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14. ABSTRACT

A fundamental goal of the Air Force personnel system is to ensure that the manpower inventory, by Air Force specialty code and grade, matches requirements. However, there are structural obstacles that impede achieving this goal. The three major independently managed systems the Air Force uses to determine manpower strength currently tend to function in isolation. Because the current organizational structure lacks broad coordinating and control mechanisms, actions taken to control one system often adversely affect another. The authors lay the foundation for a discussion of policy changes that would better synchronize these systems. They propose a methodology that would marginally modify grade authorizations within skill levels to make it possible to better achieve manpower targets. Each specialty would retain the same number of authorizations within each skill level, and the aggregate solution would maintain the same total number of enlisted authorizations by grade. This would help the manpower community follow the policy of equal selection opportunity while also taking personnel management system capabilities into account.

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Air Force Enlisted Force Management

System Interactions and Synchronization Strategies

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Prepared for the United States Air Force

PROJECT AIR FORCE

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Preface

In September 2004, the active-duty enlisted component of the United States Air Force comprised about 298,000 airmen. These airmen performed duties in about 200 specialties. Because the relationships between job requirements and personnel management policies are so complex, dedicated enlisted strength managers have never matched the inventory of people to manpower requirements.

Maj Gen Peter Sutton, the former commander of the Air Force Recruiting Service, recognized that the various enlisted force management systems could be better synchronized. Gen Sutton therefore commissioned this work in 2004 when he was Director of Learning and Force Development, Deputy Chief of Staff for Personnel, Headquarters U.S. Air Force.

This study, conducted in the Manpower, Personnel, and Training Program of RAND Project AIR FORCE as part of a project entitled Enlisted Force Management, explores three management systems that occasionally work at cross-purposes, often rendering it impossible for strength managers to achieve their objectives. The monograph explains some of the interactions of current policies and procedures and makes near-term and long-term recommendations. Those who monitor, set, and execute Air Force manpower and personnel policies and those with functional and operational oversight of enlisted career fields will be interested in this document.

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Summary

The purpose of this research is to help the Air Force better align its enlisted inventory and requirements by specialty and grade. The Air Force uses three major independently managed systems to determine strength by specialty and grade: the manpower system, the strength management system, and the enlisted promotion system. This independence persists because the current organizational structure lacks broad coordinating and control mechanisms. In turn, independence has spawned policies and procedures that occasionally work at cross-purposes.

To lay the foundation for a discussion of policy changes that would better synchronize these systems, we document salient features of each and discuss existing detrimental interactions. For example, we demonstrate that if strength managers successfully match the inventory to the funded manpower requirement for a specialty/grade combination, it is usually the case that they will be forced to retrain-in, to offer selective reenlistment bonuses, or to retrain-out to successfully meet the manpower target for the next-higher grade in that specialty (see p. 53). In part, this activity is driven by the promotion system policy of equal selection opportunity (ESO). Although ESO helps the Air Force achieve the Department of Defense (DoD) goal of ensuring a reasonably uniform application of the principle of equal pay for equal work, it also works counter to another DoD goal: satisfying authorizations for enlisted personnel by grade (see p. 43).

This monograph does not propose that the Air Force modify ESO. It does recommend that the Air Force pursue the DoDD 1304.20

(1984) goal of ensuring that requirements determination processes consider personnel management capabilities (see p. 71). Currently, there is a subset of manpower targets that strength managers cannot execute under any conditions. To the extent that strength managers do not recognize that some goals are unachievable, they may unnecessarily expend retraining and bonus resources, which would be counter to the DoD objective of supporting the most efficient allocation of resources. Under the changes we describe, each specialty would retain the same number of authorizations within each skill level, and the aggregate solution would maintain the same total number of enlisted authorizations by grade (see p. 59). To understand personnel management system capabilities better, we also recommend that the Air Force upgrade some of its personnel models (see p. 72). For example, the Air Force needs a maintainable, steady-state enlisted model with both grade and year-of-service dimensions.

To better synchronize the promotion system, we recommend that the Air Force investigate the benefits of standardizing test scores in its Weighted Airman Promotion System (see p. 72). We believe that the current practice of not standardizing scores means that some AFSCs produce fewer E7s, E8s, and E9s per 1,000 accessions (see p. 44). In turn, this may adversely affect senior NCO manning. We also believe that the Air Force should periodically assess whether the equity benefits of ESO justify its costs (see p. 74). ESO is an integral part of the Air Force enlisted culture. However, ESO carries a price. Manning deviations that affect the mission, the need to retrain about 4,000 enlisted members per year, and a reenlistment bonus budget of $200 million per year are the major costs associated with providing promotion equity.

We believe that the Air Force should manage the enlisted force toward common goals (see p. 73). Because some focus on AFSC/grade and others on AFSC/skill level and others on total AFSC manning, management actions are not as well synchronized as they might be. From a broader perspective, this leads to another recommendation to develop an overarching control structure (see p. 73). Critical players currently reside in the AF/A1 staffs, the Air Force Personnel Center (AFPC), the Air Force Manpower Agency (AFMA), and Air Educa-

tion and Training Command (Recruiting Service). At times, these groups work toward conflicting objectives.

Finally, in the long-term, we recommend that the Air Force explore productivity trade-offs (see p. 74). If the Air Force understood the relationships among productivity and experience, training, and aptitude, it could determine the least-cost objective force, as required by DoDD 1304.20.

Acknowledgments

We could not have initiated this work without the sponsorship of Maj Gen Peter Sutton, who recognized that the pieces of the manpower management system do not all fit well together. We are also grateful that Gen Sutton provided Project AIR FORCE with the opportunity to reengage in enlisted management issues. We thank John Park, Maj Todd Sriver, Capt Dave Longhorn, and CMSgt Nancy Taulbee from the Air Force Deputy Chief of Staff for Personnel's Force Policy Management Division for their insights into selective reenlistment bonuses and the trained personnel requirements processes. Reese Lang from the Training/Education Requirements Division graciously shared his expertise on Air Force retraining. Ruby Manen and Bryant Stone from the Air Force Manpower Agency helped us better understand the current grade allocation process. Dave Philpott, Dennis Davis, and Feroz Essa in the Reports and Retrieval Branch at the Air Force Personnel Center generously shared their knowledge of the personnel data system. We also thank our colleagues Ray Conley, John Crown, Larry Hanser, and Craig Moore for their critical reviews of this document, for their counsel throughout the effort, and for opening doors in both the manpower and the personnel communities. Finally, we thank our colleague Harry Thie and Jay Jacobson (Air Force retired) for their extremely constructive formal reviews. We also wish to acknowledge our editor, Miriam Polon.

Abbreviations

AF/A1	Air Force Deputy Chief of Staff for Personnel
AFMA	Air Force Management Agency
AFPC	Air Force Personnel Center
AFQT	Armed Forces Qualification Test
AFSC	Air Force specialty code
ASVAB	Armed Services Vocational Aptitude Battery
BMT	basic military training
CAREERS	Career Airman Reenlistment Reservation System
CJR	career job reservation
DEP	Delayed Enlistment Program
DoD	Department of Defense
DoDD	Department of Defense Directive
DOS	date of separation
DPP	Directorate of Personnel Programs
E1	airman basic
E2	airman
E3	airman first class
E4	senior airman
E5	staff sergeant

E6	technical sergeant
E7	master sergeant
E8	senior master sergeant
E9	chief master sergeant
EPR	enlisted performance report
ESO	equal selection opportunity
FY	fiscal year
GTEP	Guaranteed Training Enlistment Program
HYT	high year of tenure
IDEAS	AFPC's Interactive Demographic Analysis System
IEB	initial enlistment bonus
MAGE	mechanical, administrative, general, electronic
NCO	noncommissioned officer
NPS	non-prior service
OSD	Office of the Secretary of Defense
OSI	Office of Special Investigations
PFE	Promotion Fitness Exam
PPBE	Planning, Programming, Budgeting, and Execution
RAW	AFPC's Retrieval Application Website
SKT	Skills Knowledge Test
SRB	selective reenlistment bonus
SSB	special separation benefit
STP	students, transients, patients, and prisoners
TERA	temporary early retirement authority
TIG	time in grade
TIS	time in service
TPR	trained personnel requirement

UIF	unfavorable information file
VSI	voluntary separation incentive
WAPS	Weighted Airman Promotion System

CHAPTER ONE

Introduction

A fundamental goal of the Air Force personnel system is to ensure that the inventory, by Air Force specialty code (AFSC) and grade, matches requirements. However, there are structural obstacles that impede achieving this goal. To remove one of those obstacles, we propose a methodology that would marginally modify grade authorizations within skill levels in order to make it possible to better achieve manpower targets.

One of our main messages is that force management is a complex task that is best accomplished from a systems perspective. Three primary systems affect the strength of the enlisted force by grade and AFSC:

- the manpower system, which sets requirements for each grade and AFSC combination
- the strength management system, which establishes targets for overall strength, recruiting, retraining, and bonuses
- the enlisted promotion system, which determines the annual number of promotions for each grade in the aggregate[1] and in each AFSC.

These systems, with few exceptions, currently tend to function in isolation. Consequently, actions taken to control one system often adversely impact another. Hence, strength managers have often not

[1] In this monograph, *aggregate* means all AFSCs considered as a group.

realized their objectives because the overarching personnel system lacks broad coordinating and control mechanisms.[2]

Organization of the Monograph

Chapter Two discusses the overall objectives of enlisted strength management, including those set forth in the governing DoD directive. Chapter Three discusses the system for managing aggregate strength, and Chapter Four outlines the system the Air Forces uses to manage disaggregate[3] strengths. Chapter Five discusses pertinent aspects of the enlisted promotion system. Chapter Six covers the manpower system. Chapter Seven offers strategies for better synchronizing the manpower, strength management, and enlisted promotion systems. Chapter Eight offers seven near-term and long-term recommendations.

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[2] Galway et al. (2005, pp. 65–73) drew a similar conclusion about officer management.

[3] *Disaggregate* means at the AFSC level of detail.

CHAPTER TWO

Objectives of Enlisted Force Strength Management

The following objectives are drawn from the December 1984 Department of Defense Directive (DoDD) 1304.20, the regulation that underpinned many of today's goals for Air Force enlisted management.[1]

> 4.1. The Enlisted Personnel Management System. The Enlisted Personnel Management System is the total process by which enlisted personnel are developed professionally to satisfy force structure authorizations and provides the context and framework for enlisted personnel management action. The objective of the Enlisted Personnel Management System is to assist in attaining the following goals:
>
> 4.1.1. Satisfy authorizations for enlisted personnel, by grade, with the appropriate experience and skill.
>
> 4.1.2. Ensure personnel management system capabilities are taken into consideration during the requirements decision process.
>
> 4.1.3. Provide visible, relatively stable career progression opportunity over the long term.
>
> 4.1.4. Attract, retain, and motivate to career service the kinds and numbers of people the Military Services need.

[1] Assistant Secretary of Defense for Manpower, Installations, and Logistics (1984), p. 2.

> 4.1.5. Ensure a self-sustaining, vigorous force with a relatively stable career content is achieved and maintained.
>
> 4.1.6. Enable utilization of personnel in positions for which they are trained and experienced.
>
> 4.1.7. Minimize specialty imbalances over time.
>
> 4.1.8. Ensure a reasonably uniform application of the principle of equal pay for equal work among the Military Services.
>
> 4.1.9. Support the most efficient allocation of Department of Defense manpower resources in the support of Military Service missions.

The July 2005 version of DoDD 1304.20 reduced the nine goals to six:[2]

> 4.2.1. Satisfy authorizations for enlisted personnel, while ensuring the Military Services have the desired grade and experience mix, balanced across occupational groups.
>
> 4.2.2. Provide visible, relatively stable career progression opportunities over the long term.
>
> 4.2.3. Recruit and retain the desired number and quality of military personnel with the requisite qualifications and experience.
>
> 4.2.4. Ensure a self-sustaining force with relatively stable career content.
>
> 4.2.5. As a priority, maintain manning levels in designated critical skills.
>
> 4.2.6. Support the most efficient allocation of DoD human resources.

---

[2] Under Secretary of Defense for Personnel and Readiness (2005), p. 2.

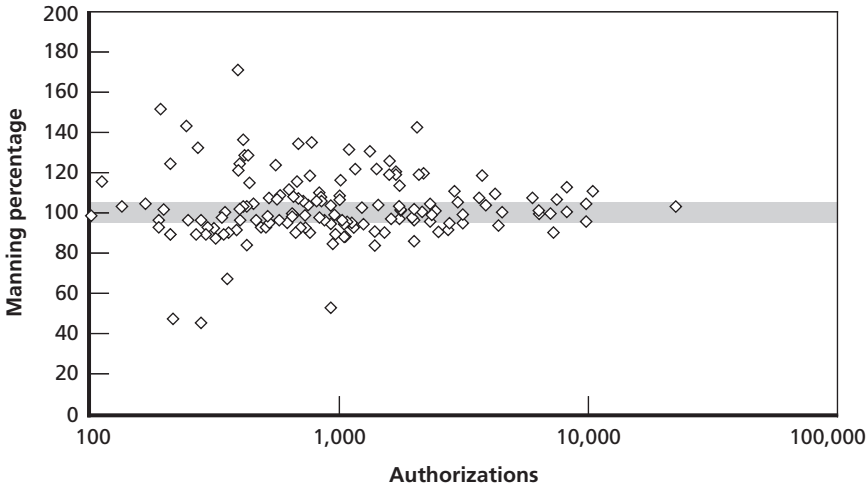
DoDD 1304.20 (2005) deleted the explicit goal of ensuring that personnel system capabilities are considered during the requirements determination process. However, this goal is implicit in the requirement to efficiently allocate resources. DoDD 1304.20 (2005) also dropped the principle of equal pay for equal work. As we shall see, these modifications have ramifications for Air Force policy.

Satisfying DoDD 1304.20 (2005) goal 4.2.1 requires that each AFSC/grade be approximately 100 percent manned over time.[3] As we discuss at length in this monograph, there are structural impediments that produce manning deviations. One major obstacle is that force managers do not all manage to the same metric. Some watch manning by AFSC/grade, others track manning by AFSC/skill level, and others manage manning by AFSC without regard to skill level or grade. Air Force Instruction (AFI) 36-2618 (*The Enlisted Force Structure*, 2004) defines three tiers of enlisted personnel based on training, education, technical competence, experience, leadership, and managerial responsibilities: the Airman Tier (E1–E4), the Noncommissioned Officer (NCO) Tier (E5–E6), and the Senior NCO Tier (E7–E9). With the appropriate policy changes, force managers could successfully manage to any of these metrics. However, it would be helpful if they—and the Air Force as a whole—adopted a common metric.

For those who manage to AFSC/grade, the Air Force does not specify a range for acceptable imbalances. In this paper we assume that the manning target for each AFSC/grade combination should be 95–105 percent, because a number of factors make achieving a target of exactly 100 percent problematic. To motivate a discussion of those factors, Figure 2.1 documents the extent to which strength managers successfully maintain each AFSC's total manning within our assumed target range. Each diamond in Figure 2.1 represents a five-digit AFSC (the graph displays only AFSCs with at least 100 funded authoriza-

[3] The current manpower system assigns authorized grades and AFSCs to funded positions. However, it does not account for deployments. Because AFSCs do not have proportional deployment requirements, one could argue that 100 percent manning should not be the goal for every AFSC.

Figure 2.1
AFSC Manning Picture, September 2004



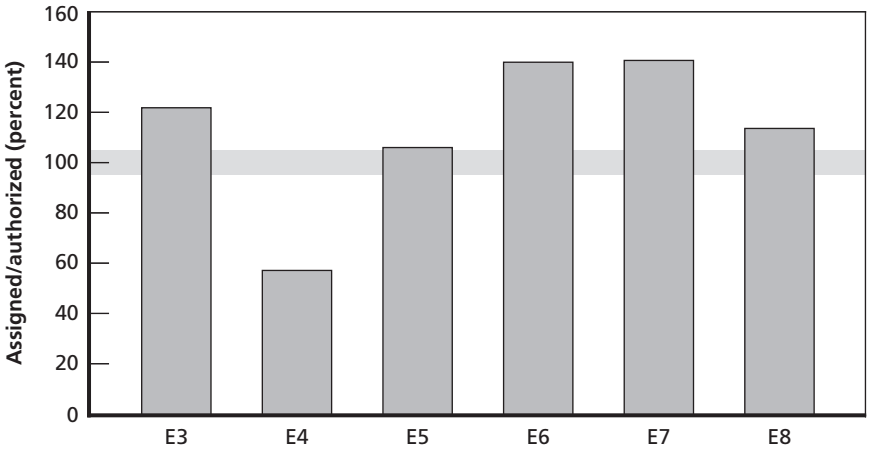
SOURCE: Air Force Personnel Center (AFPC) Retrieval Application Website (RAW).
RAND *MG540-2.1*

tions). The horizontal axis shows the number of authorizations for each AFSC. The vertical axis indicates the manning percentage (strength/authorizations). The shaded area represents 95–105 percent.

On September 30, 2004, total manning for each AFSC was in the 95–105 percent range for 40 percent of the AFSCs shown in Figure 2.1. However, we cannot conclude that this 40 percent satisfied DoDD goal 4.2.1. As Figure 2.2 demonstrates, in September 2004, even though AFSC 2T2X1,[4] Air Transportation, was 100 percent manned,

[4] The Air Force uses a five-digit alphanumeric code to designate enlisted AFSCs. The first character may have a value of 1–9 to designate a broad functional category. AFSCs that begin with 8–9, designating special duty and reporting identifiers, are commonly referred to as *tax* AFSCs because they draw their inventories from AFSCs that begin with 1–7. The second position is a letter that designates a subgroup of specialties within the broad category. The third and fifth positions are numbers that identify specific specialties within the second position subgroup. The fourth position of the AFSC is the *skill level* (1-level = input, 3-level = apprentice, 5-level = journeyman, 7-level = craftsman, 9-level = superintendent, and 0-level = chief enlisted manager). When an "X" is used as a placeholder, we mean all valid values for that position in the AFSC designation.

Figure 2.2
Air Transportation Manning Picture by Grade, September 2004



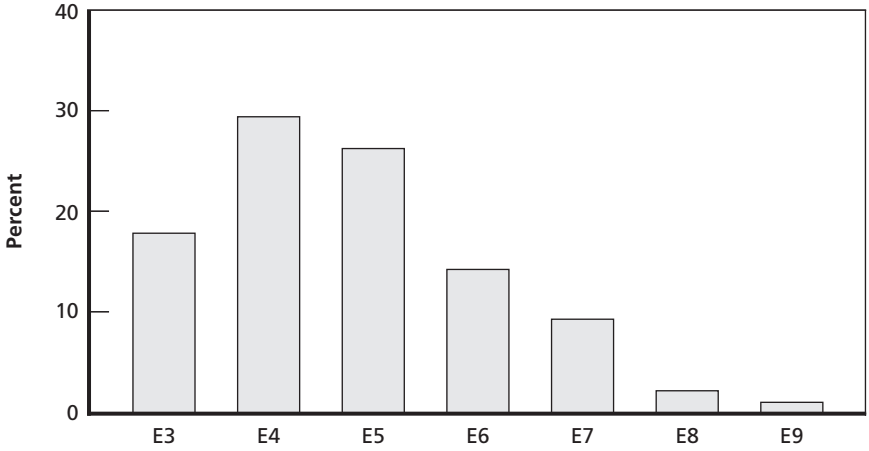
SOURCE: AFPC RAW.
RAND *MG540-2.2*

its inventory by grade did not match its authorized grades. Air Transportation had excess E1s through E3s ("3-levels"), excess E6s and E7s ("7-levels"), and too few E4s plus E5s ("5-levels").[5] As we show in Chapter Six, only 14 percent of the AFSC/grade combinations were in the 95–105 percent window at the end of fiscal year (FY) 2004. We also demonstrate that these deviations persist because policy interactions make it impossible for the Air Force to control E3 and E4 manning.

As we will see in Figure 2.5, part of the reason that force managers have not successfully matched the inventory to requirements is that there is a broad range of top five grade requirements across AFSCs. In some AFSCs, less than 40 percent of the authorizations are in the top five grades. At the other extreme, some AFSCs have 100 percent of their authorizations in the top five grades. To lay the foundation for Figure 2.5, Figure 2.3 shows the aggregate grade distribution of

[5] In the Air Force, E1 = airman basic, E2 = airman, E3 = airman first class, E4 = senior airman, E5 = staff sergeant, E6 = technical sergeant, E7 = master sergeant, E8 = senior master sergeant, E9 = chief master sergeant. Manpower authorizations do not reflect grades below E3. For consistency, assigned strength in grades E1 through E3 is typically included in E3 manning figures.

Figure 2.3
Distribution of Aggregate Permanent Party, Funded, Authorized Grades, September 2004



SOURCE: AFPC RAW.
RAND *MG540-2.3*

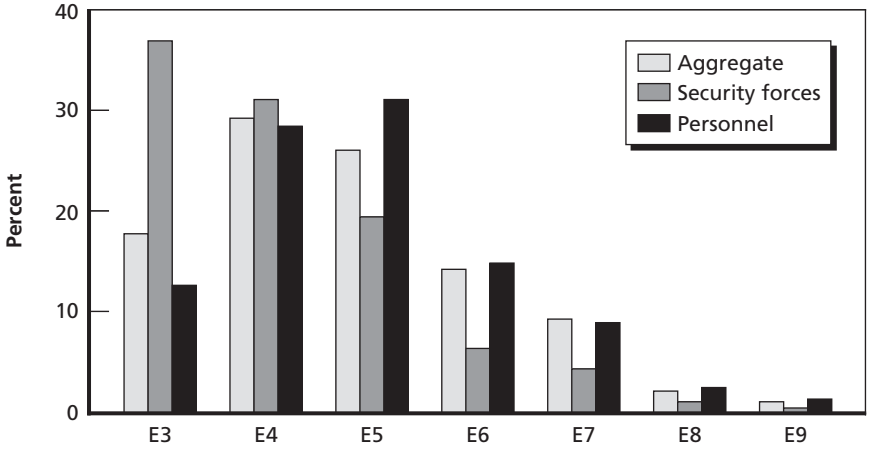
permanent party authorizations.[6] The promotion and strength management systems theoretically maintain aggregate grade strengths at or very near these requirement ceilings (except in the case of E3 and E4, as we demonstrate later).

If each AFSC's authorized grade structure mirrored the aggregate grade distribution, ensuring that every AFSC had the proper number of people in the proper grades would be less daunting. However, this is not the case. For example, Figure 2.4 contrasts the authorized grade distribution in the Security Forces (3P0X1) and Personnel (3S0X1) AFSCs with the aggregate force.

Relative to the aggregate, Security Forces (by far the largest AFSC) has a high concentration of junior grades. Security Forces mission requirements drive this grade structure. Years of training and experi-

[6] *Permanent party* members are on the job, executing the mission. Permanent party does not include students, transients, patients, and prisoners (STP).

Figure 2.4
Distributions of Security Forces and Personnel Authorized Grades, September 2004



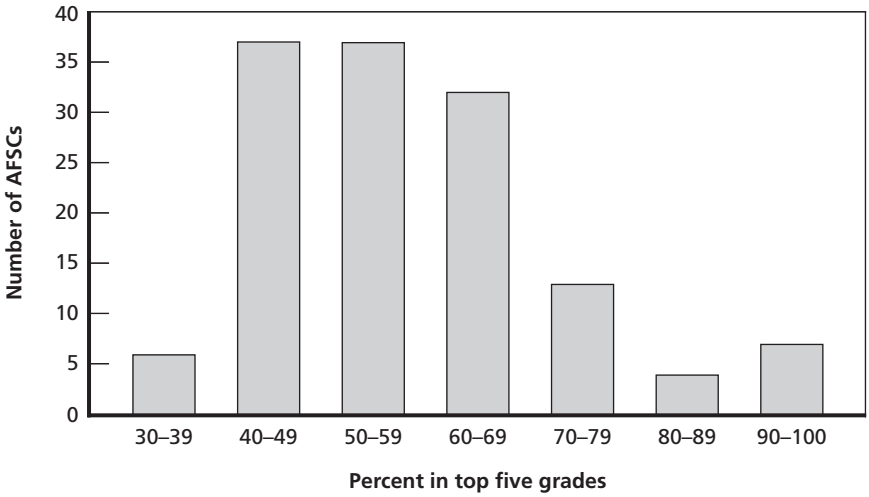
SOURCE: AFPC RAW.
RAND *MG540-2.4*

ence are not prerequisites for many Security Forces tasks. In stark contrast, the Personnel AFSC requires a much richer grade structure because a disproportionate number of its jobs require extensive experience.

Figure 2.5 illustrates the remarkable range of experience requirements across the 1XXXX–7XXXX AFSCs. The horizontal axis shows the percentage of authorizations in the top five grades for each AFSC.[7] Figure 2.5 helps one better appreciate the formidable task facing force managers. In some grade-rich AFSCs, force managers need to develop the 35 percent who are E1–E4s into the 65 percent who are E5–E9s. In other AFSCs, the 65 percent who are E1–E4s must be reduced to the

[7] In some cases, multiple *feeder* AFSCs merge into a *capper* AFSC at E7, E8, or E9. Figure 2.5 distributes capper authorizations back to the feeder AFSCs in proportion to the magnitude of the highest grades authorized in the feeder AFSCs. Some AFSCs require 100 percent in the top five grades. The Air Force populates these *lateral* AFSCs through retraining from other AFSCs. Lateral AFSCs also represent a tax on other AFSCs.

Figure 2.5
Distribution of 1XXXX–7XXXX AFSC Funded Authorizations, September 2004



SOURCE: AFPC RAW.
RAND *MG540-2.5*

35 percent who are E5–E9s. As we discuss in subsequent chapters, the promotion system, which affords approximately equal opportunity for promotion in all AFSCs, tends to produce inventories in each AFSC that mirror the aggregate grade structure rather than this broad range of top five grade requirements.

Thus far, we have laid part of the groundwork for the fundamental objective of our analysis: to improve synchronization in the three primary systems that influence Air Force strength by AFSC and grade. Ultimately, we do not argue that fully synchronizing the strength management, manpower, and promotion systems is in the best interests of the Air Force. To do so would require sacrificing the equity embedded in the promotion system, compromising the objectivity embedded in the manpower system, or incurring excessive cost and loss of productivity through over-exercising the strength management system. However, we do propose marginal system modifications that would enhance synchronization and reduce pressures for unproductive force management actions.

In the next chapter, we discuss an aggregate strength management policy that makes it impossible to achieve disaggregate manning requirements by grade.

CHAPTER THREE

The Enlisted Aggregate Strength Management System

Although one objective of enlisted strength managers is to maintain the health of individual AFSCs, they must simultaneously manage aggregate strength and aggregate grades to achieve budget, promotion opportunity, and promotion timing constraints.[1] In this chapter, we discuss some of the processes used to manage aggregate enlisted strength and grades. We then outline the techniques used to engineer the dramatic post–Cold War force reduction.

The key message of the chapter is that the Air Force has historically modified aggregate strength primarily through varying accessions. This strength management strategy, combined with a second system's policy of promoting airmen on a fully qualified basis to E4, makes it impossible to satisfy a third system's disaggregate E3 and E4 grade requirements. Hence, inadequate synchronization obstructs Air Force compliance with DoDD 1304.20's goal of satisfying authorizations for enlisted personnel, by grade, with the appropriate experience and skill.

[1] Meeting aggregate strength is a constraint rather than an objective as evidenced by the fact that the Air Force always has substantial numbers of unfunded manpower requirements that it cannot afford to fill. Similarly, the required grade for many positions exceeds the authorized grade. Strength managers also strive to meet promotion opportunity and timing constraints in order to realize retention patterns that will yield the required strength.

Managing Aggregate Strength and Grades

The principal means the Air Force uses to manage aggregate enlisted strength is modifying the non-prior service (NPS) accessions for each fiscal year. Targeted end strengths (the total strength planned to be in the force at the end of each fiscal year) are programmed through the defense Planning, Programming, Budgeting, and Execution (PPBE) System and annually authorized by Congress. Air Force analysts estimate expected losses from enlisted strength for each of several future fiscal years, and then they determine how many prior service and NPS accessions are needed to reach the targeted end strengths. The Air Force Recruiting Service subsequently almost always meets its aggregate NPS accession goal.

Overall strengths for the top five grades in the enlisted force are constrained through the PPBE System. In each programmed fiscal year, the Air Force, along with the other services, submits a grade plan to the Office of the Secretary of Defense (OSD) for approval. This plan specifies what proportion of its enlisted force will be in each of the top five enlisted grades. The proportions of the force in the two top grades are also capped by law (10 USC 517). Through a process similar to forecasting required NPS accessions, strength managers annually estimate the number of promotions needed to maintain targeted strengths in each of the top five grades during the ensuing year, and the promotion system identifies that number of individuals for promotion. Monthly promotion increments, adjusted to maintain targeted grade strengths, control the actual promotion timing. Because the promotion year does not align with the fiscal year, strength managers have the flexibility to meet end-of-year grade targets and simultaneously exhaust each promotion list within 12 months.

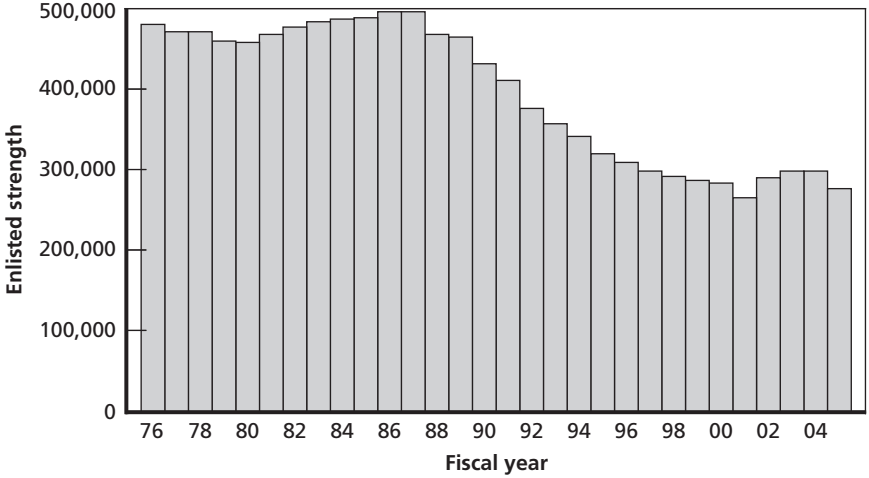
Promotions to E2 through E4 are on a fully qualified basis, primarily based on fixed periods of service. The practice of characterizing new E4s as fully qualified can be misleading because being a 5-level is not required for promotion to E4. Therefore, there should be no expectation that junior E4s will perform differently than senior E3s. As a practical matter, the policy of fixed phase points provides predictability and visible advancement for individuals who earn modest wages

during the early years of their Air Force careers. Also, promoting on a fully qualified basis is a relatively inexpensive system to administer. Promotion to E4 typically occurs at 36 months of service for four-year enlistees and 30 months for six-year enlistees. Because of recruiting incentives that accelerate their promotions to E2 and E3, six-year enlistees actually have more time in grade when they make E4. Because six-year enlistees typically remain in the Air Force for longer periods of time, they presumably reduce total recruiting and training costs, which offsets the higher cost of accelerated promotions.

