Workplace Goals and Output Quality: Evidence from time-constrained recruiting goals in the U.S. Navy*

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Abstract

This paper examines how workplace goals affect the quality of worker output. The context is the recruiting command of the U.S. Navy, one of the largest recruiting organizations in the world with approximately 4,000 recruiters recruiting 36,000 recruits per year. Navy recruiting stations and recruiters are assigned monthly goals for the quantity of new recruits, which may set a perverse incentive to sacrifice quality, especially towards the end of the month when an unfulfilled quantity goal looms large. Using data on the universe of Navy recruits from FY1998 to 2010, we find significant reductions in the quality of recruits towards the end of the contracting month, both in terms of pre-existing quality of recruits and in medium-term outcomes that reflect the quality of the job match. These effects are present even in the presence of quality goals the Navy has implemented to ensure a minimum quality of the fleet.

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1. INTRODUCTION

Managers continuously seek policies that align the incentives of workers with those of the organization. When employment is hourly or salaried, a principle-agent problem may arise which necessitates costly management oversight (Holmstrom and Milgrom 1991). While one much studied solution to this problem involves piece-rate payments or similar performance based pay (Lazear 1986), many workplace environments are not compatible with, or amenable to, piece-rate payment schemes. In such settings, another potential solution that may align the incentives of workers with that of the management is the use of goals. A large psychological literature has explored the effects of goal setting on behavior and demonstrates that goals can improve workplace performance (Latham and Yukl 1975).

However, goals (as well as performance-based pay) can also lead to perverse, and possibly unintended, consequences. For example, in a production setting workers faced with quantity goals alone are incentivized to sacrifice quality at the expense of quantity (Frick et al. 2013; Cole et al. 2012). Or, goals that are time constrained, such as daily, weekly, or monthly output goals, can lead to procrastination by workers (Asch 1990; Camerer et al. 1997).

In this paper, we provide evidence of the unintended effects of a workplace goaling policy that sets monthly quotas for recruiting stations in the United States Navy. The U.S. Navy Recruiting Command is one of the largest recruiting organizations in the world, with about 4,000 recruiters signing up about 36,000 new sailors per year. The vast majority of recruiters are enlisted uniformed service members who serve a three-year "tour" as a recruiter at a given recruiting station, generally a small office covering the surrounding geographic area. Each station's enlisted recruiters are expected to help the station meet those goals, with an implicit goal of one contract per month. Repeatedly not obtaining a contract in a month is considered poor performance and can have lasting effects on a recruiter's career prospects. In fact, a Department of Defense (DOD) 2005 Recruiter Quality of Life Survey showed that two-thirds of recruiters believed that their success in meeting their monthly goal would make or break their career (GAO 2006).

Importantly, the Navy offers minimal incentives to individual recruiters to find new recruits beyond minimum quality cutoffs (defined in terms of educational attainment and a standardized test score). By ignoring quality, a quantity goal sets incentives to sacrifice quality for quantity.

The pressure to sacrifice on quality could be the largest towards the end of the month, when an unfulfilled quantity goal may loom large. Recruiters approaching the end of the month without meeting their goal (i.e., having already signed up a recruit) may feel pressure to either sign up recruits who are easier to obtain (such as those who are not high quality) or to over-sell a Navy career to a potential recruit who may not be a good match for the Navy.

The Navy recruiting process naturally leads to lower-quality sailors being recruited at the end of the month. From discussions with Navy personnel, recruiters focus first on filling openings for high-priority or hard-to-fill Navy occupations, which tend to be the more technical occupations requiring higher scores on the Armed Forces Qualification Test. Thus, recruits signing contracts at the end of the month would be of lower quality naturally. However, even within the specific occupations, recruit quality may be lower at the end of the month, as recruiters may focus on quantity goals (for which they are formally judged) and not on quality.

We empirically document the effects of this monthly quota policy on the quality of recruits by using detailed administrative data on the universe of Navy recruits between fiscal years 1998 and 2010, merged with the U.S. military's personnel database that tracks each sailor through their early career. We find significant reductions in the quality of recruits towards the end of the contracting month, measuring quality with a rich set of indicators that are strong predictors of job performance and post-accession match quality.

These results suggest that the Navy, with its monthly quantity goals, is encouraging recruiters to sacrifice on quality, perhaps resulting in a lower-quality force than it is capable of manning. Furthermore, we explore differential end-of-month effects by the gender and race of the recruit, and we examine whether the effects vary with the ease of the macro-economic recruiting environment.

2. RELATED LITERATURE

Our research adds to the small literature on the unintended effects of employer-initiated workplace goals. In one recent paper, Frick et al. (2013) show that teamwork and performance pay incentives in a steel plant increased production, yet led to greater absenteeism and a higher incidence of running machines for longer hours at the expense of machine maintenance. Similarly, Cole et al. (2012) demonstrate that loan officers who are incentivized based on quantity rather than quality originate more loans of lower average quality.

More related to our work, there are several papers on the unintended consequences of workplace goals in military recruiting.[1] Asch (1990a) studies an incentive plan for Navy recruiters in the mid-1980's (the Freeman Plan), under which recruiters earned rewards (mostly towards promotion) for bringing in recruits over a 12-month production cycle, with more points being awarded for higher-quality recruits. She finds that production prizes had a disincentivizing effect for recruiters who were likely to win the prize regardless of extra effort, and an incentivizing effect for recruiters who could expend extra effort to increase recruitments. Furthermore, productivity dropped off significantly after the incentives under the Freeman Plan were removed. In a related report, Asch (1990b) finds that recruiters who earned greater rewards under the Freeman Plan had relatively more low-quality recruits, suggesting a sacrifice of quality for quantity.

Three papers have previously examined the relationship between monthly contracting goals and recruit quality. Two Masters theses examine whether Marine Corps recruit attrition varies by the day a contract was signed. Bruno (2005) finds that recruits who contract in the last day have higher attrition rates prior to shipping to basic training than those who contracted earlier in the month, while Baczkowski (2006) finds that, amongst those who do enter the Marine Corps, there is no relationship between the time of the month of contracting and attrition from basic training. In a recent technical report, Asch and Heaton (2010) find that Army recruiters accept more poorly qualified recruits (e.g., those who are obese, have low AFQT scores, or have low fitness ratings) at the end of the contracting month. They argue that end-of-month goaling pressure may cause recruiters to not ask questions of recruits that may reveal disqualifying factors, or even purposefully hide such factors.

There are a few shortcomings of this prior research. First, these reports do not consider a host of factors that could simultaneously affect the quality of the recruits and the timing within the month of when recruits are signed. It could be that certain recruiters are not very effective, tending to attract low-quality recruits late in the contracting month. In addition, it may be that a recruiting station is in a difficult recruiting environment—perhaps a location with a strong economy. Thus, it may be more difficult for all recruiters in a recruiting station to attract high-quality sailors and it may take longer in a given month to meet their goals. Furthermore, time

[1] There is also research on the *intended* consequences of recruiting goals in the military; for example, Dertouzos and Garber (2008) found that monthly recruiting quantity goals increase productivity in the U.S. Army.

periods (particularly in the last few years) will produce easier recruiting environments so the military would obtain higher-quality recruits and likely sign recruits earlier in the month. None of the existing reports control for the location of the station, the recruiter, or specific time periods—Bruno (2005) and Baczkowski (2006) do control for the fiscal year, but not the month within each fiscal year. By not testing the robustness of the results to the inclusion of recruiter or station fixed effects, the correlation found in past research between the time of the month of the contract and the quality of the recruit may be spurious effects of the recruiter or the station.

