

MENU OF CONTRACTS: A NEW APPROACH TO IMPROVING NAVY RETENTION BONUSES

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Military success requires retaining sufficient capable service members, but there is little research on retaining quality personnel. We propose an innovative bonus structure to retain the right quantity and quality of personnel by setting retention bonuses through a menu-of-contracts. The menu provides choices between bonus structures that encourage higher and lower quality personnel to voluntarily select the bonus structure that best reflects their perceived quality. This addresses two essential problems in military personnel research: adverse selection (making inappropriate retention decisions due to hidden quality information) and moral hazard (incentives encouraging personnel to provide less than their best effort). A menu-of-contracts can meet the military's retention needs without relying on past performance to measure expected future performance. This retains higher quality personnel, increases morale and improves future retention. It also induces personnel to maximize effort throughout their careers as they strive for the highest bonus while maintaining the perception of egalitarianism.

Key words: retention bonus, reenlistment bonus, menu-of contracts, retention auction, selective reenlistment bonus, selective retention bonus.

1. INTRODUCTION

Retaining capable military personnel is essential to the Department of Defence's mission success. This study proposes innovative retention bonuses to both retain the right quantity of military service members while also efficiently addressing the right

quality mix. We propose a contract design for retention bonuses, through a menu-of-contracts, to address two military personnel problems, adverse selection (i.e., making inappropriate retention decisions due to hidden quality information) and moral hazard (i.e., incentives encouraging officers to provide less than their best effort).

This study proposes a retention bonus contract design that links bonus payments, *ex ante*, to military performance, specifically promotion and selection as Department Head. We recommend using a menu-of-contracts, a well-established concept in economic literature, as the retention bonus contract design. We further argue that this design effectively addresses both adverse selection and moral hazard in military manpower settings, and accordingly improves effectiveness and efficiency.

Using the naval aviation officer community as the example, we describe the current retention bonus system and diagnose its problems. Specifically, the one-size-fits-all approach does not differentiate the bonus policy by higher versus lower quality officers, which inevitably creates unintended negative consequences, including:

- Unavoidable attrition by some of the most capable officers.
- Due to *adverse selection* (i.e., hidden information), the Navy overpays less capable officers (lower quality) relative to more capable officers (high quality).
- The current bonus scheme further creates *moral hazard* (i.e., hidden effort) because the bonus is not tied to future performance; high quality officers may shirk because there is limited financial

reward for high performance and lower quality officers enjoy windfall benefits and may shirk as well.

A menu-of-contracts approach that links bonuses and performance, *ex-ante*, addresses both adverse selection and moral hazard, and improves efficiency by paying the right bonus to the right officers and motivating officers' best efforts. Moreover, this approach is ethical because it is non-discriminatory; each officer is presented the same menu. The approach's advantage is that officers, knowing their type, maximize their utility (including both monetary and non-monetary factors) by self-selecting into their expected type (i.e., a separating equilibrium), and they will be motivated to exert effort consistent with the selected bonus plan.

2. ECONOMIC FOUNDATION FOR A MENU-OF CONTRACTS

This study aims to improve navy retention bonuses through better retention contract design, which falls into the principal-agent contract design framework that economists have extensively researched. The general premise of a principal-agent model involves a principal, requiring work, bargaining with an agent, supplying work. Two usual problems in principal-agent settings are *adverse selection* and *moral hazard*. The former is associated

with hidden information and the latter is associated with hidden action. (Bolton and Dewatripont, 2004) Adverse selection arises from information asymmetry between the principal and the agent, recognizing that agents have private information (e.g., their quality and effort) that the principal doesn't know or knows imperfectly. Moral hazard recognizes that the principal doesn't directly observe the agent's effort and can't explicitly contract for the desired effort. Both adverse selection and moral hazard create challenges for the principal. The principal's objectives are two-fold: limit the agent's information rents and induce the agent's best effort level.

2.1. Insurance as an Example of Adverse Selection and Moral Hazard

Consider the information asymmetry between the insured and the insurer. Insurance buyers (the insured) know their type (i.e., high or low risk), while the seller (the insurer) doesn't perfectly know the buyer's type. The insurer has a general idea about the population's average risk level and can calculate a premium that is commensurate with the average risk. However, if the insurer offers insurance at this "average" premium non-discriminatorily across all individuals, the market will suffer from "adverse selection." That is, low risk people would think the

premium is too high while high risk people would think the policy is a good deal given their high-risk level. Consequently, the policy will be purchased by a disproportionately high percentage of high-risk people. This in turn requires the insurer to raise premiums, which further drives out low risk people, leading to insurance market failure.

The best correction for adverse selection is to price individual buyers discriminatorily, provided that information is symmetric so the insurer knows the insured's risk. However, this first-best fix is not feasible because the insurer can't observe an individual's risk type, even by screening applicants. Furthermore, differentiating premiums across a class of buyers (e.g., federal employees) may be prohibited by law in some cases. Therefore, the ending equilibrium is often the second or third best where information rents are gained.

The second major problem in the insurance industry is moral hazard because the insurer cannot observe the insured's risk-aversion efforts. For example, people holding auto insurance plans with lower or no deductible payments, may less cautiously avoid non-fatal accidents. When a bad outcome's loss is insured, the insured is less prudent in avoiding that outcome. This becomes problematic when the effort to avoid the outcome is not observable and hence not contractible.

2.2. Adverse Selection and Moral Hazard in Navy Retention Bonus Contracts

We argue that similar problems exist in Navy retention bonus contracts. The Navy’s personnel system is a hierarchical labor market (with no lateral entry). Furthermore, salaries are determined by a standardized pay table based on rank and years of service, so base pay is the same for all service members with the same rank and years of service (see Table 1). (DFAS, n.d.a) Finally, average promotion rates for the U.S. military officers are regulated by the Defense Officer Personnel Management Act (DOPMA). (DoD, n.d.) Table 2 shows the timing and promotion rates specified by DOPMA for promotion to Lieutenant Commander (O4), Commander (O5), and Captain (O6).

Table 2. Commissioned Officer Promotion Requirements

To Grade	Timing	Opportunity
O4	10 years +/-1 year	80 Percent
O5	16 years +/-1 year	70 Percent
O6	22 years +/- 1 year	50 Percent

The Secretary of the Navy is authorized to recommend all fully qualified officers for promotion to Lieutenant (O3) if they reach 24 months as a Lieutenant Junior Grade (O2) within the next fiscal year.

