# Productivity Effects of Changes in the Size of the Enlisted Recruiter Force

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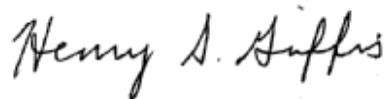
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# Contents

# Executive summary

## Background

Experimental research conducted in the late 1970s found that the productivity of the average Navy enlisted recruiter varied systematically over the course of a 3-year recruiting tour. Specifically, the experience-productivity relationship was found to be characterized by an inverted-U: recruiters in the first few months of their tours had low, but rising productivity; recruiters in the middles of their tours had sustained high productivity; and recruiters nearing the ends of their tours had declining productivity.

An important implication of this productivity pattern is that changes in the number of recruiters have the potential to change overall recruiting efficiency via changes in the distribution of experience across the recruiter force. If they are unanticipated, these changes in force efficiency could, in turn, create scenarios in which there are too few or too many recruiters to achieve a given mission.

In this research memorandum, we revisit the experience-productivity relationship with modern data and consider the implications for recruiter force efficiency. The analysis is intended to inform efforts to better manage changes in the size of the Navy's enlisted recruiter force.

## Results

### The inverted-U still holds

To investigate whether the inverted-U holds for today's recruiters, we use a linear regression model to estimate the experience-productivity relationship, holding constant not only the recruiter's other personal characteristics but also station, market, and mission characteristics.

The regression results indicate that the inverted-U still holds. Specifically, we find that there are three productivity phases in the average 3-year recruiting tour:

- **The learning phase:** Recruiters have a 4-month learning period before they can consistently produce a notional minimum of one net new contract per month.

- **The high-productivity phase:** Recruiters continue to meet this notional minimum from 5 to 30 months of experience, with peak productivity occurring between 12 and 18 months of experience.

- **The helping/transition phase:** Productivity declines rapidly after 30 months of experience, especially during the last 6 months of the recruiting tour.

The statistical results also indicate that the experience levels of other recruiters in the station significantly affect average recruiter productivity: at each month of experience, the larger the share of other recruiters in the station who are inexperienced, the lower the productivity of the average individual recruiter.

## Changes in force size can change force efficiency

Based on the individual-level results, there are two ways that changes in recruiter force size affect recruiter force efficiency via changes in the experience distribution. First, at the aggregate level, the number of net new contracts generated by a recruiter force of a given size will vary depending on the share of recruiters in each productivity phase. To test this implication, we estimate Navy Recruiting District (NRD) contract production as a function of the same market controls used in the individual-level model and the number of recruiters in each of the three productivity phases. The results indicate that recruiters in the high-productivity phase have significantly larger effects on overall production than those in the learning and helping/transition phases.

Second, at the station level, changes in force size may affect productivity if they change the experience mixes within stations. The data show that, between FY94 and FY02, the ratio of senior to junior

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recruiters varied substantially, thus potentially complicating the process of assigning recruiters to stations in high-productivity groupings.

# Recommendations

The appropriate management response to the inverted-U depends on its interpretation. If it is an inherent part of the military rotation system, in which senior Sailors train junior Sailors and the line between the current assignment and the next assignment may be blurred, the inverted-U for recruiting might be considered both normal and desirable. In this case, it should be managed and accounted for in the planning process. Specific recommendations include:

- Change the specification of the Enlisted Goaling Model to include the number of recruiters in high- and low-productivity phases

- Explore the feasibility of implementing changes in force size by extending or shortening tours rather than shrinking and growing entering cohorts

- Maximize station-level productivity by paying particular attention to station-specific experience mixes.

Other interpretations of the inverted-U suggest considering policies designed to eliminate it. For example, if it is the result of the existing system for recruiter management, it may be possible to create new systems that would generate a more desirable experience-productivity profile. In addition, given the inherent differences between the recruiting function and warfighting functions, eliminating the inverted-U by eliminating the rotation system may be possible in the recruiting context. Specific recommendations include:

- Reevaluate recruiter management to test whether the inverted-U is an unintended result of the current incentive program.

- Consider the creation of a professional recruiting force that does not rotate, either by increasing the size of the Career Recruiter Force or by using civilians.

# Introduction

## Background and tasking

The Navy's recruiting environment has changed substantially over the past 16 years. From the military drawdown in the early 1990s, through the difficult recruiting years later in the decade, to post-9/11 patriotism in the first few years of the 21st century, conditions have gone from favorable to unfavorable and back again. In response to changing external forces, the size of the Navy's enlisted recruiter force has also fluctuated, ranging from a low of 3,226 recruiters in FY94 to a high of 4,921 recruiters in FY01.

Research and experience from the drawdown indicate that such large changes in the size of the recruiter force may have secondary effects on overall recruiting efficiency, beyond those directly associated with changes in the number of recruiters in the field. In particular, individual recruiter productivity is a function of recruiter experience; therefore, recruiter force efficiency will be affected if changes in recruiter force size lead to changes in the distribution of individual recruiter experience within the force. Changes in recruiter force size may also complicate the recruiter assignment process as the number and size of stations vary with the number of recruiters, and as the number of senior recruiters varies relative to the number of junior recruiters.

In addition, under the current system for recruiter selection and training, it can take more than a year to bring a new recruiter on board. Therefore, changes in recruiter force size, especially upsizing, can be difficult to coordinate with changes in the accession mission or external recruiting conditions.

Concerned that unanticipated changes in the recruiting environment could combine with secondary efficiency effects and institutional rigidities to introduce extra risk to the recruiting mission in any given year, Commander, Navy Recruiting Command (CNRC) asked CNA to

explore strategies to ensure the efficient management of fluctuations in the size of the Navy's enlisted recruiting force.

# Issues and approach

In response to CNRC's request, this study addresses three questions:

1. How do changes in the size of the recruiter force affect force efficiency?

2. Through what mechanisms is this effect generated?

3. What are feasible ways to mitigate efficiency disruptions?

We use individual recruiter productivity as the starting point to answer these questions. Specifically, we merge Navy personnel records for recruiters with data on actual contract generation to examine individual productivity as a function of recruiter experience and station characteristics. Then, using the estimated experience-productivity relationship for individual recruiters, we show how changes in force size endogenously affect force efficiency via changes in the experience distribution of the recruiter force.

# Outline

The main sections of the report are organized as follows. First, we discuss several factors that drive changes in force size, and we describe in more detail both the issues to be addressed and the analytical approach to be used. Next, we describe the data on which the analysis is based, giving a working definition of recruiter force and distinguishing among its different members. The third section describes a regression of individual recruiter productivity on recruiter experience and other controls and then uses the estimated results to create a series of regression-adjusted experience-productivity profiles. The fourth section shows how changes in recruiter force size interact with changes in the distribution of individual recruiter experience to affect recruiter force efficiency. The report concludes with a summary of the results and their implications, as well as recommendations to improve force management and reduce the mission risks associated with changes in force size.

# History and context

In this section, we define terminology, discuss past changes in recruiter force size and drivers of those changes, and review past research that identifies potential secondary effects of changes in force size on force efficiency. These potential secondary effects are the focus of this study, and the factors identified here motivate the empirical analysis in the rest of the report.

## Terminology

We begin by providing specific definitions of three general terms:

> ***Recruiter force***--All active-duty enlisted members assigned to Navy Recruiting Stations and specifically tasked with generating new active-duty enlistment contracts.[1]

> ***Recruiter force efficiency***--The minimum number of recruiters needed to achieve a given contract objective or the maximum number of contracts achievable with a given number of recruiters.

> ***Recruiter productivity***--The number of net new contracts generated by an individual recruiter in a given month.

By providing these definitions, we seek to minimize potential confusion in a number of areas. First, our definition of recruiter force excludes administrative and management staff, even if they are members of the Career Recruiter Force (CRF). Second, our definition of recruiter force efficiency intentionally incorporates the notion of *potential* contract production, which may or may not be reflected by *actual* contract production. Finally, we explicitly make the distinction between overall force efficiency and individual recruiter productivity to facilitate discussions about issues that arise when we aggregate from the recruiter level to the force level.

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1. We discuss this in more detail when we describe our recruiter database.

# Changes in recruiter force size over the past 16 years

Research on the market-expanding effects of different Navy recruiting resources indicates that increasing the number of recruiters is a relatively reliable, cost-effective way to increase the number of new contracts.[2] Each year, planning staff at Navy Recruiting Command determine the desired number of recruiters using a constrained optimization model that calculates:

- The cost-minimizing number of recruiters for a given beginning-of- year (BOY) contract objective, or

- The maximum number of contracts for a given number of recruiters.

The model also includes as parameters the programmed levels of other recruiting resources (e.g., advertising and enlistment incentives), forecasts of the national unemployment rate and of military pay relative to civilian pay, as well as a statistically generated estimate of the supply response to increases in the number of recruiters.

The supply response to changes in the number of recruiters is, in turn, generated using the Enlisted Goaling Model (EGM). The EGM is an econometric model that uses historical data on contract production to estimate the production impact of changes in the number of recruiters, holding constant external market conditions and the levels of other recruiting resources (see [2]). Thus, in essence, the EGM is used to estimate force efficiency. We will discuss later why this estimate may not be accurate.

Finally, the desired number of recruiters is then approved or adjusted, depending on other Navy concerns, such as personnel

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2. For example, [1] estimates that a 10-percent increase in the number of Navy recruiters increases high-quality enlistments by 5.7 percent. Based on the program and personnel costs used in the study, this relationship between recruiters and enlistments translated to a marginal cost of high-quality recruits of $8,400, compared with $7,700 and $12,800 for advertising expenditures and the Navy College Fund, respectively.

budgets, endstrength limits, and the desired size of the shore establishment.[3]

As a result of this process, the size of the recruiter force has varied substantially over time. From FY90 to FY05, the maximum was 4,921 recruiters, and the minimum was 3,226 recruiters: a 42-percent range of variation around the average force size of 4,080 (see figure 1).[4] These fluctuations were driven largely by changes in the size of the accession mission and changes in force efficiency.

## Changes in the size of the accession mission

The main driver of the BOY new contract objective is the BOY accession mission,[5] so changes in the accession mission are also a main driver of changes in the required number of recruiters. Figure 2 plots FY90–FY05 BOY accession missions against recruiter force size.[6]

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3.  This description is a simplification of a complex process. Depending on the budgeting exercise being performed, CNRC staff might use the program of record for the other recruiting resources or might let the model choose the optimal mix of resources (or some of both). Also, strategies for determining the desired number of recruiters have changed over the data period. At the time this study was conducted, the strategy was to generate an average recruiter requirement across the Five-Year Defense Program and apply it to each year. This strategy was adopted to minimize year-over-year fluctuations in the size of the recruiter force.

4.  For each fiscal year, the recruiter force size is the average number of recruiters identified in each month. Because Sailors join and leave the recruiter force throughout the year, counting the total number of recruiters in each year would result in overcounting the number on board at any given time.

5.  Other factors that determine the new contract objective are the expected Delayed Entry Program (DEP) attrition rate and the goals for the size of the DEP pool. DEP recruits are those who have signed contracts but have not yet shipped to boot camp. For most of the data period, recruits could be in DEP for anywhere from 1 day to 12 months. In FY05, the maximum time in DEP increased from 12 to 15 months. DEP attrition occurs when recruits who signed contracts do not actually ship to boot camp. The BOY DEP pool for any fiscal year is the pool of recruits who signed contracts in the fiscal year just ending but, based on the terms of those contracts, will ship in the fiscal year just beginning.

6.  The actual number of recruiters on board for a given year may deviate from the BOY plan, so comparing a year-end recruiter count to the BOY accession mission does not constitute an apples-to-apples comparison.

Figure 1.    Fluctuations in the official recruiter force size, FY90–FY05[a]



• Average size of year-to-year change is 8 percent
  - Maximum increase = 23 percent in FY99
  - Maximum decrease = 10 percent in FY93 and FY94
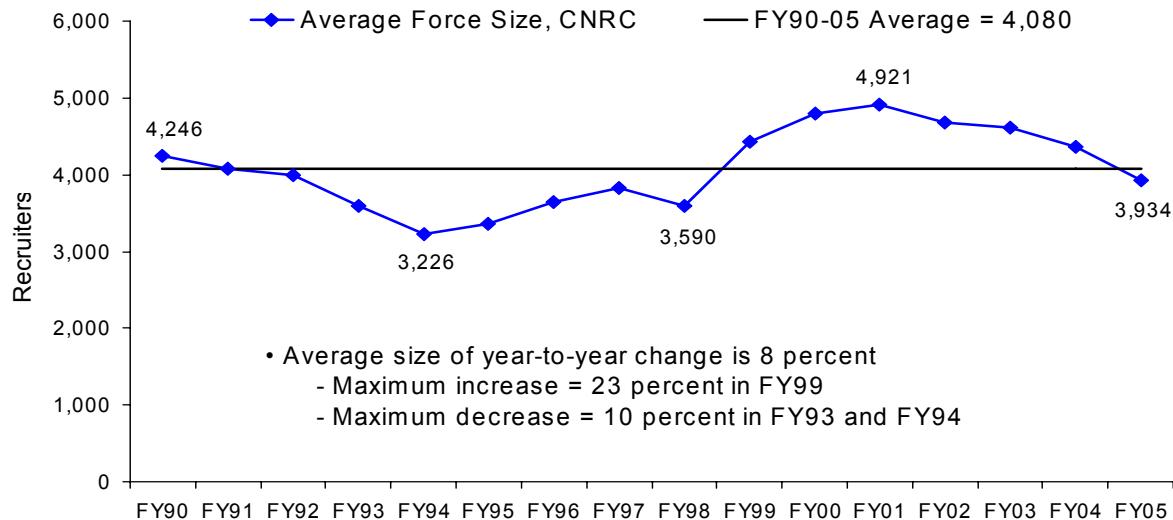
a. Source: CNRC History Report.

Figure 2.    Recruiter force size vs. beginning-of-year accession goals[a]



a. Source: CNRC History Report.

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Figure 2 illustrates three distinct mission regimes. The period from FY90 through FY94 corresponds to the military drawdown that followed the end of the cold war.[7] During this period, all the military Services experienced substantial cuts in endstrength levels, which in turn translated directly to smaller accession missions. In addition, to minimize the number of separations required to reach the lower endstrength levels, the mission for each Service was further cut below the level needed to sustain each force [5].

As the Navy's accession mission fell during the drawdown, so did the size of the Navy's recruiter force. Note, however, that the number of recruiters did not fall as quickly as the planned number of accessions. Between FY90 and FY94, the BOY accession mission decreased by 39 percent, while the number of recruiters decreased by only 24 percent. As a result, the ratio of planned annual accessions to the actual number of recruiters decreased from 22 to 18.

FY94 through FY01 was a period of sustainment, during which accession missions stabilized at new steady-state levels. Over this 7-year period, the BOY accession mission fluctuated between 53,185 and 57,370. This constitutes a fairly narrow range of just 4,185 accessions, or 8 percent of the average for the sub-period. In contrast, during these same years, the number of recruiters increased by about 1,695, (or 53 percent)[8] in response to post-drawdown recruiting difficulties.[9] Thus, by FY01, the ratio of planned annual accessions to the actual number of recruiters had fallen even further, to just under 12.

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7. Different sources define the drawdown period differently: Officially, the Defense Authorization Act of 1991 required total military endstrength to decrease 25 percent by 1995 [3], implying an FY91–FY95 time frame. Correspondingly, the Navy employed voluntary separation incentives from FY92 through FY95 [4]. However, both [1] and [5] define the drawdown period as FY90 through FY94, which corresponds to the visible drawdown shown in figure 2.

8. This is the difference between the number of recruiters in FY01 and FY94.

9. See references [1, 5, 6, and 7] for discussions of the recruiting environment during this period.

Finally, FY01 marks the beginning of the third regime, in which Navy enlisted accession missions once again began to decline. According to [8], the smaller accession missions during this period were the result of record-high retention levels combined with planned decreases in endstrength. The high retention rates, especially at the beginning of the period, were the result of substantial military pay raises and a relatively weak domestic economy. The endstrength reductions were an explicit part of the Human Capital Strategy articulated by then Chief of Naval Operations (CNO) Admiral Vernon Clark, who envisioned a future force that would be smaller but better educated and more experienced.[10]

During this second, Navy-specific, drawdown, the number of recruiters was cut substantially. However, as during the larger drawdown, the decrease in the recruiter force was smaller than the decrease in the accession mission: 20 percent vs. 32 percent. As a result, by FY05 the ratio of planned annual accessions to the actual number of recruiters had fallen to only 10, just less than half what it was in FY90.

## Changes in force efficiency

By our definition, force efficiency is essentially equivalent to force capability, and if force efficiency changes, the number of recruiters needed to meet a set mission will also change. For example, a decrease in force efficiency creates a need for a larger recruiter force for any given accession mission.

Force efficiency is a function of many factors, including the following:

- The external recruiting environment
- The quality aspects of the mission
- The level of other recruiting resources
- Recruiter placement or assignment

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10. Specifically, as of September 2004, plans called for reducing enlisted endstrength to 292,995 by FY09, down from 317,848 in FY02---a decrease of 8 percent. (See [8], table 1, page 11.)

- Recruiter management

- Recruiter ability.

Since recruiter ability and the optimality of recruiter management are unobservable, force efficiency is also effectively unobservable. But there is a perception that recruiter force efficiency decreased during the 1990s, especially just following the drawdown. In fact, between FY90 and FY05, production per recruiter (PPR)[11] decreased from 1.6 to just over 0.7. Figure 3 shows the data for the whole period.

Figure 3.  Official contracts per recruiter[a,b]
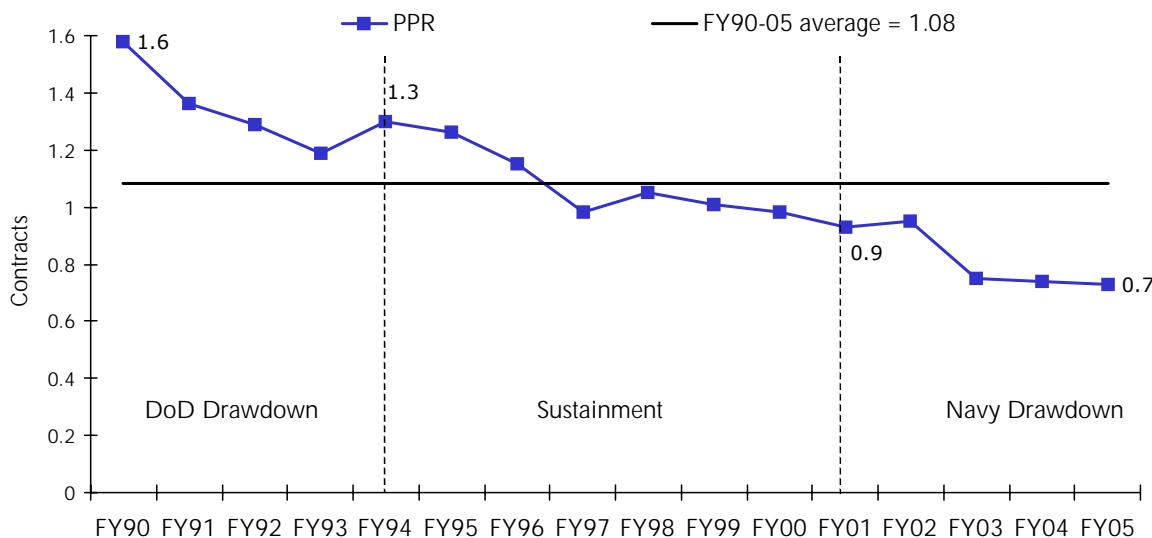


a. PPR = (total new contracts/recruiters on board)/12.
b. Source: CNRC History Report.

