1996-03

An analysis of Naval officers serving on joint duty: the impact of the 1986 Goldwater-Nichols Act

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Monterey, California

THESIS

AN ANALYSIS OF NAVAL OFFICERS SERVING ON JOINT DUTY: THE IMPACT OF THE 1986 GOLDWATER-NICHOLS ACT

by

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March, 1996

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REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE March 1996	3. REPORT TYPE AND DATES COVERED Master's Thesis

4. TITLE AND SUBTITLE AN ANALYSIS OF NAVAL OFFICERS SERVING ON JOINT DUTY: THE IMPACT OF THE 1986 GOLDWATER-NICHOLS ACT	5. FUNDING NUMBERS
6. AUTHOR(S) JOHN PETER KOVACH	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.	12b. DISTRIBUTION CODE

13. ABSTRACT *(maximum 200 words)*

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14. SUBJECT TERMS JOINT GOLDWATER-NICHOLS PROMOTION			15. NUMBER OF PAGES 109
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

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AN ANALYSIS OF NAVAL OFFICERS SERVING ON JOINT DUTY: THE IMPACT OF THE 1986 GOLDWATER-NICHOLS ACT

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MASTER OF SCIENCE IN MANAGEMENT

from the

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The purpose of this thesis is to examine trends in the quality of officers assigned to joint duty and analyze the effect of joint assignments on an officer's career. This study examines officers appearing before the 1988-1994 Commander and Captain promotion boards. Results of cross tabulations indicate qualitative differences between officers receiving the JS2 before and after 1 October 1989. Officers receiving the JS2 after 1 October 1989 demonstrated significantly higher performance (as measured by fitness report data) than officers receiving a JS2 prior to 1 October 1989. Officers receiving the JS5 were of higher quality than average, regardless of the date of the AQD. This study also examines the effects of joint duty on an officer's likelihood of promotion, and compares the results across four warfare communities: SWO, SUB, PILOT, and NFO. The results indicate that SWOs and NFOs receiving a JS2 designator prior to 1989 have a lower probability of promotion to Commander. Conversely, SWOs receiving a JS2 designator after 1 October 1989 have a significantly higher probability of promotion to Commander. The effect of a JS2 on promotion to Captain is largely statistically insignificant. The effect of a JS5 on promotion to Commander is positive for SWOs appearing before the 1990-94 promotion boards and NFOs appearing before the 1988-90 promotion boards. The effect of a JS5 on promotion to Captain is positive for SWOs appearing before the 1988-90 promotion boards, and for Pilots appearing before all Captain promotion boards.

TABLE OF CONTENTS

I. INTRODUCTION

> The Secretary of Defense shall establish policies, procedures, and practices for the effective management of officers of the Army, Navy, Air Force, and Marine Corps on the active-duty list who are particularly trained in, oriented toward joint matters...such officers shall be identified or designated...in such a manner as the Secretary of Defense directs...officers to be managed by such policies, procedures, and practices are referred to as having or having been nominated for, the "joint specialty.[1]

A. BACKGROUND AND OBJECTIVES

The above section of the Goldwater-Nichols Act (GNA) of 1986 was the latest in a series of Congressional attempts to enhance the effectiveness of the nation's joint operational warfighting ability, and its passage has had a profound effect on the career of today's Naval officer. In addition to evaluating the tenets of wisdom passed down from senior officers ("Stay operational! - Go to sea!" "Grow where you're planted!" "Get graduate education!" "Get that Beltway tour!"), the decision to "Check the joint block" must now be made by all Naval officers as they plan their careers.

GNA, particularly the revolutionary aspects of the joint officer management programs of Title IV, intended to ensure each service selects quality officers for Joint Service and CINC staffs by introducing a variety of control mechanisms designed to assure assignment of high quality officers to joint billets. By mandating comparable promotion rates for officers serving in joint billets with service peers, and requiring joint experience and education as a prerequisite for attaining flag rank, GNA framers sought to ensure high-quality, front-running personnel were assigned to joint commands.

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[1] Goldwater-Nichols Department of Defense Reorganization Act of 1986 (GNA), Public Law 99-433, 1 Oct. 1986, sec 661 (a)

This study seeks to answer two questions which have emerged as a result of the passage of GNA: 1) Has there been a measurable shift towards higher quality officers assigned to joint billets, as intended by the framers of GNA, and 2) What has been the effect of joint experience on an officer's career?

B. SCOPE, LIMITATION, AND ASSUMPTIONS

The study will analyze 1110, 1120, 1310, and 1320 designated officers appearing before the O-5 and O-6 promotion boards during the years 1988-1994, as this period will capture trends in quality of officers assigned to joint duty as a result of the Goldwater/Nichols Act. (The two year "ramp-up period from 1986-1988 would probably not reveal any discernible trends due to actual policy or individual decisions to receive joint assignment as a result of GNA). This study identifies joint duty by the JS2 or JS5 Additional Qualifications Designator (AQD), which are codes used by manpower personnel to track officers who have either completed an assignment in a qualified billet (as defined by the Joint Duty Assignment List (JDAL)) or received the Joint Specialty Officer (JSO) designation. This study uses cross tabulations to examine the qualitative characteristics of officers receiving the JS2/5 AQD before 1 October 1989 with those receiving the JS2/5 after 1 October 1989.

In order to compare the effects of joint duty on promotion across the four warfare communities, multivariate LOGIT models were estimated for each warfare community for two time periods: the 1988-90 promotion boards, and the 1991-94 promotion boards, and separate models were estimated for officers appearing before the Commander and Captain promotion boards within each community. Additionally, a "notional person" approach

was employed to assist in analyzing differences in promotion resulting from the decision to undertake joint assignments across communities..

C. ORGANIZATION OF THE STUDY

This study is organized into seven chapters. Chapter II summarizes the Navy's joint officer management policies, reviewing significant defense reform efforts up to and including GNA, and outlines the tools (JDAL and AQDs) used by Navy planners to track and manage officers with joint duty experience. Chapter III outlines the specific policies and procedures required for an officer to receive joint duty credit and/or to be selected as a Joint Specialty Officer, and examines these requirements in light of community-specific milestones and obligations. Chapter IV describes the data sets used in the study and discusses the cross-tabulation methodology used to determine differences in quality of officers assigned to joint duty, and specifies the various multivariate models to be estimated to determine effects on promotion. Chapter V presents the results of the cross-tabulations, and Chapter VI presents the empirical results of multivariate analyses of the models, and compares these results across the four warfare communities. Chapter VII summarizes the results, and provides conclusions and recommendations on further research.

II. JOINT OFFICER MANAGEMENT

In order to examine the effects of joint duty on an officer's career, it is first necessary to appreciate the strength and depth of U.S. military culture, and in particular naval culture, and the impact of repeated Congressional attempts to modify that culture by dictating military organization and doctrine. The passage of the Goldwater-Nichols Defense Reorganization Act (GNA) in 1986 was the latest congressional effort to reorganize the nation's defense forces. This act attempted to alter the organizational structure of DoD by enhancing service unification and strengthening joint institutions using mandated joint duty manning requirements and direct officer management to ensure compliance by the individual services.

A. DEFENSE REFORM HISTORY

Organization culture can be defined as the "pattern of basic assumptions - invented, discovered, or developed by a given group as it learns to cope with its problems of external adaptation and internal integration - that has worked well enough to be considered valid, and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."[2] The United States Navy, perhaps more than any other service, inherited deep-rooted traditions from the British Navy which have defined its doctrine and shaped its culture. One dimension of this culture, and of particular importance to this study, is the result of the Navy's unique operational focus. More so than any other service, the Navy Commander is at the forward edge of the

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[2] Edgar H. Schein, Organizational Culture and Leadership (San Francisco : Jossey-Bass Publishers, 1985, 9.

nation's foreign policy, and it is this focus on operational effectiveness, not only practiced but proven nearly every day in an operational environment, which results in a set of priorities and unwritten rules different from the other services. "This uniqueness is reflected in the relative emphasis placed on promotional milestones and operations, and results in a warrior (operational) focus versus staff focus."[3] The strength of the Navy's culture proved to be directly at odds with congressional efforts to institutionalize a unified service during World War II.

By the late 1940's, the improvement of technology and the complexity of warfare demonstrated during the course of World War II were clear indications that near autonomy within the individual services would no longer result in optimum achievement of national objectives. The National Security Act of 1947 (NSA) provided the first steps toward centralization by creating a Secretary of Defense and formalizing the Joint Chiefs of Staff. "In the next eleven years, the NSA underwent two major revisions (1949 and 1958), was augmented by Executive Plan 6, and purportedly clarified by the Key West Agreement. Yet, it would be another 28 years before another change occurred. Unfortunately, this wasn't because the problem of service unity was solved, nor were service rivalry and parochialism eliminated."[4] Several military actions (Vietnam, the Pueblo incident (1968), Mayaguez (1975), and Desert One (1980) seemed to further illustrate military shortcomings. In 1981, Congress formed the Congressional Military

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[3] Faller, Craig S., The Navy and Jointness: No Longer Reluctant Partners?, Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1991

[4] ibid.

Reform Caucus, primarily to study resources appropriated to the military, which spurred investigation of military organization and structure. The bombing of the Marine Barracks in Lebanon in 1983 and the subsequent investigation into that event further highlighted the need for military reforms. After several years of often bitter debate, the requirement for restoring a more balanced organizational structure between services and joint staffs began to emerge as a central theme for reform. Dr. Archie Barrett, a key framer of the GNA legislation, attributed the prevailing imbalance to the individual services, stating "the services control its (the JS) personnel structure and have no interest in developing a JS whose talent rivals service staffs"[5] It was this imbalance that GNA was designed to offset.

B. THE GOLDWATER-NICHOLS ACT

In 1986 Congress passed the Goldwater/Nichols Act, the latest of a series of attempts to centralize the military since the concept of a Joint Chiefs of Staff (JCS) first originated in World War II. The GNA preamble states:

> In enacting this ACT, it is the intent of Congress...
> 1. to reorganize the Department of Defense and strengthen civilian authority in the Department;
> 2. to improve the military advice provided to the President, the National Security council, and the Secretary of Defense;
> 3. to place clear responsibility on the commanders of the unified and specified combatant commands for the accomplishments of missions assigned to those commands;
> 4. to ensure that the authority of the commanders of the unified and specified combatant commands is fully commensurate with the responsibility of those commanders for the accomplishment of missions assigned to their commands;
> 5. to increase attention to the formulation of strategy and to contingency planning;
> 6. to provide for more efficient use of defense resources;

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[5] Dr. Archie D. Barrett, Reappraising Defense Organization (Washington dc: National Defense University, 1983), 78

7. to improve joint officer management policies; and
8. otherwise to enhance the effectiveness of military operations and improve the management and administration of the Department of Defense.[6]

GNA intended to improve the quality of officers assigned to joint duty assignments and thus subsequently improve our nation's joint warfighting capability. Until passage of GNA, joint duty was sometimes viewed as a detriment to the career of a front-running naval officer:

> In some services, the services were inclined to try to give their very best people's service to the Joint Chiefs of Staff's staff, but we found that in other services, it was regarded by the officer corps that service on the Joint Chiefs of Staff was sort of a way station, an inhibition in the progress of their career. So therefore, people really were not seeking service on the Joint Chiefs of Staff. And indeed, we found that often, the services were not putting their very best people on the staff.[7]

GNA, particularly the revolutionary aspects of the Joint Officer Personnel requirements of Title IV, sought to correct that deficiency by a twofold process. First, GNA provided for the identification of a new breed of officer: the Joint Service Officer (JSO):

> The Secretary of Defense shall establish policies, procedures, and practices for the effective management of officers of the Army, Navy, Air Force, and Marine Corps on the active-duty list who are particularly trained in, oriented toward joint matters...such officers shall be identified or designated...in such a manner as the Secretary of Defense directs...officers to be managed by such policies, procedures, and practices are referred to as having or having been nominated for, the "joint specialty.[8]

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[6] Goldwater-Nichols Department of Defense Reorganization Act of 1986 (GNA), Public Law 99-433, 1 Oct. 1986, sec. 3.

[7] Rep Richard C. White, Chairman, House Investigative Subcommittee statement as quoted in, Congress, Senate, Committee on Armed Services, Structure and Operation Procedures of the Joint Chiefs of Staff, 97th Congress, 2nd session, 16 Dec. 1982, 4.

[8] GNA, sec. 661 (a)

Not only did GNA mandate completion of JSO status as requirement for making Flag officer (O-7), but GNA also ensured services selected quality officers for Joint service and CINC staffs by specifically mandating promotion levels for those "joint specialty" officers and other officers serving in joint assignments:

> ...promotions of officers who have served or are serving on the joint staff are expected to be promoted at a rate not less than comparable contemporaries on service headquarters staffs...same rule for officers with the joint specialty... other joint duty assignments for officers other than the above shall be promoted at a rate not less than the rate for comparable contemporaries service wide.[9]

"In enacting the joint officer personnel policies contained in Title IV of GNA, Congress went beyond structural reform of DoD organization by attempting to alter organizational behavior through the modification of attitudes and beliefs."[10]

Congress further recognized that not all billets assigned to joint commands would result in suitable training for joint operations, and in order to identify billets which served as suitable training grounds for joint specialists Congress directed the Secretary of Defense to define the term "joint duty assignment", (JDA) and to develop and publish a joint duty assignment list (JDAL).

C. THE JOINT DUTY ASSIGNMENT LIST (JDAL)

Joint duty assignments were to consist of markers tagged to certain joint manpower requirements which were "limited to assignments in which the officers gain

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[9] GNA, sec. 662 (a) (1)

[10] Faller, Craig S. , The Navy and Jointness: No Longer Reluctant Partners?, Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1991

significant experience in joint matters and shall exclude: A) assignments for joint training or joint education; and B) assignments within an officer's own military department."[11] The Secretary of Defense further defined JDA as "An assignment to a designated position in a multi-service or multinational command or activity that is involved in the integrated employment or support of the land, sea and air forces of at least two of the three Military Departments.[12] These assignments would appear on the JDAL and would require special management. As a practical matter, the Joint Staff, the services, CINCs and a host of others contribute to the development of the JDAL. [13]

The first JDAL was published in 1988 and had about 8,300 positions, of which about 1,740 were Navy field grade (O-4 and above) positions. Prior to this list approximately 3,500 Navy field grade positions were considered joint positions because they were outside the parent service. The reason for the apparent discrepancy is that the JDAL does not consider all positions in joint commands to be joint duty assignments. Essentially all field grade (O-4) and above billets on the Joint Staff, CINCs and Office of the Secretary of Defense (OSD) are on the JDAL; but for the Defense Agencies the maximum number of O-4 and above billets allowed on the JDAL is 50 percent of the total number of O-4 and above billets in each command.

