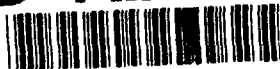


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IDA PAPER P-2566

**MILITARY PERSONNEL POLICY
REGARDING ADVANCEMENT REQUIREMENTS**

Matthew S. Goldberg
Stanley A. Horowitz, *Project Leader*

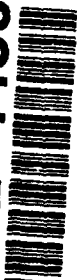
January 1992

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Prepared for
Office of the Assistant Secretary of Defense
(Force Management and Personnel)

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REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22204-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE January 1992	3. REPORT TYPE AND DATES COVERED Final Report, Jun 1990 – Jan 1992	
4. TITLE AND SUBTITLE Military Personnel Policy Regarding Advancement Requirements			5. FUNDING NUMBERS C-MDA-903-89C-0003 T-L7-798	
6. AUTHOR(S) Matthew S. Goldberg and Stanley A. Horowitz				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Institute for Defense Analyses 1801 N. Beauregard Street Alexandria, VA 22311-1772			8. PERFORMING ORGANIZATION REPORT NUMBER IDA-P-2566	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) OASD(FM&P) Room 3E763, The Pentagon Washington, D.C. 20301			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12A. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited.			12B. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This paper is one in a series of studies concerned with identifying approaches to maintaining a strong military manpower capability during a period of declining budgets and force levels. Its focus is on up-or-out policy, which requires that military personnel either be promoted after a certain period of time in the service or leave the service. We found that surprisingly few individuals actually leave the military due to up-or-out policy. Instead, individuals are forced to switch from operational positions, which many prefer, to managerial positions. This policy may improve personnel flows, thereby enhancing promotion opportunities for the stronger performers. It has also been argued that older individuals lack the physical fitness required to continue in operational positions. Evidence for pilots does not support this hypothesis.				
14. SUBJECT TERMS Military Personnel, Manpower, Experience, Promotion (Advancement)			15. NUMBER OF PAGES 25	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR	

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102**UNCLASSIFIED**

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REGARDING ADVANCEMENT REQUIREMENTS**

Matthew S. Goldberg
Stanley A. Horowitz, *Project Leader*

January 1992

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INSTITUTE FOR DEFENSE ANALYSES

Contract MDA 903 89 C 0003
Task T-L7-798

PREFACE

This paper was prepared by the Institute for Defense Analyses (IDA) for the Office of the Assistant Secretary of Defense (Force Management and Personnel) (OASD(FM&P)), under contract MDA 903 89 C 0003, Task Order T-L7-798, issued 15 March 1990. The objective of the task was to identify promising approaches to maintaining strong military manpower capability during a period of declining budgets and force levels. This is one of a total of seven papers to be published. Each of the seven papers covers a specific area of military manpower management: the proper experience mix, personnel movement, the timing of training, lateral entry, the link between career progression and assumption of management responsibilities, individual training methods, and increased use of simulators for training. The topic of this paper is the link between career progression and assumption of management responsibilities.

This work was reviewed by Waynard C. Devers and William T. Mayfield of IDA.

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CONTENTS

Preface	iii
I. Introduction	1
II. Current Policies	3
III. Theoretical Models.....	7
A. A Model of Tenure.....	7
B. An Alternative Model	10
C. A Preferred Model	11
IV. Up-or-Out and Physical Fitness	15
V. Alternatives to the Up-or-Out Policy	19
VI. Conclusions	21
References	23

FIGURES

1. Percentage of Army Pilots Working in Pilot Billets in September 1990.....	15
2. Percentage of Marine Corps Pilots Working in Pilot Billets in September 1990.....	16
3. Percentage of Air Force Pilots Working in Pilot Billets in September 1990.....	17

TABLES

1. High Year of Tenure (HYT) Points for Enlisted Personnel	3
2. Up-or-Out Separations by Enlisted Personnel, FY1990	4
3. Up-or-Out Separations by Army Captains, FY 1989.....	5
4. Up-or-Out Separations by Navy Lieutenants, FY 1989	6
5. Up-or-Out Separations by Marine Corps Captains, FY 1989	6

6. Up-or-Out Separations by Air Force Captains, FY 1989.....	6
7. Kahn-Huberman-Waldman Up-or-Out Example.....	7
8. Evolution of Officer Force	11
9. Earnings and "Intrinsic" Loss to Navy Pilots (1980 Dollars)	13

I. INTRODUCTION

The policy in the U.S. military that places limits on the number of years that an individual may remain in the military absent a promotion is called up-or-out policy. The ostensible rationale for this policy is to weed out individuals who are not qualified to assume managerial positions as their careers progress.

Because of inconsistencies in data reporting, it is difficult to compute the exact number of individuals who separate from the military due to up-or-out policy. Our best estimates, however, indicate this number is surprisingly small—fewer than 1,000 officers and 1,000 enlisted members per year.

The dominant effect of up-or-out policy is to force individuals to switch from operational positions, which many prefer, to managerial positions. For example, pilots like to fly, and may not be interested in commanding a squadron. Similarly, enlisted aircraft technicians may be content to remain on the flight line, and may have little interest in supervisory positions. It is not obvious that the military services benefit by forcing these skilled individuals to choose between promotion and separation.