Managing Strength Reductions

As Figure 3.1 illustrates, since the late 1980s, the Air Force has reduced its aggregate enlisted strength by 40 percent. Strength managers employed a number of techniques to accomplish this dramatic reduction.

Figure 3.1
Air Force Enlisted Strength, FY76–FY05



SOURCE: AFPC's *Interactive Demographic Analysis System* (IDEAS) and Static Reports (http://ask.afpc.randolph.af.mil).

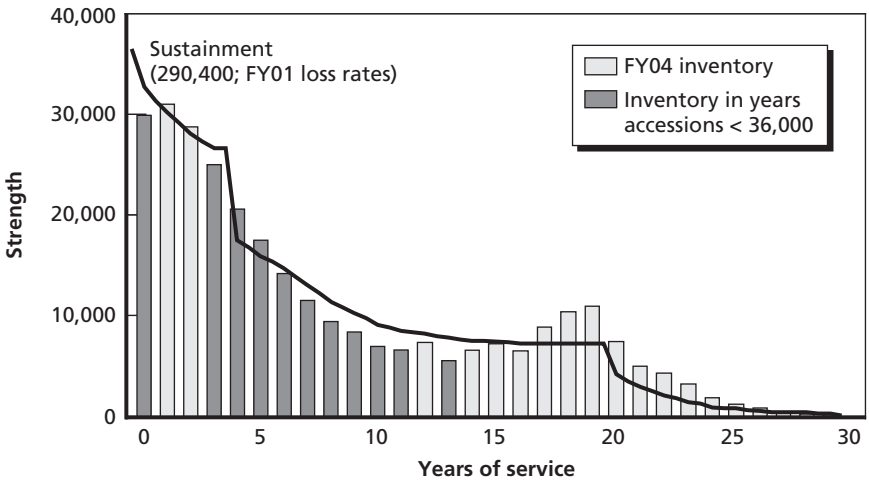
RAND *MG540-3.1*

Reducing Gains

The principal technique the Air Force used to reduce strength was to reduce NPS accessions to below sustainment[2] levels as illustrated in Figure 3.2.

Each bar in Figure 3.2 represents the actual number of active-duty enlisted members with the indicated years of service. The sustainment line shows the number of enlisted members the Air Force would have in each year of service if it accessed about 36,000 each year for the 30 years under FY01 loss patterns.[3] Comparing the line to the FY04

Figure 3.2
FY04 Inventory Versus FY01 Sustainment



SOURCE: AFPC IDEAS, RAND calculations.
RAND *MG540-3.2*

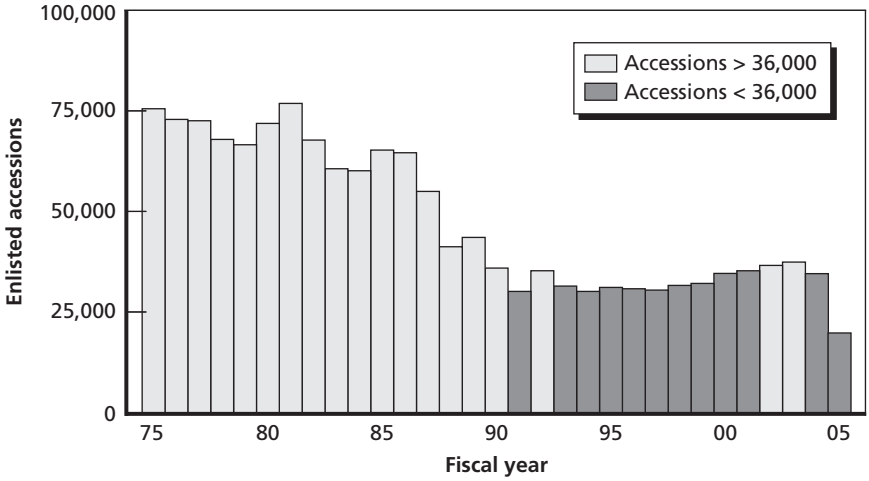
[2] *Sustainment* is a steady-state concept. In this context, it indicates the number of accessions required to sustain a specified authorized strength. If the Air Force accessed new recruits at sustainment levels for 30 years and loss rates remained constant, the resulting force would equal authorized strength, and it would have a years-of-service distribution that mirrored the line in Figure 3.2. Loss rates and total authorized strength determine the shapes of sustainment profiles.

[3] FY01 was the most recent year with normal loss rates. FY02–FY04 loss rates were abnormally low for reasons we discuss below.

inventory reveals that the Air Force did not access to FY01 sustainment for a number of years (the dark gray bars represent the remaining inventory from years in which accessions were fewer than 36,000, and the gray bars indicate the remaining inventory from accession years that equaled or exceeded 36,000). During the low-accession years, annual losses exceeded gains and strength fell as planned. The primary reason that the FY04 inventory exceeded the sustainment line for those with 17 or more years of service is that annual accessions prior to FY87 (17 years earlier) exceeded 50,000 (see Figure 3.3).

By accessing below sustainment, the Air Force drew the force down without forcing senior NCOs to separate before retirement, thereby remaining loyal to them while simultaneously retaining an experienced workforce. The choice to reduce strength by limiting NPS accessions was not an easy one because strength managers recognized that the resulting bathtub[4] would subsequently spawn a number of

Figure 3.3
Air Force NPS Accessions, FY75–FY05



SOURCE: OSD, Military Personnel Policy, Accession Policy.
RAND *MG540-3.3*

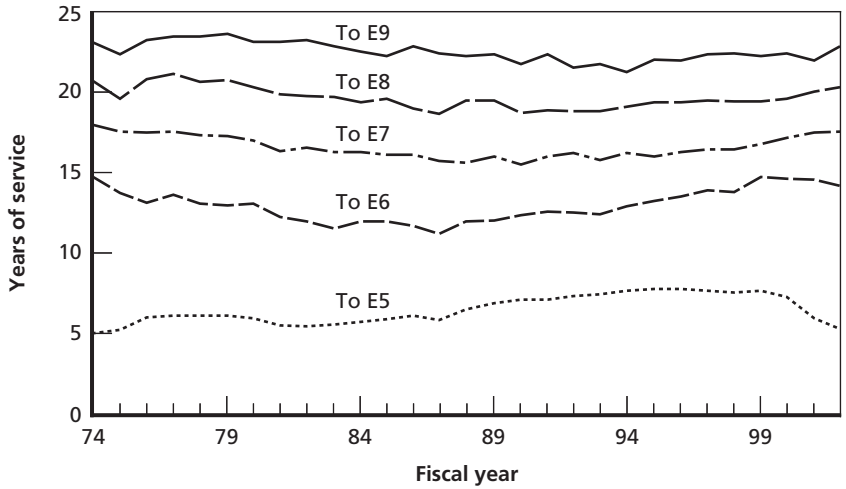
[4] *Bathtub* is a term used within AF personnel management circles to characterize a series of year groups that fall beneath a sustainment profile.

force management challenges. Figure 3.3 shows the enlisted accessions over the past 30 years that produced the FY04 inventory in Figure 3.2 (again, the dark gray bars represent years in which accessions were fewer than 36,000).[5]

The senior NCOs in the Air Force in FY04 were the remnants of year groups that entered the Air Force in substantially larger numbers from the mid-1970s through the mid-1980s. Lowering accessions and retaining a disproportionate number of NCOs predictably led to promotion timing challenges. Figure 3.4 shows average phase points[6] for enlisted members promoted since 1974.

As large year groups of NCOs progressed toward retirement while the Air Force was simultaneously drawing the force down, promotion phase points to E6 and E7 steadily increased starting in 1990, provoking

Figure 3.4
Enlisted Phase Points, FY74–FY02



SOURCE: AFPC/Directorate of Personnel Programs (DPP).
RAND *MG540-3.4*

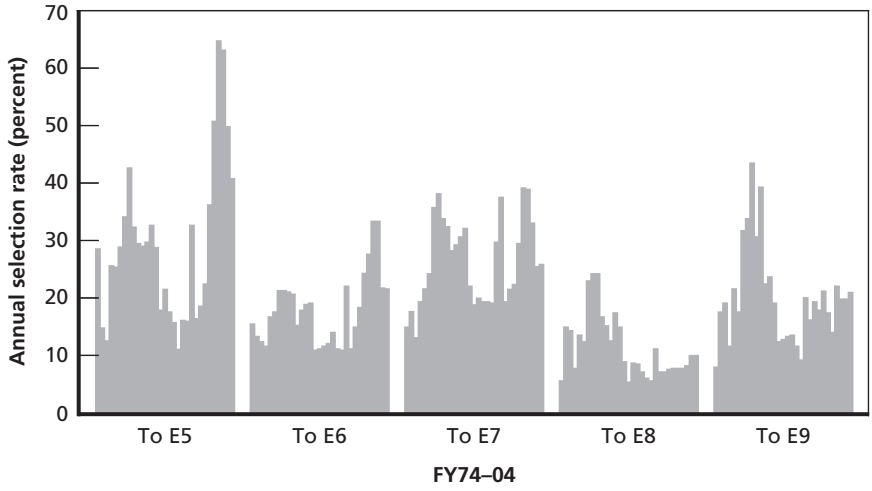
[5] We included FY05 accessions to illustrate that the Air Force continues to heavily rely on modifying accessions to manage end strength.

[6] Phase point is the number of years of service that members have at the time they sew on a particular enlisted grade.

concerns about stagnation in promotion tempo. To temper these increases and to attempt to comply with the DoDD 1304.20 goal of providing a visible, relatively stable career progression opportunity over the long term,[7] strength managers compensated by increasing promotion rates to E6 and E7, which also spiked promotions to E5,[8] as Figure 3.5 illustrates.

Although force managers were attempting to comply with DoDD 1304.20, we cannot conclude from Figures 3.4 and 3.5 that the Air Force did, in fact, achieve the goal of relatively stable career progression opportunity. The phase points of those who were promoted were stable within a range, but there were substantial variations in annual

Figure 3.5
Enlisted Promotion Rates



SOURCE: AFPC/DPP.
RAND *MG540-3.5*

[7] The 2005 edition of DoDD 1304.20 also includes this goal and places even greater emphasis on phase point management: 4.1.4. The Military Services shall define desired promotion timing objectives for grades E-5 through E-7. In normal years the average experience at promotion shall be within 1 year (above or below) the desired promotion timing. The desired promotion timing shall not change unless the Service institutes a major shift in enlisted personnel management.

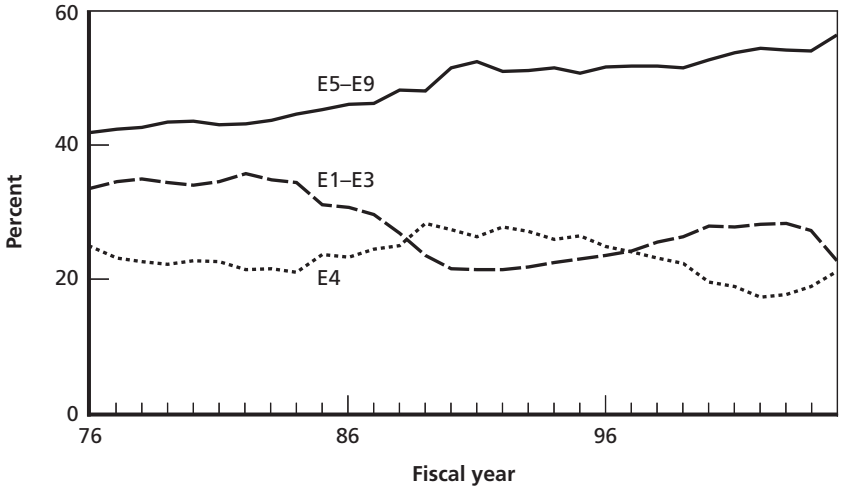
[8] Promoting an E6 to E7 also requires promoting an E5 to replace the E6 and promoting an E4 to replace the E5.

promotion rates. To address the question of compliance with DoDD 1304.20, one would need to estimate and track over time the lifetime probability of making the next higher grade conditioned on having achieved the current grade. To our knowledge, nobody in the Air Force calculates these statistics.

As Figure 3.6 shows, higher promotion rates to E5, E6, and E7, in conjunction with larger year groups, required increasing the percentage of the enlisted force in the top five grades from 45 percent when DoDD 1304.20 was published in FY85 to 56 percent in 2005. Some might argue that the continuous growth in the percentage in the top five grades is inconsistent with DoDD 1304.20's goal of ensuring a self-sustaining, vigorous force with relatively stable career content. Although it is beyond the scope of this monograph, the percentage in the top five grades would return to mid-1980s levels if the Air Force stabilized enlisted end strength and loss rates returned to normal levels.

Since the phase point to E4 is fixed at 36 months for four-year enlistees and 30 months for six-year enlistees, the additional promotions to

Figure 3.6
Enlisted Inventory, FY76–FY05

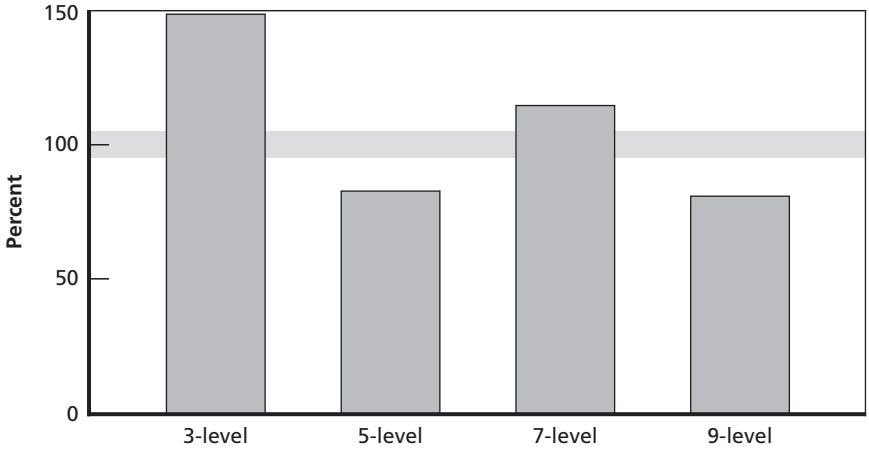


SOURCE: AFPC IDEAS.
RAND *MG540-3.6*

E5–E7 that began in the 1990s drained E4 strength more quickly than it could be replenished. This sequence of events, which began with the decision to primarily reduce strength by reducing accessions, contributed to the 5-level shortage (primarily in E4s) that the Air Force experienced at the end of FY04 (Figure 3.7).

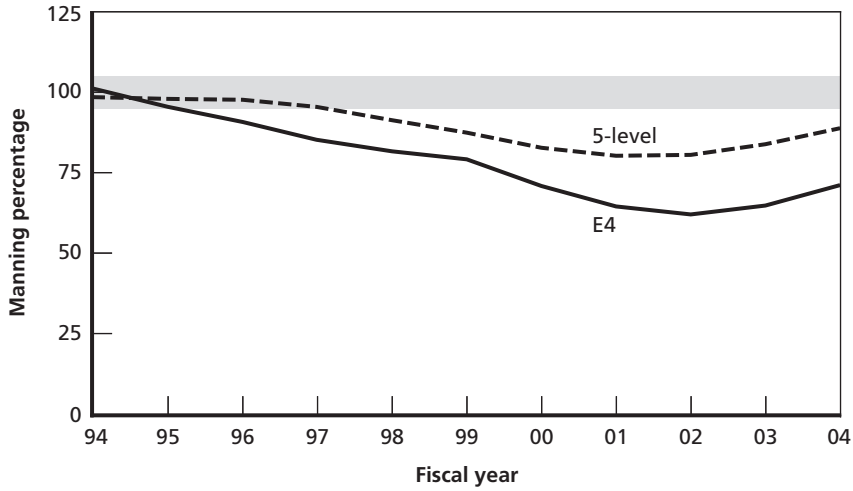
The 5-level shortage the Air Force experienced at the end of FY04 was systemic and not isolated (5-level manning has been out of tolerance since FY97). This is a key point. As seen in Figure 3.8, E4 manning (and consequently 5-level manning) cannot be controlled—largely as the result of fixed E4 phase points combined with the Air Force's decision to manage aggregate strength by modifying NPS accessions. Even though 5-level manning is driven by these two policies, force managers do modify manning at the margin by offering reenlistment bonuses.

Figure 3.7
Aggregate Manning by Skill Level, September 2004



SOURCE: AFPC RAW.
RAND *MG540-3.7*

Figure 3.8
E4 and 5-Level Manning over Time



SOURCE: AFPC RAW.
RAND *MG540-3.8*

In addition to reducing accessions, the Air Force used other tactics to reduce the size of the enlisted force. We briefly discuss some of them in the interest of balance.

First-Term Date of Separation Rollup

A second technique that generated substantial losses the initial year that strength managers employed it in the late 1980s was the first-term date of separation (DOS) rollup. It required first-term, four-year enlistees to reenlist or separate after 36 months rather than 48 months. In its first year, this policy generated end-of-initial-enlistment losses from two year groups: those reaching 36 months and those reaching 48 months. However, in subsequent years, there were losses only from those reaching 36 months. As is often the case, it was difficult to revert to the original policy.

In this instance, the Air Force could not meet falling strength requirements and simultaneously abstain from end of first-term losses during a 12-month transition back to 48 months.

The first-term DOS rollup and fewer NPS accessions reduced strength in the lower grades. Although some of the other services imposed mandatory reductions on high grades to keep their forces in balance, the Air Force elected to generate additional losses in the higher grades through voluntary programs.

Voluntary Separation Incentive (VSI)/Special Separation Benefit (SSB)

In order to maintain a flow of new accessions to ensure a vigorous force in the future, Congress authorized incentives for senior members to leave. Senior members who were not eligible for retired pay qualified for compensation if they separated. VSI was an annuity and SSB was a lump sum.

Temporary Early Retirement Authority (TERA)

To help trim the senior enlisted ranks, Congress gave the services temporary early retirement authority from FY93 to FY99. TERA allowed senior members with less than 20 years of service to retire with reduced benefits. The Air Force never offered this option to enlisted members, and this kept experience levels high.

Reduced High Year of Tenure (HYT)

HYT is a policy that limits the number of years that enlisted members can remain in the Air Force as a function of grade. The principal motivations for HYT are to keep promotion rates higher and phase points lower by separating those who have fallen behind their peers. Table 3.1 shows current HYT limits and those that were in effect during the drawdown. Lower ceilings during the drawdown had a magnified effect because shrinking authorizations placed downward pressure on promotion rates, which increased phase points and caused more NCOs to hit the HYT barrier.

Table 3.1
HYT Ceilings (Years of Service)

	E4	E5	E6	E7	E8	E9
Current	12	20	24	26	28	30
Drawdown period	10	20	20	24	26	30

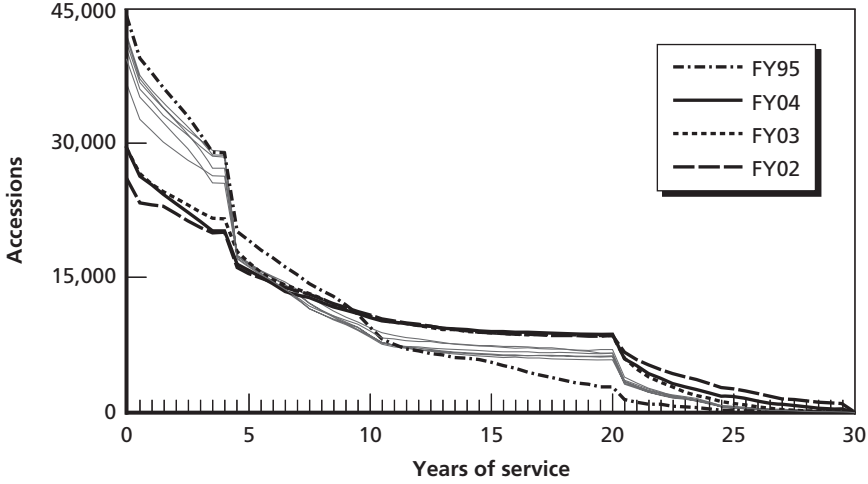
SOURCE: AFPC/DPP.

Predicting Losses

Before strength managers can select the appropriate courses of action to achieve aggregate strength, they must anticipate the problem correctly. The most critical requirement for effectively managing aggregate strength is to predict losses accurately. However, this is a nontrivial task for at least two reasons. First, because most options require substantial lead times, strength managers need to have an accurate projection of a fiscal year's losses before the beginning of the fiscal year. Second, accurately predicting losses requires analytical sophistication.[9] For example, it is normally not adequate to use historical loss rates as the sole predictor of future loss rates. Figure 3.9 illustrates why this is the case. It shows a broad range of possible enlisted force sustainment profiles for the FY05 target force of 290,400 that we derived using single-year historical loss rates over 1995–2004. We estimated these annual loss rates from the AFPC IDEAS end-of-year strength snapshots. They illustrate that loss rates can vary greatly from one year to the next. Simply using historical loss rates to predict the future would lead one to conclude that the Air Force could sustain a force of 290,400 with somewhere between 26,000 (FY02 loss rates) and 44,000 (FY95 rates) accessions per year. Such a broad range would be of limited utility to strength managers as they develop goals for the Air Force Recruiting Service. Because loss rates are not solely a function of external forces, loss forecasts also need to account for past and future Air Force policy

[9] In the late 1980s and early 1990s, the Air Force's Enlisted Force Management System employed sophisticated loss models. However, the Air Force has since eliminated the positions associated with maintaining those models.

Figure 3.9
Sustainment Profiles, FY95–FY04 Loss Rates



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changes that abnormally affect loss rates. For example, in FY02, the Air Force implemented the Stop Loss program in the aftermath of the 9/11 attacks.[10] This policy drove loss rates to abnormally low levels by restricting losses during a period of hostile military operations. However, even as the Air Force phased out Stop Loss, loss rates remained low in FY03 and FY04. This may have been due to higher post-9/11

[10] Under certain levels of hostilities, the Air Force may curtail losses from any or all AFSCs. When implemented, Stop Loss ensures that the Air Force will not experience an exodus of trained assets when it needs them most. However, when gains continue at normal rates and losses drop to nearly zero, strength grows rapidly. At current NPS accession levels, an across-the-board Stop Loss program would cause the size of the enlisted force to increase at a rate of 30,000–35,000 per year. The effects of Stop Loss can be long lasting. Not all of the losses prevented by Stop Loss necessarily materialize when the program is lifted. The nearer Stop Loss takes an individual to retirement, the more likely that person is to remain in the Air Force. Members must also find jobs and make housing arrangements before they separate. Because members do not know when the Air Force will lift Stop Loss, it is difficult for them to make transition plans. In addition, world events that are significant enough to move the Air Force to implement Stop Loss may well exert downward pressure on the U.S. economy and make it more difficult for members who wish to separate to find jobs. Such factors as increased patriotism and a feeling of mission accomplishment can also increase retention rates during times of conflict.

patriotism, which is a top reason that enlisted members remain in the Air Force. However, another factor, a shift in the mix of four- and six-year enlistees, substantially contributed to the lower loss rates in FY03 and FY04.

As indicated in Table 3.2, starting in FY99, the Air Force modified its policy to allow a dramatic increase in six-year enlistments. The rate jumped from 8 percent in FY98 to 43 percent in FY99, and the rate has remained above 40 percent with a corresponding reduction in the four-year enlistments. The four-year enlistees who entered the Air Force in FY99 were first eligible to separate in FY03, but the six-year enlistees who entered in FY99 were not be eligible to separate until FY05. Therefore, in FY03 and FY04, the number of first-term airmen who were eligible to separate was dramatically lower than normal (gray-shaded cells). There were about 7,000 fewer losses in FY03 and FY04 combined because of the FY99 policy change. In FY05, as the FY99 six-year enlistees became eligible to separate, losses should have been closer to normal rates.

This discussion demonstrates the importance of normalizing loss rates to account for abnormal events in the past and projected policy changes. The best loss forecasts also anticipate changes in external forces (e.g., the economy) that affect Air Force loss rates.[11]

Table 3.2
Four- and Six-Year Enlistments by Fiscal Year

Year of Enlistment	96	97	98	99	00	01	02	03	04
Four-year enlistees									
% of NPS accessions	95	94	92	57	52	49	56	56	57
First FY eligible to separate	00	01	02	03	04	05	06	07	08
Six-year enlistees									
% of NPS accessions	5	6	8	43	48	51	44	44	43
First FY eligible to separate	02	03	04	05	06	07	08	09	10

[11] The discontinued Enlisted Force Management System normalized loss rates and accounted for exogenous factors.

In this chapter, we have discussed the basics of aggregate strength management. We saw that managing total strength by varying NPS accessions unavoidably affects E4 manning under current promotion policy. In the next chapter, we look at disaggregate strength management, which is a bit more complicated.

CHAPTER FOUR

The Enlisted Disaggregate Strength Management System

Using Chapter Three as a backdrop, this chapter discusses some of the methods used to manage the strength of AFSCs. In disaggregate strength management, some methods target the total strength of an AFSC whereas others are appropriate for managing strength in the NCO grades (E5–E9). These methods tend to be interrelated in subtle ways, with strong potential to produce the secondary results that we discuss. After we introduce disaggregate strength management techniques in this chapter, we show in subsequent chapters that the Air Force, through its own force management actions, brings about conditions that require costly attention. Finally, we show that these costs can be avoided.

Managing the Total Strength of an AFSC

As we have seen, total aggregate strength is managed primarily by calculating appropriate NPS recruiting goals, given targeted end strengths, expected losses, and other gains such as expected prior service accessions. Within an AFSC, the trained personnel requirement (TPR)[1] process at one time applied the same approach at the disaggregate level of detail. The disaggregate process, however, was more complex because

[1] The TPR specifies annual production from Air Force technical training schools. Accessions to generate this production usually come from two fiscal years—the fiscal year in which production occurs and the previous fiscal year.

it was also necessary to consider such factors as promotions, expected cross-flow between AFSCs, the reality that funded manpower authorizations did not necessarily sum to aggregate end strengths, and the fact that smaller populations made forecasting losses less certain. The old TPR process often produced training requirements that fluctuated dramatically from one year to the next for many AFSCs. These oscillations greatly complicated training and disaggregate strength management. To help stabilize the training infrastructure, the TPR process is now slanted toward maintaining stable strength profiles based on historical retention and retraining patterns, independent of authorizations by grade.

As we did when we examined aggregate strength management, we first examine the dynamics of managing a reduction in an AFSC's strength. However, because some disaggregate authorizations can increase even as aggregate strength is decreasing, we also examine the dynamics of managing an increase.

Reducing Strength by Lowering Accessions

The primary lever used to reduce strength in an AFSC is to reduce accessions into the AFSC, either by lowering the TPR or by shorter-term diversions within the training pipeline. However, if the problem is overmanning in the top five grades, this approach will generate E3 and E4 undermanning problems.

The quickest way to reduce gains into an AFSC is to pull members out of initial skill training courses and classify them into other AFSCs. However, there could be a number of consequences to this course of action. Those who entered under the Guaranteed Training Enlistment Program (GTEP) would have the option of separating, since the training the Air Force promised would no longer be available. The Air Force also guarantees all others training in an *aptitude area* (mechanical, administrative, general, or electronic). It could be the case that no other AFSCs in the same aptitude area require additional production. Finally, there are some airmen whose low Armed Services

Vocational Aptitude Battery[2] (ASVAB) scores restrict their service to a single AFSC within an aptitude area.

The second most expedient option would be to modify the flow out of basic military training (BMT). Reclassifying non-GTEP recruits into other AFSCs would generate no ill will because recruits do not know their AFSCs until the final days of BMT. Again, GTEPs would have the option of separating, and there could be logistical challenges for the technical training centers.

Depending on the magnitude of the reduction, a third option would be to reduce the number of GTEPs in the Delayed Enlistment Program (DEP). In practice, the Air Force Recruiting Service would offer the GTEPs in question the option of switching to other AFSCs or of further delaying their entry into the Air Force. By moving extended active-duty dates far enough into the future, GTEPs could be moved into the next fiscal year's technical school production. Changing contracts is generally not viewed as an attractive option within the Recruiting Service, because it generates angst among recruits who might change their minds and decide not to join the Air Force. Another way to reduce the size of the DEP would be to redirect recruits toward the Air National Guard or Air Force Reserve.

Other Strength Reduction Methods

Palace Chase.[3] The Air Force may allow airmen in some AFSCs who have not reached a reenlistment decision point to separate early in order to accept a position in the Air National Guard or the Air Force Reserve.

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[2] To be classified into a specific AFSC, a basic military training (BMT) graduate must have a qualifying Armed Forces Qualification Test (AFQT) score and the Mechanical (M), Administrative (A), General (G), or Electronic (E) score required for that AFSC. Air Force testing experts derive MAGE scores from ASVAB subtests. OSD testing experts derive the AFQT score from a subset of the ASVAB test modules that is primarily related to math and English skills.

[3] The Palace Chase program is an early release program that allows active Air Force officers and enlisted members to request to transfer from active military service to an Air Reserve component.

Interservice Transfers. The Air Force may allow airmen in some AFSCs who have not reached a reenlistment decision point to separate in order to accept a position in another active-duty service component.

Increasing Total Strength in an AFSC

Actions to increase strength are generally the opposite of those used to decrease strength. Chief among them is increasing the TPR to above the sustainment level for some period of time.

Strength managers offer initial enlistment bonuses (IEBs) to encourage new recruits to volunteer for AFSCs that are difficult to fill. One consequence of offering IEBs in large numbers of AFSCs is that it becomes a challenge for recruiters to steer bonus-motivated enlistees into the AFSCs that are traditionally difficult to fill. Casting a very wide IEB net appears to reflect a higher priority on meeting aggregate strength than on meeting disaggregate strength.

Managing the NCO Strength of an AFSC

Independent of the actions taken to manage the total strength of an AFSC, other options can be exercised to increase or decrease the proportion of NCOs in the AFSC. Although these actions might be viewed as increasing or decreasing the total strength of an AFSC, they could in practice be balanced by offsetting changes in the level of NPS accessions called for by the TPR. Thus, it is possible to increase or decrease NCO strength without changing the total strength in an AFSC.