Second, the two analyses that use regression analysis (Bruno 2005; Backowski 2006) control for measures of quality (e.g., aptitude score and education) as well as the demographic characteristics of the recruit (e.g., age, gender, and race) in the time-of-month-quality relationship. Controlling for quality and demographics estimates a partial effect of the time of the month and a recruit's quality, but the policy-relevant relationship of interest is in fact the unconditional relationship: certain groups may be targeted at the end of the month *because* they are of lower quality and easier to recruit. We explore the effect of controlling for characteristics in our analysis.

Third, as mentioned above, Navy recruiters focus on filling openings for more technical occupations earlier in the contracting month. If the Army and Marine Corps do the same, then the observed patterns of reduced recruit quality at the end of the month may simply be reflecting sequential filling of occupations with decreasing quality qualifications. Thus, controlling for the occupation would be important.

Finally, these studies do not explore how the quality of recruits is reduced over the course of the month. In particular, by comparing the last few days of the month with the preceding month in its entirety, the reference group includes a period of time that may already be affected by recruiters sacrificing quality to meet their goals, leading to an underestimate of the end-of-month effect. Therefore, we explore the robustness of the choice of control group in a parametric estimation framework. We demonstrate below the importance of these empirical considerations.

3. RECRUITING IN THE NAVY

3.1 Goals and contracts

The U.S. Navy, through the Navy Recruiting Command, sets a yearly recruiting goal at the beginning of each fiscal year (October 1st) specifying the required number of new accessions. This goal is based on the total force size needed for the coming year and reflects the realized retention of service members in the past year as well as the expected retention rates in coming years. This total-force recruiting goal is often modified over the course of the fiscal year in response to changes in personnel needs or divergences from expected and actual retention.

Once the total goal is set, the Navy Recruiting Command allocates monthly recruiting goals to two geographic regions (the East and the West), which then allocate goals to the 26 regional Navy Recruiting Districts (NRDs); NRDs in turn distribute monthly goals to the recruiting stations within their district. While recruiting stations do not explicitly assign goals to individual recruiters who work in those stations, recruiters typically have an implicit goal of one contract per month. Recruiters who do not meet their goal are sometimes forced to work evenings or weekends in order to catch up, and it is never considered acceptable to continually under-produce.[2]

3.2 Quality standards

The Navy categorizes potential recruits on the basis of their educational attainment and their score on the military's standardized aptitude test, the Armed Forces Qualification Test (AFQT). Potential recruits are considered "Total Test Category Uppers" (TTCUs) if they have an AFQT score of 50 or higher. (The AFQT is a percentile score; therefore a score of 50 or greater indicates the recruit is in the top half of all applicants who take the test.) Potential recruits are considered Tier 1 if they have a high school diploma (or are expected to earn one), Tier 2 if they have an alternative credential, and Tier 3 if they do not have a high school diploma or credential (and are not expected to earn one in the near future). Navy-wide, there are overall minimum quality standards; for example, all recruits must score above the 31st percentile of the AFQT distribution, and no more than six percent of recruits may be Tier 3. Furthermore, certain occupations have higher minimum standards for any potential recruit; for example, a nuclear engineer must be Tier 1 and in the upper decile of the AFQT distribution.

[2] This was confirmed through private conversations with Navy recruiting officials at the Navy Recruiting Command.

In an attempt to ensure there are enough recruits that meet the minimum qualification standards for the various occupations, the Navy requires that a certain percentage of recruits are TTCUs (that is they score above a 50 on the AFQT). Also, in order to ensure diversity, a certain percentage of recruits are often required to be female or black. Taken together, this implies that a recruiting station may be given, for example, a goal of ten contracts in a month along with sub-goals stating that eight of the contracts must be TTCUs, three must be female, and two of the TTCUs must be black. Unfortunately, we do not have access to the specific recruiting goals (in either total quantity or in quality) that were assigned at any stage of the recruiting process.

3.3 Incentives for recruiters

Importantly, there are only weak incentives for recruiters or recruiting stations to find recruits with greater quality than any minimum standard set by the goals mentioned above.[3] The primary incentive based on quality is the Enlisted Recruiter Incentive System (ERIS), which gives extra points for contracts for females, minorities, having an AFQT score above 50, and nuclear-field recruits. Like the Navy's earlier Freeman Plan, ERIS points are awarded on a 12-month (fiscal year) cycle. The primary awards for doing well are achievement medals. Hojnowski (2005) makes an argument for the ERIS program offering little incentives to recruiters. First, he points out that recruiters would only be eligible for two full-year fiscal-year award cycles in their three-year recruiter tour because they typically do not start their tour at the beginning of the fiscal year. Second, contracts for easier low-quality recruits still contribute to their point total. Another issue, as Asch (1990) found with the Freeman program, is that the points system has no incentivizing power for recruiters who are well below or well above the threshold getting an award.

Overall, the disconnect between quantity and quality in the recruiter incentive system is summarized nicely by a GAO report which states that while "services expect recruiters to recruit fully qualified personnel … [they] primarily evaluate recruiters' performance on the number of contracts they write …." (GAO 2006). For the vast majority of recruiters who do not recruit more than one sailor per month, pressure to meet their individual monthly goal may lead a

[3] The Navy has created some incentives for recruiters to increase the number of sailors they sign up. For example, the "Six-shooter" award is earned by signing six or more recruiting contracts in one month; importantly, neither this award nor any other awards based on the quantity of recruits are conditional on the quality of the recruits that are obtained other than that they meet the basic quality standards.

recruiter to expend less effort to obtain a better qualified recruit, and settle for one that simply meets the minimum quality standards. These incentives are also at play at the station level, when a station as a whole has not met its goal for the month, they may be more willing to sign less-than-ideal recruits who nonetheless meet acceptable overall or occupation-specific minimum qualifications.

3.4 Post-contract

A recruit might not be sent to basic training ("bootcamp") immediately upon signing a contract to enlist. If they do not, they are placed into the Delayed Entry Program (DEP) and are scheduled to ship to basic training some time within one year. DEP is used mainly to allow recruits to finish high school, but there are several other reasons for recruits to enter DEP such as getting one's affairs in order before shipping off to basic training, waiting for a basic training session to start, or waiting for the Navy to have a spot open for a recruit in the given occupation a recruit signs up for (to coincide with occupation-specific training after basic training).

While in DEP, recruits may annul their contract to join the Navy with no consequences, financial or otherwise. The Navy accepts this under the belief that allowing attrition while in DEP avoids costlier attrition later. Furthermore, recruits may be forced to leave DEP (and thus not access into the Navy) if they become ineligible, due to such things as gaining too much weight or committing certain misdemeanors or felonies. As a result, attrition from DEP is non-negligible (about 20 percent as we show below), and part of a recruiter's job is to manage their recruits who are in DEP. Recruiters will often contact their recruits regularly to remind them to keep out of trouble and to keep them engaged in the process of getting ready to ship.