Rosen observes that employee performance in hierarchical organizations depends on a combination of capability and effort. (Rosen, 1992) He further observes that motivation to expend effort comes from the benefits gained by promotion within the organization. This includes both benefits from immediate promotions and expected benefits from future potential

Table 1. Commissioned Officer Monthly Pay

Years of Service	> 10	> 12	> 14	> 16	> 18	> 20
O-7	\$10803	\$11125	\$11448	\$12463	\$13320	\$13320
O-6	\$8541	\$8541	\$9026	\$9884	\$10388	\$10891
O-5	\$7864	\$8135	\$8486	\$9023	\$9278	\$9530
O-4	\$7460	\$7832	\$8090	\$8238	\$8324	\$8324
O-3	\$6634	\$6961	\$7131	\$7131	\$7131	\$7131

promotions. For example, promotion to O4 in the Navy moves officers to a higher pay band, but also keeps officers eligible for promotion to O5 and above. However, Rosen also observes that the military pay table, with both rank and service time elements, reduces the incentive to promote more quickly; any benefits are temporary over those who promote more slowly. Properly rewarding capability and effort in this system also requires predicting future potential.

Asch and Warner model retention decisions as a comparison between the future benefits of continued service, including current and future potential promotions, versus the benefits of non-military employment, combined with the level of effort required for successful military promotion versus the disutility of effort, and the affinity for or disutility of military service. (Asch and Warner, 2001) The larger and more permanent the benefits for successfully reaching career milestones, the greater the incentive to supply effort and remain in military service. They observe that a one-time bonus may induce retention this period for those on the margin of stay-leave decisions, but marginal individuals are more likely to leave in the next period.

Because the military base pay table limits incentives to work toward promoting early, it is important to

ask if retention bonuses provide additional support to address moral hazard or adverse selection. Navy retention bonuses are one-size-fits-all. That is, all officers within the same subgroup receive the same bonus at the same time, inevitably introducing adverse selection. Specifically, because the bonus is calculated to retain average quality officers, the most capable officers will leave disproportionately; among officers deciding to stay, the Navy inefficiently overpays less capable officers (lower quality) and underpays more capable officers (high quality) relative to their Navy value. The “moral hazard” problem also arises. The bonus is not specifically tied to promotion or performance (e.g., selection to Department Head), which motivates officers to work hard; higher quality officers may shirk because they are rewarded anyway; lower quality officers enjoy windfall benefits and may shirk as well (they are guaranteed bonus payments, like insurance against bad performance).

Since the insurance industry’s and Navy’s problems are similar, it is helpful to learn how the insurance industry addresses these issues. In particular, how does the insurer, as the principal, tackle adverse selection and moral hazard?

There are two main adverse selection remedies. The first is screening, in settings where permitted by law. Screening includes medical

exams and questioning applicants regarding their health and lifestyle, which effectively reduces information asymmetry and mitigates adverse selection. This assumes that both screening and differential insurance pricing (price discrimination) are legal. In some settings, this remedy may be unavailable because law prohibits either screening, price discrimination, or both.

An alternative approach is to offer a menu-of-contracts to all potential buyers, so there is no price discrimination. Yet the menu-of contracts must be intelligently designed so that individual buyers, who are better informed than the sellers, will self-select into contracts that best fit their needs and simultaneously provide the sellers' desired outcome. The seller does not put individual buyers into specific contracts, rather, the buyers self-select into the "right" contract to maximize their self-interests. In economics, this is called a separating equilibrium, in which types (higher versus lower quality, or higher versus lower risk) are detected and separated by the agents' signal as opposed to the principal's screen.

In the health insurance industry, for example, the menus include low-premium-low-coverage plans and high-premium-high-coverage plans. High-risk people, knowing they may face high medical costs, are willing to pay high premiums to get better

coverage; low-risk people, who expect low medical costs, would choose low premium plans, achieving the desired separating equilibrium.

To make a menu-of-contracts work, the principal must ensure that the menu encourages the agents to truthfully signal their type. In his seminal paper titled *Job Market Signalling*, Nobel laureate Spence used labor markets to illustrate signalling theory. (Spence, 1973) In particular, Spence's model includes two types of job applicants whose productivities, labelled high versus low, are unknown to the employer. Due to this information asymmetry, lower-productivity applicants are overpaid and high productivity applicants are underpaid relative to one another, if wages are set at the applicant pool's average expected productivity. High productivity employees would reject offers and find alternative jobs, creating adverse selection. In Spence's case, high productivity workers attempt to signal their type by acquiring more education. To make education an effective signal, it must be significantly costlier for lower-productivity applicants to acquire, so mimicking a high productivity applicant through this signal is impossible or prohibitively expensive (costless signals are termed "cheap talk"). In equilibrium, the employer would pay higher wages to high productivity workers and lower

wages to lower productivity workers, achieving a perfect separating equilibrium. Revisiting the insurance example, a low-premium-low-coverage plan can be designed to be too costly for high-risk people, motivating them to choose the right plan for both themselves and the insurer.

A quick glance at the Navy's retention bonus indicates that similar adverse selection problems exist. The Navy does not know naval officers' capabilities and motivation and the Navy offers the same bonus across all the officers, which overpays less capable and/or motivated officers and underpays more capable and/or motivated officers relative to their Navy value. Following the wisdom of the insurance industry, we propose a menu-of-contracts that offers naval officers a choice between high-performance-high-pay and lower-performance-lower-pay contracts. Achieving high performance is less costly for more capable and/or motivated officers (high quality) and costlier for less capable and/or motivated officers (lower quality). Therefore, high quality officers would choose high-performance-high-pay contracts to signal their quality. Delivering high performance is too difficult for less capable officers, hence they are better off choosing lower-performance-lower-pay contracts. Note that such a menu-of-contracts is not detrimental to moral

because everybody is presented with the same menu and there is no discrimination.

In addition to helping solve adverse selection, the proposed menu-of-contracts addresses moral hazard. In auto insurance, moral hazard recognizes that insured drivers exert less effort to avoid non-fatal accidents because the loss from an accident is well covered. For the same reason, the current military retention bonus system guarantees officers the same bonus regardless of performance, hence, *ceteris paribus*, the bonus doesn't effectively induce the officers' best effort. Linking the bonus payment to an officer's career advancement or performance better motivates more capable officers to provide their best effort because poor performance is not equally rewarded. Combining monetary bonus incentives with an officer's career concerns provides much stronger motivation than the current system.