The JDAL is constantly under revision, and to date most of those revisions have meant growth in the number of JDAs. This growth reflects changes due to re-

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[11] GNA Title IV JCS Controlled Activities section 401 chap 38 section 668

[12] "JDAL Brief," CDR Jerry Faber, Head, Joint Officer Manning Branch Naval Bureau of Personnel (PERS-455), 19 September 1995

[13] ibid.

organizations, shifts in nominative billets from one service to another, as well as addition of new commands and activities.[14] Since its inception, the Navy's share of the JDAL has grown from 1,740 to 1,940 billets. (The July 1995 JDAL billets by Command are listed in Table 2.1). Of these 1,940 billets, 960 (50 percent) must be filled with JSOs or JSO nominees, and 166 of these are determined to be critical, and must be filled with a qualified JSO.

[14] ibid.

Table 2.1 Navy JDAL Billet Summary
04-06 (JDAL 95-B)

COMMAND	LCDR	CDR	CAPT	TOTAL
OSD	1	42	51	**94**
JOINT STAFF	24	140	30	**194**
USACOM	63	53	19	**135**
USCENTCOM	44	22	5	**71**
USEUCOM	41	39	15	**95**
USPACOM	100	51	26	**177**
USSPACECOM	36	20	9	**65**
USSPECOM	30	44	15	**89**
USSOCOM	19	17	4	**40**
USSTRATCOM	110	36	26	**172**
USTRANSCOM	21	24	6	**51**
Defense Agencies	114	158	117	**389**
DoD Field	7	10	7	**24**
Outside DoD	3	10	7	**20**
JCS Controlled Activities	13	29	18	**60**
SACEUR	30	32	17	**79**
SACLANT	23	35	17	**75**
Allied Naval Forces North	4	8	2	**14**
NATO Milcommittee	5	2	7	**14**
Support NATO Activities	2	5	1	**8**
COMBINED	5	5	3	**13**
Cross Department	11	14	7	**32**
Jointly Manned Activities	22	6	1	**29**
Total	**728**	**802**	**410**	**1,940**

Source: PERS-455, August 1995

D. JOINT ADDITIONAL QUALIFICATION DESIGNATORS (AQD)

The Navy system for tracking officers with joint experience consists of awarding various joint Additional Qualification Designators (AQDs) in the master personnel record upon completion of various phases of joint education/experience/

expertise. For example, an officer who completes a three year tour (only two years for a critical occupational specialist, i.e. a warfare designated officer) in a JDAL billet after January 1, 1987, or in a qualifying JDAL billet prior to January 1, 1987, is awarded a JS-2 AQD. An officer who completes Armed Forces Staff College (AFSC) after July 1990 receives Joint Professional Military Education (JPME) Phase II credit, and is awarded a JS-8 AQD. Table 2.2 lists all the Navy Additional Qualification Designators (AQDs) for officers who receive joint duty assignment credit. The Navy uses these AQDs to track officers who are working towards their Joint Specialty Officer (JSO) designations, as well as to recognize those who are fully qualified as JSOs.

There are nine joint AQDs. Two AQD codes, (JS5 and JS9) are used to identify officers designated as Joint Service Officers (JSOs). A Joint Specialty Officer (JSO) must meet the following standards:

(1) complete JPME
    -either at the National War College or Industrial College of the Armed Forces, or
    -complete both Phase I JPME (7 service colleges/selected Fellowships and Foreign War Colleges) and Phase II JPME (AFSC)
(2) complete a joint tour,
(3) be selected by Navy JSO selection board, and
(4) be approved by SECDEF.

The JS5 is awarded when an individual is selected by a specially convened Joint Specialty Officer Screening Board to consider all eligible JSO nominees, and the JS9 is used to designate a JSO based on the Critical Occupation Specialty takeout provision.[15]

[15] A Critical Occupational Specialists (COS is an O-4 through O-6 holding a 111x, 112x, 113x, 114x, 131x, or 132x designator. A COS's first joint tour may be as short as 24 months, providing the officer is going to an operational billet. His subsequent joint tour must be 36 mos. The Navy is allowed 240 COS takeouts per year.

Table 2.2 Joint Additional Qualification Designator (AQD)

AQD	DESCRIPTION AND REQUIREMENTS
JS1	JPME Graduates: Includes National War College, Industrial College of the Armed Forces (ICAF), and the Armed Forces Staff College (AFSC) (through June 1990). For 1989 included March (Intermediate level only), June, and November graduates of Naval War College, also includes FY-89 Army, Air Force and USMC Service College Graduates.
JS2	Received joint duty credit for completion of a joint duty assignment (JDA)(see JS6), either in a JDAL billet after January 1, 1987 or a qualifying JDAL billet before January 1, 1987.
JS3	JSO nominee: Any JPME graduate who is serving in or has served in a JDAL billet. Should not be confused with JS5 (JSO) who has been designated by SECDEF as a JSO based on education and/or experience. (JS3 primarily administrative AQD used by BUPERS.)
JS4	COS JSO nominee: A critical occupational specialist who has not completed full JPME and is serving or has served in a JDAL billet. (JS4 is primarily an administrative AQD used by BUPERS.)
JS5	Joint specialty officer, or JSO: An officer who was selected by the Navy, approved and designated by SECDEF as JSO. Designation as a JS5 is made only when SECDEF has approved a selection board list.
JS6	Joint equivalency waiver: In-service billet joint service credit for pre 01 October 86 tour. May count as joint credit for flag, extended through 1999. Applying four year rampdown beginning in 1995. Promotions using joint equivalency waiver require a joint duty assignment before O9.
JS7	Graduate of a Phase I school as defined by the Office of SECDEF: Any officer who graduates from an intermediate or senior college after January 12990 or who graduates from selected foreign war colleges or fellowships. *Note: Until January 1, 1994, graduates of service colleges during academic years 1985-1988 received Phase I credit. If Phase II was completed before January 1, the officer will be credited with full JPME. If not, Phase I credit is lost.*
JS8	Graduates of AFSC (JPME, Phase II) after July 1990.
JS9	COS takeout JSO: Officer who was designated a JSO via the COS takeout tour provision (two years).

Source: Perspective, Jan/Feb 1992

The JS6 is used to identify Joint Equivalency Credit for pre-October 86 tours, and counts as credit for Flag only (use of this AQD expires in 1998). The JS2 code recognizes completion of a post-1986 JDAL billet assignment or a qualifying JDAL billet prior to

January 1, 1987. Three codes recognize varying levels of Joint Professional Military Education (JPME): JS7 and JS8 are awarded for completion for JPME phase I and II, respectively, and JS1 is awarded for full JPME graduates. The two remaining codes (JS3 and JS4) are primarily administrative AQDs used to track JSO nominees.

Between the passing of GNA on 1 October 1986 and its implementation on 01 October 1989, the Navy granted de-facto JSO designation for selected officers who had served in any of the 3,500 positions identified as "joint" prior to the initial JDAL. These JSOs had to have completed either JPME or a JDA, but not both, and were thought to be promotable by the members of the JSO screening board. As a result of this liberal designation policy, the number of Navy JSOs grew dramatically immediately following GNA. Since that time the total number of URL LCDR-CAPT Naval officers has declined from 18,151 to 15,930, while the requirements for qualifying for the JS5 have become more stringent and the competition for selection for JSO has sharpened. As Table 2.3 shows, this has resulted in a decreasing number of JSOs, as the original pool of JSOs becomes eligible for retirement and fewer officers are awarded the JS5.

Table 2.3 Unrestricted Line (URL) JSO Inflow and Inventory

	1992	1994	1996 (a)	1998 (a)	2000 (a)
URL JSO Inventory	1,200	1,075	975	877	740
New URL JSOs/Year	33	100	100	100	100

Source: PERS-455, September 1995
(a) Projected numbers

As Table 2.3 shows, this shrinking pool of JSOs, coupled with the growth of the JDAL, and the new requirement to fill a percentage of those billets with qualified JSOs or JSO nominees, is leading to a smaller inventory of qualified officers available to fill a growing number of joint billets.

E. SUMMARY

The GNA provision requiring JSO status as a prerequisite for Flag rank and the mandatory promotion rate floors for joint officers or others assigned to joint duty are both meant to ensure the services send quality officers to joint duty assignments. In the initial phase of implementation of GNA, a plethora of waivers and substitutions were introduced to enable the services to immediately meet these requirements, while they were starting the process of growing the cadre of joint specialists envisioned by the framers of GNA. However, an officer who wishes to become a JSO must do so while balancing his/her own community and professional goals and milestones. The next chapter discusses the process by which an individual competes for the JS5/9 AQD (JSO), an well as the "typical" career milestones of four Navy unrestricted line communities: surface warfare officer (SWO), submarine officer (SUB), pilot (PILOT), and naval flight officer (NFO). An understanding of these facets of an officer's career will enable better modeling of the effect of holding a particular joint AQD, or combinations of joint AQDs, on an officer's career success and performance.

III. THE JOINT SPECIALTY AND THE AVIATION, SURFACE, AND SUBMARINE COMMUNITIES

The previous chapter discussed the requirements for obtaining specific AQDs pertaining to the joint specialty, but failed to address the questions: How does an officer put it all together? What influences an officer's decision to pursue the Joint Specialty Officer (JSO) designation, and what specific career decisions must be made as a result of that decision?

Since the passage of GNA in 1986, naval officers have grappled with the challenge of how best to incorporate joint military education (JPME) and a joint tour in an already-crowded career. Not only is it difficult to complete the required community-specific jobs, and obtain the schooling and training necessary for promotion, but the *timing* of hitting these gates is every bit as crucial as getting past them. Officers must be careful to balance the successful completion of necessary and/or desirable billets with the timing of certain career milestones, which often vary across communities. These decisions are driven by a multitude of considerations, not the least of which is the career goals of the officer. An officer choosing to pursue a path which leads only to a twenty year retirement, will have a different set of concerns and priorities than the officer who wants to be competitive for flag rank.

In addition to determining possible changes in the quality of officers obtaining joint experience, this paper discusses the effect of joint experience on an unrestricted line officer's career (SWO, SUB, Pilot and NFO only), up until and including the O-5 and O-6 promotion boards. A comprehensive listing of all the career options available to each type

of unrestricted line officer up to these points is nearly impossible to illustrate. There are literally hundreds of options available to an officer during the course of a twenty-plus year career, but by understanding some of the basic career choices facing an officer within a particular community, one can better understand the effect of joint experience on that career.

In the following sections several "paths" towards the Joint specialty will be examined. The career options, decisions, and tradeoffs facing officers in three communities (Aviation, Surface and Submarine), will also be discussed, as well as the timing of specific community/professional milestones (Department Head/XO/CO screening, JSO selection, and promotion). By understanding and appreciating the choices and decisions facing these officers, one can better model the decision to choose joint education and/or experience, and determine the effect this decision has on the officer's career.

A. THE ROAD TO JSO

As mentioned previously, in order to be selected as a JSO, an officer must:

(1) complete full JPME
(2) complete a joint tour,
(3) be selected by Navy JSO selection board, and
(4) be approved by SECDEF.

A more comprehensive examination of this procedure is provided below:

(1) *Complete full JPME*. Full JPME can be obtained by attending the National War College (NWC) or the Industrial College of the Armed Forces (ICAF) in Washington DC. Officers sent to NWC or ICAF are usually of the rank of O-6 (Captain). Full JPME was

also awarded for Armed Forces Staff College (AFSC) through June 1990, and for March/June/November 1989 graduates of Navy War College, and June 1989 graduates of Army, Air and USMC service colleges. An alternative to obtaining full JPME through NWC or ICAF is the completion of *both* phases of JPME (Phase I and Phase II). Phase I JPME is awarded through attendance at the Service Colleges (Navy, Army, Air), Command and Staff Colleges (Navy, Marine Corps, Army, Air), Selected Foreign War Colleges, and selected fellowship programs. The curriculum usually lasts approximately 10 months, depending on the college, and attendees are usually O-4s or O-5s. Table 3.1 shows the PME enrollment of Navy officers at these colleges through 1994.

Table 3.1 Navy PME Enrollment FY87-95

	FY87	FY88	FY89	FY90	FY91	FY92	FY93	FY94	FY95*
NAVY WC	95	99	98	101	100	111	125	105	108
NAVY C&S	97	83	84	106	110	142	165	163	163
ICAF	40	40	39	39	40	40	40	43	43
NATL WC	28	28	28	27	28	28	28	30	30
ARMY WC	8	8	8	8	8	8	8	9	9
ARMY C&S	3	8	8	10	39	49	60	60	48
AIR WC	10	10	9	11	15	16	15	15	15
AIR C&S	4	11	11	25	35	34	35	35	35
USMC C&S	9	12	12	23	24	24	24	25	25
FOREIGN WC	20	17	17	15	19	17	20	15	19
TOTAL	314	316	314	365	418	469	520	500	495

* FY95 BASED ON QUOTA PLAN (CH 1)
SOURCE: "Joint Officer Management Brief", PERS-455, April 1995

JPME Phase II is obtained by attending the Armed Forces Staff College (AFSC) in Norfolk, Virginia. This course is taught at the senior level for all O-6s and O-5s who are graduates of senior service colleges, and at the intermediate level for all O-4s and O-5s who are graduates of an intermediate service college. The curriculum is offered four times per year, and lasts three months.

(2) *Complete a joint tour*. Officers must complete a three-year tour in a JDAL billet after January 1, 1987 or a qualifying JDAL billet before January 1, 1987. Critical Occupational Specialists (COS) in their first joint assignment may detach anytime after 24 months with full joint credit if going to an operational Navy assignment. COSs are O-4 through O-5 (LCDR-CAPT) warfare qualified officers (surface-111X, submarine-112X, special warfare-113X, special operations-114X, pilot-131X, and naval flight officers-132X).

(3) *Be selected by a Navy JSO selection board*. The Navy convenes a Joint Specialty Officer screening board twice a year, in April and October. This board consists of a president, usually a warfare officer of flag rank, and approximately eight Captains as board members. This board reviews the records of all officers meeting JSO eligibility criteria, and selects only those considered promotable for the JSO designation. Table 3.2 shows the results of the JSO screening board for FY 1988-1994 for all designators.

Table 3.2 Number of JSOs Selected by JSO Board, FY1988-FY1994, All Designators

	1988	1989	1990	1991	1992	1993	1994	Total
Number of designated JSOs	2,880	845	0	18	0	33	165	3,941

The large number of officers selected in 1988 is a result of relatively liberal selection process which considered all officers completing JPME or joint duty, but not necessarily both, prior to 1988. Officers selected for the JSO designation have their names forwarded to SECDEF for final approval.

(4) *Be approved by SECDEF*: Approval of applicants forwarded by Navy selection board is virtually automatic.