4. DATA AND VARIABLE CONSTRUCTION

4.1 Data

We use the U.S. Navy's "PRIDE" (Personalized Recruiting for Immediate and Delayed Enlistment) recruitment database to explore the end-of-the-month quality-quantity tradeoff in Navy recruiting of enlisted personnel.[4] This database contains recruit-level information on the universe of contracts signed for the 749,597 enlisted Navy recruits between October 1997 (when

[4] Note that we focus on enlisted personnel, which constitute over 80 percent of Navy uniformed services.

the database begins) and April 2011, the most recent data currently available. Several key variables are included in PRIDE, the first of which is the calendar date on which the recruiting contract was signed from which we can calculate how many days were left in the calendar month when the contract was signed. In addition, we can determine if the sailor shipped to basic training or attrited from DEP, the state that the contract was signed in, and the identification code of the recruiter. Finally, two variables allow us to identify the quality of the recruit at the time of signing the contract: educational attainment and their AFQT score.

To this database, we merge U.S. military personnel data provided by the Defense Manpower Data Center (DMDC) that contains information on a recruits' short and medium-term career outcomes. The DMDC data were provided as quarterly snapshots of each sailor's status, along with the date of separation and reason for separation, if applicable. From this data, we create variables describing sailor attrition and promotion, which help identify aspects of the quality of recruits. The DMDC database extends through December 2012.

Our working sample includes all Navy recruits in the PRIDE database up through April 2010 who were residing in the 50 U.S. states and the District of Columbia and for whom we observe their AFQT score and occupation. From the 749,597 recruits in PRIDE, we first exclude all recruits who were recruited in the year before the end of our data, from May 2010 to April 2011 (43,380 recruits representing 5.8 percent of the sample) because we cannot consistently observe whether everyone recruited in this time frame entered the Navy or attrited from DEP. We also exclude the 17,049 recruits (2.4 percent of the sample) who were living outside the 50 U.S. states when they joined the Navy, as there would not be information on the state unemployment rate, which we use in the model described below. We then drop 27,215 recruits (3.8 percent) who did not have a Navy occupation indicated in the recruiting data. Finally, an additional 92 recruits did not have an AFQT score and were excluded. The final sample has 691,087 recruits.

We considered limiting the sample to the first recruit for each recruiter in a month. However, while most recruiters have a goal of one, there are exceptions; this implies there could exist an end-of-month quality sacrifice for recruits after the first contract for a recruiter. In addition, recruiting stations may sacrifice on quality if they have not met their contract goal as the end of the month approaches. As a result, we include all recruits, not just the first recruit of a month.

Table 1 contains summary statistics of this sample: 80 percent are male; 51 percent are white, 18 percent are black, and 19 percent are Hispanic; and the vast majority were U.S. citizens and were not married (95 and 98 percent, respectively) at the time of signing their recruiting contract.

4.2 Measures of recruit quality and match

Several outcomes characterize the initial quality of Navy recruits, their match with the organization, and their productivity on the job. Table 1 contains summary statistics of these variables and we describe them in turn.

The first set of outcomes is based on the recruits' qualification status, i.e., how the Navy classifies recruits. The Navy defines a high quality recruit as someone who has a high school diploma (or is in high school and is expected to earn a diploma) and scores a 50 or higher on the AFQT. We therefore create three outcomes: (1) AFQT score, (2) whether the AFQT score is less than 50, and (3) whether the recruit does not have a high school diploma or is not expected to obtain one (i.e., education Tier 2 or 3). Table 1 shows that the average AFQT score amongst enlistees is the 61st percentile, reflecting the fact that the Navy rarely accepts any recruit with an AFQT score below 30, and that 31 percent of recruits scored below the 50th percentile. Only six percent of recruits were non-high school graduates, reflecting the fact that the Navy considers a high school diploma an important qualification for service and official Department of Defense policy of keeping this number to a minimum.

The entering quality of the recruit is only important insomuch as it leads to a good match between the recruit and the Navy. Our first measure of this match is an indicator for whether the sailor attrited from DEP (that is, did not ship to basic training); 20 percent of the sample of recruits did so.

Next, we consider attrition during the first term. Attrition is detrimental to the military as there are substantial fixed costs associated with recruitment and training. We create indicators for whether a recruit attrited from the Navy at various points, defining attrition as a sailor failing to fulfill his/her obligated service.[5] We first examine attrition within the first 12 months of service, then attrition in the 13th through 24th months of service, conditional on surviving to the

[5] We do not consider as attrition reasons for leaving service that can be considered legitimate, such as death or transferring to Officer Training School.

13th month, and finally attrition in the 25th through 45th months, conditional on surviving to the 25th month. While the typical term of service is for 48 months (four years), a sailor may leave service any time after 45 months without it being considered not fulfilling one's obligated service. Overall attrition is highest in the first year at 19 percent, while conditional attrition rates are lower in the second year (7 percent) and over the final two years of the first term (10 percent).

We then look into why a recruit separated early, creating an indicator for attriting due to arguably the most deleterious reasons we label reasons of "character," including motivational problems, substance abuse, sexual perversion, and law violations.[6] In the first year of service, about one quarter of separations were for reasons of character, while in subsequent years close to three quarters of separations were due to reasons of character.

Note that when we consider post-accession attrition, we exclude the 20 percent of recruits who attrited from DEP, as they never entered active duty. Furthermore, there were 57,653 sailors who shipped to boot camp but did not show up in any quarterly observations in the DMDC data, implying that they shipped and attrited between the end-of-quarter snapshots; we count these as having attrited in the first 12 months. Unfortunately, we do not have the reason for the attrition for these sailors, so we cannot determine whether it was for character reasons.

Finally, we examine the productivity of the sailor once in the fleet, measured by the speed at which they promote though two key enlisted ranks, E4 and E5 (the 4th and 5th pay grade levels for enlisted sailors). Sailors typically enter the Navy as an E1, although some with prior service or certain high qualifications may enter as an E2 or E3. Promotion to E2 and E3 are standard, occurring after a fixed set of time for virtually all sailors, and variation in promotion speed starts with the promotion to E4 (Kumazawa 2010; Golan et al. 2010). Promotions are constrained and largely based on forecasted vacancies within an occupation at the higher grades. But, given the available slots for promotions, the Navy attempts to select the best qualified. The promotion process highlights the need to look within occupations in our empirical analysis.

[6] The full list of reasons for attrition due to a reason of "character" includes: character or behavior disorder, motivational problems (apathy), alcoholism, discreditable events, shirking, drugs, civil court conviction, court-martial, fraudulent entry, AWOL or desertion, sexual perversion, good of the service (discharge in lieu of court-martial), juvenile offender, misconduct, unfitness, pattern of minor disciplinary infractions, commission of a serious offense, entry level (Basic Training) performance and conduct, erroneous enlistment or induction, desertion, and imprisonment.

Typically, sailors must be in pay grade E3 for six months to be promoted to E4, but exceptions are made for those who finish at the top of their class in certain training exams and those who complete an advanced form of training. We classify sailors who promote to E4 in one to nine months to be "fast" promoters to E4; 39 percent of the sample are fast promoters. We exclude from this analysis those who leave or are not observed for at least nine months after being promoted to E3. We further exclude 1.4 percent of the remaining sailors who have zero or a negative number of months to E4, which may reflect demotions back to E3 or could indicate bad data.

A sailor must be in E4 for at least 12 months to be promoted to E5, with a few exceptions. Promotions to E5 and greater occur on six-month cycles. We classify any sailor who is promoted in 18 months or less as "fast" promoters to E5; 47 percent of the sample are fast promoters. As with E4, we exclude from the analysis for fast-E5-promoters anyone who had left or was not observed for 18 months after being promoted to E4. We note that our results are robust to similar definitions of fast promotion that use other cutoffs in the distribution, such as below the median of time to promotion (results available on request).