On the other hand, there are several reasons why up-or-out policy may actually improve personnel management. We will argue that up-or-out policy may remove a "glut" of poor performers in the intermediate ranks, thereby enhancing promotion opportunities for their stronger counterparts. These enhanced promotion opportunities may, in turn, improve the morale, retention, and performance of the stronger individuals.

Another argument often advanced is that older individuals lack the physical fitness required to continue performing in operational positions. An up-or-out policy is therefore necessary to force older individuals either to switch from operational to managerial positions or to separate from the military. We present empirical evidence that physical fitness is not a serious impediment to performance for helicopter pilots or, more surprisingly, even for fighter and attack pilots.

The remainder of this paper proceeds as follows. In Section II, we review the military's current up-or-out policies. These policies are different for officers than for enlisted personnel, and also vary in some details across the services. We also report approximate tabulations of the number of up-or-out separations that occurred in a recent

year. Section III offers several possible rationales for the up-or-out system. In particular, an up-or-out policy may enable the services to better identify candidates for subsequent promotions and command responsibilities.

Section IV reviews the hypothesis that an up-or-out policy is necessary because older individuals suffer a decline in physical fitness. Our data appear to refute this hypothesis, at least for certain pilot communities. In Section V, we recommend experimentation with a new career track for pilots. This new track would not require forced separation due to failure to promote. Finally, the paper concludes with some suggestions for further research.

II. CURRENT POLICIES

Current service policies do not allow an individual to remain in the military unless promotions occur at prescribed rates. For officers, a continuation board is convened if an officer fails to be selected for promotion on two consecutive occasions. The continuation board may or may not decide to allow the officer to remain in the military. With the board's approval, an officer may continue through year-of-service (YOS) 20 as an O-3, YOS 24 as an O-4, and YOS 28 as an O-5.

The policy for enlisted personnel is described in Table 1. For each enlisted paygrade, there is a high year of tenure (HYT) beyond which an individual cannot continue absent a promotion. There is considerable variation among the services in their HYT policies. The Air Force allows an individual to continue through YOS 20 as an E-4. The Navy allows continuation through only YOS 10 as an E-4, but allows continuation through YOS 20 as an E-5. The Army and the Marine Corps are even more stringent. They require promotion to E-5 for continuation beyond YOS 8, and promotion to E-6 for continuation beyond YOS 13.

**Table 1. High Year of Tenure (HYT) Points
for Enlisted Personnel**

Service	HYT by Paygrade				
	E-4	E-5	E-6	E-7	E-8
Army	8	13	20	24	27
Navy	10	20	23	26	28
Marine Corps	8	13	20	22	27
Air Force	20	20	23	26	28

Source: Service Enlisted Objective Force submissions,
May 1990.

It is difficult to assess the exact number of individuals who leave the military because of up-or-out policies. The service personnel systems assign separation codes to each individual who leaves the military. Unfortunately, "up-or-out" is not an explicit separation code for any service. Rather, individuals who leave for this reason are assigned some other separation code, depending on their service policies and possibly the inclination of their commanding officers.

The number of up-or-out separations among enlisted personnel may be approximated in the following manner.¹ The Army, for example, allows an individual to continue through YOS 8 as an E-4. Presumably, most Army soldiers who separate at paygrade E-4 in YOS 9 do so because of HYT policy. However, some of these individuals may have separated even in the absence of HYT policy. Therefore, the numbers to follow should be interpreted as upper bounds. As indicated in Table 2, there were 467 separations at paygrade E-4 and YOS 9 in FY 1990. Similarly, there were 128 separations among Navy personnel at paygrade E-4 in YOS 11, and 63 separations among Marine Corps personnel at paygrade E-4 in YOS 9.

**Table 2. Up-or-Out Separations
by Enlisted Personnel, FY 1990**

Service	YOS	Paygrade	Number of Separations
Army	9	E-4	467
	14	E-5	202
Navy	11	E-4	128
Marine Corps	9	E-4	63
	14	E-5	11
Total			871

Source: Defense Manpower Data Center.

There were also HYT separations at paygrade E-5 among Army and Marine Corps personnel. We estimate that there were 202 separations from the Army at paygrade E-5 in YOS 14, and 11 separations from the Marine Corps at paygrade E-5 in YOS 14. In total, there were at most 871 up-or-out separations of enlisted personnel in FY 1990.

The calculations for officers are somewhat more complex, and are reported in Tables 3 through 6. Table 3 first presents the tail of the YOS distribution of all Army officers promoted from rank O-3 (captain) to rank O-4 (major) during FY 1989. Nearly 94 percent of these promotions were earned by officers with at most YOS 12, and over 60 percent were earned by officers at exactly YOS 12. To develop an upper bound, we assume that all separations by captains in YOS 13 through 19 were involuntary. This assumption seems plausible, because the draw of military retirement pay after a 20-year career makes it unlikely that many individuals with this much seniority would separate

¹ The data in this section were provided by the Defense Manpower Data Center.

voluntarily. There may be a few such individuals, however, who had prior enlisted service and are partially exempt from up-or-out rules.