The above outlined the specific schools, assignments, and procedures required for an officer to be considered for a JSO designation. Despite the benefits that come with the JSO designation (comparable promotion rates with specific service/staff counterparts as outlined in Chapter II, eligibility for Flag, etc.), an officer's decision to pursue the joint designation is not an easy one. Even after successful completion of all the requirements, the officer might not be considered a good candidate for promotion by the JSO selection board, and denied the JSO designation. Even if an officer does receive the JSO designation, he could perhaps find himself in a small pool of eligible JSOs to fill a "critical," but not necessarily career-enhancing, joint billet outside of his immediate community, further reducing the time available to make his mark inside his warfare community. Thus, the decision to pursue a JSO designation must be carefully weighed by the individual officer against a host of community-specific requirements, milestones, and considerations.

B. AVIATION

Table 3.3 is a general outline of career options provided to officers within the aviation community. Although promotion rates and screening results vary between the NFO and pilot communities, the career planning for the two communities is similar. The table is by no means exhaustive, but provides a framework which officers can use to plan their career in aviation. As the table illustrates, officers desiring to choose a joint career

Table 3.3 Aviation Officer Professional Development Path

<table>
<tr><td rowspan="2">CAPT</td><td colspan="2">SEQ CMD/FLAG</td><td rowspan="2">SENIOR SEA/SHORE
-DC
- SUBSPECIALTY
-JOINT
- MAJ SHORE STAFF
- AFLOAT STAFF</td></tr>
<tr><td>CAG</td><td>MAJOR SHIP CMD/
MAJOR SHORE CMD</td></tr>
<tr><td rowspan="5">CDR</td><td colspan="2">JPME/JOINT/DC/STAFF/SHIP</td><td rowspan="2"></td></tr>
<tr><td colspan="2">FRS CO/CV XO/NUC POWER</td><td rowspan="3">4TH SEA TOUR</td></tr>
<tr><td colspan="2">SQUADRON CO</td></tr>
<tr><td colspan="2">SQUADRON XO</td><td rowspan="2">2ND SHORE TOUR
- JPME
- JOINT</td></tr>
<tr><td colspan="2">FRS/PXO TRAINING</td></tr>
<tr><td rowspan="4">LCDR</td><td colspan="2">2ND SHORE TOUR
JPME
JOINT
DC/STAFF
SUBSPECIALTY</td><td>-DC
-STAFF
-SUBSPECIALTY</td></tr>
<tr><td colspan="2">3RD SEA TOUR
(30 MONTHS)</td><td>SQUADRON DEPT HEAD</td></tr>
<tr><td colspan="3">FRS</td></tr>
<tr><td rowspan="3">LT</td><td colspan="2" rowspan="2">2ND SEA TOUR
(24 MONTHS)</td><td>-SHIP
-SEA STAFF
- SQUADRON</td></tr>
<tr><td>-FRS/TRACOMINST
- PG SCHOOL
- STAFF
- RECRUITING</td></tr>
<tr><td rowspan="3">LTJG</td><td colspan="2" rowspan="2">1ST SEA TOUR
(36 MONTHS)</td><td>- SQUADRON</td></tr>
<tr><td colspan="3">FRS</td></tr>
<tr><td>ENS</td><td colspan="3">FLIGHT TRAINING</td></tr>
</table>

Source/ PERS-211V, September 1995

(following 1 January, 1987) are hard pressed to obtain the JS5 designation prior to their CDR promotion board. Even those planning on obtaining the JS5 prior to the Captain

promotion board must make some potentially hazardous career decisions. Officers may have to forego the initial "Beltway" (Washington D.C.) tour, or skip the opportunity to attend graduate school, as the payback tour would conflict with the ability to complete a JDAL tour or JPME. Another consideration is that an aviation officer gets three opportunities to screen for XO and CO, possibly once as a senior LCDR, and twice more as a junior CDR. Following his third sea tour an officer may well choose an assignment on an aviation staff (in order to have the screening board consider a FITREP signed by an officer within his community), or perhaps choose a tour on the CNO staff or elsewhere in the Pentagon, as both are recognized as breeding grounds for front-running officers. For a generation of officers raised with the credo "stay operational," it may be difficult to make a purposeful leap to the joint environment, which , as discussed in Chapter II, has long been regarded as not conducive to front-running officers. Senior Commanders/junior Captains face the same dilemma as they plan for the major ship/shore command screening board.

C. SURFACE

Surface warfare qualified officers (SWOs) share many of the same concerns as their aviator counterparts, and their professional development path is shown in Table 3.4. The decision to pursue the JSO designation is made at the expense of completing more traditional Navy surface-warfare jobs, and is compounded by the attention SWOs must pay to the timing of Department Head, XO, and CO screening boards, as well as promotion boards.

Table 3.4 Surface Warfare Professional Development Path

CAPT	**FIFTH SHORE** - TRAINING COMMAND - MAJOR STAFF - SUBSPECIALTY TOUR - DC/JOINT TOUR - ACQUISITION TOUR	
	MAJOR COMMAND MAJOR PROGRAM	
	FOURTH SHORE - DC/JOINT TOUR - ACQUISITION TOUR -SUBSPECIALTY TOUR	
CDR	SR SVC COL/JPME POST CMD SEA	
	CDR COMMAND	CDR COMPLEX SEA
	THIRD SHORE - SUBSPECIALTY - DC/JOINT TOUR - TRAINING COMMAND - MAJOR STAFF - ACQUISITION TOUR	
	SR SVC/PME POST XO SEA TOUR	
LCDR	LCDR XO/CO TOUR	LCDR COMPLEX SEA TOUR
	SECOND SHORE -DC/JOINT TOUR - SUBSPECIALTY TOUR - TRAINING COMMAND	
	JR SVC/PME	
	SPLIT DEPT HEAD TOUR	SINGLE DEPARTMENT HEAD TOUR
LT	FIRST DEPT HEAD TOUR	
	SWOS DEPARTMENT HEAD AND ENROUTE TRAINING	
	-STAFF **FIRST SHORE**-RECRUITING -PG SCHOOL	DIVISION OFFICER FOLLOW ON TOUR
LTJG	FIRST SEA TOUR DIVISION OFFICER AFLOAT	
ENS	SWOS DIVISION OFFICER AND ENROUTE TRAINING	

Source/ PERS-211W, September 1995

Surface warfare officers have three opportunities to be selected for Department Head, and an overall 85% chance of being selected (this high percentage is partly a reflection of a small pool of applicants available to fill the required Department Head

billets, as 60 percent of all commissioned surface officers fail to stay beyond the 7 year point). The timing of the conclusion of department head school (typically when the officer is a senior Lieutenant) may preclude assignment to an O-4 billet in a joint tour, and therefore the officer would not qualify for an approved JDAL billet (JDAL billets are O-4 and above). Additionally, the SWO is screened for XO/CO as a LCDR, and typical selection rates are 70 percent for XO/CO. Historically the SWO screens for Command upon selection to O-5, with a 50 percent likelihood of being selected. Both these boards are critical to an officer's career, and the officer will want to ensure his competitiveness before these boards.

All decisions to compete for the Joint designation (i.e. attending PME and serving in a JDAL billet) are made at the expense of a more "traditional" path, and the timing of the screening boards puts additional pressure on the officer to fill competitive billets during those periods of consideration. The shore tours available during which officers can attain the required Joint AQDs are those as a LCDR, CDR, and CAPT. These are precisely the times when an officer is under consideration for screening (and often promotion), and renders the decision to pursue joint expertise potentially more difficult. It might be argued that sub-par performers returning from sea duty have more pressure to improve their record of performance during their shore tour, and might be more inclined to forego joint assignments, whereas those individuals who are confident their operational record is strong may be more willing to depart their community for the time it takes to obtain a JS2.

D. SUBMARINE

Table 3.5 displays the typical career path for submarine warfare qualified officers. As Table 3.5 shows, submariners also suffer from the same constraints and pressures as their Aviation and Surface warfare officer counterparts. In addition to the concerns faced by aviators and SWOs, which apply equally to the submarine community, it may be argued that the submarine community has a uniquely operational agenda, and a mission which often requires autonomy and independence. As such the submarine community may consider itself as having the least to gain from operating within a joint environment, and therefore a submarine officer may be less inclined to pursue the JSO designator than other warfare qualified officers.

Table 3.5 Nuclear Submarine Officer Professional Development Path

CAPT	POST COMMAND SHORE	MAJOR COMMAND	SECOND MAJOR COMMAND DC SHORE
	SR SVC COLLEGE	POST COMMAND SHORE	MAJOR COMMAND
CDR	COMMAND		
	PCO	PCO	
LCDR	XO	POST XO SHORE	XO
	POST DH SHORE	XO	POST DH SHORE
	NAV	NAV WEPS	IMA SLO RADCON
LT	ENG	WEPS ENG	WEPS ENG/NAV /NAV WEPS
	SOAC		
	POST JO SHORE TOUR / PG SCHOOL		
LTJG	FIRST SEA TOUR		
ENS	INITIAL TRAINING		

Source/ PERS-211N

IV. DATA AND METHODOLOGY

This study uses a data file provided by Professor William Bowman at the United States Naval Academy and Professor Steve Mehay at the Naval Postgraduate School. The original data were extracted from the Navy Officer Promotion History Files from the Bureau of Naval Personnel (BUPERS), and Fitness Report History Files provided by Navy Personnel Research and Development Center (NPRDC). Two data sets were constructed for the analysis in this thesis. The first consists of 5,295 male surface, submarine, pilots and NFOs (1110, 1120, 1310, and 1320 designators) who appeared before the O-5 Commander promotion board during the years 1988-1994; the second consists of 3,227 male 1110, 1120, 1310, and 1320 designated-officers who appeared before the O-6 Captain promotion board during the same time period. The years 1988 through 1994 were chosen in order to identify trends in the quality of officers assigned to joint duty as a result of the 1986 Goldwater/Nichols Act. The time involved in completing a JDAL billet precludes being able to identify any trends during the two year "ramp-up" period from 1986-1988 during which an individual may have decided to receive joint assignment immediately after enactment of GNA. The previous chapter underscored the requirement to analyze these four communities separately in order to allow for more accurate modeling of career paths, completion of necessary "wickets", and recognition of key jobs in each community. The two data sets, officers appearing before the O-5 (Commander) promotion board and officers appearing before the O-6 (Captain) promotion board, are used to examine both the qualitative change in officers being

assigned to joint billets and the effects of a JS2 or JS5 designator on an officer's career. Due to the different career path options available to men and women during the 1970s, the 60 female officers in the original data set were excluded from the study in order to allow for more accurate modeling. Although it has been shown in earlier chapters that joint professional military education (JPME) plays an important role in an officer's being designated as a JSO, it is the JS2 designator(reflecting completion of a JDAL billet), and , of course, the JS5 code (full JSO certification) that are most relevant in evaluating the Navy's success in filling the nation's joint billets with quality personnel, because these are the individuals who have actually filled the joint billets. Of the 8,522 officers included in this study, only 16 held the JS9, and none were considered for this study.

A. DATA SETS

The above data sets are used to explore the differences between those officers receiving their AQD prior to FY1989, (henceforth referred to as JS2 EARLY, JS5 EARLY) and those receiving AQDs in FY1989 and after (JS2 LATE, JS5 LATE). As previously discussed, many of those officers receiving the JS2/5 designators prior to FY1989 were "grand-fathered," and received their AQD for services rendered prior to that date. It was also noted that prior to the enactment of GNA, front-running Naval officers avoided joint duty. Additionally, many of the positions considered "joint" when the first JSO board convened in 1988 were subsequently determined not to be valid joint billets and thus were not included in the original JDAL or its subsequent revisions. In contrast, officers opting for joint billets after 1986, who then received a JS2 or JS5 designator after 1988 , made that decision *after* GNA, and possibly as a direct result of

GNA mandates and provisions. Additionally, for perhaps the first time Navy placement officers and detailers were actively seeking to place high-quality, promotable officers in joint billets. The GNA stipulation that promotion rates for officers filling certain joint billets must meet or exceed certain Navy-specific levels prompted assignment officers to adequately staff joint billets with promotable officers. For these reasons, it is hypothesized that officers receiving the JS2 and JS5 after FY1988 will be of significantly higher quality than those awarded Joint duty credit based on positions held prior to FY1988.

Table 4.1 shows the joint designators held by the 5,295 officers appearing before the FY1988-1994 Commander Promotion boards.

Table 4.1 Number of Joint Designators Held by Officers Appearing Before the FY 1988-1994 Commander (O-5) Promotion Boards, By Designator *

Joint Designator	Designator				
	1110	**1120**	**1310**	**1320**	**TOTAL**
JS1	60	9	50	57	**176**
JS2	169	49	74	125	**417**
JS3	49	6	15	31	**101**
JS4	61	28	50	52	**191**
JS5	83	41	31	52	**207**
JS6	7	1	5	6	**19**
JS7	112	12	78	69	**271**
JS8	27	2	13	5	**57**
JS9	5	0	1	0	**6**
NO AQD	1268	634	1316	974	**4,192**
Total	1660	738	1596	1301	**5,295**

* Officers may hold more than one AQD

** 129 of 417 JS2 AQDs were awarded after FY 1988

*** 74 of 207 JS5 AQDs were awarded after FY 1988

Of 417 officers holding the JS2 at the time of their promotion board, only 129 were awarded the AQD after FY1988 (JS2 LATE). Of the 207 officers holding the JS5 designator, only 74 received the AQD after FY1988 (JS5LATE).

Table 4.2 shows the JSX AQDs held by the 3,227 officers appearing before the FY1988-1994 Captain Promotion boards.

Table 4.2 Number of Joint Designators Held by Officers Appearing Before the FY 1988-1994 Captain (O-6) Promotion Board, by Designator *

Joint Designator	Designator				
	1110	**1120**	**1310**	**1320**	**TOTAL**
JS1	103	9	93	34	**239**
JS2	186	36	123	94	**439**
JS3	22	4	47	14	**87**
JS4	73	11	51	48	**184**
JS5	181	49	145	71	**446**
JS6	12	9	8	5	**34**
JS7	59	7	85	37	**188**
JS8	8	0	9	5	**22**
JS9	3	1	4	2	**10**
NO AQD	571	306	874	408	**2,158**
Total	989	383	1,250	605	**3,227**

* Officers may hold more than one AQD
** 111 of 439 JS2 AQDs were awarded after FY 1988
*** 25 of 446 JS5 AQDs were awarded after FY 1988

Of 439 officers holding the JS2 at the time of their promotion board, only 111 of these were awarded the AQD after FY1988 (JS2 LATE). Of the 446 officers holding the JS5, only 25 received the AQD after FY1988 (JS5LATE).

The following chapter (Chapter V) uses statistical analysis of the above data sets to answer the question: Is the Navy filling joint billets with higher quality officers since the passage and subsequent implementation of GNA in 1986?