5. QUANTIFYING RECRUIT QUALITY OVER THE CONTRACTING MONTH

The key variable we use to explain variation in the quality of the recruit is the number of days left in the recruiting month at the time a contract was signed. As discussed above, we would expect that quality would fall throughout the contracting month, as recruiters became more pressured to achieve their quantity goal. Figure 1 contains a pseudo cumulative density function (CDF) of when recruits were signed throughout the month, plotting data for the entire sample. We refer to this as a pseudo CDF because in order to standardize across months with different numbers of days (i.e., 28, 29, 30, or 31), we show the first 12 days of the month, the last 15 days of the month, and the average of the middle days (denoted as M, which could include one, two, three, or four days). If recruiters contracted recruits uniformly across the month, the CDF would be roughly linear, increasing the cumulative total by about 3.2 to 3.5 percent of the recruits on a given day. As can be seen, one large departure from a uniform recruitment pattern is at the beginning of the month, when about seven percent of recruits in a given month sign on the first

day. The other significant period is the end of the month, in which 20 percent of recruits are signed in the last three days.

Figure 2 shows how two of our indicators of recruit quality – AFQT score and DEP attrition – vary over the time of the month the contract was signed; it is clear that there is a general downward trend in quality (lower AFQT score and higher DEP attrition rates) over the course of the month. Having a higher-than-normal quality of recruits in the first few days would be expected, as recruiters who have already met their goal for the current month may hold off on signing high-quality recruits until the next month in order to meet their goal quickly in the next month, and they would likely process them at the beginning of the month. These general patterns may be explained by several factors: recruiters and recruiting stations sacrificing quality at the end of the month to meet their quantity goals, contextual factors (e.g., period effects or recruiter quality) causing spurious correlation, or just the normal monthly recruiting process of taking care of the high-priority occupations early in the month.

In order to isolate whether there is the sacrificing of quality as the end of the month approaches, we explore this relationship parametrically. To do so, we must choose a reference group to which we compare end-of-month recruits. Using the first few days of the month would probably overstate any effect given that recruiters likely save high-quality recruits to the following month. Still, these high-quality recruits in the first few days of the month should be a part of the reference group, as this would represent the ideal contracts recruiters sign when they are not scrambling at the end of the month to meet their goal.

There is no obvious correct answer for what to use as the reference group, but Figure 2 does tend to show an accelerated downward trend in the AFQT score with 15 days left in the month. Therefore, we choose as a reference group those recruits signed in the set of days prior to 15 days left. We then classify the last 15 days into five three-day groups. This will allow the model to indicate the extent to which recruiters sacrifice quality as the end of the month approaches.

Our parametric model is as follows:

$$Y_{itsro} = DaysLeft_{itsro}\Phi + X_{itsro}\beta + \mu_t + \mu_s + \mu_r + \mu_o + \varepsilon_{itsr}$$

where, for recruit *i,* recruited at time *t*, in state *s*, by recruiter *r*, in occupation *o*, *Y* is an outcome, such as AFQT score or an indicator for atritting in a given time period, *DaysLeft* is a vector of

indicators that characterize the number of days left in the month when a contract was signed; X includes any variables that vary by time and geographical area that could affect the quality of the recruit, and μ_t, μ_s, μ_r, and μ_o are time (year-month), state, recruiter, and Navy occupation fixed effects.[7]

Recruiter fixed effects are important in this model because recruiters likely vary in their recruiting ability, with some systematically obtaining lower or higher quality recruits at given points in a month. Including recruiter fixed effects thus isolates the within-recruiter relationship between quality and time of month the contract was signed. Likewise, a recruiting station may systematically be in an environment faced with certain macro-economic labor market conditions or certain positive or negative attitudes towards the military that systematically lead to a correlation between recruit quality and the time of month the contract was signed. Note that as recruiters rarely work at more than one recruiting station, recruiter fixed effects essentially controls for recruiting station specific effects. Finally, occupation fixed effects implies that this model is comparing recruits entering into the same occupation who sign at different times of the month.

An important consideration is whether to include recruit specific characteristics as covariates in the model above. For example, one could control for characteristics such as gender, race/ethnicity, and age. Furthermore, for the post-contract outcomes, one could condition on pre-enlistment measures of quality, such as AFQT score and educational attainment. We argue that the preferred model should not include such recruit-specific covariates, as these are most certainly correlated with quality and may capture part of the quality effect we aim to estimate. For the post-contract outcomes, unlike Bruno (2005) and Backowski (2006), we do not control for pre-accession measures of quality as doing so would isolate a partial effect of the end-of-month contracts on recruit quality.

Finally, the only other time and location varying explanatory variable we include is the state unemployment rate. The unemployment rate is theoretically important as the strength of the economy could affect both the length of time during a month it takes to obtain contracts and the quality of the recruits. While a finer measure of the strength of the economy would be ideal, unemployment rates at more local levels (such as metropolitan areas or counties) tend to have

[7] State fixed effects may explain variation even when recruiter fixed effects are included as a recruiter in a location near a state border may sign recruits from different states.

much more sampling variation; thus, we follow common practice in the literature and use the more aggregated unemployment rate (e.g., Dee 2001; Ruhm and Black 2002). We use an average of the home-state unemployment rate for the month of enlistment and the prior two months.

6. RESULTS

Table 2 presents a progression of models for a primary outcome of interest, the AFQT score. Column 1 includes only the five three-day groups as regressors (along with a constant); recruits who signed in the last three days of the month have a strongly significant 2.8 points (percentiles) lower AFQT score than those who signed before the last 15 days of the month. Echoing the graphical results from Figure 1, the AFQT score decreases monotonically across the three-day groups in the latter half of the month, with the AFQT score in all three-day groups statistically lower than the AFQT score in the beginning of the month.

Column 2, adds state and year-month fixed effects as well as the unemployment rate, and the end-of-the-month effect decreases for all three-day groups by roughly 20 to 65 percent. The positive (and significant) point estimate on the unemployment rate indicates that within state increases in the state unemployment rate are positively associated with the Navy recruits from that state having higher AFQT scores.[8]

Column 3 of Table 2 adds recruiter fixed effects to control for the possibility that certain recruiters are not very productive, so they may take longer in a given month to attain a contract and may, at the same time, have more difficulty signing high-quality recruits. Likewise, stations may be in difficult recruiting environments and potentially have the same incidental correlation. We find, however, that adding recruiter fixed effects had very little effect on the estimates, generally reducing them from four to 12 percent. The coefficient estimate on the last three days is only reduced from -2.242 to -2.159 and remains strongly significant, as do the rest of the estimates on the day-of-month groups.

[8] In unreported analysis, it appears that the majority of the change in point estimates moving from column 1 to column 2 is due to the year-month fixed effects rather than the state fixed effects or the unemployment rate, signaling a correlation between the time period within the sample, the time of month a contract is signed, and the quality of the recruit.

