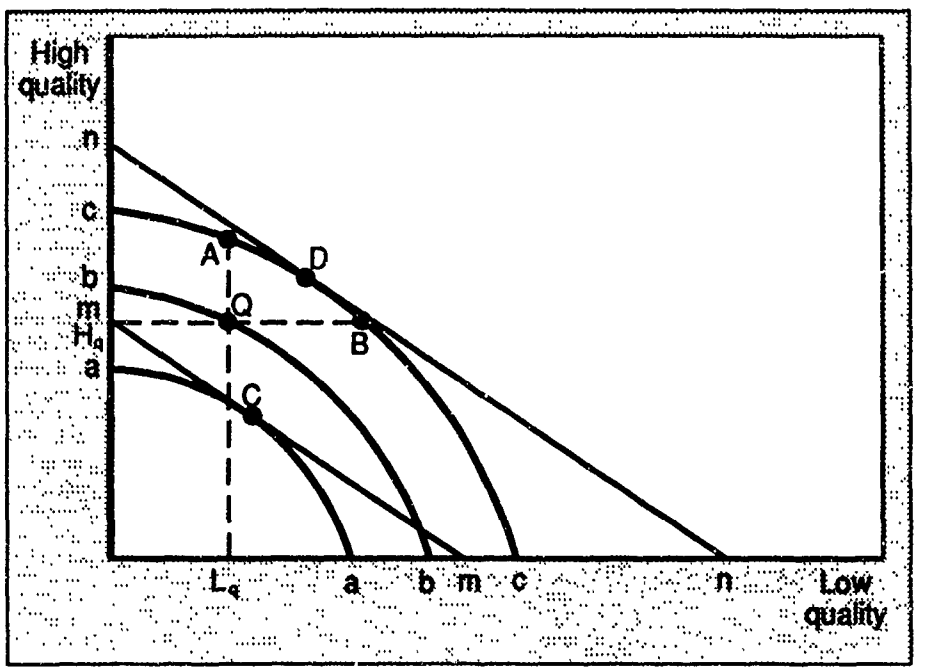

Fig. 1—The optimal quality mix at a point in time

the origin, such as bb′ and cc′, represent the recruiter's opportunity set when recruiting resources are increased. The slope of the curve is negative and equals the relative marginal costs or relative difficulty of obtaining high versus low quality enlistments. To obtain an additional high quality enlistment, a recruiter must sacrifice low quality enlistments. The curve is shown as concave because recruiters first obtain the most visible or most willing high quality recruits but thereafter must work harder, sacrificing more low quality enlistments to obtain an additional high quality one.

Enlistments increase when recruiters supply more effort, given market potential and resource availability. For example, recruiters who make more phone calls per hour without altering the effectiveness of each contact increase the number of enlistments they make. When effort increases, the tradeoff shifts further from the origin. In Fig. 1, the curve bb′ can also represent a greater level of effort than the curve aa′. The outer curve, cc′, represents the production possibilities when effort is maximized. The placement of this curve depends on recruiter

ability—for more able recruiters, the curve will be farther from the origin.

Point Q in the figure represents a possible quota. Because of monitoring, under producers—those facing the curve aa'—can choose only points to the left of L_q. Those who exceed the quota can overproduce solely low quality enlistments (points along $\overline{QB}$), solely high quality enlistments (points along $\overline{QA}$), or some combination. Alternatively, they can underproduce low quality enlistments and overproduce high quality ones (points above $\overline{QH}$ but to the left of $\overline{QA}$).

To illustrate the recruiter's optimal choice of enlistments under the Freeman Plan, we consider only two quality categories—a high school graduate in AFQT Category I, worth 116 points, representing a high quality enlistment, and a non-high school graduate in AFQT Category I, worth 100 points, representing a low quality enlistment. The number of Freeman points earned in a given month equals (100 × low) + (116 × high). The line mm' in the figure illustrates different combinations of high and low quality contracts that yield the same number of Freeman points. Lines farther from the origin, such as nn', represent more enlistments of both types of contracts and, therefore, more Freeman points.

The recruiter's objective is to maximize the number and level of rewards he or she obtains subject to the production possibility curve. To do this, the recruiter must choose, in each month of the 12-month production cycle, the combination of high and low quality enlistments that maximizes points for a given level of effort as well as the optimal level of effort.[2] Below, we discuss how recruiters choose their level and allocation of effort over time. For a given level of effort, the recruiter maximizes points where the marginal benefit, equal to the relative points assigned to each quality type, equals the ratio of the marginal costs. This occurs where the slopes of the tradeoff curve and the Freeman point line are equal. Points C and D in Fig. 1 illustrate two such points.

Since point C represents more low quality enlistments than the quota, L_q, underproducers may not be allowed to maximize Freeman points in a well-managed station. Instead, they would be required to choose points along the high quality axis, where high quality enlistments are maximized, and the recruiter primarily underproduces low quality enlistments.

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[2]For simplicity, we assume recruiters maximize their reward attainment by maximizing the number of points they earn each month. In actuality, recruiters probably care more about maximizing average accumulated points since rewards are based on these. However, by making this simplifying assumption, we still capture the essential elements affecting recruiters' decisions while significantly simplifying the problem conceptually.

Generally, overproducers are free to choose the quality mix of contracts, for a given level of effort, that maximizes their Freeman points. Their choices will depend on the point assignment for high and low quality, the size and quality composition of the market they face, resource availability, and ability.

If the relative points assigned to high versus low quality are less than the relative difficulty of achieving high quality at a given point on the tradeoff curve, recruiters will maximize their total point attainment by enlisting relatively more low quality recruits. From a policy perspective, if recruiters earn more Freeman points by overproducing low quality contracts, increasing the point differential between high and low quality contracts or increasing the high quality quota would increase recruiters' incentive to overproduce high quality.

The above analysis suggests that overproducers may choose to overproduce low quality rather than high quality contracts under the Freeman Plan. In Sec. V, we will look for empirical evidence of this type of behavior.

RECRUITER CHOICES OVER TIME

Given effort, recruiters' optimal enlistment choices will vary over time because of anticipated changes and different realizations of random changes in market potential, recruiting resources, and quotas. These factors change the shape and position of the production possibilities curve as well as the number of over- and underproducers. Over time, recruiters choose the allocation and type of effort that maximize their chances of winning a prize. We first examine these choices over the production cycle and then over a recruiter's tour.

Productivity Over the 12-Month Production Cycle

Whether recruiters supply more effort *at a point in time* depends on the difficulty of winning rewards, quota levels, and their preferences for rewards versus leisure. In turn, the difficulty of winning depends on the Freeman Plan's point structure and reward requirements, recruiter ability, market potential, and resource availability.

Rewards will be harder to win if the number of points that can be earned for any quality category is low, the points required to win are high, recruiter ability is low, and market opportunities are limited. In these cases, the potential for earning points is lower, given effort, and recruiters must supply more effort to earn more points. If the points required to win are too high, winning may be impossible for less able

recruiters and those in smaller markets, even when effort is maximized. Such recruiters may supply only enough effort to meet their quotas.

Presumably, higher quotas will generally induce more effort. The recruiters who value rewards the most relative to leisure will supply more effort. But those who value rewards the least relative to leisure will supply less effort and possibly only enough to meet their monthly quotas.

Recruiters may vary effort *over time* and thus vary productivity over the cycle. The allocation of effort over time depends on how quotas, market size and composition, and resource levels change over the cycle, regardless of the anticipation of the changes, recruiters' point accumulation, or their preferences for allocating time. If market or quota changes are anticipated, recruiters can preplan an effective strategy at the beginning of the cycle for distributing effort over time that capitalizes on available opportunities. If unexpected changes occur, however, the strategy may no longer be optimal.

For example, recruiters may anticipate that market opportunities will be best at the end of the cycle, when seasonal variations result in a greater supply of potential recruits. Their strategy may be to supply less effort initially and then more effort when the recruiting environment improves. Thus, they plan to increase productivity over the cycle. If, on the contrary, it happens that market opportunities are unexpectedly poor at the end of the cycle, a better strategy, ex post, would have been to supply greater effort initially. In other words, ex post, their productivity profile is flatter over the cycle.

When unanticipated changes occur, recruiters at the end of their cycle may update their strategy when they have insufficient average accumulated points to win a reward. If they increase effort to increase their point accumulation, productivity will rise at the end of the cycle. If they reduce effort because they believe their chances of accumulating sufficient points to win is small, productivity will fall. Thus, it is not clear whether productivity will rise or fall given the past pattern of points collected.

More generally, recruiters may vary effort during the production cycle based on their success to date on the Freeman Plan. Recruiters with a greater number of average accumulated points at the beginning of the month may increase effort during the month to further raise their average points. Thus, current productivity and past average points would be positively related. On the other hand, more successful recruiters may reduce effort, consume more leisure, and "free-ride" on past achievements. Such recruiters may value leisure more than winning better rewards. Thus, empirically, current productivity and past average points would be negatively related.

Recruiters' preferences for the time-path of leisure will also affect the allocation of effort over time. Those who value large blocks of leisure may maximize effort at the beginning or end of the cycle and consume leisure for the remaining months. Alternatively, those who prefer the same amount of leisure each month may supply a constant but lower level of effort each month. In part, these choices depend on their discount rate. Recruiters who discount future costs and benefits more will end-load effort Because of procrastination, productivity will rise over the cycle. However, whether recruiters can front-load or end-load enlistments will depend on their quotas.

In addition to varying their *level* of effort over time, recruiters may vary their *type* of effort. In the initial months, they may devote considerable time to activities that build their inventory of future recruits, such as visiting job fairs and giving lectures at high schools rather than working to gain enlistments immediately. Later in the cycle, as they approach the eligibility month for winning a reward, they deplete their inventory, enlist more recruits, and increase their Freeman point attainment. If their points are insufficient at the end of the cycle to win a reward, they may "steal" future enlistments and deplete their inventory even further to ensure winning. Such a strategy would result in productivity rising over the first cycle and dropping at the beginning of the second.

In summary, recruiters may increase productivity over the production cycle for a variety of reasons: (1) to take advantage of anticipated market opportunities at the end of the cycle; (2) to improve their chances of winning at the end of the cycle when their average points are insufficient to win; (3) to ensure winning a (better) reward when they have been successful; (4) to compensate for consuming leisure in the initial months; and (5) to build an inventory in the initial months and deplete it as they approach the reward eligibility month. In Sec. VI, we will empirically examine the enlistment patterns over the production cycle and the factors that affect these patterns for evidence of how recruiters vary productivity to win rewards.

Productivity Over a Recruiter's Tour

The human capital model (Becker, 1975) predicts that productivity rises with tenure. Initially, productivity rises as a worker learns and gains proficiency on the job. Eventually, as the worker gains experience, the elements of the job are no longer new and the worker's productivity stabilizes at a higher level of productivity. In addition to producing more contracts, a more experienced recruiter will also produce

relatively more high quality contracts. Past studies have shown that productivity follows this pattern.[3]

Freeman status may alter how recruiter productivity varies with experience. How recruiters vary their level and type of effort over and between production cycles will affect how productivity varies with tenure because as recruiters gain months of production, they also gain months of tenure.

Since recruiters' tours are generally 36 months, the opportunities for winning rewards are limited and some recruiters may reduce effort. With a 12-month production cycle, recruiters can win only three rewards at most. Recruiters aiming to win all three must supply sufficient effort to win every 12 months. Those who have the usual three-year tour and who fail to win immediately after the first year become ineligible to win all three rewards. Such recruiters may reduce effort because they have more than 12 months to win each of the two rewards for which they remain eligible.