The enlisted promotion system sustains rather than corrects NCO shortages and overages in an AFSC. Therefore, the Air Force employs a variety of strength management programs to move NCO manning toward required levels across AFSCs. We first discuss methods to increase NCO strengths in AFSCs that have higher percentages of NCO requirements and then discuss methods to reduce strengths in AFSCs with lower NCO requirements. As we see in Chapters Five and Six, the natural tendency for an AFSC to be undermanned or overmanned in the NCO grades can be partially attributed to the manpower and promotion systems.

Increasing NCO Strength in an AFSC

There are two primary methods for increasing NCO strength in an AFSC: retraining-in[4] lateral gains from other AFSCs and awarding bonuses to reduce the AFSC's own losses.

Retraining-In. The objective of the NCO retraining program is to align strength to requirements by AFSC and grade. The annual NCO retraining program moves individuals who are reenlisting for at least the second time from AFSC/grade combinations with substantial NCO overages into AFSC/grades with substantial NCO shortages. Strength managers in the Deputy Chief of Staff for Personnel's Training/Education Requirements Division (AF/A1PT) determine retraining requirements and communicate them through the On-Line Retraining Advisory. The retraining program consists of voluntary and involuntary phases. During the voluntary phase, eligible NCOs in AFSC/grades with overages may elect to retrain into AFSC/grades with shortages.[5] During this phase, the Air Force also notifies a subset of the eligible NCOs that they are vulnerable to involuntary retraining should it become necessary during the second phase of retraining.

When enough NCOs do not volunteer to meet retraining objectives, strength managers, in an effort to avoid involuntary retraining, return NCOs with secondary AFSCs in shortage skills to those skills if it is in the best interest of the Air Force. If this fails to achieve retraining objectives, strength managers implement involuntary retraining.

Under the Career Airmen Reenlistment Reservation System (CAREERS), airmen who reach the end of their first enlistment contracts can, as a matter of personal preference, retrain into skills where shortages exist, regardless of the total or NCO manning in their current AFSCs. Because CAREERS does not consider the manning of the losing AFSC, it might also be characterized as a retention program. Presumably, it is better to lose an airman from one shortage AFSC to another shortage AFSC than to lose the individual to the Air Force.

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[4] See AFI 36-2626 (1999).

[5] One eligibility requirement is that individuals who retrain must have at least the minimum MAGE score to qualify for training in the new AFSC.

However, there is no reason that manning bounds could not be placed on losing AFSCs with high training costs.

A conservative estimate is that the Air Force retrains about 4,000 people per year at a cost of about $40 million.[6] Table 4.1 illuminates the major centers of retraining activity. Each cell with a bullet indicates that, on average, at least 100 retrain annually in that cell.

It may come as a surprise that the Air Force simultaneously retrains out of and into the same AFSC. Figure 4.1 shows the data for FY04. Each diamond in Figure 4.1 represents an AFSC.

The horizontal axis in Figure 4.1 indicates the number that the Air Force retrained out of each AFSC in FY04, and the vertical axis records the number that the AF retrained into the same AFSC. For example, for AFSC 4N0X1 (Medical Service), strength managers retrained out 61 and retrained in 80 for a net gain of 19 in the AFSC (see arrow in the figure). Retraining in both directions in the same AFSC occurs

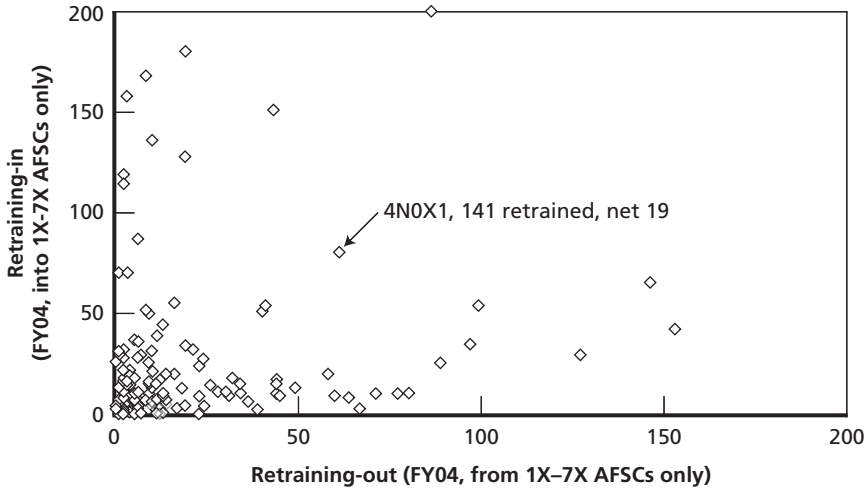
Table 4.1
Primary Retraining Acitivity

	Retrain into These AFSCs:							
Retrain from These AFSCs	**1X**	**2X**	**3X**	**4X**	**5X**	**6X**	**7X**	**8X**
1XXXX (Operations)	•		•					
2XXXX (Logistics)	•	•	•					•
3XXXX (Support)	•		•					•
4XXXX (Medical)				•				•
5XXXX (Professional)								
6XXXX (Acquisition)								
7XXXX (OSI[a])								
8XXXX (Special Duty)			•					

[a]Office of Special Investigations

[6] This is a conservative estimate. It assumes that only E4s retrain. The retraining cost per E4 is based only on composite salary (without permanent-change-of-station costs) and assumes that time spent in technical training is an opportunity cost that persists for only 10 weeks.

Figure 4.1
AFSCs with Simultaneous Retraining-In and Retraining-Out



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primarily because of the AFSC's authorization structure. In Chapter Seven, we explore this phenomenon and consider mitigating policy changes.

Selective Reenlistment Bonuses (SRBs). Manning by grade does not drive SRBs. It is more often the case that manning by skill level influences SRB decisions. The Air Force SRB budget is normally about $200 million per year.[7] SRBs encourage members to retrain into bonus AFSCs. SRBs also increase the continuation rates[8] of those already in bonus AFSCs. An unappealing aspect of managing the force with a large SRB budget is that the Air Force awards bonuses to substantial numbers of airmen who would have remained without bonuses. However, measuring this "economic rent" is problematic because the Air

[7] Much of the SRB budget is used for honoring past commitments. The $200 million figure is expected to decline over time as fewer AFSCs qualify for bonuses.

[8] The *continuation rate* for an AFSC is the percentage of individuals who start a fiscal year in that AFSC and are still in it at the end of the year.

Force currently has only a limited ability to predict the reaction within an AFSC to bonuses.[9]

Strength managers may offer three different SRBs within the same AFSC based on years of service (see Table 4.2). SRB managers could most easily manage to a year-of-service profile if a sanctioned profile existed for each AFSC.[10] Given that the objective of disaggregate strength management is to align the inventory with requirements by grade, developing these profiles would require the ability to dynamically translate grades by AFSC into years of service. However, the Air Force no longer maintains models capable of accurately estimating the disaggregate and dynamic interactions of SRBs, continuation rates, and promotions.[11]

Table 4.3 shows the composition of the force by grade in each SRB zone. At the end of FY04, SRBs would have had the most impact on E5 manning. While Zone A bonuses undoubtedly influence E4

Table 4.2
SRB Zones

Zone	For Reenlistments Occurring with Time in Service
A	17 months through 6 years
B	6 years 1 day through 10 years
C	10 years 1 day through 14 years

[9] The services often pay bonuses to groups of officers or enlisted members to increase retention. Some individuals within these groups would have remained even if they had not received bonuses, although the services do not know who they are. Within DoD analysis circles, bonuses paid to members who would have remained without bonuses are called "economic rent."

[10] Whereas SRB zones are determined by years of service, the Air Force tracks reenlistments rates by term of enlistment: those reenlisting at the end of their first term, second term, and all other terms (career). For example, an individual reenlisting at the end of the first term might have a Zone A or a Zone B multiplier. Hence, the policy lever does not exactly align with the metric or the objective.

[11] The Enlisted Force Management System provided this capability.

Table 4.3
Grade Distribution Within SRB Zones, September 2004 (%)

	Zone A[a]	Zone B	Zone C
E3	2		
E4	51	7	1
E5	47	90	62
E6		3	36
E7			1
Total	100	100	100

[a] Because the Air Force only offers four- and six-year initial enlistments and because SRBs are only awarded at reenlistment points, this table includes only those with at least four years of service.

manning at the margin, we have already seen that E4 manning is primarily a function of past accession patterns and E5–E9 promotion rates.

The amount of an SRB is calculated by multiplying an individual's monthly base pay by the length of the reenlistment (in years) and by the bonus multiplier. The Deputy Chief of Staff's Force Management Policy Division (AF/A1PF) staff sets multipliers that currently range from 0.5 to 6.5 in 0.5 increments. For example, an E6 with 8 years of service who reenlists for 4 years in an AFSC with a multiplier of 5.5 would earn an SRB equal to

$$\$2{,}604.30 \times 4 \times 5.5 = \$57{,}294.60 .^{12}$$

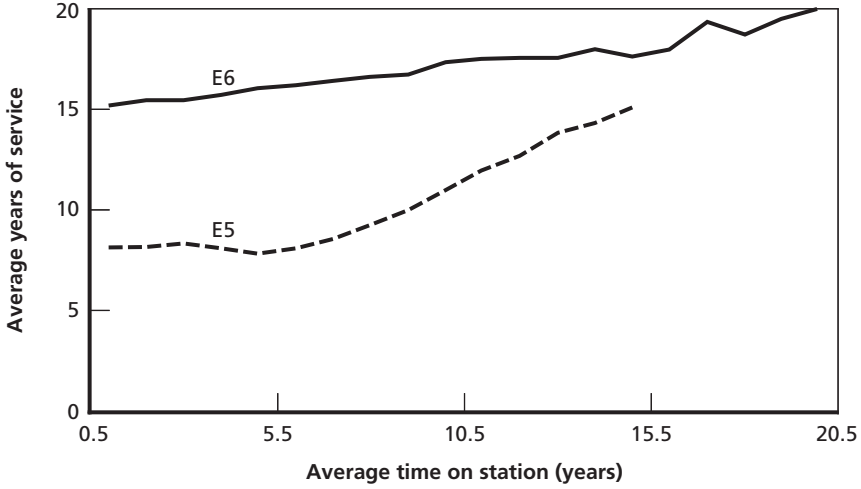
The Air Force pays individuals 50 percent of the bonus at reenlistment and the remaining 50 percent in annual installments during the reenlistment period.

[12] Base pay extracted from January 2005 pay tables. An SRB may not exceed $60,000.

Reducing NCO Strength in an AFSC

Retraining-Out. Retraining-out is essentially the opposite of retraining-in. For each AFSC with a retraining-out objective, strength managers generate a list of potential non-volunteers. Because some of these members may not be eligible for retraining at the time it eventually becomes necessary, the number on each list equals three times the retraining objective. In addition, simply knowing that they are on the list encourages many to voluntarily retrain so that they do not get whatever is left if involuntary retraining becomes necessary. The selection criterion for the list is highest time on station.[13] As Figure 4.2 shows, NCOs with higher time on station also tend to have higher time in service and therefore more experience.

Figure 4.2
Relationship Between Average Years of Service and Average Time on Station, September 2004



SOURCE: AFPC IDEAS.
RAND *MG540-4.2*

[13] *Time on station* at a point in time is the difference between that point and an individual's date arrived station. Date arrived station is normally the date upon which an individual reports to a new duty location as the result of a permanent-change-of-station move. However, when a new job is in the same corporate limits of the same city or town as the last job or when the member does not relocate his/her household, date arrived station does not change. See AFI 36-2110 (2005), p. 103.

The NCOs with higher time in service in a given grade are those who have competed less successfully for promotion, due primarily to lower promotion fitness exam and skills knowledge test scores.[14] Hence, a consequence of strength management policy is that the NCOs the Air Force encourages to retrain tend to be those who have demonstrated a lower propensity to absorb new material. Of course, NCOs in AFSCs with overages who are not on the list can also retrain as a matter of personal preference.

Career Job Reservations (CJRs). To reduce the strength in an AFSC, force managers may limit the number of first-term airmen who are allowed to reenlist in that AFSC. Airmen who fail to secure CJRs in their current AFSCs may retrain through CAREERS or separate from the active-duty Air Force. The Air Force uses the criteria in Table 4.4 to rank-order the airmen competing for CJRs in an AFSC.

Table 4.4
Sorting Logic Used to Rank-Order Airmen Competing for CJRs

Step	Condition
1	Those with unfavorable information files[a] go to the bottom of the list for the AFSC
2	Those with top scores on their last three enlisted performance reports (EPRs)[b] go to the top
3	For those with identical EPR scores, those with a higher current grade go to the top
4	For those with identical EPR scores and identical grades, those with a projected grade (already selected for promotion) go to the top
5	For those with the same projected grade, those with an earlier date of rank (to current grade) go to the top
6	For those with the same date of rank, those with an earlier total active federal military service date (TAFMSD) go to the top
7	For those with the same TAFMSD, those with an earlier date of birth go to the top

[a] Unfavorable information files document failures to comply with regulations and are normally associated with lapses in discipline.

[b] Scores are integers between 1 (low) and 5 (high).

[14] These two tests are components of the enlisted promotion system that we discuss in Chapter Five.

CJR ranking criteria push lower performers out of the Air Force or into other AFSCs. Gaining AFSCs, which tend to have richer NCO requirements, probably do not view this policy as being in their best interests. As subsequent chapters show, some CJR actions—which lead to retraining poorer performers—are counterproductive and easily avoided.

Chapter Highlights

In this chapter, we have seen that TPR, SRB, and retraining managers all work toward different objectives. SRB managers primarily influence 5-level manning; TPR managers focus on sustaining the total strength of AFSCs; and retraining managers are primarily concerned about strength by grade. Ideally, all enlisted managers would be working toward a common goal. We will see in the next chapter that many retraining and SRB activities are reactions to the imbalances generated by the enlisted promotion system.

CHAPTER FIVE

The Enlisted Promotion System

Air Force Pamphlet 36-2241 (2005) contains the following statement about the objectives of the enlisted promotion system:

> The enlisted promotion system supports DoDD 1304.20, Enlisted Personnel Management System, by helping to provide a visible, relatively stable career progression opportunity over the long term; attracting, retaining, and motivating to career service the kinds and numbers of people the military services need; and ensuring a reasonably uniform application of the principle of equal pay for equal work among the military services.[1]

This passage references three of the nine DoDD 1304.20 (1984) goals for enlisted force management. Although we show in this chapter that the Air Force enlisted promotion system acts counter to some of the other six DoDD goals, achieving the three promotion objectives listed in AF Pamphlet 36-2241 is an integral part of the Air Force enlisted culture.

Given the considerable variation in authorized grade structures across AFSCs (Figure 2.5), the Air Force could have taken two basic approaches to designing a promotion system. One option would have been to promote individuals according to the requirements of each AFSC. Prior to 1972, this was the Air Force's tactic. It is also the approach taken by the other services. Under this system, the opportunity to progress from one grade to another often varied widely across

[1] Air Force Pamphlet 36-2241 (2005), p. 234.

AFSCs. To the extent that AFSCs are not demographically homogenous, as is the case today, promoting to requirements could have a disproportionate effect on some groups. Although this approach would be tractable from a force management perspective, it has at least two potential downsides. First, about half of new recruits do not enter the Air Force with guaranteed AFSCs. Rather, the Air Force classifies them into AFSCs based on its needs. There could be aggregate morale and retention implications if the Air Force assigned recruits involuntarily to AFSCs with reduced opportunity for advancement.[2] Additionally, individuals in AFSCs with increasing requirements (for example, those associated with new weapon systems being phased into the inventory) would receive promotion windfalls while those serving in AFSCs with decreasing requirements would feel unfairly disadvantaged.[3] It could also be argued that promoting to requirements would be inconsistent with the DoDD 1304.20 (1984) goal of ensuring a reasonably uniform application of the principle of equal pay for equal work if one measures equal work in terms of years of experience.[4]

A second approach to designing a promotion system would be to give everyone an equal opportunity for promotion, independent of each AFSC's grade requirements. In fact, since 1972, equal selection opportunity (ESO) has been the Air Force's promotion policy. ESO distributes annual promotions, by grade, to each AFSC in proportion to the

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[2] The enlisted force has a record of being actively engaged in its promotion system. In the middle 1960s the enlisted promotion system to E4–E7 had command-centered promotion boards but no standard promotion procedures. Those eligible for promotion had no understanding of how competitive they were, and no one could give them guidance on how to improve their promotability if they were not promoted. Airmen dissatisfaction was growing, and that dissatisfaction was being expressed to the Air Staff and Congress in increasing volume. (Shore and Gould, 2004, p. 10)

[3] The Air Force currently provides enlisted members not selected for promotion with their scores, promotion cutoff scores, and the number of nonselected personnel who had higher scores. Even if it constricted feedback, in the age of the Internet it is hard to imagine that the Air Force could obscure the fact that some AFSCs had a 0 percent promotion rate in a given cycle.

[4] Presumably, the services that promoted to requirements either had a different definition of "equal work" or placed a higher priority on other DoDD 1304.20 goals.

number of members eligible for promotion in that AFSC.[5] Therefore, ESO tends to sustain overmanning in already overmanned AFSCs and undermanning in already undermanned AFSCs. Thus, while ESO acts counter to the DoDD 1304.20 goal of minimizing specialty imbalances over time, it does help ensure a reasonably uniform application of the 1984 principle of equal pay for equal work because it tends to maintain parity in lifetime earnings from base pay across AFSCs.

In an attempt to keep disaggregate manning percentages within an acceptable band about 100 percent, strength managers exercise the options we discussed in Chapter Four to react to the AFSC/grade overages and shortages that are unmitigated—and at times caused—by ESO. We also observed that force managers exercise policy options to channel retrainees into AFSCs with a richer proportion of authorized top five grades. Although increased retraining into an AFSC/grade combination improves manning at that grade, it simultaneously increases the base that generates promotions for the next-higher grade. However, it is often the case that the next-higher grade does not require more promotions. This is another instance of a disconnect between the strength management, enlisted promotion, and requirements systems.

The Weighted Airman Promotion System (WAPS)[6]

In the enlisted force, promotion to E2–E4 is on a fully qualified basis and is primarily a function of time, with 15 percent being promoted early to E4 based on performance.[7] Since 1970, promotion to E5–E7 has been formula driven and involves no promotion board. Each eligible airman earns a weighted score that is a function of enlisted performance report scores (EPR), decorations, score on the promotion fit-

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[5] The ESO policy allows a measured departure from this overall scheme for mission-critical AFSCs with chronic shortages. These AFSCs realize promotion rates that are 1.2 times the rates in other AFSCs.

[6] WAPS is the system that the Air Force uses to promote airmen to the top five grades within each AFSC.

[7] Commanders delay promotions for a small percentage of airmen with disciplinary or low performance issues.

ness exam (PFE), score on the Skills Knowledge Test (SKT), time in service (TIS), and time in grade (TIG).[8] Promotion to E8 and E9 has an additional component—a board score. Each of these factors carries a different point value that in 1970 reflected the importance the Air Force placed on that factor.[9] Today, contrary to the notion held by many, WAPS factors with more points available do not necessarily play greater roles in determining whom the Air Force promotes. Rather, factors that have greater variations in points actually awarded have greater effects on promotion results. In more familiar terms, variation is a measure of point spread. For example, for promotion to E7, EPR scores make up to 135 points available. However, because almost all E6s earn nearly perfect EPR scores, EPRs have the smallest point spread and the least impact in determining promotion to E7. When one examines EPR scores over time, the inflation that continues to diminish variation becomes apparent.

For promotion to E7, the greatest variation occurs in test scores. Partially because the Air Force does not standardize test scores across AFSCs, testing does not have the same promotion impact in every AFSC. Some might argue that testing differences across AFSCs are not problematic because members of an AFSC only compete among themselves for available promotions. However, this view may miss the mark. Differences in testing impact could subtly lead to senior NCO overmanning or undermanning pressures in some AFSCs. Here is the serpentine logic trail:

1. Suppose an AFSC has a difficult SKT or a difficult version of the PFE. Tests that are more difficult lead to a wider range of test scores. Within an AFSC, this tends to favor good testers by

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[8] E4s–E6s earn up to 100 points on the PFE, up to 100 points on the SKT, up to 25 points for decorations, up to 60 points for TIG, up to 40 points for TIS, and up to 135 points for EPRs.

[9] "WAPS has undergone revalidation in 1972, 1977, and 1986. Using a policy-capturing approach for each revalidation, the data indicated that different promotion formulae should be applied to those in different grades. However, it was determined that different weighting schemes would lead to a less understandable, and potentially less acceptable, system." (Duncan, 1994, pp. 1–2)

placing more weight (variation) on testing and less weight on longevity and the other WAPS factors.

2. Better testers tend to have less TIG. Members with good EPR scores and high TIG necessarily have a record of poor testing. Therefore, in AFSCs with difficult tests, promoted airmen tend to have less TIS when they sew on each grade.
3. Consider two AFSCs, one with a phase point to E7 of 14 years, and another, 16 years. NCOs in the AFSC with the 14-year phase point would, on average, compete for promotion to E8 in 12 annual promotion cycles before reaching high year of tenure at 26 years of service, whereas those in the AFSC with the 16-year phase point would, on average, compete in only 10 annual cycles. Since ESO distributes promotions based on the size of each AFSC's eligible pool, AFSCs with lower phase points to E7 are better postured to generate E8s, and subsequently E9s.
4. All other things being equal, AFSCs with more consistently difficult tests should generate a higher percentage of E8s and E9s.

Hence, the combination of ESO and a policy of not standardizing test scores can have a positive or negative impact on E7, E8, and E9 manning. This phenomenon may also exist at lower grades, but strength managers can compensate for unfavorable impacts with retraining and bonuses. However, strength managers have fewer options for dealing with E7, E8, and E9 manning deviations.

Reducing Gains—A Strength Management Action That Affects the Enlisted Promotion System

If the Air Force decided to reduce manning in an AFSC by reducing gains over a three- or four-year period, there would be severe consequences for previous gains in that AFSC. A reduction in an AFSC's gains results in fewer airmen becoming E4s 30–36 months later. This reduction in E4 flow erodes the promotion base for senior E4s in the AFSC, and the Air Force subsequently promotes fewer of them to E5 under ESO. During periods when average phase points to E5 are in the

7–8 year range, more of these senior E4s would face separation under HYT simply because they preceded a series of small year groups. At a minimum, their phase points would increase. Senior E4 recruiters experienced a variation of this phenomenon when the Air Force barred additional E4s from entering recruiting duty (a lateral AFSC) during the 1990s. The Air Force eventually used HYT to separate most E4s who did not elect to retrain out of recruiting.

The precipitous drop in FY05 accessions will have a similar impact on future promotions in AFSCs that absorbed disproportionate shares of the reduction. Hardest hit will be members who entered the Air Force in FY04. When they compete for promotion to E5, they will have a proportionally smaller FY05 group to generate promotion quotas for them. This may also cause future manning issues at higher grades.

Just as disproportionately decreasing accessions in an AFSC for a period adversely affects E5 phase points for preceding year groups, a period of disproportionately high accessions would later generate a period of accelerated phase points.

Chapter Highlights

In this chapter, we have seen that there is little synchronization between the enlisted promotion system and disaggregate requirements. Force managers retrain out excesses that ESO generates. They also retrain-in and offer SRBs when ESO does not provide enough promotions.

We now turn our attention to the third system that has a major impact on the strength by grade of each AFSC. The requirements system establishes the goals that motivate disaggregate strength management activities.

CHAPTER SIX

The Manpower System

One of the manpower system's primary missions is to determine the combination of AFSCs, skill levels, and grades that each unit requires to accomplish its mission. The manpower community establishes requirements using two primary techniques. Most often, units have a standard mission and structure, and the manpower system applies established templates to determine requirements. A less-often-used approach involves the following procedure:

1. A manpower team examines each task a unit performs.
2. For each task, the team determines the number of hours the unit should require to perform the task.
3. The team determines the AFSCs and the associated skill levels the unit needs to perform each task. The team assumes that individuals do not perform tasks beneath their skill levels.
4. The team adds up the labor requirements for all unit tasks and determines unit manpower requirements.
5. Within skill levels, the team determines grade requirements.

Regardless of the technique used, the manpower system determines each unit's unconstrained requirements by AFSC, skill level, and grade. When evaluating positions, manpower experts consistently indicate that they have more confidence in their assessments of required

skill levels than in their assessments of grades.[1] This point is key. The mitigation strategies offered in Chapter Seven preserve each position's skill level and only modify grades within skill levels.

The manpower system also constrains the total number of grades in accordance with aggregate strength management limits. Hence, each position has a required (unconstrained) grade and an authorized (constrained) grade, which may not be identical. Required grades should be at least as high as authorized grades.

Establishing Authorized Grades

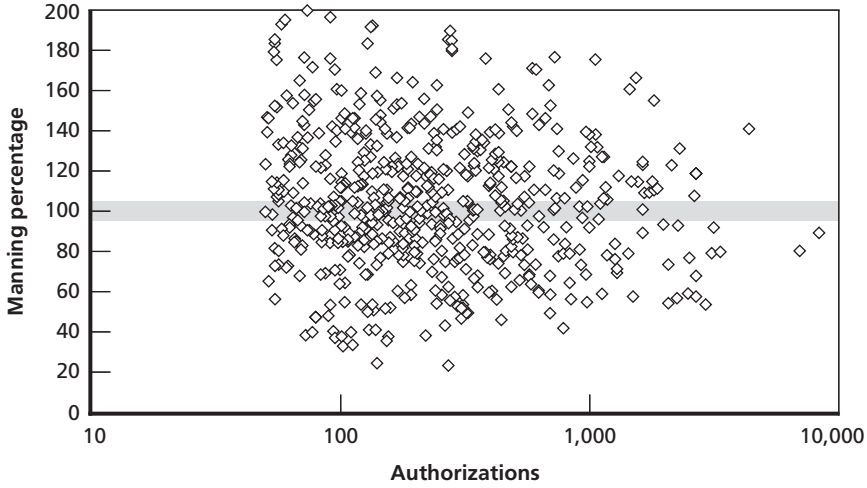
Although the manpower system does constrain aggregate grades, it does not examine the grade requirements for each AFSC across all units to determine whether the strength management system can execute those requirements. This omission is at odds with DoDD 1304.20's (1984) goal of ensuring that personnel management system capabilities are taken into consideration during the requirements decision process. As we show below, a primary reason that the Air Force often has the right number of people in an AFSC but in the wrong grades is that some grade requirements in that AFSC are not executable.[2]

Figure 6.1 provides empirical evidence that the manpower, strength management, and enlisted promotion systems are not well synchronized. Each diamond on the chart represents the manning for an AFSC/grade combination. The horizontal axis reflects the number of authorizations, and the vertical axis represents the manning percentage. At the end of FY04, only 14 percent of the AFSC/grade combina-

[1] This is not surprising, because grade is a subset of skill level. As one refines the granularity of any subjective observation, it becomes more difficult to distinguish between shades of gray.

[2] A requirement for an AFSC is *unexecutable* if, over a broad range of acceptable promotion, retention, and retraining patterns, the strength management system cannot produce the appropriate number of airmen to fill the grade requirements that the manpower system has established.

Figure 6.1
Evidence of Disconnects: Inventory Does Not Match Authorizations (by AFSC and Grade)



SOURCE: AFPC RAW.
RAND *MG540-6.1*

tions with at least 50 authorized and 50 assigned personnel were in the 95–105 percent range.[3]

To comply with DoDD 1304.20's goal of satisfying authorizations for enlisted personnel, by grade, with the appropriate experience and skill, strength managers strive to drive every AFSC/grade combination in Figure 6.1 to within some band about 100 percent manning. Strength managers employ CJRs, retraining-out, SRBs, and retraining-in. However, for AFSCs with unexecutable manpower targets, current policies do not give strength managers enough leverage to achieve their goals. Even when current programs can bring strength in line with authorizations, they often do so at significant expense to the taxpayers.

There are at least three reasons to be concerned about the deviations in Figure 6.1. First, if the Air Force believes that its requirements

[3] AFSC/grade combinations with fewer than 50 authorized or assigned personnel are not plotted on Figure 6.1. Manning levels greater than 200 percent are also not plotted.

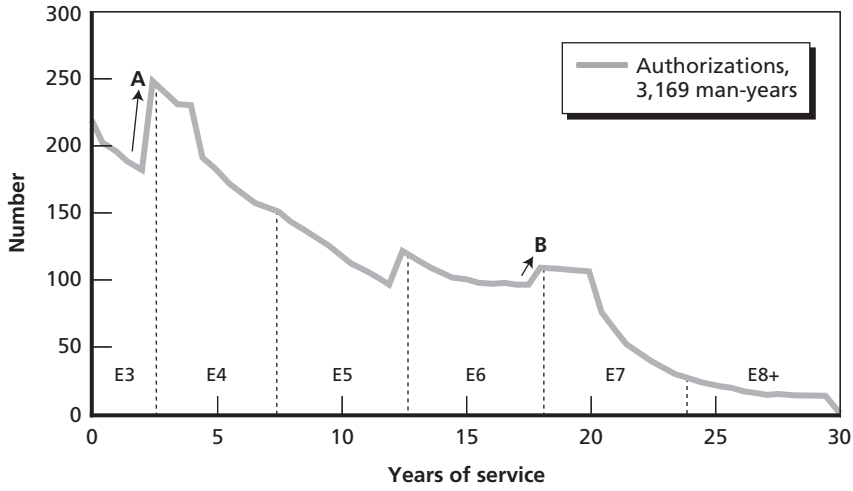
determination process is valid, there are mission implications when the inventory does not match requirements. Second, the Air Force spends about a quarter of a billion dollars annually on SRBs and bonuses. Even marginal improvements in efficiency could save millions of dollars annually. Finally, as we see below, remedies are available that would reduce the number of unexecutable targets.