B. MULTIVARIATE ANALYSIS

This thesis will also analyze the effect of the JS2 or JS5 designator on an officer's likelihood of promotion. An officer's relative position with respect to the group of individuals being considered for promotion is referred to as his or her "zone." When a particular group of officers is presented to the fiscal year's promotion board for primary consideration, they are said to be "in zone." Those who have been considered but failed to be selected are "above zone", while all others are considered "below zone" and may be considered for promotion if the board chooses. The model used in this analysis measures promotion without regard to the number of appearances before the promotion board (usually limited to three). Although potential bias exists from counting "above zone" officers twice in the data, this represents only about 3 percent of the sample for each rank studied. Note, however, that this approach does have the effect of lowering annual promotion rates slightly below "official" Navy promotion statistics.[16]

The binary nature of the dependent variable (promotion) allows for using maximum likelihood logit models to estimate the probability of being promoted to the rank of Commander or Captain. A non-linear LOGIT model is specified and estimated via maximum likelihood techniques. Promotion is assumed to be a function of numerous Navy background and demographic factors. The models specify promotion as a function of race, age, commissioning source, undergraduate major (technical or non-technical), college performance, marital status, number of dependents at the time of the promotion

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[16] Butterbaugh, Thomas A. "A Multivariate Analysis of the Effects of Academic Performance and Graduate Education on the Promotion of Senior U.S. Navy Officers", M.S. Thesis, Naval Postgraduate School, Monterey, CA. June 1995

board, whether or not the individual possesses a graduate education, and documented Naval performance (as reported in the officer's Fitness Reports). The parameter estimates provided by the LOGIT model reflect the increase (or decrease) in the log of the odds ratio of being promoted, per unit increase in the explanatory variable being considered[17]. Because each of the explanatory variables in the model are either dummy (binary) variables or the mean value of a continuous variable, the change in the log of the odds ratio of being promoted is only seen when the observed member possesses the attribute (white, USNA grad, etc.) in question. A more understandable evaluation of the LOGIT coefficients is to compute the change in the probability of being promoted, given the member has the attribute under consideration. The estimate may be obtained from the formula: **B*P**(1-**P**) where **B** represents the LOGIT parameter estimate for a given explanatory variable, and **P** represents the probability of the event in the overall sample.

Models were constructed for each designator (SWO, SUB, Pilot and NFO), and within each designator, one for each AQD (JS2 or JS5) and each promotion board (Commander or Captain). Additionally, models were specified for officers appearing before the 1988-1990 promotion boards and the 1991-1994 promotion boards, in order to determine any change in the effect of a joint AQD during GNA implementation. This enabled comparisons among officer communities and between each community and the entire sample population for each type of AQD being evaluated. The results of these models are discussed in Chapter VI, which attempts to answer the question: What is the

[17] Gujarati, D.N. Basic Econometrics, 3rd edition, McGraw-Hill, 1995

effect of a JS2 or JS5 designator on the probability of promotion of an officer, and does this effect vary for different years and across different communities?.

C. VARIABLE DEFINITION

This model regressed a dependent variable, which serves as a proxy for performance, on a number of explanatory variables representing background and personal characteristics. The independent (explanatory) variables for the promotion model were chosen from the background and personal characteristics provided in the data base. They were chosen because of their use, in either identical or similar forms, in prior studies on Navy promotions (Nolan, 1993; Talaga, 1994; Buterbaugh, 1995;) and studies on Navy officers and Graduate education (Mehay and Bowman, 1995). For the promotion model, the dependent variable is a binary variable (PROMOTE), which takes a value of one if the member is selected for promotion to the rank of Commander (O-5) or promotion to Captain (O-6), and a value of zero if the member is passed over (not selected).

The explanatory variable WHITE takes a binary value of 1 if the individual is white or Caucasian, and 0 if the member is a member of any other ethnic group. The variable USNA takes on a binary value of 1 if the officer received a commission from the United States Naval Academy, and a value of 0 if commissioned via another commissioning source (OCS, ROTC, NESEP, other). The explanatory variables UGRDTECH, SCHOLAR and GRADEDUC are included to capture the academic history and performance of the individuals. UGRDTECH takes on a value of 1 if the individual received a technical undergraduate major (Biological/Physical sciences, Math/Computer Science/Operations Analysis, Engineering) and 0 if otherwise (Business, Social Sciences,

Humanities, other). SCHOLAR reflects college performance, and takes on a binary value of 1 if the individual maintained an undergraduate GPA of 3.2 or better on a 4.0 scale, and a value of 0 if below 3.2. GRADEDUC takes on a binary value of 1 if the individual received a graduate education from any source (Naval Postgraduate School, Sponsored civilian institution, Non-Sponsored (own-time)), and a value of 0 if the individual has no graduate degree. MARRIED takes a binary value of 1 if the individual was married at the time of the promotion board, and 0 if otherwise, DEP is the number of dependents at the time of the promotion board, and AGE is age at the time of commissioning.

Three variables, PCTREC3 PCTREC4 and PCTREC5, were constructed from BUPERS FITREP data and are used as proxies for professional performance. The numbers in the variable names refers to the paygrade at the time the fitness reports were received (e.g. PCTREC3 is for O-3 (Lieutenant) FITREP data), and were calculated as the number of times an officer (a) was recommended for early promotion, (b) rated in the top 1% *and* (c) received an "A" (the highest possible grade) in Command Desirability in that paygrade, all divided by the total number of valid FITREPS received in that paygrade. A valid FITREP is defined as one in which the officer is evaluated against one or more of his peers, is not a detaching FITREP (often referred to as a "kiss", due to its inflated grades), and there is a frequent basis of observation of over ninety days. JDUTYA is a binary variable with a value of 1 if the officer had either a JS2 or JS5 designator, and a value of 0 if the officer did not have the joint duty code in question. XOSCREEN and COSCREEN were included as proxies for professional performance, with values of 1 being assigned if the officer successfully screened for XO or CO in the appropriate

paygrade, and 0 if otherwise. Table 4.3 lists and defines the explanatory variables used in the promotion model, as well as other variables used for analyzing the quality of officers.

Table 4.3 List of Variable Names and Definitions

Variable Name	Commander Data Set	Captain Data Set
PROMOTE	1 IF SELECTED FOR THE RANK OF COMMANDER, 0 IF NOT SELECTED	1 IF SELECTED FOR THE RANK OF CAPTAIN, 0 IF NOT SELECTED
USNA	1 IF GRADUATED FROM THE U.S. NAVAL ACADEMY, 0 OTHERWISE	1 IF GRADUATED FROM THE U.S. NAVAL ACADEMY, 0 OTHERWISE
UGRDTECH	1 IF TECHNICAL UNDERGRADUATE MAJOR, 0 OTHERWISE	1 IF TECHNICAL UNDERGRADUATE MAJOR, 0 OTHERWISE
MARRIED *	1 IF MARRIED, 0 IF OTHERWISE	1 IF MARRIED, 0 IF OTHERWISE
DEP *	NUMBER OF DEPENDENTS	NUMBER OF DEPENDENTS
GRADEDUC*	1 IF OFFICER HAS A GRADUATE EDUCATION, 0 OTHERWISE	1 IF OFFICER HAS A GRADUATE EDUCATION, 0 OTHERWISE
WHITE	1 IF WHITE, 0 OTHERWISE	1 IF WHITE, 0 OTHERWISE
PCTREC3	# OF RAPPED, 1%, COMMAND DESIRED FITREPS AS AN O-3 DIVIDED BY THE # OF VALID O-3 FITREPS	# OF RAPPED, 1%, COMMAND DESIRED FITREPS AS AN O-3 DIVIDED BY THE # OF VALID O-3 FITREPS
PCTREC4	# OF RAPPED, 1%, COMMAND DESIRED FITREPS AS AN O-4 DIVIDED BY THE # OF VALID O-4 FITREPS	# OF RAPPED, 1%, COMMAND DESIRED FITREPS AS AN O-4 DIVIDED BY THE # OF VALID O-4 FITREPS
PCTREC5	N/A	# OF RAPPED, 1%, COMMAND DESIRED FITREPS AS AN O-5 DIVIDED BY THE # OF VALID O-5 FITREPS
SCHOLAR	1 IF COLLEGE GPA IS 3.2 OR ABOVE, 0 OTHERWISE	1 IF COLLEGE GPA IS 3.2 OR ABOVE, 0 OTHERWISE
AGE	AGE AT COMMISSIONING	AGE AT COMMISSIONING
JDUTYA **	1 IF OFFICER HOLDS JS2/5 AQD, 0 OTHERWISE	1 IF OFFICER HOLDS JS2/5 AQD, 0 OTHERWISE
XOSCREEN	1 IF INDIVIDUAL SCREENS FOR XO, 0 OTHERWISE	1 IF INDIVIDUAL SCREENS FOR XO, 0 OTHERWISE
COSCREEN	1 IF INDIVIDUAL SCREENS FOR CO, 0 OTHERWISE	1 IF INDIVIDUAL SCREENS FOR CO, 0 OTHERWISE

* At time of promotion board

** variable can be used to identify JS2 or JS5 AQD, depending on the model

V. DATA ANALYSIS

This chapter is divided into two sections. The first section compares and contrasts the demographic characteristics of the Commander data set, and examines qualitative differences, as measured by fitness reports, educational level, and performance, between JS2/JS5 designator holders and their non-joint counterparts. Additionally, XO/CO screening boards results for JS2/5 designated and non-joint officers are analyzed across different communities and different time periods. The second section performs the same analyses for the Captain data set.

A. COMMANDER DATA SET

1. Performance Characteristics

Table 5.1 compares background characteristics of all officers appearing before the FY 1988-1994 Commander promotion boards in column 1 with the subset of officers holding the JS2 designator in column 2. These JS2 recipients are further broken down into two additional groups - those receiving their JS2 designator prior to 1 October 1989 (JS2EARLY) in column 3, and those receiving their JS2 designator after 1 October 1989 (JS2LATE) in column 4.

Although there appear to be only minor differences between all 5,295 unrestricted line (URL) officers (column 2), and the 417 officers holding a JS2 (column 4), further examination of *when* the officers received the AQD reveals some interesting differences. For example, there appears to be little difference in O-3 performance as measured by

Table 5.1 Background Characteristics of Officers Appearing Before the 1988-1994 Commander (O-5) Promotion Board (Officers Holding JS2 AQD)

	ALL OFFICERS	N	ALL OFFICERS HOLDING A JS2 AQD	N	OFFICERS AWARDED A JS2 AQD PRIOR TO 1 OCT 1989	N	OFFICERS AWARDED A JS2 AQD AFTER 1 OCT 1989	N
USNA	.300	5295	.225	417	.218	288	.240	129
UGRDTECH	.551	5295	.467	417	.461	288	.480	129
MARRIED	.888	5295	.872	417	.868	288	.883	129
DEP	1.51	5295	1.44	417	1.468	288	1.37	129
GRADEDUC	.377	5295	.369	417	.340	288	.431	129
WHITE	.960	5294	.961	417	.954	288	.976	129
PCTREC3	.605	5249	.609	408	.570	279	.693	129
PCTREC4	.904	5249	.861	408	.813	279	.966	129
SCHOLAR	.203	5295	.170	417	.142	288	.232	129
AGE	22.9	5287	23.2	417	23.39	288	23	129
JS2 AQD	.078	5295	1	417	1	288	1	129

PCTREC3 (.605 for all officers vs. .609 for officers holding the JS2), and O-4 performance (PCTREC4) for all officers (.904) seems to be slightly better than the mean for JS2 officers (.861). However, officers receiving their JS2 *prior* to 1 October, 1989 (column 6) had superior performance records, and were "rapped" (recommended for accelerated promotion, ranked in the top one percent, and received an "A" in Command desirability) only 57 percent of the time as a Lieutenant, compared to 69 percent of the time for those receiving a JS2 *after* FY1988 (column 8). Similarly, officers who received their JS2 prior to 1988 were rapped 81 percent of the time as an O-4, while officers receiving a post-1988 JS2 were rapped 96 percent of the time . Indeed, the measures of quality used here (GRADEDUC, PCTREC3, PCTREC4, and SCHOLAR) seem to indicate that officers receiving a JS2 prior to 1988 were below-average quality, and

officers receiving their JS2 after 1988 were above average quality, compared to all officers appearing before the FY 1988-1994 Commander promotion boards.

Table 5.2 provides a similar comparison for officers holding the JS5 designator.

Table 5.2 Background Characteristics of Officers Appearing Before the 1988-1994 Commander (O-5) Promotion Board (Officers Holding JS5 AQD)

	ALL OFFICERS	N	ALL OFFICERS HOLDING A JS5 AQD	N	OFFICERS AWARDED A JS5 AQD PRIOR TO 1 OCT 1989	N	OFFICERS AWARDED A JS5 AQD AFTER 1 OCT 1989	N
USNA	.300	5295	.304	207	.323	133	.270	74
UGRDTECH	.551	5295	.502	207	.458	133	.581	74
MARRIED	.888	5295	.835	207	.864	133	.783	74
DEP	1.51	5295	1.299	207	1.33	133	1.243	74
GRADEDUC	.377	5295	.386	207	.360	133	.432	74
WHITE	.960	5294	.961	207	.962	133	.959	74
PCTREC3	.605	5249	.681	206	.680	132	.684	74
PCTREC4	.904	5249	.953	206	.942	132	.973	74
SCHOLAR	.203	5295	.188	207	.187	133	.189	74
AGE	22.9	5287	22.8	206	22.78	133	22.9	74
JS5 AQD	.039	5295	1	207	1	133	1	74

Of the four measures of quality (GRADEDUC, PCTREC3, PCTREC4, and SCHOLAR), only SCHOLAR fails to support the premise that officers assigned the JS5 after FY1988 were of higher average quality than all officers appearing before the 1988-94 Commander promotion boards (the mean value of SCHOLAR was .188 for officers holding the JS5 compared to .203 for all officers). However, the real difference between the JS2 data and the JS5 data is apparent when comparing officers assigned the JS5 designator prior to FY 1988. Although we hypothesized that officers assigned the JS5 designator prior to FY 1988 would be of lower quality, the means for both PCTREC3 and PCTREC4 show these officers to be of higher quality than the full officer population. The explanation appears to

be that these officers were more carefully screened in 1988 for the JS5 than their counterparts vying for the JS2. In order to more fully investigate the performance characteristics of officers receiving a JS2/5, Table 5.3 compares the backgrounds of the 5,295 officers appearing before the FY1988-1994 Commander promotion boards and breaks the data into two groups: those appearing before the FY 1988-1990 boards, and those appearing before the FY 1991-1994 boards.