The timing of rewards can also affect effort at the end of a recruiter's tour. If recruiters have insufficient time remaining to finish their production cycle, they may reduce effort. If enough time does remain, they may increase effort depending on how many months they need to complete their production cycle, their average accumulated points, and the value they place on leisure relative to rewards. Those with more production months—and closer to being eligible to win a reward—may increase effort. Those with more average points accumulated may increase or decrease effort depending on the gap between their earned and required points to win. In particular, if the gap is large and the likelihood of closing the gap in the time remaining is small, recruiters may decrease effort.

In Sec. VII, we will investigate how the Freeman Plan affects the relationship between productivity and experience.

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[3]Carroll, Lee, and Rao (1986), and Kostiuk and Follmann (1989).

IV. EMPIRICAL METHODOLOGY AND DATA

GENERAL EMPIRICAL METHODOLOGY

The theoretical framework presented in Sec. III indicates three aspects of recruiter behavior that may be affected by the Freeman Plan: the quality choice of contracts at a point in time; the time-path of enlistments over the production cycle; and the time-path over a recruiter's tour.

To examine these enlistment outcomes empirically, we estimate regression models with the following general form:

$$D_{it} = E_{it}\alpha + Z_i\gamma + \eta_{it} \quad (1)$$

where D_{it} is the dependent variable at time t for recruiter i, E_{it} is a vector of explanatory variables that vary with time and recruiter, Z_i is a vector of explanatory variables representing recruiter attributes that vary with recruiter, i, but are time-invariant, and η_{it} is a random error term.

In the analysis of quality choice and the Freeman Plan presented in Sec. VI, the dependent variable D_{it} equals the ratio of high to low quality contracts in the first stage of the analysis and equals earned Freeman points in the second stage. In the analyses of the time-path of enlistments over the production cycle and over a recruiter's tour, presented in Secs. VII and VIII, respectively, D_{it} equals net contracts. Since the specification of the explanatory variables differs in each regression model that is estimated, we discuss this aspect of the econometric model in more detail in each of the results sections.

DATA REQUIREMENTS

To examine how recruiters respond to the Freeman Plan, the "ideal" database would consist of monthly recruiter level information, spanning each recruiter's 36-month tour, on enlistments, recruit attrition, quotas, market characteristics, recruiter resources (including the amount of time a recruiter devotes to recruiting), tenure, and Freeman Plan characteristics including month of production, past rewards, average accumulated Freeman points, and points earned each month.

Although recruiter level enlistment and Freeman Plan performance data are available at the national level, they are not gathered in conjunction with information on individual quotas and the market characteristics

and resources facing each recruiter. Thus, national data cannot be applied to the problem at hand.

These data requirements can be met, however, with case-study data that focus on a specific NRD. The disadvantage of this approach is that the results may not be generalizable to the national level. This problem is somewhat mitigated if the NRD chosen is large and consists of a wide variety of submarkets with different sizes and compositions of high and low quality youths.

The Chicago NRD represents a wide variety of submarkets with different demographic compositions. It includes not only the inner-city of a major metropolitan area, but also its affluent suburbs, the rural areas of northern, eastern, and central Illinois, and northern Indiana. For these reasons, data on Chicago recruiters are used to study recruiter behavior. The data cover the period from April through August 1986, a time when the Chicago NRD was one of the top performing districts in the country relative to its quotas. Thus, the Freeman Plan is studied in the best possible light.

Because the Chicago NRD data span only five months,[1] certain analytical problems arise. First, to examine how enlistments vary over the production cycle and over a tour, we must compare the behavior of recruiters with different months of production and tenure. Inferences about the behavior of individual recruiters based on cross-recruiter comparisons may be incorrect if the observed productivity patterns are generated by differences among recruiters in ability and training rather than the effort decisions of individual recruiters. In the estimation process, we attempt to control for differences in recruiter attributes by taking advantage of the panel nature of the dataset. The estimation technique is described below in the discussion of methodological issues.

Second, the analytical results may not generalize beyond the five months covered by the sample because seasonal changes in recruiting conditions that occur throughout the year may not be captured by the sample. To understand the extent of this problem, we must distinguish between seasonal changes that affect all recruiters equally and those that affect recruiters differently. For example, a reduced supply of potential recruits will affect all recruiters, but poor economic conditions may affect recruiters in inner-city territories more than those in high-income territories. If seasonal changes outside the sample affect all recruiters equally, then the sample's predicted productivity patterns over time or across

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[1]A limited time-series is used because key variables were not reported in some months of the year, and data in later months were unavailable because the Chicago NRD changed its reporting format. Also, because these unofficial data had a large number of inconsistencies, considerable effort was required on the part of the researcher to hand enter and clean the data.

recruiters could be uniformly higher or lower than those occurring outside the sample. However, if recruiters are affected differently, then the sample's predicted *shape* of these productivity patterns—the relative productivity over time or across recruiters—may differ. Since this study's primary purpose is to analyze the *shape* of the patterns rather than their absolute *level*, out-of-sample changes that affect recruiters differently present a greater problem for the purposes of this study.

Fortunately, the five-month sample period includes both poor recruiting months (April and May) and good ones (July and August) and, therefore, captures seasonal changes that may affect recruiters differently. Moreover, we have no reason to believe that these effects occurring within a sample are any different from the effects that would occur outside the sample period. Thus, the estimated shape of the productivity profile over time or across recruiters should generalize to other parts of the year. However, we do not attempt to generalize the estimated absolute level of these productivity profiles because the seasonal changes within the sample may be uniformly larger or smaller than those outside the sample.[2]

The data have two other limitations. Because of the Navy's decentralized method of allocating quotas, data on individual quotas are unavailable. However, the data indicate both station size and quotas. We proxy recruiter quotas as station quotas divided by the number of recruiters in the station.[3]

Second, the Chicago data cannot be used to determine whether the Freeman Plan improved productivity because detailed recruiter data prior to the introduction of the plan are unavailable. Thus, if productivity is low, we cannot conclude that the Freeman Plan is ineffective because productivity might have been lower before the plan began. However, the data can be used to examine whether recruiter behavior is consistent with the incentives embedded in the Freeman Plan.

OVERVIEW OF THE CHICAGO NAVY RECRUITING DISTRICT

During the sample period, the Chicago NRD comprised an average of 113 recruiters per month with 49 stations and eight zones. The number of recruiters in the NRD and in each zone varies from month to month as recruiters join or leave the NRD. Zone 1, which covers the downtown and

[2]However, we do attempt to control for uniform seasonal changes within the sample, by including monthly dummy variables in the regression model Eq. (1).

[3]This proxy is reasonable to the extent that the average station has only two recruiters. However, if the station includes one junior and one senior recruiter, the proxy will probably overstate the quota for the junior recruiter (who probably receives a lower quota) and understate the quota for the senior recruiter.

inner city of Chicago, is the largest zone with an average of 22 recruiters per month. Zone 5, which covers the western rural areas of Illinois, is the smallest zone with an average of 10 recruiters per month.

The number of stations per zone varied from five to seven stations. The size of stations also varied. In April 1986, 51 percent of the stations consisted of two recruiters, 19 percent consisted of three recruiters, 17 percent consisted of one recruiter, 11 percent consisted of four recruiters, and 2 percent consisted of six recruiters.

Not surprisingly, the NRD net contract (total enlistments minus attrition) quota changed in each calendar month. The quota was highest in July and August, 299 and 296, respectively, and lowest in May and April, 238 and 249, respectively. Zone quotas not only varied across months, but also across zones. As discussed in Sec. II, quotas differ across zones because market size and composition differ.

In terms of performance, the NRD met or exceeded its net contract quota each month, although some zones failed to meet their quotas. Moreover, for a given zone, quota attainment varied over time. Thus, overall success at the NRD level masked underachievement at the zone level.

Recruiters also face quotas for different quality levels of enlistments. The NRD quota for AFQT Category I to IIIA enlistments was 56 percent of total enlistments in each of the five months. To meet this quota, the NRD assigned a 60 percent quota for these types of enlistments to each zone. In April and May, the NRD as well as the zone quotas for high school diploma graduates was 75 percent of total enlistments. In 1987, CNRC raised the national quota for this category of enlistments to 90 percent. In anticipation of the new policy, the Chicago NRD raised its quota in June to 80 percent high school diploma graduates.

With the exception of August, the NRD met its goal of 56 percent test score I to IIIA enlistments, although zone performance varied considerably. Moreover, performance was inconsistent within individual zones. Once again, good performance at the district level disguised wide variations at the zone level.

Variation at the station level in quotas and quota attainment is also evident. The table in the appendix shows the regression results from estimating two equations: the first equation relates station net contract quotas to station size (number of recruiters), calendar month, and station; the second relates station net contract attainment to station net contract quotas, station size, calendar month, and station. The control group in the regressions is the largest station in the district, Irving Park in Zone 1. The results show the variation across stations in quotas and attainment. For example, the station quota for Round Lake was 2.8 fewer net contracts than for Irving Park after controlling for station size. The

recruiting station in Peoria attained 2.5 more net contracts than did Irving Park after controlling for station size and station net contract quotas.

RECRUITER CHARACTERISTICS IN THE CHICAGO NRD

The Chicago NRD database has 540 observations, representing five complete months of data on 90 recruiters and less than five months of data on an additional 35 recruiters who either joined the district or ended their tour during the sample period, or who had incomplete data. Therefore, the sample consists of 125 recruiters.

Table 3 presents the sample means and standard deviations of recruiter level enlistments, quotas, resource availability, tour length, and Freeman Plan status. On average, recruiters made 2.59 gross contracts per month. Of these, 1.46 or 60 percent were AFQT Category I to IIIA enlistments. In addition, 2.39 or 92 percent were high school graduate enlistments. Recruiters made 1.28 high quality enlistments, defined as high school graduates in AFQT Categories I to IIIA, and 1.30 low quality enlistments, defined as high school graduates in AFQT Categories IIIB and IV and non-high school graduates in all AFQT categories.

Net of recruit attrition,[4] recruiters enlisted 2.41 recruits, exceeding the average net contract quota of 2.39 recruits. Although on average recruiters surpassed the quota, only 52 percent of the recruiters actually exceeded the quota. The table also shows average black and Hispanic AFQT Category I to IIIA quotas per recruiter, which were .17 and .12, respectively.

Numbers of recruiters may not accurately measure resource availability. For example, recruiters often spend part of the month away from recruiting because of vacation or sick leave. On average, recruiters were away .12 percent of the month, or half a week. Thirty-eight percent of the recruiters were station chiefs. In smaller stations (which are the majority of the Chicago NRD stations), a station chief not only has managerial responsibilities, but is also a production recruiter as well. These recruiters thus have less time to devote to recruiting than do non-managers.

Recruiters' average tour length is 36 months, and 80 percent of the recruiters in this sample had tours between 35 and 37 months. Among the eight recruiters with tours greater than 37 months, three recruiters won tour extensions under the Freeman Plan. Two recruiters have 68- and 70-month tours and are full-time naval reservists who rotate to new tours in a different manner from active duty recruiters. The

[4]Attrition equals the number of unfulfilled contracts.