Our proposed menu-of-contracts improves the Navy's retention incentives. It effectively addresses adverse selection and moral hazard in a non-discriminating way.

3. A MENU-OF-CONTRACTS PROPOSAL FOR THE NAVY AVIATION COMMUNITY

To develop a more effective retention bonus, it is important to understand the current Aviation Career Continuation Pay (ACCP)

bonus. This section summarizes aviators' careers, compensation, and how ACCP fits their expected career progression.

3.1. Aviator Career Progression

Navy pilots and naval flight officers (NFOs) face long training timelines and service obligation. NFOs are generally "winged" in 12–18 months and pilots in 18–24 months, at which time they become fully qualified aviators and begin their service obligation. Currently, pilots owe eight years from this point and NFOs owe six. After winging, both are assigned to a Fleet Replenishment Squadron (FRS) for final training on their specific aircraft. This takes an additional six to twelve months, depending on the platform. (Kelso, 2014)

Prior to their first sea tour, aviators receive "non-observed" fitness reports (FITREPs). Non-observed FITREPs do not count for or against promotion. Officers arrive at their first squadron with a blank evaluation slate. Performing well in this first operational tour is essential to remain competitive for key jobs in later tours.

In the first shore tour, a screening process selects officers for the limited billets that best support aviators' promotion. These orders are important to remaining competitive for promotion.

After the first shore tour, aviators serve in a disassociated sea

tour. Like the previous tour, officers are slated to jobs depending on their prior performance.

Not all aviators have time for a second shore tour before their Department Head (DH) tour, because of the various times between commissioning and arrival at their first squadron. This tour length is variable and often a holding point for officers until they screen for O4 and DH. Aviators then complete 30-month orders as a squadron DH, after requalifying at the FRS if necessary.

Aviation officers' career progression is illustrated in Figure 1. The top fork shows the aviators' career path when successfully promoting to O4 and screening for DH.

3.2. Current Aviation Career Continuation Pay Structure

Given the time and money required to train and maintain naval aviators' proficiency, it is essential that the Navy retain quality personnel in these high skill positions. The Navy has long offered bonuses to enhance retention. The current program is Aviation Career Continuation Pay (ACCP). The aviation community commonly refers to ACCP as "the bonus." (NPC, 2020d) ACCP is divided into two categories: Aviation DH Retention Bonus (ADHRB) and Aviation Command Retention Bonus (ACRB). These bonuses encourage

aviators to stay for their DH tour and commanding officer (CO) tour, respectively.

3.2.1. Aviation Department Head Retention Bonus

The ADHRB incentivizes aviators to complete a DH tour. To do so, officers must pass two screening processes. At nine or ten years of active service, depending on several factors officers don't control, aviators are "in zone" for promotion to O4. If an officer has a "Failure of Selection" (FOS) decision, they receive another look the following year ("above zone"). Aviators are separated from the Navy if they FOS a second time.

If aviators select to O4, they may choose to compete for DH orders. This selection board occurs in the fiscal year following O4 promotion. This board has three looks; the first two boards consider officers for operational DH billets and the third considers officers for operational

training DH billets. (CNO, 2015) Unlike FOS for O4, aviators may continue as Navy aviators after DH FOSs; officers promoted to O4 are generally able to remain on active service until twenty years of service, and the associated retirement benefits. However, they are not expected to promote to Commander (O5) if they FOS for DH. They may be promoted by changing communities.

For reference, the unrestricted line community (aviation, surface warfare, submarine warfare, and special warfare) is expected to meet the 80% DOPMA O4 promotion guidelines overall, though promotion rates may vary across these subcommunities and over time. In FY20, the Navy reported an 84% pilot O4 promotion rate, which included 42 second-look candidates (33% of this group). The Navy reported an 88% NFO O4 promotion rate, which included 15 (36%) second-look candidates.

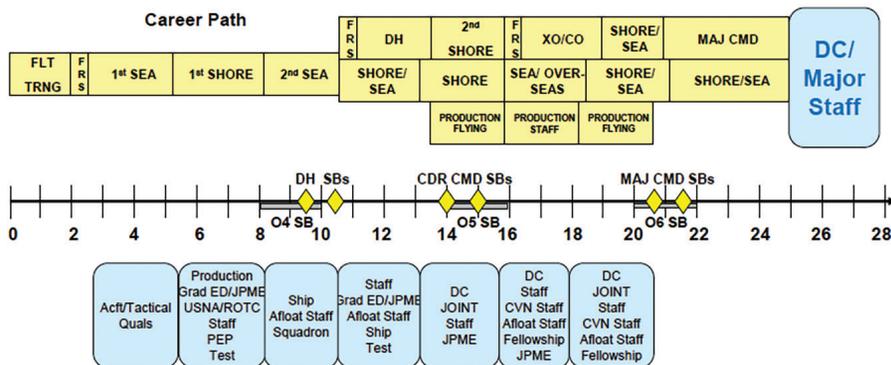


Fig. 1. Aviation Officer Career Progression. (NPC, 2020a)

For comparison, the FY19 aviator O4 promotion rate was 71% and the NFO promotion rate was 72%. (NPC, n.d.c) In addition, 63% of eligible O4s were selected for DH in FY20. (NPC, n.d.a)

Currently, an aviator may accept the ADHRB bonus a year before completing their Active Duty Service Obligation (ADSO). (ASN (M&RA), 2016) ADSO is calculated from the date the officer is winged. Pilots incur an eight-year obligation and NFOs a six-year obligation. NFOs' time from commissioning to winging is also generally shorter, so they are eligible for the bonus earlier in their careers than pilots. Upon taking the bonus, aviators are obligated to five additional years of aviation service beginning on their ADSO or contract acceptance, whichever is later. (Ibid.) Additionally, they must remain aviators, compete for DH orders, and, if selected, execute those orders. In return, aviators are offered equal lump-sum bonus payments each year, for five years, beginning at their ADSO. If aviators opt to take the bonus early, they receive six payments starting a year before their ADSO, but their total payments remain the same. (Ibid.)