Table 5.3 Background Characteristics of Officers Appearing Before the 1988-1994 Commander (O-5) Promotion Board By Early/ Late Promotion Board Dates

	ALL OFFICERS	N	1988-1990 PROMOTION BOARDS	N	1991-1994 PROMOTION BOARDS	N
USNA	.300	5295	.273	2495	.323	2800
UGRDTECH	.551	5295	.511	2495	.587	2800
MARRIED	.888	5295	.885	2495	.890	2800
DEP	1.51	5295	1.517	2495	1.504	2800
GRADEDUC	.377	5295	.369	2495	.383	2800
WHITE	.960	5294	.965	2495	.956	2800
PCTREC3	.605	5249	.524	2449	.676	2800
PCTREC4	.904	5249	.845	2449	.956	2800
SCHOLAR	.203	5295	.159	2495	.241	2800
AGE	22.9	5287	23	2489	22.8	2798
JS2 AQD	.078	5295	.094	2495	.064	2800
JS5 AQD	.039	5295	.037	2495	.040	2800

It can be argued that officers with an AQD awarded after 1 October 1989 are less likely to have appeared before the 1988-1990 boards, and therefore any differences observed among officers (based on the date of their AQD) may be attributed to the date of the promotion board. For example, the mean for PCTREC3 increases from .524 for the 2,449 officers appearing before the 1988-90 promotion boards (column 4), to .676 for the 2,800 officers appearing before the 1991-94 promotion boards. A similar increase is

noted for the mean of PCTREC4 variable (.845 to .956). This increase in the means of these proxies for performance may reflect grade creep in the performance evaluation system, as opposed to a marked improvement in the capabilities of the officers.[18] If the number of officers who receive the AQD after 1988 are more likely to appear before a 1991-1994 promotion board, then any increase in FITREP performance for these JS2/5 holders may be attributed to grade creep vice any real change in the quality of an officer holding the JS2/5 designator. Table 5.4 shows a cross-tabulation of those JS2/5 EARLY/LATE with the two promotion board year groups.

Table 5.4 Date of JS2/5 Designator by FY of Promotion Board

	FY 1988-1990 Promotion boards	**FY 1991-1994 Promotion boards**	**Total**
JS2 AQD received FY1988 or before (JS2EARLY)	228	60	288
JS2 AQD received FY1989 or after (JS2LATE)	9	120	129
JS2 Total	237	180	417
JS5 AQD received FY1988 or before (JS5EARLY)	79	54	133
JS5 AQD received FY1989 or after (JS5LATE)	15	59	74
JS5 Total	94	113	207

Table 5.4 shows that of the 288 officers receiving their JS2 on or before FY1988, 228 (79 percent) appeared before the FY 1988-90 Commander promotion board, and of

[18] FITREP grade creep is a well-recognized problem in the Navy. It is loosely defined as the tendency to rate individuals higher than they deserve, because "everyone else is doing it", and Commanding officers feel a responsibility to protect the officers assigned to them. It has grown more acute with each passing year, and by 1995 the system had become so inflated that the Navy was forced to implement a new format for evaluating officers.

the 129 officers receiving the JS2 after FY 1988, 120 (93 percent) appeared before the FY 1991-1994 Commander Promotion board. Of officers receiving the JS5 on or before FY 1988 , 79 of 133 (59 percent) appeared before the FY 1988-90 Commander promotion board, while 59 of the 74 officers (78 percent) receiving their JS5 during or after FY 1989 appeared before the FY 1991-94 Commander promotion boards.

Two-sample t-tests were used to test the null hypothesis that the means for two independent samples were equal, i.e., that there was no significant difference in performance between officers earning the JS2 before 1988, and officers appearing before the FY 1988-90 Commander promotion board. The means of the qualitative variables PCTREC3, PCTREC4, SCHOLAR, and GRAD were compared between the 228 officers receiving a JS2 before 1 October 1989 and the 2,258 non-JS2 officers appearing before the FY 1988-1990 Commander promotion boards. A similar test was performed for the 120 officers receiving their JS2 after 1 October 1989 and the 2,620 officers appearing before the FY 1991-1994 Commander promotion boards. A significance level of 10% was chosen for both tests. The results, as well as the results for a similar comparison of JS5 officers, are shown in Table 5.5.

These results indicate that there were significant differences in the means of PCTREC3 and PCTREC4 variables in three of the four JS2 groups compared. Officers receiving their JS2 during FY 1989 or later demonstrated a higher level of performance, as measured by fitness reports, than officers receiving their AQD prior to FY 1989. The differences in the means for SCHOLAR and GRADEDUC, however, show no significant difference for the JS2 groups.

Table 5.5 T-Test * Results: Means Are Listed, With P-Values in Parenthesis (Commander Data Set)

GROUPS COMPARED	PCTREC3	PCTREC4	SCHOLAR	GRAD
JS2 AQD received FY 1988 or before (228 officers), [1a] and	.534	**.790**	.131	.358
FY 1988-90 CDR Promotion Board (2,258 officers) [1b]	.524	**.850**	.162	.370
Significant (Yes/No) (p-value)	No (.7322)	**Yes (.0006)**	No (.1934)	No (.7423)
JS2 AQD received FY 1989 or after (120 officers), and	**.720**	**.971**	.243	.384
FY 1991-94 CDR Promotion Board (2,620 officers)	**.673**	**.957**	.233	.433
Significant (Yes/No) (p-value)	**Yes (.0930)**	**Yes (.0400)**	No (.7994)	No (.2814)
JS5 AQD received FY 1988 or before (79 officers),[2a] and	**.623**	**.929**	.189	.329
FY 1988-90 CDR Promotion Board (2,401 officers)	**.521**	**.842**	.157	.369
Significant (Yes/No) (p-value)	**Yes (.0247)**	**Yes (.0001)**	No (.4311)	No (.4605)
JS5 AQD received FY 1989 or after (59 officers), and	.723	**.976**	**.118**	.389
FY 1991-94 CDR Promotion Board (2,687 officers)	.673	**.955**	**.245**	.383
Significant (Yes/No) (p-value)	No (.2073)	**Yes (.0238)**	**Yes (.0047)**	No (.9191)

* A t-test is used to determine significant differences in means between two groups)
1a. 219 had valid FITREP data
1b. 2,221 had valid FITREP data
2a. 78 had valid FITREP data

The results for JS5 were less clear, as there were again significant differences in the means of PCTREC3 and PCTREC4 variables in three of four JS5 groups. However, having a JS5 was positively correlated with higher quality performance, *regardless* of the date of the AQD. As mentioned before, this can be explained if one accepts the rationale

that these officers were more carefully screened in 1988 for the JS5 than were their counterparts vying for the JS2. Also of interest is that officers who received their JS5 after FY 1989 had significantly lower average GPAs than officers who appeared before the FY 1991-94 Commander promotion boards.

2. Executive Officer/Commanding Officer (XO/CO) Screening

Comparisons of XO/CO screening results and their relationship to officers holding a JS2/5 are perhaps less useful due to the method of coding this field in the Officer Master File, as will be explained later. Nonetheless, this field was examined, and Table 5.6 shows the XO/CO screening history of all officers appearing before the 1988-1994 Commander (O-5) promotion board, broken down by designator.

Table 5.6 XO/CO Screening Results of All Officers Appearing Before the 1988-1994 Commander (O-5) Promotion Board, by Designator

	1110	1120	1310	1320	TOTAL
TOTAL # OF OFFICERS	1,660	738	1,596	1,301	5,295
TOTAL # OF VALID XO/CO SCREENING RESULT ENTRIES	1,437	731	174	86	2,428
MISSING RECORDS	223	7	1,422	1,215	2,867
TOTAL # SELECTED FOR XO *	1,276	667	172	81	2,196
SELECTION RATE (OF THOSE WITH VALID ENTRIES)	88.79%	91.24%	98.85%	94.19%	90.44%
TOTAL # SELECTED FOR CO	165	161	172	81	579
SELECTION RATE (OF THOSE WITH VALID ENTRIES)	11.48%	22.02%	98.85%	94.19%	23.56%

* Includes those selected for CO

As mentioned in Chapter III, there are differences across communities when it comes to community-specific milestones such as department head tours, sea/shore rotation, tour lengths, schools, etc. One significant difference is the timing at which an officer screens for XO or CO. As mentioned previously, an aviation officer (Pilot or NFO) screens for XO and CO concurrently, usually after selection to Commander. As the above table shows, of the 2,897 aviation officers appearing before the 1988-1994 Commander Promotion boards (1,596 pilots and 1,301 NFOs), only 260 had valid XO/CO screening results. SWOs and submariners, by contrast, have largely completed their XO and CO screening prior to appearing before the Commander promotion board. Additionally, discussion with community managers at the Bureau of Naval Personnel revealed that the data field used to record screening board results is used differently by the communities, may be changed periodically, and is often cleared after a period of time, thus it is not always possible to extract the latest available screening results from the data. The data used in this study did not include XO/CO screening results for aviators, which occurred after the promotion board in question. For this reason, in the following chapter it is impractical to include the XOSCREEN and/or COSCREEN variables when estimating the multivariate promotion models for aviators.

3. Promotion

Table 5.7 shows overall promotion rates for officers who appeared before the 1988-1994 Commander promotion boards, by designator.

Table 5.7 Promotion Statistics of Officers Appearing Before the 1988-1994 Commander (O-5) Promotion Board (by Designator)

	1110	1120	1310	1320	TOTAL
TOTAL # OF OFFICERS	1,660	738	1,596	1,301	5,295
NUMBER PROMOTED	1,067	560	1,144	734	3,505
PROMOTION RATE	64%	76%	72%	56%	66%

The difference in promotion rates across communities ranges from a low of 56 percent for NFOs to a high of 76 percent for pilots. The difference in promotion rates across communities further suggests the need to estimate separate models for each designator when attempting to determine the effects of joint duty on promotion.

Table 5.8 shows the promotion rates of officers appearing before the FY 1988-94 Commander promotion boards, by year for the entire group, and broken down by the JS2/JS5 designators.

Table 5.8 Promotion Rates of Officers Appearing Before 1998-1994 Commander Promotion Board, by AQD

		1988	1989	1990	1991	1992	1993	1994	TOTAL
All Officers	**NUMBER**	708	1000	787	665	831	427	877	5,295
	PROMOTED	470	648	501	443	588	276	579	3,505
	PROMOTION RATE	**66.3**	**64.8**	**63.6**	**66.6**	**70.7**	**64.6**	**66.0**	**66.1**
JS2 Officers	**NUMBER**	79	107	51	37	57	37	49	417
	PROMOTED	42	48	24	24	44	26	30	238
	PROMOTION RATE	**53.1**	**44.8**	**47.0**	**64.8**	**77.1**	**70.2**	**61.2**	**57.0**
JS5 Officers	**NUMBER**	17	37	40	49	44	13	7	207
	PROMOTED	13	27	34	40	38	10	6	168
	PROMOTION RATE	**76.4**	**72.9**	**85.0**	**81.6**	**86.3**	**76.9**	**85.7**	**81.1**

Despite a relatively constant overall promotion rate, there is a considerable difference between the JS2 and JS5 officer promotion rates. JS2-designated officers have

a promotion rate ranging from a low of 47.06 to a high of 77.19 percent, while promotion rates for JS5-designated officers ranged from a low of 72.97 to a high of 86.36 percent. The relatively high promotion rate for JS5 reflects the screening process used prior to selection for the JS5.

Table 5.9 breaks this data into two distinct promotion year groups: FY 1988-90, and FY 1991-94.

Table 5.9 Promotion Rates of Officers Appearing Before the 1988-1994 Commander Promotion Board, by AQD, by Year Groups

	ALL YEARS (1988-1994)	EARLY YEARS (1988-1990)	LATE YEARS (1991-1994)
OVERALL PROMOTION RATE	**66.19**	**64.88**	**67.35**
JS2 PROMOTION RATE	**57.07**	**48.10**	**68.88**
JS5 PROMOTION RATE	**81.16**	**78.72**	**83.18**

The sharp difference in promotion rates for officers assigned the JS2 suggests the need to specify promotion models for the two promotion year groups outlined above, as well as for each designator.

B. CAPTAIN DATA SET

1. Performance Characteristics

Table 5.10. compares the same background characteristics of all officers appearing before the FY 1988-1994 Captain promotion boards in column 1 with those holding the JS2 designator in column 2. These JS2 recipients are further broken down into those

receiving the JS2 designator in FY 1988-90 (JS2EARLY) in column 3, and FY 1991-94 (JS2LATE) in column 4.

Table 5.10 Background Characteristics of Officers Appearing Before the 1988-1994 Captain (O-6) Promotion Board (Officers Holding JS2 AQD

	ALL OFFICERS	N	ALL OFFICERS HOLDING A JS2 AQD	N	OFFICERS AWARDED A JS2 AQD PRIOR TO 1 OCT 1989	N	OFFICERS AWARDED A JS2 AQD AFTER 1 OCT 1989	N
USNA	.323	3227	.284	439	.265	324	.339	115
UGRDTECH	.379	3227	.364	439	.345	324	.417	115
MARRIED	.941	3227	.943	439	.938	324	.956	115
DEP	1.77	3227	1.801	439	1.85	324	1.66	115
GRADEDUC	.499	3227	.526	439	.515	324	.556	115
WHITE	.986	3227	.986	439	.990	324	.973	115
PCTREC3	.536	2260	.517	319	.517	233	.516	86
PCTREC4	.833	2260	.855	319	.851	233	.866	86
PCTREC5	.957	2260	.958	319	.950	233	.978	86
SCHOLAR	.273	3227	.328	439	.290	324	.434	115
AGE	22.4	3203	22.5	435	22.56	320	22.6	115
JS2 AQD	.136	3227	1	439	1	324	1	115

There appear to be only slight differences in the means between all officers in column 2 and officers holding the JS2 in column 4. However, the examination of *when* the officers received the AQD again reveals some interesting differences. The mean of O-4 and O-5 performance (as measured by the PCTREC4 and PCTREC5 variable) among officers receiving a post-1988 JS2 designator is higher than the mean for all officers appearing before the FY 1988-94 promotion boards. However, the mean for O-3 performance (as measured by PCTREC3) for officers receiving a post-1988 JS2 designator is lower than the mean for all officers appearing before the FY 1988-94 promotion boards - an unexpected result. If, as a result of GNA, the Navy was trying to ensure officers of better quality were being sent to joint billets, one would expect to see higher, rather than lower,

LT fitrep rankings. One possible explanation is that the differences are not great in magnitude (.536 to .516), and may be attributed to anomalies due to the small number of officers receiving a post-1988 JS2 and having valid FITREP data (only 86 officers). Every other measure of quality (GRADEDUC, PCTREC4, PCTREC5, and SCHOLAR) seems to support the premise that officers receiving their JS2 prior to 1988 were of lower quality, and officers receiving their JS2 after 1988 were of higher quality, than the average officer appearing before the FY 1988-1994 Commander promotion board.

Table 5.11 provides a similar comparison for officers receiving the JS5 and appearing before the FY 1988-94 promotion boards.