Figure 6.2 illustrates an AFSC that has an unexecutable grade structure.[4] This authorization structure is not executable for two reasons. First, it calls for about 220 gains per year out of the training pipeline to satisfy E3 authorizations. However, because the E3 foundation is too small to support the required number of E4s (even with perfect E3 retention), strength managers would need to annually retrain-in about 70 E4s at three years of service. However, there is no policy mechanism that permits routine retraining prior to four years of service, primarily because it would be inefficient to satisfy requirements in this manner. Hence, it is not possible to reasonably achieve both 100 percent E3 and 100 percent E4 manning for 1C1X1 (see jump A in Figure 6.2).[5]

[4] Figure 6.2 is the product of a simple year-of-service model that associates grades with years of service. This is a common construct within strength management circles. It translates manpower requirements, which have no year-of-service dimensions, into objective roadmaps. These maps provide accession and retraining information to strength managers based on assumed retention patterns. Figure 6.2 includes this AFSC's fair share of taxes (individuals assigned to special duties and reporting identifiers). The Figure 6.2 continuation profile is based on average FY02–FY04 Air Force retention patterns rather than on 1C1X1 loss rates. This modeling simplification does not invalidate our conclusions because unexecutable targets remain unexecutable over a broad range of loss rates. By removing a source of variation, using common loss rates also makes it easier to compare the remedies explored in Chapter Seven. To implement the concepts discussed in this monograph, the Air Force would need to fine-tune our results with more-sophisticated models that employ dynamic, disaggregate loss rates.

[5] It would be technically possible to achieve 100 percent manning in both grades through massive retraining-in at four years of service accompanied by retraining-out at six years of service, but such a policy would be costly in terms of both retraining dollars and wasted human capital.

Figure 6.2
Air Traffic Control (AFSC 1C1X1) (FY04 Authorizations)



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The second reason that this authorization structure is unexecutable is that the E6 promotion base under ESO is too small to support E7 authorizations (see jump B in Figure 6.2). Because the E7/E6 authorization ratio for AFSC 1C1X1 is 0.74[6] (and because the strength management system does not routinely retrain E7s), if strength managers consistently achieve 100 percent E6 manning, this AFSC will be undermanned in E7s.

In the next chapter, we discuss strategies for marginally modifying authorization structures to make them more executable, thereby complying with the DoDD 1304.20 (1984) guidance to ensure that personnel management system capabilities are taken into consideration during the requirements determination process.

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[6] Assuming that aggregate E6 and E7 strength aligns with aggregate E6 and E7 authorizations, strength managers adjust promotion rates to ensure that the E6 population will sustain the E7 population. Therefore, by definition, the aggregate E7/E6 ratio (0.66 in this case) is sustainable. If an AFSC has an E7/E6 ratio that exceeds the aggregate ratio, under ESO, its E6 promotion base will be too small to sustain its E7 authorizations. We discuss this concept in depth in Chapter Seven.

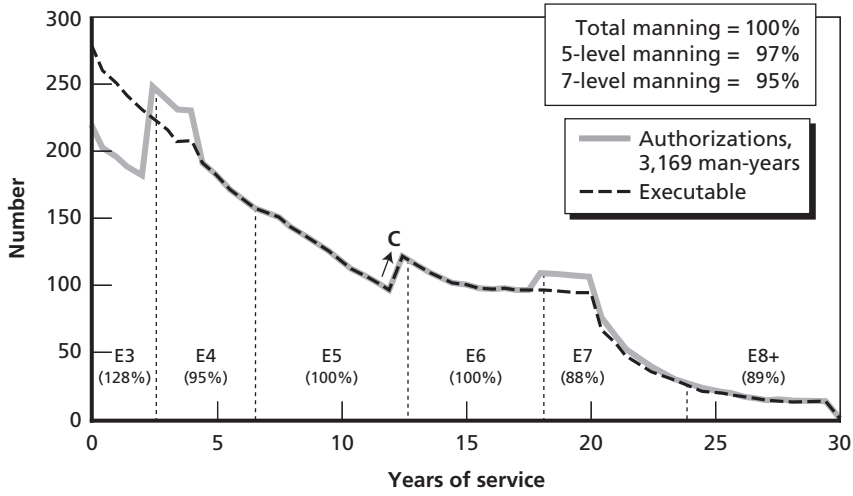
CHAPTER SEVEN

Strategies to Improve Synchronization of the Strength Management System with the Enlisted Promotion and Manpower Systems

The previous five chapters have discussed the strength management, promotion, and requirements systems. The Air Force tends to manage these systems independently, even though actions taken to manage one often affect another. At the end of the day, enlisted manning at the AFSC/grade level of detail is out of tolerance—even though force managers spend about $250 million per year on retraining and reenlistment bonuses. The solutions we offer in this chapter do not modify authorizations at the skill level because the manpower community is most confident about skill-level requirements. In the spirit of DoDD 1304.20 (1984), we suggest grade modifications within skill levels that would allow force managers to better meet requirements.

This chapter lays additional groundwork for a discussion of synchronization strategies by developing the concept of *executable targets*. Figure 7.1 shows one of many executable targets that the Air Force could adopt for our example AFSC, 1C1X1. The authorization structure, represented by the gray line, is the same as shown in Figure 6.2. The black line represents a target inventory that does not match the authorizations in several grades but is executable. In this case, the executable target would start with about 275 NPS gains per year. The 275 gains would be supplemented with retraining-in at the four-year mark. Finally, strength managers would retrain-in additional E6s. The objective force would yield 100 percent manning for E5s and E6s (and for the entire AFSC). However, 100 percent E6 manning

Figure 7.1
Air Traffic Control (AFSC 1C1X1), Executable Target 1



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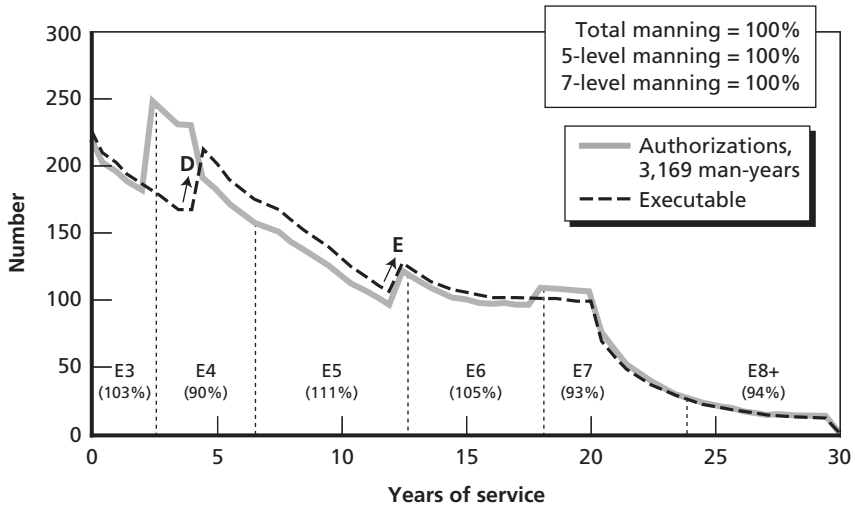
would sustain only 88 percent E7 and 89 percent E8+ manning. This example again illustrates a fundamental disconnect between the manpower and enlisted promotion systems: ESO and funded authorizations are not synchronized. To the extent that strength managers achieve 100 percent manning in one grade, that promotion base will usually not support the correct manning at the next higher grade. In turn, this generates pressure for costly retraining and bonus activities. In the executable example in Figure 7.1, E5 authorizations cannot sustain E6 authorizations without retraining-in (jump C).

Figure 7.2 illustrates an alternative executable inventory for AFSC 1C1X1. In this case, the objective force would start with about 220 NPS gains with substantial retraining-in at two points (jumps D and E) to yield 100 percent 5-level manning and 100 percent 7-level manning. Under the existing authorization structure, AFSC 1C1X1 would need to be overmanned in E6s and undermanned in E7s to achieve 100 percent 7-level manning. Similarly, strength managers would intentionally underman E4s and overman E5s to achieve 100 percent 5-level manning. The attractive feature of this target inventory is that it would achieve 100 percent 5-level and 7-level manning, the dimension of the

Figure 7.2
Air Traffic Control (AFSC 1C1X1), Executable Target 2



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requirements determination process in which the manpower community has the most confidence.

Although this approach would provide executable targets for strength managers, establishing manning targets that do not align with manpower grade requirements is somewhat unappealing. Since the grade requirements, but not the executable manning targets, tend to be visible to those outside the central strength management function, functional managers and commanders would continue to perceive that personnel resources are poorly distributed. Additionally, where grades are undermanned, as E7s would be in the above examples, there is no systematic signal to the assignment system to indicate which E7 requirements are the most critical. In general, this approach would be difficult to explain to the force and would require continual education as members of the personnel community rotate in and out of jobs.

Figures 7.1 and 7.2 represent just two potential executable targets for AFSC 1C1X1. However, the two options imply different TPRs and manning targets by grade. As a precursor to managing every AFSC in

this fashion, strength managers would need to work with career field managers to establish acceptable executable goals. Once established, all strength managers could then direct their efforts, which are currently divergent at times, toward a common end state. If Figure 7.2 represented the agreed-upon target for AFSC 1C1X1, strength managers would attempt to maintain E4 manning at 90 percent, and 111 percent would be the target for E5s. Establishing grade-manning targets other than 100 percent would also require SRB managers to modify their procedures.

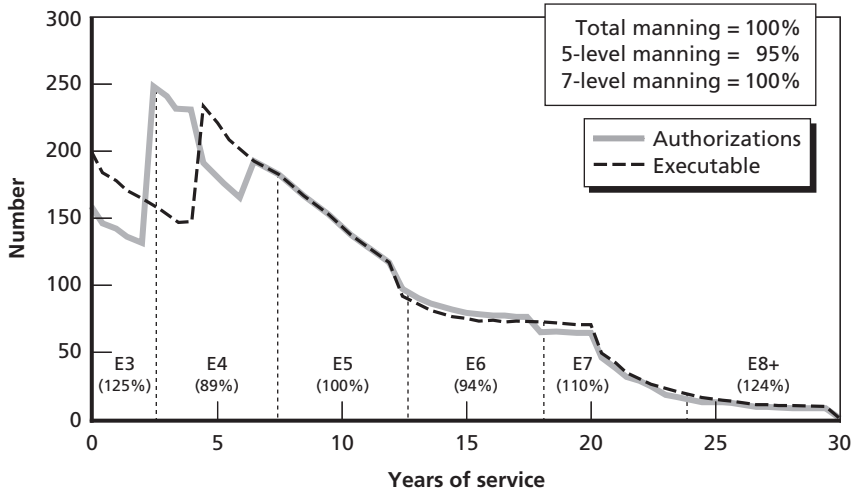
It is probable that career field managers would not select identical executable objectives. From a strength management perspective, that would not be problematic. Strength managers would need to perform a final step before agreeing to individual executable targets. They would need to ensure that the aggregation of executable targets would also be executable. Specifically, strength managers would need to ensure that retraining-in targets by grade and year of service equaled retraining-out targets in both numbers and kinds (aptitudes). Strength managers would also need to ensure that the total numbers in each grade remained constant for the Air Force to continue to operate within budget constraints and to meet promotion timing objectives. In the sections that follow, we expand these ideas by means of four strategies that would be executable in the aggregate.[1] These four strategies are not exhaustive, but they do serve as a springboard for discussion.

Strategy 1: Adopt Executable Grade Manning Targets

Figure 7.3 shows the current unexecutable authorization structure for AFSC 2E2X1 (Comm, Network, Switching & Crypto Systems) along with an executable Strategy 1: adopting executable grade manning targets. In this strategy, the authorization structure is unchanged, and grade-manning targets would vary, sometimes significantly, from 100

[1] In establishing executable targets, we used aggregate Air Force grade and year-of-service relationships as the expected relationships for individual AFSCs. If the Air Force chooses to adopt the strategies proposed here, similar expectations could be used for initial development of targets. However, more-refined targets could be developed that take into account persistent

Figure 7.3
AFSC 2E2X1 Executable Target—Strategy 1



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percent. This strategy assumes that the requirements system does not comply with DoDD 1304.20's goal of ensuring that personnel management system capabilities are taken into consideration during the requirements decision process. As an example, we analytically derived executable grade manning targets that would keep 7-level manning at 100 percent and 5-level manning between 95 percent and 105 percent.

To achieve 100 percent 7-level manning, AFSC 2E2X1 strength managers would need to target E6 manning at 94 percent to produce 110 percent E7 manning. Again, this is because the E7/E6 ratio for this AFSC is less than the Air Force average (see footnote 6 in Chapter Six). Filling only 94 percent of the E6 authorizations would sustain 110 percent of the E7 authorizations under ESO.

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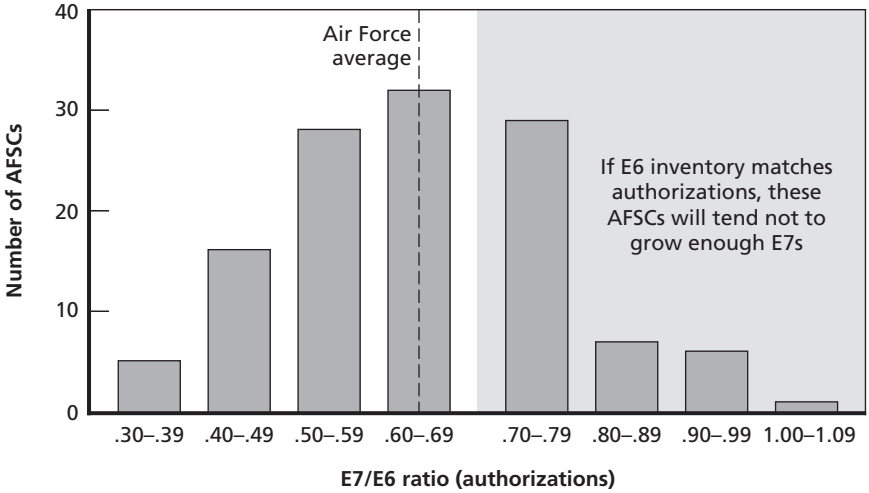
differences in retention patterns among AFSCs, as well as the effects of SRBs, CJRs, and retraining programs in modifying retention patterns. If policy moves in this direction, we would anticipate investment in the development of a refined model to produce executable targets.

As Figure 7.4 illustrates, most AFSCs have an E7/E6 ratio that deviates from the Air Force average. In addition, as Figure 7.5 illustrates, the magnitude of the deviation for an individual AFSC can vary over time. This variance should be of concern because, even if force structure changes, an AFSC's internal grade ratios should not drift substantially in the absence of major changes in aggregate grade ratios. This suggests that an AFSC's E7/E6 ratio is not changing by centralized design. In fact, the commands freely modify the AFSCs and/or grades of many positions they own. Therefore, the E7/E6 authorization ratio in most AFSCs is fluid (see the appendix) and problematic for force managers.

One can appreciate that if strength managers were able to achieve 100 percent E6 manning each year in AFSC 2E2X1, the E7 manning in that AFSC would fluctuate dramatically. Grade ratio oscillations also make it impossible for the strength management system to satisfy E7 manpower targets.

Figure 7.4
Distribution of AFSCs by E7/E6 Ratio, FY04



SOURCE: AFPC RAW.
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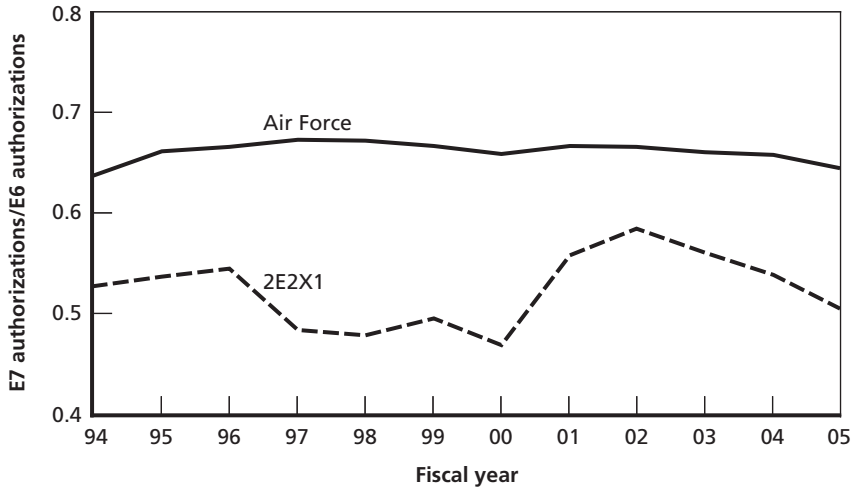
Figure 7.5
AFSC 2E2X1 E7/E6 Ratio over Time



SOURCE: AFPC RAW.
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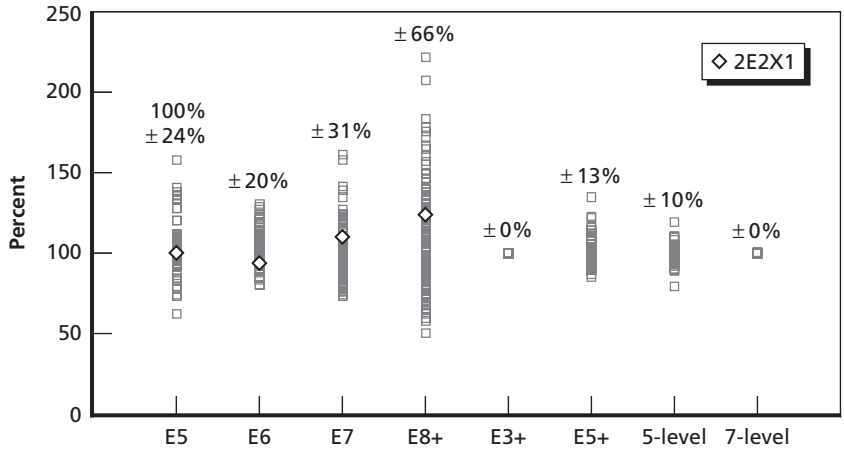
Figure 7.6 shows the result of employing Strategy 1 for all AFSCs. Each small rectangle indicates the executable target for an AFSC/grade combination (in high-density areas, the rectangles fuse into a solid column; the diamonds indicate the executable targets for AFSC 2E2X1). To compare the four strategies we discuss in this chapter, we indicate a two-standard-deviation range for each executable target. For example, under Strategy 1, 95 percent of the executable E5 manning targets would be in the range of 100 percent ± 24 percent (± two standard deviations).

Figure 7.6 shows that under Strategy 1, the executable targets for E6 and E7 manning deviate substantially from 100 percent. Also, although the Strategy 1 objective was to keep 5-level manning at 100 percent ± 5 percent, that was not always possible, primarily because of the authorization structure of lateral AFSCs. To ensure that retraining-in balanced retraining-out and that there was no change in aggregate grades, we made marginal adjustments to the Strategy 1 solution for AFSC 3P0X1, Security Forces. We selected AFSC 3P0X1 because, as

Figure 7.6
Strategy 1 Results for All AFSCs



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the largest AFSC, we could use it to balance the system with the least effect on the unconstrained Strategy 1 solution.

Strategy 2: Adjust E6 and E7 Authorizations

Strategy 1 would establish grade-manning objectives in grades E4–E7 that often vary significantly from 100 percent. As indicated above, this approach is unappealing in several respects. In Strategy 2, we partially mitigate this problem by modifying authorizations to yield E6 and E7 manning targets of 100 percent (while leaving 7-level authorizations unchanged for each AFSC). Strategy 2 also complies with DoDD 1304.20's goal of ensuring that personnel management system capabilities are taken into consideration during the requirements decision process. Table 7.1 uses two notional AFSCs (A and B) to illustrate Strategy 2.

These notional AFSCs have identical E6 promotion bases of 1,000 (we assume that strength managers successfully match E6 inventory to authorizations). Under ESO, identical promotion bases would generate the same number of promotions annually—200 in this example.

Table 7.1
Modifying Authorizations Within Skill Levels

	AFSC A	AFSC B
E7/E6 ratio	500/1,000 = 0.5	820/1,000 = 0.82
Annual ESO promotions to E7	200	200
Required annual promotions	180	220
Modified E7/E6 ratio	596/904 = 0.66	724/1096 = 0.66

However, because AFSC A has fewer E7 authorizations, it requires fewer promotions to E7 (assuming similar retention patterns for E7s in both AFSCs). If the manpower system were to modify E7 and E6 authorizations as indicated so that both AFSCs had an E7/E6 ratio that equaled the Air Force average (without changing the number of 7-levels in either AFSC and without changing the total number of E6s or E7s in the combined AFSCs), each AFSC would have an E6 promotion base that would sustain its E7s under ESO. With this minor shift in authorizations, the executable manning targets for both AFSCs would be 100 percent. The manpower system should have no objection to making such a marginal adjustment because its processes are focused on identifying skill-level requirements rather than grade requirements. The black line in Figure 7.7 illustrates such an E7/E6 authorization adjustment for our AFSC 2E2X1 example.

Under this modified E7/E6 authorization structure, executable E6 and E7 manning targets for this AFSC become 100 percent, as illustrated in Figure 7.8.

In addition to establishing an executable structure, Strategy 2 communicates vital information to the assignment system. Figure 7.9 summarizes the Strategy 2 results for all AFSCs.

Under Strategy 2, the executable targets are more appealing, especially the E6 and E7 targets. Again, it is not possible to achieve E7 manning targets and simultaneously construct 5-level manning targets that fall in the 95–105 percent range for all lateral AFSCs. Because achieving 100 percent E7 manning often generates E8+ manning targets that fall well away from 100 percent, lateral AFSCs must compensate by offsetting E8+ deviations with E5 deviations.

Figure 7.7
Modified E7/E6 Ratio

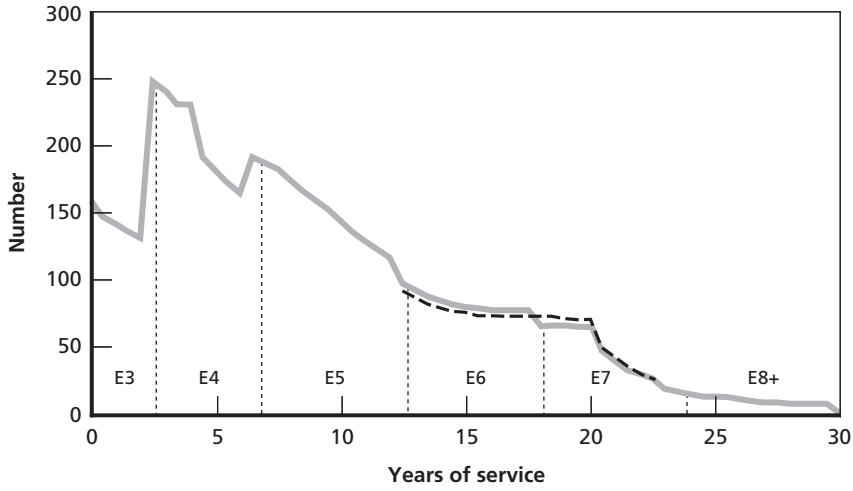

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Figure 7.8
AFSC 2E2X1 Executable Target—Strategy 2

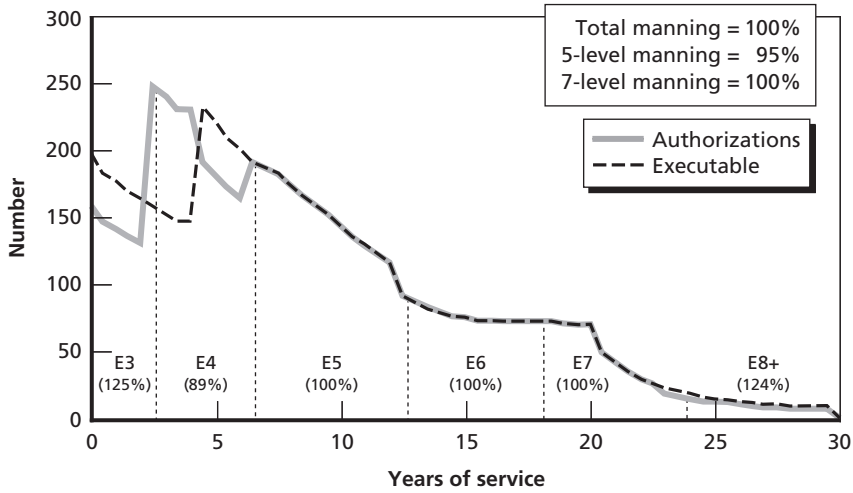

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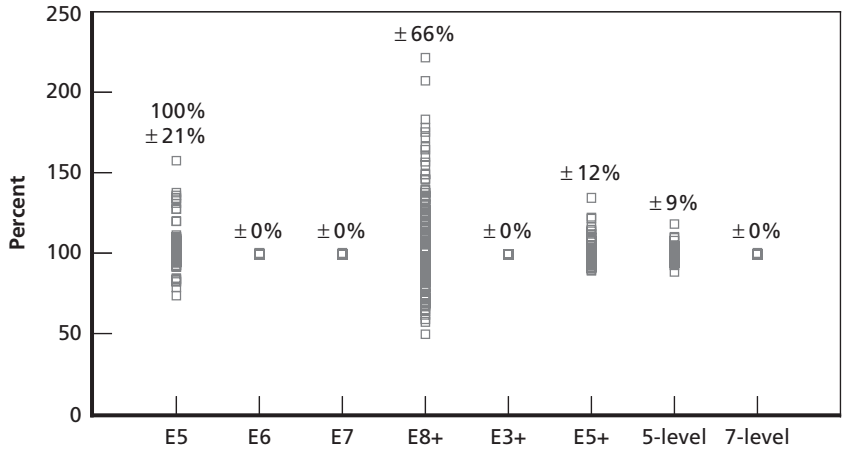
Figure 7.9
Strategy 2 Results for All AFSCs



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Strategy 1 and Strategy 2 both require that the Air Force train about the same number of people each year (retraining plus NPS), so Strategy 2 is cost-neutral relative to Strategy 1. However, Strategy 2 is not perfect. If strength managers achieve 100 percent E5 manning, they would still often need to retrain E6s to achieve 100 percent E6 manning under ESO. But retraining E6s instead of E4s or E5s is not desirable for a number of reasons:

- Gaining AFSCs do not favor retrained-in supervisors (E6s) who have little functional expertise.
- Individuals who retrain are at a testing disadvantage under WAPS. The later in a career that one retrains, the more material one must learn to be competitive.
- It is less expensive from a salary perspective to retrain individuals in lower grades.
- For 2E2X1 and many other AFSCs, Strategy 2 calls for simultaneous retraining-in and retraining-out, which reduces the Air Force's return on its training investment.

Strategy 3: Adjust E4, E5, E6, and E7 Authorizations

A logical extension of Strategy 2 would eliminate retraining in both directions within an AFSC. If the manpower system were to adjust E4s and E5s within an AFSC's 5-levels so that the E6/E5 ratio equaled the Air Force ratio, achieving 100 percent E5 manning would yield a promotion base that would generate the correct number of E6s without retraining. In turn, the number of E4s in an AFSC would need to be adjusted to maintain a constant number of 5-levels. The following derivation yields the target E5/E4 ratio for AFSC_{xx}:

Let $\mathrm{L7/L5}_{xx}$ be the ratio of 7-level to 5-level authorizations determined by the manpower system for AFSC_{xx}. Also, let $\mathrm{E7/E6}_{AF}$ be the ratio of Air Force E7 to E6 authorizations and $\mathrm{E6/E5}_{AF}$ be the ratio of Air Force E6 to E5 authorizations. Then

$$(\mathrm{L7/L5})_{xx} = (\mathrm{E6}_{xx} + \mathrm{E7}_{xx}) / (\mathrm{E5}_{xx} + \mathrm{E4}_{xx}) \tag{1}$$

$$(\mathrm{E5}_{xx} + \mathrm{E4}_{xx}) = (\mathrm{E6}_{xx} + \mathrm{E7}_{xx}) / (\mathrm{L7/L5})_{xx} \tag{2}$$

$$\mathrm{E4}_{xx} = (\mathrm{E6}_{xx} + \mathrm{E7}_{xx}) / (\mathrm{L7/L5})_{xx} - \mathrm{E5}_{xx} \tag{3}$$

$$\mathrm{E4}_{xx} = \frac{(\mathrm{E6}_{xx} + \mathrm{E7}_{xx}) - \mathrm{E5}_{xx} \times (\mathrm{L7/L5})_{xx}}{(\mathrm{L7/L5})_{xx}} \tag{4}$$

$$(\mathrm{E4}_{xx}/\mathrm{E5}_{xx}) = \frac{(\mathrm{E6}_{xx}/\mathrm{E5}_{xx}) + (\mathrm{E7}_{xx}/\mathrm{E5}_{xx}) - (\mathrm{L7/L5})_{xx}}{(\mathrm{L7/L5})_{xx}} \tag{5}$$

$$(E4_{xx}/E5_{xx}) = \frac{(E6_{xx}/E5_{xx}) \times [1 + (E7_{xx}/E6_{xx})] - (L7/L5)_{xx}}{(L7/L5)_{xx}} \quad (6)$$

$$(E5_{xx}/E4_{xx}) = \frac{(L7/L5)_{xx}}{(E6_{xx}/E5_{xx}) \times [1 + (E7_{xx}/E6_{xx})] - (L7/L5)_{xx}} \quad (7)$$

Since we want $(E6_{xx} / E5_{xx})$ to equal $E6/E5_{AF}$ and $(E7_{xx} / E6_{xx})$ to equal $E7/E6_{AF}$,

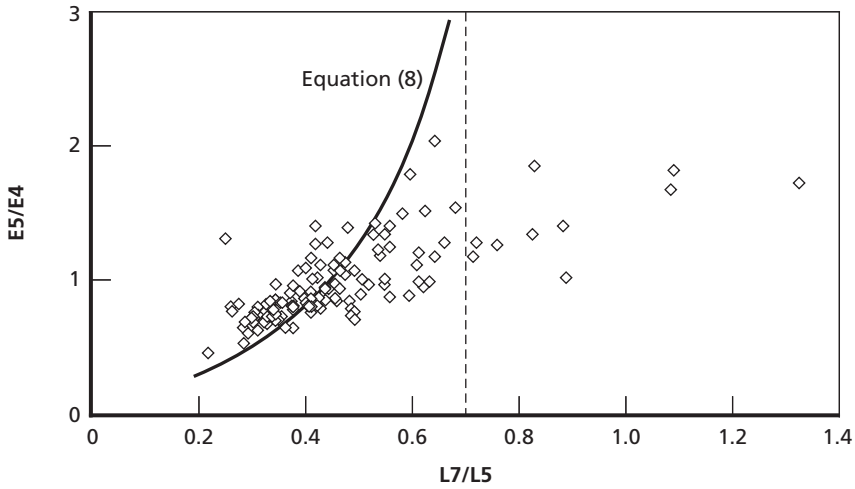
$$(E5_{xx}/E4_{xx}) = \frac{(L7/L5)_{xx}}{(E6/E5)_{AF} \times [1 + (E7/E6)_{AF}] - (L7/L5)_{xx}} \quad . \quad (8)$$

As one would anticipate, Equation (8) calls for a richer E5 promotion base, i.e., a higher $(E5_{xx}/E4_{xx})$ ratio, for AFSCs with a richer 7-level mix, i.e., a higher $(L7/L5)_{xx}$ ratio. Figure 7.10 contrasts Equation (8) with the FY04 authorization structure. Each diamond in Figure 7.10 plots the E5/E4 authorization ratio for an AFSC as a function of its L7/L5 ratio. The upward-sloping line represents the E5/E4 ratio (on the vertical axis) that satisfies Equation (8), given the L7/L5 ratio shown on the horizontal axis.