Column 4 adds occupation fixed effects to account for the fact that Navy recruiters may fill more technical occupations earlier in the contracting month. This indeed appears to be the case, as the coefficient estimates on the day-group indicators are smaller than in column 3 by 20 to 50 percent. However, even within occupations, AFQT scores still drop significantly over the contracting month. As discussed below, the specification in column 4 is our preferred model to isolate the effect of monthly goals on the quality of recruits: controlling for recruiter, state, time, and occupation fixed effects isolates the relationship between the time-of-month a contract was signed and outcomes of interest, while not controlling for recruit characteristics estimates the full relationship between recruit quality and the time of the month the contract was signed, rather than a partial effect within demographic groups.

In practice, the partial effect appears to be very similar to the full effect, as we show in Column 5 which adds recruit characteristics to the model. We can see that - conditional on the full set of fixed effects - females have higher AFQT scores than males; blacks, Hispanics, other races have lower AFQT scores than whites; non-citizens have higher AFQT scores than citizens; and married recruits have higher AFQT score than unmarried recruits. In unreported analysis, we find that demographics explain about 10 to 15 percent of the end-of-month drop in quality when occupation fixed effects are *not* included.

The results in Table 2 described so far speak to some of the shortcomings of the previous studies. While recruiter fixed effects do not appear to be an important omission in the previous studies, state and year-month fixed effects are important to factor out external factors that simultaneously affect the time of the month of a contract being signed and the quality of the recruit. Furthermore, we find evidence that the Navy is indeed filling higher-skilled occupations earlier in the contracting month, so not looking at only within occupations will lead to spurious end-of-month quality declines. Finally, simply characterizing the end of the month as the last few days of the month would understate the end-of-month effect, as the sacrificing of quality appears to start at least 15 days prior to the end of the month.

We further demonstrate this point in column 6, which takes our preferred model from column 4 but uses just an indicator for the last three days; thus, the reference group includes the contracts of lower quality from 15 to four days left in the month. The estimated end-of-month effect is about 20 percent lower, suggesting that controlling for the time leading up to the end of

the month is important, not just to show the progression of recruiters sacrificing quality as the end of the month approaches, but also to avoid understating the end-of-month effect.

Overall, Table 2 indicates that the finding that sailors signed towards the end of the month are of lower quality than sailors signed earlier in the month is fairly robust to different specifications and cannot be explained away by differences in recruiters, stations, or the characteristics of the recruits.

Other pre-accession characteristics and outcomes

Table 3 contains coefficients on the five three-day groups for several pre-accession outcomes in our preferred specification, which includes the lagged unemployment rate and all fixed effects, for recruiters, states, year-months, and occupations. Column 1 re-displays column 4 of Table 2 for ease of comparison. The outcome in column 2 is an indicator for whether the recruit had an AFQT score below 50, an official Navy indicator of low quality. We note that some of the more technical occupations within the Navy have a minimum required AFQT score above 50, implying that the estimated effect for this outcome reflects only within-occupation end-of-month quality effects for those lower skilled occupations that allow recruits with an AFQT score less than 50. By 13 to 15 days left in the month, recruits are already 0.9 percentage points more likely to have an AFQT score below 50 than recruits signed earlier in the month. That increased likelihood continues to get larger as the end of the month approaches, with recruits who signed in the last three days having a 3.4-percentage-points higher probability of having an AFQT score below 50. All of the coefficients are significantly different from zero at the one percent level.

The end-of-month effects are of similar magnitude when considering educational attainment. Column 3 presents results for an outcome that is equal to one for recruits who did not graduate high school (and were not expected to before deploying to basic training). This is a relatively infrequent outcome, particularly in the last few years with the strong recruiting environment. Significant differences do not show up for recruits until 10 to 12 days left in the month. Recruits in the last three days have a 3.5-percentage-point higher probability of being a non-high school graduate.

In the model for DEP attrition (column 4), all of the estimates on the three-day groups are significant at the one percent level. While the effect is relatively small for recruits who signed up with 13 to 15 and 10 to 12 days left, as the end of the month approaches, recruits are

significantly more likely to attrite from DEP. Those recruits signed in the last three days of the month are 3.8 percentage points more likely to attrite from DEP than those who signed in the beginning of the month.

The last three outcomes in Table 3 repeat the first three, but condition on the sample that eventually deployed to basic training; that is, they exclude those who attrite from DEP. The end-of-month effects for these conditional outcomes are very similar to their corresponding outcome for all recruits. The estimates are slightly lower for the AFQT score and for having an AFQT score less than 50, but very similar for the non-high school graduate outcome.

In a sensitivity-analysis check, we estimated another set of models that were the same as in Table 3 but were only for recruiters' first contract of the month. We do not report the results, but they were very similar to the results for all contracts in Table 3. This suggests that recruiting stations, as a whole, engage in sacrificing of quality at the end of the month to meet their contract objective.

Overall, Table 3 shows that there is an extra sacrificing of quality in the last three days, as each estimate for the last three days is significantly greater (in magnitude) than the corresponding estimate for 4 to 6 days left in the month ($p < 0.01$ for each). Furthermore, the escalating sacrificing starts earlier, as the estimates on 4 to 6 days left are significantly greater than the estimates on 10 to 12 days left ($p < 0.01$).

From column 1, the end-of-month effect of about one point on the AFQT score is relatively small when considering the mean (61) and the standard deviation (18). However, the end-of-month effect on the two variables that are officially used for quality indicators—having an AFQT score below 50 (3.4 percentage points more likely) and being a non-high school graduate (3.5 percentage points more likely)—are fairly large relative to the overall rates in the population (30 percent have an AFQT below 50 and 6 percent are not high school graduates). Furthermore, the 3.8 percentage point higher likelihood of attrition from DEP is about 18 percent of the overall DEP attrition rate of 21 percent.

Post-accession outcomes

The results in Table 3 show that recruiters sacrifice on many dimensions of pre-accession quality towards the end of the contracting month. In Table 4, we consider post-accession outcomes that proxy for the match of the recruit with the Navy.

Overall, there are fewer significant estimates compared with the outcomes in Table 3 and there are hardly any cases in which there are significant differences for those signing in the four three-day groups prior to the last three days. However, those signing in the last three days, relative to those signing before the last 15 days, are significantly more likely to attrite in the first year of service (0.7 percentage points) and attrite in the third or fourth year of service (0.3 percentage points). There is evidence for significantly higher attrition for reasons of character amongst those recruited in the end of the month versus the beginning of the month. Those signed in the last three days of the month are less likely to promote quickly to E4 by 0.6 percentage points, but there is no significant difference in promotion to E5.

Compared to the overall rates, the end-of-month effects for the post-accession outcomes are fairly small. This suggests that there is not as much sacrificing of quality at the end of the month in terms of how well a sailor may fit into the Navy, presuming this can be detected to some extent by the recruiter.

Heterogeneous effects by gender, race, and time period

We now turn to explore how the relationship between the time of the month and recruit quality varies by gender, by race, and in good versus bad economic times. Table 5 contains estimates from our main model for selected outcomes, with the end-of-month variables interacted to allow for separate effects for males and females. For visual ease, we only display estimates for indicators for one to three days left in the month interacted with both genders. The bottom row of Table 5 contains p-values for tests of significant differences between the last three-days estimates for males and females.

Females are typically more difficult to recruit, so there has historically been a targeted monthly goal for females, which is usually around 20 percent of the total goal. However, conditional on the included fixed effects, amongst recruits signing in the first half of the month the AFQT score of females is 0.14 point higher than for the score for males. We could observe a potentially greater end-of-month effect for females as recruiters and stations may need to scramble not just to fill their goal for all recruits, but also for female recruits. Indeed, we find that the end-of-month effect is larger for females, with those in the last three days having a 1.867 points lower AFQT score than those signed before the last 15 days compared to a 0.960 point lower score for males; this difference is strongly significant ($p \approx 0.000$).