Congress has authorized up to \$25k a year for this bonus. (37 U.S.C. § 301b) Previously, the Navy offered \$25k to both pilots and NFOs. Over time, however, the Navy has more specifically administered the bonus,

first distinguishing between pilots and NFOs and later distinguishing further by aircraft Type/Model/Series (T/M/S). T/M/S refers to the aviation subcommunity where all members generally fly the same type of aircraft. The Navy became more specific to avoid overpaying subcommunities not facing personnel shortages. The five-year bonuses offered between 2009 and 2020 are given in Table 3. (NPC, 2016)

In FY19, aviators were offered two bonus options, Early Commitment and Standard Commitment, depending on whether they decided before (early) for after (standard) screening for DH. Table 3 shows the Early Commitment five-year bonuses. The standard commitment five-year bonuses are \$25K less across all aviators. (Ibid.)

Aviators retain bonus payments already received if they fail to select for either O4 or DH, but don't receive further payments. If aviators voluntarily leave the Navy before completing their obligation, or if they don't accept DH orders when offered, they must repay funds already received. (ASN (M&RA), 2015a; ASN (M&RA), 2015b)

The Navy has allowed some flexibility in this contract. The aviation community regularly allows officers who FOSed once for O4 to transfer to a different community and retain the bonus payments already received. These officers are likely

to FOS on the second look, and the probability is even lower that they will then select for DH. Rather than forcing these officers to stay in aviation, the aviation community allows them to transfer to a different community, potentially select to O4, and continue their Navy service. This saves the Navy from separating officers who could add value in a different community.

a different community after a single FOS.

3.2.2. Aviation Command Retention Bonus (ACRB)

The ACRB is different than the ADHRB. The ACRB is only offered to aviators who promote to O5, apply for, selected to, and are actively serving as a squadron CO. (ASN

Table 3. Total Aviation Command Retention Bonuses 2009–2020

	T/M/S	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FV17	FY18*	FY19	FY20
Pilot	HM	\$125K	\$125K	\$50K	\$50K	\$75K	\$75K	\$75K	\$75K	\$75K	\$100K	\$175K	\$175K
	HC/ HS/ HCS	\$125K	\$125K	\$50K	\$75K	\$125K							
	HSL/ HSM	\$125K	\$125K	\$50K	\$25k	\$75K	\$75K	\$75K	\$75K	\$75K	\$75K	\$175K	\$125K
	VAQ	\$125K	\$125K	\$75K	\$125K	\$125K	\$125K	\$125K	\$125K	\$125K	\$150K	\$175K	\$175K
	VAW/ VCR	\$125K	\$125K	\$25k	\$50K	\$50K	\$125K						
	VFA	\$125K	\$150K	\$175K	\$175K								
	VP	\$125K	\$125K	\$50K	\$50K	\$50K	\$75K	\$75K	\$75K	\$75K	\$75K	\$75K	\$125K
	VQ(P)	\$125K	\$125K	\$50K	\$75K	\$125K							
	VQ(T)	\$125K	\$125K	\$50K	\$75K	\$125K							
NFO	VAQ	\$125K	\$75K	\$100K	\$175K	\$75K							
	VAW	\$125K	\$75K	\$25k	\$50K	\$50K	\$75K	\$75K	\$75K	\$75K	\$75K	\$50K	\$75K
	VFA	\$125K	\$75K	\$50K	\$50K	\$50K	\$50K	\$75K	\$75K	\$75K	\$75K	\$75K	\$75K
	VP	\$125K	\$75K	\$50K	\$75K	\$50K							
	VQ(P)	\$125K	\$75K	\$50K	\$50K	\$50K	\$50K	\$75K	\$75K	\$75K	\$75K	\$75K	\$50K
	VQ(T)	\$125K	\$75K	\$25k	\$50K	\$50K	\$100K	\$100K	\$75K	\$75K	\$75K	\$50K	\$75K

The drawback is that this policy allows lower performers to accept the bonus knowing that they are unlikely to select to O4, and then transfer to a different community, stay in the Navy, and retain bonus payments already received. Mitigating this drawback, it is difficult to transfer to

(M&RA), 2015a; ASN (M&RA), 2015b)

Forreference, DOPMA specifies a 70% O5 promotion rate. Again, the Navy aggregates all unrestricted line officers for DOPMA compliance. The Navy reported a 61% FY20 pilot promotion rate to O5, including

29% of second-look candidates. The Navy reported a 58% FY20 NFO promotion rate to O5, including 19% of second-look candidates. The FY19 promotion rates to O5 were 65% and 45% for aviators and NFOs, respectively. (NPC, n.d.b) The Navy also reported that 28.5% of eligible O5s were selected for command in FY20. (NPC, n.d.a)

The annual ACRB bonus is \$18,000, the first instalment of which is paid upon contract acceptance and the second instalment a year later. The contract obligates officers to their 21st and 22nd years of service. Should officers apply for the bonus after their 20th year of service then the two-year obligation begins when the Navy accepts their application. The offer expires the day the aviator relinquishes squadron command. (ASN (M&RA), 2015a; ASN (M&RA), 2015b)

Most officers complete their CO tour in their nineteenth year of service. Assuming they accept the bonus immediately, they are paid in advance for future years of service. The Navy felt it prudent that aviation DHs receiving ADHRB bonuses were not better paid than the CO, so CO bonus payments begin before the obligated service.

3.2.3. Problems Facing Aviator Retention

The rigid structure of junior officers' promotions in their first years of service and the Navy's preference

for egalitarian pay structures, based on rank and years of service, as codified in the military pay table (DFAS, n.d.a), make it difficult to retain the best performers as opposed to lower performers. It is critical, however, to retain high performers to ensure continued excellence in Navy aviation. Identifying and retaining top performers is critical to any organization, particularly those with hierarchical labor markets. Motivating middle and lower performers to become top performers is even more important with mandated 80% and 70% promotion rates for O4s and O5s, respectively. Our proposal supports these goals.

The Navy faces two problems. First, it needs to retain the required number of high-quality officers. However, focusing solely on quantity could lead to a vicious cycle of poor leadership and retention as previously seen in the Surface Warfare Officer community (Stocker and Crawford, 2008); focusing solely on quality could leave billets unfilled. Second, the Navy needs to accomplish this efficiently; paying the right people a sufficient bonus to remain in aviation and compete for both DH and CO billets.

The Navy has the added constraint that morale and pay parity play a large role in compensation decisions. The Navy prefers similar compensation for service members with similar qualifications. The

military pay scales are uniform across all services and publicly available. (DFAS, 2020) This, in part, is why the Navy and other services shy away from pay-for-performance pay plans. The military assumes that better performance leads to faster promotion and the associated increased pay. However, promotions for junior Navy officers (Ensign, Lieutenant Junior Grade, and Lieutenant) depend primarily on time in rank, not performance.