Figure 7.10 implies that most career field managers who might select Strategy 3 could anticipate adjusting their E5/E4 ratios. In addition, career field managers responsible for AFSCs on the right half of Figure 7.10 need to recognize that the large E5/E4 ratios generated by Equation (8) could only be achieved by retraining-in E5s.

Strategy 3 does not work well for about 20 percent of AFSCs. Figure 7.11 shows why Strategy 3 potentially misses the mark for AFSC 2E2X1.

Figure 7.10
Equation (8) Versus FY04 Authorizations



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The attractive aspect of employing Strategy 3 for AFSC 2E2X1 is that if strength managers achieve 100 percent manning for E5s, that promotion base would be properly sized to generate 100 percent manning in E6s and E7s without any additional retraining. However, Strategy 3 calls for decreasing the E5/E4 ratio for AFSC 2E2X1. The only way to achieve this ratio without changing the numbers of 3-level and 5-level authorizations would be to retrain-in E4s at four years of service and retrain-out E5s at six years of service. This would not be practical and Figure 7.11 shows the best executable implementation of Strategy 3 for AFSC 2E2X1. For this AFSC, 88 percent 5-level manning would be the target.[2] In the case of AFSC 2E2X1, Strategy 3 yields fewer E5 authorizations, with part of the reduction offset by increasing E3 authorizations rather than E4 authorizations.

[2] A strategy that yielded 100 percent E4 manning, and hence 100 percent 5-level manning, could be developed if we relaxed our assumed constraint that grade changes would be made only within skill levels—in this case, by shifting E4 authorizations to E3.

Figure 7.11
AFSC 2E2X1—Strategy 3

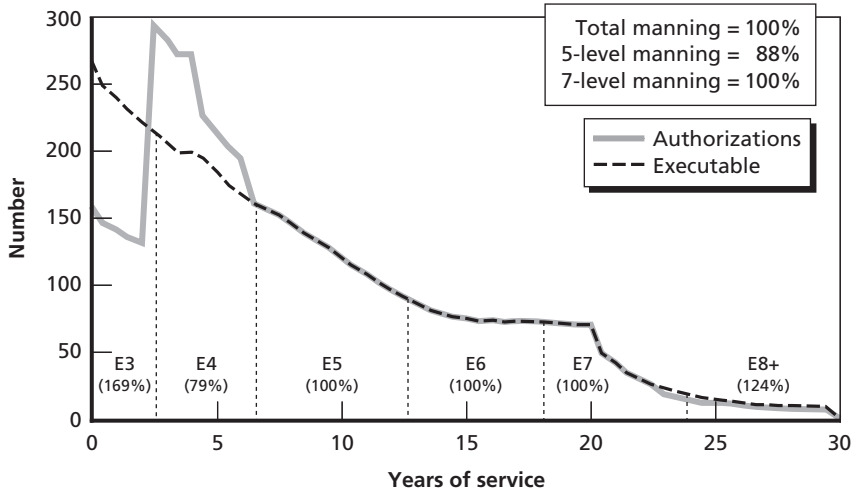

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Figure 7.12 shows that there are other AFSCs for which Strategy 3 works well. In fact, under Strategy 3, strength managers could establish 5-level manning targets in the 90–110 percent range for 83 percent of all AFSCs.

For AFSC 1N6X1, the executable target under Strategy 3 yields 5-level manning that is in the desired range, retraining is in a single direction, and achieving 100 percent E5 manning generates the proper number of E6s and E7s without additional retraining.

Figure 7.13 shows the results of using Strategy 3 for all AFSCs. Strategy 3 tends to outpace Strategy 2, except for 5-level manning. In practice, individual career field managers could be expected to select either Strategy 2 or Strategy 3 or another set of executable targets that best meet the needs of their AFSCs. Strategy 3 would impose about the same total training demands (TPR plus retraining) as Strategies 1 and 2, so it too would be cost-neutral.

To put Strategies 1–3 into context, Figure 7.14 shows selected manning deviations by grade and skill level for FY04. Compared to FY04, all of the strategies we discussed would yield better results.

Figure 7.12
AFSC 1N6X1—Strategy 3

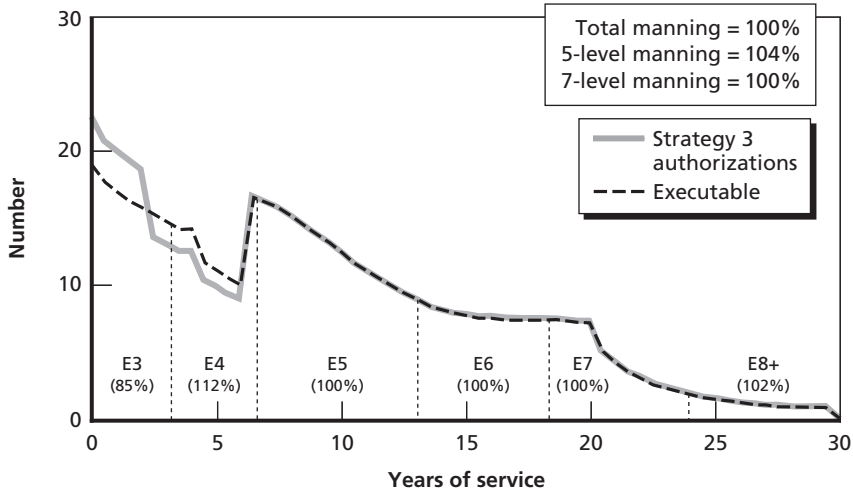

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Figure 7.13
Strategy 3 Results for All AFSCs

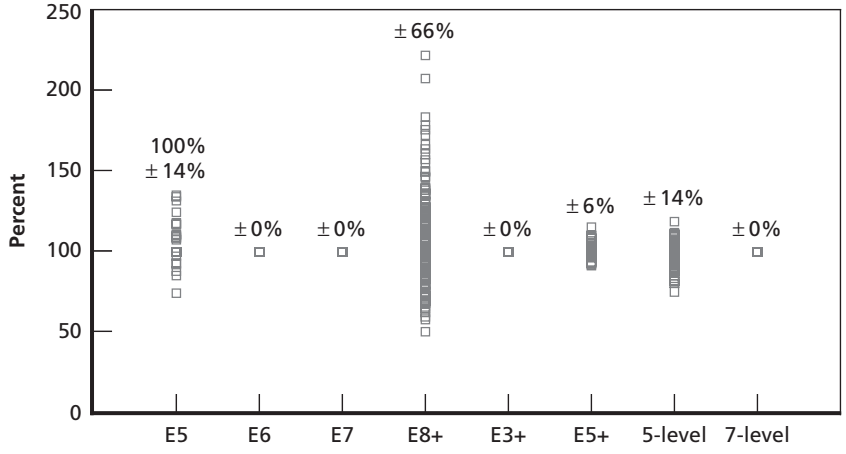

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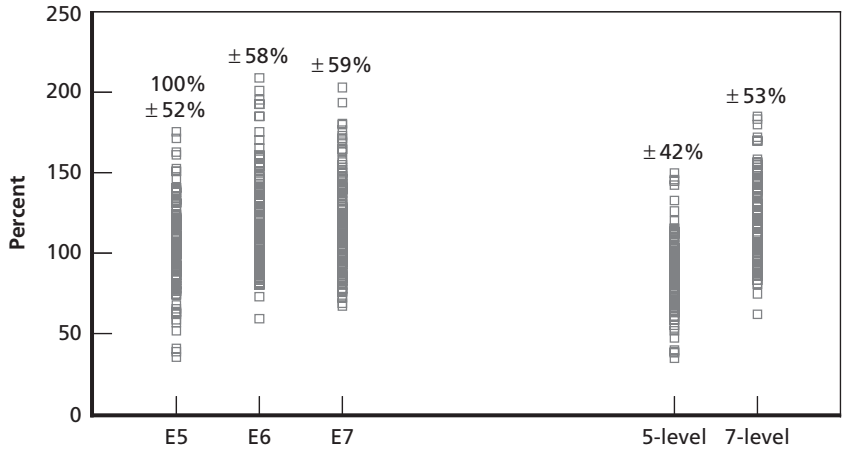
Figure 7.14
FY04 Manning by Grade



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Strategy 4: Satisfying E8+ Authorizations

We saw in Figures 7.6, 7.9, and 7.13 that Strategies 1, 2, and 3 would not mitigate current disaggregate manning deviations for E8s and E9s. Again, under ESO, if E7 authorizations are incorrectly sized, the E8+ inventory will not match requirements (assuming that the E7 inventory matches E7 requirements). Hence, if the Air Force is more concerned about E8+ manning, it could adjust E8/E7 requirements ratios and then establish E6 requirements that would sustain the E7 requirements under ESO. However, in most cases, this would modify 7-level requirements. The fundamental problem remains the same. The E8+ requirements determination process does not account for the capabilities of the personnel management system.

CHAPTER EIGHT

Conclusions and Recommendations

DoDD 1304.20 (1984) directed the Air Force to establish executable requirements, to minimize deviations from those requirements, and to execute requirements as efficiently as possible. The fact that disconnects among the requirements, promotions, and strength management systems have persisted for over 30 years suggests that it is not widely recognized by senior or junior managers that requirements are often not executable. For many enlisted AFSCs, 100 percent manning cannot be achieved for every grade under current policies. Employing SRBs and retraining in pursuit of unachievable goals represents an inefficiency that could be reduced. Strength managers, who do not pursue common targets, at times exacerbate the situation: Retraining experts focus on manning by grade; bonus managers worry about manning by year-of-service zones; and TPR managers worry about overall AFSC manning while trying to maintain historical experience levels.

The Air Force could pursue a number of policy changes to synchronize enlisted force management. This chapter characterizes them by time horizon.

Near Term

Recommendation 1. The Air Force should pursue the DoDD 1304.20 (1984) goal of ensuring that personnel management system capabilities are taken into consideration during the requirements decision process. Even though this goal is only implied by DoDD 1304.20 (2005), unexecutable goals create expectations that

the Air Force cannot fulfill. Enlisted strength managers should collaborate with career field managers and manpower managers to establish acceptable, executable manning targets, by grade, for each AFSC while simultaneously preserving aggregate grades and AFSC skill levels. Personnel managers should also communicate to field commanders that the combination of fixed phase points and managing aggregate strength primarily by modifying NPS accessions implies that E3 and E4 manning will usually not be 100 percent. In turn, this means that 5-level manning will generally not be 100 percent.

Establishing executable targets would require that the manpower community increase centralized control over the requirements determination process. This would be a first step toward establishing broad coordinating and control mechanisms that would allow force managers to achieve their objectives.

Establishing executable targets would affect only authorized grades. The manpower community should continue to document unconstrained, required grades. The difference between required and authorized grades allows the Air Force to periodically assess the impacts of system constraints.

Recommendation 2. The Air Force should upgrade some of its personnel modeling capabilities. A prerequisite to working with career field managers to establish executable targets is to develop a maintainable, steady-state enlisted model with both grade and year-of-service dimensions. Additionally, an inventory projection model that ages the enlisted force along similar dimensions and is also sensitive to compensation-related retention effects is crucial if strength managers hope to efficiently balance accessions, retraining, and SRBs. Fifteen years ago, the Air Force possessed a suite of sophisticated modeling tools that met these needs. However, the personnel community should not reinvest in complex, high-fidelity models without a corporate commitment to maintain them. If it plans to rely on less-accurate models, the personnel community should identify and vigorously protect the force management polices that provide flexibility.

Recommendation 3. The Air Force should investigate the benefits of standardizing WAPS test scores. A companion to setting efficient, executable, manning targets is ensuring that the WAPS/ESO

combination is producing a manageable outcome. Partially because the Air Force does not standardize either PFE or SKT scores, testing does not carry the same effective weight in every AFSC, which leads to differences in phase points. One implication of not standardizing scores is that AFSCs with less effective weight on testing not only produce fewer E9s per 1,000 accessions, but also have greater phase points for the E9s they do produce. This restricts the pool that is adequately developed (through a variety of E9 jobs at multiple organizational levels) for top-tier E9 jobs. Therefore, the Air Force should explore the merits of standardizing enlisted test scores. Standardizing scores is computationally tractable and is common practice in many widely used testing programs (e.g., the ASVAB, the Scholastic Aptitude Test, the American College Test, and the Graduate Record Exam are all standardized).

Long Term

Recommendation 4. The Air Force should manage the enlisted force using a common metric. Some force managers manage to AFSC/grade; others manage to AFSC/skill level; others worry about total AFSC manning. AFI 36-2618 (2004) implies that AFSC/tier might be the appropriate metric. Managing to different metrics can only lead to management initiatives that are not synchronized. We have demonstrated in this monograph that, under current policies, it is not possible to successfully manage to AFSC/grade or to AFSC/skill level. However, managing to total AFSC manning or to AFSC/tier might produce a solution that is too granular. Therefore, the Air Force should first define the coarsest groupings of interchangeable people that it can live with from an assignment perspective, and then modify manpower, strength management, and promotion policies so that the personnel community can manage to those groupings.

Recommendation 5. The Air Force should develop an overarching control structure. One of the reasons that the Air Force does not manage the enlisted force using a common metric is that enlisted management is currently fragmented, and no single office can control or be held responsible for the health of the force. Critical players

are currently on the AF/A1 staffs, at AFPC, at the Air Force Manpower Agency (AFMA), and in Air Education and Training Command (Recruiting Service).

Recommendation 6. If the Air Force does not pursue Recommendation 4, it should periodically assess whether the equity benefits of ESO justify its costs. ESO is deeply ingrained in the Air Force enlisted culture. Many of ESO's benefits are visible, but others are not widely appreciated. AFI 36-2618 (2004) implicitly endorses ESO by stating that one purpose of the enlisted force structure is to "provide a common, stable career structure for all enlisted personnel." However, equity carries a price. Manning deviations that affect the mission, the need to retrain about 4,000 enlisted members per year, and an SRB budget of $200 million per year are the major costs associated with providing promotion equity. The Air Force does strike a balance between equity and requirements by providing a marginal promotion advantage for critically short AFSCs. The magnitude of this advantage and the number of AFSCs that enjoy it have varied over time. However, the advantage is the same for every critically manned AFSC, no matter how great the shortage.

One of the regulatory underpinnings for ESO was DoDD 1304.20's (1984) goal of equal pay for equal work. Since that goal is not part of DoDD 1304.20 (2005), the Air Force should determine if ESO is consistent with the goals of satisfying authorizations and efficiently allocating resources.

In 2003, the Air Force did implement an enhanced Chronic Critical Shortage program for E8 and E9 cycles. This program is a fairly radical departure from ESO in that some donor AFSCs experience promotion rates below the Air Force average and other AFSCs see rates that substantially exceed 1.2 times the Air Force rate. This enhanced program is one approach to meeting requirements that are otherwise unexecutable. However, we caution the Air Force to ensure that it is not pursuing unstable requirements.

Recommendation 7. The Air Force should explore productivity trade-offs. The manpower system currently assumes that it would be inefficient for individuals to perform tasks beneath their skill levels. However, some have long questioned this assumption. It might be the

case that 7-levels could perform a subset of 5-level functions at a lower cost than 5-levels, even though 7-levels command higher salaries. This could occur when 7-levels are sufficiently more efficient, requiring fewer workers or less time to accomplish a task. Conversely, 5-levels might perform some 7-level functions at lower costs.

If it understood the relationships among productivity and experience, training, and aptitude, the Air Force could determine the least-cost objective force, as required by DoDD 1304.20. Although human resource managers have long recognized the great benefit of understanding these relationships, there has been a simultaneous recognition that capturing the information, either through surveys or experiments, would be extremely expensive. Air Force enlisted members perform on the order of 20,000 tasks.[1] The challenge would be to measure trade-offs among skill levels, training, and aptitude for most of the tasks that enlisted members perform.

Closing Thoughts

Because the Air Force's manpower, strength management, and enlisted promotion systems are not well synchronized, there are manpower targets that the personnel community cannot execute under any conditions. To the extent that strength managers do not recognize that some goals are unachievable, they may be unnecessarily expending retraining and bonus resources. In addition, when strength managers successfully match the inventory to the funded manpower requirement for a specialty/grade combination, they will usually be forced to retrain-in, offer selective reenlistment bonuses, or retrain-out to meet the manpower target for the next-higher grade in that specialty. This monograph has suggested approaches the Air Force could employ to better align its enlisted inventory with requirements by specialty and grade. Under the changes we describe, each specialty would retain the same number of authorizations within each skill level. Our cost-neutral remedy does

[1] This is a gross estimate that assumes about 200 specialties with 100 tasks per specialty.

not call for changes to the pillars of the enlisted culture, and it would bring the Air Force into better compliance with DoDD 1304.20.

APPENDIX

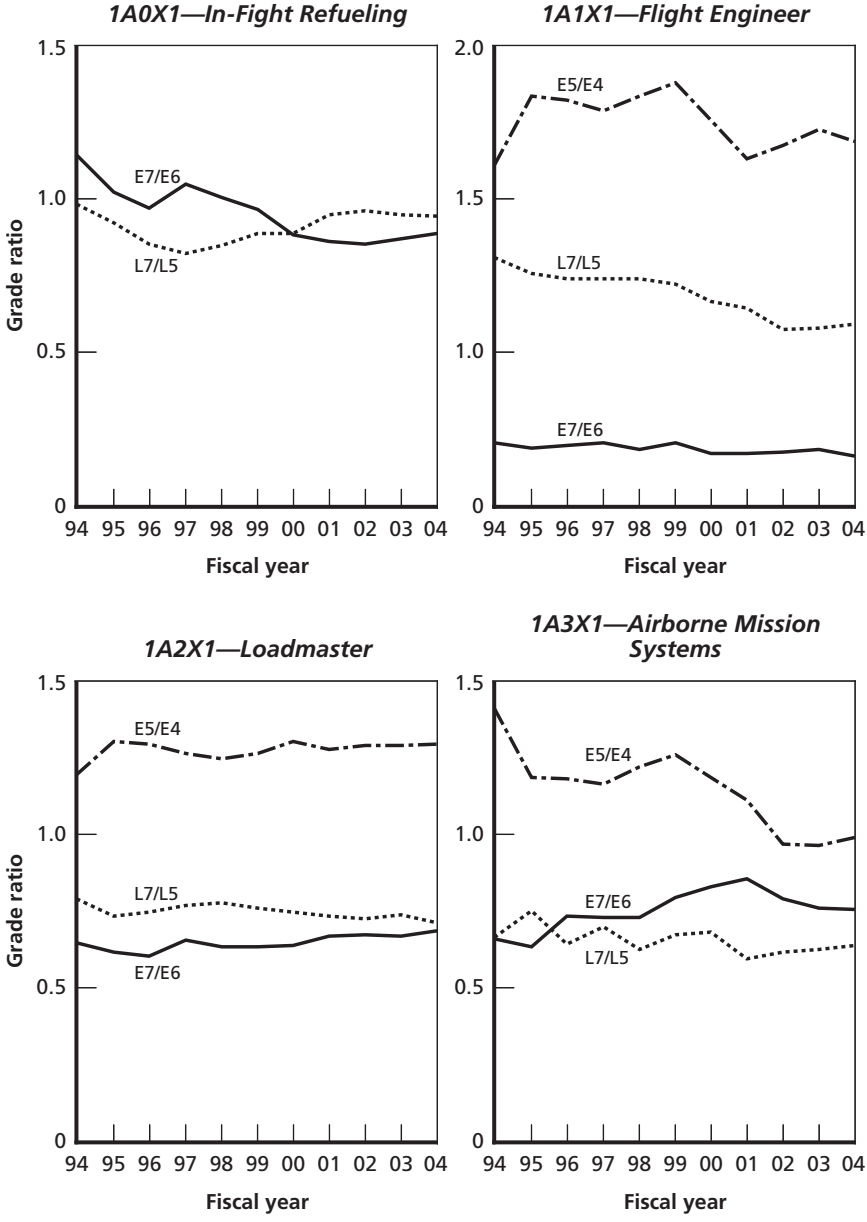
Selected Manpower Grade Ratios over Time

In this appendix, we document E7/E6, E5/E4, and 7-level/5-level ratios for funded authorizations over time for most enlisted AFSCs. We provide this information for those who may be delving into the structural manning challenges for a particular AFSC. As we discussed in the body of the monograph, both fluctuating ratios and E7/E6 ratios that differ from the Air Force E7/E6 ratio (0.66 in FY04) impede successful disaggregate management.

The magnitudes of the ranges of the vertical axes on the graphs in this appendix all equal 1.5. While this makes it possible to visually compare trends across AFSCs, it does tend to visually understate significant variations. A range of 1.5 is necessary because a few E5/E4 variations are exceptionally pronounced, particularly for lateral AFSCs. All data came from AFPC RAW.[1]

The AFSCs are arranged in numerical order; the name of the AFSC appears at the top of each graph.

[1] There is no universal agreement on how to count permanent party authorizations. However, for the purposes of this appendix, it is sufficient to count them consistently to demonstrate changes in ratios over time.



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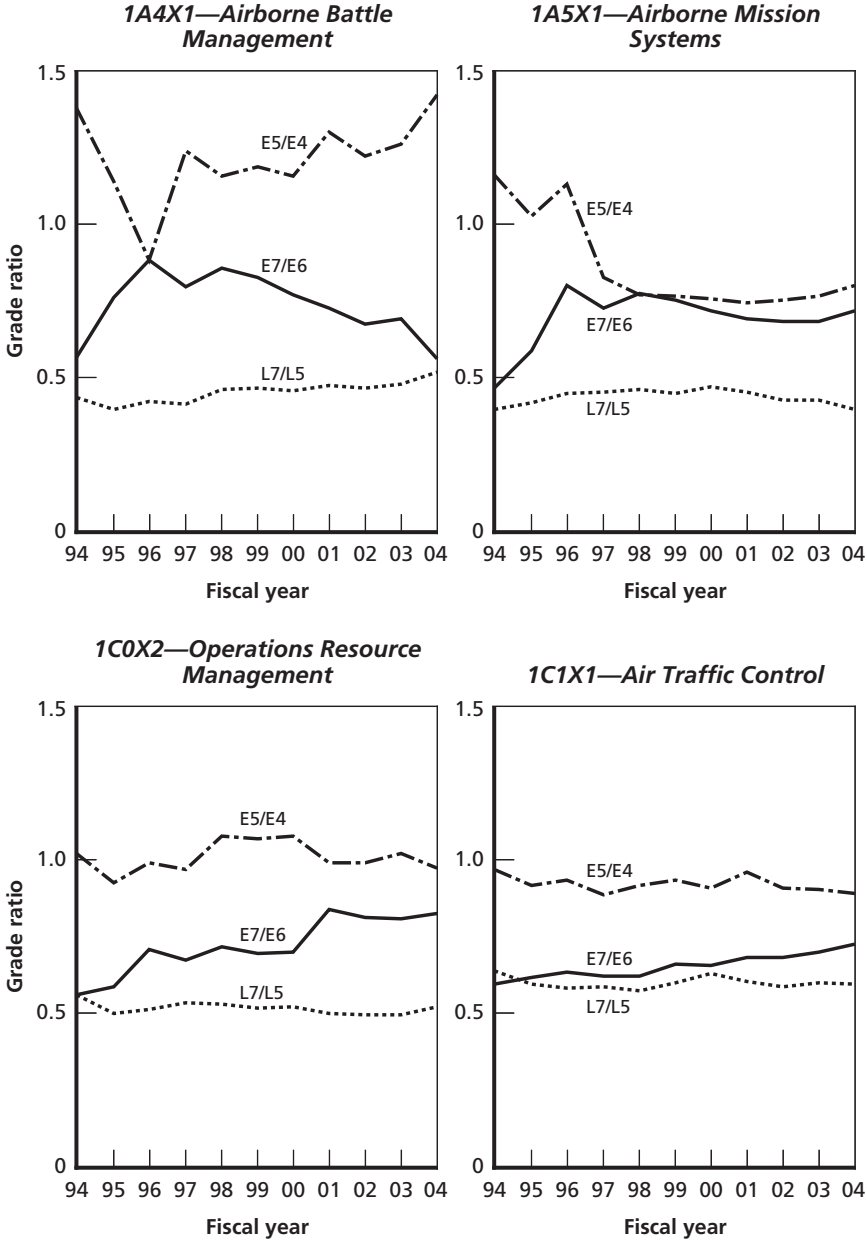
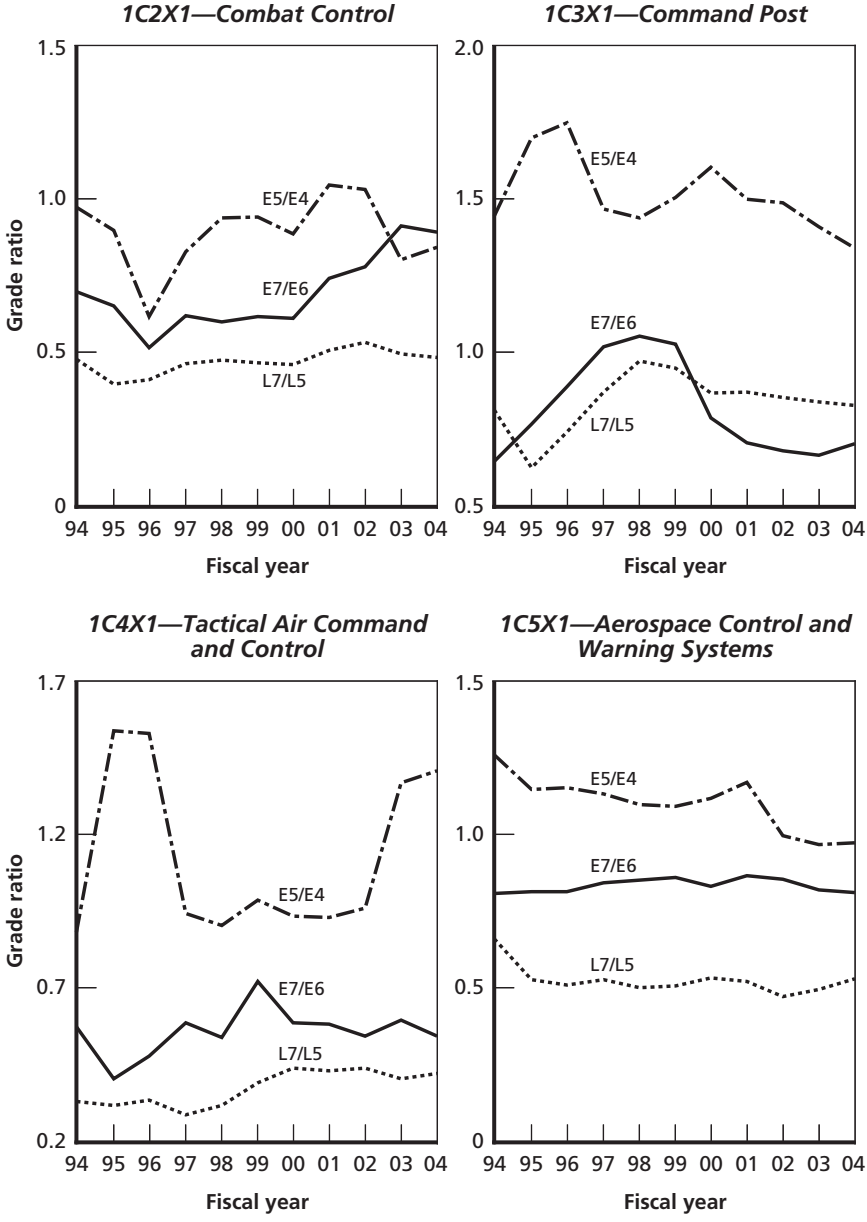


RAND *MG540-A.2*



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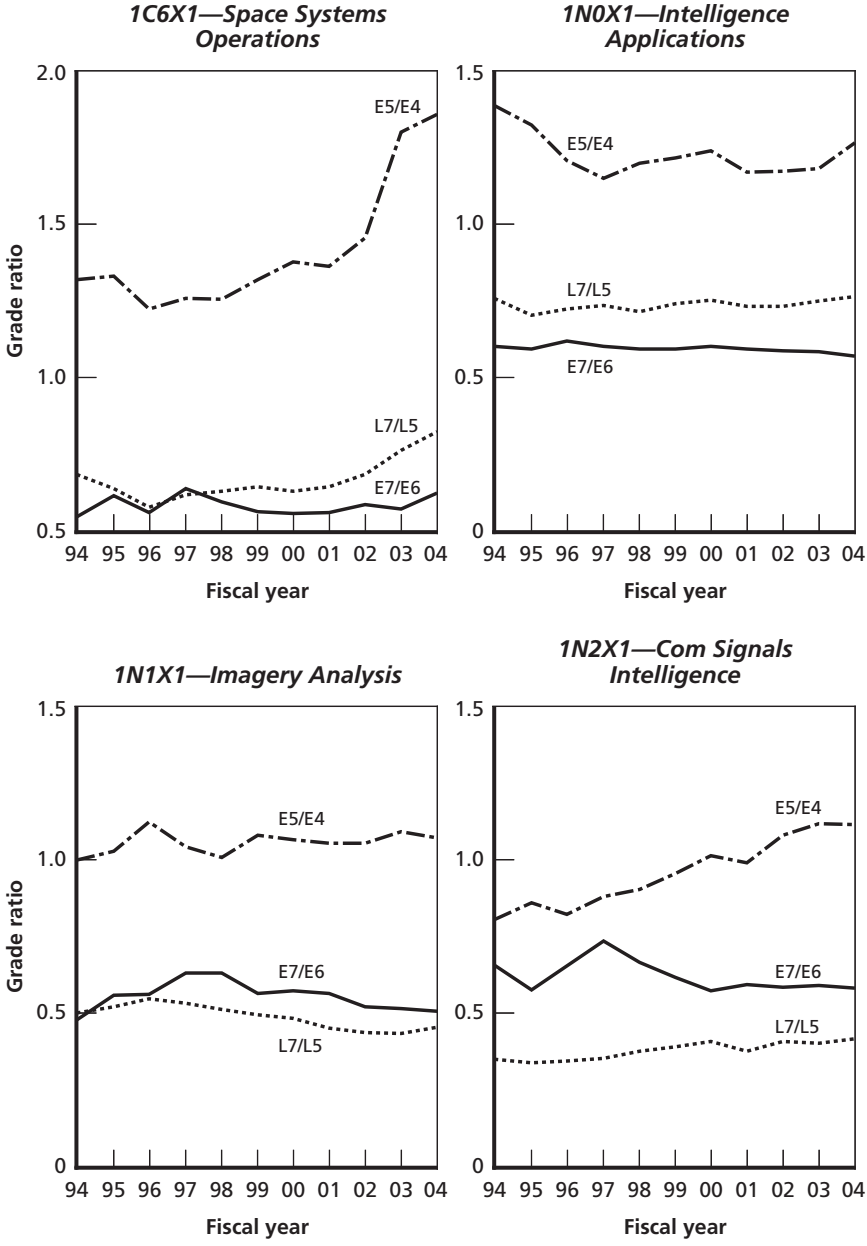