These changes in PPR do not necessarily result from changes in force efficiency: although changes in force efficiency will necessarily cause changes in PPR, all else equal, the converse does not hold. This is because production may be effectively demand-constrained or goal-constrained, such that if the recruiter force is larger than necessary,

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11.  PPR = (total new contracts/recruiters on board)/12.

actual production may be an underestimate of force efficiency. It is for this reason that the EGM's estimates of the supply response to changes in the number of recruiters may be biased [9].

To explore this possibility, we identify periods when production was not likely to have been demand constrained using the ratio of end-of-year (EOY) contract attainment to the EOY contract objective: when this ratio is less than 1, the demand constraint is not likely to be binding. Figure 4 compares EOY contract objectives with actual contract attainment for FY90 through FY05.

Figure 4.   EOY new contract objectives vs. new contract attainment[a]
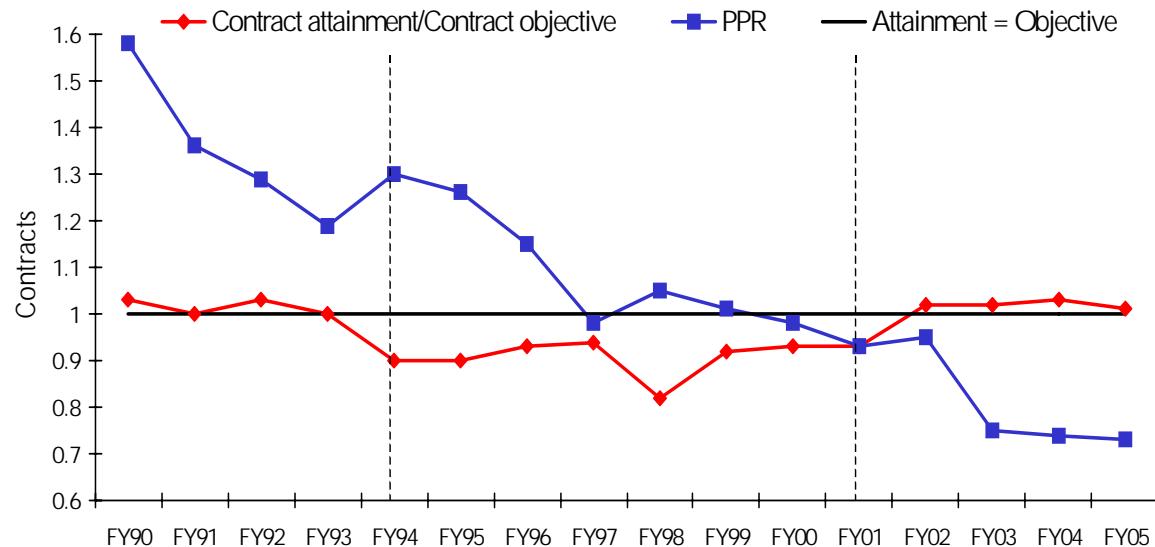
a. Source: CNRC History Reports.

The data in figure 4 show that Navy recruiting fell short of its contract objectives in all 8 years of the sustainment sub-period.[12] However, new contract attainment has met or exceeded the objective in every other fiscal year since FY90. Consequently, the falling PPR during the

12.  Recall that, in FY98, the Navy missed not only its contract objective but also its accession mission.

sustainment period and during the two drawdown periods should be viewed differently. It seems likely from the figure that efficiency did actually decline in the FY94–FY01 period when the ratio of contract attainment to EOY contract objective was strictly less than 1. In contrast, observed decreases in PPR for FY90–FY93 and FY02–FY05 were likely driven by disproportionate decreases in the accession mission relative to decreases in the size of the recruiter force.

According to [1], since FY94, "the Services have experienced increasing difficulty in accomplishing their recruiting missions." Reference [1] attributes the post-drawdown decrease in PPR to strong economic conditions and to lower enlistment propensities among American youth. In addition, a series of articles by RAND researchers [5, 6, and 7] raises the possibility that changes in recruiter management after the drawdown decreased recruiters' ability to convert potential supply to actual contracts. These researchers hypothesize that the decreases in recruiter productivity actually followed from the decreases in the number of recruiters in the field and in the level of recruiting resources. Reference [5], for example, states the following:

> The large reduction in recruiting resources during the drawdown could have contributed to important changes in recruiter and resource management practices, such as goaling or the allocation of resources, including the stationing of recruiters. Such changes could affect the ability to cover the whole country and sign potential recruits with the same effectiveness as before the drawdown.

It is also possible that changes in force size changed the ability distribution within the force via changes in the experience distribution.

# The importance of individual recruiter experience and the experience distribution

## Individual recruiter experience

In general, worker productivity is expected to increase with experience as on-the-job learning takes place.[13] Because Navy recruiters are selected from the general population of Sailors whose "real" Navy jobs are not recruiting related and who most likely have no previous

recruiting or sales experience, it is likely that the effect of experience on productivity is especially important for this particular group of workers. Recognizing this likelihood, the Navy included a study of the relationship between recruiter experience and recruiter productivity in an early-AVF recruiting experiment, known as the *Navy Enlistment Marketing Experiment*.[14] Using monthly contract data from May 1977 through December 1978 for recruiters from three NRDs, the study found that the experience-productivity curve had an inverted-U shape, as shown in figure 5. (These results are reported in [12].)

Figure 5.    Recruiter productivity[a] curve from 1978–1979 experiment[b]
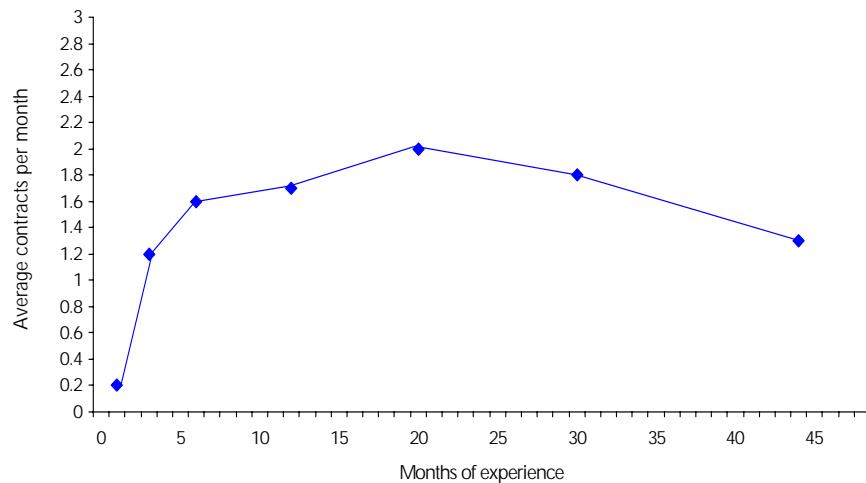


a. Productivity in this experiment was measured by *gross* contracts per month.
b. Source: [12], figure 1, page 1374.

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13.  For seminal work on this topic, see [10].

14.  The *Navy Enlistment Marketing Experiment* was initiated in 1978 to evaluate the effectiveness of the Navy's marketing efforts by quantifying the relationships between enlistments and recruiting resources—specifically, numbers of recruiters and levels and types of advertising expenditures. See [11] for a detailed description of the experiment and its goals.

The increase in productivity over the first year of the recruiting tour was consistent with the theoretical prediction that productivity should increase with experience, and was interpreted to represent on-the-job learning. The low productivity after 2 years of experience was, however, considered "unexpected and counterintuitive." Further investigation revealed that much of the late-tour decline in productivity could be attributed to a particular aspect of recruiter management. At the time, recruiters were evaluated based on monthly accessions, not contracts. As a result, recruiters nearing the ends of their tours were fulfilling their shipment goals with DEP recruits, rather than generating new contracts. However, even after correcting for this effect by eliminating from the sample recruiters in the last 6 months of their tours, [12] still found that productivity dropped somewhat over the 29- to 39-month range of experience. Thus, for a standard 36-month recruiting tour, these authors identified three productivity phases:

- The "learning phase" in months 1 through 4

- The "non-learning phase" in months 5 through 31

- The "de-learning phase" in months 32 through 36.

These results were then applied in a companion study (see [11]) that modeled total CNRC contract production in a fiscal year as a function not simply of the total number of recruiters but of the number of recruiters in the non-learning phase and the number of recruiters in the learning and de-learning phases. In the regression results, non-learning recruiters had consistently positive and significant effects on overall production, while learning and de-learning recruiters either had no significant impact on production or had much smaller effects than non-learning recruiters. The authors note that failing to take the effects of experience into account may have contributed to substantial variation across previous estimates of the effects of the number of recruiters on total production.[15]

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15. Reference [12], for example, cites [13] and [14] on this issue.

## Changes in the experience distribution of the recruiter force

If experience is a determinant of ability, then when moving from a discussion of individual productivity to force efficiency, we need to consider the experience distribution. More specifically, the relationship between individual recruiter productivity and individual experience is important to the discussion of changes in force size because, given current practices, changes in force size will cause predictable changes in the distribution of experience within the recruiter force. For example, during a downsizing, the current practice is simply not to fill billets that are vacated by recruiters ending their tours. In this case, the average level of experience in the recruiter force is likely to increase as existing recruiters become more experienced but new recruiters are not added. Assuming a positive relationship between experience and productivity, an increase in average experience translates to an increase in average productivity.

In contrast, during upsizing, the current practice is to assign new recruiters to existing billets as they become vacant and to increase manning at other stations. In this case, average experience is likely to decrease as more and more new recruiters are brought on board. The likely result is a decrease in average productivity. If this decrease is not accounted for in the planning process, too few new recruiters may be added to meet whatever goal is in place.

Since recruiters are entering and exiting the force constantly throughout any given year, NRD leadership must continuously manage the assignment of new recruiters and the reassignment of experienced recruiters to vacant billets. The typical recruiter tour is 3 years in length, so one-third of the recruiter force in a given year has 12 or fewer months of experience. However, changes in force size necessarily change this proportion. Consider a downsizing: as smaller-than-normal cohorts of new recruiters enter in a year, the recruiter force ends up with a smaller proportion of recruiters with fewer than 12 months of experience. Furthermore, as these small cohorts work their way through their 3-year tours, in the following years, the recruiter force will have smaller proportions of recruiters with more than 12 months of experience.

Figure 6 gives an example, using actual data, of such movement of cohorts through the 3-year tour. The red numbers identify the movement of relatively large cohorts, the blue numbers identify relatively small cohorts, and the green numbers identify relatively stable cohort sizes. The last row of numbers in the figure shows the share of the recruiters who are in months 5 through 28, which roughly correspond to the high-productivity, non-learning phase of the recruiting tour identified in [12]. This share varies widely as the cohort size changes from trimester to trimester.

# Summary

The data and discussion presented in this section showed that the size of the recruiter force fluctuates substantially and these fluctuations have the potential to change force efficiency via their effect on the distribution of recruiter experience, if the experience-productivity relationship is characterized by an inverted-U. The cited research documenting the inverted-U relationship used data on average productivity from the late 1970s. The question remains whether the inverted-U still holds today and to what extent it is mitigated by controlling for other factors that are associated with recruiter productivity. To answer this question, we will use Navy recruiting and personnel data to quantify these effects during the 1990s and the first half-decade of the 21st century. The main part of our analysis is the estimation of regression-adjusted experience-productivity profiles of Navy recruiters that control for other recruiter characteristics besides experience as well as station characteristics, market characteristics, and mission characteristics. Before presenting our regression results, we describe the data.

Figure 6.  Movement of cohorts through the experience distribution[a]

| Experience | 1998 ONDJ | FMAM | JJAS | 1999 ONDJ | FMAM | JJAS | 2000 ONDJ | FMAM | JJAS | 2001 ONDJ | FMAM | JJAS | 2002 ONDJ | FMAM | JJAS | 2003 ONDJ | FMAM | JJAS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-4 months | 206 | 381 | 465 | 657 | 996 | 812 | 219 | 153 | 356 | 471 | 370 | 411 | 449 | 462 | 458 | 373 | 392 | 329 |
| 5-8 months | 172 | 205 | 377 | 462 | 650 | 990 | 806 | 218 | 153 | 356 | 468 | 369 | 409 | 448 | 461 | 456 | 371 | 392 |
| 9-12 months | 208 | 170 | 202 | 372 | 452 | 634 | 970 | 786 | 215 | 153 | 353 | 460 | 366 | 406 | 443 | 452 | 449 | 368 |
| 13-16 months | 273 | 203 | 167 | 196 | 363 | 428 | 611 | 937 | 767 | 211 | 149 | 351 | 450 | 363 | 398 | 434 | 445 | 440 |
| 17-20 months | 400 | 264 | 198 | 159 | 187 | 346 | 410 | 593 | 913 | 748 | 204 | 147 | 346 | 443 | 353 | 390 | 427 | 432 |
| 21-24 months | 558 | 384 | 256 | 190 | 152 | 178 | 335 | 397 | 582 | 890 | 732 | 200 | 144 | 340 | 430 | 344 | 384 | 419 |
| 25-28 months | 409 | 536 | 365 | 247 | 183 | 146 | 172 | 327 | 385 | 562 | 862 | 710 | 191 | 139 | 334 | 417 | 331 | 377 |
| 29-32 months | 284 | 387 | 510 | 344 | 236 | 172 | 140 | 166 | 314 | 375 | 538 | 837 | 686 | 185 | 134 | 323 | 398 | 324 |
| 33-36 months | 224 | 252 | 341 | 452 | 309 | 198 | 145 | 125 | 153 | 291 | 336 | 470 | 759 | 637 | 166 | 124 | 291 | 369 |
| 37-40 months | 155 | 108 | 129 | 154 | 256 | 146 | 94 | 77 | 77 | 97 | 146 | 150 | 211 | 416 | 404 | 109 | 64 | 152 |
| 41+ months | 73 | 107 | 123 | 136 | 173 | 233 | 226 | 189 | 163 | 135 | 115 | 130 | 159 | 213 | 316 | 371 | 254 | 177 |
| Share in months 5-28 | 68.2 | 58.9 | 49.9 | 48.3 | 50.2 | 63.6 | 80.1 | 82.1 | 74.0 | 68.1 | 64.8 | 52.8 | 45.7 | 52.8 | 62.1 | 65.7 | 63.3 | 64.3 |

Small cohorts lead to small share in months 5-28.

Large cohorts lead to 66-percent increase in the share of recruiters in months 5-28.

Relatively equal sized cohorts lead to stable share in months 5-28.

a. Average number of recruiters in the listed experience category by trimester.

# The data

To test whether the inverted-U still holds in more recent data, we must create experience-productivity profiles for recruiters in the first 48 months of recruiting duty. Since some recruiters have more than 48 months' experience, the group of recruiters in which we are primarily interested is actually a sub-set of the total recruiter force. In this section, we discuss in more detail our definition of recruiter force and the Sailors who compose it. Then, we describe the process by which we created a recruiter force data set and the criteria we used to select a sub-sample of recruiters on which to base our analysis.

# Force members' roles

Applying the definition of *recruiter force* provided on page 7, there are two types of recruiters who qualify for inclusion in our data set: Recruiter Canvassers and Recruiters-in-Charge (RINCs). Sailors filing these roles primarily hold the Navy Enlisted Classification (NEC) 9585, but they might also be members of the Career Recruiter Force (CRF) and thus hold the NEC 2186. Depending on their roles and their NEC designations, different members of the force are likely to have varying levels of productivity and experience.

### Recruiter Canvassers vs. Recruiters-in-Charge

Recruiter Canvasser is the title held by the Sailor whom most people probably picture when they think of a recruiter. *The Manual of Navy Enlisted Manpower and Personnel Classifications and Occupational Standards*[16] describes the skills and duties of the Recruiter Canvasser in the following way: "Recruits individuals into the U.S. Navy and Naval Reserve. Possesses expertise in recruiting techniques and knowledge

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16. http://buperscd.technology.navy.mil/bup_updt/508/NEC/ NEC%20Menu_508.htm.

of recruiting textbooks and Navy enlistment programs and policies. Communicates and relates effectively with prospects, groups and the community. Possesses a basic knowledge of classification techniques."

Recruiter Canvassers who are successful in the first 18 months of their recruiting tours may qualify to serve as RINCs. The RINC is officially the station manager and has the primary responsibility for ensuring that the station meets its contract goal. In his role as a manager, the RINC trains new Recruiter Canvassers and manages the workloads of all the recruiters in the station. RINCS may also be responsible for generating new contracts. The extent to which a RINC does each activity depends on the size of the station he manages. In a large station, management is the focus; in a smaller station, the RINC has fewer management responsibilities and more production responsibilities.

Given these roles, Recruiter Canvassers are expected to generate more contracts per month than RINCs, who are expected to have more experience, on average, than Recruiter Canvassers. By definition, a RINC should have at least 18 months of recruiting experience.

Unfortunately, the information captured in the EMR does not allow us to distinguish between Recruiter Canvassers and RINCs in our data.

## NEC 9585 vs. NEC 2186

Recruiters with the NEC 9585 (hereinafter, "9585s") are Sailors with other Navy specialties who serve as recruiters while on shore duty, then return to their regular jobs when they rotate back to sea. Detailers in each occupational community are expected to nominate a specific number of Sailors for recruiting duty each year; for each community, this number varies by fiscal year depending on the planned size of the recruiter force. The recruiter selection process then screens applicants based on their physical fitness levels, their family status, their financial status, and their moral standing as indicated by histories of legal or alcohol problems.[17] The notional recruiting tour lasts 36 months, but it can be extended for an additional 12 months. Most 9585s complete only one tour as a recruiter.

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17. The recruiter application form is available to view on the CNRC website: http://www.cnrc.navy.mil/documents/RSTscreening.doc.

In contrast, the 2186 NEC is awarded to Sailors who are approved for lateral conversion to the CRF for the remainder of their naval careers. According to [15], the CRF was created to "develop a cadre of exceptional recruiting managers to provide consistency and leadership to the recruiting effort." Thus, Career Recruiters (hereinafter, "2186s") typically fill management roles that are not included in our definition of the recruiter force. However, some 2186s do serve as RINCs of large stations. As stated in [15], "CRF selectees must have already exhibited leadership in a RINC position. E-6 and E-7 CRF members should be able to effectively run stations with three to four recruiters assigned." Some 2186s also serve as Recruiter Canvassers. Currently, the CNRC staff estimates that about half the RINCs and about 5 percent of Recruiter Canvassers are members of the CRF.

Based on these definitions, 9585s and those 2186s whom we count as members of the recruiter force (i.e., 2186s who are either RINCs or Recruiter Canvassers) are expected to differ in ways that are similar to the ways in which Recruiter Canvassers and RINCs differ. Specifically, since 9585s are more likely than 2186s to be Recruiter Canvassers, they are likely to generate more contracts on average. In addition, 9585s should have, on average, less overall recruiting experience than 2186s, as well as fewer recruiting tours.

Unlike Recruiter Canvassers and RINCs, 9585s and 2816s can be distinguished in our data.

## The Recruiter Force data set

The Recruiter Force data set includes Sailors who were assigned to recruiting-related activities, held recruiting-related NECs, and were actively generating contracts during the period of FY90 through FY05. It was built by merging contract data from the Navy recruiting database (Personalized Recruiting for Immediate and Delayed Entry or PRIDE) with assignment and NEC data from the Enlisted Master Record (EMR).

## Unit of observation

To capture the relationship between months of recruiter experience and recruiter productivity, the data set is structured so that the unit of observation is the "recruiter-month." For example, in October 1995, recruiter X brought in two contracts and it was the seventh month in his first tour as a recruiter. Thus, there are multiple observations for each recruiter in the sample.