Overall, females are about nine percentage points more likely to attrite from DEP, but their end-of-month effect is the same as that for males. Females are six percentage points more likely to attrite in the first 12 months. However, the end-of-month effect is reversed from what we have observed elsewhere, as females signing in the last three days are less likely to attrite in the first 12 months as females signing before the last 15 days of the month. For attrition in the 3rd and 4th years of the first term (25 to 45 months), males signed in the last three days are significantly more likely to attrite, while there is a negative yet noisy effect for females. The estimates on the last three days for the attrition-for-character-reasons outcome in the first year of service (column 5) indicates that females signed in the last three days, for some reason, have lower attrition rates, but there is no effect for males; the difference is significant at the two percent level. Males signing in the last three days have a slightly higher probability of attriting for character reasons in the 3rd and 4th years of service, but there is no effect for females. For having a fast promotion to E4, effects for both genders are negative but insignificant.

For differences across race and ethnicity, Table 6 shows that recruits of all races have lower AFQT scores when recruited in the last three days of the month, and that the end-of-month-quality reduction is stronger for all minorities relative to whites (the difference from whites is insignificant for blacks, but significant at less than the one percent level for Hispanics and those of other races). For DEP attrition, the effect of the last three days is slightly higher for blacks (with an insignificant difference), lower for Hispanics (significant at the five percent level), and the same for those of other races. For attrition in the first year, all racial/ethnic groups have a positive and significant estimate on the last three days, but none are significantly different from that for whites. For the other outcomes, there are only two estimates that are significant: Whites who sign the contract in the last three days are 0.4 percentage points more likely to attrite in the third and fourth years, and Hispanics signed in the last three days are 1.3 percentage points less likely to promote quickly to E4 compared to their counterparts who are signed before the last 15 days. While this estimate is significantly stronger than that for whites, no other difference between the minority groups and whites is significant.

Finally, Table 7 shows the separate effects for two different time periods: fiscal years 1997-2007 and fiscal years 2008-10. The former time period was generally a very difficult recruiting period for the Navy, due to a low unemployment rate and a general sense of negativity associated with the military as a result of certain events in the Iraq War (such as the prisoner abuses by U.S.

soldiers at Abu Grahib). In contrast, the Great Recession coincides with the start of fiscal year 2008, which ushered in very high unemployment rates and coincided with reduced recruiting needs due to the expected drawdown of military operations in Iraq and Afghanistan. We do not include an indicator for the fiscal year 2008-10 period, as its effect would be captured in the year-month fixed effects; however, we do provide the means for the two periods for each outcome.

The results are mixed as to which period had a greater sacrificing of quality at the end of the month. The last-three-days effect on the AFQT score is larger for the fiscal year 2008-10 period (p-value = 0.03) and the effect of higher DEP attrition is significantly stronger for the fiscal year 1997-2007 period (p-value = 0.00). The estimates for the rest of the outcomes are all insignificant for fiscal years 2008-10, partly due to there being fewer observations realized for some of these first-term outcomes.

7. DISCUSSION

In this paper, we find clear evidence that Navy recruits are of lower quality towards the end of the contracting month. This evidence is strongest for the measures of quality that represent the recruits' qualification status and for whether the recruit attrited after signing the contract but before accessing into the Navy. While there were some significant end-of-month effects for the outcomes representing whether the recruit was a good fit for the Navy (measured by attrition in the first term) and productivity while in the Navy (measured by the speed of promotion), the effects are small in relation to overall levels of these outcomes. While we are not able to empirically uncover the reasons why quality is lower at the end of the month, we surmise that this is due to recruiters or recruiting stations being more concerned about the number of contracts and not expending extra effort above the mandated minimum to find higher quality recruits when they have not yet met their monthly quantity quota.

Production goals are important to encourage productivity; however, the management and setting of these goals is likely causing the Navy to acquire more low-quality recruits than it otherwise could acquire. This phenomenon is consistent with other efforts to boost the productivity of recruiters in the military, in which quantity was incentivized at the expense of quality (Asch, 1990b; Oken and Asch, 1997; Matthews, 2011). While it is clearly sub-optimal to

recruit low-quality recruits who are not a good match with the Navy, without an exogenous change in policy we have little to say empirically about how a different incentive system (one with goals or otherwise) would encourage the recruitment of quality, better matched recruits.

However, several possible changes in the setting of goals and management of recruiters and recruiting stations could possibly reduce the incidence of sacrificed quality at the end of the month. First, perhaps a recruiter's monthly goal should be based on both quantity and quality. Second, perhaps the goals should be set on a two- or three-month basis. Of course, longer goaling time periods could simply compound the end-of-month problem, but perhaps it would allow more flexibility in managing any randomness involved in when potential high-quality recruits are found,. Third, the Navy could keep the monthly goal, but make it "understandable" that a recruiter or station may come up empty or short one month and just expect them to make it up within, say, two months. This will give the recruiters and stations the flexibility to search harder for higher-quality recruits and not have to settle on low-quality recruits at the end of the month.

As with the current incentive system, any proposed changes could of course have unintended negative consequences. For this reason, we strongly suggest the Navy experiment with randomly assigned alternative goaling systems across recruiting stations. The sheer size of the recruiting command lends itself to such experimentation, and the potential benefits of a superior fighting force will likely outweigh the costs of experimentation.

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Figure 1. Pseudo cumulative density function of contracts obtained over the course of a month.

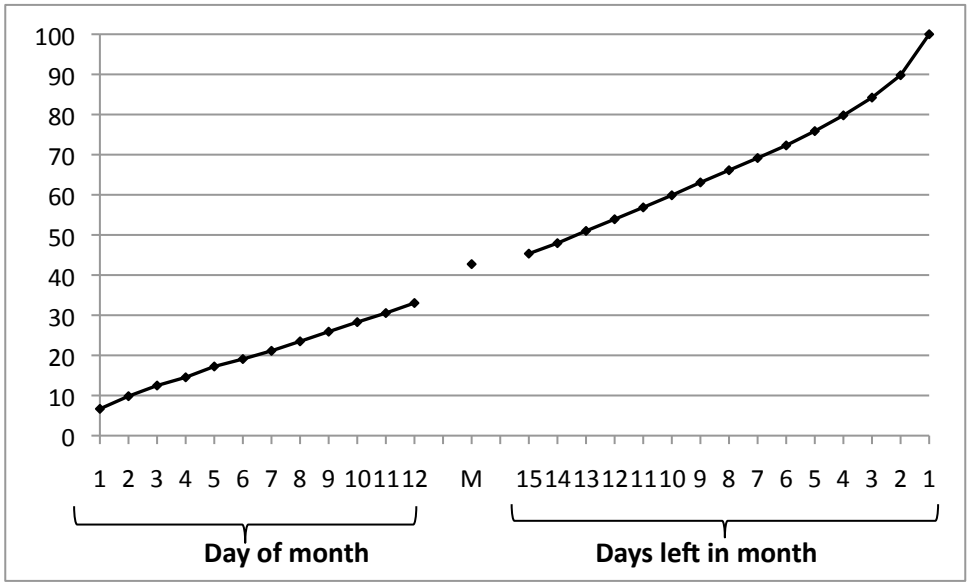

Figure 2. AFQT score and DEP attrition as a function of the day of the month the contract was signed.