The first-time junior officers' promotion depends on performance is selection to O4, nine to ten years after commissioning. While this promotion is based on officers' performance, the time they become eligible for promotion is largely independent of performance, despite some recent Navy efforts to increase timing flexibility. (CNO, 2015) Early promotions are rare in the aviation community and pay advantages from early promotions only last one year. Officers promoting in zone have the same rank and years of service as early promoted officers, and hence the same pay.

The Navy has tried to make the ADHRB more efficient over time, recognizing that offering all aviators the same bonus is a blunt instrument. To increase the bonus' efficiency, they first distinguished pilots from NFOs, and then further distinguished aviators by T/M/S. (NPC, 2016) The essential next step is incorporating

officer quality. The bonus does not currently distinguish between high and lower-quality officers. All aviators are offered the same bonus within the same designator (pilot or NFO) and T/M/S.

Targeting larger bonuses to high quality aviators requires distinguishing high from lower-quality aviators using the Navy's limited personal performance data. The first two to three years of an aviator's career are spent in flight school, with no observed FITREPs. After that, NFOs have a squadron tour and a shore tour to prove their Navy value. The Navy may have to decide what bonus an NFO deserves after just two tours of duty, and NFOs may need to decide whether to take a bonus in that same time frame. Pilots have one additional tour.

There is what is considered a "golden path" of jobs leading to DH and CO selection. There are limited numbers of these jobs, so it becomes critical to receive these assignments. Aviators are selected to this path based largely on the merit of their final first tour FITREP. While aviators receive FITREPs in each tour, it is widely recognized across all communities that the final (check-out) FITREP from their most recent tour is the most important. This FITREP gives the officers' final ranking against their peers in the unit. In practice, the aviation community decides whether an officer will succeed based on limited data.

Increasing the ACCP bonus' efficiency and retaining higher quality officers also increases the quantity retained. A 2014 officer retention survey asked aviators why officers stay or leave the Navy. The author identified three actionable areas where the Navy could affect retention: pay, navy culture, and operational tempo. (Snodgrass, 2014) Effectively restructuring the ACCP bonus affects pay and indirectly navy culture, a major part of which is leadership. Increasing pay for the highest performers presumably keeps the best leaders. Better leadership helps future retention, as many officers cite poor leadership and communication as a reason for their departure. (Doyle and Patrissi, 2014) Not overpaying lower performers saves money that can be applied to retaining the required quantity of high performers.

3.2.4. Solution: Menu-of-Contracts

How do we retain the best quality officers in the numbers required while also maintaining a perception of fairness and parity? The answer lies in a menu-of-contracts. Allowing officers to choose their bonus structure maintains perceived fairness in the bonus payments. Aviators, knowing

their type, maximize their interests by self-selecting into higher and lower quality tiers. This improves the Navy's bonus efficiency.

4. PROPOSED MENU-OF- CONTRACT BONUS PLAN

We propose that the Navy offer aviators two DH tour bonuses, and another two CO tour bonuses. The tier 2 bonus has lower total payments, proposed to be 75% of the current bonus. (Bonus amounts are illustrative and may change depending on circumstances at the time offered.) The bonus is offered six years after an aviator's winging date for both pilots and NFOs, and payments begin immediately upon contract acceptance. In return, the aviator is obligated to compete for and accept, if selected, DH orders. Payments continue annually until the end of the DH tour, at which time the payments stop and the aviator is free from contractual service obligations. The tier 2 bonus may be taken at any time after the six-year mark and before the end of the DH tour, but payments stop at the end of the DH tour no matter when the bonus was taken. Payments stop immediately if an aviator fails to screen for O4 or DH. If pilots don't accept this bonus, they must complete their required eight years of obligated service

after winging. NFOs can transfer or separate after completing their obligated service.

The tier 1 bonus initially pays one half of the tier 2 bonus. Upon selection to DH, the tier 1 bonus pays out at 2.67 times the tier 1 bonus. Total tier 1 bonus payments taken at the six-year mark for aviators selected for DH will total approximately 120% of the current bonus, or over 150% of the tier 2 bonus. All aviators selecting the tier 1 bonus at six years receive the same total payments no matter when they select to DH. If they delay accepting the bonus, they forfeit payments for each year delayed. The major stipulation to these bonus options is that aviators choose their preferred bonus after completing their first squadron tour, though they can choose to accept or reject that offer at the six-year mark after their winging. Table 4 summarizes the tier 1 and 2 bonuses.

High quality officers confident about promoting and selecting to DH should choose the Tier1 bonus and accept their DH assignment to maximize their bonus payments. Successful candidates would earn 7.125B, where B is the current annual bonus, as opposed to 4.5B under the Tier 2 bonus. Lower quality officers pessimistic about DH selection should choose the Tier 2

bonus, paying 2.25B if they FOS, as opposed to 1.125B under the Tier 1 bonus.

All DH contracts terminate at the end of an aviator's DH tour and flow into a similar CO contract system. Two contracts will be offered at the end of an aviator's DH tour. Tier 2 guarantees immediate payments at 75% of the current CO bonus and obligates aviators to compete for and accept squadron CO orders, if selected. Payments stop should an aviator fail to select for O5 or command.

Like the tier 1 DH bonus, the tier 1 CO bonus initially pays half the tier 2 bonus. Payments begin upon contract acceptance. The tier 1 bonus increases upon CO selection, doubling the total tier 2 bonus. Bonus payments stop when the CO tour ends, ending aviators contractual obligations. Payments pause upon an FOS for both the ADHRB and ACRB. Payments stop if the aviator

has a second FOS. If officers select to the position in question on their second look, payments resume including reimbursement for missed payments. Officers selecting on their second look are paid the same total bonus as those selecting on their first look. The following describes the rationale for each bonus plan element.

Table 4. Bonus Payments by Bonus Choice, Bonus Acceptance, and Career Outcomes

Bonus Choice Decision at the end of first sea Tour (end of the 6th yr.)	Bonus Acceptance? At the sixth year after winging (end of 8 th yr.)	Promoted to DH? (end of the 11 th yr.)	Bonus before being promoted to DH*	Bonus earned as a DH (yrs. 12-14)	Total Bonus Payout
Tier 1	Yes	Yes	.375B*3=1.125B	2B*3=6B	7.125B
		No	.375B*3=1.125B		1.125B
	No (intend to leave)	Yes (unlikely)	0	0	0
		No	0	0	0
Tier 2	Yes	Yes	.75B*3=2.25B	.75B*3=2.25B	4.5B
		No	.75B*3=2.25B	0	2.25B
	No (intend to leave)	Yes (unlikely)	0	0	0
		No	0	0	0

* B is the current annual bonus.