Table 5.11 Background Characteristics of Officers Appearing Before the 1988-1994 Captain (O-6) Promotion Board (Officers Holding JS5 AQD)

	ALL OFFICERS	N	ALL OFFICERS HOLDING A JS5 AQD	N	OFFICERS AWARDED A JS5 AQD PRIOR TO 01 OCT 1989	N	OFFICERS AWARDED A JS5 AQD AFTER 01 OCT 1989	N
USNA	.323	3227	.349	446	.315	352	.478	94
UGRDTECH	.379	3227	.369	446	.346	352	.457	94
MARRIED	.941	3227	.973	446	.971	352	.978	94
DEP	1.77	3227	1.852	446	1.78	352	2.09	94
GRADEDUC	.499	3227	.535	446	.519	352	.595	94
WHITE	.986	3227	.991	446	.994	352	.978	94
PCTREC3	.536	2260	.580	341	.582	272	.572	69
PCTREC4	.833	2260	.887	341	.887	272	.890	69
PCTREC5	.957	2260	.979	341	.977	272	.990	69
SCHOLAR	.273	3227	.269	446	.227	352	.425	94
AGE	22.4	3203	22.5	443	22.53	349	22.4	94
JS5 AQD	.136	3227	1	446	1	352	1	94

The means of the five measures of quality (GRADEDUC, PCTREC3, PCTREC4, PCTREC5, and SCHOLAR) of officers receiving the JS5 after 01 October 1989 and

appearing before the FY 1988-94 promotion boards are all higher than the means for all officers appearing before the same promotion boards. Of interest again, as when analyzing the JS5 Commander data set, is that officers assigned the JS5 *before* FY 1989 also appear to be of higher quality than average. Although these officers were hypothesized to be of lower quality, all measures of quality except SCHOLAR indicate higher quality. This may again be explained if one accepts the rationale that these officers were more carefully screened in 1988 for the JS5 than their counterparts vying for the JS2. Furthermore, it is likely that most of these officers received their JPME by completing Phase I and Phase II JPME (JPME Phase II is offered at the Armed Forces Staff College (AFSC)). As officers attending AFSC are carefully screened prior to their selection, this selection bias could explain the higher quality of JS5 officers, regardless of when they received the AQD.

Table 5.12 compares general characteristics of the 5,295 officers appearing before the FY 1988-1994 Captain promotion board and breaks the data into two groups: those appearing before the FY1988-1990 boards, and those appearing before the FY 1991-1994 boards.

Table 5.12 Background Characteristics of Officers Appearing Before the 1988-1994 Captain Promotion Board (by Early/Late Promotion Board Dates)

	ALL OFFICERS	N	1988-1990 PROMOTION BOARDS	N	1991-1994 PROMOTION BOARDS	N
USNA	.323	3227	.269	1259	.358	1968
UGRDTECH	.379	3227	.285	1259	.440	1968
MARRIED	.941	3227	.934	1259	.945	1968
DEP	1.77	3227	1.74	1259	1.79	1968
GRADEDUC	.499	3227	.494	1259	.502	1968
WHITE	.986	3227	.992	1259	.982	1968
PCTREC3	.536	2260	.522	812	.543	1448
PCTREC4	.833	2260	.808	812	.847	1448
PCTREC5	.957	2260	.935	812	.968	1448
SCHOLAR	.273	3227	.243	1259	.292	1968
AGE	22.4	3203	22.4	1244	22.4	1959
JS2 AQDs	.136	3227	.108	1259	.153	1968
JS5 AQDs	.138	3227	.110	1259	.155	1968

It can again be argued that officers appearing before the 1988-1990 boards are less likely to have an AQD awarded after 1988, and therefore the above differences among officers (based on the date of their AQD) may be attributed to the date of the promotion board. Table 5.13 is provided to determine the extent of this problem, as was provided earlier in this section for the Commander data set.

Table 5.13 Date of JS2/5 AQD by FY of O-6 (Captain) Promotion Board

	FY1988-1990 Promotion boards	FY1991-1994 Promotion boards	Total
JS2 AQD received FY1988 or before (JS2EARLY)	132	192	324
JS2 AQD received FY1989 or after (JS2LATE)	4	111	115
JS2 Total	136	303	439
JS5 AQD received FY1988 or before (JS5EARLY)	137	215	352
JS5 AQD received FY1989 or after (JS5LATE)	2	92	94
JS5 Total	139	307	446

Of the 115 officers receiving their JS2 after FY 1988, 111 (96%) appeared before the FY 1991-1994 O-6 promotion boards, and of the 94 officers receiving their JS5 after FY 1988, 92 (98%) appeared before the FY 1991-1994 Captain promotion boards. T-tests were performed similar to those performed for the Commander data set, again using a significance level of 10 percent. The results are shown in table 5.14.

Table 5.14 T-test Results: Means are Listed, With P-Values in Parenthesis (Captain Data Set)

GROUPS COMPARED	PCTREC3	PCTREC4	PCTREC5	SCHOLAR	GRAD
JS2 AQD received FY 1988 or before (132 officers), [1a] and	.556	.804	**.904**	**.340**	.537
FY 1988-90 CAPT Promotion Board (1,123 officers) [1b]	.519	.808	**.939**	**.233**	.490
Significant (Yes/No) (p-value)	No (.3927)	No (.8845)	Yes (.0587)	**Yes (.0140)**	No (.3050)
JS2 AQD received FY 1989 or after (111 officers), [2a] and	.523	.865	.978	**.450**	.567
FY 1991-94 CAPT Promotion Board (1,665 officers)[2b]	.551	.842	.967	**.286**	.498
Significant (Yes/No) (p-value)	No (.5220)	No (.2685)	No (.2203)	**Yes (.0002)**	No (.1590)
JS5 AQD received FY 1988 or before (137 officers), [3a] and	.563	**.874**	**.975**	**.182**	.554
FY 1988-90 CAPT Promotion Board (1,120 officers)[3b]	.515	**.798**	**.929**	**.251**	.487
Significant (Yes/No) (p-value)	No (.2161)	**Yes (.0054)**	**Yes (.0001)**	**Yes (.0529)**	No (.1375)
JS5 AQD received FY 1989 or after (92 officers), [4a] and	.564	**.887**	**.993**	**.434**	**.597**
FY 1991-94 CAPT Promotion Board (1,661 officers) [4b]	.535	**.839**	**.966**	**.289**	**.497**
Significant (Yes/No) (p-value)	No (.5438)	**Yes (.0307)**	**Yes (.0001)**	**Yes (.0030)**	**Yes (.0621)**

1a. 83 had valid FITREP data
1b. 725 had valid FITREP data
2a. 82 had valid FITREP data
2b. 1,216 had valid FITREP data
3a. 106 had valid FITREP data
3b. 704 had valid FITREP data
4a. 67 had valid FITREP data
4b. 1,215 had valid FITREP data

The only significant difference in means of the four variables compared for holders of the JS2 designator were for SCHOLAR and PCTREC5. Officers receiving the JS2 designator in FY 1988 or prior demonstrated a significantly lower level of performance as measured by O-5 fitness reports. Interestingly, holders of the JS2 designator demonstrated a significantly higher GPA than their non-JS2 counterparts. This trend is repeated for officers receiving the JS5 designator after 1989; however, officers receiving the JS5 prior to 1988 have a *lower* mean GPA than their board counterparts. Officers holding the JS5 demonstrated higher levels of performance as O-4s and O-5s, as measured by fitness reports, regardless of when the JS5 is received. As mentioned earlier, officers were screened prior to being awarded the JS5, and this higher level of documented performance is a result of this selection bias. Lastly, officers receiving the JS5 after 1989 are more likely to have a graduate degree.

2. Executive Officer/Commanding Officer (XO/CO) Screening

An analysis of XO/CO screening results and their relationship to officers holding the JS2/5 in the Captain data set, like those in the Commander data set, is difficult to conduct. Table 5.15 shows the XO/CO screening history by designator for all officers appearing before the 1988-1994 Captain (O-6) promotion board.

Table 5.15 XO/CO Screening Results of Officers Appearing Before the 1988-1994 Captain (O-6) Promotion Board (by Designator)

	1110	1120	1310	1320	TOTAL
TOTAL # OF OFFICERS	989	383	1,250	605	3,227
TOTAL # OF VALID SCREENING RESULT ENTRIES	931	383	737	234	2,285
MISSING RECORDS	58	0	513	371	942
TOTAL # SELECTED FOR CO	611	370	639	205	1,825
SELECTION RATE (OF THOSE WITH VALID ENTRIES)	65.6%	96.6%	86.7%	87.6%	79.9%
SELECTION RATE (OF ALL AVAILABLE OFFICERS)	61.8%	96.6%	51.1%	33.8%	56.6%

Although the number of missing valid screening entries for the Captain data set are less than the number of missing records in the Commander data set (942 vs. 2,867), of those 944 missing records all but 58 are in the aviation community. The lack of valid XO/CO screening entries for aviators again precludes including the COSCREEN variable when modeling the effects of JS2/5 on promotion for the aviation community.

3. Promotion

Table 5.16 provides the promotion rates for officers appearing before the 1988-1994 Captain promotion boards, by designator.

Table 5.16 Promotion Statistics for Officers Appearing Before the 1988-1994 Captain (O-6) Promotion Board (by Designator)

	1110	1120	1310	1320	TOTAL
TOTAL # OF OFFICERS	989	383	1,250	605	3,227
NUMBER PROMOTED	530	250	663	209	1,652
PROMOTION RATE	54%	65%	53%	35%	51%

As in the Commander data set, there is a considerable range in promotion rates across communities, ranging from a low of 35 percent promotion rate for NFOs, to a high of 65 percent for pilots. These ranges of promotion again underscore the requirement to model the effect of joint duty on promotion within individual communities.

Table 5.17 shows the promotion rates of officers appearing before the FY 1988-1994 Captain promotion boards, broken down by JS2/5.

Table 5.17 Promotion Rates of Officers Appearing Before 1998-1994 Captain Promotion Board, by AQD

		1988	1989	1990	1991	1992	1993	1994	TOTAL
All Officers	NUMBER	407	415	437	554	620	382	412	3,227
	PROMOTED	206	216	223	301	327	188	191	1,652
	PROMOTION RATE	**50.61**	**52.05**	**51.03**	**54.33**	**52.74**	**49.21**	**46.36**	**51.19**
JS2 Officers	NUMBER	29	58	49	67	97	58	81	439
	PROMOTED	8	28	23	35	42	25	34	195
	PROMOTION RATE	**27.59**	**48.28**	**46.94**	**52.24**	**43.30**	**44.07**	**41.98**	**44.42**
JS5 Officers	NUMBER	11	62	66	93	94	53	67	446
	PROMOTED	11	51	47	72	62	33	29	305
	PROMOTION RATE	**100**	**82.26**	**71.21**	**77.42**	**65.96**	**62.26**	**43.28**	**68.39**

Similar to the Commander data set, there is a relatively constant overall promotion rate for all officers, and there is again a considerable difference in promotion rates among the JS2 and JS5 officers. JS2 designated officers have a promotion rate ranging from a low of 27.59 to a high of 52.24 percent, while promotion rates for JS5 designated officers ranged from a low of 43.28 to a high of 100 percent. The high promotion rate for JS5 officers again reflects the rigorous screening process required for selection for the JS5 designator.

Table 5.18 breaks the data into two distinct promotion year groups: FY 1988-90, and FY 1991-94.

Table 5.18 Promotion Rates of Officers Appearing Before the 1988-1994 Captain Promotion Board, by AQD, by Year Groups

	ALL YEARS (1988-1994)	EARLY YEARS (1988-1990)	LATE YEARS (1991-1994)
OVERALL PROMOTION RATE	**51.19**	**51.23**	**51.16**
JS2 PROMOTION RATE	**44.42**	**43.38**	**44.88**
JS5 PROMOTION RATE	**68.39**	**78.41**	**63.84**

Unlike the commander data set, the promotion rates for JS2 officers is relatively constant between the two time periods under consideration, while the promotion rates for JS5 designated officers varies considerably across the two groups. This difference of promotion rates among JS5 officers in the Captain data set, as with the difference of promotion rates among JS2 officers in the Commander data set, again underscores the requirement to run separate models for the two promotion year groups, as well as for each particular designator, when analyzing the effects of a JS2/5 on promotion as will be done in the following chapter.

VI. EMPIRICAL ANALYSIS

One of the goals of this thesis is to examine the effect of possession of the JS2/5 designator, along with other factors, on the probability of a naval officer's promotion to Commander and Captain. Table 6.1 lists the means of background factors by community of officers appearing before the FY 1988-1994 Commander and Captain promotion boards.

Table 6.1. Variable Means (Proportions) by Designator and Promotion Board

	SURFACE (1110)		SUB (1120)		PILOT (1310)		NFO (1320)	
VARIABLE	**CDR**	**CAPT**	**CDR**	**CAPT**	**CDR**	**CAPT**	**CDR**	**CAPT**
COMMSRCE	.282	.382	.460	.597	.337	.272	.186	.161
UGRDTECH	.490	.316	.892	.691	.522	.343	.471	.361
MARRIED	.871	.935	.902	.958	.899	.939	.887	.945
DEP	1.45	1.76	1.52	1.81	1.59	1.81	1.51	1.77
GRAD	.410	.586	.280	.326	.330	.473	.446	.520
WHITE	.929	.979	.981	.997	.975	.989	.969	.985
SCHOLAR	.161	.264	.471	.522	.151	.229	.167	.221
AGE@COMM	23.04	22.34	22.52	22.39	22.50	22.38	23.44	22.84
JS2	.101	.188	.066	.093	.046	.098	.096	.155
JS5	.050	.183	.054	.055	.019	.116	.039	.117
PCTREC3	.641	.601	.655	.493	.568	.512	.576	.496
PCTREC4	.913	.885	.937	.835	.905	.802	.874	.803
PCTREC5	-	.958	-	.978	-	.956	-	.940
XOSCREEN	.887	-	.670	-	-	-	-	-
COSCREEN	.083	.649	.229	.966	-	-	-	-
SAMPLE SIZE	1,660	989	738	383	1,596	1,250	1,301	605

There are many differences among designators and between ranks within designators. For example, only 27.2 percent of pilots appearing before the 1988-94 Captain promotion boards attended the U.S. Naval Academy, as compared to 59.7 percent of submariners. Similarly, only 16.1 percent of Surface Warfare officers appearing before the 1988-94 Commander promotion boards possessed a GPA of 3.2 or above as compared to 47.1

percent of Submarine officers. Because of these differences between the communities and ranks, it is necessary to run separate models to compare the effects of a JS2/5 designator on an officer's career.

This chapter is divided into two sections: the first section examines the surface warfare officer (1110) community, and analyzes the effects of a JS2/5 on promotion to Commander or Captain, using LOGIT models. Similar models are specified and estimated for submarine (1120), pilot (1310), and naval flight officer (1320) communities. The second section discusses the marginal effects on the probability of promotion for an officer holding the JS2 or JS5 designator, and compares these effects between year groups and across communities.