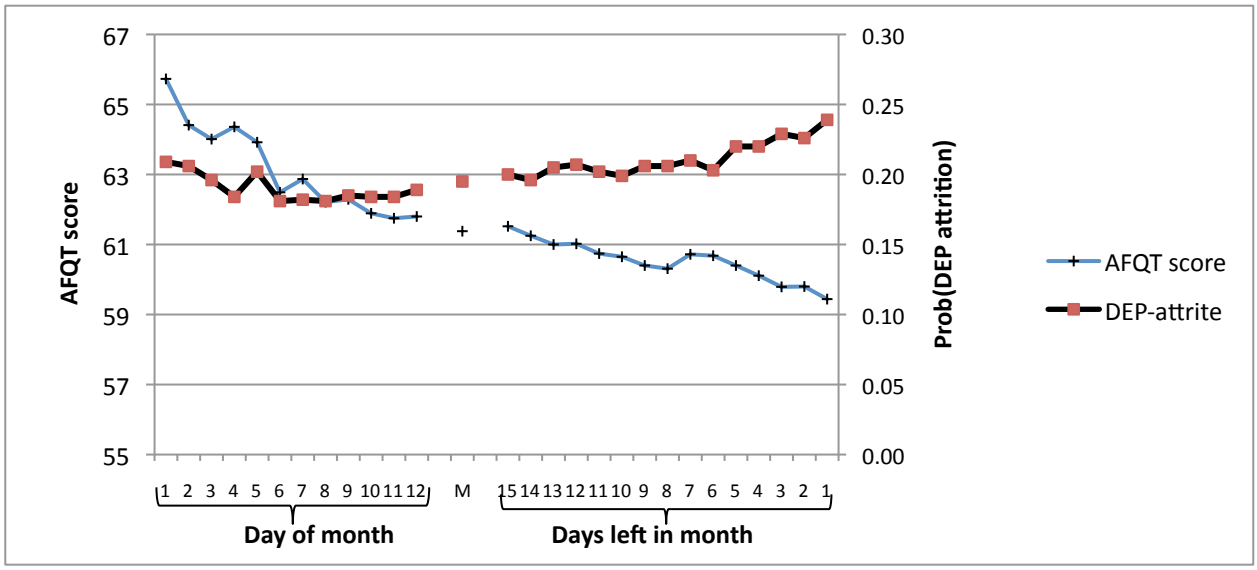

Table 1: Summary statistics.

	Mean	(s.d.)	Observations
Demographics			
Male	0.800	(0.400)	689,536
White	0.508	(0.500)	689,536
Black	0.179	(0.384)	689,536
Hispanic	0.191	(0.393)	689,536
Other race	0.121	(0.327)	689,536
Citizen	0.954	(0.210)	689,536
Not married	0.978	(0.147)	689,536
Outcomes			
AFQT percentile	61.171	(18.382)	689,536
AFQT < 50	0.307	(0.461)	689,536
Non-high school graduate	0.064	(0.245)	689,536
Attrited from DEP	0.206	(0.405)	688,362
Attrited from active duty:			
within 12 months	0.192	(0.394)	563,876
between 13 and 24 months	0.073	(0.260)	450,565
between 25 and 45 months	0.107	(0.310)	355,940
Attrited for reason of character:			
within 12 months	0.050	(0.219)	506,936
between 13 and 24 months	0.056	(0.231)	450,565
between 25 and 45 months	0.072	(0.258)	355,940
Fast promotion to rank:			
E4	0.394	(0.489)	285,470
E5	0.474	(0.499)	175,748
Time of month enlistment contract was signed			
Prior to 15 days left in month	0.411	(0.492)	689,536
13 to 15 days left in month	0.088	(0.283)	689,536
10 to 12 days left in month	0.091	(0.287)	689,536
7 to 9 days left in month	0.098	(0.297)	689,536
4 to 6 days left in month	0.109	(0.312)	689,536
1 to 3 days left in month	0.204	(0.403)	689,536

Notes:

(1) Sample includes all Navy recruiting contracts signed between October 1997 and April 2010.

(2) A recruit is defined as a non-high school graduate if they have not earned a high school diploma and are not expected to earn one before shipping to basic training.

(3) DEP (Delayed Entry Program) is the holding program after a recruit is contracted but before they ship to basic training.

(4) Attrition from active duty is defined as leaving for any reason other than death or early release for attending a military academy or the warrant officer training program.

(5) See text for the definition of attrition for reason of character.

(6) Fast promotion is defined as promotion within nine months for E4 and 18 months for E5; the samples are restricted for several reasons (see text).

Table 2: AFQT score as a function of the day of month the contract was signed.

Outcome =	AFQT score	AFQT score	AFQT score	AFQT score	AFQT score	AFQT score
	(1)	(2)	(3)	(4)	(5)	(6)
1 to 3 days left in month	-2.826***	-2.242***	-2.159***	-1.167***	-1.125***	-0.906***
	(0.060)	(0.061)	(0.061)	(0.046)	(0.046)	(0.042)
4 to 6 days left in month	-2.236***	-1.254***	-1.157***	-0.694***	-0.676***	
	(0.075)	(0.076)	(0.076)	(0.058)	(0.058)	
7 to 9 days left in month	-2.046***	-1.000***	-0.930***	-0.679***	-0.638***	
	(0.079)	(0.079)	(0.079)	(0.060)	(0.060)	
10 to 12 days left in month	-1.720***	-0.672***	-0.610***	-0.325***	-0.314***	
	(0.081)	(0.081)	(0.081)	(0.062)	(0.061)	
13 to 15 days left in month	-1.398***	-0.549***	-0.484***	-0.294***	-0.277***	
	(0.082)	(0.082)	(0.082)	(0.062)	(0.062)	
Unemployment rate		0.183***	0.187***	0.166***	0.138***	0.168***
		(0.034)	(0.063)	(0.048)	(0.048)	(0.048)
Female					0.085**	
					(0.042)	
Black					-5.635***	
					(0.053)	
Hispanic					-2.255***	
					(0.053)	
Other race					-0.299***	
					(0.057)	
Non-citizen					1.471***	
					(0.085)	
Married					1.746***	
					(0.111)	
State and year-month FE		Yes	Yes	Yes	Yes	Yes
Recruiter FE			Yes	Yes	Yes	Yes
Occupation FE				Yes	Yes	Yes
Observations	689,536	689,536	689,536	663,481	663,481	663,481
R-squared	0.004	0.039	0.009	0.406	0.417	0.406

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) The omitted variables are an indicator for signing a contract prior to 15 days left in month, white, male, citizen, and not married.

(3) There are 19,230 recruiter, 51 state (including Washington, D.C.), 151 year-month, and 137 occupation fixed effects.

(4) The unemployment rate varies at the state-month level; it is calculated as the three month average across the month the contract was signed and the previous two months.

Table 3: Pre-accession characterstics and outcomes as a function of the day of the month the contract was signed.