4.1. Early Selection of Bonus Option

Selecting the preferred bonus option early is essential for an effective menu-of-contracts system. By committing early, before officers learn all of their FITREP results, billet assignments, and other factors contributing to DH selection, they indicate whether or not they expect to expend the effort required to perform well. If the Navy allowed officers to choose later in their career, then officers could observe their past performance, determine the chances of making DH, and choose the bonus accordingly. Early choice incentivizes tier 1 bonus takers to maximize their efforts to select to DH so they receive

the highest payoff. It also alleviates the Navy from determining which aviators to offer higher and lower bonuses. The aviators self-select into the appropriate category based on their expected ability and motivation to promote and select for DH.

It does not pay lower expected performers to choose tier 1 bonuses because they receive lower bonus payments before their FOS for O4 or DH. Lower performers should choose the tier 2 bonus because it guarantees higher payments assuming they screen out. If they are middle performers and not sure they will select for DH, they will choose between tier 1 and 2 bonuses based on their risk tolerance. The Navy has

received fair value if officers chose the tier 1 bonus and are screened for DH, while the Navy has paid less for a DH if selected officers chose the tier 2 bonus. Whether selecting the tier 1 or 2 bonus, the Navy pays less money under this proposal than under the current bonus scheme for officers who FOS and are forced out.

4.2. Six-year Mark

Currently, aviators can take the ADHRB bonus based on their ADSO date. ADSO is significantly different for NFOs, who incur a six-year service obligation after winging, compared to pilots, who incur an eight-year obligation. The Navy has learned that it needs to offer aviation bonuses by the time aviators complete their ADSO because most aviators decide whether or not to commit to a Navy career at their ADSO. The Navy changed the ACCP structure to ensure that it was available even for officers on shore tours.

The menu-of-contracts is available at the six-year mark after winging for both pilots and NFOs. For an effective menu-of-contracts system, there must be time between contract signing and the milestones triggering higher bonus payments. Lower quality individuals have less incentive to select into tier 2 bonuses if contract signing and realizing the required milestones are close in time. With few or no bonus payments prior to the critical milestones, the higher

initial tier 2 payments are relatively insignificant. Officers will select the higher tier 1 bonus if they have even a small chance of making DH.

We also cannot offer the bonus too early because officers may be reluctant to accept the continued service obligation years before their ADSO. Circumstances can change leading aviators to reconsider their continued service during the intervening years.

4.3. Stopping Payment After DH Tour

Stopping payments and service obligations after the DH tour disincentivizes aviators from delaying choosing their bonus until their O4 and DH outcomes are certain. Delaying the bonus can only hurt aviators because they miss potential payments.

This bonus element also incentivizes pilots to obligate to continued service with additional years on their ADSO. Should pilots choose to separate at the earliest off ramp, they can reject the bonus and serve their final two years of obligated service. If they are unsure of whether or not to stay, they can delay their bonus decision until completing their service obligation, but they miss those bonus payments. Aviators must accept the bonus at the earliest possible point to receive the full bonus available.

Stopping bonus payments after the DH tour also incentivizes aviators to accept the command bonus to continue serving at close to their current income. The danger is that aviators will resign their commission on completing their DH tour. However, aviators have served over 14 years at this point. The draw of retirement benefits at 20 years and the potential immediate CO bonus will help retain these aviators. Furthermore, the new retirement plan offers officers continuation bonuses between their eighth and twelfth year of service. Naval officers are currently eligible to receive an annual payment of 2.5 times their basic monthly salary for four years at 12 years of service, which obligates them to an additional four years of service. (DFAS, n.d.b) Combining this with the command bonus offers a large incentive to remain in Navy aviation. Aviators are very close to the 20-year mark when the blended retirement and command bonus obligations expire, so they should stay at least until then.

4.4. Continuous Offer vs. One-time Offer

The Navy accomplishes two things by offering the DH bonus at any time, and not just the six-year mark. First, as explained above, pilots may be reluctant commit to extra service obligations at the six-year mark because they are considering separating after completing their

ADSO. Providing pilots the option to accept the bonus at any time offers an incentive as they decide. Secondly, offering this flexibility does not increase the Navy's cost, because the payments stop at the end of the DH tour. Deferring the decision penalizes candidates by missing payments and saves the Navy money.

4.5. Payment Pause for One-Time FOS

This bonus plan aims to limit payments to officers who FOS to 04, DH, 05, or CO. A single FOS indicates that an aviator is a lower quality candidate. Should they later select to 04, DH, 05, or CO, they are paid the same bonus as if selected on the first look. However, pausing payments at the first FOS saves the Navy money should aviators FOS twice, as is normal.

5. EXPECTED EFFECTS

5.1. Increased Retention of Highest Quality Aviators

This bonus system offers the largest bonuses to the highest performers, while avoiding the perception that the Navy is acting inequitably. Aviators choose the bonus plan that maximizes their individual expected earnings. Aviators who believe they are motivated, high performers will choose the tier 1 bonus, expecting to achieve the required milestones

and receive a higher total payment. Aviators who fear they are lower performers, or less motivated, will opt for the tier 2 bonus, which allows them to receive guaranteed payments whether or not they select to O4 and DH, at least until they FOS for O4 or DH. Navy aviation needs to keep its best officers or face a spiral of poor leadership feeding into poor retention, as reported within the Surface Warfare Officer community. (Stoker and Crawford, 2008) This bonus system is an effective way to identify expected high performers and offer them higher bonuses.

According to Kuhn and Yockey, individualized performance evaluations best support bonus systems offering high-risk-high-reward options and lower-risk-lower-reward options. (Kuhn and Yockey, 2003) This characterizes the Navy, where FITREPs, billet selection, and all other measures of officer quality are based on individual performance. Aviators' fate is in their hands, including promotion and selection to DH. This is what people want when deciding whether to take a riskier performance-based compensation package or a safer lower compensation.

5.2. Increased Bonus Efficiency

This bonus program will use the Navy's bonus budget more efficiently. Offering individual aviators bonus options saves the Navy money and retains more quality

officers. Figure 2 shows potential outcomes for aviators facing these decisions. Figure 2 assumes that officers forgoing a bonus do so because they intend to leave the aviation community, either by leaving the military or transferring to a different community (outcome 3 in Figure 2).