A. LOGIT MODEL

Four basic LOGIT models are specified and estimated: two for officers appearing before the Commander promotion board and holding the JS2 or JS5 designator, and two for officers appearing before the Captain promotion boards and holding the JS2 or JS5 designators. Results from the previous chapter underscored the need to examine the effects of a JS2/5 designator on promotion during two different time periods, FY1988-1990 and FY1991-1994. In order to evaluate the sensitivity of the effect of the JS2/5 (JDUTYA) to an increasingly inclusive set of controls, several alternative specifications for the promotion models are estimated within each designator and time period.

1. Model Estimates for Surface Warfare Officers

The variable XOSCREEN is defined as being selected as XO qualified (ship) when appearing before a LCDR screening board. The variable COSCREEN is defined as being

selected for Command principal (ship) when appearing before a LCDR screening board. Table 6.2 lists the results of the LOGIT model used to analyze the effect of a JS2 on promotion to Commander for SWO officers.

Table 6.2. Estimated Effect of JS2 on Promotion to O-5 for SWOs.

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	**1.83 (3.2)**	**-4.31 (10.12**	**-6.68 (12.1)**	**4.61 (26.5)**	**-3.31 (6.11)**	**-4.56 (5.20)**
COMMSRCE	**.62 (9.24)**	**.63 (7.65**	.45 (2.53)	**.37 (4.01)**	**.42 (4.32)**	.18 (.45)
UGRDTECH	**-.28 (2.89)**	-.10 (.30	-.011 (.002)	**-.29 (3.70)**	-.15 (.81)	.23 (1.08)
MARRIED	**.50 (3.02)**	.25 (.56)	.09 (.05)	.21 (.66)	.22 (.56)	.14 (.11)
DEP	.09 (1.29)	.10 (1.08)	**.21 (2.93)**	.05 (.45)	.0002 0	-.06 (.33)
GRAD	**.76 (19.84)**	**.80 (16.58)**	**.87 (11.5)**	**.81 (25.1)**	**.73 (17.07)**	**.42 (3.35)**
WHITE	-.02 (.007)	-.56 (1.87)	-.95 (2.18)	-.11 (.15)	-.42 (1.77)	-.13 (.12)
SCHOLAR	**.54 (4.25)**	**.71 (5.07)**	**.72 (2.96)**	**-.41 (4.40)**	**-.44 (4.31)**	-.04 (.02)
AGE	**-.09 (5.30)**	-.05 (1.2)	-.02 (.17)	**-.18 (27.8)**	**-.13 (11.42)**	**-.14 (8.83)**
JS2	**-1.01 (14.85)**	**-.87 (8.14)**	-.55 (2.07)	**.47 (3.09**	.38 (1.59)	.38 (.92)
PCTREC3		**.94 (14.99)**	**.76 (6.19)**		**2.08 (56.8)**	**1.15 (10.1)**
PCTREC4		**6.14 (86.4)**	**3.68 (18.7)**		**5.84 (48.0)**	**4.03 (15.0)**
XOSCREEN			**5.11 (48.3)**			**4.46 (18.5)**
COSCREEN			n/a			**1.22 (8.08)**
SAMPLE SIZE	727	715	667	894	894	728
-2 Log L	77.98	235.2	365.6	88.4	235.9	159.6

* Dependent Variable: Promotion to Grade 5 (Commander)

Note: Asymptotic wald chi-square statistics in parenthesis. Coefficients significant at the 10% level are in bold

Columns 2-4 list the estimated coefficients of the SWO promotion to O-4 models for the years 1988-1990. As expected, the coefficients indicate younger, married officers are more likely to promote, and minorities are just as likely to promote as whites. Graduates of the Naval Academy are more likely to promote than officers entering the Navy via alternate commissioning sources, and officers holding higher GPAs or a graduate degree are also more likely to promote. Interestingly, SWOs holding a non-technical degree are less likely to promote. In the first two model specifications (columns 2 and 3) the coefficient of JS2 (representing possession of the JS2 designator) are both negative and significant; furthermore, its effects falls as additional controls are included. Column 4 includes XO screening results as an explanatory variable (there was perfect correlation between COSCREEN and promotion, thus COSCREEN was omitted from the model), and the strong correlation between XO screening and promotion reduced the significance of several variables, including JDUTYA. In general, inclusion of the additional controls improved model fit, as the chi-square for the log likelihood ratio rose significantly from 77.98 to 365.6.

Columns 5-7 of Table 6.2 list the estimated coefficients when modeling SWO promotion to O-5 during the years 1991-1994. The signs of the coefficients are similar to those for the 1988-90 promotion boards with two exceptions: Officers possessing a *lower* GPA were more likely to promote, and officers possessing a JS2 designator were *more* likely to promote in the years 1990-94. This result for JS2 is in accordance with the

bivariate analysis in Chapter V that officers obtaining joint duty experience after 1990 were of higher quality than officers assigned to joint duty prior to 1990.

Table 6.3 lists the results of the LOGIT model used to analyze the effect of a JS5 on promotion to Commander for SWO officers.

Table 6.3. Estimated Effect of JS5 on Promotion to O-5 for SWOs

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	**1.82** (3.18)	**-4.35** (10.4)	**-6.73** (12.2)	**4.54** (25.4)	**-3.48** (6.57)	**-4.78** (5.64)
COMMSRCE	**.62** (9.58)	**.62** (7.40)	.43 (2.25)	**.35** (3.66)	**.43** (4.42)	9.21 (.59)
UGRDTECH	-.23 (2.0)	-.06 (.11)	.003 (.0002)	**-.29** (3.66)	-.15 (.83)	.22 (1.01)
MARRIED	**.47** (2.78)	.24 (.5)	.06 (.02)	.24 (.87)	.27 (.84)	.15 (.13)
DEP	.10 (1.39)	.10 (1.15)	**.22** (3.09)	.04 (.36)	-.01 (.02)	-.07 (.47)
GRAD	**.80** (22.1)	**.84** (18.2)	**.90** (12.6)	**.82** (25.3)	**.74** (17.3)	**.43** (3.47)
WHITE	-.10 (.08)	-.64 (2.4)	-.99 (2.35)	-.13 (.23)	-.47 (2.17)	-.14 (.13)
SCHOLAR	**.58** (4.98)	**.74** (5.60)	**.74** (3.16)	**-.42** (4.47)	**-.45** (4.37)	**-.05** (.02)
AGE	**-.09** (5.66)	-.05 (1.28)	-.02 (.20)	**-.18** (26.9)	**-.12** (10.58)	**-.13** (7.64)
JS5	.17 (.19)	-.04 (.01)	-.45 (.93)	**1.81** (11.2)	**1.88** (11.1)	**1.23** (4.31)
PCTREC3		**.96** (15.6)	**.75** (6.03)		**2.14** (58.8)	**1.26** (12.2)
PCTREC4		**6.17** (88.7)	**3.74** (19.5)		**5.86** (46.7)	**3.88** (14.2)
XOSCREEN			**5.17** (49.5)			**4.53** (18.6)
COSCREEN			omit			**1.61** (8.42)
SAMPLE SIZE	727	715	667	894	894	728
-2 Log L	62.89	227.0	364.6	102.4	250.3	165.7

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Asymptotic wald chi-square statistics in parenthesis. Coefficients significant at the 10% level are in bold

The estimated coefficients for SWO promotion to O-5 listed in Table 6.3 are very similar to those listed in the previous table, with the exception of JS5 in columns 2-4. In this

case, JS5 was defined as having the JS5 designator, and the requirement to screen before an administrative board prior to receiving the JS5 designator is reflected in the neutral (vice negative) coefficient for JS5 when modeling promotion for the years 1988-90.

Table 6.4 lists the results of the LOGIT model used to analyze the effect of a JS2 on promotion to Captain for SWO officers. Captain promotion models are identical to those specified for the Commander data set, except for the addition of the PCTREC5 variable and the omission of the XOSCREEN variable. COSCREEN is defined as being selected for Command principal (ship) while appearing before the Commander screening board, and in both time periods was perfectly correlated with promotion and was therefore not included in the model specification.

Table 6.4. Estimated Effect of JS2 on Promotion to O-6 for SWOs

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	-2.58 (1.51)	**-6.62 (4.40)**	**-6.62 (4.40)**	.28 (.033)	**-11.33 (15.82)**	**-11.33 (15.82)**
COMMSRCE	-.358 (2.08)	.38 (1.10)	.38 (1.10)	.28 (2.47)	.28 (1.63)	.28 (1.63)
UGRDTECH	-.354 (1.65)	.23 (.367)	.23 (.367)	.03 (.035)	-.07 (.117)	-.07 (.117)
MARRIED	-.475 (.655)	.58 (.427)	.58 (.427)	.61 (2.01)	.52 (.941)	.52 (.941)
DEP	-.164 (1.73)	.24 (1.89)	.24 (1.89)	-.03 (.169)	-.04 (.130)	-.04 (.130)
GRAD	-.294 (1.65)	.18 (.335)	.18 (.335)	**.29 (2.98)**	.21 (.963)	.21 (.963)
WHITE	.737 (.732)	.80 (.354)	.80 (.354)	-.45 (.604)	-1.12 (2.52)	-1.12 (2.52)
SCHOLAR	-.054 (.046)	.51 (1.69)	.51 (1.69)	.16 (.736)	.17 (.552)	.17 (.552)
AGE	.120 (2.12)	**-.23 (5.11)**	**-.23 (5.11)**	-.02 (.138)	-.01 (.036)	-.01 (.036)
JS2	.319 (1.47)	-.55 (2.10)	-.55 (2.10)	-.30 (1.94)	**-.50 (3.67)**	**-.50 (3.67)**
PCTREC3		**1.84 (14.9)**	**1.84 (14.9)**		**.97 (11.7)**	**.97 (11.7)**
PCTREC4		**1.95 (7.36)**	**1.95 (7.36)**		**4.03 (28.1)**	**4.03 (28.1)**
PCTREC5		**7.89 (21.4)**	**7.89 (21.4)**		**8.21 (14.9)**	**8.21 (14.9)**
COSCREEN			**omit**			**omit**
SAMPLE SIZE	358	250	238	597	468	468
-2 Log L	14.9	88.4	257.9	12.2	99.7	99.7

* Dependent Variable: Promotion to Grade 6 (Captain)

Note: Asymptotic wald chi-square statistics in parenthesis. Coefficients significant at the 10% level are in bold

The lack of significant coefficients in the basic SWO O-6 promotion model, coupled with the low chi-square of 14.9 (significant with p=.0001), suggest a poorly

specified model with poor fit. The inclusion of Fitrep data (column 3) improves model fit significantly. Similar inadequacies are found for the model predicting O-6 promotion in the years 1990-94 (columns 4-5).

Table 6.5 lists the results of the LOGIT model used to analyze the effect of a JS5 on promotion to Captain for SWO officers. COSCREEN was again perfectly correlated with promotion to O-6, and was omitted from the model.

Table 6.5 Estimated Effect of JS5 on Promotion to O-6 for SWOs

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	2.50 (1.50)	**-6.88 (4.99)**	**-6.88 (4.99)**	.19 (.01)	**-11.44 (16.2)**	**-11.44 (16.2)**
COMMSRCE	**.50 (3.97)**	.50 (1.87)	.50 (1.87)	.26 (2.08)	.29 (1.67)	.29 (1.67)
UGRDTECH	.41 (2.12)	.23 (.37)	.23 (.37)	-.001 (.0001)	-.09 (.170)	-.09 (.170)
MARRIED	.33 (.32)	.36 (.16)	.36 (.16)	.55 (1.63)	.42 (.64)	.42 (.64)
DEP	.12 (.91)	.23 (1.75)	.23 (1.75)	-.04 (.20)	-.04 (.15)	-.04 (.15)
GRAD	.23 (1.02)	.22 (.45)	.22 (.45)	**.30 (3.12)**	.19 (.84)	.19 (.84)
WHITE	-.97 (1.30)	.58 (.19)	.58 (.19)	-.46 (.62)	**-1.16 (2.75)**	**-1.16 (2.75)**
SCHOLAR	.02 (.009)	.41 (1.14)	.41 (1.14)	.16 (.74)	.16 (.47)	.16 (.47)
AGE	-.11 (1.92)	**-.21 (4.63)**	**-.21 (4.63)**	-.02 (.10)	-.01 (.01)	-.01 (.01)
JS5	**1.33 (16.7)**	**.72 (3.03)**	**.72 (3.03)**	**.38 (2.96)**	.07 (.08)	.07 (.08)
PCTREC3		**1.79 (14.2)**	**1.79 (14.2)**		**1.02 (13.1)**	**1.02 (13.1)**
PCTREC4		**1.83 (6.35)**	**1.83 (6.35)**		**3.92 (26.7)**	**3.92 (26.7)**
PCTREC5		**8.00 (22.2)**	**8.00 (22.2)**		**8.34 (15.2)**	**8.34 (15.2)**
COSCREEN			**omit**			**omit**
SAMPLE SIZE	358	250	250	597	468	468
-2 log L	32.8	89.5	89.5	13.3	96.1	96.1

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Asymptotic wald chi-square statistics are in parenthesis. Coefficients significant at the 10% level are in bold.

Table 6.5 suffers from the same limitations as the previous table, with one notable exception. The JS5 coefficient was positive and significant in both models used to predict

promotion to O-6 during the years 1988-90. This positive effect can be explained be noting again that individuals screen for the JS5 designator, and this selection process is captured by the JS5 variable.

2. Model Estimates for Submarine, Pilot and NFO Communities

Similar models were specified and run separately for the SUB, PILOT and NFO communities. The results are grouped and summarized in Tables A.1 - A.12 in the appendix to ease reference and comparison. Significant differences existed between and within communities. As discussed previously, the models specified for the aviation communities (PILOTs and NFOs) did not include command screening results, as these boards often occur after the promotion boards, and data entry was often incomplete in the officer master file.

Coefficients for both COMMSRCE and UGRDTECH were positive and significant for O-5 promotion in the submarine community (Tables A.1 - A.2). This is to be expected given the highly technical requirements placed upon the submarine warfare officer. However, the same specification for Submarine officer promotion to O-6 (Tables A.3 - A.4) shows a declining effect of a technical major. This possibly reflects the fact that administrative and management skills are necessary to perform at the O-6 rank and these are more likely to be found in non-technical degree holders. The coefficients for both JS2 and JS5 were insignificant at the 10 percent level for almost all Submarine promotion models (Tables A.1 - A.4), with the exception of a positive and significant effect for JS5 in the basic model for promotion to O-6 (Table A.4, column 4).

Tables A.5 - A.8 summarize the models predicting promotion to O-5 and O-6 for pilots. Unlike the models for submariners, the coefficient for UGRDTECH is negative and significant for pilots appearing before the 1988-90 O-5 promotion boards. (Table A.5, columns 2 and 3). The effect of a JS2 is insignificant in the models predicting promotion to O-5 (Table A.5), but negative and significant in the basic model predicting promotion to O-6 during 1988-90 (Table A.7), suggesting again that individuals receiving a JS2 designator early (in time to appear before the 1988-90 Captain promotion boards) were below-average performers, and were not as likely to be promoted as their non-joint counterparts. The effects of a JS5 on promotion were positive and significant at the 1988-90 O-5 promotion boards (Table A.6) and for *all* O-6 promotion boards (Table A.8), which is again expected given the screening requirements for JS5.