					Conditional on starting active duty		
Outcome =	AFQT score	AFQT < 50	Non-high school graduate	Attrited from DEP	AFQT score	AFQT < 50	Non-high school graduate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 to 3 days left in month	-1.167***	0.034***	0.035***	0.038***	-1.106***	0.032***	0.036***
	(0.046)	(0.001)	(0.001)	(0.001)	(0.053)	(0.002)	(0.001)
4 to 6 days left in month	-0.694***	0.022***	0.012***	0.022***	-0.710***	0.021***	0.012***
	(0.058)	(0.002)	(0.001)	(0.002)	(0.066)	(0.002)	(0.001)
7 to 9 days left in month	-0.679***	0.018***	0.005***	0.017***	-0.676***	0.017***	0.006***
	(0.060)	(0.002)	(0.001)	(0.002)	(0.068)	(0.002)	(0.001)
10 to 12 days left in month	-0.325***	0.011***	0.003**	0.008***	-0.266***	0.009***	0.003**
	(0.062)	(0.002)	(0.001)	(0.002)	(0.070)	(0.002)	(0.001)
13 to 15 days left in month	-0.294***	0.009***	0.002	0.007***	-0.290***	0.009***	0.002*
	(0.062)	(0.002)	(0.001)	(0.002)	(0.070)	(0.002)	(0.001)
State and year-month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recruiter and Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	663,481	663,481	663,481	662,358	524,534	524,534	524,534

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) All regressions control for the past-three-month average state specific unemployment rate.

(3) The omitted variable is an indicator for signing a contract prior to 15 days left in month.

Table 4: Post-accession outcomes as a function of the day of the month the contract was signed.

	Attrited from active duty:			Attrited for reason of character:			Fast	Fast
Outcome =	within 12 months	between 13 and 24 months	between 25 and 45 months	within 12 months	between 13 and 24 months	between 25 and 45 months	promotion to rank E4	promotion to rank E5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1 to 3 days left in month	0.007***	0.001	0.003*	-0.000	0.001	0.000	-0.006**	0.003
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)	(0.003)
4 to 6 days left in month	0.001	-0.002*	0.001	-0.001	-0.003**	0.002	-0.003	-0.005
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
7 to 9 days left in month	0.004*	-0.002	-0.003	-0.001	-0.001	-0.002	-0.000	-0.002
	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
10 to 12 days left in month	0.001	0.001	0.000	0.000	0.000	-0.001	-0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
13 to 15 days left in month	0.001	-0.002	-0.001	0.001	-0.003*	-0.001	0.002	0.005
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.003)	(0.004)
State and year-month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recruiter and Occupation FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	541,436	430,504	340,473	485,299	430,504	340,473	275,577	163,125

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) All regressions control for the past-three-month average state specific unemployment rate.

(3) The omitted variable is an indicator for signing a contract prior to 15 days left in month.

Table 5: End-of-month quality effects by gender, selected outcomes.

			Attrited from active duty:		Attrited for reason of character:		
Outcome =	AFQT	Attrited from DEP	within 12 months	between 25 and 45 months	within 12 months	between 25 and 45 months	Fast promotion to rank E4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 to 3 days left x Male	-0.960***	0.034***	0.007***	0.004**	0.001	0.002*	-0.003
	(0.052)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)
1 to 3 days left x Female	-1.867***	0.034***	-0.007**	-0.005	-0.004**	-0.003	-0.009
	(0.097)	(0.003)	(0.003)	(0.004)	(0.002)	(0.003)	(0.006)
Female	0.140**	0.088***	0.056***	0.018***	-0.001	-0.035***	-0.027***
	(0.067)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)
Observations	663,481	662,358	541,436	340,473	485,299	340,473	275,577
H_0: 1 to 3 days left x Male = 1 to 3 days left x Female, p-value	0.00	0.96	0.00	0.03	0.02	0.10	0.32

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) All regressions control for the past-three-month average state specific unemployment rate and state, year-month, recruiter, and occupation fixed effects.

(3) The omitted variable is an indicator for signing a contract prior to 15 days left in month.

Table 6: End-of-month quality effects by race, selected outcomes.

			Attrited from active duty:		Attrited for reason of character:		
Outcome =	AFQT	Attrited from DEP	within 12 months	between 25 and 45 months	within 12 months	between 25 and 45 months	Fast promotion to rank E4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 to 3 days left x White	-0.953***	0.039***	0.005**	0.004**	0.000	0.001	-0.001
	(0.064)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.003)
1 to 3 days left x Black	-1.141***	0.045***	0.008**	0.000	-0.003	-0.003	-0.006
	(0.103)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.006)
1 to 3 days left x Hispanic	-1.379***	0.030***	0.009***	0.001	0.001	-0.000	-0.013**
	(0.101)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.005)
1 to 3 days left x Other race	-1.363***	0.037***	0.009**	0.001	0.003	0.001	-0.008
	(0.128)	(0.004)	(0.004)	(0.005)	(0.003)	(0.004)	(0.007)
Black	-5.582***	-0.009***	-0.022***	0.011***	-0.008***	0.016***	-0.053***
	(0.077)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)
Hispanic	-1.934***	0.004*	-0.029***	-0.012***	-0.009***	-0.008***	-0.017***
	(0.074)	(0.002)	(0.002)	(0.003)	(0.001)	(0.002)	(0.004)
Other race	-0.062	0.007***	-0.006**	-0.000	-0.002	-0.002	-0.010**
	(0.081)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.004)
Observations	663,481	662,358	541,436	340,473	485,299	340,473	275,577
H_0: 1 to 3 days left x White = 1 to 3 days left x Black, p-value	0.12	0.11	0.47	0.29	0.18	0.28	0.41
H_0: 1 to 3 days left x White = 1 to 3 days left x Hispanic, p-value	0.00	0.02	0.28	0.41	0.82	0.75	0.05
H_0: 1 to 3 days left x White = 1 to 3 days left x Other race, p-value	0.00	0.76	0.43	0.52	0.40	0.99	0.37

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) All regressions control for the past-three-month average state specific unemployment rate and state, year-month, recruiter, and occupation fixed effects.

(3) The omitted variable is an indicator for signing a contract prior to 15 days left in month.

Table 7: End-of-month quality effects pre- and post-fiscal year 2008, selected outcomes.

			Attrited from active duty:		Attrited for reason of character:		
Outcome =	AFQT	Attrited from DEP	within 12 months	between 25 and 45 months	within 12 months	between 25 and 45 months	Fast promotion to rank E4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1 to 3 days left x FY[97-07]	-1.124***	0.042***	0.007***	0.003	0.000	0.000	-0.006**
	(0.051)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.003)
1 to 3 days left x FY[08-11]	-1.381***	0.022***	0.002	0.005	-0.002	-0.002	-0.004
	(0.108)	(0.003)	(0.004)	(0.006)	(0.002)	(0.005)	(0.006)
Observations	663,481	662,358	541,436	340,473	485,299	340,473	275,577
H_0: 1 to 3 days left x FY[97-07] = 1 to 3 days left x FY[08-12], p-value	0.03	0.00	0.20	0.71	0.32	0.72	0.71
Mean of outcome in FY[97-07]	60.25	0.206	0.192	0.107	0.055	0.072	0.391
Mean of outcome in FY[08-11]	65.16	0.208	0.079	0.112	0.031	0.061	0.411

Notes: *** p<0.01, ** p<0.05, * p<0.1

(1) Standard errors are in parentheses.

(2) All regressions control for the past-three-month average state specific unemployment rate and state, year-month, recruiter, and occupation fixed effects.

(3) The omitted variable is an indicator for signing a contract prior to 15 days left in month.