Table 3. Up-or-Out Separations by Army Captains, FY 1989

YOS	Promotions to O-4	Cumulative Number	Cumulative Percentage	Base Number	Continuation Rate	Up-or-Out Separations
11	248	989	0.3129			
12	1,977	2,966	0.9383			
13	164	3,130	0.9902	842	0.9038	81
14	15	3,145	0.9949	676	0.9246	51
15	5	3,150	0.9965	456	0.8904	50
16	2	3,152	0.9972	369	0.9322	25
17	3	3,155	0.9981	302	0.9437	17
18	4	3,159	0.9994	209	0.9713	6
19	2	3,161	1.0000	147	0.9728	4
Total:						234

Source: Defense Manpower Data Center.

The fifth column of Table 3 gives the base number of Army captains, by YOS, at the beginning of FY 1989. The sixth column gives the percentage of these captains who remained in the Army for the entire year (i.e., the annual continuation rate). The product of the base number and the complement of the continuation rate gives the number of separations. In all, 234 Army captains separated in YOS 13 through 19. This figure is an upper bound to the number of involuntary, up-or-out separations among Army captains in FY 1989.

Tables 4 through 6 report similar calculations for Navy lieutenants, Marine Corps captains, and Air Force captains. In the Navy, nearly 98 percent of all promotions from rank O-3 (lieutenant) to rank O-4 (lieutenant commander) were earned by officers with at most YOS 11, and over 30 percent were earned by officers at exactly YOS 11. Assuming that all separations in YOS 12 through 19 were involuntary, there were 146 up-or-out separations. Finally, there were at most 26 up-or-out separations of Marine Corps captains in YOS 14 through 19, and at most 362 up-or-out separations of Air Force captains in YOS 12 through 19. In total, we estimate at most 768 up-or-out separations of officers in FY 1989.

Table 4. Up-or-Out Separations by Navy Lieutenants, FY 1989

YOS	Promotions to 0-4	Cumulative Number	Cumulative Percentage	Base Number	Continuation Rate	Up-or-Out Separations
10	521	1,311	0.6386			
11	695	2,006	0.9771			
12	37	2,043	0.9951	432	0.8750	54
13	4	2,047	0.9971	324	0.9105	29
14	2	2,049	0.9981	346	0.9509	17
15	2	2,051	0.9990	271	0.9557	12
16	1	2,052	0.9995	338	0.9675	11
17	1	2,053	1.0000	405	0.9679	13
18	0	2,053	1.0000	442	0.9842	7
19	0	2,053	1.0000	338	0.9923	3
Total:						146

Source: Defense Manpower Data Center.

Table 5. Up-or-Out Separations by Marine Corps Captains, FY 1989

YOS	Promotions to 0-4	Cumulative Number	Cumulative Percentage	Base Number	Continuation Rate	Up-or-Out Separations
12	28	70	0.1299			
13	466	536	0.9944			
14	3	539	1.0000	126	0.9206	10
15	0	539	1.0000	107	0.9626	4
16	0	539	1.0000	110	0.9545	5
17	0	539	1.0000	120	0.9667	4
18	0	539	1.0000	121	0.9917	1
19	0	539	1.0000	164	0.9878	2
Total:						26

Source: Defense Manpower Data Center.

Table 6. Up-or-Out Separations by Air Force Captains, FY 1989

YOS	Promotions to 0-4	Cumulative Number	Cumulative Percentage	Base Number	Continuation Rate	Up-or-Out Separations
10	177	822	0.1979			
11	2,878	3,700	0.8907			
12	441	4,141	0.9969	1,354	0.8538	198
13	6	4,147	0.9983	1,203	0.9584	50
14	1	4,148	0.9986	1,073	0.9618	41
15	3	4,151	0.9993	827	0.9613	32
16	1	4,152	0.9995	857	0.9755	21
17	1	4,153	0.9998	769	0.9883	9
18	1	4,154	1.0000	883	0.9898	9
19	0	4,154	1.0000	661	0.9970	2
Total:						362

Source: Defense Manpower Data Center.

III. THEORETICAL MODELS

Up-or-out policies are not unique to the military. In universities, assistant professors who do not receive tenure are forced to leave. Similarly, attorneys who are not offered partnerships in law firms are also forced to leave. Why don't universities or law firms simply retain these individuals as permanent, junior members?

A. A MODEL OF TENURE

Two articles in the economics literature have recently investigated the up-or-out phenomenon [1 and 2]. Consider the following highly stylized example. A worker's career extends over two time periods. All workers within a class are considered homogeneous during the first period, hence they all earn the same wage. During the first period, they may also undertake investments that will enhance their productivity in the second period. An investment in this context is any expenditure of time, effort, or money that places the worker on the "fast track" rather than the "slow track." For example, the worker may put in longer hours on the job, or expend more effort establishing business contacts.