As Figure 2 shows, if high performers choose the tier 1 bonus, accept it, and select for DH as expected, the Navy has successfully targeted the bulk of the bonus budget to high performers (outcome 1). The Navy pays more per officer retained, but retains high quality aviators. The main risk with this bonus system is if aviators choose the tier 2 bonus because they are not certain they will perform well. If they later expect to select for DH, they may not accept the lower bonus payments (outcome 6).

Lower performers are not expected to choose the tier 1 bonus, but if they do and accept it, they will only select for DH if their performance improves. If they do perform well, they shift to outcome 1 described above. If not selected, they will only receive the lower payment before they FOS by either the O4 or DH selection boards, saving the Navy's bonus budget (outcome 2).

Aviators unsure of their selection to DH, should prefer the higher initial payments offered by the tier 2 bonus. Some of those might ultimately perform well and select for DH allowing the Navy to

retain high performers at 75% of the current system (outcome 4). If not selected, they will only receive bonus payments until they FOS for DH, again costing the Navy 75% of the current system (outcome 5).

Aviators who choose either tier 1 or 2 bonuses but FOS on their first O4 look (outcomes 2 and 5), may see limited chances of making DH and instead leave the Navy or transfer communities. In this case, the aviation community has separated a lower performer after paying only a portion of the total bonus. This also allows that officer to transfer to a different community without risking a second FOS for O4, potentially saving the Navy from separating an officer well suited to a different community.

5.3. Lower Payments to Lower Performers

NFO's in particular, and pilots to a lesser degree, currently receive large payments before they FOS by O4 or DH boards. The menu-of-contracts disincentivizes that behaviour. Officers taking either the tier 1 or tier 2 bonus and not selecting to DH receive lower annual payments than under the current system. On the other hand, aviators not accepting the bonus clear the aviation community of lower performing or less committed officers sooner than if screened out by O4 or DH boards.

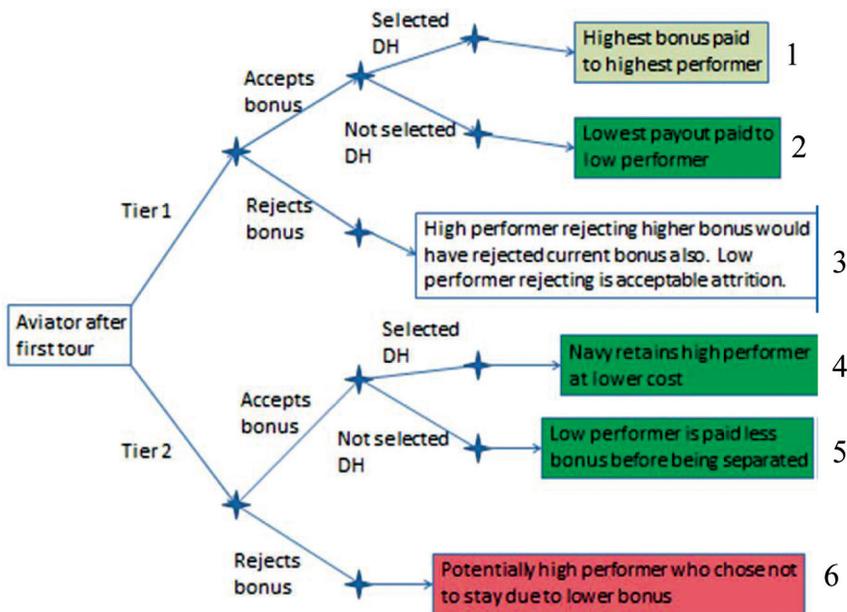


Fig. 2. Possible Bonus Outcomes

5.4. Increased Motivation and Effort

The incentives for high performers will be significant under this new system, motivating officers selecting the tier 1 bonus to remain in service and maintain a high performance throughout their careers. The payoffs for DH selection are significant; the penalty for FOS is equally substantial.

The Navy can't observe, and thus reward, expended effort. Officers make a personal decision concerning the effort devoted to top performance. The Navy can only observe results of officers' efforts through the officers' performance, and that may not become observable until well after the expended effort. For instance, officers know if they maximized their effort to receive a good FITREP when they leave a command, but the Navy will not observe that FITREP until much later. The menu-of-contracts is intended to motivate middle and lower performers to increase their effort to become high performers. The rewards for such effort are significant, for the Navy and the aviator. Any tier 1 bonus taker is beneficial from the Navy's standpoint. Those selecting to DH are either naturally high performers making their best effort to ensure selection, or middle or lower performers investing significant effort to increase performance. Even aviators who don't select for DH

presumably exert stronger effort attempting to be selected, benefiting the Navy. From the aviators' standpoint, they hope their added effort is rewarded by higher bonus payments.

5.5. Maintenance of Equity

The element of choice is essential to maintain equity among aviation officers. Officers choose the bonus plan that best fits their skills, expectations, and intentions. This alleviates concerns about the Navy treating anybody unfairly or favouring some aviators over others. Simultaneously, it relieves the Navy of deciding who should get higher or lower bonuses. Many officers will also appreciate holding their fates and compensation in their own hands.

6. SETTING RETENTION INCENTIVES: STATUS QUO, AUCTIONS, AND MENU-OF-CONTRACTS

Considering the critical role retention incentives play in military force management, it is important to develop criteria to compare alternative approaches to implementing retention incentives perform. Arguably, the most important performance measure is precision: the ability for these retention incentives to accurately meet their quantity and quality objectives. The 2008 Quadrennial Review of Military Compensation

published four additional evaluation criteria for military compensation programs. (DoD, 2008) Adapting these four principles to retention incentives yields the following performance measures:

- *Voluntary*: retention incentives should ensure aviators willingly accept the required service commitment and perceive that compensation is satisfactory and fair.
- *Flexible and Responsive*: retention incentives should be flexible enough to effectively respond to emerging issues, shifting priorities, and changing market conditions.
- *Best Value*: retention incentives should provide cost-effective solutions that minimize costs to address service needs.
- *Support Achievement*: retention incentives should reward exceptional performance.

The final performance measure introduced for this assessment is practicality, including Navy implementation and aviator participation ease. (Coughlan and Gates, 2010) We will use these criteria to compare three alternative approaches to setting retention incentives: the status quo, the menu-of-contracts, and auctions.