Table 3

MEANS AND STANDARD DEVIATIONS OF RECRUITER LEVEL VARIABLES
(N = 540)

Variable	Mean	Standard Deviation
Enlistments		
Gross contracts	2.59	1.78
AFQT Category I to IIIA	1.46	1.26
AFQT Category IIIB and IV	1.12	1.23
High school graduates	2.39	1.74
Non-high school graduates	.20	.47
High quality	1.26	1.21
Low quality	1.30	1.32
Net contracts	2.41	1.79
Quotas		
Net contract quota	2.39	.47
Recruiters exceeding quota	.52	.50
Black I to IIIA quota	.17	.26
Hispanic I to IIIA quota	.12	.20
Recruiter resources		
Percent of month on leave	.12	.20
Station chief status	.38	.49
Length of Stay		
Tour of duty length	36	5.67
Months of tenure	13.94	11.17
Freeman Plan Status		
Months on production cycle	7.57	4.20
Percent of sample in Cycle 1	.79	.41
Percent of sample in Cycle 2	.18	.39
Percent of sample in Cycle 3	.02	.15
Current month points	231	175
Accumulated points	1840	1182
Av. accumulated points	232	101
Lagged av. accumulated points	231	99
Tenure when reward won	15.1	3.08

reasons for the extended tours of the remaining three recruiters are unclear. Seventeen recruiters have shorter than normal tours. The records of 10 of these recruiters indicate that their tour length was later extended to 36 months. The reason for their lengthened tours is unclear.

On average, recruiters had 14 months of tenure. The majority of the recruiters in the sample (55 percent) were in their first year of recruiting duty, probably because the Navy nationally increased the number of recruiters in 1986. Twenty-six percent of the recruiters were in their second year, 14 percent were in their third year, and 4 percent were in their fourth year. Because of the large number of first-year recruiters, few recruiters in the sample had won Freeman rewards since these recruiters have not reached the reward eligibility month of the production cycle. Twenty-five recruiters (out of a total of 125) did win a reward. Also, because of the small number of senior recruiters, few recruiters were at the end of their tour. As a result, our analysis of recruiter behavior at this stage of their tour will be limited to 17 recruiters.

Table 3 also presents average Freeman Plan status and performance. The average recruiter is in the eighth month of the production cycle. Under the Navy's accounting system, recruiters whose cycle is a 12-month moving average are denoted as being in the 12th month of production. However, we distinguish these recruiters from those who entered the 12th month of production in the current month by denoting the former recruiters as being in the 13th month of production.[5]

On average, recruiters earned 231 points each month and accumulated 1840 Freeman points. The mean value of their average accumulated points, equal to total accumulated points divided by their month of production, was 232. One hundred recruiters remained in the first production cycle throughout the sample period, 16 remained in the second cycle, and two remained in the third cycle. During the sample period, seven recruiters won a reward—five recruiters entered the second cycle and two entered the third cycle. Thus, 105 recruiters were in the first cycle for at least part of the sample period, 23 were in the second cycle, and four were in the third cycle.[6] Out of the 125 recruiters, 56 were eligible to win a reward by the end of the sample period. Of these, 21 had won one reward and were in cycle two, and four had won two rewards and were in cycle three. Recruiters, on average, had 15 months of tenure when they won their reward.

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[5]Our definition of the production cycle for estimation purposes is discussed in greater detail at the end of this section.

[6]In terms of observations, 428 are attributed to the first cycle, 99 to the second cycle, and 15 to the third cycle.

METHODOLOGICAL ISSUES

Estimation

We estimate the reduced form regression model in Eq. (1) using Ordinary Least Squares. Recruiters may differ in unobserved attributes such as ability and effort, posing a problem for interpreting the results. The regression results when recruiters vary effort can be observationally equivalent to the results when recruiters differ in ability. Therefore, we cannot be confident that the results are generated by recruiter effort decisions. We must eliminate the effect of differences in recruiter ability while ensuring that the effect of variations in effort remain.

To eliminate ability differences empirically, we estimate fixed-effect, or dummy variable, regression models that exclude recruiter attributes that are fixed over time, such as ability, and include attributes that change over time, such as effort. Operationally, we estimate the relationship between the change (over time) in each variable rather than the levels. Assuming effort is uncorrelated with ability and the random error term in the regression model, estimators derived from the fixed-effects model will be unbiased.

To see this, we can decompose E_{it} in Eq. (1) into two terms: those that vary with time and recruiter, X_{it}, and those that vary with time, recruiter, effort, and ability, Y_{it}, such as performance on the Freeman Plan. We can also decompose the error term η_{it} into two terms: $(\epsilon_{it} + \mu_i)$, where ϵ_{it} is a random error that varies with time and recruiter and has a zero mean and standard deviation equal to σ and where μ_i equals unobservable, time invariant, recruiter attributes, such as ability. The regression model if net contracts, C_{it}, is the dependent variable is:

$$C_{it} = X_{it}\beta + Z_i\gamma + Y_{it}\delta + \epsilon_{it} + \mu_i \qquad (2)$$

The variable Y_{it} is a function of both observed characteristics, Q_{it}, and unobserved characteristics, ability μ_i and effort v_{it}, or:

$$Y_{it} = Q_{it}\alpha + \mu_i + v_{it} \qquad (3)$$

Since Y_{it} depends on ability, we cannot determine whether the effect of Y_{it} on contracts is due to ability or other factors. Moreover, Y_{it} is correlated with the error term η_{it}, implying that estimates of δ will be biased. Our objective is to estimate Eq. (2) net of ability. To see how Eq. (2) depends on ability, μ_i, substitute Eq. (3) into Eq. (2) and rearrange to obtain:

$$C_{it} = X_{it}\beta + Z_i\gamma + W_{it}\delta + \mu_i\delta + \mu_i + \epsilon_{it} \quad (4)$$

where W_{it} is defined as $(Q_{it}\alpha + v_{it})$ or Y_{it} net of ability. However, the equation we want to estimate is:

$$C_{it} = X_{it}\beta + Z_i\gamma + W_{it}\delta + \eta_{it} \quad (5)$$

To do this, a fixed-effects model is estimated. Operationally, the change between t and t − 1 is computed for each variable in Eq. (4). Equation (4) then becomes:

$$\Delta C_{it} = \Delta X_{it}\beta + \Delta W_{it}\delta + \Delta\epsilon_{it} \quad (6)$$

Ability as well as observed fixed attributes, Z_i, are no longer in the equation and we can interpret the results in terms of effort. If we assume that effort, v_{it}, is uncorrelated with the random error term, ϵ_{it}, the estimation results will be unbiased. Equation (6) is estimated to obtain β and δ in Eq. (5).[7]

Since all the parameter estimates in Eq. (5) are desired, the estimated effect of Z_i is obtained using the following procedure. First, Eq. (6) is estimated to obtain $\hat{\beta}$ and $\hat{\delta}$. Then, the mean value of X_{it}, Y_{it}, and Z_i is computed over time for each recruiter. The mean value of Z_i over time is simply the value of Z_i itself. Thus, Eq. (5) becomes:

$$\bar{C}_i = \bar{X}_i\hat{\beta} - \bar{Y}_i\hat{\delta} + Z_i\gamma + \mu_i \quad (7)$$

The first two terms in Eq. (7) are subtracted from C_i to create a new dependent variable. The resulting equation is:

$$\bar{C}_i - \bar{X}_i\hat{\beta} - Y_i\hat{\delta} = Z_i\gamma + \mu_i \quad (8)$$

This equation is estimated to obtain $\hat{\gamma}$. The parameter estimates from Eq. (6) together with those from Eq. (8) give all of the parameter estimates in Eq. (5), our objective.

In the tables presented in the following sections, we report the estimation results for Eq. (6), denoted model 1 (or the fixed-effects model), and for Eq. (8), denoted model 2 (or the recruiter attribute model).

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[7]In Eq. (6), autocorrelation of the error terms is built into the model. The correction for autocorrelation requires reducing the sample size. As a result, time series variations in a five-month period are reduced. The results after correcting for autocorrelation are qualitatively the same as when we simply reduce the sample size without correcting for this problem. Thus, we do not correct for autocorrelation in estimated regressions.

Number of Observations

The total sample size is 540 observations. Since few recruiters have won two rewards, the observations for cycle three recruiters are excluded, thereby decreasing the sample size to 527. To estimate Eq. (6), we lag observations by one month, thereby further decreasing the number of observations to 404.[8] Since we estimate Eq. (8) using the mean value of each variable for each recruiter, the sample size equals 123.[9]

Variable Definitions

Month of Production. Navy records report months of production in fractional amounts since only a recruiter's time on duty is included. For example, when a recruiter with 4 months of production is on leave for two weeks in a given calendar month, months of production advances only by .5 for a total of 4.5. At the end of a production cycle, a recruiter's month of production can be as high as 12.75.

For estimation purposes, months of production are rounded to whole numbers. Thus, the production cycle runs from one to 13 months. Recruiters whose cycle is a running 12-month average are in the 13th month of production.

To properly model recruiter behavior in light of the Freeman Plan, we distinguish the 13th production month from the other months because, at this month, recruiters do not progress further on the cycle and accumulated points become a moving average.

To accomplish this, we use two variables to represent months of production in the estimating equations.[10] The first variable, denoted PROD, runs from one to 12. For recruiters in the 13th production month, PROD equals 12. The second variable, denoted MONTH13, equals one if the recruiter is in the 13th month and equals zero otherwise. Thus, for a recruiter with production month less than or equal to 12, say four, PROD = 4 and MONTH13 = 0. For a recruiter in the 13th month, PROD = 12 and MONTH13 = 1.

Other Variables. Recruiters' territories or market potential are proxied by dummy variables that indicate their zone affiliation. We also include a dummy variable that indicates whether a recruiter was reassigned to a new station (within their zone) during the sample

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[8]Of the 404 observations, 323 are attributed to cycle one and 81 to cycle two.

[9]The two recruiters who remain in cycle three during the sample period are excluded. Thus, the number of recruiters drops from 125 to 123.

[10]The two variables operate as a spline with the breaking point at month 13.

period. Both this variable and calendar month capture changes in market potential during the sample period.

Resource availability is based on each recruiter's time availability. We proxy time available by a dummy variable indicating whether a recruiter is in command of a station. Weeks excused per month from recruiting duty is excluded, despite its importance, because this variable may be endogenously determined. Recruiters may decide when to take leave time based on their performance on the Freeman Plan and whether they are eligible to win a reward. Fortunately, excluding this variable does not alter the qualitative results of the study because the regression results are qualitatively the same whether it is excluded or not.

Finally, we represent recruiters who are in their second production cycle with a dummy variable called "Cycle 2."

V. RESULTS: QUALITY MIX AND FREEMAN PLAN PERFORMANCE

The theoretical analysis in Sec. III predicted that recruiters will enlist relatively more high quality than low quality recruits and earn more Freeman points if the relative points assigned to high quality contracts exceed the relative difficulty of achieving them, given quotas. Since station chiefs presumably constrain underproducers from freely choosing their quality mix, the examination of this theoretical proposition will focus on overproducers.

However, to put the analysis in context, the section begins by addressing the question of who overproduces and who underproduces. In particular, we examine how the level of over- or underproduction varies with recruiter tenure, the Freeman production cycle, quotas, calendar month, past performance on the Freeman Plan, changing stations, tour length, market, and resource availability.

WHO OVERPRODUCES AND WHO UNDERPRODUCES?

Approach

Roughly 50 percent of the Chicago NRD recruiters produced more net contracts than their quota over the sample period. What factors affect the amount by which net contracts exceed or fall short of the net contract quota? To address this question, the dependent variable in Eq. (1) is defined as net contracts minus net contract quota. The explanatory variables are tenure, quotas, station reassignment, months of production, and past Freeman Plan performance.