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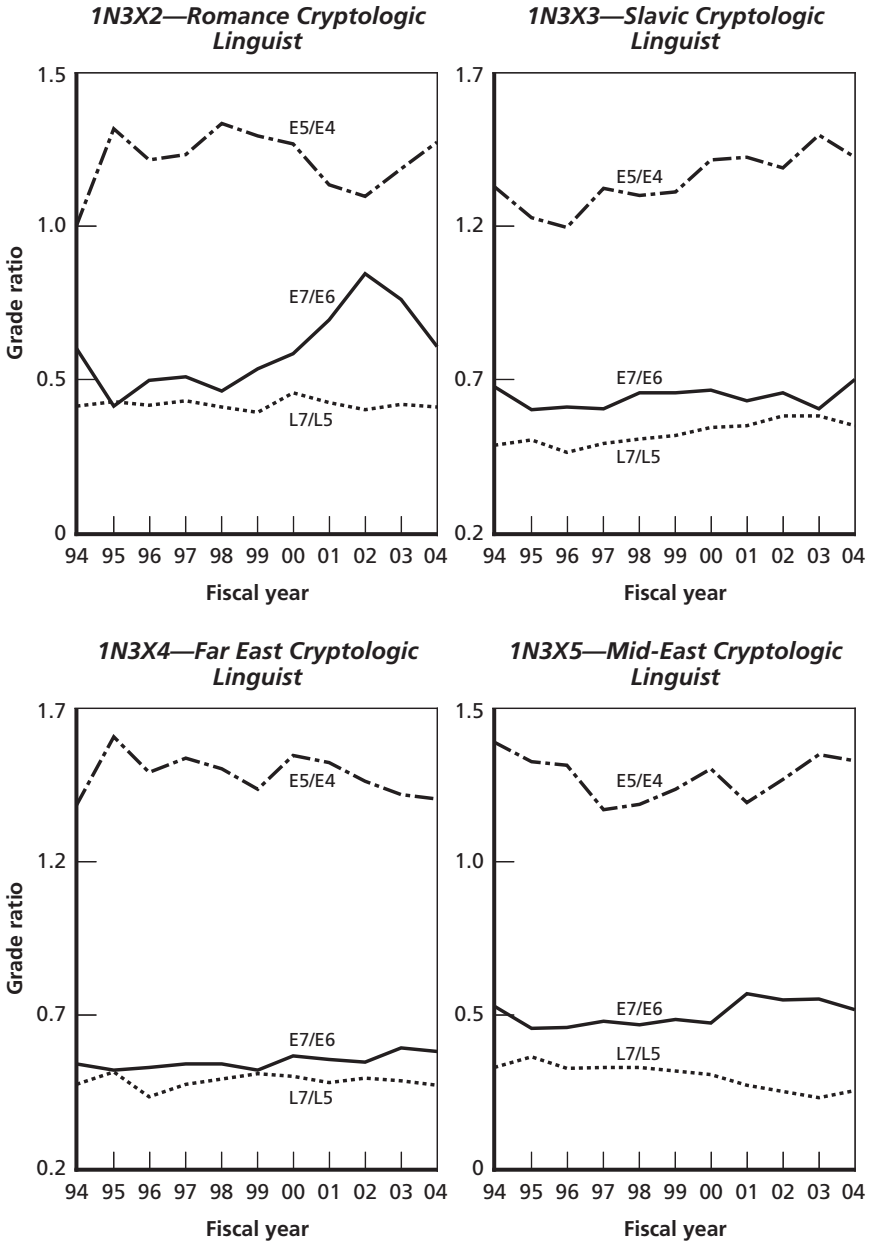

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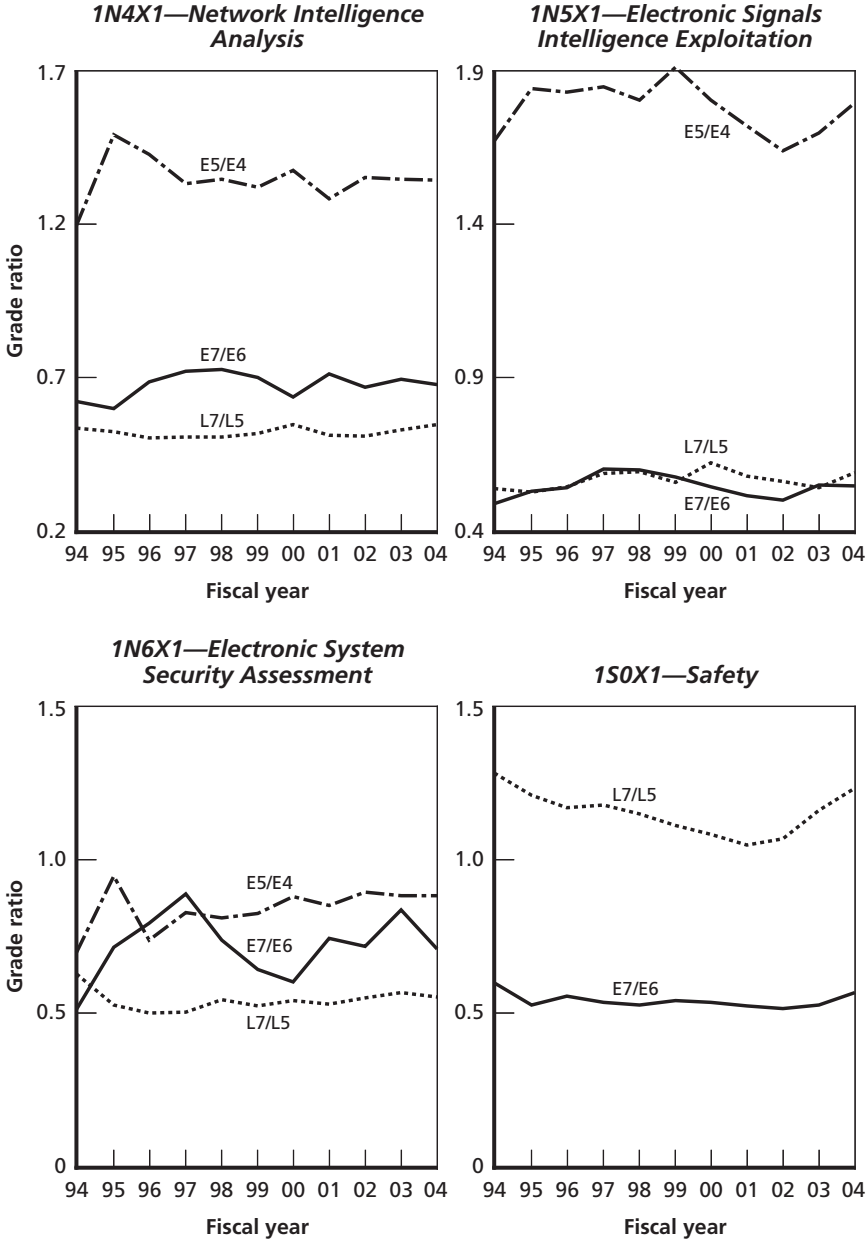

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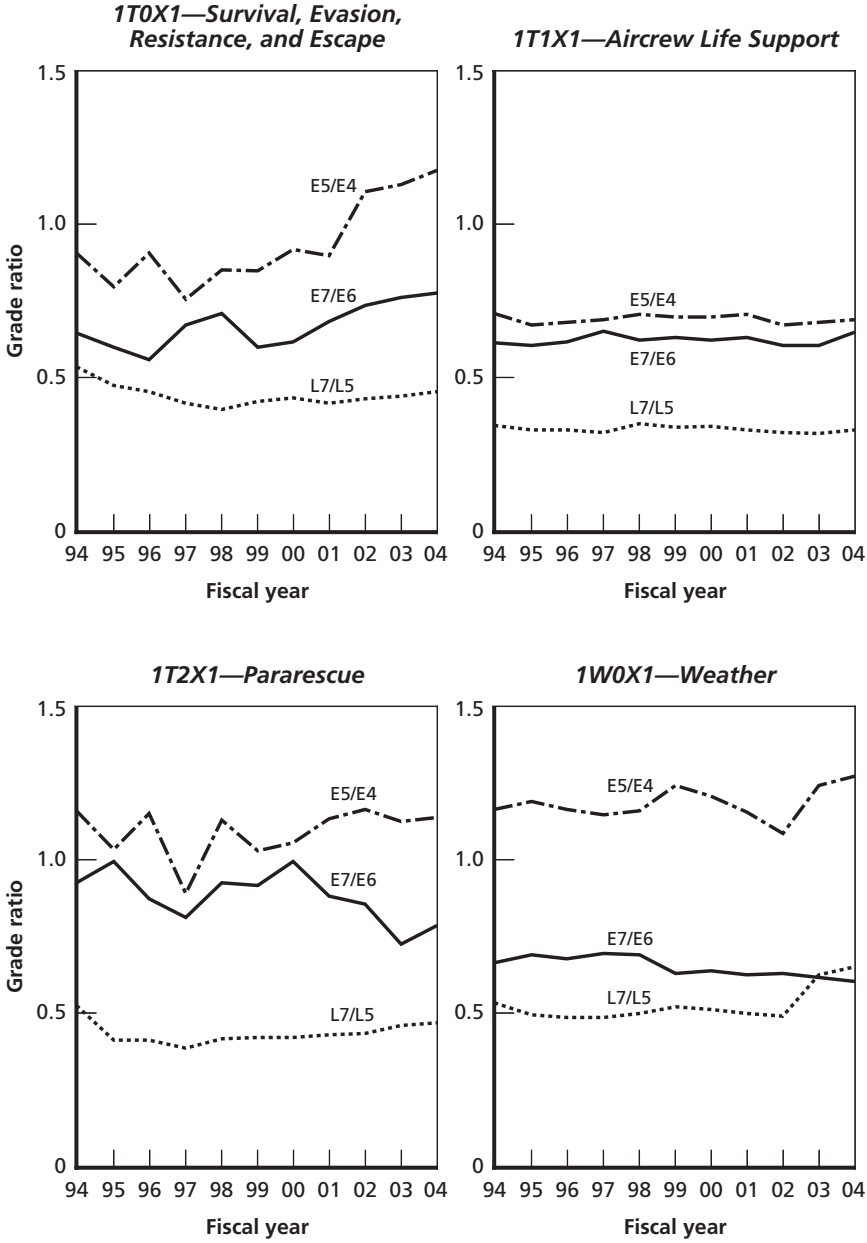

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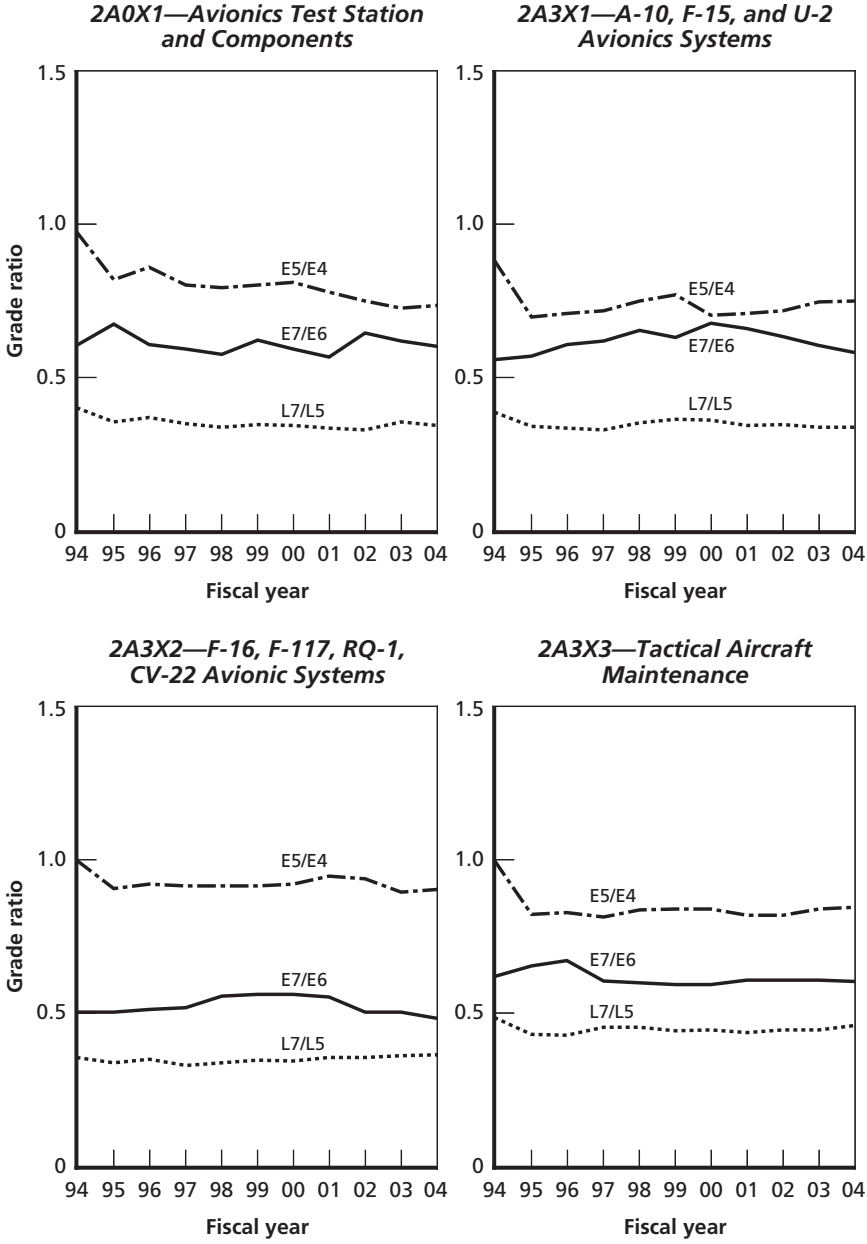

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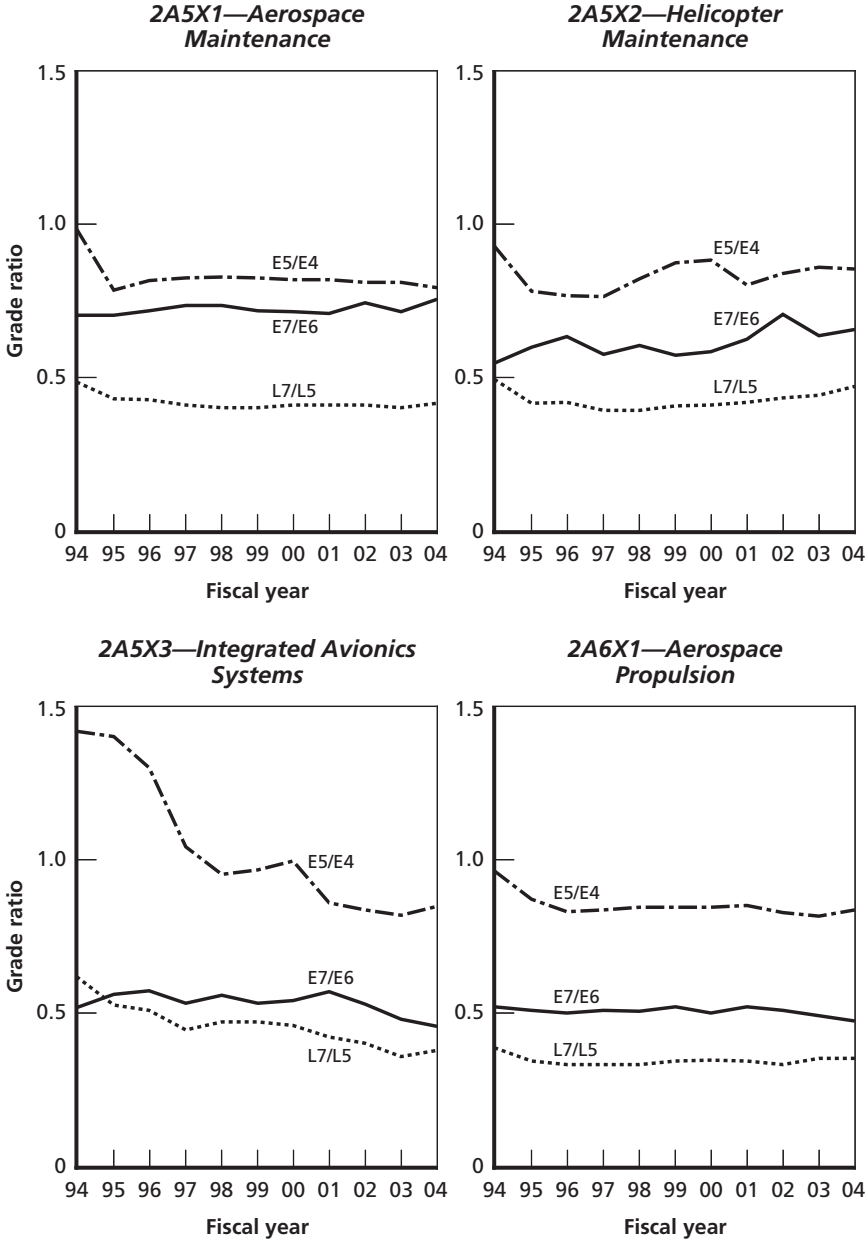

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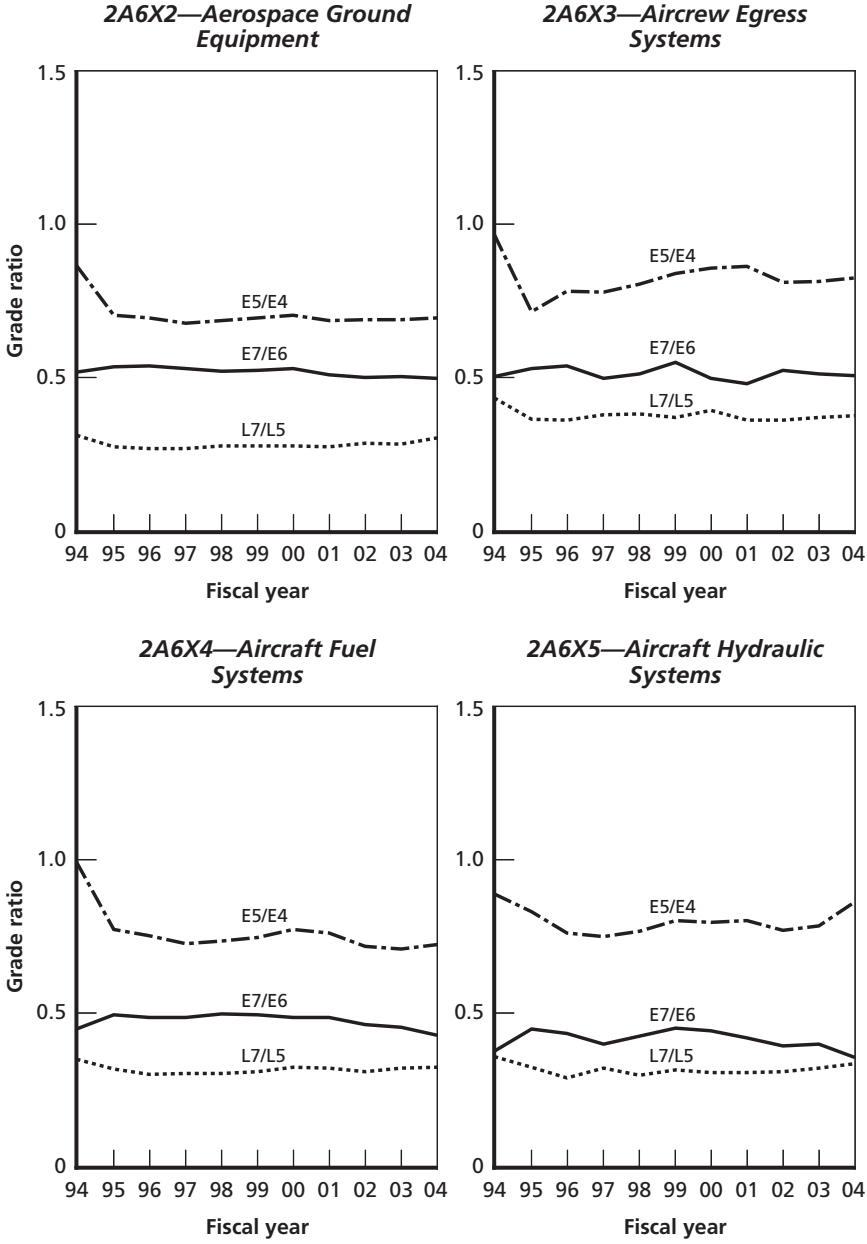

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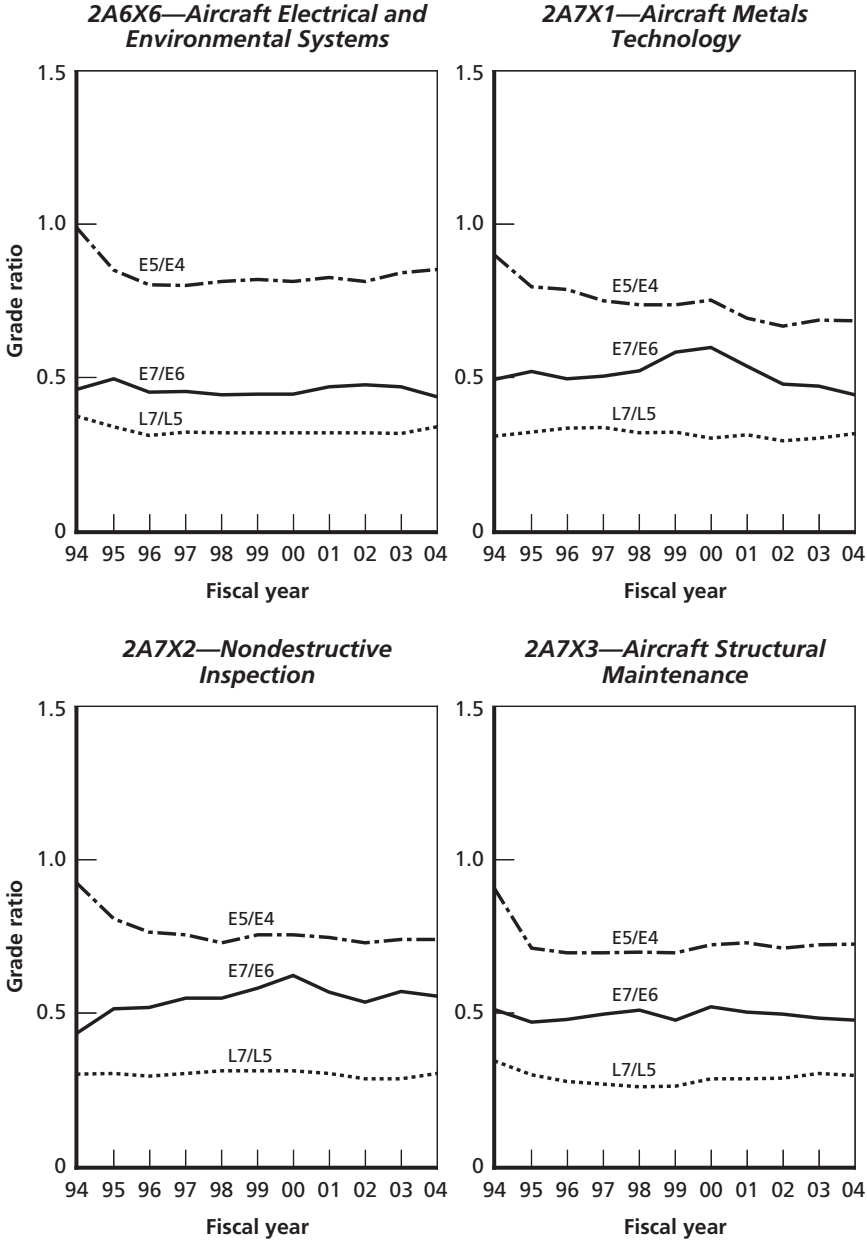

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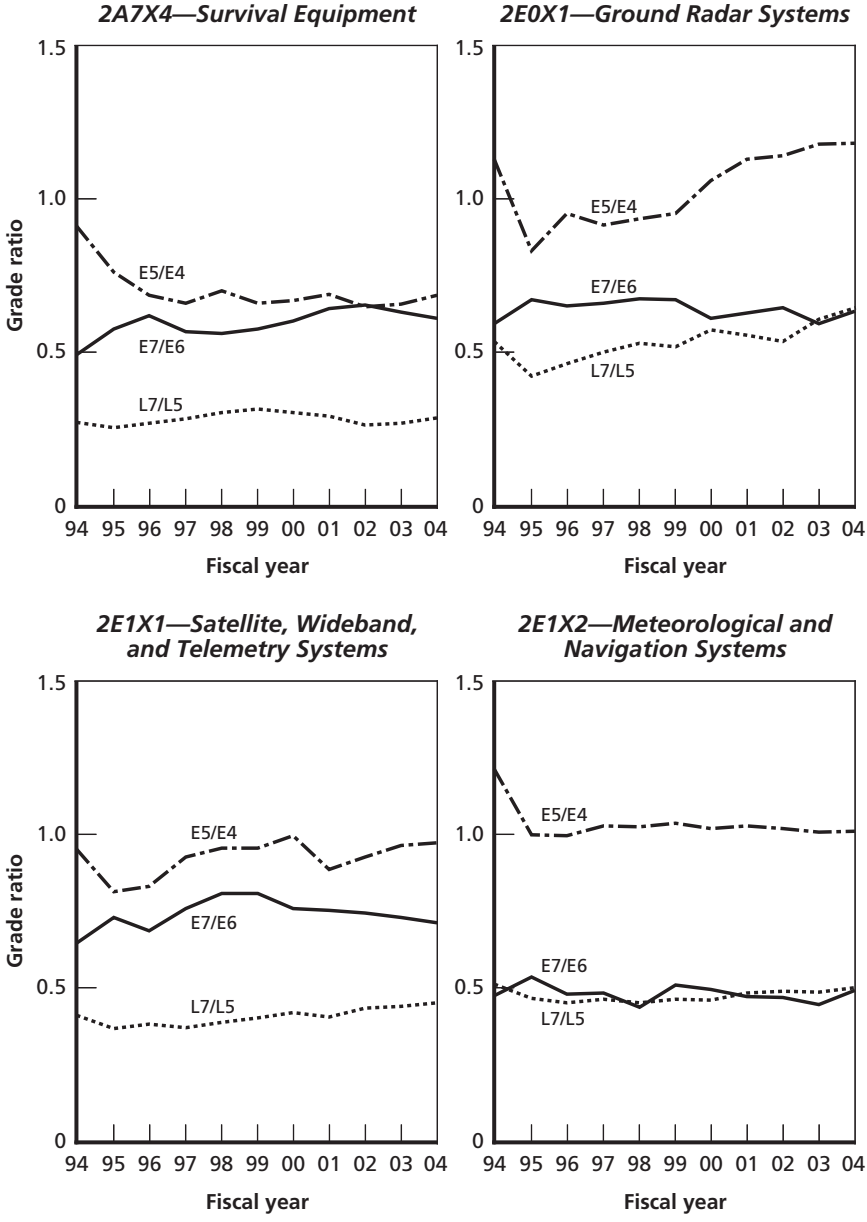

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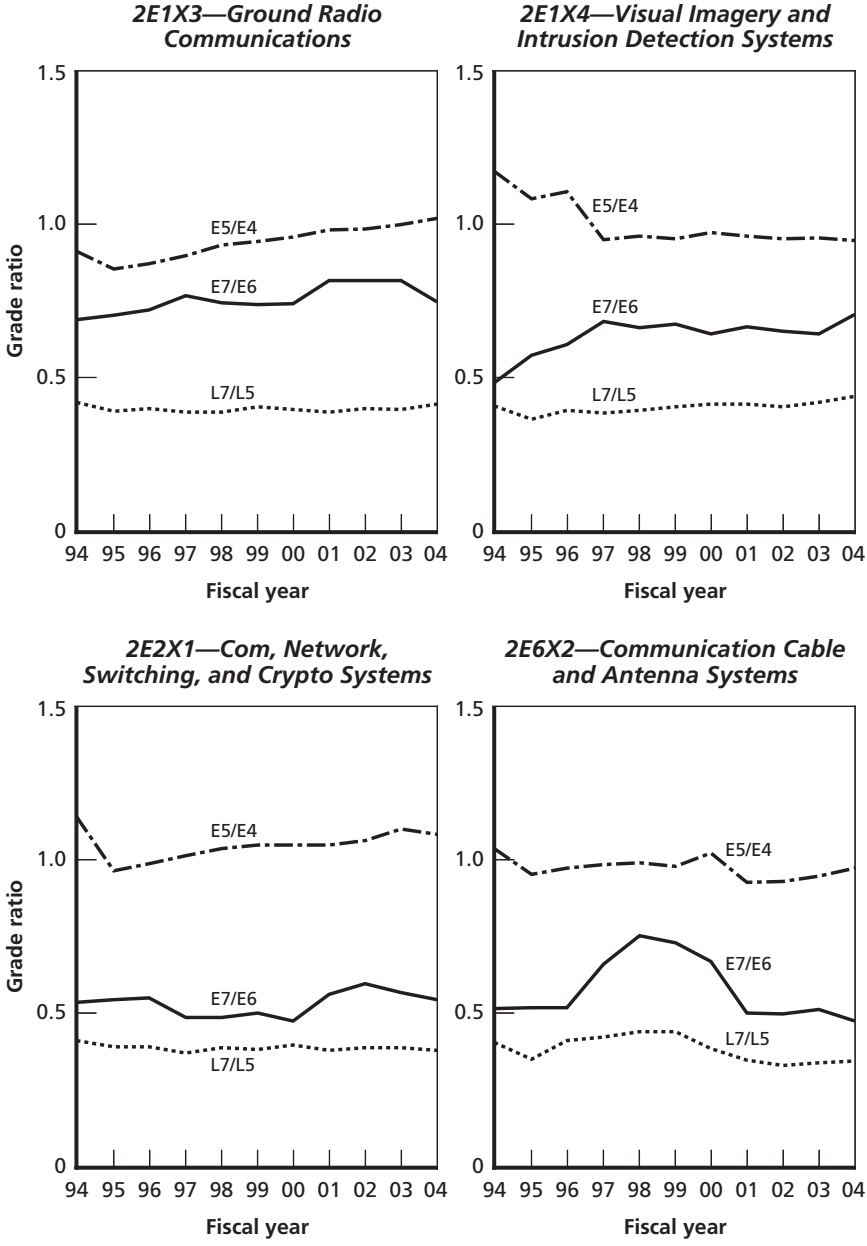