The status quo relies on statistical analysis to set one-size-fits-all retention incentives at various career milestones. The most common

statistical modelling approaches include:

- basic econometric regression models
- Annualized Cost of Leaving model
- Dynamic Retention Model

For several reasons, including data biases and sensitivity to assumptions that are difficult to validate, these modelling approaches have reliability challenges for setting retention bonuses at any particular point in time. Arkes points to four primary sources of biases affecting these models:

reverse causality from supply shifts (a negative bias), the endogeneity of the decision point causing coded SRBs [selective retirement bonuses] to be higher for re-enlisters than leavers (a positive bias), measurement error (a likely negative bias), and excess supply preventing the full effect of an SRB change to materialize (a positive or negative bias). (Arkes, 2016, p. 475; see also Arkes, et al., 2019)

As a result, decision makers have used rules-of-thumb and past experience to modify the modelling results. For example, Bock compared imputed and actual retention bonuses for U.S. Marine Corps. Zone A reenlistments (marines between 17 months and six years of service). (Bock, 2005) As pictured in Figure 3,

he found little correlation between the predicted required Selective Reenlistment Bonus multiple (multiplier on basic monthly pay) and the actual multiple offered.

Traditional retention bonuses invoke willing retention (voluntary), but may be set too high or low to retain the targeted number of aviators and don't discriminate over aviator quality. Thus, they may not retain the desired aviator quantity or quality (precision) and don't motivate aviators to work to increase quality (support achievement). Further, traditional retention incentives are purely monetary-based and do not incorporate non-monetary incentives or other cost-saving measures (best value) and only change periodically (flexible). However, traditional retention incentives are relatively

easily implemented and understood by aviators (practical). Thus, the traditional retention incentives score high as voluntary and practical, but low as precise, flexible, best value, and support achievement.

The menu-of-contracts has two distinct advantages over the traditional approach. It distinguishes between higher and lower quality aviators (precision), paying bonuses that reflect aviator quality, and motivates aviators to enhance their quality (achievement). As such, this approach is more precise, flexible regarding force quality, and supports achievement. It also allows aviators to reveal their perceived capability and motivation to achieve high performance. It is difficult for the services to identify high quality performance with

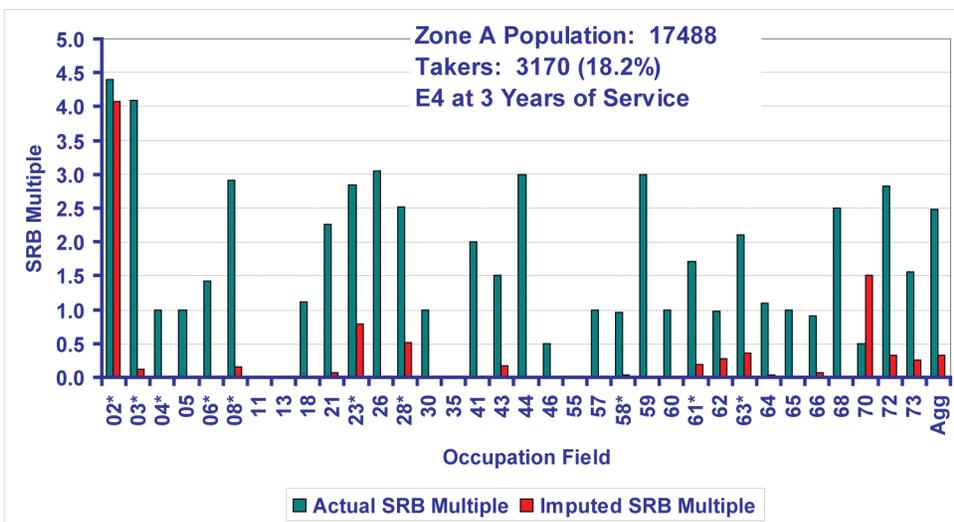


Fig. 3. Actual Versus Imputed SRB Multiples. (Bock, 2005)

the current performance reviews. Self-identification avoids this difficulty. At the same time, the menu-of-contracts option faces the same precision concerns about setting bonuses as the traditional approach and is slightly more complicated to implement and for aviators to understand.

Auctions are an alternative for setting retention incentives. (Coughlan and Gates, 2010; Coughlan, et al., 2011; Coughlan, et al., 2013; Kelso, 2014; Williams, 2015) A basic auction, where aviators bid the bonus they require to remain in aviation and the Navy retains the lowest bidders, provides precision in setting the minimum retention incentives required to achieve the precise retention outcome desired. (Coughlan and Gates, 2010) The enhanced precision auctions provide makes auctions flexible and responsive to military needs at a potentially reduced cost. However, they do not discriminate between high and lower quality service members and are purely monetary incentives so they suffer the same best value concerns as the current bonus system.

Future research could consider incorporating simple auctions into the menu-of-contracts approach to improve precision and best value. Such a hybrid approach would rank high in all performance dimensions, except practicality. It would be

more complicated to implement and for aviators to understand than the current bonus system.

Finally, both monetary and non-monetary incentives affect aviators' retention decisions. Management literature has documented numerous non-monetary factors that critically influence employees' turnover decisions, including job satisfaction, organizational commitment, job alternatives, and job embeddedness. (Lee, et al., 2014) In fact, monetary incentives are rarely directly mentioned. This casts doubt on the wisdom of using monetary incentives as a major determinant of retention. More complex auctions can introduce personalized non-monetary incentives, such as location choice, geographic stability, etc. (Coughlan and Gates, 2010).

7. CONCLUSIONS

The menu-of-contracts system is a viable alternative to the current retention incentives. The menu-of-contracts can meet the Navy's retention needs while increasing efficiency. The menu-of-contracts encourages and rewards good performance, without using past performance to measure future expected performance. This will retain higher quality aviators, which increases morale and retention. It also induces aviators' maximum effort throughout their careers as they strive for the highest possible bonus.

The menu-of-contracts does all of this while maintaining the perception of egalitarianism, remaining within the current aviator career timeline, and utilizing the promotion structure already in place.

However, this initial menu-of-contracts approach requires estimating the bonus that retains the right quantity and quality of aviators. Further, the menu-of contracts doesn't incorporate non-monetary incentives beyond career progression incentives. Auction designs address both of these concerns, providing the opportunity to incorporate choice of location, geographic stability, etc. Future research should develop a more complex menu-of-contracts design, introducing the precision of auctions in determining bonus levels and incorporating non-monetary incentives.

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