## Selection criteria[18]

The use of Navy personnel data to identify recruiters who were either Recruiter Canvassers or RINCS was not straightforward because the exact positions held by recruiting personnel are not indicated on individuals' records. In our effort to include only those recruiters who were actually recruiting, we were more concerned about including people who were not recruiting than about losing some who were. To this end, we kept only those who:

- Were assigned to the recruiting activity 5465
- Possessed the 9585 or 2186 NEC at some point during the FY89–FY05 period
- Were dNECed to 9585 or to 2186 at some point during the FY89–FY05 period
- Had at least one contract during the period
- Did not start a recruiting tour as an E1, E2, E3, or E9
- Were determined to be in a first, second, or third tour.

Our exclusions left us with 1,146,329 contracts (almost 99 percent of all contracts signed in the FY89–FY05 period), attributed to 27,524 recruiter tours, and 24,670 recruiters.

Using this sample, the annual force sizes that we report in the next section and on which we base our analysis differ slightly from those reported by CNRC and shown in figure 1. Figure 7 compares our counts with CNRC's counts. The figure shows that, although the CNA

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18. See appendix A for a detailed description of the criteria used to create the sample.

counts follow the same year-over-year pattern as the official CNRC counts, the CNA number tends to be higher, especially early in the data period.

Figure 7. Fluctuations in average force size, CNA counts[a] vs. CNRC counts[b]
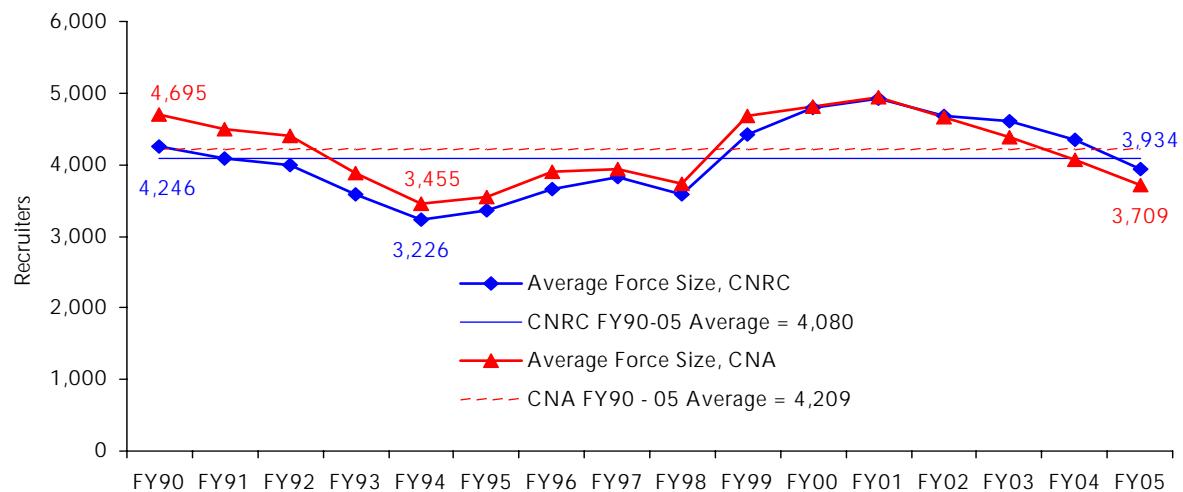


a. Source: Authors' calculations based on data from PRIDE and the EMR.
b. Source: CNRC History Reports.

## Data from other sources

In addition to the information on recruiters and contracts, the recruiter force data set also includes identifiers for Navy Recruiting Stations (NRSs) and variables that characterize external recruiting conditions.

**Station identification**

To associate recruiters with stations, we used CNRC-maintained files that contain the addresses of recruiting stations across the country back to FY94.

**Market characteristics**

The recruiting environment is closely tied to economic conditions, so the recruiter force data set also includes market data from the Bureau

of Labor Statistics (BLS), the Current Population Survey (CPS), and the Census Bureau. These data were available only through FY02.

# Makeup of the recruiter force by NEC and tour

## The recruiter force by NEC

Figure 8 shows that 9585 recruiters make up the bulk of the recruiter force, while 2186s constitute only a small percentage of those who are actively recruiting. For the whole data period, 9585s made up an average of 92 percent of the total recruiter force. Note, however, that 2186s' shares of the force have stayed slightly higher than in the drawdown years since peaking in FY98. As a result, the average 2186 share is higher for the second half of the data period than for the first half: 8.4 percent for FY97 through FY05, versus 3.9 percent for FY90 through FY96.

Figure 8.   Recruiter force by NEC[a]
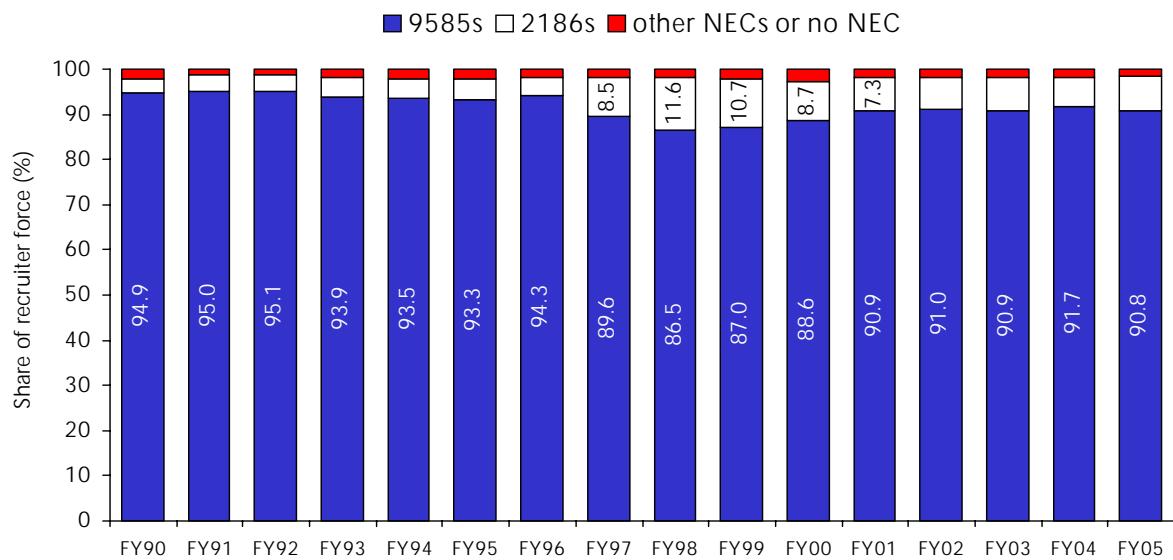


a. In the data, some Sailors who are generating contracts either do not have an NEC at all or do not have a recruiting-related NEC (i.e., they have neither 9585 or 2186).

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## Tour patterns and experience levels

**9585s by tour**

Figure 9 shows that most 9585 recruiters serve only one tour of recruiting duty. In addition, the data show that the share serving second or third tours has remained roughly constant over time, with one exception. In FY93, FY94, and FY95, the shares of 9585s serving second recruiting tours were substantially higher than in any other fiscal years during the data period. These shares then declined steadily from FY96 onward; by FY99 the shares of second- and third-tour 9585s had stabilized at levels slightly higher than those during the drawdown. Since this pattern in the data does not seem to be related to the recruiting crisis of the late 1990s, we infer that it was instead related to drawdown dynamics, and that using more second-tour 9585s is not part of CNRC's standard means of responding to changes in recruiting conditions.

Figure 9.   9585 recruiters by tour
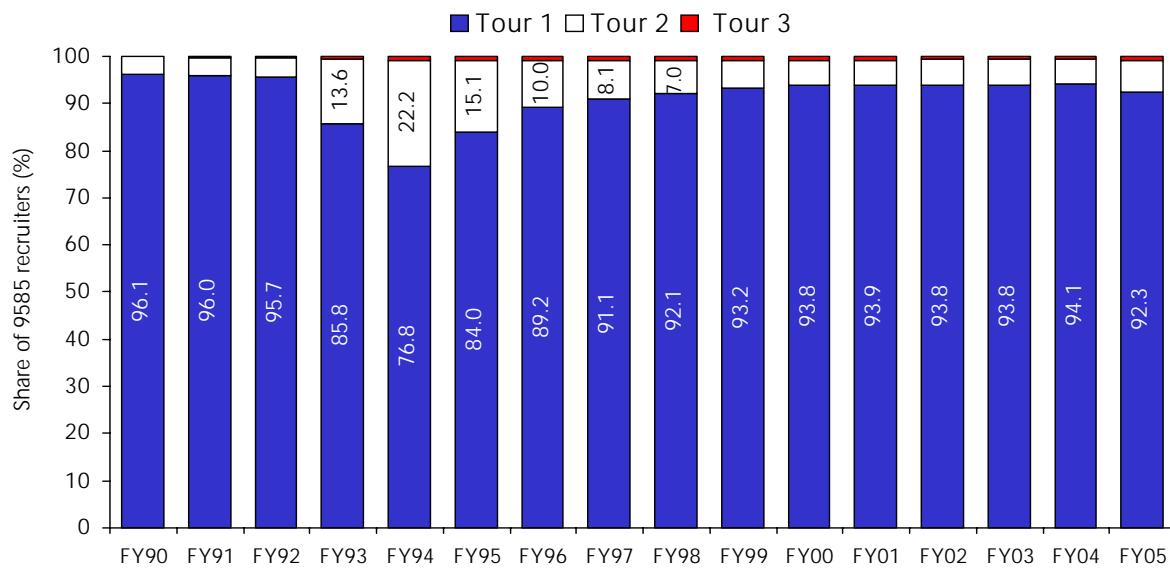
## 2186s by tour

Figure 10 shows that 2186s participating in the recruiter force are spread more evenly across tours than 9585s, particularly later in the data period. This is consistent with the fact that, by definition, recruiters are 9585s in their first recruiting tours, then switch to the CRF and remain in recruiting-related billets throughout their careers. The very low first-tour shares in FY93 through FY95 are consistent with the high second-tour shares for 9585s in these years; therefore, the data suggest that 9585s were transferring in their second tours in these years.[19]

Figure 10. 2186 recruiters by tour
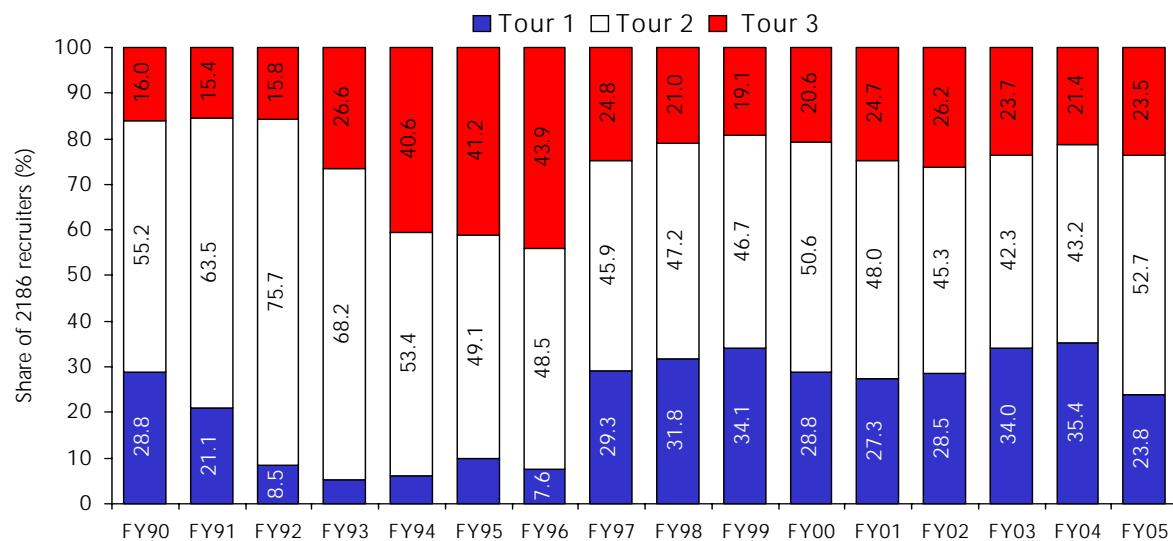


## First-tour 9585s

### Share of the force

Finally, figure 11 shows that the bulk of the recruiter force is consistently made up of 9585 recruiters in their first tours: the percentages range from 72 percent, in FY94, to 91 percent, in FY91, for an average of 84 percent over the entire period.

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19. New 2186 tours are identified by changes in Unit Identification Code (UIC).

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Figure 11. First-tour 9585s in the recruiter force
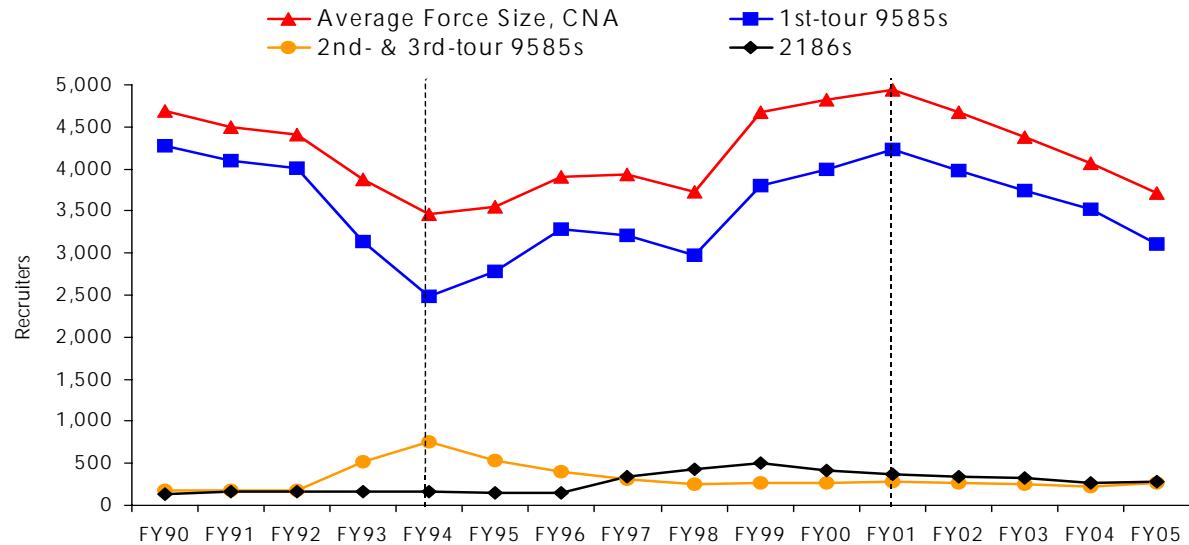


The data also show that the first-tour 9585s drive the overall pattern of force size. Of course, this is mainly because they are the largest group. However, it also means that the number of first-tour 9585s changes the most with changes in the recruiting mission, as described in the previous section.

**Share of contracts generated**

In addition to constituting the greater part of the recruiter force, figure 12 shows that first-tour 9585s also generate the great majority of contracts, which is consistent with the roles described earlier. This figure also compares first-tour 9585s' shares of contracts generated with their shares of the recruiter force. In every fiscal year, this group's share of contracts is even greater than its share of the force: in only 5 fiscal years did first-tour 9585s generate less than 90 percent of all contracts.

Figure 12. First-tour 9585 recruiters' share of contracts and the recruiter force
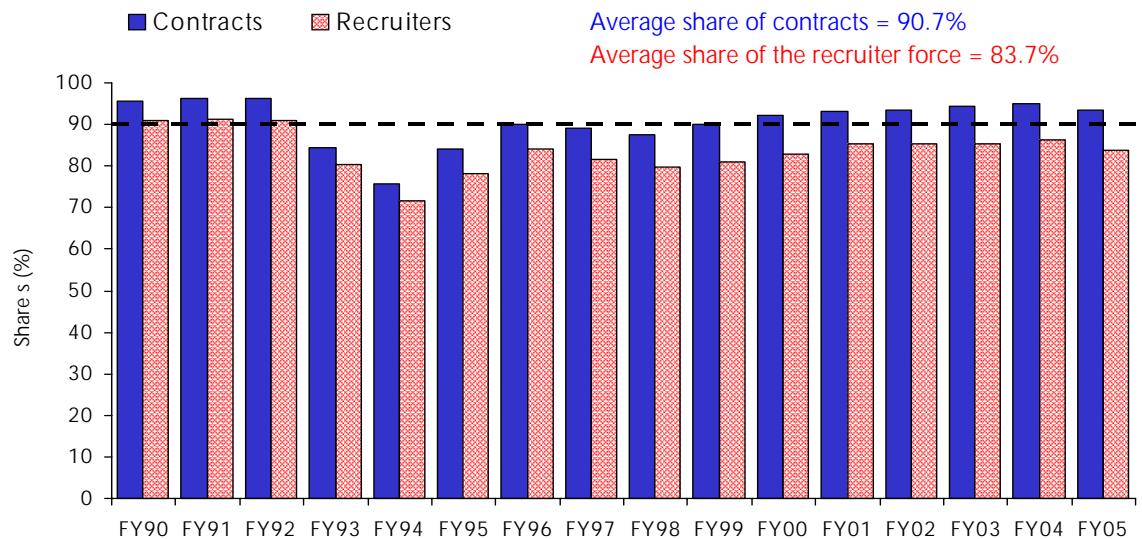


## The sub-sample used for analysis

To study the experience-productivity relationship during the first 48 months of recruiting duty, we chose to focus our analysis on first-tour 9585s because they make up nearly 99 percent of the recruiters in this experience range.[20]

The analysis sub-sample is also limited to recruiters who served during the period of FY94 through FY02, a sub-set of the fiscal years for which we have recruiter data. The time period was limited because we cannot identify stations before FY94 and the market-related data were only available through FY02.

Table 1 shows the effect of limiting the analysis to first-tour 9585s for the relevant years. The table has several noteworthy points: (1) the vast majority of observations in the data set correspond to first-tour recruiters with the 9585 NEC, (2) there are very few third-tour recruiters and most of these (70 percent) are Career Recruiters or 2186s, and (3) while over 90 percent of 9585 recruiters are in their

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20. Some 9585s do transfer to the CRF during their first tours. Therefore, a very small number of 2186s are within the relevant range.

first tours, about half of Career Recruiters are in their second tours and about a quarter are in their third tours. The total sample includes 13,716 recruiters, 374,885 recruiter-months, and 500,680 contracts. For the FY94–FY02 period, we exclude 1,503 recruiters and 62,918 contracts by focusing on first-tour 9585s only.

Table 1.    Recruiter months by NEC and tour: counts and shares, FY94–FY02

| NEC in month[a] | Counts by recruiter month | | | | Shares by recruiter month (%) | | | |
|---|---|---|---|---|---|---|---|---|
| | 1st tour | 2nd tour | 3rd tour | Total | 1st tour | 2nd tour | 3rd tour | Total |
| Currently 9585 | 374,885 | 36,808 | 3,552 | 415,245 | 83.1 | 8.2 | 0.8 | 92.0 |
| Currently 2186 | 10,400 | 16,682 | 8,824 | 35,906 | 2.3 | 3.7 | 2.0 | 8.0 |
| Total | 385,285 | 53,490 | 12,376 | 451,151 | 85.4 | 11.9 | 2.7 | 100.0 |

a. Includes recruiters who currently possess the NEC or who possessed the NEC within the last 12 months of the current recruiting tour.

Finally, although we are focusing on first-tour 9585s, the sample is structured to include the characteristics of these recruiters' station mates, who may be 2186s or 9585s in second or third tours.

# Does the inverted-U still hold?

The inverted-U results from [12] were unexpected and counter-intuitive; they were also considered undesirable. In an effort to eliminate the inverted-U, CNRC switched from accession goaling to contract goaling. This change was implemented with the Freeman Plan, the Navy's Recruiter Productivity and Personnel Management System, which addressed the inverted-U and other incentive issues [12]. Although the Freeman Plan was replaced by other incentive plans in 1988 (before the beginning of our data period), goaling is still based on net contracts.