Recruiter tenure may affect production levels relative to the quota. More experienced recruiters may be more productive and, therefore, overproduce to a greater extent. On the other hand, if these recruiters receive higher quotas, production levels relative to quotas may not vary with tenure.

Meeting minority high quality quotas may be difficult for some recruiters, given their market and the demographic characteristics of minorities. As a result, recruiters facing higher minority quotas may overproduce to a lesser extent (or underproduce to a greater extent).

Whether station reassignment affects production relative to quotas depends on why recruiters are reassigned. If zone supervisors relocate

recruiters to improve individual performance, recruiter production may increase. On the other hand, if recruiters are reassigned to improve the new station's performance by placing good recruiters in poor stations, then recruiter production may decrease. Thus, the effect of changing stations is an empirical question.

The theoretical analysis in Sec. III suggested that productivity may vary over the production cycle. Depending on quotas, productivity relative to quotas may vary as well. Therefore, the regression equation also contains the two production cycle variables PROD and MONTH13, defined in Sec. IV. To allow for the possibility that past Freeman winners may exhibit different behavior, we also include in the regression a dummy variable indicating whether a recruiter is in his or her second cycle, and interact this variable with PROD and MONTH13.

Because recruiters may vary effort based on their past Freeman Plan performance, past success on the Freeman Plan may be associated with more or less over- or underproduction. Thus, we include lagged average accumulated points in the equation as well.[1] We also include variables representing the interaction between lagged average points and PROD and MONTH13 because the effect of past Freeman performance may vary over the production cycle. In particular, successful recruiters near the reward eligibility month may increase or decrease production more or less than those further away.

Results

In terms of statistical significance, the results reported in Table 4 indicate that more experienced recruiters have lower productivity relative to the net contract quota, holding the other variables constant. Season, minority high quality quotas, and changing station do not have statistically significant effects. The last variable may lack significance because the negative effect of changing stations equals the positive effect, thereby making the net effect inconclusive. Recruiters with longer tours also produce more net contracts relative to their quota. However, station chief status is not statistically significant.

Production relative to the quota rises over the production cycle and increases over the second cycle. However, the profile is flatter the more successful a recruiter has been on the Freeman Plan, defined in terms of lagged average points. The effect of increasing month of pro-

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[1]By including a lagged variable in the equation, we lose one month of data. Thus, the sample size falls from 404 to 283. Section IV discusses sample size.

Table 4

WHAT AFFECTS THE AMOUNT OF OVER- AND UNDERPRODUCTION?
(Dependent variable = net contracts − net contract quota)

Variable	Coefficient Estimate	t-Statistic
Model 1[a]		
Tenure	−.54	−3.21[b]
Black I-IIIA quota	−.69	−1.23
Hispanic I-IIIA quota	−.44	−.59
June	−.01	−.07
July	−.05	−.33
Change station	.40	1.11
PROD	1.57	5.35[b]
MONTH13	4.28	2.28[c]
Cycle 2	5.81	1.84[d]
Cycle 2 × PROD	.55	1.81[d]
Cycle 2 × MONTH13	−.67	−.56
Lagged average points	.0002	.09
Lagged average points × PROD	−.0034	−4.59[b]
Lagged average points × MONTH13	−.0133	−1.91[c]
R^2 = .25, N = 283		
Model 2[a]		
Intercept	−8.14	−2.92[b]
Tour length	.20	2.59[b]
Station chief status	−.45	−.58
Zone 2	−3.04	−2.01[c]
Zone 3	−2.13	−1.62[d]
Zone 4	.36	.29
Zone 5	1.32	.90
Zone 6	.16	.12
Zone 7	.84	.62
Zone 8	−.71	−.53
R^2 = .17, N = 123		

[a]Model 1 is a fixed-effect model; Model 2 is a recruiter attribute model (see Sec. IV).
[b]Significant at the .01 level.
[c]Significant at the .05 level.
[d]Significant at the .10 level.

duction, holding tenure constant, when production month is less than 13, equals:

$$1.67 + (.55 \times \text{cycle 2}) - (.0034 \times \text{lagged average points})$$

Given that lagged points equal 231, on average, productivity relative to quotas rises by .88 per month for nonwinners and by 1.43 for winners.

Less successful recruiters increase production when they are eligible to win a reward. For recruiters in their 13th month of production, the effect on production equals [4.28 – (.0158 × lagged average points)]. If recruiters averaged less than 270 points as of the beginning of the month, production relative to the quota rises.

Not surprisingly, the effect of lagged average points—past Freeman success—on production is negative and statistically significant. Recruiters with one additional average point reduce production relative to the quota by [(–.0034 × PROD) – (.0158 × MONTH13)]. Thus, production falls and falls more when recruiters are further in the production cycle.

Finally, past reward winners overproduce more (underproduce less). For recruiters in cycle two, production increases by [5.81 + (.55 × PROD)].

In summary, recruiters with less tenure, longer tours, more months of production, fewer lagged average points—poorer Freeman Plan performance—and who have won a reward overproduce to a greater extent, or underproduce to a lesser extent.

DO FREEMAN POINTS INCREASE WITH HIGH QUALITY ENLISTMENTS?

Approach

To address this question empirically, a two-stage least squares estimation approach is used. In the first stage, we estimate the relationship between the ratio of high to low quality enlistments and tenure, month of production, quotas, seasons, past Freeman performance (lagged average points), and changing station. In the second stage, we estimate the relationship between Freeman points earned in the current month and the ratio of high to low quality enlistments, where the ratio is that predicted from the first stage estimates. Therefore, the regression model is:

$$H_{it}/L_{it} = X_{it}\beta + Y_{it}\delta + \eta_{it}$$

$$F_{it} = (H_{it}/L_{it})\alpha + \lambda_{it}$$

where H_{it} and L_{it} are high and low quality contracts and F_{it} are Freeman Plan points earned in month t. This estimation approach allows us to account for how the ratio of high to low quality varies with recruiter characteristics when the relationship between current points and the ratio is estimated.

A problem arises because several overproducers did not enlist any low quality contracts. Thus, the ratio of high to low quality contracts cannot be formed. To surmount this problem, we added one to the number of low quality contracts made by each recruiter, i.e., to the denominator of the ratio. However, the ratio becomes downward biased, and the coefficient estimate of the ratio in the second stage equation becomes upward biased. Put differently, we will be more likely to estimate a positive relationship between current points and the ratio and more likely to conclude that recruiters earn more points with relatively more high quality contracts. On the other hand, a negative relationship in the face of this bias would be more robust. Thus, by introducing this bias, a stronger test for a negative relationship between points and high quality enlistments is imposed.

In this analysis, no distinction is made between recruiters in their first and second production cycle because once we exclude underproducers, the number of observations for cycle 2 recruiters, which is already limited, drops by half. Such a drop would cause the coefficient estimates of the variables cycle 2, cycle 2 × PROD, and cycle 2 × MONTH13 to be based on too few observations to be meaningful.[2]

Results

The first column of Table 5 shows the regression results for the first stage estimates (where the ratio of high to low quality is the dependent variable), and the second column shows them for the second stage estimates (where the dependent variable is Freeman points earned in the current month).

One of the key results of the section is shown in column 2. In general, overproducers earn more points in the current month by recruiting relatively more high quality enlistments since the coefficient estimate of the ratio of high to low quality is positive and significant.

[2]Since the sample used includes only overproducers, the sample size drops from 283 to 156.

Table 5

QUALITY MIX AND FREEMAN PLAN PERFORMANCE

(Two-stage least squares estimates)

	Dependent Variable			
	Stage 1 High Quality/Low Quality		Stage 2 Current Freeman Points	
Variable	Coefficient Estimate	t-Statistic	Coefficient Estimate	t-Statistic
High Quality/Low Quality			185.75	4.62[a]
Tenure	.354	3.38[a]		
PROD	.228	1.16		
MONTH13	1.908	1.56[b]		
Lagged Average Points	.001	.46		
Change Station	-.597	-1.79[c]		
Net Contract Quota	-.085	-.47		
Black I-IIIA Quota	.041	.09		
Hispanic I-IIIA Quota	-.422	-.66		
June	.012	.09		
July	.250	1.76[c]		
PROD × lagged average points	-.0014	-2.22[d]		
MONTH13 × lagged average points	-.0114	-1.86[d]		
	R^2 = .19, N = 158		R^2 = .12, N = 158	

NOTE: Only the fixed-effects model is estimated (see Sec. IV).
[a]Significant at the .01 level.
[b]Significant at the .15 level.
[c]Significant at the .10 level.
[d]Significant at the .05 level.

Thus, the point differential between high and low quality enlistments under the Freeman Plan appears sufficient to induce recruiters to enlist relatively more high quality recruits. However, since the parameter estimate is upward biased, we cannot rule out the possibility that some overproducers earn more points with more low quality. Moreover, we cannot conclude the amount by which points increase when they enlist relatively more high quality individuals.

The coefficient estimates in column 1 are also of interest since they provide some insight as to whether recruiters with more tenure, higher quotas, more months on the production cycle, better past performance

on the Freeman Plan, and those who change station recruit relatively more high quality enlistees.

More experienced overproducers enlist relatively more high quality recruits; the coefficient estimate on tenure, .354, is positive and statistically significant. However, changing station has a negative (and statistically significant) impact on the quality mix. The latter result suggests that overproducers are reassigned to stations in lower quality markets.

Past Freeman Plan performance has a negative and statistically significant effect on quality mix. Overproducers with one more lagged average point reduce the ratio of high to low quality by (−.0014 × PROD) + (−.011 × MONTH13).

When recruiters at the eligibility month have had more success on the Freeman Plan, they favor low quality enlistments. For recruiters at month 13, the effect on quality mix equals [1.91 − (.011 × lagged average points)]. When lagged average points exceed 174, they favor low quality enlistments. Otherwise, they enlist relatively more high quality recruits.

Holding tenure constant, recruiters closer to the reward eligibility month produce relatively more low quality contracts, and the better their past Freeman performance, the more they favor low quality. When month of production is less than 13, the effect of production month is not statistically significant. However, production month has an indirect and statistically significant impact through its interaction with past Freeman success (lagged average points). Increasing production month lowers the ratio of high to low quality by (−.0014 × lagged average points).

Because tenure increases when production month increases and tenure and quality mix are positively related, we must incorporate the effect of tenure to determine how the ratio of high to low quality varies over the cycle. When production month is less than 13, the change in quality mix as month/tenure increases equals:

$$\Delta(H/L)/\Delta\text{time} = .354 - (.0014 \times \text{lagged average points})$$

And when production month equals 13, the change equals:

$$\Delta(H/L)/\Delta\text{time} = .354 + 1.94 - (.011 \times \text{lagged average points})$$

After accounting for the positive effect of tenure, we find that whether recruiters decrease the relative number of high quality enlistments over the first 12 months of the cycle depends on their past success on the plan. Those who have been more successful on the plan (they have earned more than 250 average points) decrease quality.

However, less successful recruiters increase the quality mix of enlistments over the cycle. When lagged points for overproducers are evaluated at their mean value, 268, the relative number of high quality enlistments falls by .02 per month when production month is less than 13, and falls by .68 when recruiters are eligible to win a reward.

In summary, overproducers generally increase their Freeman performance in the current month by favoring high quality recruits. However, since the estimate is upwardly biased, it is possible that some recruiters do favor low quality. In particular, we find that recruiters who are relocated to a new station make relatively fewer high quality enlistments. The quality mix is also lower for more successful overproducers. Moreover, more successful overproducers reduce their quality mix of enlistments over the production cycle.