An investment makes it more likely that the worker achieves the fast track, but does not guarantee this result. In Table 7, workers who choose to invest and those who do not invest each have a probability of achieving the fast track (labelled "high productivity" in the table). This probability equals 0.4 in the absence of any investment, but increases to 0.6 if the investment is made.

Table 7. Kahn-Huberman-Waldman Up-or-Out Example

	Probability of High Productivity	Probability of Low Productivity	Investment Cost	Expected Net Salary	
				Conventional Contract	Up-or-Out Contract
Invest:	0.6	0.4	\$100	\$2,100	\$2,000
Do not invest:	0.4	0.6	\$0	\$1,800	\$1,650
Value to current employer	\$3,000	\$1,000			
Value to other employers	\$750	\$750			

It is assumed that the employer cannot *directly* observe whether or not the worker has invested. At the end of the first period, however, the employer can determine whether the worker has high productivity or low productivity. This determination constitutes an *indirect* observation on the worker's investment decision, because productivity is correlated (albeit imperfectly) with investment. It is further assumed that productivity, although observed by this employer, is not observed by other, potential employers in the market. Hence the investment, if undertaken, does not improve the worker's job prospects outside of the current employer.²

As an alternative to an up-or-out contract, the employer might retain all workers but simply pay them according to their revealed productivity levels. We refer to this alternative as a *conventional contract*. We will investigate conventional contracts first, then we will show that a possible weakness of conventional contracts is alleviated by an up-or-out contract.

In Table 7, an investment costs the worker \$100 and, again, serves to increase the probability of achieving high productivity from 0.4 to 0.6. Table 7 also indicates that the employer values the output of a high-productivity worker at \$3,000, and values a low-productivity worker at \$1,000.

Under a conventional contract, workers are retained regardless of their productivity level, but are paid salaries equal to their value to the employer. Hence, a worker's expected gross salary is a probability-weighted average of the values \$3,000 and \$1,000. If the worker invests, an expected *net* salary is obtained after subtracting the cost of the investment. Given the numbers in Table 7, a worker would always choose to invest because, by doing so, a net gain of \$300 is made.

The putative weakness of a conventional contract is as follows. The employer, regardless of the true assessment of the worker's productivity, always has an incentive to declare the worker as low-productivity. By doing so, the employer can pay all workers a salary of \$1,000, even though 60 percent of them have value \$3,000. The employer thus enjoys a net gain of \$2,000 for each high-productivity worker that the employer deliberately mislabels as low-productivity.

² In our example of professors, other universities can observe professors' publication records, but not their teaching ability. Similarly, other law firms can observe attorneys' performances in court, but not their ability to draw contracts. If these examples seem unpalatable, we may assume instead that workers' investments build "specific" human capital. This is human capital, which even if observed by other employers, is of greater value to the current employer than to others.

It might be thought that a high-productivity worker in this situation could benefit by transferring to a different employer. Recall, however, our assumption that productivity is not observed (or not valued) by other, potential employers in the market. Therefore, high-productivity workers have no method of demonstrating their productivity levels to other potential employers.

When workers become aware of their employer's strategy, they, in turn, no longer have an incentive to invest. There is no reason to expend resources investing, in order to enhance their productivity in the second period, if increases in productivity are never rewarded by their employer. Hence, in the final equilibrium, no investment is undertaken.

Now consider an up-or-out contract. Under this arrangement, the employer retains only the high-productivity workers, and pays them a salary equal to their value in production (\$3,000 in our example). Low-productivity workers are fired, and must seek employment elsewhere. We assume in Table 7 that these workers' value to other employers is \$750. With an up-or-out contract, the worker still chooses to invest, this time enjoying a net gain of \$350.

Finally, we must show that, unlike the situation with conventional contracts, the up-or-out contract gives the employer no incentive to deliberately mislabel high-productivity workers as low-productivity. With a conventional contract, employers had this incentive because it enabled them to retain high-productivity workers (worth \$3,000 each) and pay them the low-productivity wage (\$1,000 each). But with an up-or-out contract, all workers declared low-productivity must be fired. Hence the employer would end up firing not only workers who are truly low-productivity, but also some high-productivity workers deliberately mislabeled as low-productivity workers. Firing high-productivity workers, whom it was profitable to employ in the first place, is clearly not an optimal strategy.

The model predicts that the up-or-out contract keeps employers honest, and removes their incentive to mislabel the productivity of their workers. Hence the workers retain their incentive to invest in their own productivity.

It is doubtful whether the above stylized example could be used to justify the up-or-out system employed by the military. It is clear that the military wants to encourage individuals to work hard and invest in their own productivity. Yet the military has no apparent incentive to mislabel its high-productivity individuals as low-productivity. On the contrary, the services acknowledge high-productivity individuals by selecting them for promotion and (in the case of officers) command.

More fundamentally, it is not clear that the model described above is logically consistent. Employers are in constant competition for workers. An employer who offered conventional contracts, but who acknowledged high-productivity workers, could bid workers away from competitors with reputations for deception. Honest employers would thrive in the marketplace, so that competition would serve as the mechanism to enforce recognition of high-productivity workers. Up-or-out contracts do not seem to be necessary for this purpose.