In this section, we seek to determine whether the inverted-U still holds. We go beyond the original study by estimating the experience-productivity relationship holding other factors constant.

## Recruiter management during the study period

Some background on the phases of a recruiting tour, recruiter incentives, and station level management gives context to the experience-productivity discussion that follows.

### Phases of a recruiting tour

The first week after training[21] is a week of indoctrination, which takes place at the NRD headquarters rather than at the recruiter's assigned station. After reaching his assigned station, the recruiter has an additional month of indoctrination, during which he is closely guided and monitored by the RINC. Including this 30-day indoctrination period, the first 3 months of recruiting are considered to be the "planting seeds" period during which the recruiter is not only learning his job,

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21. For the purposes of this study, both conceptually and empirically, recruiter tours are defined to begin after the completion of recruiter training.

but is also developing centers of influence. In particular, he is establishing relationships with high school administrators and other staff members.

At the end of 9 months, a recruiter is evaluated and a determination is made regarding whether he is recruiter qualified.[22] If a recruiter does not appear to be making appropriate progress by the end of 6 months, the RINC should step in with extra help; one option is to call in the NRD recruiter trainer. Currently, most recruiters do get qualified with the help of their RINCs. However, the CNRC staff we interviewed indicated that earlier in our data period, recruiters were more likely than they are today to have their tours terminated if they did not get qualified. In our data, we see evidence of this. The share of recruiters with tours lasting 12 or fewer months is 5.0 percent in the FY90–FY94 period and 1.4 percent in the FY99–FY03 period.

Successful recruiters can become RINC-qualified at 18 months, at which point their duties may shift from production to management.[23] To become RINCs, recruiters must demonstrate the ability to use and to explain how to use such recruiting tools as the Enlisted Recruiting Production Management System and the Prospect Record System. They must also be able to apply a working knowledge of the RINC's responsibilities for the DEP Program, of NRS security and administration, of attrition and waiver analysis, and of NRS funding and budgeting. The last, and perhaps the most important, aspect of RINC qualification is a demonstrated ability to train recruiters.

Finally, CNRC staff identified a condition known as a "short-timer's attitude," which causes productivity to fall late in a recruiting tour. According to CNRC staff, the short-timer's attitude typically sets in 3 to 6 months before a Sailor is scheduled to transfer. At this stage, recruiters are typically beginning to turn their attention to their next assignments (i.e, studying for and taking rating exams or searching for new housing); they may also be taking accumulated leave. Thus,

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22. For a description of the recruiter PQS process, see [15] and the references therein.

23. For a description of the RINC PQS process, see, again, [15] and the references therein.

this may be a period of competing obligations. In addition, it can also be the case that a recruiter's replacement is already at the station and producing contracts.

## Recruiter Excellence Incentive Program (REIP)

The Navy's current incentive program, REIP, was in effect in various forms throughout most of our data period.[24] The basic reward provided under REIP is promotion, and there are two types of promotion awards: meritorious promotions and production promotions.[25] Under REIP, meritorious promotions to E5, E6, and E7 are given to individual recruiters as a reward for superior contribution to mission performance. They are awarded at the NRD level, with the number of promotions available equal to 1 for each 50 enlisted personnel. To be eligible for a meritorious promotion, a recruiter must have met his time-in-rate requirements, passed his promotion exam, been on recruiting duty for a specified number of months,[26] and cannot have been meritoriously advanced to his current paygrade.[27] In addition to these requirements, a recruiters' recruits must complete boot camp at a specified rate.[28]

Production promotions are given only in years in which Navy recruiting meets both its overall accession mission and its quality goals. They are awarded to outstanding recruiters in NRDs that exceed their contract objectives, and the number of production promotions awarded in any given NRD in any given year is based on the extent to which the NRD exceeded its quantity and quality goals.

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24. We do not describe previous forms (e.g., RATE and RMAP), which were in effect from FY 1990 through April 1993, because the data period for our model starts in FY 1994.

25. In addition to these promotion incentives, the REIP also includes the Gold Wreath Program and the Unit Annual Awards Program. See [16] for more information about these programs.

26. The time-on-board requirement varies from 15 to 24 months over the data period.

27. Members of the Career Recruiter Force are not eligible.

28. We do not have information on what this rate is currently or whether it changed over the data period.

In a given fiscal year, the total number of recruiters in an NRD (CNRC-wide) who can be promoted under REIP (i.e., the number receiving meritorious and production promotions combined) may not exceed 7 percent (4 percent) of the enlisted recruiter force.[29]

## Station-level management and teamwork

Despite these individual-level incentives, as recruiters, Sailors work toward *station-wide* monthly net contract goals. Within this context, recruiters are given individual tasks and quotas (goals) for obtaining new contracts by their RINCs. These tasks and quotas may be for a specific day, week, or month, and may be broken down further by quality, since most recruits must be high school graduates, or by race/ethnicity and gender in an effort to promote diversity. The monthly goals, both the overall station goal and the tasks from the RINCs, change throughout the year as the contract objective changes and are, therefore, effectively unobservable.

In addition, interviews tell us that RINCs may divide labor according to recruiters' relative skills. For example, "cold calling" and developing and maintaining centers of influence (i.e., networking) are two daily recruiting tasks. Consider a three-man station, where recruiter A has a comparative advantage in cold-calling and recruiter B has a comparative advantage in developing centers of influence. The RINC may allow recruiter A to do most of the cold calling necessary for the station and recruiter B to concentrate on centers of influence.

## Implications for the shape of the experience-productivity profile

As described, the phases of the modern recruiting tour are clearly consistent with an inverted-U experience-productivity profile: recruiters still spend the first few months learning their jobs and getting familiar with their markets, and, despite the shift to contract goaling, the short-timers attitude may cause their productivity to fall as they approach the ends of their tours.

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29. See [6] for a detailed description of REIP, as well as earlier recruiter incentive plans.

The structure of the promotion awards under REIP could also contribute to an inverted-U. Given the length of the recruiting tour, each recruiter is effectively eligible for only one meritorious advancement. Anecdotally, this has created a practice by which a recruiter who has gotten a meritorious advancement helps the "next guy" get his. This suggests that a person's measured productivity may drop after his first promotion has been achieved.

More generally, the importance of on-the-job learning, combined with the team aspects of recruiting, suggests that the shape of an individual recruiter's learning curve may depend on the experience level and skills of other recruiters in his station, especially the RINC. For example, it is possible that more-experienced recruiters are not only more productive themselves but are also better mentors or trainers for new, inexperienced recruiters.

Station size may also be a factor. In small stations, the burden of production is shared by only a few recruiters, who must each consistently generate contracts in order to ensure that the station meets its monthly goals. In contrast, in large stations, the production burden is distributed across many recruiters; thus, the station may reach its goal even if one recruiter has an unproductive month due to either bad luck or lack of effort (i.e., shirking).

Station-level management also has possible effects that are consistent with an inverted-U. First, if helping junior recruiters is part of the duties of an experienced recruiter, senior recruiters may be dividing their time between recruiting and training and, thus, be less productive in terms of their own contract generation. This effect is likely to be greater in larger stations since RINCs of large stations are more likely to need help managing more junior people. Second, combining the potential REIP effects with shirking potential in large stations suggests that more senior recruiters may be more likely to shirk when they can. If this is the case, the inverted-U shape would be more pronounced for recruiters in larger stations.

# Definition of productivity

We define *recruiter productivity* by the number of net new contracts generated per month.[30] We use net new contracts rather than gross contracts to measure productivity because the number of net new contracts is the metric on which recruiters are evaluated. We analyze monthly productivity because we are interested in changes in productivity with each month of recruiting experience. In addition, stations are goaled and production is tracked by month.

## Potential biases of net new contracts as a productivity measure

**Production may be demand constrained**

We saw in figure 4 that, at the recruiter-force level, new contract attainment relative to the new contract objective is roughly bounded from above by 1, indicating that total production can be demand-constrained. Similarly, individual production may also be bounded from above, which means that actual contract production may be an underestimate of true individual productivity.

To control for this issue, other researchers have done sample selection corrections by identifying stations that appear to be demand constrained and those that do not. Another approach has been to remove this "upper bound"—that is, consider only those groups that are expected to be supply constrained (i.e., high-quality recruits = A cells or A and C cells). We do not use either technique here because it is unclear how binding the demand constraint really is.

If the perception that it is "difficult" to get 1 contract per month is true, then it is unlikely that recruiters who are able to attain 10 contracts in a given month are discouraged from doing so or that these (potential) recruits are turned away. The fact that the current REIP is structured so that overproducing NRDs may award extra promotions also indicates that recruiters are not discouraged from exceeding their monthly goals. Finally, from FY94 through FY02, the ratio of new

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30. The number of net new contracts in a month is the difference between the number of gross new contracts and the number of attrites from the Delayed Entry Program.

contract attainment to the new contract objective was less than 1, indicating that there was no binding demand constraint during the period we analyze.

Even if production is demand constrained, it is unlikely that the extent to which this is true varies systematically over the 3-year recruiting tours in our data set. In other words, since in any given month in a fiscal year recruiters have various levels of experience, the average productivity at each month of experience across all fiscal years will include recruiters whose production may have been demand constrained and those whose production was not demand constrained. Therefore, demand-constrained production may affect the position of the experience-productivity curve, but we would not expect demand-constrained production to change the curve's shape.

**Measurement error**

There are two potential sources of measurement error. First, we have noted that the team aspects of recruiting and the structure of REIP may result in the attribution of a senior recruiter's contract production to a more junior recruiter. If this does occur, then using net new contracts as the dependent variable will overestimate productivity of junior recruiters and underestimate the productivity of senior recruiters. This would make the inverted-U more pronounced.

The second source of error is our inability to identify RINCs in the data. If a Recruiter Canvasser becomes a RINC, it is likely the number of net new contracts he generates each month will decline. Since we can't capture this transition in our data, we will attribute the decrease in contracts generated to a decrease in productivity rather than a shift of responsibilities from production to management.

# Unadjusted experience-productivity profiles

Next, we present experience-productivity profiles that are not regression adjusted. Displaying the raw data in this fashion shows whether the inverted-U still holds, indicates the extent to which the foregoing issues are present in our data, and informs how they should be handled in a statistical model of recruiter productivity.

## Selected profiles

Figure 13 depicts the unadjusted experience-productivity profile for the average first-tour 9585. The figure shows that, in our data, productivity increases sharply through the first 6 months, then levels off between the 7th and 16th months of the tour. Peak productivity of about 1.4 net contracts per month occurs at 9 months of experience. Productivity declines slowly and steadily from month 16 through month 30, then declines more rapidly through the remainder of the tour. Recruiters produce a notional minimum requirement of one net new contract per month[31] throughout most of their tours---from month 3 through month 32.

Figure 13. Average productivity of first-tour 9585s, by months of recruiting experience[a]
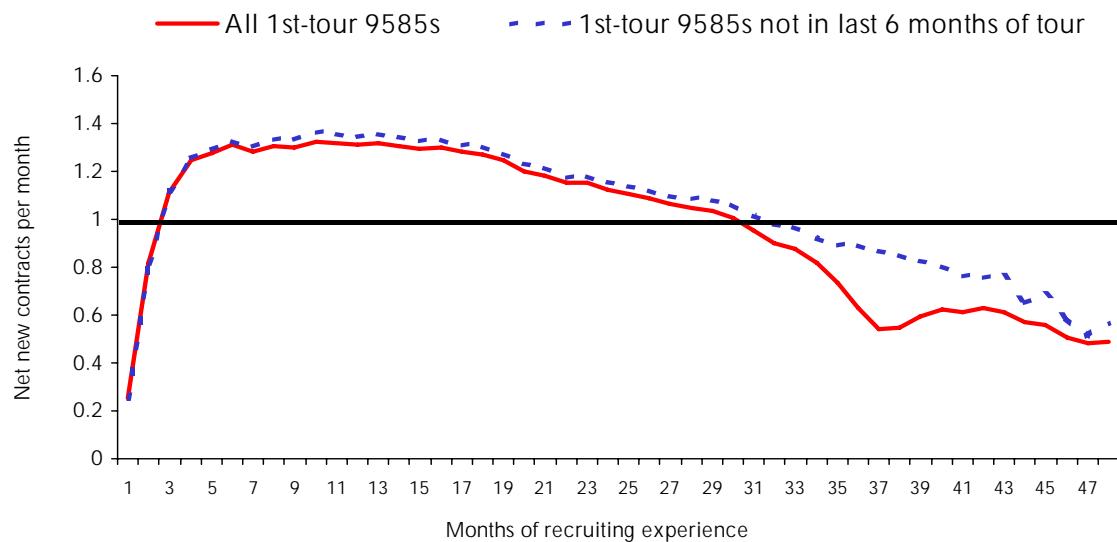
Based on the phases of the recruiting tour described previously, the fact that we observe average productivity peaking between months 7 and 12 of a first tour seems fairly reasonable. Furthermore, since

31. Since we don't have data on monthly contract goals, we assume that recruiters have a minimum monthly goal of one contract. We refer to this as the "notional minimum requirement."

recruiters become RINC-eligible at month 18, it also seems reasonable that average productivity begins to decline around this point as some share of recruiters with this experience level shift to RINC status. The more dramatic declines late in the tour are consistent with the short-timer's attitude.

Comparing our data with the data in figure 5, the main differences appear to be that average productivity peaks much earlier and declines more and for longer in our data than in the data from [12].[32] Despite these differences, however, our data do suggest similar learning, productive, and de-learning phases.

To address the short-timer phenomenon, figure 13 also shows the experience-productivity profile of the average first-tour 9585 recruiter who is *not in the last 6 months of his tour.* These data show that experienced recruiters who are not approaching the ends of their tours are more productive than experienced recruiters who are preparing to transfer. The difference becomes noticeable at month 30—6 months before the end of a typical 36-month tour.

Similar to reference [12], from figure 13, for a standard 36-month recruiting tour, we identify three productivity phases:

- The "learning phase" in months 1 through 4

- The "high-productivity phase" in months 5 through 30

- The "helping/transition phase" in months 31 through 36.

Next, we try to determine the extent to which RINCs may be driving down average productivity after month 16 of the recruiting tour.[33]

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32. Overall productivity is lower in our data as well, partly because we use *net* new contracts, while [12] appears to use *gross* new contracts.

33. Given an average number of stations per fiscal year equal to 1,152 and an average number of first-tour 9585s of 3,471, as many as 33 percent of first-tour 9585s could be RINCS. This share actually depends on how many RINC positions are filled by 9585s in additional tours or by 2186s. Currently, the CNRC staff estimates that half of RINCs are 2186s, which brings the potential RINC share for first-tour 9585s closer to 16 percent. Both these shares could be large enough to affect the overall average.

Since we cannot identify RINCs in our data, we do this by comparing the latter half of the experience-productivity profile of all recruiters with the profile of recruiters in one-man stations who are technically RINCs but are also solely responsible for their station's contract production.

Figure 14 shows that after month 19 of a first tour, recruiters in one-man stations do, in fact, have higher average productivity than first-tour 9585s in larger stations. In particular, the average production of recruiters in one-man stations drops below one net new contract per month about 6 months later than that of first-tour recruiters in stations with two or more recruiters; this difference is even more pronounced for recruiters in one-man stations who are not nearing the ends of their tours. The data also show, however, that between months 19 and 30, the *rate of decrease* in average productivity is about the same for recruiters in one-man stations as it is for recruiters in larger stations. This result indicates that it is not our inability to exclude non-producing RINCs that is causing the decrease in average productivity over this range of experience.

Figure 14. Average productivity of first-tour 9585 recruiters in one-man stations, by months of recruiting experience



42
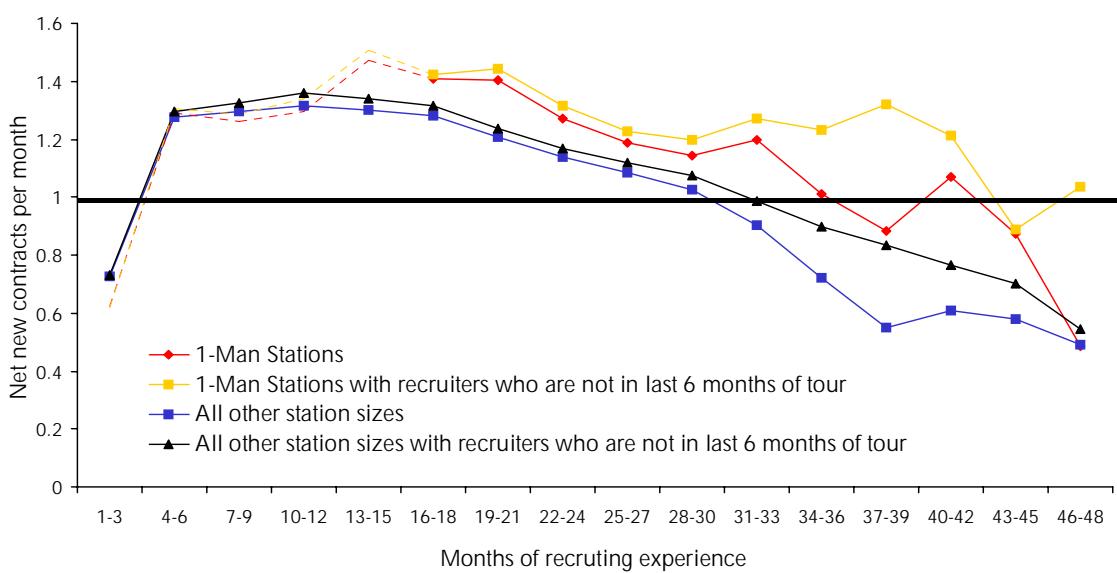
Figure 15 compares the unadjusted experience-productivity profiles for all recruiters in the analysis sample (i.e., FY94-02) to the profile for recruiters serving in FY98. The data show that, even in this difficult recruiting year, when the demand-constraint was almost certainly not binding, the profile is still characterized by an inverted-U.

Figure 15. Unadjusted experience-productivity profile of 1st-tour 9585 recruiters in FY98, by months of recruiting experience
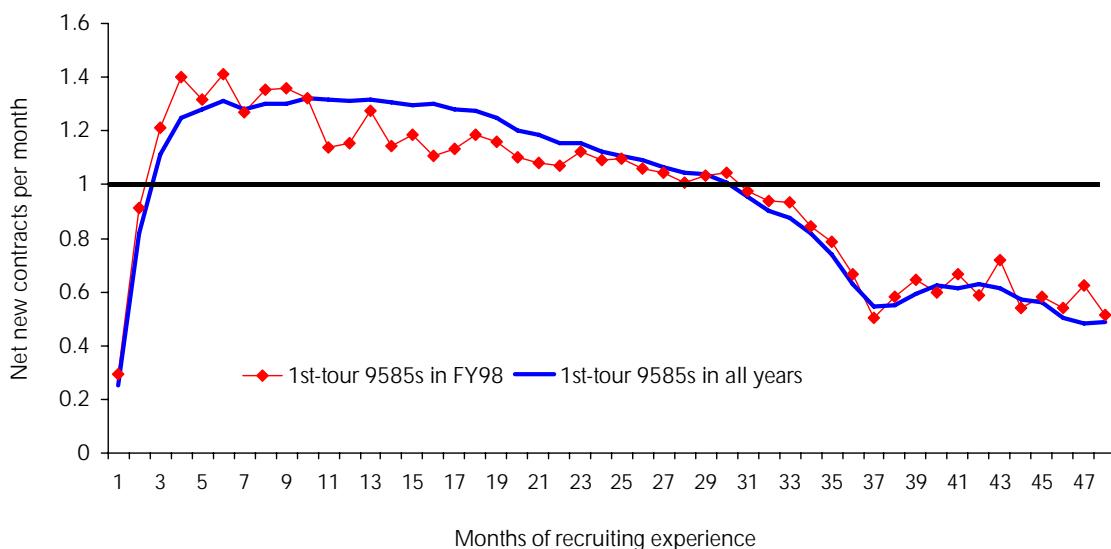


We have hypothesized that certain aspects of station-level management in Navy recruiting may also be important in determining the relationship between experience and productivity. To explore the importance of station size in our data, figure 16 shows experience-productivity profiles for stations of various sizes. The data show that the larger the station, the more productivity declines with experience. Productivity also begins to decline earlier in larger stations. These patterns are consistent with both the shirking and helping effects we have hypothesized.