These findings suggest that quality mix regresses toward the mean. Recruiters who are in a poorer position for winning a Freeman reward produce relatively more high quality enlistments and earn more monthly points (since monthly points are positively related to quality mix in Table 5). Recruiters who are in a better position produce relatively more low quality enlistments and earn fewer monthly points. One interpretation of these results is that recruiters who are in a good position for winning a reward reduce effort while poorer performers increase effort.

VI. RESULTS: PRODUCTIVITY OVER THE PRODUCTION CYCLE

THE SHAPE OF THE PRODUCTIVITY CURVE

Approach

To ascertain how productivity varies over the production cycle for recruiters in each cycle, we estimated a model that relates net contracts, the dependent variable in Eq. (1), to the recruiter's month of production, where a separate (dummy) variable is used to represent each of the 13 months.[1] Tenure also increases as months of production increase, and continues to rise when the recruiter reaches the 13th month. To separate the effect of tenure from that of the production cycle for recruiters in their second cycle, variables that capture the change in tenure are included. Tenure is also included for first cycle recruiters although the effects of tenure and month of production are indistinguishable for recruiters whose tenure is less than 12 months. In the next section, we explore the relationship between tenure and months of production in greater depth.

Results

The key result of the analysis is that productivity rises over the production cycle. Table 6 shows the regression results. The estimated coefficient for each month of the cycle indicates the number of net contracts in that month, when the other variables in the equation equal zero. In particular, when only month of production is allowed to vary, productivity rises from zero to 4.39 for nonreward winners in the first cycle and from −.35 to 5.94 for those who have won one reward. However, for reward winners, only the last three months of the cycle have statistically significant coefficients.

Since tenure varies as months of production vary, the effect of tenure must be incorporated to determine the true shape of the productivity curve. The shape of the productivity curve when the effect of tenure is allowed to vary, and when all other variables are set equal to their mean values, is shown in Fig. 2 for first cycle recruiters and in

[1]Out of a total sample size of 404, first cycle recruiters account for 323 observations, and second cycle recruiters account for 81. This translates into 105 first cycle recruiters and 23 second cycle recruiters. See Sec. IV for further details.

Table 6

PRODUCTIVITY OVER THE PRODUCTION CYCLE
(Dependent variable = net contracts)

Variable	Cycle 1 Coefficient Estimate	Cycle 1 t-Statistic	Cycle 2 Coefficient Estimate	Cycle 2 t-Statistic
Model 1[a]				
Tenure	−.116	−.22	.09	.34
Tenure squared	−.00165	−.11	−.0031	−.25
Month 2	.01	.11	.17	.19
Month 3	.91	1.28	.13	.09
Month 4	.79	.93	.61	.36
Month 5	1.10	.99	1.46	.73
Month 6	2.11	1.66[b]	.96	.44
Month 7	2.42	1.68[b]	2.15	.92
Month 8	2.10	1.33	2.56	1.07
Month 9	2.53	1.42[c]	2.65	1.09
Month 10	3.26	1.63[b]	2.17	.94
Month 11	3.48	1.58[c]	3.58	1.86[b]
Month 12	4.14	1.69[b]	4.64	2.21[d]
Month 13	4.69	1.86[b]	5.94	2.49[e]
Net contract quota	.35	1.52[c]	−.12	−.27
Black I-IIIA quota	−1.36	−2.21[d]	.37	.29
Hisp. I-IIIA quota	−1.81	−2.65[e]	1.02	.52
Change station	.65	1.49[c]	−.54	−.69
May	−.16	−.74	.39	.78
June	.15	.61	.42	.79
July	.43	2.06[d]	.13	.27
	R^2 = .10, N = 323		R^2 = .21, N = 81	
Model 2[a]				
Intercept	.12	.07	.45	.17
Station chief	−.70	−2.12[d]	−.45	−.40
Tour length	.05	1.04	.06	1.01
Zone 2	−1.30	−2.35[d]	−4.96	−2.46[d]
Zone 3	−.56	−1.02	−3.52	−2.17[d]
Zone 4	−.82	−1.60[c]	−2.41	−1.37
Zone 5	−1.03	−1.83[b]	−.73	−.41
Zone 6	−1.22	−2.22[d]	−1.80	−1.08
Zone 7	−1.34	−2.56[e]	−1.77	−.84
Zone 8	−1.04	−1.94[d]	−5.32	−2.10[d]
	R^2 = .16, N = 105		R^2 = .48, N = 23	

[a]Model 1 is a fixed-effects model; Model 2 is a recruiter attribute model (see Sec. IV).
[b]Significant at the .10 level.
[c]Significant at the .15 level.
[d]Significant at the .05 level.
[e]Significant at the .01 level.

Fig. 3 for second cycle recruiters. In Fig. 3, we assume that recruiters begin their second cycle in their 16th month of tenure.[2] The solid lines in the figures indicate the margin of error.

Figure 2 shows that recruiters in their first production cycle secure 1.20 net contracts in their first month and 4.22 net contracts in their 13th month. Thus, over the first cycle, net contracts rise by three. Recruiters who have won a reward obtain 1.07 contracts in first month and 6.43 contracts in their 13th, implying a rise of 5.36 contracts over the second cycle. Thus, productivity rises more over the second than the first cycle, especially in the last four months, when tenure varies as well.

Although the regression model does not test any hypotheses regarding *why* productivity rises over the production cycle, we can offer

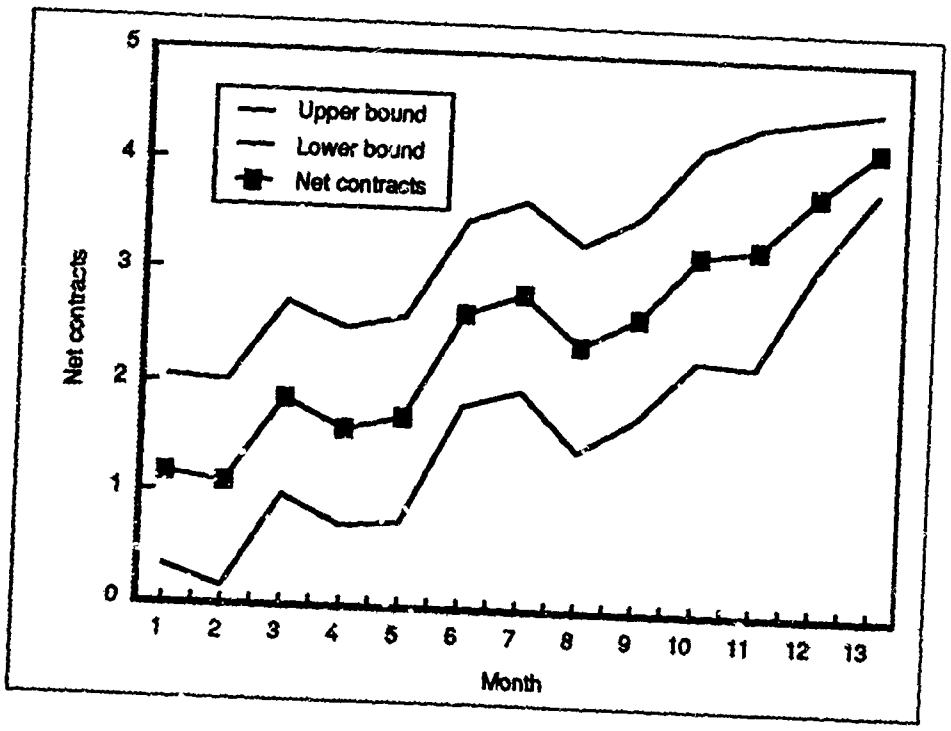

Fig. 2—Productivity by production month: nonwinners

[2]Table 3 indicates that recruiters, on average, started their new production cycle at the 16th month of their tours.

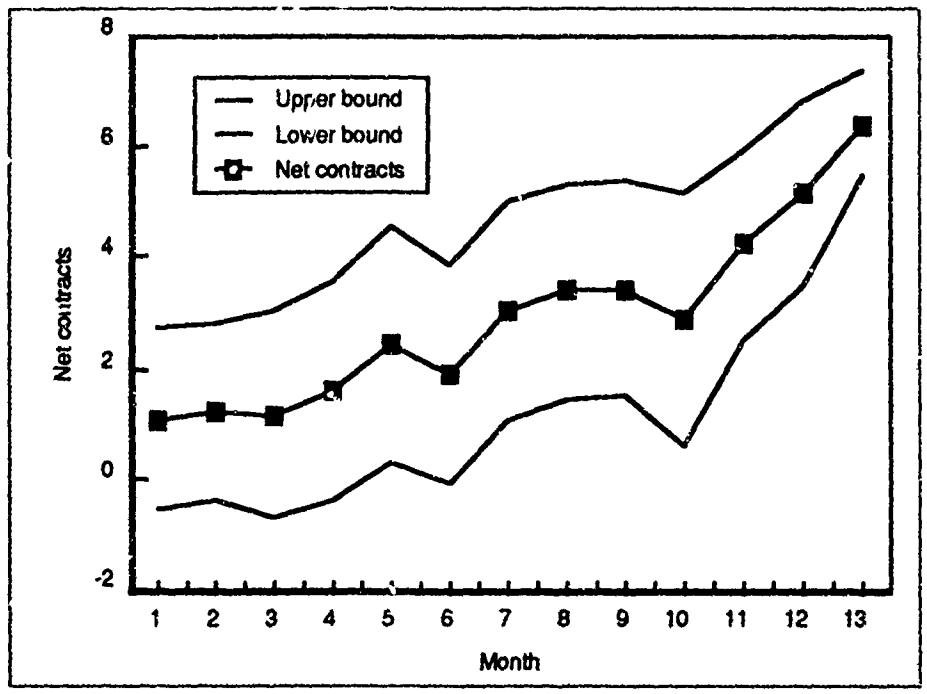

Fig. 3—Productivity by production month: winners

III. First, recruiters may initially stockpile future recruits and deplete their stock at the end of the cycle when they become eligible to win a reward. Alternatively, recruiters may vary their level of effort over the cycle. They may simply procrastinate until they near the reward point in the cycle, thereby supplying less effort initially and more effort at the end of the cycle. Alternatively, recruiters may supply adequate effort levels, from the Navy's perspective, during the cycle but supply extra effort at the end of the cycle by working overtime and enjoying less time on leave.

FACTORS AFFECTING THE SHAPE OF THE PRODUCTIVITY CURVE

Variations in quotas, past Freeman Plan success, seasons, and changing recruiting stations may alter the observed rise in productivity over the production cycle. We next examine the effect of these factors on the shape of the productivity curve.

If more experienced recruiters receive higher quotas, quotas will rise over the production cycle. Given that quotas induce greater productivity, the productivity curve will steepen as quotas increase. However, after controlling for tenure in the equation, quotas may have little additional effect on the curve's shape.

Less productive recruiters may improve when they are reassigned to new stations, implying that their productivity profile will be steeper. However, if more productive recruiters are reassigned to improve the performance of less productive stations, productivity will rise less over the production cycle.

As shown in Figs. 2 and 3, the profiles of reward winners and nonwinners are roughly similar in shape—both appear linear—but the profile for reward winners is steeper. Thus, reward status may affect how productivity varies over the production cycle.

Greater success on the Freeman Plan, defined in terms of lagged average accumulated points, may steepen or flatten the productivity profile. More successful recruiters may rest on past achievements and decrease effort to consume more leisure. Productivity will rise less when (lagged) average points are greater. On the other hand, more successful recruiters may increase productivity to ensure winning a reward. Thus, the curve will be steeper the higher are lagged average points.