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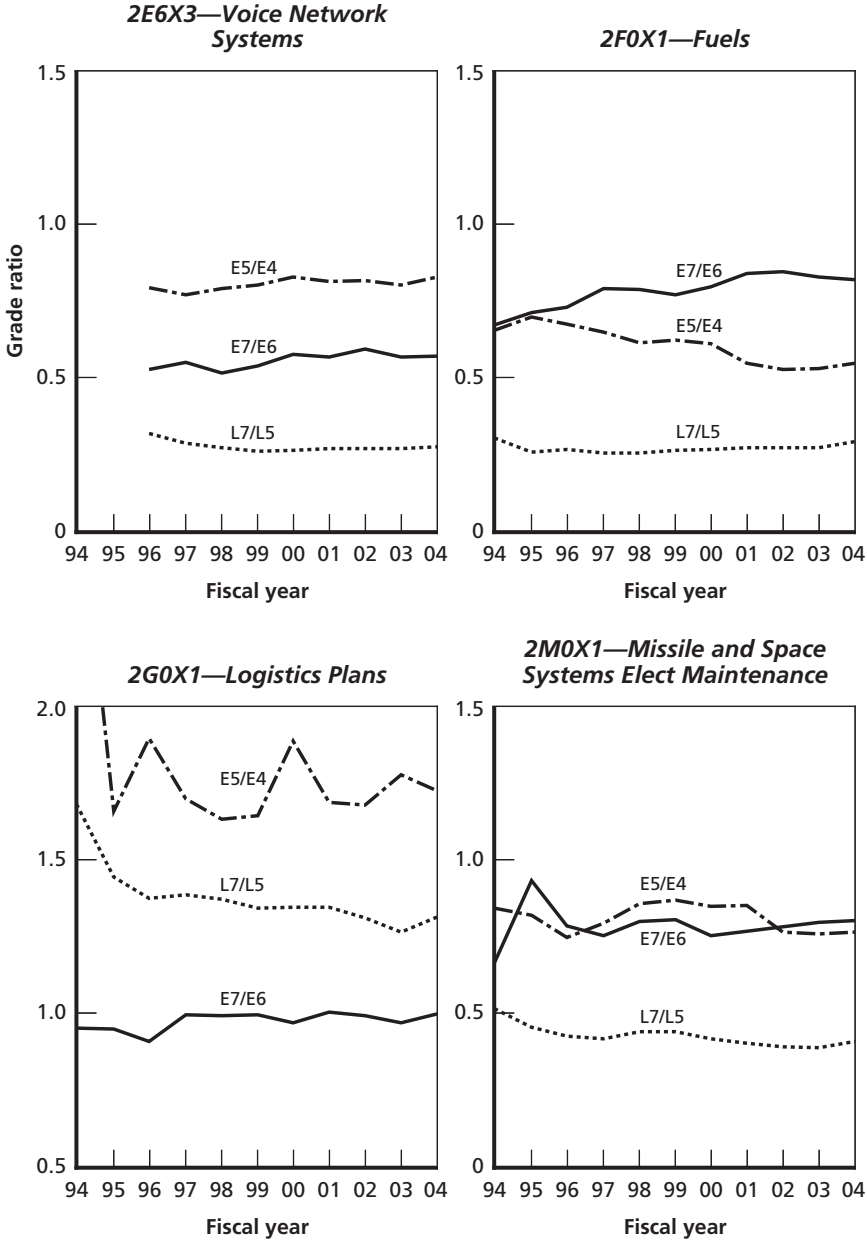

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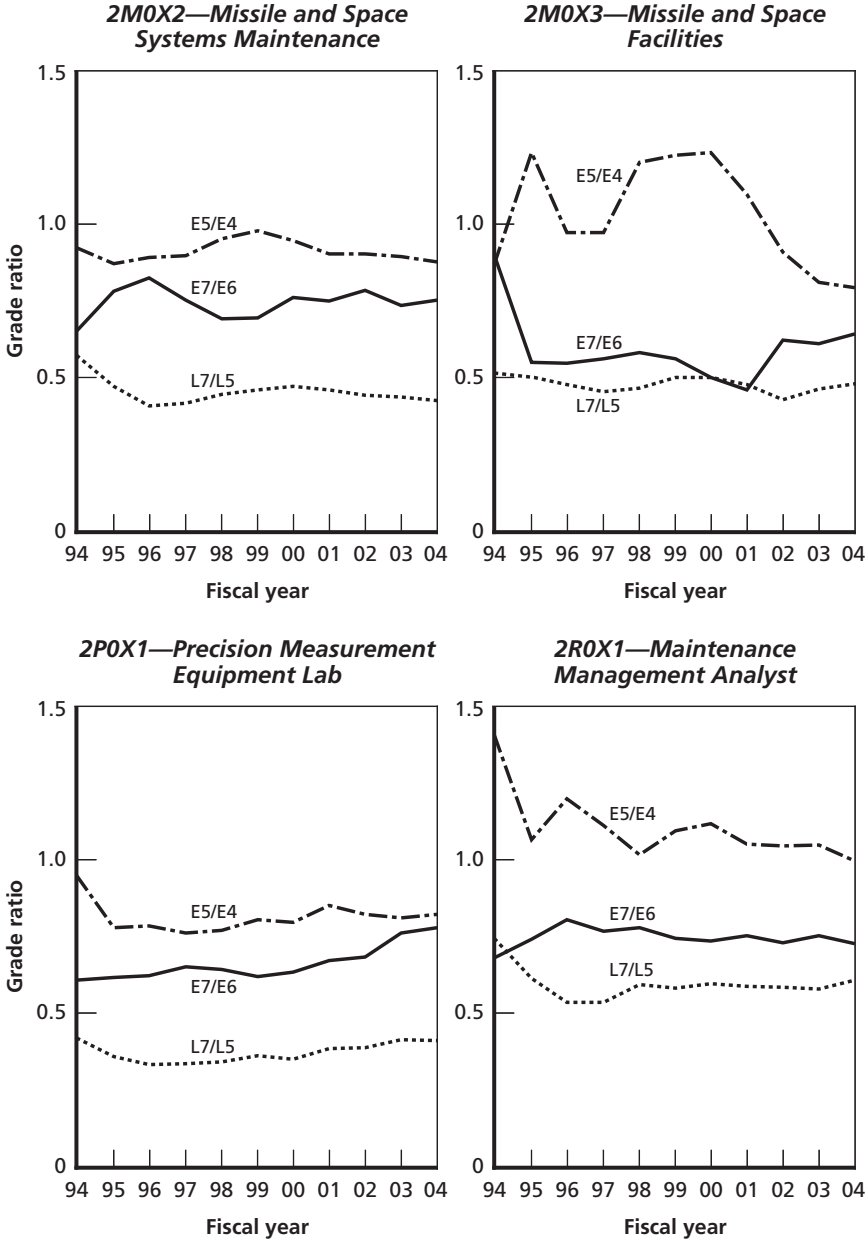

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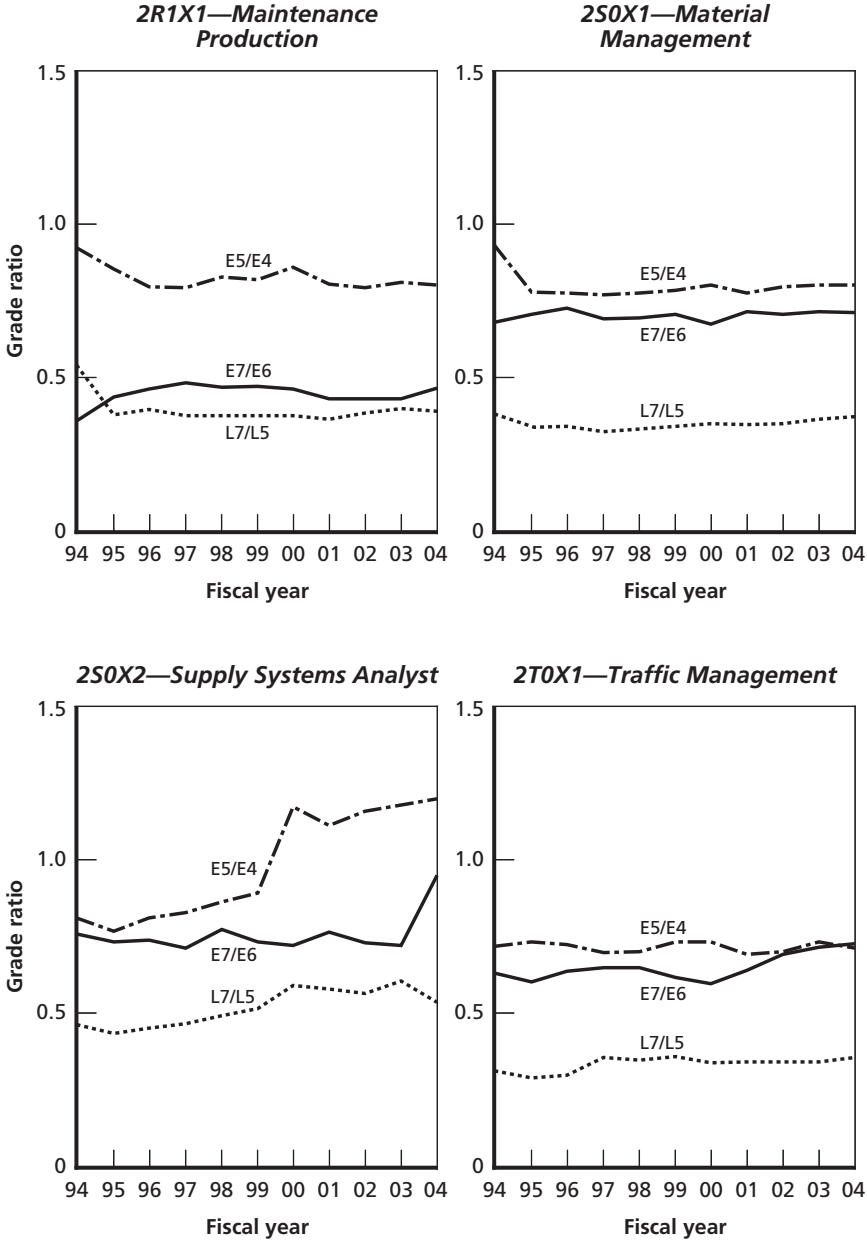

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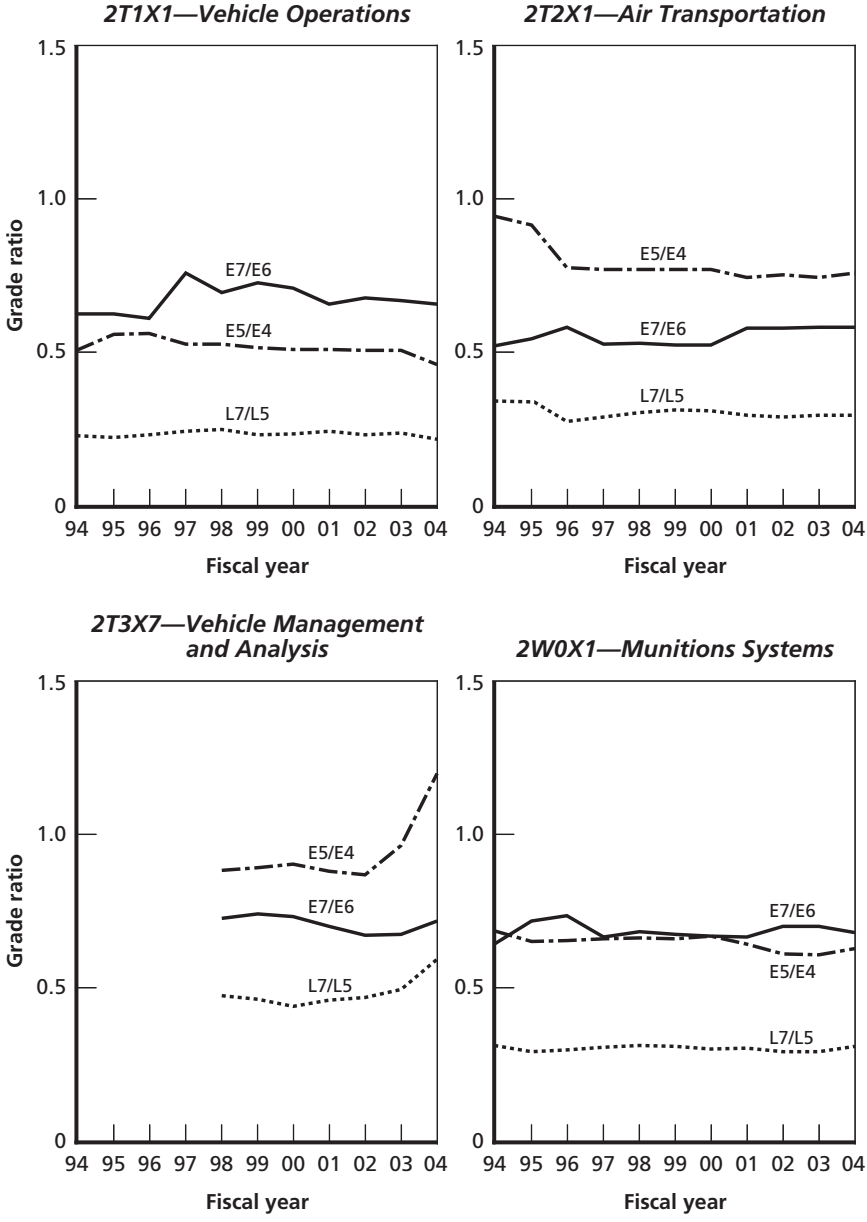
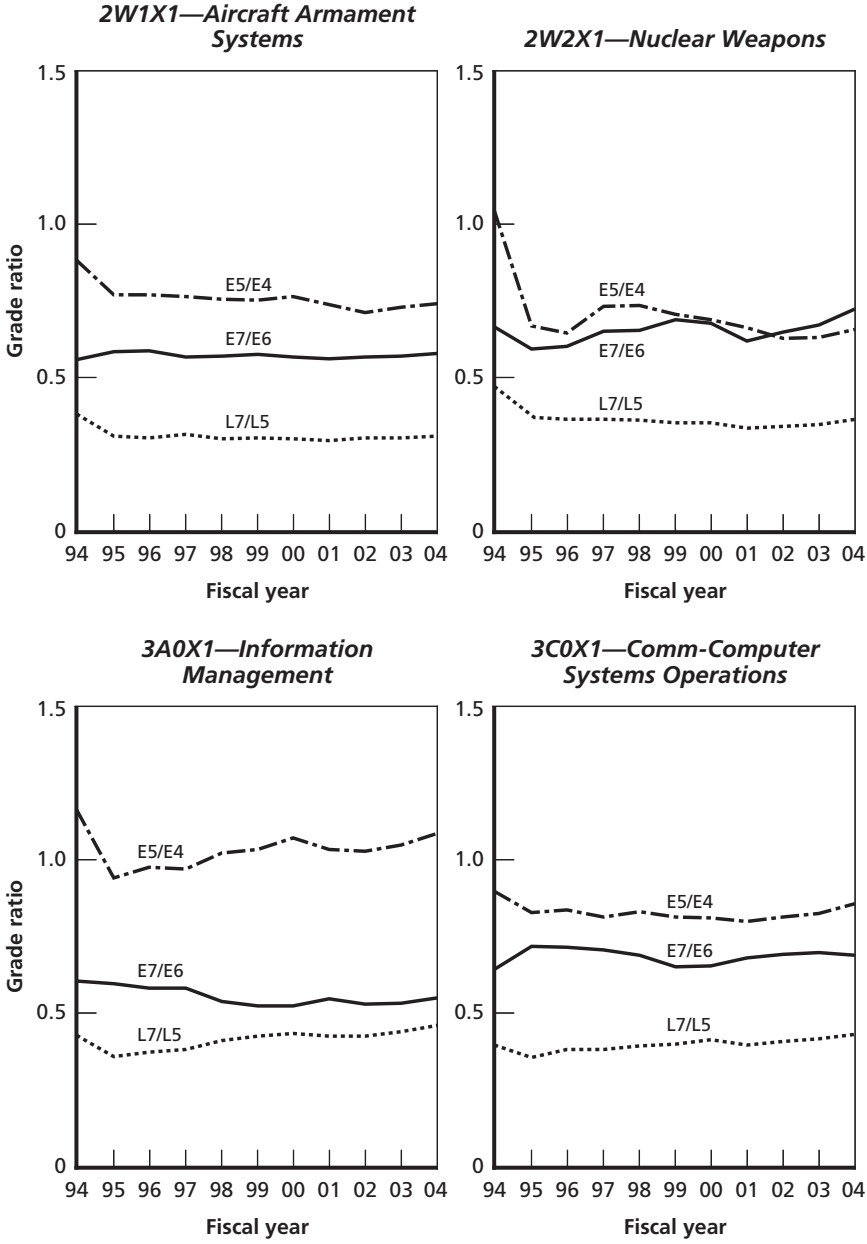


RAND *MG540-A.17*



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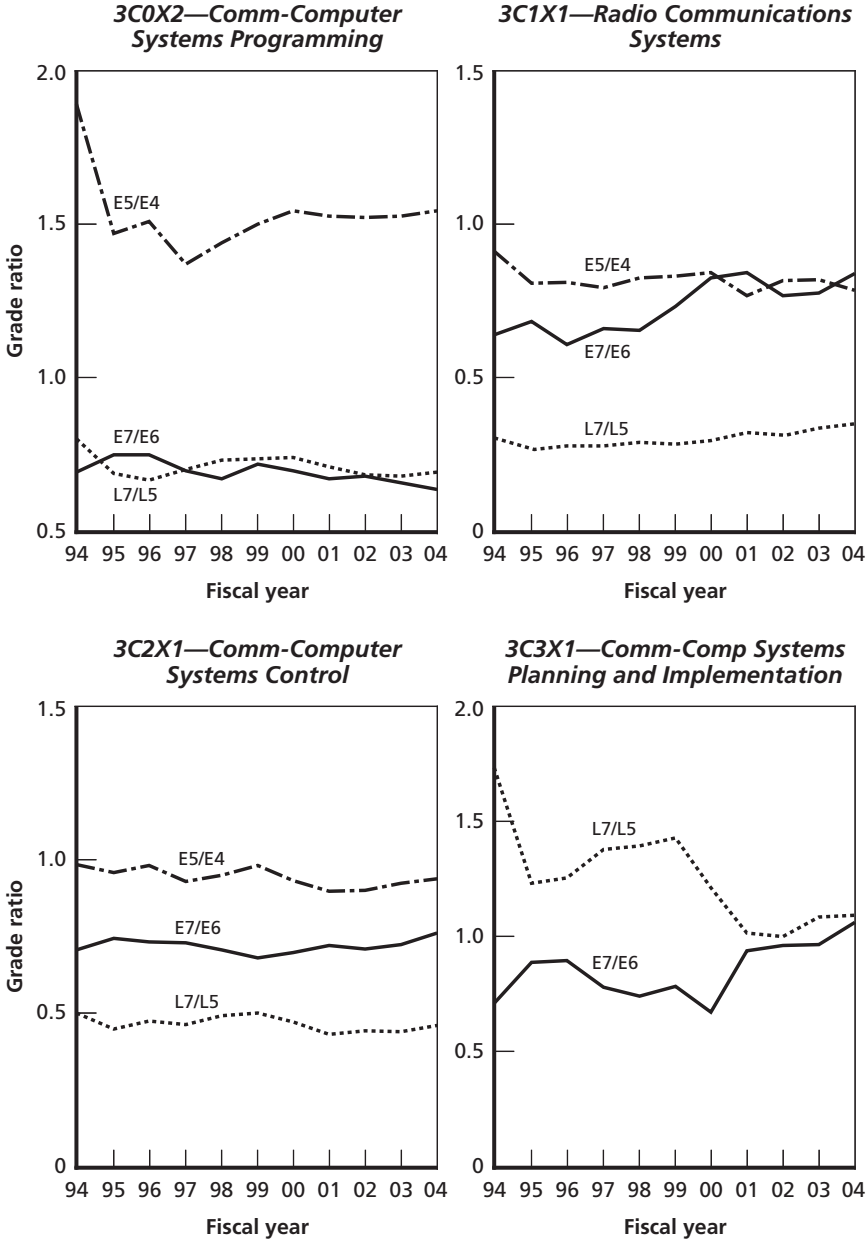

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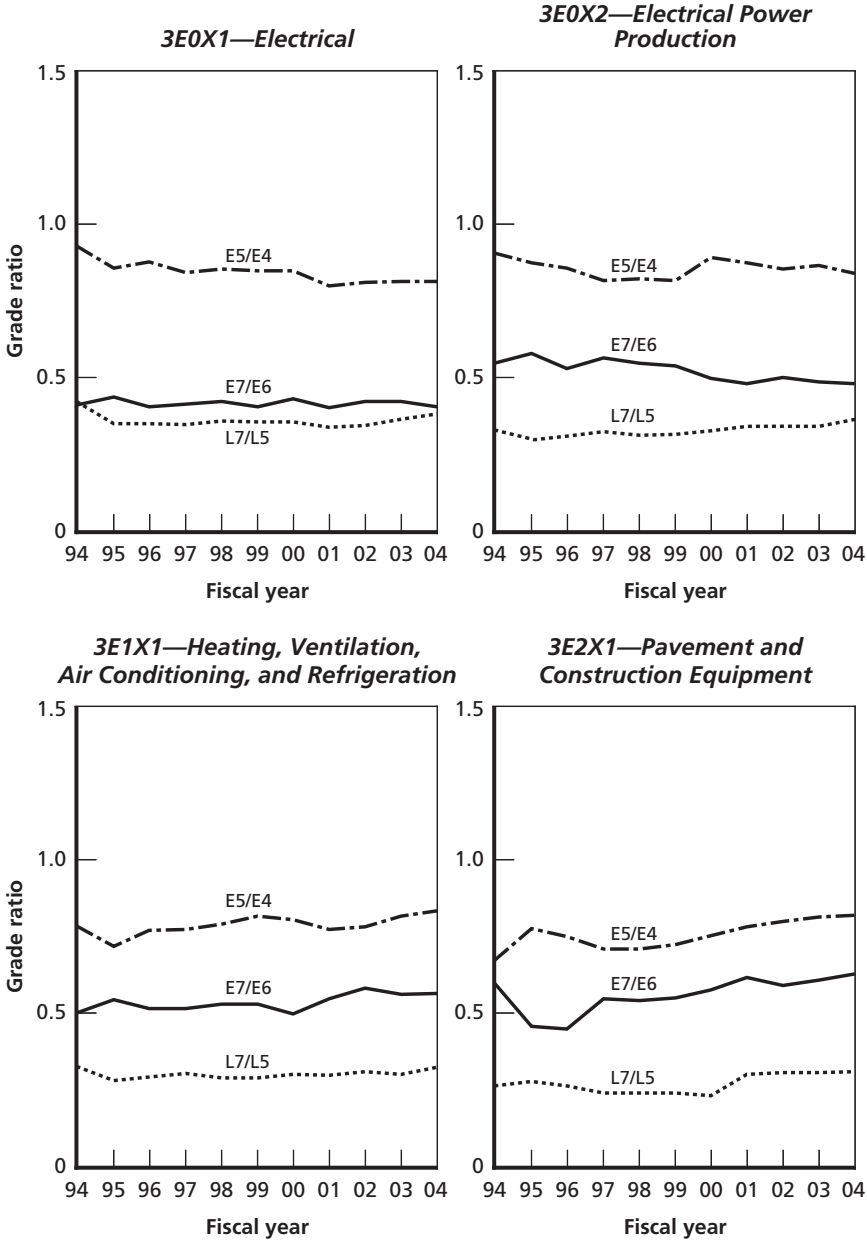

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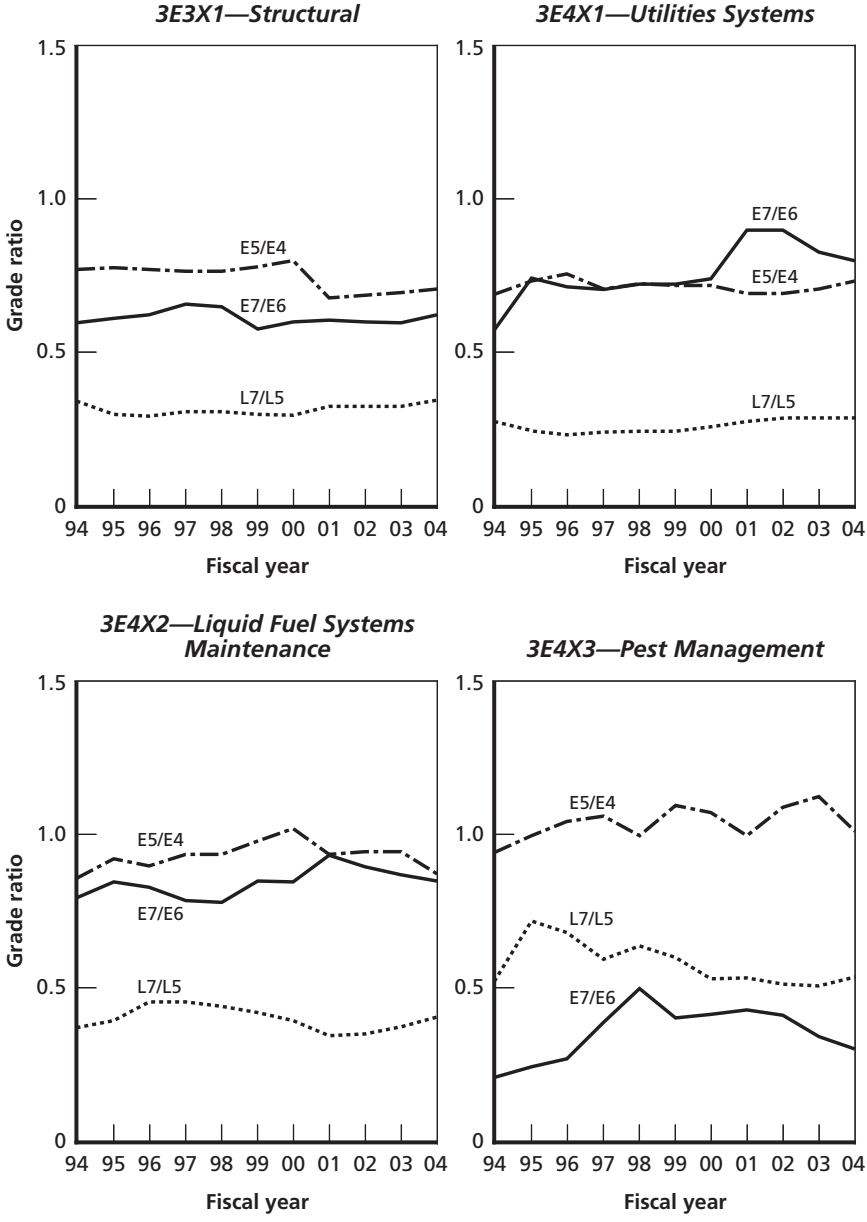

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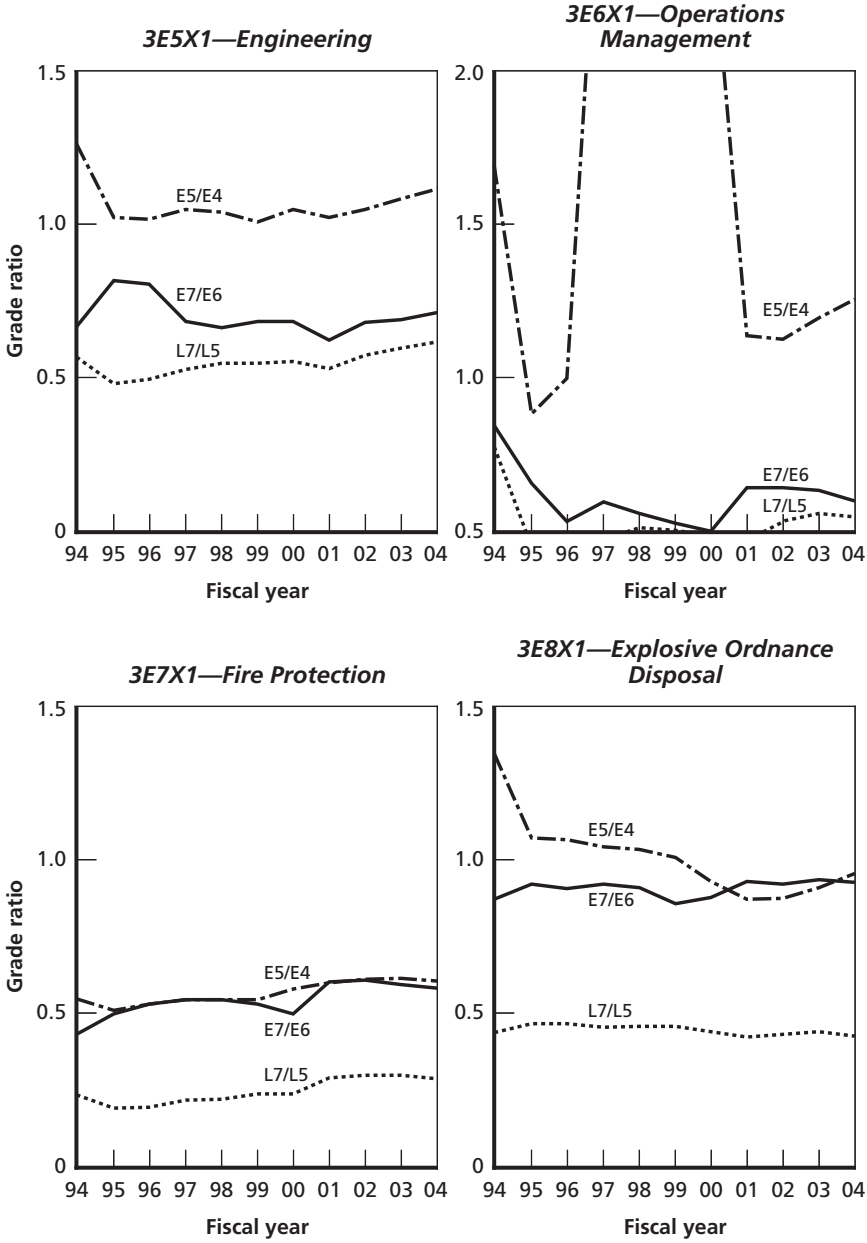