To summarize, figures 13 through 16 show that, in our data, the relationship between recruiter productivity and recruiter experience is generally consistent with expectations based on economic theory,

phases of a recruiter tour, and past empirical findings. The data also indicate that neither the potential demand-constraint issues nor our inability to control for RINC status is likely to be as problematic as feared. Finally, the data suggest that the recruiter productivity regression should control for end-of tour effects and station size.

Figure 16. Average productivity of first-tour 9585 recruiters, by months of recruiting experience and station size[a]



Months of recruiting experience
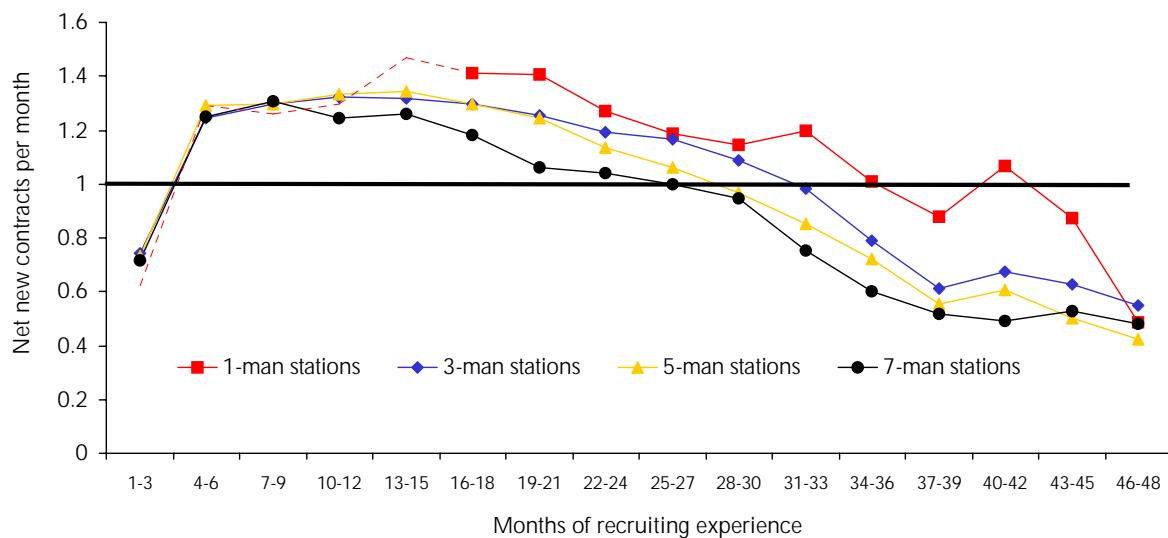
a. The pattern is the same in two-, four-, and six-man stations, as well as for larger stations.

# Recruiter productivity regression

## General equation

To capture the aspects of recruiter productivity described previously, we adopt the following general specification to describe recruiter productivity as a function of recruiter experience and other control variables:

$$Q_{it} = f(Exp_{ist}, Exp_{jst}, RC_{it}, SC_{st}, MIS_{st}, MKT_{st}, \alpha_i, \varepsilon_{ist}),$$

where

$Q_{it}$ = the productivity of recruiter i in period t

$Exp_{ist}$ = the experience level of recruiter i in station s in period t

$Exp_{jst}$ = the experience level of recruiter j in station s in period t

$RC_{it}$ = personal characteristics of recruiter i in period t

$SC_{st}$ = characteristics of station s in period t

$MIS_{st}$ = mission characteristics in station s in period t

$MKT_{st}$ = market characteristics in station s in period t

$\alpha_i$ = a recruiter fixed effect

$\varepsilon_{ist}$ = an independent and indentically distributed (i.i.d.) error term.

We discuss each component of the regression equation in turn.

**The dependent variable: $Q_{it}$**

Consistent with the definition of productivity given earlier, the dependent variable in the model is the number of net new contracts generated by recruiter i in month t of his first recruiting tour.

**Experience levels of recruiter i and recruiter j: $Exp_{ist}$ and $Exp_{jst}$**

The primary relationship of interest is the relationship between productivity and recruiter experience. In addition, because the effect of recruiter i's experience may vary with the experience of other recruiters in his station (recruiters j, k, l, etc.), we also include indicators of experience levels for other recruiters. These experience-related variables are specified in the following ways:

- Experience level of recruiter i in station s in period t

    — Experience, experience squared, and experience cubed (measured by month)
    — Recruiter i is within 6 months of the end of his tour (indicator)

- Experience level of other recruiter(s) j in station s in period t

    — Interaction between recruiter i's experience and the share of all recruiters in the station in each of the following experience categories:

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– First tour: 1–6 months; 7–12 months; 13–18 months; 19–24 months; 25–30 months; 31 or more months
  – Second or third tour: 1–18 months; 19 or more months.

## Other determinants of productivity[34]

To isolate the experience-productivity relationship, it is necessary to control for other factors associated with recruiter productivity, which are captured by the four vectors, $RC_{it}$, $SC_{st}$, $MIS_{st}$, and $MKT_{st}$.

***Personal characteristics of recruiter i.*** These variables are included to control the potential effects of recruiter characteristics other than experience. For example, given the long hours kept by recruiters, it is possible that single Sailors and those without dependents might be more productive because they do not have the outside responsibilities associated with marriage and/or children. Similarly, one might conjecture that recruiters whose personal characteristics match those of the target population (e.g., younger recruiters) would be better able to identify with the recruits, thereby making them more productive. The nine characteristics in this category are:

— Gender (indicator for female)
— Age and age squared (continuous variable)
— Marital status (indicator - married vs. not)
— Number of children (continuous)
— Race (indicators)
— Paygrade (indicators for E4–E8)
— Education level (three indicators: one each for NHSDG or alternative to HSDG, for HSDG, and for more than HSDG)
— TAR/TEMAC Status (indicator)
— AFQT score (continuous).

***Station characteristics.*** To capture the observed differences in productivity by station size and to account for potential differences in the roles of 9585s and 2186s, the three variables that characterize the station are:

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34. We recognize that this list is not exhaustive; rather, it represents all the theoretically relevant variables for which we had meaningful data.

— Station size (specified a continuous variable)
— Station size interacted with recruiter i's experience level
— Share of station's recruiters who are 2186s.

*Mission characteristics.* There is evidence from past research that contract goals affect productivity at the station level, such that the amount of team effort put forth depends on the goal. This idea is also conveyed by recruiters in the field who project an attitude that seems to say, "Give us a goal, and we'll meet it." Since we do not have either station- or individual-level goaling data,[35] we include the following proxies:

— Monthly goal proxy (equal to the BOY accession goal divided by the average number of recruiters in the fiscal year divided by 12)
— Size of the Navy accession mission relative to the sizes of other Services' missions (Navy's share of total DoD accessions in a fiscal year)
— Seasonality of recruiting (indicators for calendar month)
— Time effects (indicators for fiscal years).[36]

*Local market characteristics.* Finally, we also control for the state of the external recruiting environment, using the following variables:

— Unemployment rate and unemployment rate squared (measured by the monthly unemployment rate for the state associated with the contract)
— Size of the target-age population (measured annually by number of 18- to 24-year-olds in the state associated with the contract)
— Opportunity cost of enlistment (measured annually by the average weekly wage for young men (aged 18 to 27) with a

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35. Recall that official goaling occurs at the station level; individual-level goals would be those assigned by the RINC on a daily, weekly, or monthly basis. Such data are not available for the long time-series that we have.

36. The fiscal year indicators will capture any year-specific effects that are not captured by other variables in the regression, including both mission characteristics and market characteristics.

high school diploma and no college, in the state associated with the contract)

— NRD indicators.

***Recruiter fixed effect.*** Finally, we expect that some Sailors will be better recruiters than others and that what distinguishes them from one another will not be entirely based on observable characteristics. Therefore, the model includes a recruiter fixed effect, $\alpha_i$, which captures time-invariant aspects of an individual recruiter's productivity that are not captured by the other recruiter characteristics in the regression. Empirical research has confirmed the importance of unobserved individual heterogeneity in many work settings.[37] References [12 and 21] confirm its importance in the context of Navy recruiting.[38]

## Descriptive statistics for the sample

### Unconditional productivity means

To show the range of productivity, table 2 shows the average number of net new contracts per first-tour 9585 recruiter per month, as well as the minimum and maximum numbers and the $10^{th}$, $25^{th}$, $75^{th}$, and $90^{th}$ percentiles. The data show the same decline in recruiter productivity over time as seen in figure 3. The minimum and the $10^{th}$ and $25^{th}$ percentiles are always zero. The maximum ranges from 9 to 18 for net contracts. Examining the $75^{th}$ and $90^{th}$ percentiles indicates

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37. References [17, 18, 19, and 20] show the importance of individual heterogeneity in wage determination and interindustry wage differentials, in the labor supply of women, and in the returns to on-the-job training, respectively.

38. Specifically, reference [12] found that after controlling for experience and NRD (but no other personal characteristics), active-duty recruiter performance was consistent from month to month: more-productive recruiters remained more productive, and less-productive recruiters remained less productive. Similarly, reference [21] found that individual heterogeneity matters for Naval Reserve recruiters. Controlling for multiple factors in addition to recruiter experience, reference [21] concluded that individual effects act proportionally on average productivity, "which implies that enormous differences exist in expected productivity between good and bad recruiters."

that these maximums are clearly outliers. Generating more than 3 contracts during the period was rare. Finally, the mean stays close to the notional minimum requirement of 1 net contract per month.

Table 2.    Monthly productivity statistics[a]

| FY | Average number of recruiters | Net contracts | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Min. | $10^{th}$ | $25^{th}$ | Ave. | $75^{th}$ | $90^{th}$ | Max. |
| 1994 | 2,532 | 0 | 0 | 0 | 1.25 | 2.00 | 3.08 | 11 |
| 1995 | 2,844 | 0 | 0 | 0 | 1.22 | 2.00 | 3.00 | 17 |
| 1996 | 3,341 | 0 | 0 | 0 | 1.11 | 1.92 | 2.83 | 11 |
| 1997 | 3,267 | 0 | 0 | 0 | 1.03 | 1.92 | 2.75 | 10 |
| 1998 | 3,029 | 0 | 0 | 0 | 1.10 | 1.92 | 2.83 | 11 |
| 1999 | 3,868 | 0 | 0 | 0 | 1.01 | 1.83 | 2.75 | 18 |
| 2000 | 4,057 | 0 | 0 | 0 | 1.06 | 2.00 | 2.75 | 10 |
| 2001 | 4,264 | 0 | 0 | 0 | 1.00 | 1.92 | 2.50 | 11 |
| 2002 | 4,039 | 0 | 0 | 0 | 0.99 | 1.83 | 2.67 | 9 |
| Ave. | 3,471 | 0 | 0 | 0 | 1.09 | 1.93 | 2.80 | 12 |

a. Min. = minimum; Ave. = average; Max. = maximum;
   $10^{th}$, $25^{th}$, $75^{th}$, and $90^{th}$ = percentiles.

**Recruiter characteristics**

Table 3 shows how the number of first-tour 9585s, their average experience, and their distribution across the phases of a recruiter tour vary by fiscal year. In terms of numbers of recruiters, the data show the same sustainment-period trends as seen for the total recruiter force (see figures 2 through 4). The data also show that average experience in the force does vary over time, with the minimum equal to just under 17 months of experience in FY99 and the maximum equal to just over 21 months of experience in FY01. The percentage changes in each series illustrate that changes in the number of recruiters and changes in force experience were negatively correlated through most of the data period. In particular, the large increase in the number of first-tour 9585s in FY99 was associated with a substantial decrease in average experience in that year. However, the relationship is not one-to-one and does not hold in the last 3 years of the data period. This suggests that the relationship between force size and average force

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experience may be fairly complex, depending on the total distribution of experience across the force and on when during the fiscal year entering (exiting) recruiters came on board (transferred out). This is supported by the associated changes in the share of recruiters in the high-productivity phase.

Table 3.  Average number, average experience, and experience distribution of first-tour 9585s

| FY | First-tour 9585s | | Percentage change | | Share (%) in each phase | | |
|---|---|---|---|---|---|---|---|
| | Number[a] | Average experience[b] | Number | Average experience | Learning | High-productivity | Helping/transition |
| 1994 | 2,532 | 19.5 | -20.4 | -4.4 | 12.0 | 68.3 | 19.8 |
| 1995 | 2,844 | 18.4 | 12.3 | -5.7 | 14.2 | 64.8 | 21.0 |
| 1996 | 3,341 | 17.7 | 17.5 | -3.9 | 15.4 | 66.7 | 18.0 |
| 1997 | 3,267 | 19.4 | -2.2 | 9.3 | 6.9 | 75.9 | 17.2 |
| 1998 | 3,029 | 21.3 | -7.3 | 9.9 | 11.5 | 65.8 | 22.7 |
| 1999 | 3,868 | 16.6 | 27.7 | -21.9 | 21.1 | 57.1 | 21.8 |
| 2000 | 4,057 | 18.3 | 4.9 | 10.2 | 6.0 | 81.7 | 12.4 |
| 2001 | 4,264 | 21.4 | 5.1 | 16.9 | 9.8 | 69.4 | 20.8 |
| 2002 | 4,039 | 21.2 | -5.3 | -1.0 | 11.3 | 56.7 | 31.9 |
| Average | 3,471 | 19.3 | -- | -- | 12.0 | 67.4 | 20.6 |

a. Average number of first-tour 9585s across months in each fiscal year.
b. Experience is measured as the number of months on recruiting duty.

Table 4 shows personal characteristics of first-tour 9585s vs. characteristics of other recruiters in the sample (i.e., recruiters j, k, and l). The data confirm the expectation that, relative to 2186s and 9585s serving additional tours, first-tour 9585s are, on average, younger and more junior. They are also more likely to be female, to be high school graduates, and to have higher average AFQT scores. The data show that, compared with 9585s (regardless of tour), 2186s are more likely to be married and to be Hispanic or non-Hispanic black.

**Stations**

Table 5 presents the total number and distribution of stations by station size for each fiscal year. The data show that the number of stations stayed roughly constant at around 1,050 through the first 4 years of the data period. In response to the recruiting difficulties in the late 1990s, the number of stations increased dramatically in FY99–FY00.

Table 4.  Sample characteristics of first-tour 9585s and other recruiters[a]

| Personal characteristics | 1st-tour 9585s | Other recruiters | |
| --- | --- | --- | --- |
| | | Other 9585s[b] | 2186s[c] |
| Averages | | | |
| Age | 32 | 34 | 35 |
| AFQT score | 59 | 58 | 55 |
| Number of children | 1.4 | 1.9 | 1.9 |
| Sample shares (%) | | | |
| Married | 77.5 | 85.8 | 88.3 |
| Female | 6.4 | 3.1 | 5.9 |
| Non-Hispanic white | 63.2 | 69.7 | 59.6 |
| Non-Hispanic black | 21.0 | 20.0 | 25.3 |
| Hispanic | 9.6 | 6.1 | 10.6 |
| Asian or other race | 6.1 | 4.2 | 4.4 |
| E4 | 2.6 | 0.1 | 0.1 |
| E5 | 43.7 | 18.8 | 4.1 |
| E6 | 39.0 | 52.9 | 63.2 |
| E7 | 12.1 | 23.4 | 30.2 |
| E8 | 2.4 | 4.4 | 2.4 |
| NHSDG | 8.0 | 12.1 | 11.8 |
| HSDG | 88.2 | 83.7 | 84.0 |
| More than high school | 3.7 | 4.2 | 4.1 |

a. Average across the sample period, FY94–FY02.
b. 9585s in second or third tours.
c. 2186s in first, second, or third tours.

Table 5.  Number of stations and distribution by station size

| Fiscal year | Number of stations | Percentage change in number of stations | Percentage of all stations | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | 1-man | 2-man | 3-man | 4-man | 5-man | 6-man | More than 6 |
| 1994 | 1,038 | | 14.0 | 24.0 | 20.6 | 18.8 | 11.1 | 6.2 | 4.2 |
| 1995 | 1,041 | 0.3 | 12.4 | 23.4 | 19.8 | 18.7 | 12.4 | 6.9 | 5.7 |
| 1996 | 1,060 | 1.8 | 9.9 | 21.0 | 19.4 | 17.1 | 14.0 | 9.5 | 8.4 |
| 1997 | 1,083 | 2.2 | 9.1 | 20.6 | 21.5 | 18.1 | 14.0 | 8.6 | 7.5 |
| 1998 | 1,086 | 0.3 | 11.8 | 21.7 | 21.8 | 18.0 | 12.2 | 7.4 | 6.6 |
| 1999 | 1,157 | 6.5 | 8.0 | 16.4 | 19.5 | 17.9 | 14.1 | 10.1 | 13.0 |
| 2000 | 1,305 | 12.8 | 7.5 | 20.0 | 22.0 | 20.5 | 13.8 | 7.9 | 7.8 |
| 2001 | 1,313 | 0.6 | 7.1 | 19.6 | 21.6 | 19.5 | 14.8 | 8.7 | 8.4 |
| 2002 | 1,283 | -2.3 | 10.0 | 20.2 | 20.3 | 18.6 | 14.5 | 8.8 | 7.3 |
| Average | 1,152 | -- | 10.0 | 20.8 | 20.7 | 18.6 | 13.4 | 8.2 | 7.7 |
| Std dev | 117 | -- | 2.4 | 2.2 | 1.0 | 0.9 | 1.3 | 1.3 | 2.4 |
| Std dev/ average | 0.10 | -- | 0.24 | 0.11 | 0.05 | 0.05 | 0.09 | 0.15 | 0.31 |

The most common station sizes are two-, three-, and four-man stations, each accounting for about 20 percent of all stations and, thus, for a combined total of about 60 percent. These stations' shares of the total were also the most stable over the data period. Five-man stations are the next most common with an average share of over 13 percent of all stations; one- and six-man stations have an average share of about 10 percent. Large stations with more than six recruiters are the least common, and their share of all stations was the most variable over the data period. In particular, note that in FY99, when the greatest increase in the number of recruiters occurred, the share of stations with more than six recruiters nearly doubled. The large station share dropped again in FY00, when the number of stations increased by nearly 150. Thus, these data show that changes in the number of stations may lag changes in the number of recruiters.[39]

Table 6 presents data to show how recruiters were distributed across stations of each size in each fiscal year. Although 1- and 2-man stations account for 31 percent of all stations, on average, they account for only about 15 percent of recruiters. Similarly, over the 9-year period, 4-man or larger stations accounted for less than half of all stations, but nearly 70 percent of recruiters. Thus, being in a relatively large station is the more representative experience for most recruiters.