Less successful recruiters may also have a steeper profile. Such recruiters may have attained fewer average points because they diverted their effort toward building their stock of future recruits rather than making more enlistments. However, when they draw down their stock in future months, their productivity will rise. On the other hand, less successful recruiters may become discouraged and reduce effort in future months. As a result, their profile will be flatter.

Approach

The dependent variable is net contracts. Months of production, one of the explanatory variables, is represented by PROD and MONTH13, defined in Sec. IV. The productivity curve is linear in months 1 through 12. As seen in Figs. 2 and 3, the assumption roughly approximates reality.

The explanatory variables not only include quotas, calendar month, change of station, and past performance on the Freeman Plan, but also each of these variables multiplied by PROD and MONTH13. The estimated coefficients of these interacted variables indicate the effect of each factor on the shape of the curve. We also control for the effect of tenure by including a linear and quadratic term in tenure.

Results

Table 7 shows the regression results. Tour length and station chief status do not have a statistically significant effect on the position of the curve. In terms of the shape of the curve, quotas and calendar month do not have a statistically significant impact. Ignoring the effects of tenure, which will be investigated in Sec. VII, the effect on net contracts of increasing month of production by one, when production month is less than 13, is:

$$1.99 - (.29 \times \text{change station}) - (.00365 \times \text{lagged points})$$

The effect of changing station is only statistically significant at the .10 level, whereas the effect of past average points is significant at the .01 level. The results indicate that productivity rises by 1.99 net contracts when lagged points equal zero and recruiters do not change station. Although the result is tenuous, it suggests that relocated recruiters have a flatter productivity curve; net contracts rise by 1.7 per month. More successful recruiters also have a flatter profile. Given that lagged average points equal 231, on average, productivity rises by only 1.15 contracts per month, assuming recruiters did not change stations. When lagged average points are greater than 231, productivity rises even less.

For recruiters at month 13 of the production cycle, lagged points and change of station also affect productivity. However, the effect of past points is only significant at the .10 level. For recruiters in their last production month, the change in net contracts is:

$$3.69 + (2.25 \times \text{change station}) - (.014 \times \text{lagged points})$$

When lagged points equal zero, net contracts rise by 3.69 at the end of the cycle, but this effect is only marginally statistically significant. Productivity rises more when recruiters are reassigned to a new station and rises less when recruiters have been more successful on the plan. Given that lagged average points, on average, equal 204, net contracts rise by .83 when recruiters are eligible to win a reward.

The negative effect of relocation when recruiters have less than 13 months of production suggests that recruiters are reassigned to improve the performance of a poorly performing station. However, since reassignment significantly improves the performance of recruiters in their 13th month, the results suggest that these recruiters were reassigned because their performance in their former station was poor.

The negative relationship between current productivity and past success on the Freeman Plan, as represented by lagged average points, is

Table 7

WHAT FACTORS AFFECT THE SHAPE OF THE PRODUCTIVITY CURVE?
(Dependent variable = net contracts)

Variable	Coefficient Estimate	t-Statistic
Model 1[a]		
Tenure	−.99	−2.34[b]
Tenure squared	.0124	1.41[c]
PROD	1.99	4.39[b]
MONTH13	3.69	1.50
Change station × PROD	−.29	−2.26[d]
Change station × MONTH13	2.55	2.37[b]
Lagged average points × PROD	−.00365	−4.86[b]
Lagged average points × MONTH13	−.014	−1.62[e]
Cycle 2 × PROD	.19	.49
Cycle 2 × MONTH13	−1.11	−.88
Net contract quota × PROD	.06	.70
Net contract quota × MONTH13	.15	.24
Black I-IIIA quota × PROD	−.07	−.37
Black I-IIIA quota × MONTH13	−.47	−.37
Hispanic I-IIIA quota × PROD	.07	.27
Hispanic I-IIIA quota × MONTH13	−.09	−.10
June × PROD	.08	1.22
June × MONTH13	−.24	−.47
July × PROD	.05	.73
July × MONTH13	−.02	.04
Change station	2.01	2.15[d]
Lagged average points	.00016	.06
Cycle 2	11.19	2.48[b]
Net contract quota	−.48	−.37
Black I-IIIA quota	.28	.18
Hispanic I-IIIA quota	−1.44	−.66
June	−.45	−.91
July	−.13	−.27
	R^2 = .30, N = 283	
Model 2[a]		
Intercept	2.60	.93
Station chief status	−.60	−.78
Tour length	−.02	−.24
Zone 2	−3.27	−2.26[d]
Zone 3	−2.80	−2.13[d]
Zone 4	.15	.12
Zone 5	.95	.65
Zone 6	.07	.05
Zone 7	.32	.24
Zone 8	−.91	−.67
	R^2 = .13, N = 123	

[a]Model 1 is a fixed-effects model; Model 2 is a recruiter attribute model (see Sec. IV).
[b]Significant at the .01 level.
[c]Significant at the .15 level.
[d]Significant at the .05 level.
[e]Significant at the .10 level.

this section's second key result. As before, we can explain these results in terms of how recruiters vary their level and type of effort over the production cycle, although the regressions themselves do not provide a test of which explanation is valid. Recruiters may have had less success on the plan in the past because they devoted their effort to building their inventory rather than making enlistments. But once the enlistments are made, productivity rises.

Alternatively, recruiters with less than 12 months of production may modulate their effort over time. In other words, net contracts regress toward the mean. When performance is high in one month, recruiters subsequently lower effort in the following month, implying a flatter productivity curve. Conversely, when performance is low, recruiters subsequently increase effort. When recruiters become eligible to win a reward at the end of the cycle, productivity rises in response to poorer past performance.

VII. RESULTS: PRODUCTIVITY OVER A RECRUITER'S TOUR

Past studies show that net contracts rise with tenure initially but eventually remain constant as recruiters become more experienced. The effect of the Freeman Plan on productivity may alter this profile. As recruiters gain tenure, they also progress on the production cycle until they reach the reward eligibility month. As shown in the previous section, productivity rises with months of production and rises more the less successful the recruiter has been in terms of the number of Freeman points he or she has earned. In this section, we estimate the productivity profile over a recruiter's tour, taking specific account of the interrelationship between tenure and the production cycle.

Recruiter incentives may be altered at the end of the tour. With little time remaining, recruiters may have little incentive to maintain or increase productivity. The Freeman Plan can affect this incentive. Recruiters with greater chances of winning a reward prior to their tour's end may increase productivity. In this section, we examine whether recruiters at the end of their tour reduce productivity and whether a recruiter's Freeman status affects this decline.

We estimate productivity over the tour first, ignoring the issues related to incentives at the end of the tour. We examine these issues separately at the end of the section.

HOW DOES PRODUCTIVITY VARY WITH EXPERIENCE?

Approach

We assume that recruiters win one reward during their tour. In the equation we estimate, we include tenure, tenure-squared, and separate variables for the recruiter's month of production by reward status.

To model how tenure and month of production interrelate requires careful understanding of how the two variables move together. In the recruiter's first year, tenure and months of production move in unison. Thus, from an estimation standpoint, the interrelationship between tenure and the production cycle in the first 12 months is indistinguishable. However, after the first year, a recruiter in the first cycle is in the 13th production month even though tenure continues to progress. Thus, to represent the relationship between tenure and production

month for recruiters in their first cycle, we include a variable indicating the interaction only between MONTH13 and tenure. A variable representing the interaction between month of production and tenure when the production month is less than 13 would be extraneous.

For recruiters in their second cycle, the month of production equals the month after winning a reward. Twelve months later, the production month equals 13. Recruiters remain at month 13 until the end of their tour. To represent the relationship between tenure and the production cycle for second cycle recruiters, we include interaction variables between month of production and tenure. The coefficient estimates of these variables will indicate whether recruiters who start their second cycle when their tenure is greater than 16 months (the mean starting date—see Table 3) have a different shape tenure profile than those who start earlier.

In the previous sections, we represented production month by two variables, PROD and MONTH13. In this section, we use three variables, MONTH1–5, MONTH6–12, and MONTH13. By allowing productivity to rise at different rates between months one and five than between months six and 12, two additional effects can be captured. First, for reward winners, we can examine whether there is a difference between how recruiters vary productivity immediately after winning and later in their production cycle. Second, for nonreward winners, we can capture the effect of learning on the job when recruiters begin their tour.[1] These new variables are defined in a similar way to PROD and MONTH13, described in Sec. IV. When month of production is less than or equal to five, MONTH1–5 equals the month of production, and MONTH6–12 and MONTH13 equal zero. When production month is greater than five but less than or equal to 12, MONTH1–5 equals five, MONTH6–12 equals the month of production minus five, and MONTH13 equals zero. Finally, when the production month equals 13, MONTH1–5 equals five, MONTH6–12 equals seven, and MONTH13 equals one.[2]

The model to be estimated is:

Net contracts = f(tenure, tenure-squared,
cycle1 × (MONTH1–5, MONTH6–12, MONTH13),
cycle1 × tenure × (MONTH13),
cycle2 × (MONTH1–5, MONTH6–12, MONTH13),

[1]This section's main conclusions do not depend on the specific month intervals selected. For example, when we defined the intervals as months one to four and five to 12, or defined them as months one to nine and ten to 12, the estimated tenure profiles had the same key features as those discussed in the text.

[2]In other words, these variables act as a spline with the breaking points at month six and month 13 of the production cycle.

cycle2 × tenure × (MONTH1–5, MONTH6–12, MONTH13),
cycle2, Z)

The vector Z equals the other variables of the model, which include the quotas, calendar month, change of station, station chief status, tour length, and zone.

Results

Column 1 in Table 8 shows the estimation results. The lack of statistical significance for most of the variables, despite the relatively high R^2, suggests that the independent variables are highly correlated, thereby making it difficult to distinguish the net effect of any single variable. One solution to this problem is to do nothing, given the model is correctly specified, and use this equation to predict the tenure profile. Alternatively, we can estimate the model using a specification that eliminates colinear variables. Our solution is to reestimate a second specification of the model and compare its prediction for the tenure profile to those generated by the column 1 estimates.

Column 2 in Table 8 presents the results from estimating the model when we exclude the interaction variables between tenure and production month and the variables MONTH1–5 and MONTH6–12 for recruiters in their first cycle. The estimated coefficients on the tenure variables are statistically significant (although only marginally for tenure) and confirm earlier work that found that productivity rises with tenure but the rise declines as recruiters gain experience. For recruiters in their second cycle, the production cycle variables are all positive and statistically significant. The relative sizes of the coefficients indicate that productivity rises faster in the first five months of the cycle than in the last seven. At the end of the cycle, recruiter productivity jumps by 1.43 net contracts. The negative and significant coefficient on the dummy variable cycle 2 implies that the tenure profile shifts down after recruiters have won a reward. Although the estimated coefficient for MONTH13 is also positive for recruiters in their first cycle, the variable is not statistically significant, suggesting that either productivity does not rise for first cycle recruiters in their 13th month or that the effect is indistinguishable from that of second cycle recruiters.

Figure 4 shows the predicted tenure profile based on the estimates in Column 2. For comparison sake, Fig. 5 shows the predicted profile generated from the original model's estimates in column 1.[3] The dotted lines indicate the margins of error. Although the profiles differ in

[3]Recruiters are assumed to begin their second cycle at month 16 (see Table 3).