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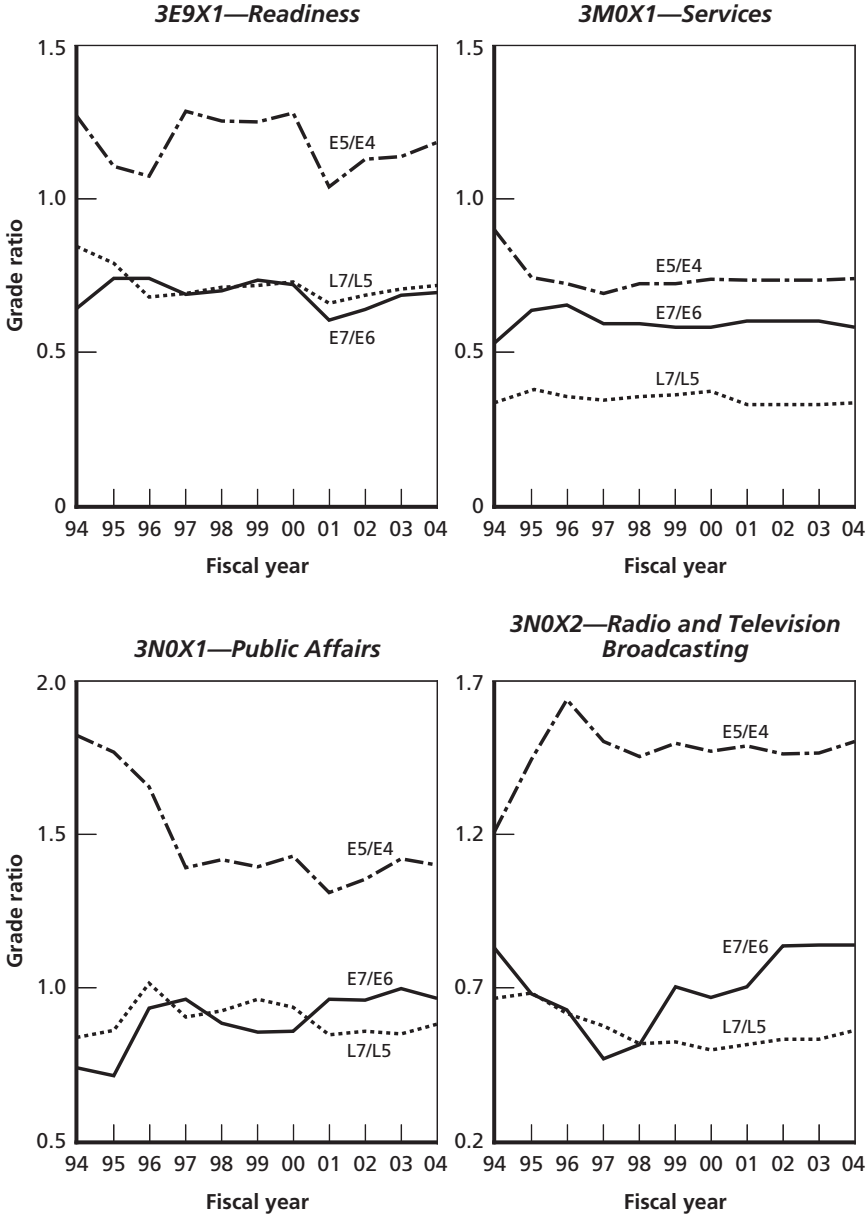

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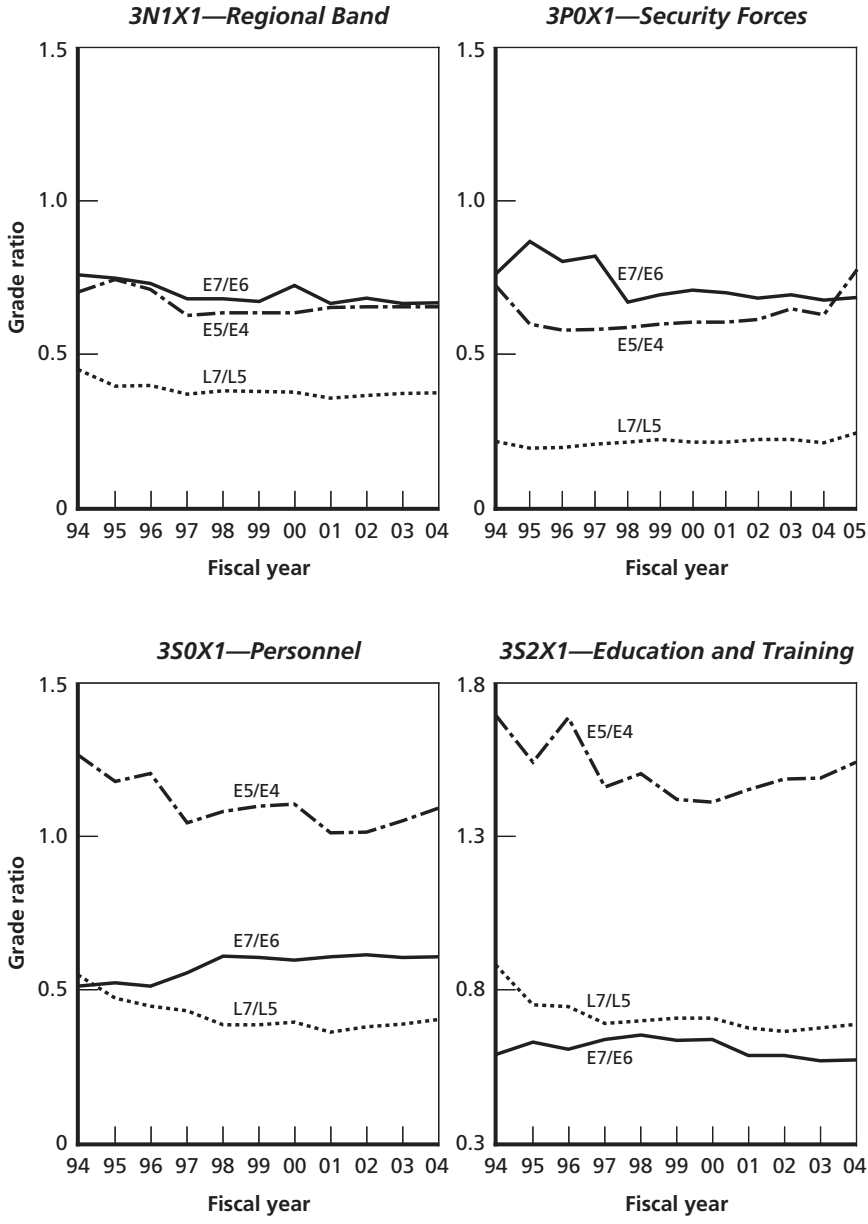

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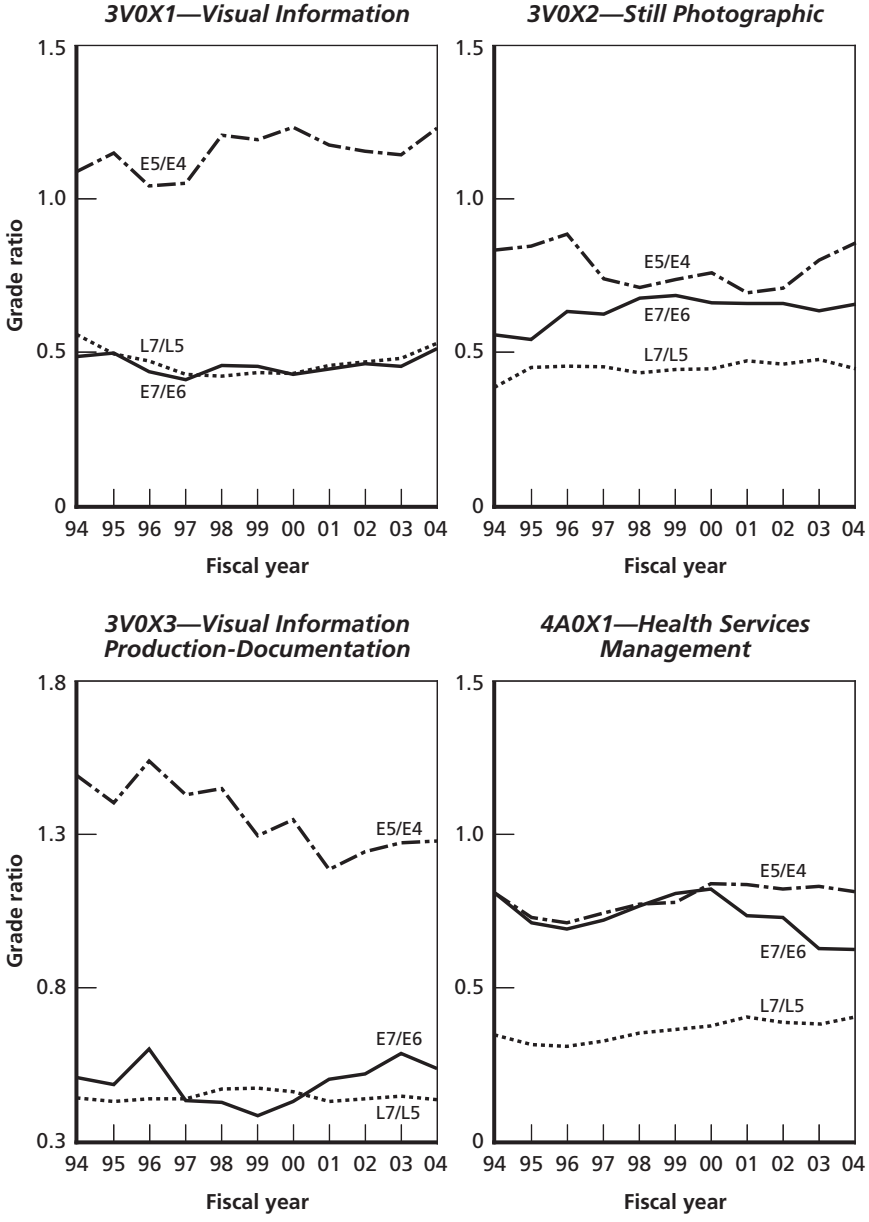

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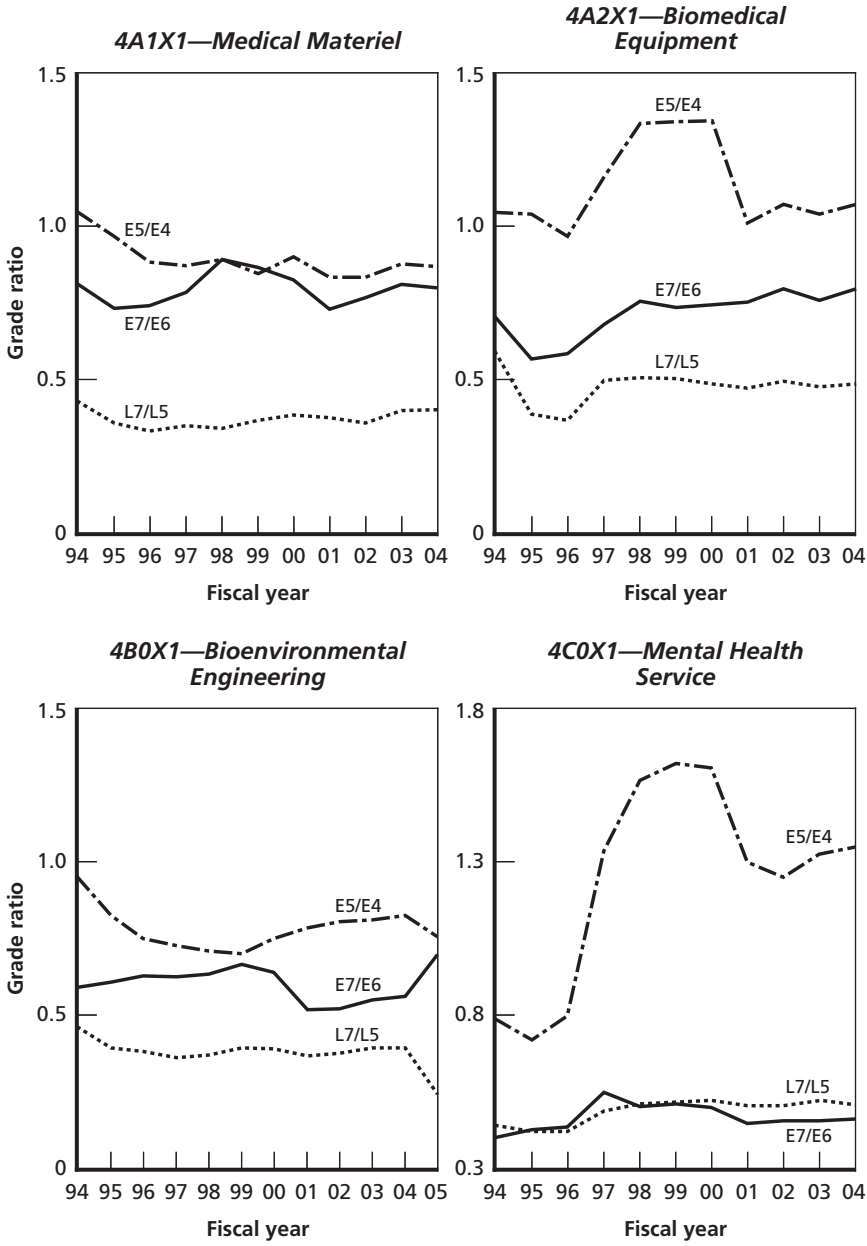

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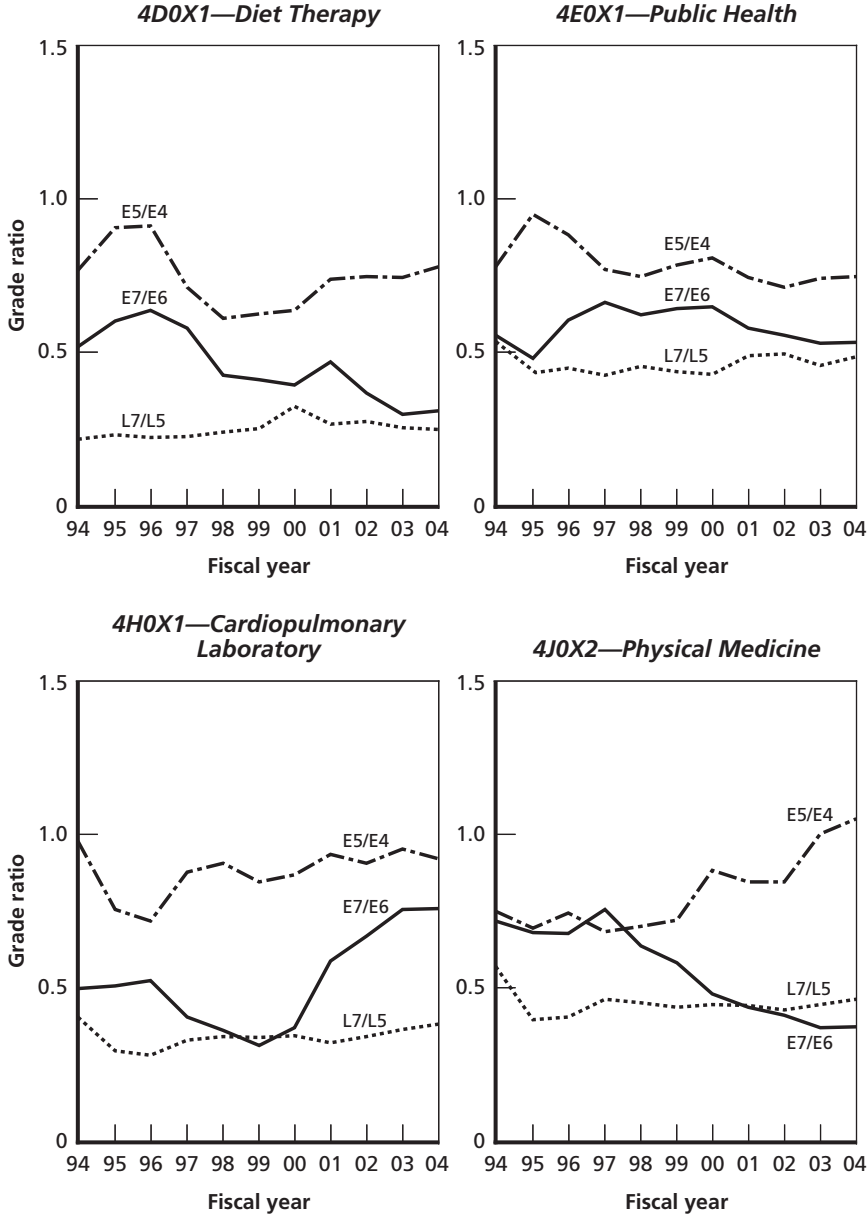

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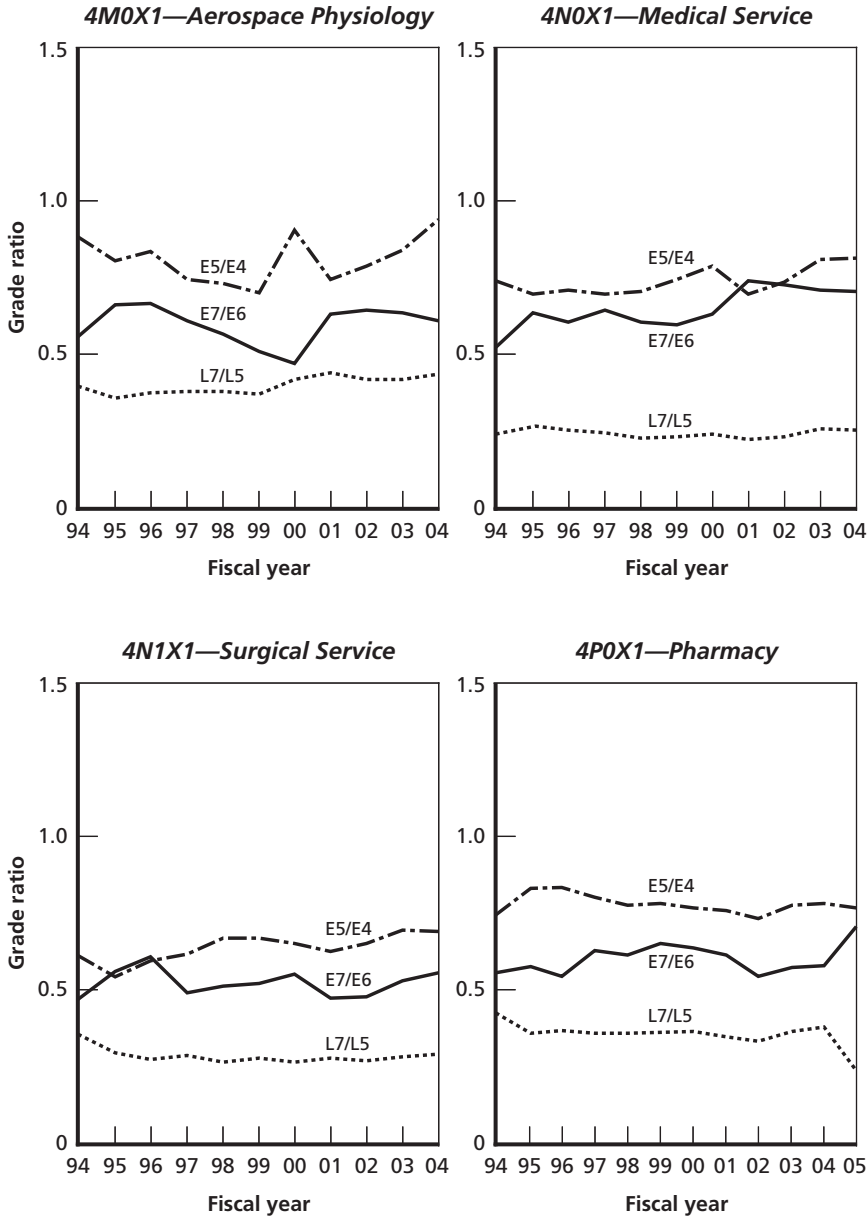

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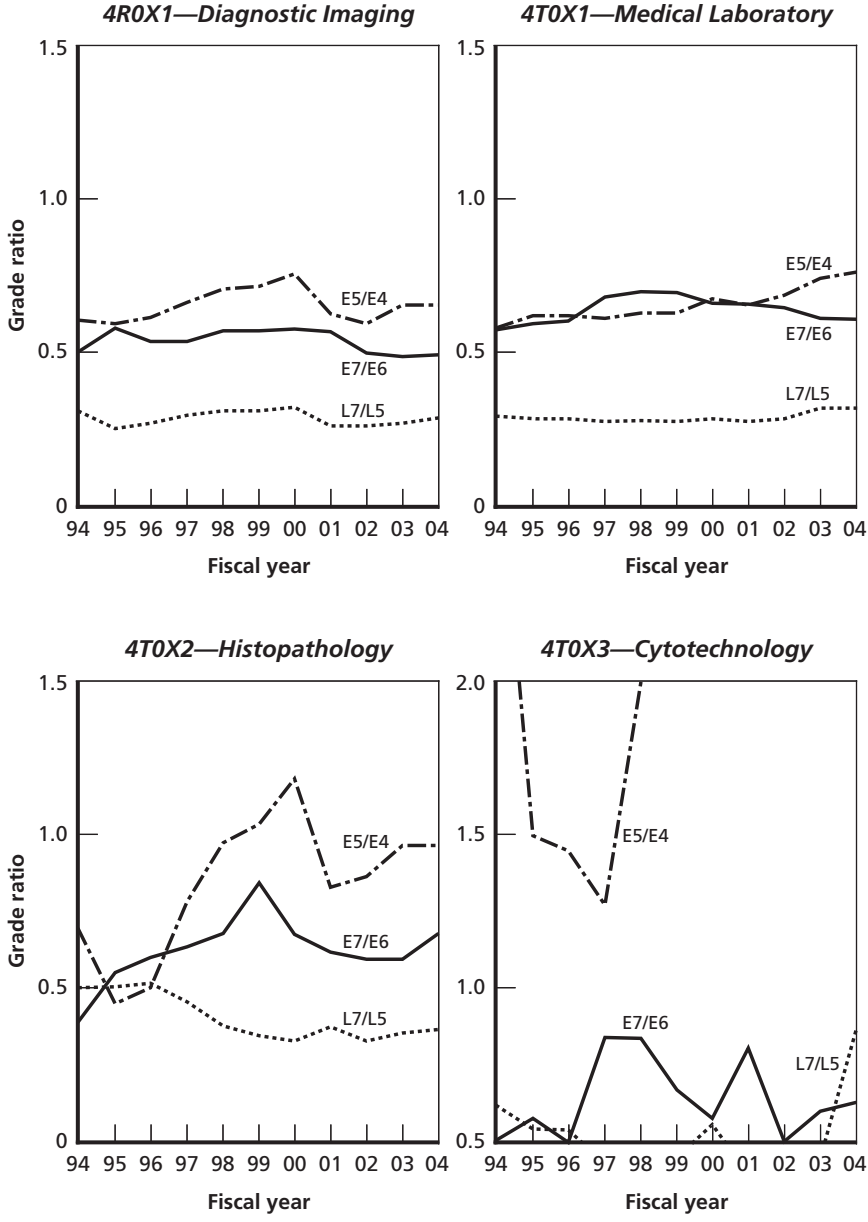

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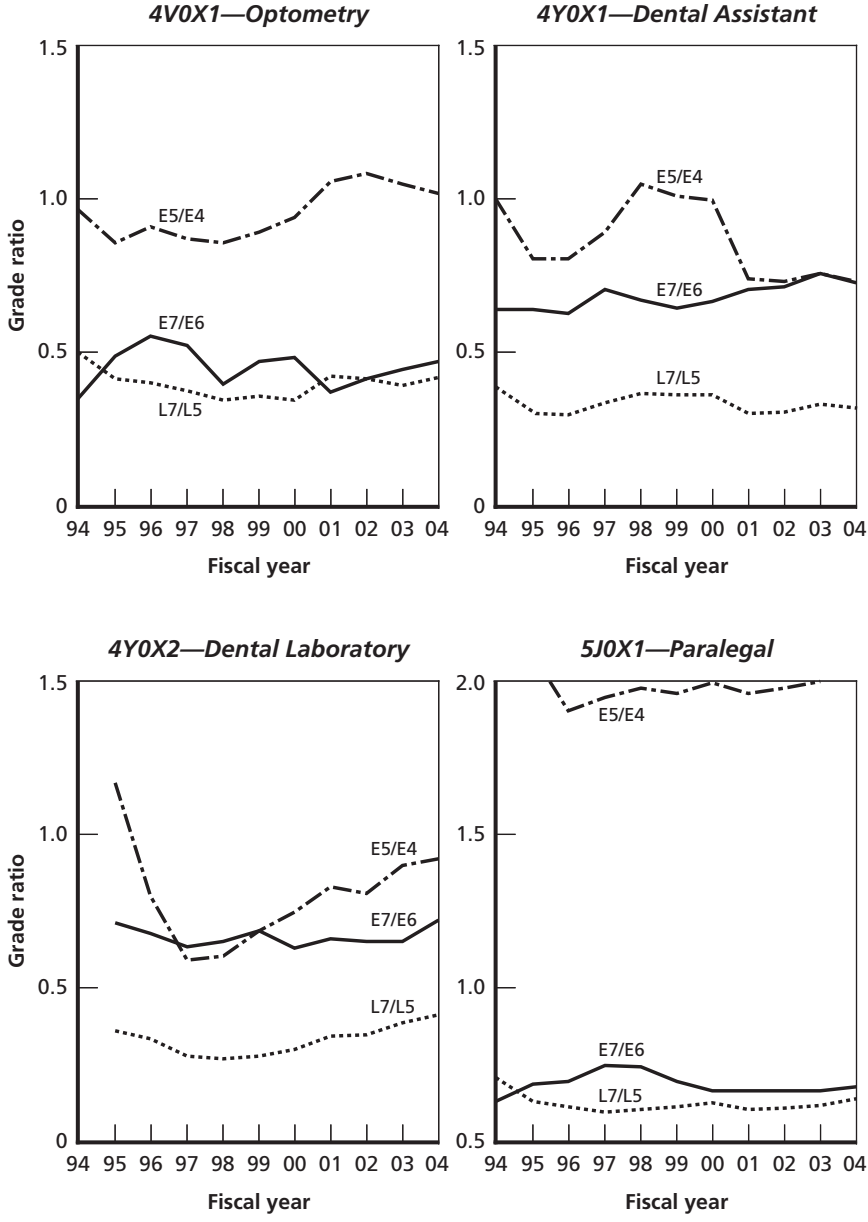

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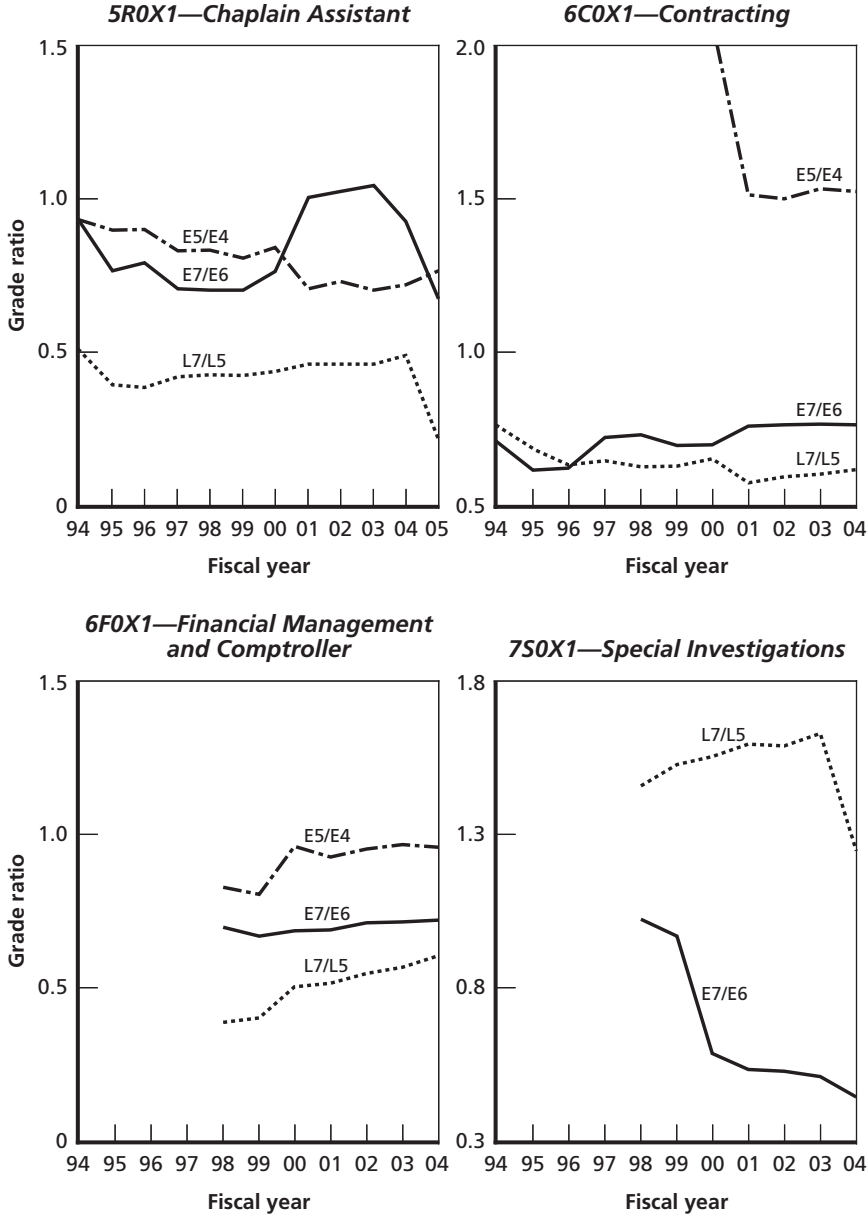

RAND *MG540-A.31*

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