Table 6.    Distribution of recruiters by station size

| | Percentage of all recruiters in each station size | | | | | | |
|---|---|---|---|---|---|---|---|
| FY | 1-man | 2-man | 3-man | 4-man | 5-man | 6-man | More than 6 |
| 1994 | 4.1 | 15.2 | 19.8 | 23.4 | 17.1 | 11.3 | 9.1 |
| 1995 | 3.5 | 14.1 | 17.7 | 22.4 | 18.4 | 11.7 | 12.1 |
| 1996 | 2.7 | 11.7 | 16.2 | 18.9 | 18.8 | 15.3 | 16.4 |
| 1997 | 2.5 | 11.8 | 18.1 | 20.4 | 18.9 | 13.8 | 14.6 |
| 1998 | 3.3 | 13.1 | 19.5 | 20.8 | 17.5 | 13.0 | 12.8 |
| 1999 | 1.9 | 8.6 | 15.0 | 18.0 | 17.9 | 14.9 | 23.6 |
| 2000 | 2.1 | 11.5 | 18.7 | 22.3 | 18.4 | 12.5 | 14.5 |
| 2001 | 1.9 | 10.9 | 17.8 | 21.1 | 19.7 | 13.1 | 15.4 |
| 2002 | 2.8 | 11.6 | 17.5 | 21.2 | 19.6 | 13.4 | 14.0 |
| Ave. | 2.8 | 12.1 | 17.8 | 21.0 | 18.5 | 13.2 | 14.7 |

39. Another way to see this phenomenon in the data is to compare the percentage changes in the number of recruiters from table 3 with the percentage changes in the number of stations in table 5. Clearly, the increase in stations in FY99 and FY00 lagged the increases in recruiters.

## Estimation technique

We use linear regression with a recruiter fixed effect to estimate the effect of experience on recruiter productivity. The actual estimating equation takes the form:[40]

$$Q_{it} = \beta_0 + \beta_1 Exp_{ist} + \beta_2 (Exp_{ist})^2 + \beta_3 (Exp_{ist})^3 + \beta_4 Exp_{ist} * Exp_{jst_i} +$$
$$\beta_5 RC_{it} + \beta_6 SC_{st} + \beta_7 MIS_{st} + \beta_8 MKT_{st} + \alpha_i + \varepsilon_{ist}.$$

## Estimation results

The complete estimation results are presented in appendix B; in this section, we discuss the pertinent results in qualitative terms and present regression-adjusted experience-productivity profiles to illustrate the relationships of interest.

The estimated coefficients on experience, experience squared, and experience cubed are highly statistically significant and have the expected signs and pattern. Specifically, productivity increases with experience at a decreasing rate until 12–18 months of experience. Then productivity decreases at a decreasing rate. A significantly negative coefficient on the "within 6 months of end of tour" variable lends credence to the existence of the short-timer's attitude.

The returns to experience also vary with the number and experience levels of other recruiters in the station. At all experience levels, the higher the share of other recruiters in a station who are inexperienced, the lower the recruiter's productivity, holding all else constant. The regression coefficients also indicate that as a recruiter's experience level increases, his productivity is least affected by other

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40. Econometrically, the appropriate method of estimation for this equation is the fixed-effect negative binomial (FENB) technique because it deals best with two specific characteristics of the data: the small integer nature and the over-dispersion of the dependent variable. (For more on the FENB, see [22, 23, 24, and 25].) Estimating a similar specification using the FENB technique yields a regression-adjusted experience-productivity profile that has essentially the same shape as the OLS-estimated profile. The position, however, is quite different seemingly because FENB assumes E[Y/X] = exp(XB), which results in estimated productivity levels that are above feasible levels. It is for this reason that we focused on linear regression results rather than FENB results.

experienced recruiters. We explicitly show these differences by depicting average predicted productivity for selected station sizes and station mixes in the next section.

The regression results also confirm the pattern in the unadjusted experience-productivity profiles that productivity of recruiter i declines as station size increases. This result, however, may be mitigated somewhat by the result that recruiters in stations with higher shares of 2186s are more productive, all else equal, since stations with larger shares of 2186s tend to be larger stations.[41] The coefficient on the interaction between station size and recruiter experience was small and statistically insignificant.

Finally, the recruiter fixed effect accounts for about 20 percent of the explained variance, which indicates that unobserved recruiter characteristics, such as level of effort, are important determinants of recruiter productivity.

## Selected profiles

To show the extent to which the inverted-U shape of the experience-productivity profile remains after controlling for various recruiter and station characteristics, as well as market factors, we generate a series of regression-adjusted experience-productivity profiles. First, figure 17 compares the raw data for first-tour 9585s with the regression-adjusted experience-productivity profile over the first 48 months of a recruiting tour. The figure shows that the inverted-U shape remains even in the presence of controls.

Figure 18 shows that the regression-adjusted productivity is lower for those first-tour 9585s in larger stations, holding all else constant. Note, however, that the productivities shown here are averages across all station mixes (i.e., all recruiter i/recruiter $j_k$ combinations). Therefore, this figure does not necessarily imply that all recruiters should be in one-man stations. Indeed, the recruiters in one-man stations were most likely trained in larger stations where they received help from more experience recruiters. Instead, the primary take-away is that the inverted-U holds even in one-man stations.

41. Almost 57 percent of all 2186s are assigned to 4-, 5-, or 6-man stations. Another 20 percent of the 2186s are assigned to even larger stations. At the same time, over 50 percent of all stations have 3 or fewer recruiters.

Figure 17. Regression-adjusted experience-productivity profile of first-tour 9585 recruiters
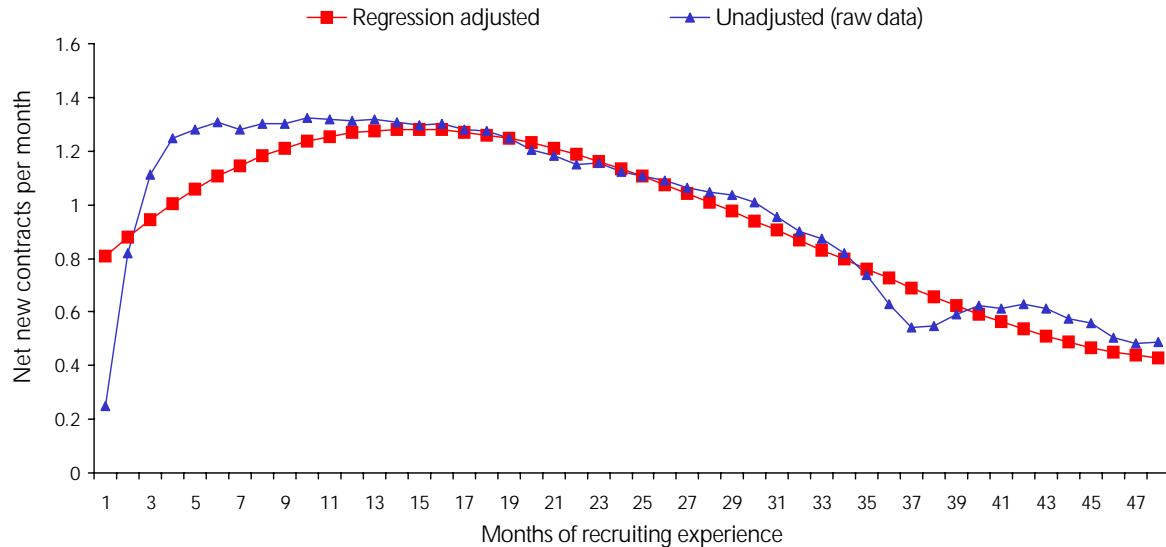


Figure 18. Regression-adjusted experience-productivity profiles of first-tour 9585 recruiters, by months of experience and station size
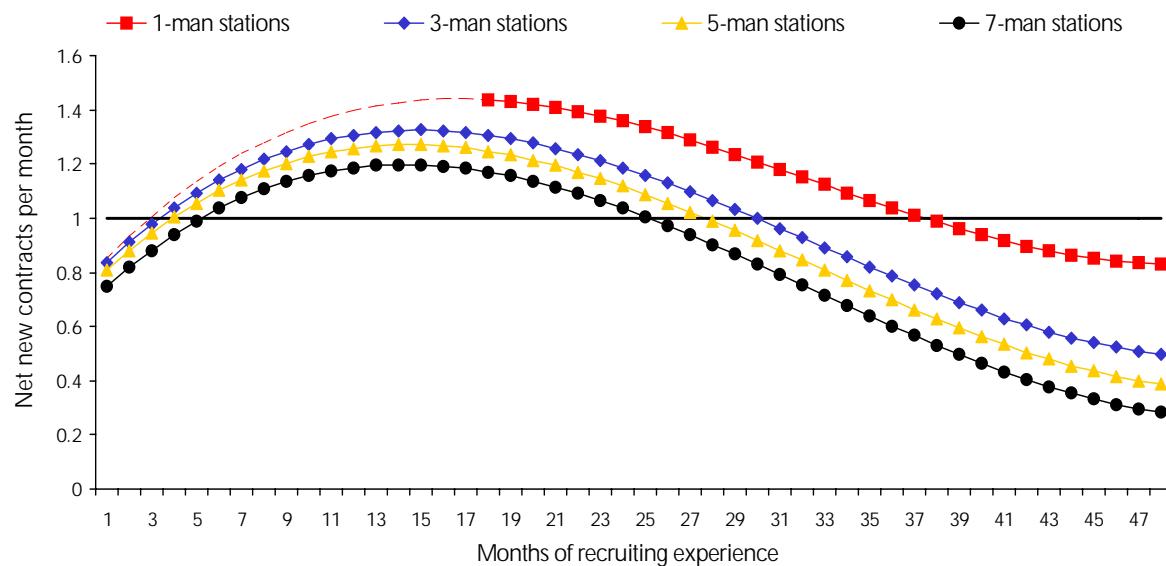


Figures 19 and 20 illustrate the estimated impact of recruiter j's experience on the productivity of recruiter i. For each month in the 1- to 48-month tour, figure 19 shows the average regression-adjusted

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Figure 19. Regression-adjusted average productivity in three-man stations for each month of experience of recruiter i, by the experience levels of the other recruiters[a]
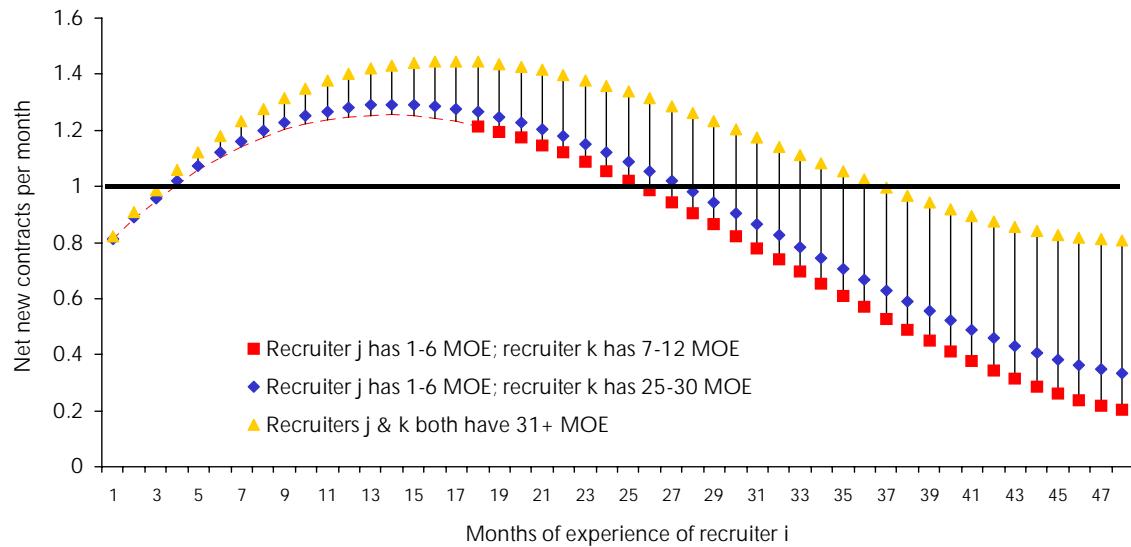


a. MOE = months of experience.

Figure 20. Regression-adjusted average productivity in two-man stations for each month of experience of recruiter i, by the experience level of the other recruiter
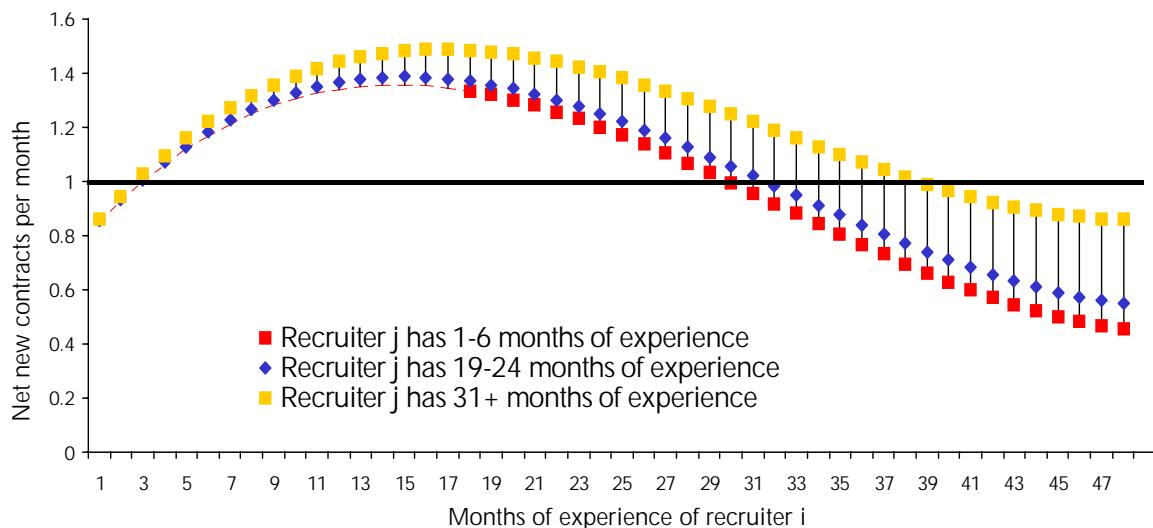
productivity of recruiter i, conditional on three pre-specified experience levels for recruiter j: 1–6, 19–24, and 31 or more months.[42] The figure shows that, after controlling for recruiter, station, mission, and market characteristics, as well as individual recruiter heterogeneity, the experience level of the other recruiter in the station has a significant effect on productivity. Specifically, in every month of the tour, average productivity increases with the experience level of the other recruiter.

The results are similar for three-man stations. Figure 20 shows the average regression-adjusted productivity of recruiter i, conditional on three pre-specified experience levels for recruiters j and k:

- Recruiter j has 1-6 months of experience; recruiter k has 7-12
- Recruiter j has 1-6 months of experience; recruiter k has 25-30
- Recruiters j and k have 31 or more months of experience.

Again, the data show that, in each month of the recruiter tour, estimated productivity is higher when recruiter i's station mates are more experienced. Thus, the estimated effects of other recruiters' experience are consistent with the helping and mentoring interpretation of the inverted-U: newer recruiters are more productive when paired with senior recruiters, while senior recruiters are less productive when paired with junior recruiters.

## Summary

In this section, we used linear regression to estimate the relationship between recruiter productivity and recruiter experience, holding constant other factors that might affect individual recruiter productivity. Our results confirm the inverted-U-shaped experience-productivity profile found in early empirical analysis and found in our unadjusted profiles. Even after controlling for changes in recruiting conditions, we find (a) that recruiters on average have a 1- to 3-month learning period before they can consistently produce the notional minimum of one net new contract per month, (b) that recruiters

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42. Because the experience level of recruiter j is not advancing by month along with the experience level of recruiter i, the figures are technically not experience-productivity profiles.

continue to meet this notional minimum from 4 to 30 months of experience, with peak productivity occurring between 12 and 18 months of experience, and (c) that productivity declines rapidly during the last 6 months of the recruiting tour. We also find evidence that the experience levels of other recruiters in the station significantly affect the average recruiter's productivity. That is, the larger the share of other recruiters in the station that are inexperienced, the lower the productivity of an individual recruiter. We discuss the implications of our regression results in the next section.

# Productivity implications of the inverted-U

The previous section showed that experience is an important determinant of recruiter productivity. Here, we discuss the implications our findings have for recruiter assignment and force efficiency. The shape of the inverted-U depends on the experience level of other recruiters, so our results suggest that changes in force size will affect productivity if they change the relative experience mix within stations. At the aggregate level, the impact of changes in recruiter force size on force efficiency arises from changes in the overall experience distribution.

## Implications for recruiter assignment

We saw in figures 19 and 20 that the shape of the inverted-U depends on the experience level of other recruiters. Regardless of station size, recruiter i is more productive at all experience levels when the other recruiter(s) have more than 30 months of experience. This is consistent with the interpretation that late-tour decreases in productivity result from more experienced recruiters helping junior recruiters.

We believe that Chief Recruiters currently do consider experience combinations when assigning new recruiters to stations. Changes in force size, however, complicate this process since a Chief Recruiter may be forced to assign recruiters to stations where there are diminishing returns. For example, during an upsizing, if new recruiters are distributed among stations that already have relatively junior members, productivity in these stations may decline because the senior recruiters in these stations have to divide their time among more junior members. Thus, if changes in force size change the ratio of senior to junior recruiters, there will likely be secondary, unintended effects on productivity.

Table 7 shows how the ratio of senior recruiters to junior recruiters changes with fluctuations in force size. We consider a recruiter to be "senior" if he or she has enough experience to be a RINC (i.e., at least

18 months of recruiting experience). In our data, from FY94 to FY02, the ratio of senior to junior recruiters varies substantially—from a minimum of 0.44 to a maximum of 2.31. If there are too few senior recruiters to aid junior recruiters, productivity will likely be lower than expected. That is, changes in the ratio of senior recruiters to junior recruiters may create a situation in which either too many or too few recruiters are on board to meet a given mission, other things equal.

Table 7.   Changes in force size vs. the ratio of senior to junior recruiters[a]

| FY | Trimester | Percentage change in force size | Ratio of senior recruiters to junior recruiters | Ratio of RINC eligible to number of stations |
|---|---|---|---|---|
| 1994 | ONDJ | -- | 1.15 | 1.30 |
| | FMAM | -3.94 | 1.19 | 1.29 |
| | JJAS | 1.06 | 1.15 | 1.34 |
| 1995 | ONDJ | 3.63 | 0.96 | 1.31 |
| | FMAM | -0.73 | 0.92 | 1.31 |
| | JJAS | 1.25 | 0.86 | 1.30 |
| 1996 | ONDJ | 3.60 | 0.81 | 1.32 |
| | FMAM | 7.06 | 0.82 | 1.45 |
| | JJAS | 2.12 | 0.82 | 1.48 |
| 1997 | ONDJ | -1.27 | 0.80 | 1.38 |
| | FMAM | -0.93 | 1.00 | 1.51 |
| | JJAS | -2.95 | 1.60 | 1.78 |
| 1998 | ONDJ | -5.52 | 2.13 | 1.86 |
| | FMAM | 1.77 | 1.97 | 1.83 |
| | JJAS | 4.52 | 1.51 | 1.72 |
| 1999 | ONDJ | 7.01 | 0.96 | 1.47 |
| | FMAM | 15.34 | 0.58 | 1.25 |
| | JJAS | 7.41 | 0.44 | 1.08 |
| 2000 | ONDJ | -3.88 | 0.53 | 1.11 |
| | FMAM | -4.20 | 0.74 | 1.29 |
| | JJAS | 1.94 | 1.36 | 1.77 |
| 2001 | ONDJ | 3.84 | 2.31 | 2.26 |
| | FMAM | -0.71 | 2.12 | 2.21 |
| | JJAS | -1.26 | 1.59 | 1.98 |
| 2002 | ONDJ | -1.65 | 1.35 | 1.84 |
| | FMAM | -2.80 | 1.26 | 1.75 |
| | JJAS | -3.36 | 1.11 | 1.62 |

a. Based on the analysis sample of first-tour 9585s.

Furthermore, the effect of changes in the ratio of senior to junior recruiters may be exacerbated by the fact that there needs to be a minimum number of RINCs. That is, as force size changes, new stations cannot be opened unless there is a recruiter who is RINC eligible (i.e., has at least 18 months of experience) available to serve in the RINC position. As the number of senior recruiters relative to the number of stations decreases, Chief Recruiters have less latitude to match RINCs to stations and to distribute additional senior personnel among stations. The last column of table 7 shows that the ratio of potential first-tour 9585 RINCs to stations varied from 1.08 in the summer of FY99 to 2.26 in the fall of FY01.