B. AN ALTERNATIVE MODEL

The economics literature provides an alternative model that may be adapted to explain the up-or-out phenomenon. Lazear [3] has developed a rationale for mandatory retirement in the civilian sector. Under Lazear's model, firms pay workers wages below the value of their output during the early years of employment. However, firms pay workers wages above the value of their output during the later years of employment. For workers who remain with the firm long enough, the two effects will cancel out, so that the discounted value of wages is equal to the discounted value of output over the worker's entire career.

Firms have two incentives for structuring contracts in this fashion. First, contracts of this sort appeal mostly to workers who intend to remain with the firm for a lengthy career. By offering these contracts, the firm tends to attract more "stable" workers. Hence a deferred-compensation contract is a clever mechanism for inducing workers to reveal information about their intentions.

Second, deferred-compensation contracts discourage workers from shirking their responsibilities. A worker who is dismissed for shirking will not be able to recover the loss incurred in the early years when that worker's wage was below the value of output. By offering these contracts, the firm may be more confident in the worker's performance, and need not spend as much time monitoring the worker.

The difficulty with deferred-compensation contracts arises when workers remain with the firm for too long. Once payback for the early years has been achieved, workers continue to receive wages above the value of their output. Hence a point may be reached where a worker prefers to remain with the firm, but the firm prefers for the worker to leave. Lazear used this insight to explain mandatory retirement provisions, which require workers to retire at a prescribed age.

This model may be adapted to explain up-or-out provisions in the military. If allowed to remain in the military, individuals on a low-productivity track would receive undeserved longevity increases in excess of the value of their output. Up-or-out separations are roughly analogous to the separations for shirking in Lazear's model. In addition, up-or-out provisions provide a bureaucratic, impersonal method for weeding-out poor performers, without giving the appearance of vindictiveness on the part of the individual's commanding officer.

C. A PREFERRED MODEL

In this subsection, we develop our preferred model for up-or-out contracts in the military. We first consider the equilibrium rank distribution when the system does not have any up-or-out provisions. We begin in the upper half of Table 8 with 200 O-3s, equally divided between high-productivity "leaders" and low-productivity "non-leaders." We assume that productivity cannot be observed until rank O-4, where we begin with 50 individuals of each type. We also begin with 30 leaders at rank O-5.

Table 8. Evolution of Officer Force

Period	O-3		O-4		O-5	
	Leaders	Non-Leaders	Leaders	Non-Leaders	Leaders	Non-Leaders
Without Up-or-Out						
1	100	100	50	50	30	0
2	100	100	35	65	30	0
3	100	100	20	80	30	0
4	100	100	15	85	20	10
5	100	100	15	85	15	15
6	100	100	15	85	15	15
With Up-or-Out						
1	100	100	50	50	30	0
2	100	100	50	50	30	0

The number of billets remains constant at 200 O-3s, 100 O-4s, and 30 O-5s. The O-5 billets turn over at the end of each period. The turnover of O-5s induces promotions of O-4s to O-5, in turn inducing promotions of O-3s to O-4. We assume zero turnover among O-3s and O-4s within each period. Finally, we assume that all new O-3s are equally divided between leaders and non-leaders.

At the end of period 1, 30 O-4 leaders are identified and promoted to rank O-5. Thus, 20 O-4 leaders and 50 O-4 non-leaders are available to remain as O-4s in period 2.

In order to meet the total requirement of 100 O-4s in period 2, 30 O-3s must be promoted. Because productivity cannot be observed among O-3s, we expect 15 leaders and 15 non-leaders among those promoted. Thus, we end up with 35 O-4 leaders and 65 O-4 non-leaders in period 2.

At the end of period 2, 30 O-4 leaders are again identified and promoted to rank O-5. Now only 5 O-4 leaders are available for period 3, along with 65 O-4 non-leaders. In order to meet the total requirement of 100 O-4s in period 3, 15 O-3 leaders and 15 O-3 non-leaders are promoted. Thus, we end up with 20 O-4 leaders and 80 O-4 non-leaders in period 3.

Continuing this process, the system converges to an equilibrium in period 5. The equilibrium distribution contains only 15 O-5 leaders, who must be supplemented with 15 O-5 non-leaders in order to meet the total requirement of 30 O-5s.

The system fails to provide an adequate number of O-5 leaders. The reason for this failure is as follows. At rank O-4 there are, by assumption, no up-or-out provisions. Hence, the O-4 ranks are clogged by a majority of non-leaders (85 out of 100 in equilibrium). Thus, there are not enough O-4 leaders to feed even 30 O-5 billets. There are 100 O-3 leaders present in each period, but they cannot all be groomed for promotion to O-5 because of the glut of non-leaders at the intermediate rank of O-4.