Table 8

PRODUCTIVITY OVER TENURE
(Dependent variable = net contracts)

Variable	Specification 1 Coefficient Estimate	t-Statistic	Specification 2 Coefficient Estimate	t-Statistic
Model 1[a]				
Tenure	−.41	−1.04	.25	1.46[b]
Tenure squared	.0059	.75	−.0082	−1.79[c]
Cycle 2	5.54	1.33	−2.76	−2.61[d]
MONTH1–5 × cycle1	.69	1.68[c]		
MONTH6–12 × cycle1	.69	2.10[e]		
MONTH13 × cycle1	−1.05	−.81	.42	1.08
MONTH1–5 × cycle2	2.02	1.87[c]	.65	1.69[c]
MONTH6–12 × cycle2	−.30	−.36	.49	1.96[e]
MONTH13 × cycle2	3.80	1.36	1.43	1.61[c]
Tenure × MONTH1–5 × cycle2	−.05	−1.30		
Tenure × MONTH6–12 × cycle2	.03	1.13		
Tenure × MONTH13 × cycle2	−.07	−.90		
Tenure × MONTH13 × cycle1	.09	1.28		
Net contract quota	.23	1.18	.24	1.24
Black I-IIIA quota	−1.36	−2.65[d]	−1.46	−2.84[d]
Hispanic I-IIIA quota	−1.60	−2.79[d]	−1.61	−2.80[d]
Change station	.26	.75	.32	.93
May	−.12	−.60	−.11	−.59
June	.05	.22	.05	.26
July	.29	1.60[b]	.36	2.01[e]
	R^2 = .15, N = 412		R^2 = .12, N = 412	
Model 2[a]				
Intercept	−5.83	−2.92[d]	−4.04	−3.73[d]
Station chief status	.15	.33	−.67	−1.98[e]
Tour length	.18	4.46[d]	.18	6.00[d]
Zone 2	−1.58	−1.92[e]	−1.79	−2.96[d]
Zone 3	−1.55	−2.03[e]	−1.08	−1.92[e]
Zone 4	−.58	−.77	−1.31	−2.35[e]
Zone 5	−.48	−.57	−1.43	−2.27[e]
Zone 6	−1.05	−1.35	−1.49	−2.59[d]
Zone 7	−1.26	−1.61[c]	−1.11	−1.94[e]
Zone 8	−1.40	−1.73[c]	−1.22	−2.05[e]
	R^2 = .21, N = 119		R^2 = .31, N = 119	

[a]Models 1 and 2 are the fixed-effects and recruiter attribute models, respectively; see Sec. IV.
[b]Significant at the .15 level.
[c]Significant at the .10 level.
[d]Significant at the .01 level.
[e]Significant at the .05 level.

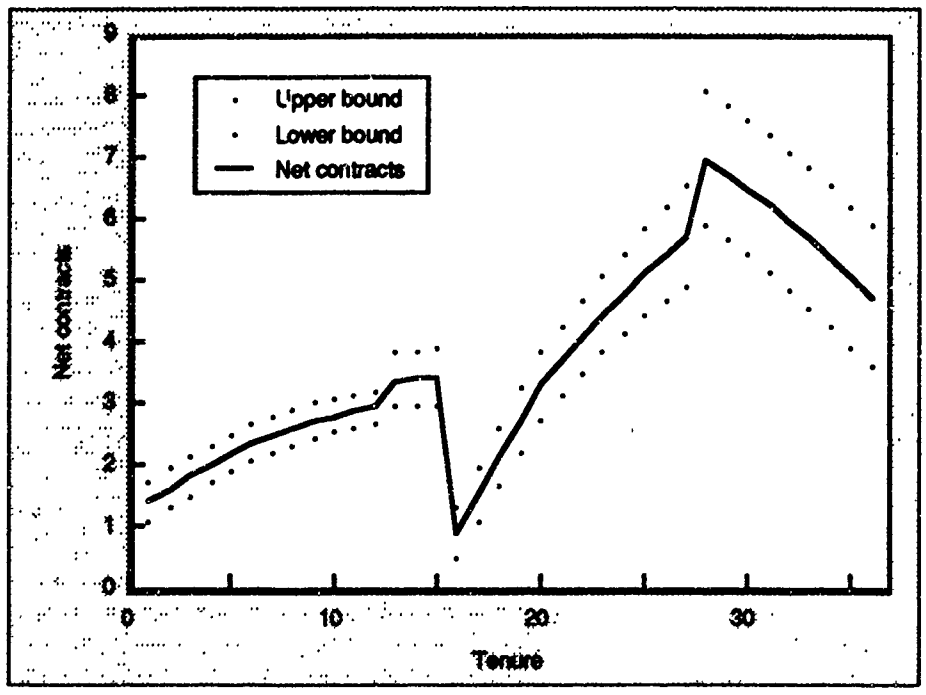

Fig. 4—Tenure profile: specification 2

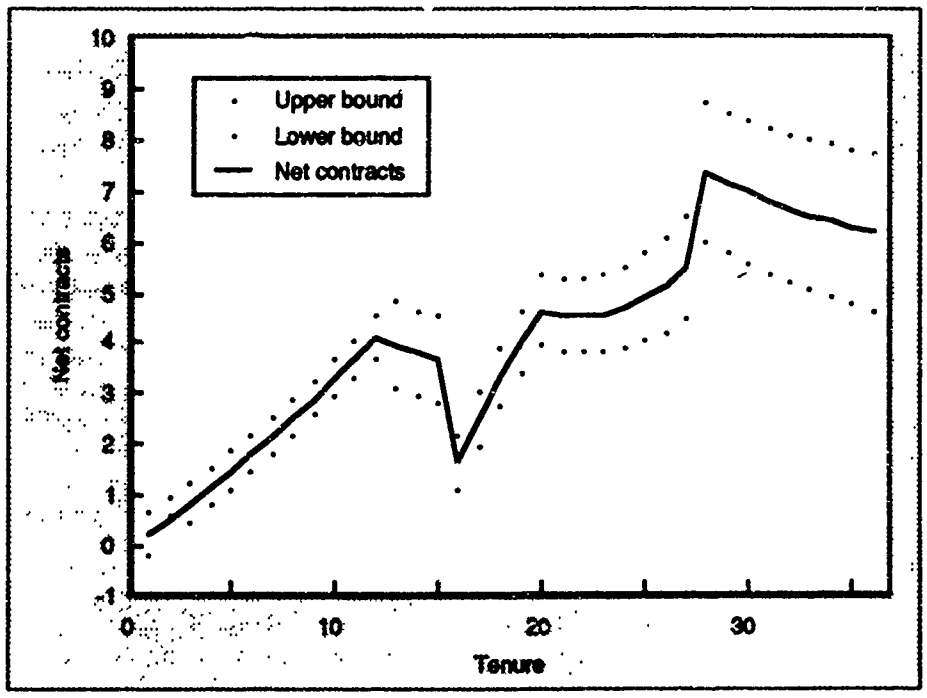

Fig. 5—Tenure profile: specification 1

shape somewhat, particularly between months 13 and 15 and months 21 to 27, they both have the same key feature.

The main feature of both profiles, and one of the key results of this section, is that productivity drops sharply after a recruiter wins a reward. The difference in productivity between month 15 and month 16 of tenure is statistically significant, as indicated by the error bands in the figures. Thus, productivity rises over tenure as the recruiter gains months on the production cycle. After the recruiter wins, productivity falls by 2.4 net contracts (see Fig. 4). However, within five to six months, the recruiter's productivity in the second cycle is back to its level prior to winning the reward. Productivity rises dramatically thereafter, reaching 5.7 net contracts when the recruiter is at the 27th month of tenure. The figures indicate that productivity falls at the end of the tour; we discuss this period in the next subsection.

One interpretation of the drop in net contracts after a reward is won is that recruiters deplete their inventory of potential recruits to win the reward. Put differently, recruiters may "steal" future enlistments to improve their chances of winning a reward in the current month. Once recruiters win their reward, they must divert their effort toward building their inventory rather than making enlistments. As a result, productivity is lower once the reward is won but rises again five months later after their stock is replenished.

An alternative interpretation is simply that recruiters reduce effort once they have won. Since they will not be eligible to win for another 12 months, they may "rest" after exerting effort to achieve the reward. Thus, productivity rises over the first production cycle as recruiters increase effort. When they become eligible to win, they exert the most effort. However, once they have won, they rest and then start the process again.

The estimates for specification 2 in Table 8 also indicate that productivity is negatively related to high quality minority quotas, positively related to tour length, and negatively related to station chief status. The estimated relationship between tour length and net contracts suggests that recruiters with more opportunities to win Freeman rewards produce more. On the other hand, recruiters who must devote part of their time to managing a station and, therefore, have fewer resources available to them produce less net contracts.

PRODUCTIVITY AT THE END OF THE TOUR

The profiles in Figs. 4 and 5 suggest that productivity falls at the end of the tour. In this subsection, we examine this phenomenon

further and investigate whether and how the Freeman Plan plays a role. Only 17 recruiters were in the last year of their tour, including the four recruiters in their third production cycle. Since only two of the 17 recruiters had insufficient time to complete their cycle before rotating, examining the behavior of recruiters with insufficient time remaining is infeasible. These two recruiters are excluded from the analyses, leaving a total of 15 recruiters (and a sample size of 61 observations). Due to the small sample size, the results are intended to be suggestive rather than conclusive.

Approach

The theoretical analysis in Sec. III suggested that whether recruiters increase or decrease productivity in their last year depends on (a) the number of months remaining of their tour, represented by the variable "remaining time;" (b) how close they are to the production cycle's reward eligibility month, represented by the variables PROD and MONTH13; and (c) their average accumulated points, represented by the variable lagged average points. If recruiters reduce effort, productivity should fall as time remaining falls. However, recruiters who are more likely to win a reward, either because they have more months of production or more average points, may reduce productivity less or actually increase productivity when time remaining falls.

To capture these effects, we estimated the following model:

Net contracts = f(remaining time, PROD, MONTH13, lagged average points,
remaining time × lagged points, remaining time × PROD,
remaining time × MONTH13, PROD × lagged points,
MONTH13 × lagged points)

Including the interaction between remaining time and lagged average points allows past points to affect the rise or fall in productivity as tenure increases. Similarly, the interaction between PROD, MONTH13, and lagged average points allows past points to affect how productivity varies with production month. Finally, we include the interaction between production month and time remaining since production month rises as time remaining falls.

If net contracts fall as tenure increases, then the change in net con-

tracts when time remaining increases by one month is positive. However, because time remaining and production month vary inversely, the full effect of one more month of tenure equals the change in net contracts when time remaining increases minus the change in net contracts when month of production increases.[4]

Results

The regression results are presented in Table 9. Productivity falls at the end of the tour, holding month of production constant; success on the Freeman Plan, in terms of lagged average points, does not alter this pattern. Only remaining time, PROD, and the interactions of PROD with remaining time and with lagged average accumulated points are statistically significant. Holding production month constant, the effect on net contracts of increasing remaining time by one month equals [1.71 − (.13 × PROD)]. Thus, net contracts rise as remaining time rises, but rise less the more months of production a recruiter has. Conversely, net contracts fall when tenure rises but fall less when month of production is greater.