# Implications for force efficiency

Beyond the senior to junior recruiter ratio, given the inverted-U, at the aggregate level, it is the overall experience distribution of the force that is important. That is, force efficiency is a function of the relative number of recruiters in the high-productivity phase of their tours. Before discussing the effect on force efficiency of the proportion of the recruiter force in each phase, we show how changes in force size change the overall experience distribution of the force.

## Changes in force size and in the overall experience distribution

Because recruiters are entering and exiting the force constantly throughout the year, the experience distribution of the force changes according to the relative sizes of entering and exiting cohorts. Recall in figure 6 that we showed the movement of cohorts through the experience categories. The top panel of table 8 summarizes this movement: it shows how recruiters in the force have been distributed across nine experience categories from FY94 through FY02. The bottom panel of the table displays the share of recruiters in the high-productivity phase of a tour (i.e., months 5 through 30) and the percentage change in force size, showing how they changed over the same time period. Note that, when recruiter force size increases, for the most part, the share in the high-productivity phase decreases.[43]

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43. The correlation between share of recruiters in the high-productivity phase and percentage change in force size is -0.24.

Over the FY94–FY02 period, the range of variation in the number of recruiters was 50 percent around an average of 3,471. Table 8 shows that, during this same time period, there was considerable variation in the concentration of recruiters in the most productive phase of the recruiting tour: the maximum share of 81.7 percent and the minimum share of 56.7 percent represent a 37-percent range of variation around the average share of 67.4 percent.

Table 8. Experience distribution of first-tour 9585s, by fiscal year

| Experience category | Ave. productivity[a] | Average share in each category,[b] by fiscal year | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
| <1 month | 0.25 | 3.2 | 3.6 | 3.8 | 1.5 | 3.2 | 5.3 | 1.5 | 2.4 | 2.8 |
| 2-4 months | 1.06 | 8.8 | 10.6 | 11.6 | 5.3 | 8.3 | 15.8 | 4.4 | 7.4 | 8.5 |
| **5-6 months** | **1.29** | **5.3** | **7.1** | **7.5** | **4.2** | **4.8** | **9.6** | **3.7** | **4.9** | **5.5** |
| **7-12 months** | **1.31** | **16.2** | **19.3** | **18.5** | **18.5** | **9.8** | **20.6** | **22.1** | **12.0** | **15.4** |
| **13-18 months** | **1.30** | **15.2** | **13.7** | **16.3** | **22.2** | **11.4** | **11.7** | **27.7** | **8.9** | **14.9** |
| **19-24 months** | **1.18** | **15.4** | **12.6** | **14.0** | **16.8** | **18.6** | **7.0** | **17.9** | **19.4** | **12.1** |
| **25-30 months** | **1.06** | **16.1** | **12.1** | **10.4** | **14.1** | **21.3** | **8.2** | **10.3** | **24.2** | **8.7** |
| 31-36 months | 0.83 | 13.0 | 11.9 | 9.5 | 11.5 | 15.0 | 12.3 | 5.6 | 14.8 | 17.7 |
| 37+ months | 0.48 | 6.7 | 9.1 | 8.5 | 5.7 | 7.6 | 9.4 | 6.8 | 6.0 | 14.3 |
| *Share in high-productivity phase[c]* | | | | | | | | | | |
| | | 68.3 | 64.8 | 66.7 | 75.9 | 65.8 | 57.1 | 81.7 | 69.4 | 56.7 |
| **Percentage change in force size** | | | | | | | | | | |
| | | -20.4 | 12.3 | 17.5 | -2.2 | -7.3 | 27.7 | 4.9 | 5.1 | -5.3 |

a. Unadjusted average productivity for the experience category.
b. For each experience category, we count the average number of recruiters in that category over the fiscal year.
c. Months 5 through 30.

The impact of changes in force size on force efficiency arises from the non-trivial change in the relative shares of recruiters who are not producing the notional minimum requirement of one net new contract per month. For example, the high-productivity share for FY98 was relatively low---10 percentage points lower than the share in FY97. Furthermore, the majority of recruiters in the high-productivity phase were on the cusp of the helping/transition phase. In FY99, however, even though the high-productivity share is even lower, the majority are in the most productive months of their tour (i.e., 7 to 18 months

of experience). This suggests that the decrease in the number of recruiters, the difficult recruiting conditions, **and** the small share in high-productivity phase all combined to contribute to missing mission in FY98.

## Potential effect on total contracts

Table 8 shows that changes in force size change the experience distribution of recruiters. What, however, is the potential impact of these changes in the experience distribution on the expected number of net new contracts? To address this question, we estimate two specifications of an NRD-level productivity equation and compare the results. The first specification estimates NRD net new contract production as a function of the total number of first-tour 9585 recruiters plus other market controls. The second specification estimates NRD net new contract production as a function of the same market controls and the number of first-tour 9585 recruiters in each of the three productivity phases.[44]

- Specification 1:

$$Q_{nt} = f(\#R'ER_{nt}, MIS_{nt}, MKT_{nt}, \alpha_n, \varepsilon_{nt}),$$

    where
    $Q_{nt}$ = the productivity of NRD n in period t
    $\#R'ER_{nt}$ = the number of recruiters in NRD n in period t
    $MIS_{nt}$ = mission characteristics in NRD n in period t
    $MKT_{nt}$ = market characteristics in NRD n in period t
    $\alpha_n$ = an NRD fixed effect
    $\varepsilon_{ist}$ = an i.i.d. error term.

- Specification 2:

$$Q_{nt} = f(\#LEARN_{nt}, \#HIGHPROD_{nt}, \#HELP_{nt}, MIS_{nt}, MKT_{nt}, \alpha_n, \varepsilon_{nt}),$$

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44. In both specifications, MIS and MKT contain the same variables as were included in the individual recruiter productivity regression, although they are now measured as an average for the NRD as opposed to at the state level. See page 47.

where
$$Q_{nt} = \text{the productivity of NRD n in period t}$$
$$\#LEARN_{nt} = \text{the number of recruiters in the } \textit{learning phase} \text{ in NRD n in period t}$$
$$\#HIGHPROD_{nt} = \text{the number of recruiters in the } \textit{high-productivity phase} \text{ in NRD n in period t}$$
$$\#HELP_{nt} = \text{the number of recruiters in the } \textit{helping/transition phase} \text{ in NRD n in period t}$$
$$MIS_{nt} = \text{mission characteristics in NRD n in period t}$$
$$MKT_{nt} = \text{market characteristics in NRD n in period t}$$
$$\alpha_n = \text{an NRD fixed effect}$$
$$\varepsilon_{ist} = \text{an i.i.d. error term.}$$

The estimated coefficients on the number of first-tour 9585 recruiters are as follows:[45]

> Specification 1:
> coefficient on the *total number* of recruiters     0.54
>
> Specification 2:
> coefficient on the number of recruiters in the *learning phase*     0.44
> coefficient on the number of recruiters in the *high-productivity phase*     0.57
> coefficient on the number of recruiters in the *helping/transition phase*     0.45

The regression results for specification 1 indicate that recruiters have a positive and significant effect on net new contracts. In other words, all else equal, increasing the number of recruiters on board will increase contract attainment. In specification 2, the coefficients for the different phases of a recruiting tour differ as expected. Recruiters in the high-productivity phase have large, positive, and significant effects on overall production, while those in the learning and helping/transition phases have relatively smaller effects.

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45. Complete regression results for both specifications are presented in appendix C.

These coefficients, like the changes in ratio of senior to junior recruiters presented in table 7, imply that failing to take into account the effects of experience may cause a situation in which either too many or too few recruiters are on board to meet a given mission. Consider the following examples of each case.

From FY97 to FY98, the total number of first-tour 9585s decreased by 239 and the share of all first-tour 9585s in the high-productivity phase decreased by 10 percentage points. Specification 1 of the NRD model predicts that this change in force size would result in 1,550 fewer net new contracts generated, all else equal. Specification 2, however, predicts that the decrease in force size *combined with the change in the experience mix* would result in 2,000 fewer net new contracts generated, all else equal. Thus, in this example, failing to consider changes in the experience mix might have led to having too few recruiters to meet the mission. Two years later, the opposite case occurred. From FY99 to FY00, the total number of first-tour 9585s increased by 200 and the share of recruiters in the high-productivity phase increased by 25 percentage points. In this case, specification 1 of the NRD model predicts that net new contract generation would have increased by 1,290 contracts, while specification 2 predicts an increase of 2,730 contracts. This second example suggests that failing to account for the "aging" of previous large cohorts of new recruiters may have resulted in an unnecessary increase in force size in FY00.

Because our NRD-level regression is not designed to predict contracts, the specific numerical results are not directly generalizable to CNRC as a whole.[46] They do, however, illustrate the extent to which changes in the experience composition of the force can create changes in force efficiency. This implies that the inverted-U shape of individual productivity should be considered in the planning process.

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46. Specifically, the model is estimated only on the sample of first-tour 9585s .

# Conclusions and recommendations

## Summary of analytical results and their implications

Based on the statistical model of individual recruiter productivity, the experience-productivity profile has an inverted-U shape: holding other factors constant, recruiter productivity increases with experience at a decreasing rate until 12 to 18 months of experience; then productivity decreases. The regression results also indicate that the shape and position of the experience-productivity profile for an individual recruiter depends on both the number of other recruiters in his station and their experience levels. In particular, at each experience level, first-tour recruiters are more productive when they have more experienced station mates.

Combined, these results mean that changes in the distributions of recruiters and recruiter experience across and within stations will cause force efficiency to fluctuate even when external recruiting conditions remain constant. Thus, changes in force size can indeed have secondary effects on efficiency if they cause changes in the force's experience distribution.

Looking ahead, it is likely that exogenous factors will create pressures to change the size of the recruiter force. Since FY90, the trend in mission size has been downward, so that recent accession missions of about 37,000 are historically low. This is consistent with historically low endstrength levels. Given that accession goals have decreased more rapidly than the size of the recruiter force, there may be pressure to decrease the number of recruiters. Some analyses, however, indicate that current accession missions are too low to maintain long-run, steady-state endstrength goals. If this is the case, the accession mission may increase in the next few years, thus creating pressure to increase the size of the recruiter force.

In either case, the analysis presented in this report indicates that it is important to take into account the likely impact of changes in force size on the experience mix of recruiters. For example, if the accession mission does increase and it is deemed necessary to increase the number of recruiters, the likely short-run results will be a decrease in average force experience and a consequent decrease in force efficiency. In the longer run, the large entering cohort of new recruiters will become a large exiting cohort 3 years later. If the large exiting cohort is replaced, it will be replaced by another larger entering cohort and the cycle will start again.

At the same time, external recruiting conditions will inevitably change. Economic conditions and the security environment, both of which affect enlistment propensities, will become better or worse for recruiting. Changes in these factors are notoriously difficult to predict. From a recruiting perspective, the worst outcome is one in which a low-productivity experience mix occurs concurrent with unexpectedly negative external recruiting conditions.

## Interpreting the inverted-U

The policy implications of the inverted-U depend on how it is interpreted. If the inverted-U is the result of desirable recruiter behavior, it must be managed around to minimize unanticipated fluctuations in force efficiency; if it is the result of undesirable recruiter behavior, it must be managed away.

There are several competing explanations for the inverted-U. The first, and most obvious, is the short-timer's attitude, which can be viewed as a recruiting-specific manifestation of the military rotation process. It is possible that the short-timer's attitude is equally prevalent Navywide, but the difference between recruiting duty and other assignments is that there is a straightforward, objective metric for recruiting performance.

The inverted-U could also be the result of the team aspects of recruiting. For example, if part of a senior recruiter's duties is to mentor and guide junior recruiters, then the late-tour decreases in productivity may not be a bad thing. To the extent that it is guidance from their

more experienced station mates that makes junior recruiters turn into productive mature recruiters, it should not be eliminated; the process may be the most efficient way to get a constantly rotating recruiter force to reach its maximum productivity.

In contrast, station-level goaling, or team recruiting, also introduces the possibility that some members may shirk their duties and free-ride on the productivity of their station mates once they have become recruiter-qualified. As noted earlier, the larger the station, the more potential there is for this type of behavior.

With the data available, we cannot determine the extent to which any of these factors contributes to the inverted-U. Therefore, we make recommendations for each interpretation.

# Managing the inverted-U

If it is an inherent part of the military rotation system, in which senior Sailors train junior Sailors and the line between the current assignment and the new assignment may be blurred, the inverted-U for recruiting might be considered both normal and desirable. In this case, it should be managed and accounted for in the planning process. In particular, planners should try to minimize fluctuations in the experience distribution in order to minimize fluctuations in force efficiency.

## Recommendations to minimize fluctuations in the experience distribution

### Extend or shorten tours

During a force upsizing, changes in the experience distribution could be minimized by extending tours rather than bringing in extra large entry cohorts. Granting (or imposing) tour extensions before the short-timer's attitude sets in would, in turn, minimize the impact of extensions on late-tour productivity. In contrast, during a force downsizing, changes in the experience distribution could be minimized by cutting tours short. Again, the change in tour length should not be announced too far in advance to minimize low productivity during

the transition phase. Both of these options would have to be weighed against the necessary amount of advance announcement needed to enter the detailing window for the next assignment and to provide proper notification to Sailors and their families.

## Recommendations to minimize the impact of fluctuations in the experience distribution

### Account for experience distribution in the planning process

To the extent that fluctuations in force size and force experience can't be avoided, we recommend exploring ways to incorporate recruiter experience into the planning process. For example, it may be effective to change the specification of the EGM to include the number of recruiters in high- and low-productivity experience categories, rather than just the total number of recruiters.

### Strategic recruiter assignment

To consistently maximize station-level productivity, we recommend that Chief Recruiters in each NRD pay particular attention to station-specific experience mixes. For example, new recruiters should be assigned to stations with more experienced recruiters and station size should be monitored. We assume that this is already being done to some extent, but it is worth exploring ways to fine-tune the process in light of the results presented here.

# Eliminating the inverted-U

Other interpretations of the inverted-U suggest that it would be appropriate to consider policies designed to eliminate it. For example, if the mid-tour peak in productivity is the result of the existing system for recruiter management, it may be possible create new systems that would generate an experience-productivity profile that peaks later in the tour or doesn't have the mid-tour decline at all. In addition, given the inherent differences between the recruiting function and warfighting functions, eliminating the inverted-U by eliminating the rotation system may be possible in the recruiting context.

## Recommendations to eliminate the inverted-U

**Reevaluate recruiter management**

Although our equation for recruiter productivity accounted for many factors besides recruiter experience, we didn't have data that allowed us to account for recruiter incentives, monthly goals, and recruiter management. Therefore, we recommend additional studies to analyze the productivity effects of the current incentive program, as well as the effects of station-level goaling and the PQS process.

**Create a professional recruiting force that does not rotate**

Several approaches are possible for creating a non-rotating recruiter force. The most obvious is to increase the size of the CRF and use Career Recruiters as production recruiters, as well as managers, but this approach is not consistent with the new focus on a sea-centric Navy with a minimal shore structure. Therefore, other approaches include using civilian recruiters or creating a cross-Service recruiter force. Any of these options would have to be thoroughly studied before being implemented.

# Appendix A: Data documentation

## Database assembly

### Data sources

**PRIDE --> Contracts**

To count contracts, we used the Navy's primary recruiting database, known as PRIDE (Personalized Recruiting for Immediate and Delayed Entry). PRIDE contains detailed information on all Navy enlistment contracts, including when the contract was signed, as well as the demographic characteristics, education levels, and DEP status of the recruits. For each contract, PRIDE also includes the social security number (SSN) of the recruiter who was responsible for it, a station identification number (STN ID), and a Navy Recruiting District (NRD) identification number. We selected all contracts that had DEP dates from FY89 through FY05[47] and that could be associated with a recruiter or a station. This first data step yields 1,159,671 contracts, associated with 1,096,308 unique SSNs and 5,608 unique STN IDs.

**EMR --> Recruiters**

To count recruiters, we used the Enlisted Master Record (EMR) to identify two groups of potential recruiters: those who were stationed at Navy "recruiting activities" during the FY89–FY05 period and those whose SSNs were associated with contracts in PRIDE. For this step, recruiting activities were defined by activity codes 5465, 5486, and 5488 *(*which correspond to NAVCRUITDIST, NAVCRUITCOM, and CHNAVPERS, respectively*)*. In addition to SSN, the EMR provides information on the personal characteristics of recruiters, including

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47. This time period allows us to count recruiters and contracts from the pre-DoD drawdown, DoD drawdown, sustainment, and Navy-specific drawdown eras.

demographics, paygrade, rating, Unit Identification Code (UIC), and NEC.

**CNRC Address Files** --> **Stations**

Address files maintained by Commander, Navy Recruiting Command (CNRC) contain the addresses of recruiting stations across the country for each fiscal year from FY94 to present. According to these yearly snapshots, there were 2,255 STN IDs over the FY94–FY05 period.

**BLS, CPS, and Census Bureau** --> **Market characteristics**

Because the recruiting environment is closely tied to current economic conditions, we added market data from the Bureau of Labor Statistics (BLS), the Current Population Survey (CPS), and the Census Bureau. The dataset contains monthly unemployment rates by state and Metropolitan Statistical Area (MSA) from the BLS, average weekly wages by state and by fiscal year of the target-age population (18- to 23-year-old men) from the CPS, and the size of the target age population by state and by fiscal year from the Census Bureau.

## Creating the recruiter database

### Merging the recruiter data with the contract data

To create the recruiter database, we merged—by SSN—the information on contracts and recruiters from PRIDE and the information on Sailors at recruiting activities from the EMR. Three cases describe the results of this merge:

- The contract record had a recruiter SSN, but that SSN could not be matched to any Sailor in the EMR. These cases were dropped.

- The contract record had a recruiter SSN, but the Sailor with that SSN in the EMR was assigned to an activity or UIC unrelated to recruiting (i.e., the Sailor was assigned to a ship at the time the contract was signed). These cases were also dropped.

- The SSN associated with a contract matched the SSN of a Sailor who could be identified as being on a recruiting tour according to the criterion that the Sailor had one of the activity codes

listed earlier. The observations resulting from this case provide the basis for our dataset.

**Defining recruiter tours and tour lengths**

Recruiter SSNs appear, disappear, and reappear in the data. We interpret this as indicating that the recruiter had multiple "recruiting tours". A recruiting tour was assumed to end if we observed a change in UIC, a PRD extension of greater than or equal to 36 months, or if the Sailor left the Navy.

**Unit of observation**

After the merge, we had observations spanning FY89 through FY05, with the observation unit being the "recruiter-month" (i.e., in October 1995, recruiter X brought in 2 contracts, it was the 7th month in his first tour as a recruiter, etc.). All variables are measured on a monthly basis except the wage and population data.

A total of 1,158,389 contracts were attributed to 37,335 unique recruiters and 46,258 recruiter-tours. Each record contained numerous variables describing the recruiter and the contracts obtained by the recruiter, as well as the station with which the contracts and recruiter were associated.

## Refining the recruiter data

To finalize the recruiter database for use in analysis, several more decisions had to be made. Some related to specific concerns associated with the goals of this study, others related to improving the reliability of the data and, therefore, are likely to apply to any future use of the data set.

First, because we were interested only in contracts associated with production recruiters and, therefore, contract-producing UICs, we removed those contracts affiliated with certain UICs. These UICs include Navy Recruiting Regions, Command Activities, CASH, CNRC detachments, Cyberspace Recruiting, and those that are outside the United States.