On the contrary, consider an up-or-out system, as illustrated in the lower half of Table 8. We begin with the same rank distribution in period 1 as in the previous analysis. Once again, 30 O-4 leaders are promoted to rank O-5 at the end of period 1. Now, however, the 20 remaining O-4 leaders as well as the 50 O-4 non-leaders are subject to an up-or-out provision, and must separate at the end of period 1. Thus, the O-4 ranks are completely cleared at the end of each period, through either promotion ("up") or separation ("out"). These individuals are replaced when 100 O-3s are promoted. Because productivity still cannot be observed among O-3s, we expect 50 leaders and 50 non-leaders among those promoted.

This rank distribution is sustainable in equilibrium. The differences from the previous analysis are as follows. Most importantly, the up-or-out system provides 30 O-5 leaders, so that the O-5 level is now populated entirely with leaders. This result obtains because the O-4 ranks are no longer clogged with non-leaders, thus leaving room to promote leaders through rank O-4 and all the way to rank O-5. On the other hand, the 20 O-4 leaders who are not selected for promotion must separate at the end of each period.

In this example, the up-or-out system yields several benefits. By providing sharper discrimination, the service is better able to identify candidates for promotions and command responsibilities. This feature may also improve morale among the more capable officers. More of these officers are selected for promotion, so these officers' achievements are recognized and rewarded.

A study by Spruill and Cavalluzzo [4] estimated the value that pilots place on fast-track assignments. Specifically, the study investigated the costs and benefits of consolidating aircraft squadrons. Consolidating two squadrons into one would cut in half the number of department-head billets available for O-4s, as well as the number of command billets available for O-5s.

According to this study, pilots would be injured in two ways by these billet reductions. First, promotion boards may consider experience as a department head or squadron commander among the criteria for promotion. Second, pilots may value experience in these positions over and above their effect on the probability of promotion.

Table 9 reports Spruill and Cavalluzzo's estimates of the dollar value of these losses. Their estimates are based on a survey of 1,798 Navy fighter and attack pilots, and the values are expressed in 1980 dollars. The column labelled "Earnings Loss" reflects the lower lifetime earnings associated with a career path having a lower probability of promotion. The column labelled "Intrinsic Loss" measures the lifetime value that pilots place on department-head and squadron-commander billets, beyond their effect on the probability of promotion.

**Table 9. Earnings and "Intrinsic" Loss to Navy Pilots
(1980 Dollars)**

<u>Year of Service</u>	<u>Earnings Loss</u>	<u>Intrinsic Loss</u>
6	\$1,882	\$4,352
7	\$2,079	\$4,199
8	\$2,308	\$4,047
9	\$2,542	\$3,142
10	\$2,814	\$3,019

Source: Spruill and Cavalluzzo [4].

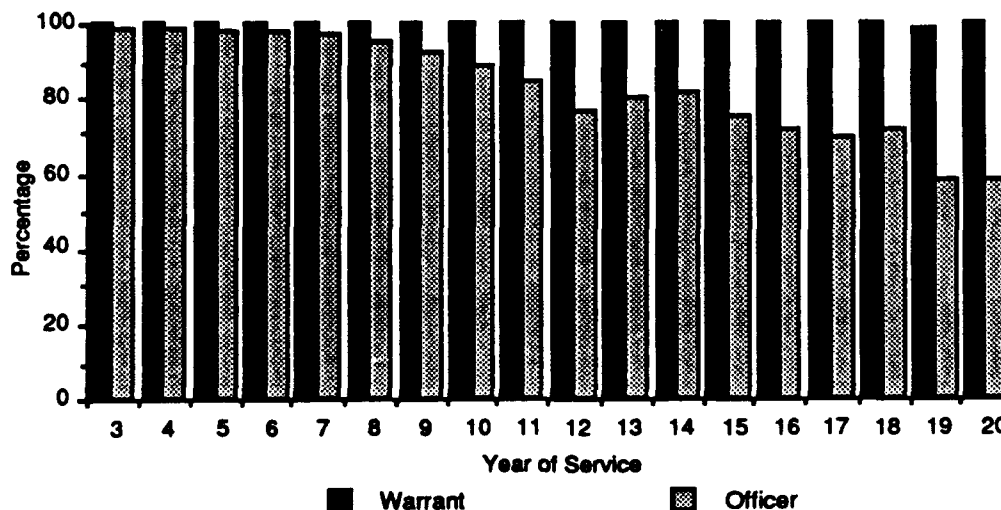
The latter numbers, in particular, are non-negligible. Apparently, many pilots value the opportunity to serve in middle-management positions. In our current application, an up-or-out system would improve the probability of a more capable officer receiving a department-head and squadron-commander assignment. These pilots could avoid some of

the losses described above, resulting in an improvement in their morale and retention. In turn, these improvements would result in better squadron leadership and performance.