When month of production is allowed to vary, the effect of time remaining on productivity changes since production month and time

Table 9

PRODUCTIVITY AT THE END OF THE TOUR
(Dependent variable = net contracts)

Variable	Coefficient Estimate	t-Statistic
Remaining time	1.71	1.79[a]
PROD	3.59	2.37[b]
MONTH13	−3.02	−.96
Lagged average points	.01	1.37
Remaining time × lagged points	−.001	−.76
Remaining time × PROD	−.13	−1.62[a]
Remaining time × MONTH13	.22	.52
PROD × lagged points	−.0039	−1.92[b]
MONTH13 × lagged points	.01	.84
R^2 = .24, N = 61		

NOTE: Fixed-effects model only.
[a]Significant at the .10 level.
[b]Significant at the .05 level.

[4]Mathematically, the derivative of net contracts with respect to tenure is Δcontracts/Δ(time remaining) − Δcontracts/ΔPROD.

remaining are negatively related. When time remaining (t) rises by one month, the effect on net contracts equals:

$$1.71 - (.15 \times t) - [3.59 - (.13 \times t) - (.0039 \times \text{lagged points})]$$

or

$$-1.88 + (.0039 \times \text{lagged points})$$

For recruiters in their last year, lagged average accumulated points equal 238, on average. Thus, as time remaining increases and production month decreases, net contracts fall by .95. Conversely, productivity rises by .95 per month when tenure and month of production rise. However, recruiters with more average accumulated points increase productivity less.

In summary, when recruiters with the same month of production are compared, those with less time remaining have lower productivity, and average points do not play a (statistically significant) role. However, for a given recruiter, as tenure increases, production month increases as well. Since productivity rises over the production cycle, the negative effect on net contracts of less time remaining is compensated for by the positive effect of more months of production.[5] Thus, productivity rises as tenure and production month increase. When the recruiter has a greater number of average accumulated points, productivity rises less as tenure increases.

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[5]The change in net contracts resulting from an increase in production month equals 3.59 − .13(time remaining) −.0039(lagged points). If time remaining equals 12, lagged points must equal 520 for productivity to fall over the production cycle. Since none of the recruiters had this many lagged average points, productivity does, in fact, rise with production month.

VIII. SUMMARY AND POLICY OPTIONS

SUMMARY OF FINDINGS

The purpose of this study was to describe Navy recruiter productivity patterns and to determine whether these patterns were consistent with the Freeman Plan's incentive effects. The study's main findings are:

1. Recruiters who enlist relatively more high quality recruits generally earn more Freeman points in a given month.
2. The relative number of low quality recruits rises when recruiters have been more successful on the Freeman Plan, in terms of their average point accumulation.
3. Productivity rises over the production cycle.
4. Productivity generally rises with experience but drops precipitously after a recruiter wins a reward.
5. Recruiters who have been more successful on the Freeman Plan, in terms of their average accumulated points, produce fewer net contracts and their productivity rises less over the production cycle.
6. Recruiters reduce productivity at the end of their tour but reduce it less when they are closer to becoming eligible for a reward.

The first result suggests that, in general, the point differential between high and low quality enlistments under the Freeman Plan is sufficient to induce recruiters to enlist relatively more high quality net contracts. However, since the model used to estimate the relationship between quality mix and earned points incorporated a bias that would make this result more likely, we cannot rule out the possibility that some recruiters earn more points by enlisting comparatively more low quality personnel. In fact, the second result indicates that quality mix regresses toward the mean. Recruiters who are in a better position to win a reward reduce the quality of their enlistments. Those in a less satisfactory position increase enlistment quality. Thus, for some recruiters, the point differential may be insufficient.

Results 3 and 4 regarding the time-path of enlistments are consistent with the notion that recruiters respond to the Freeman Plan's incentives by varying their level and type of effort over time. The observed patterns can be interpreted in two ways. First, productivity

may rise over the production cycle because recruiters procrastinate by supplying less effort at the beginning, when the reward eligibility month is far away, and increasing effort at the end. Productivity may drop after recruiters win a reward, indicated by result 4, if recruiters reduce effort either to recover from their previous exertions or because they have 12 months before they will be eligible to win another reward.

An alternative interpretation is that recruiters vary their type of effort over time. At the beginning of their production cycle, they may divert their effort toward stockpiling future enlistments and away from making enlistments. At the cycle's end, they deplete their inventory and productivity rises. Productivity may drop following a reward because recruiters completely depleted their inventory of recruits, or possibly "stole" future recruits, to ensure winning a reward, thereby lowering productivity after the reward is won.

Result 5 is consistent with both interpretations. Recruiters may reduce effort when past performance is better if they value leisure more than they value more lucrative rewards. Thus, for more successful recruiters, productivity is relatively constant over the production cycle. On the other hand, if recruiters initially stockpile recruits and later deplete their stock, poorer past performance on the plan will be associated with greater productivity in the current month. Thus, for less successful recruiters, productivity rises over the production cycle.

Which interpretation is correct is an empirical question. Detailed activity data would be required to address this question. Alternatively, a controlled experiment whereby recruiters varied either or both their level and type of effort could be considered.

Determining whether recruiters vary their *level* of effort or simply their *type* of effort is important from a policy perspective. In particular, if observed behavior is explained by stockpiling activity, then such behavior may be consistent with the Navy's objectives and should not be discouraged. On the other hand, if observed patterns result from recruiters varying their level of effort, the Navy may deem that altering recruiter incentives is necessary. We discuss several options for changing recruiter incentives next.

POLICY OPTIONS

The policy recommendations suggested below require marginal changes to the Freeman Plan and, thus, can be implemented relatively quickly. Significantly altering the Freeman Plan, or even replacing it, are other possibilities, but such policy recommendations are beyond the scope of this study.

Shortening the length of the production cycle may discourage recruiters from supplying less effort at the beginning of the production cycle or, more generally, may encourage them to produce a more constant level of enlistments over time. Shortening the cycle's length has the effect of making the reward eligibility "deadline" occur sooner. A recruiter aiming to win a reward has less time to compensate for lower effort at the beginning of the cycle. Such a policy may also discourage recruiters from reducing productivity after winning a reward. Since recruiters have less time to accumulate sufficient points to win their next reward, they would be less likely to reduce effort at the beginning of the new cycle.

Shortening the length of the production cycle may also affect recruiters' incentives to reduce productivity when their past average points have been high. With less time to become eligible to win, successful recruiters may have a greater incentive to maintain their level of average points. If they reduce productivity in response to good performance, they may jeopardize winning a reward. However, if they have accumulated more than enough average points to win, or if they value leisure more than better rewards, they may still reduce productivity if doing so does not impair their chances of winning. Shortening the cycle may still have a beneficial effect since the amount of time that productivity is lower is less when the cycle is shorter.

Because the data contained too few observations on recruiters with insufficient time at the end of their tour to complete their production cycle, we were unable to determine whether these recruiters reduced productivity. However, if this behavior is prevalent, shortening the production cycle would limit the extent of the problem because recruiters would be in this situation less often.

Although the results indicated that the point differential between high and low quality enlistments is generally sufficient to induce recruiters to enlist high quality, the fact that some recruiters prefer low quality enlistments suggests that modifying the Freeman Plan's point system might be considered. More fundamentally, the Navy's main recruiting objective is meeting its quotas, particularly its high quality quotas. Yet, this objective is only indirectly incorporated in the Freeman Plan through the point differential between high and low quality enlistments. The cost to the Navy of monitoring underproducers to ensure that they meet their high quality quota is another byproduct of not sufficiently incorporating the Navy's preference for high quality into the Freeman Plan. Given the Navy's desire to recruit high quality youth at a time when the pool of potential recruits is expected to diminish, increasing the point differential between the different quality categories might be a preferred policy option.

APPENDIX

Table A.1

STATION NET CONTRACT QUOTAS AND ATTAINMENT

Station Variable		Dependent Variable			
		Quota	t-Statistic	Attainment	t-Statistic
	Intercept	2.23	4.07[a]	−.78	−.55
	No. of recruiters	1.88	16.61[a]	1.15	2.54[a]
	Net contract quota			.66	3.54[a]
	April	−.61	−3.13[a]	−.14	−.29
	May	−.92	−4.78[a]	−.25	−.49
	June	−.46	−2.37[a]	−.15	−.31
	July	.34	1.78[b]	.23	.48
		Station[c]			
Zone 1	West 63rd St.	.75	1.49[d]	2.01	1.59[d]
	South Clark St.	.50	.99	−.07	−.06
	Hyde Park	−.46	−.85	2.31	1.72[b]
	Logan Square	−.88	−1.61[b]	−.33	−.24
	West Lawrence	.13	.25	−.70	−.56
Zone 2	Glenview	−.48	−.75	−2.36	−1.48[d]
	Round Lake	−2.80	−3.58[a]	.04	.02
	Palatine	−.72	−1.42	.02	.01
	Waukegan	−.34	−.67	−1.36	−1.07
	Libertyville	−1.26	−2.33[a]	−2.76	−2.02[e]
	Crystal Lake	−.86	−1.59[d]	.38	.28
Zone 3	Cottage Grove	−.86	−1.59[d]	2.58	1.90[e]
	East 92nd St.	−1.06	−1.96[e]	2.11	1.55[d]
	Harvey	−.06	−.11	−1.35	−1.00
	Oaklawn	−1.45	−2.87[a]	−2.34	−1.82[b]
	South Ashland	−.64	−1.20	.95	.71
	Tinley Park	−.54	−1.06	−1.02	−.80
Zone 4	Kankakee	−.46	−.85	−1.49	−1.10
	Chicago Heights	−.52	−1.02	.48	.38
	Gary	−1.59	−3.06[a]	2.02	1.53[d]
	Hammond	−1.50	−2.96[a]	−2.15	−1.67[b]
	Valparaiso	−1.06	−1.69[b]	1.35	.86
	Merrillville	−1.14	−2.05[e]	−1.30	−.92
	Portage	−.98	−1.65[b]	1.04	.70

Table A.1— continued

Station Variable		Dependent Variable			
		Quota	t-Statistic	Attainment	t-Statistic
		Station[c]			
Zone 5	Dekalb	−.82	−1.33	32	.21
	East Rockford	−.58	−1.13	.26	.20
	Sterling	−1.28	−2.34[e]	.33	.24
	West Rockford	−1.13	−1.99[e]	.99	69
	Loves Park	−.76	−1.32	.71	.48
Zone 6	Peoria	−1.80	−3.55[a]	2.54	1.95[e]
	Pekin	−.55	−.96	.09	.06
	Galesburg	−.46	−.85	−.09	−.06
	East Peoria	−.51	− 91	−.59	−.36
	Champaign	−.66	−1.22	1.04	.77
	Bloomington	−.26	−.48	−1.42	−1.06
Zone 7	LaSalle	−.54	−1.06	1.78	1.39
	Elgin	−1.11	−1.98[e]	−.31	−.22
	Aurora	−.86	−1.56[d]	−1.58	−1.14
	Joliet	.35	.70	1.67	1.33
	Wheaton	−1.01	−1.93[e]	−1.28	−.97
Zone 8	Downers Grove	−.75	−1.35	.62	.43
	Melrose Park	.37	.74	−1.02	−.81
	LaGrange	−.86	−1.59[d]	.78	.57
	Elmhurst	−.81	−1.39	−1.30	−.90
	DesPlaines	−.70	−1.29	−.35	−.26
	Berwyn	−1.47	−2.50[a]	.08	.06
		R^2 = .86, N = 228		R^2 = .62, N = 228	

[a]Statistically significant at 1 percent level.
[b]Statistically significant at 10 percent level.
[c]Dummy variables with Irving Park in Zone 1 as the omitted station.
[d]Statistically significant at 15 percent level.
[e]Statistically significant at 5 percent level.

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