**Identifying production recruiters**

Again, attempts were made to include only those recruiters who were actually recruiting (i.e., production recruiters). The criteria used for identifying production recruiters were those who (a) were assigned to the recruiting activity 5465, (b) possessed the 9585 or 2186 NEC at some point during the FY89–FY05 period, or (c) were dNECed to 9585 or to 2186 at some point during the period. Dropping those recruiters who do not fulfill these criteria eliminated 9,883 contracts (0.85 percent of all contracts) and 14,109 recruiter tours (29 percent of all recruiter tours).

Even with these relatively strict criteria for selecting production recruiters, we still found that there were many recruiters who appeared to be on a recruiting tour but who had no contracts. To address this, we made the following additional cuts:

- We dropped recruiters who had no contracts over their entire tour.

- Recruiters who began a tour at a paygrade of E1, E2, E3, or E9 were analyzed and found to have very few or no contracts during the tour. They were deemed not to be "production recruiters," and these recruiter-tours were dropped from our sample.

- Recruiters who were determined to be in a 4th, 5th, or 6th tour were analyzed and found to have very few or no contracts during those tours. They were deemed to be in more management type of roles and therefore not to be "production recruiters," and the observations associated with the 4th, 5th, or 6th tour were dropped from our sample.[48]

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48. Recruiters had as many as nine recruiting tours over the FY87–FY05 period. Recruiters in their 7th, 8th, or 9th tour had zero contracts in these tours; therefore, observations associated with these tours were already dropped by the "no contracts" criterion. Over 90 percent (690 out of 753) of the recruiters in their 7th, 8th, or 9th tour held the 2186 NEC (i.e., were part of the Career Recruiting Force), and so it would not be unusual for them to have no contracts this late in their career.

Dropping contracts and recruiters who fit these criteria resulted in eliminating 2,177 contracts (less than 0.2 percent of all contracts) and 10,939 recruiter-tours ( 22.5 percent of all recruiter-tours).

Our decisions left us with 1,146,329 contracts (over 98 percent of all contracts) attributed to 27,524 recruiter-tours.

The last step in the process of creating the recruiter dataset was to add station-related variables. Before we could do this, we needed to create a station level database.

## Creating the station database

**Merging the contract data with the CNRC address file data**

To create the station database, we used the contract data and the CNRC address files. We used the NRD and STN IDs in PRIDE to match contracts (and the associated recruiters) to stations in the yearly station snapshots in CNRC's address file. Then, we compared names and addresses to match stations over time.[49] Three cases describe the results of this merge.

- The station ID in the contract record from PRIDE was not listed in the address files. These records were labeled as "unknown" stations.

- The station ID in the contract record from PRIDE matched a station in the address files, but the station ID was associated with two different stations in the address files. The date of the contract determined which station name to assign to the contract.

- We noticed that, in some cases, new stations seem to be born out of current stations. The new station's address sometimes matched an address of a current station, but then in the next address file the station location would be different----on the

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49. Station codes, names and locations change over time. To link station codes over time, we compared the station code, station name, and station address, which included street, city, state, and ZIP code.

other side of town or in a nearby town. These stations were treated as two stations with different station IDs.

After linking these stations over time, the 2,255 unique station IDs became 1,469 unique stations.

**Merging in the market data**

We then merged in the unemployment data by month and by state and the wage and population data by fiscal year and by state where the state is that of the station.

**Time frame and unit of observation**

Since the CNRC address files date back only to FY94, after the merge the station database spans the FY94–FY05 period. The unit of observation in the station data, similar to the recruiter data, is station-month, and again, all variables are measured on a monthly basis except the wage and population data.

Since the station data starts in FY94 and not FY89, it captures only 710,474 contracts attributed to 1,796 station-tours (1,447 unique stations).[50] Each observation contained numerous variables describing the station, recruiters assigned to the station, and the contracts generated by the station.

## Refining the station data

As with the recruiter database, creating the station database required several decisions to improve the reliability of the data.

**Defining station characteristics**

Once we had connected contracts to stations over time, we could then connect recruiters to stations through their contracts. To create the

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50. Recall that the contract data yielded 5,608 unique station IDs, not unique stations, and that STN IDs appear, disappear, and reappear in our data. We interpret this to indicate that a station was closed and then reopened. As shorthand, we refer to these periods as "station tours." A station tour is assumed to end if we observe a period of greater than 6 months with no contracts.

station characteristics, we simply aggregated the characteristics of the recruiters who had contracts in the station for each month. During this process, we sometimes observed that recruiters had contracts in multiple stations in a single month. In these cases, we weighted the recruiters' characteristics by the share of contracts associated with each station. For example, if a recruiter had two contracts in station A in month X, and one contract in station B in month X, his characteristics carried a weight of 2/3 within the calculation of Station A's characteristics and a weight of 1/3 within the calculation of Station B's characteristics.

## Merging station data into the recruiter data

Finally, we merged station characteristics back into the recruiter data and created additional variables to be used in estimation. Specifically, because one of the goals of this project is to examine the dynamics of a station's experience mix, we added to each recruiter record variables measuring the number and the experience level of other recruiters in his station and a variable measuring the share of the recruiters in the station who were members of the CRF.

# Appendix B: Individual recruiter productivity regression results

To investigate whether the inverted-U shape of the experience-productivity profile reported in [12] still holds, we estimate the effect of experience on recruiter productivity using a newly developed recruiter database. See appendix A for a complete description of the data.[51] We go beyond the analysis done by the authors of [12] by estimating the experience-productivity relationship, holding other factors constant.

Our dependent variable is individual recruiter productivity measured by the number of net new contracts generated in a given month. We use linear regression with individual recruiter fixed effects to isolate the impact of experience on productivity. Before presenting the regression results, we discuss why we use linear regression as opposed to a negative binomial model, which could better explain the discrete nature of the dependent variable.

## Negative binomial vs. linear regression

Given the small integer nature of our dependent variable and the likely complicated relationship between experience and productivity, it is unlikely that linear regression, even with fixed effects, would truly capture the underlying data generation process. A nonlinear model is more appropriate for describing the numerous incidences of zeros and the discrete nature of the data. The Poisson regression model is a common choice for such nonlinear models. Because we have considerable individual heterogeneity in our data, however, the Fixed

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51. Since our goal was to estimate the effect of experience on productivity over a tour, recruiters were excluded from analysis if we could not observe their entire tours.

Effects Negative Binomial regression model (FENB), which allows overdispersion to vary by individual, would be a better choice.[52]

Despite its appropriateness for our data, we chose not to use the FENB model for several reasons. Standard econometric packages can only estimate a "conditional FENB model." That is, the fixed effect is conditioned out of the likelihood function and is never estimated. The researcher, therefore, never learns about the impact of the fixed effect, and any predictions based on estimates from the negative binomial model necessarily assume that the fixed effect is zero. In addition, the negative binomial model assumes that contracts have an exponential conditional mean function (i.e., $E[Y/X]= \exp(x\beta)$). The purpose of this assumption is to ensure that the mean is positive. Unfortunately, in our data, this assumption appears to yield unreasonably large values for regression-adjusted averages of monthly contracts. Finally, since a significant number of our control variables are also discrete, the negative binomial model does not converge to a global maximum for our preferred specification of the independent variables.[53]

Alternatively, OLS with fixed effects (OLS FE) estimates the impact of the fixed effect (i.e., individual recruiter heterogeneity) and yields plausible averages of regression-adjusted monthly contracts. Because we are specifically interested in the experience-productivity relationship for individual recruiters, we choose to use linear regression with individual recruiter fixed effects.

## Estimation results

Table 9 presents our estimates of the effect of experience on recruiter productivity, monthly net new contracts.

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52. The Poisson model assumes that there is no overdispersion, which exists when the conditional variance is greater than the conditional mean.

53. Indeed, the likelihood function of our preferred specification was not concave. After removing the 31 NRD indicator variables, however, the model did converge. This specification of the regression estimated via negative binomial suggests the same inverted-U shape of the experience-productivity profile, although the position of the curve is much different.

Table 9.   Estimation results from a linear regression with fixed effects[a]

| Independent variables | Coefficient | Robust std. error | t-statistic |
|---|---|---|---|
| Experience (I[th] month of recruiter i in first recruiting tour) | 0.092 | 0.003 | 29.57 |
| Experience squared | -0.370 | 0.014 | -25.58 |
| Experience cubed | 0.379 | 0.021 | 18.23 |
| Recruiter is within 6 months of end of tour | -0.203 | 0.011 | -19.13 |
| Station size | -0.031 | 0.004 | -7.35 |
| Experience of recruiter i interacted with station size | 0.000 | 0.000 | -1.30 |
| Experience of recruiter i interacted with the share of other recruiters in the station whose experience level is: | | | |
|    1-6 in their first tour | -0.015 | 0.002 | -7.55 |
|    7-12 in their first tour | -0.020 | 0.002 | -10.51 |
|    12-18 in their first tour | -0.017 | 0.002 | -8.69 |
|    19-24 in their first tour | -0.013 | 0.002 | -6.82 |
|    25-30 in their first tour | -0.005 | 0.002 | -2.73 |
|    31+ in their first tour | 0.003 | 0.002 | 1.28 |
|    1-18 in their second tour | -0.004 | 0.003 | -1.65 |
|    19+ in their second tour | 0.001 | 0.003 | 0.32 |
|    1-18 in their third tour | 0.002 | 0.004 | 0.43 |
|    19+ in their third tour | -0.005 | 0.004 | -1.07 |
| Recruiter's age | 0.089 | 0.026 | 3.45 |
| Recruiter's age squared | -0.001 | 0.000 | -3.41 |
| Recruiter's marital status | 0.004 | 0.021 | 0.18 |
| Number of children | 0.032 | 0.013 | 2.55 |
| Recruiter has less than HS degree or has the equivalent to an HSDG | -0.024 | 0.350 | -0.07 |
| Recruiter has more than HS degree | -0.103 | 0.101 | -1.02 |
| Recruiter's paygrade is E4 | -0.189 | 0.065 | -2.89 |
| Recruiter's paygrade is E5 | 0.293 | 0.020 | 14.44 |
| Recruiter's paygrade is E7 | -0.312 | 0.027 | -11.61 |
| Recruiter's paygrade is E8 | -0.381 | 0.045 | -8.41 |
| Navy's share of DoD mission (FY) | 0.009 | 0.006 | 1.46 |
| State unemployment rate | 0.040 | 0.023 | 1.70 |
| State unemployment rate squared | 0.002 | 0.002 | 0.90 |
| Natural log of target age population in the state (FY) | 0.042 | 0.038 | 1.11 |
| Natural log of weekly wage of 18-24 males in state (FY) | -0.012 | 0.075 | -0.16 |
| Currently has TAR or TEMAC status | 0.139 | 0.310 | 0.45 |
| Percentage of recruiters in a station that have NEC 2186 | 0.340 | 0.046 | 7.33 |
| FY 1995 | 0.071 | 0.019 | 3.75 |

Table 9.  Estimation results from a linear regression with fixed effects[a] (continued)

| Independent variables | Coefficient | Robust std. error | t-statistic |
|---|---|---|---|
| FY 1997 | -0.076 | 0.012 | -6.46 |
| FY 1998 | 0.049 | 0.014 | 3.54 |
| FY 1999 | 0.056 | 0.015 | 3.74 |
| FY 2000 | 0.025 | 0.014 | 1.82 |
| FY 2002 | 0.028 | 0.031 | 0.90 |
| January | -0.001 | 0.011 | -0.05 |
| February | -0.092 | 0.010 | -9.00 |
| March | -0.061 | 0.010 | -6.21 |
| April | -0.116 | 0.010 | -11.52 |
| May | -0.205 | 0.010 | -20.84 |
| July | 0.050 | 0.010 | 5.04 |
| August | 0.071 | 0.010 | 7.05 |
| September | 0.009 | 0.011 | 0.81 |
| October | -0.066 | 0.011 | -5.86 |
| November | -0.141 | 0.011 | -13.02 |
| December | -0.118 | 0.011 | -11.04 |
| Constant | -1.107 | 0.665 | -1.67 |
| Standard deviation of fixed effects | | 0.510 | |
| Standard deviation of random error | | 1.046 | |
| Fraction of variance due to the fixed effect | | 0.192 | |
| Number of observations | | 241,597 | |
| Number of recruiters | | 7,218 | |
| R-squared | within | 0.085 | |
| | between | 0.122 | |
| | overall | 0.094 | |

a. Gender, race, AFQT, and NRD are also included in the specification but are dropped because they are time-invariant. The "goal proxy" variable and indicators for FY94, FY96, and FY01 are dropped due to multicollinearity.

Selected results from table 9 follow:

- The overall effect of experience varies as expected. That is, productivity increases with experience at a decreasing rate and then decreases----the experience-productivity profile has an inverted-U shape. The average marginal effect of an additional month of experience, however, is negative, regardless of recruiter i's current experience level.

- As expected, recruiters are less productive in the last 6 months of their tour. The model cannot, however, tell us whether this is due to "burnout" or whether the recruiter is simply preparing to return to the fleet.

- As expected, the number and the experience levels of other recruiters in the station significantly affect an individual recruiter's productivity.

- Although the coefficients on "recruiter's age" show that age has a U-shaped effect, the overall marginal effect is positive. This does not offer strong support for the hypothesis that younger recruiters better identify with recruits, making recruiting easier for them. However, the magnitude of the effect is relatively small.

- Recruiters with children are slightly more productive than those without, all else equal. Marital status, recruiter's education level, the Navy's share of the DoD mission, the state unemployment rate, size of the target-age population, and weekly wages of 18- to 24-year-old males, however, do not have strong effects on the number of net contracts an individual recruiter generates in a month.

- Contracts follow the seasonality patterns of accessions more closely than expected (i.e., lower in October, November, December, April, and May). One might have expected contracts to "lead" accessions.

# Appendix C: NRD regression results

To address the potential impact of changes in the experience distribution of recruiters on the expected number of net new contracts, we examine productivity at the NRD level. We estimate two specifications of a regression of NRD productivity on the number of recruiters assigned to the NRD plus other market controls. The two specifications differ only by how they measure the number of recruiters.

- Specification 1 includes the total number of recruiters.

- Specification 2 includes the number of recruiters in each of the three phases of a recruiting tour----the learning phase, the high-productivity phase, and the helping/transition phase.

Both specifications contain the same control variables for market and mission characteristics as were included in the individual recruiter productivity regression.[54] Table 10 presents the regression results for both specifications.

The regression results for specification 1 indicate that recruiters have a positive and significant effect on net new contracts. In other words, all else equal, increasing the number of recruiters on board will increase contract attainment. In the second specification, the coefficients for the different phases of a recruiting tour differ as expected. Recruiters in the high-productivity phase have large positive and significant effects on overall production, while those in the learning and helping/transition phases have relatively smaller effects. Furthermore, the coefficient for the high-productivity phase is statistically significantly different from the coefficients for the other two phases.[55]

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54. In the NRD regression, these control variables are measured as an average for the NRD as opposed to at the state level.

55. The coefficients for the learning and helping/transition phase are not statistically different from one another.

Table 10. NRD regression results[a]

| Independent variable | Specification 1 | | | Specification 2 | | |
|---|---|---|---|---|---|---|
| | Coefficient | Robust std. error | t-statistic | Coefficient | Robust std. error | t-statistic |
| Total number of recruiters in NRD | 0.54 | 0.09 | 6.17 | | N/A | |
| Number of recruiters in the *learning* phase | | N/A | | 0.44 | 0.10 | 4.49 |
| Number of recruiters in the *high-productivity* phase | | N/A | | 0.57 | 0.09 | 6.68 |
| Number of recruiters in the *helping/transition* phase | | N/A | | 0.45 | 0.11 | 4.02 |
| Navy's share of DoD mission (FY) | 4.55 | 0.72 | 6.32 | 3.97 | 0.71 | 5.57 |
| Proxy for monthly goal[b] (FY) | 29.86 | 7.63 | 3.91 | 18.50 | 6.70 | 2.76 |
| Average state unemployment rate | 19.09 | 6.19 | 3.09 | 18.96 | 6.17 | 3.07 |
| Average state unemployment rate squared | -1.59 | 0.48 | -3.30 | -1.56 | 0.48 | -3.27 |
| Natural log of target age population (average for FY of states within NRD ) | 4.52 | 19.33 | 0.23 | 3.98 | 19.47 | 0.20 |
| Natural log of weekly wage of 18-24 males (average for FY of states within NRD) | -35.37 | 18.12 | -1.95 | -37.49 | 18.12 | -2.07 |
| Percentage of recruiters in an NRD that have NEC 2186 | 53.55 | 48.86 | 1.10 | 52.61 | 48.96 | 1.07 |
| FY 1995 | 3.03 | 2.85 | 1.07 | 0.80 | 2.62 | 0.31 |
| FY 1996 | 8.05 | 4.52 | 1.78 | 4.02 | 4.14 | 0.97 |
| FY 1997 | -1.76 | 5.75 | -0.31 | -6.66 | 5.36 | -1.24 |
| FY 1998 | 7.06 | 7.51 | 0.94 | 4.05 | 7.12 | 0.57 |
| FY 1999 | 11.23 | 8.95 | 1.25 | 6.87 | 8.38 | 0.82 |
| FY 2000 | 22.02 | 10.23 | 2.15 | 14.80 | 9.48 | 1.56 |
| FY 2001 | 20.93 | 10.96 | 1.91 | 15.15 | 10.30 | 1.47 |
| FY 2002 | 25.34 | 11.96 | 2.12 | 18.60 | 11.10 | 1.68 |
| January | 2.82 | 1.85 | 1.52 | 2.67 | 1.82 | 1.47 |
| February | -9.70 | 2.34 | -4.14 | -9.97 | 2.30 | -4.34 |
| March | -6.41 | 2.19 | -2.93 | -6.65 | 2.14 | -3.10 |
| April | -19.74 | 2.29 | -8.63 | -19.61 | 2.26 | -8.67 |
| May | -28.23 | 1.86 | -15.19 | -28.21 | 1.86 | -15.17 |
| July | 4.26 | 1.58 | 2.69 | 4.25 | 1.58 | 2.70 |
| August | 7.30 | 1.79 | 4.08 | 7.08 | 1.77 | 4.00 |
| September | -2.56 | 2.53 | -1.01 | -2.74 | 2.51 | -1.09 |
| October | -6.46 | 2.28 | -2.84 | -7.26 | 2.26 | -3.21 |

Table 10. NRD regression results[a] (continued)

| Independent variable | Specification 1 | | | Specification 2 | | |
|---|---|---|---|---|---|---|
| | Coefficient | Robust std. error | t-statistic | Coefficient | Robust std. error | t-statistic |
| November | -14.32 | 2.19 | -6.54 | -15.25 | 2.16 | -7.05 |
| December | -16.55 | 2.09 | -7.91 | -17.53 | 2.03 | -8.65 |
| Constant | 69.40 | 108.14 | 0.64 | 115.76 | 114.76 | 1.01 |
| Standard deviation of fixed effects | | 18.62 | | | 18.93 | |
| Standard deviation of random error | | 18.25 | | | 18.20 | |
| Fraction of variance due to the fixed effect | | 0.51 | | | 0.52 | |
| Number of observations | | 3,255 | | | 3,255 | |
| Number of NRDs | | 31 | | | 31 | |
| R-squared | within | 0.47 | | within | 0.47 | |
| | between | 0.90 | | between | 0.91 | |
| | overall | 0.66 | | overall | 0.65 | |

a. FY 1994 and the month of June are the omitted categories for the FY and month of year control variables.
b. Monthly goal proxy = (BOY accession goal/average number of recruiters)/12. This remains an individual-level goal because, within an NRD, the goal is allocated across stations to equalize PPR across recruiters.

These results suggest that, if changes in force size change the distribution of recruiters across the three phases of a tour, they can create changes in force efficiency. This implies that the inverted-U shape of individual productivity should be considered in the planning process.

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