IV. UP-OR-OUT AND PHYSICAL FITNESS

Another argument often advanced in favor of up-or-out policy is that older individuals lack the physical fitness required to continue performing in operational positions. An up-or-out policy is therefore necessary to force older individuals to switch from operational to management positions, or else to separate. This argument may have some validity for enlisted personnel in strenuous occupations such as infantry. Among officers, however, the evidence is decidedly mixed. We will examine some data for pilots, arguably the most physically demanding of all officer occupations.³

In September 1990, there were 5,173 warrant officers and 4,904 officers in the Army who had between 3 and 20 years of service, and who had been trained as helicopter pilots. Figure 1 depicts the percentage in each YOS cell who were working in helicopter-pilot billets in September 1990. For officers, this percentage ranges from a high of 100 at YOS 3 to a low of 59 at YOS 20. However, the percentage for warrant officers remains at 100 throughout *essentially the entire YOS spectrum*. Hence, at least for helicopter pilots, physical fitness does not appear to preclude service even at YOS 20.

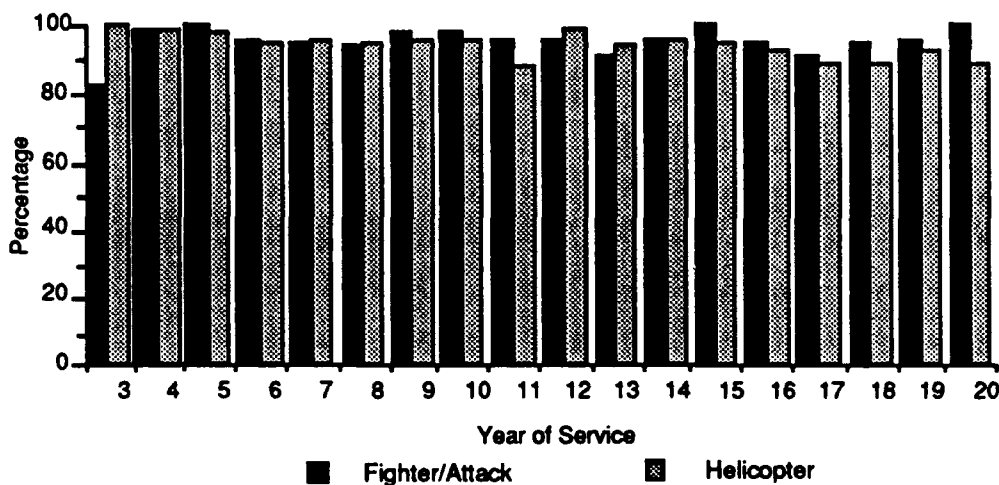


Source: Defense Manpower Data Center, September 1990.

Figure 1. Percentage of Army Pilots Working in Pilot Billets in September 1990

³ The data in this section were again provided by the Defense Manpower Data Center.

The evidence is similar for the Marine Corps. In September 1990, there were 2,259 officers in the Marine Corps who had between 3 and 20 years of service, and who had been trained as helicopter pilots. There were also 970 officers, in the same YOS range, who had been trained as pilots of fixed-wing fighter and attack aircraft. Figure 2 depicts the percentage in each YOS cell who were working in pilot billets in September 1990. For helicopter pilots, this percentage remains above 90 throughout most of the YOS spectrum. Interestingly, the percentage remains above 90 for fighter and attack pilots as well. This latter observation fails to support the hypothesis that fighter and attack aircraft are more demanding than helicopters for older pilots.

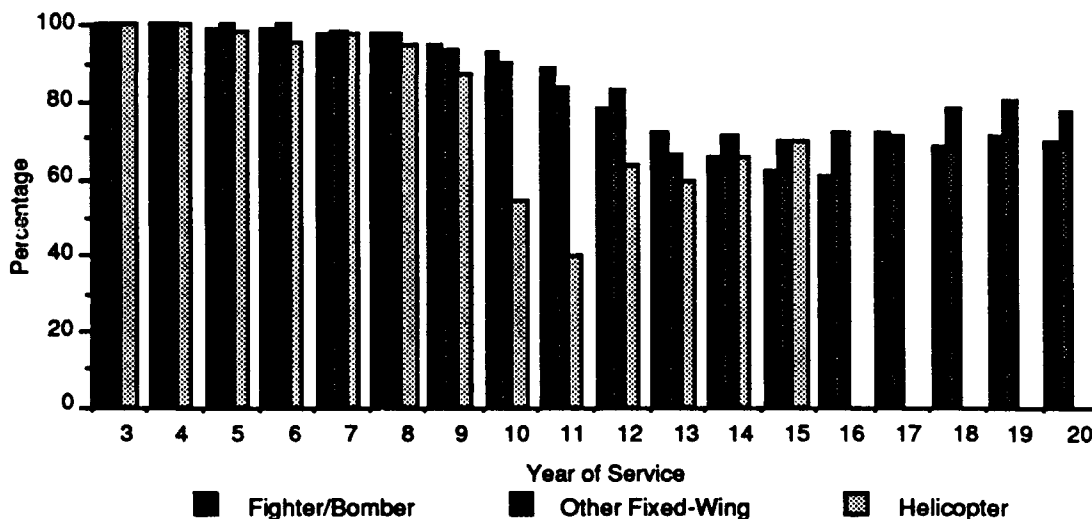


Source: Defense Manpower Data Center, September 1990

Figure 2. Percentage of Marine Corps Pilots Working in Pilot Billets in September 1990

In September 1990 there were 438 officers in the Air Force who had between 3 and 20 years of service, and who had been trained as helicopter pilots. There were 6,672 officers who had been trained as pilots of fixed-wing fighter and bomber aircraft. There were also 8,042 officers who had been trained as pilots of other fixed-wing aircraft. This latter category includes transport, tactical airlift, tanker, electronic warfare, and airborne command and control aircraft.

Figure 3 depicts the percentage in each YOS cell who were working in Air Force pilot billets in September 1990. Within the first 15 years of service,⁴ this percentage falls from about 100 in all three categories to between 60 and 70. In light of the experience of the Army and Marine Corps, however, it appears that this decline is the result of a deliberate policy to reassign pilots, rather than a deterioration in pilots' physical fitness. Moreover, the modest increase to nearly 80 percent in YOS 18 to 20 again belies the contention that older pilots are unable to continue flying.



Source: Defense Manpower Data Center, September 1990

Figure 3. Percentage of Air Force Pilots Working In Pilot Billets in September 1990

Although older individuals are still assigned to pilot billets, one might ask whether their performance remains safe and effective. Borowski [5] presents empirical evidence that, at least for Navy pilots, accident rates tend to be inversely related to career flight hours. For fighter and attack pilots, accident rates attributed to pilot error decreased monotonically in successive experience intervals, through 1,500 career hours. The pilot-error accident rate in the open-ended 1,500+ interval was not significantly different from that in the 750-1,500 interval. Hence, no decline in safety was found for the most senior pilots.

⁴ We do not show helicopter pilots beyond YOS 15, because the small numbers of remaining pilots yield erratic estimates.

In addition to being less accident-prone, experienced pilots are more effective, according to empirical evidence. Hammon and Horowitz [6] have demonstrated three aspects of superior performance on the part of experienced pilots. First, experienced Navy pilots execute safer landings aboard aircraft carriers. Second, experienced Navy F-14 pilots obtain higher scores on opposed air-to-air combat exercises. Finally, experienced Marine Corps attack pilots deliver ordnance closer to the target in bombing exercises.

V. ALTERNATIVES TO THE UP-OR-OUT POLICY

It may be sensible to suspend the up-or-out policy in selected occupations where physical fitness is not a constraint, and where promotion to management is not essential. This has been done for Army warrant-officer helicopter pilots. These individuals are on a separate track, and do not compete with other officers for command positions. It may be possible to establish similar tracks in other occupations.

A related possibility is to have two tracks within the same occupation, one for individuals seeking promotion to management, and another for individuals content to remain in operational positions. An individual would not have to make an immediate choice between these two tracks. At some point toward the middle of his career, an individual selected for promotion could transfer to the management track. Conversely, individuals passed over for promotion could remain in the operational track for the remainder of their careers. One benefit of this proposal is that it would avoid having pilots, whose training costs up to \$2 million, acting in managerial positions that do not fully utilize their training.

The study by Spruill and Cavalluzzo estimated the willingness of pilots to enroll in an operational track that would not involve command responsibilities. Specifically, 1,798 Navy fighter and attack pilots were asked the following question:⁵

Suppose that aviators could choose permanent duty involving operational flying as an alternative to the normal [unrestricted line officer] path. This duty would allow for career flying without forced separation due to failure to promote. Which career path would you choose?

The operational track was preferred by 67.8 percent of O-2s, 62.3 percent of O-3s, 49.8 percent of O-4s, and 31.3 percent of O-5s. From this evidence, it appears that younger pilots, at least, would be seriously interested in a career track that allowed them to continue flying without concern about future promotion. Although only a minority of senior pilots express a preference for the operational track, many of their colleagues may already have left the military in order to continue flying in the commercial sector. We recommend that the operational track be given further consideration.

⁵ Reference [4], Appendix G, page G-15.

VI. CONCLUSIONS

The main conclusion of this paper is that very few military personnel separate due to up-or-out policy. We estimate that in a recent year fewer than 1,000 officers and 1,000 enlisted members separated for this reason. The more important effect of up-or-out policy may be to force individuals "up" rather than "out." For example, Spruill and Cavalluzzo report that many pilots would prefer an operational track that involved more flying, without command responsibilities. The absence of such a track (except for Army warrant officers) forces pilots into managerial positions toward which many are ambivalent.

Our evidence indicates that physical fitness is not an impediment to performance for older pilots. Over 90 percent of Marine Corps fighter and attack pilots are assigned to flying billets, even in years-of-service 15 through 20. Although the percentage is lower for Air Force fighter and bomber pilots, the difference may be the result of deliberate policy rather than a deterioration in pilots' physical fitness. Further study of Air Force personnel management could shed light on this issue.

We recommend that further study also be made of an operational track for pilots. The feasibility and desirability of this track could be assessed along several fronts. First, additional surveys of pilots would reveal their willingness to participate in an operational track. Input could also be collected from personnel managers in the various aviation communities. Most importantly, analytical work would be required to estimate the net cost savings and expected changes in readiness that would accompany the introduction of an operational track for pilots.

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