Tables A.9 - A.12 summarize the models predicting promotion to O-5 and O-6 for NFOs. The models predicting promotion to O-5 (Tables A.9 - A.10) show that UGRDTECH is significant and negative in both basic models, and also for the inclusive specification for years 1988-90 (The coefficient is insignificant for the inclusive specification for the years 1990-94, column 4). The coefficient for MARRIED is significant and positive for both basic models. The coefficient for SCHOLAR is positive for the early promotion years, but negative (and significant for the inclusive model) when modeling promotion during 1990-94 (column 4), and younger NFOs were more likely to get promoted to O-5. Lastly, the basic model predicts NFO holders of the JS2 designator were less likely to promote to O-5 during the 1988-90 promotion boards (Table A.9, columns 1 and 2), and holders of the JS5 designator were more likely to promote when

appearing before the same boards (Table A.10, columns 1 and 2). Tables A.11 - A.12 show the results of the model predicting NFO promotion to O-6. NFOs holding the JS2 had a higher likelihood of promotion to O-6 when appearing before the 1990-94 promotion boards (Table A.11, column 4). Both basic models similarly predicted a higher likelihood of promotion to O-6 given the officer holds the JS5 designation (Table A.12, Columns 1 and 3), but the sign of this coefficient goes to negative when using the inclusive model to predict promotion to O-6 (column 4). The low Chi-square suggests the model may not be adequately specified for modeling promotion to Captain.

B. MARGINAL EFFECTS OF A JS2/5 ON PROMOTION

Another approach used to analyze the effect of JS2 or JS5 on promotion is to determine the marginal effect this attribute on the probability of promotion. For example, in order to analyze the marginal effects of a JS2/5 on a SWO's probability of promotion, a "notional person" is developed using the mean values (or median proportions) of the explanatory variables in the model. The likelihood of promotion to Commander (SWO) will serve as an example. Table 6.6 lists the variable means of Surface warfare officers by rank and promotion year groups, for promotion to the ranks of Commander and Captain.

Table 6.6 Variable means (proportions) of SWOs appearing before the Commander and Captain promotion boards, by Rank and Fiscal Years

	COMMANDER			CAPTAIN		
VARIABLE	ALL 1988-94	EARLY 1988-90	LATE 1991-94	ALL 1988-94	EARLY 1988-90	LATE 1991-94
COMMSRCE	.282	.273	.290	.382	.322	.418
UGRDTECH	.490	.467	.509	.316	.239	.363
MARRIED	.871	.874	.869	.935	.940	.931
DEP	1.45	1.46	1.44	1.76	1.76	1.76
GRAD	.410	.397	.422	.586	.588	.585
WHITE	.929	.942	.919	.979	.981	.978
SCHOLAR	.161	.122	.193	.264	.276	.257
AGE@COMM	23.04	22.98	23.08	22.34	22.33	22.35
JS2	.101	.104	.099	.188	.223	.166
JS5	.050	.044	.054	.183	.190	.178
PCTREC3	.641	.553	711	.601	.594	.604
PCTREC4	.913	871	.947	.885	.871	.892
PCTREC5	-	-	-	.958	.935	.971
XOSCREEN	.887	.812	956	-	-	-
COSCREEN	.083	.010	.152	.649	.628	.663
SAMPLE SIZE	1,660	743	917	989	372	617

The coefficients of the independent variables in the estimated logit equations were transformed into marginal effects by setting the explanatory dummy variables equal to zero or one, or to the mean for continuous variables, and solving for the predicted probability. In this manner, the probability of being promoted is established for a reference individual, or "notional person" (base case). In the model for a SWO appearing before the Commander promotion board, the notional person is a white married male with 1.45 children, with a non-technical bachelor's degree with a GPA of below 3.2, and no graduate school degree. This notional person received a commission at age 23.04, did not attend the U.S. Naval Academy, and does not hold a JS2 designator. The individual was a) rated in the top 1 percent and b) recommended for early promotion and c) received an A in Command Desirability on 64 percent of his valid LT FITREPs and 91 percent of his

valid LCDR FITREPs, and screened for XO but not for CO (individuals who screened for CO are also considered as screening for XO).

By changing the value of any single explanatory variable from zero to one or from one to zero (for binary variables), or by a unit or percentage amount (for continuous variables), computing the new probability of being promoted, and taking the difference between the two probabilities, a "delta" for the variable may be obtained. This delta represents the change in the probability of being promoted when that particular explanatory variable is altered from the base case while leaving all other variables fixed at their mean values. Table 6.7 lists the results when using a notional person approach for estimating the marginal effect of each variable on the probability of promotion to Commander.

Table 6.7 Marginal Effects on the Likelihood of Promotion for Changes in the Explanatory Variables (SWO O-5 Promotion Boards)

	FY1988-1994 PROMOTION BOARDS			FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
OVERALL PROBABILITY OF PROMOTION	.600	.590	.733	.578	.540	.712	.551	.568	.784
COMMSRCE	.102	.109	.052	.140	.149	.084	.090	.100	.030
UGRDTECH	-.061	-.040	.019	-.069	-.026	-.002	.070	.036	-.042
MARRIED	-.083	-.057	-.018	-.125	-.064	-.020	-.053	-.055	-.025
DEP	.017	.012	.015	.024	.026	.043	.013	0	-.011
GRAD	.161	.158	.100	.169	1.85	.144	.183	.165	.063
WHITE	.027	.095	.063	.008	.134	.153	.027	.099	.023
SCHOLAR	-.009	-.032	.038	.125	.165	.124	-.103	-.111	-.008
AGE	-.040	-.029	-.022	-.023	-.013	-.005	-.046	-.033	-.025
JS2	**-.064**	**-.048**	**-.019**	**-.247**	**-.210**	**-.021**	**.112**	**.090**	**.058**
PCTREC3		-.020	-.010		-.012	-.007		-.037	-.014
PCTREC4		-.121	-.065		-1.22	-.064		-.131	-.067
XOSCREEN			-.711			-.698			-.744
COSCREEN			.177			omit			.141
N	1,621	1,609	1,395	727	715	667	894	894	728

Note: Based on LOGIT model in Table 6.2

Columns 2 through 4 of Table 6.7 shows the marginal effect of a change in a particular independent variable, holding all other variables constant, for all SWOs appearing before the 1988-1994 Commander promotion boards. Marginal effects for the four continuous variables (DEP, AGE, PCTREC3 and PCTREC4), were computed by *increasing* the variable mean 1 unit for DEP and AGE (e.g. from 1.45 to 2.45 for DEP), and *decreasing* the mean 10 percent for PCTREC3 and PCTREC4 (e.g. from .641 to .58 for PCTREC3). As mentioned in the previous chapter, separate models were specified for officers appearing before the FY1988-1990 and 1991-1994 promotion boards. Columns 5 through 7 show the marginal effects for SWOs appearing before the 1988-1990 promotion

boards, while columns 8 through 10 show the marginal effects for SWOs appearing before the 1991-1994 promotion boards. In the last case, the notional person has a technical undergraduate degree.

Column 2 in the above table shows that for a notional person appearing before the FY1988-1994 promotion boards, excluding FITREP performance and XO/CO screening results, the probability of promotion is .600. An officer with the same characteristics, but holding a JS2 designator, has a 6.4 percentage point lower probability of promotion to Commander. If fitness report information is included in the model, an officer holding a JS2 has a 4.8 percentage point lower promotion probability (column 3). Lastly, if both fitness report information and screening results are added to the original model, an officer holding the JS2 is still 2.5 points less likely to get promoted than an officer without the JS2, holding all other variables constant (column 4).

Although holding a JS2 designator appeared to decrease an officer's likelihood of promotion to Commander during the years 1988-1994, there is value in separately examining the effect of holding a JS2 designator across the early promotion year groups, (FY1988-90) vs. the later years (1991-94). In the early years GNA was undergoing implementation and front-running officers had not yet begun to actively search out joint duty assignments.

For officers appearing before the early promotion boards, the basic promotion model predicts a 24.7 point lower promotion probability for officers holding the JS2 designator (column 5). The addition of fitness report information in the model results in a 21.0 point lower probability of promotion for JS2s (column 6), and including XO/CO

screening in the model reduces a JS2 officer's likelihood of promotion to Commander by only 2.2 percentage points (column 7).

Conversely, the basic model predicts an officer appearing before the later Commander promotion boards will have an 11.2 point increase in the likelihood of promotion if he holds the JS2 designation (column 8). Addition of FITREP and XO/CO screening results lowers the marginal effect of the JS2 designator to 9.0 and 5.3 points, respectively (columns 9 and 10), but the effect is still positive.

Subsequent models were specified and estimated for SWOs holding the JS5 designator and appearing before the Commander promotion boards, and SWOs holding either the JS2 or JS5 designator and appearing before the Captain Promotion boards, as well as a similar set of models for each warfare community (see appendix for the results for submariners, pilots, and NFOs). Those model results for the JS2/5 variables are summarized for all communities in tables 6.8 - 6.11.

Table 6.8 Marginal Effects of Joint Designator on O-5 and O-6 Promotion for SWOs *

		Commander		Captain	
		Early	**Late**	**Early**	**Late**
JS2	**basic model**	**-.247**	**.112**	.080	.077
	w/ fitrep	**-.210**	.090	-.137	**.124**
JS5	**basic model**	.043	**.334**	**.304**	**.093**
	w/fitrep	-.012	**.335**	**.172**	.020

* Figures in bold are significant at the 10 percent level
Based on Logit models in Tables 6.2 - 6.5

Table 6.9 Marginal Effects of Joint Designator on O-5 and O-6 Promotion for SUB *

		Commander		Captain	
		Early	**Late**	**Early**	**Late**
JS2	**basic model**	-.177	.081	-.091	-.129
	w/ fitrep	-.101	.106	-.008	-.028
JS5	**basic model**	.060	.149	.145	**.162**
	w/fitrep	-.038	.097	0	.119

* Figures in bold are significant at the 10 percent level
Based on LOGIT models in Tables A.1 - A.4

Table 6.10 Marginal Effects of Joint Designator on O-5 and O-6 Promotion for Pilots *

		Commander		Captain	
		Early	**Late**	**Early**	**Late**
JS2	**basic model**	.041	.023	**-.227**	-.081
	w/ fitrep	-.003	.050	-.135	-.100
JS5	**basic model**	**.299**	.199	**.289**	**.156**
	w/fitrep	.185	.177	**.375**	**.183**

* Figures in bold are significant at the 10 percent level
Based on Logit models in Tables A.5-A.8

Table 6.11 Marginal Effects of Joint Designator on O-5 and O-6 Promotion for NFOs *

		Commander		Captain	
		Early	**Late**	**Early**	**Late**
JS2	**basic model**	**-.198**	-.085	-.017	.075
	w/ fitrep	**-.230**	-.088	.141	**.149**
JS5	**basic model**	**.331**	.097	**.341**	**.286**
	w/fitrep	**.269**	.066	.146	**.212**

* Figures in bold are significant at the 10 percent level
Based on Logit models in Tables A.9 - A.12

It should be re-emphasized that the above marginal effects are for a person possessing the specific mean attributes listed in Table 6.7. As such, they are useful for general comparisons, and identifying general trends, but because the mean traits differ among and

across communities, they should not be used to draw specific quantitative differences between communities.

When comparing the marginal effects between communities it is evident that an officer possessing the JS2 generally has a lower probability of promotion when appearing before the 1988-90 Commander promotion boards, and a higher probability of promotion when appearing before the 1990-94 promotion boards, regardless of community. The only notable exception is for NFOs, where the marginal effect of a JS2 on promotion is negative, yet not significant, for officers appearing before the 1990-94 Commander promotion boards.

The effects of a JS2 on promotion to Captain are mixed across communities, although significant effects support the hypothesis that possession of a JS2 results in a decreased likelihood of promotion for 1988-90, and an increased likelihood of promotion for the 1990-94 Captain promotion boards. The marginal effect of a JS5 on promotion to Commander and Captain is generally positive for all promotion years, 1988-94 inclusive.

VII. CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the conclusions drawn from the statistical and empirical analysis presented in this thesis. The chapter also proposes recommendations for further research into the effects of joint duty on officer performance.

A. CONCLUSIONS

1. Statistical Analysis

The results from the statistical analysis conducted in Chapter V support the hypothesis that during the time period 1988-1994 the Navy has succeeded in sending an increasing percentage of high quality officers to joint billets. Officers receiving the JS2 designator prior to 1 October 1989 were characterized by significantly lower levels of performance, as measured by LCDR fitness reports, than their non-joint counterparts appearing before the 1988-90 Commander promotion boards. Officers receiving the JS2 after 1 October 1989 were characterized by significantly higher levels of performance, as measured by LT and LCDR fitness reports, than their counterparts appearing before the 1991-94 Commander promotion boards. Officers receiving the JS5 designator had higher levels of performance, as measured by fitness reports, than their counterparts, *regardless* of the date of their JS5 designator. This is to be expected given the screening process necessary prior to awarding the JS5 designator.

When examining the officers appearing before the O-6 promotion boards, officers receiving the JS2 designator prior to 1 October 1989 had significantly lower performance on their Commander fitness reports than their non-joint counterparts appearing before the

1988-90 Captain promotion boards. Interestingly, JS2-designated officers had significantly higher GPAs than their counterparts, regardless of when the JS2 was received. Officers receiving the JS5 designator also had higher levels of performance, as measured by LCDR and CDR fitness reports, than their counterparts, regardless of the date of the AQD. Lastly, officers receiving the JS5 after 1 October 1989 were also more likely to have a higher GPA and were more likely to have a graduate degree then their non-JS5 counterparts.

2. Summary of Empirical Results

There appears to be some significant difference on the effect of a JS2/5 designator on an officer's likelihood of promotion across the different warfare communities. Table 7.1 summarizes the JS2 coefficients from the estimated LOGIT models predicting promotion to Commander during 1988-1994.

Table 7.1 Estimated Effect of JS2 on Promotion to O-5

		SWO	SUB	PILOT	NFO
EARLY (1988-90)	Basic Model	**-1.01**	-.74	.17	**-.80**
	Full Model (inc. fitrep)	**-.87**	-.52	-.01	**-.93**
LATE (1991-94)	Basic Model	**.47**	.42	.11	-.33
	Full Model (inc. fitrep)	.38	.68	.29	-.35

Note: Coefficients significant at the 10% level are in bold

The coefficient of the JS2 variable is *negative* in seven of the eight models specified to determine the effect of a JS2 on promotion to Commander during the *early* promotion years of 1988-90. Of these seven models, the negative coefficient for JS2 is significant at the 10 percent level in four (both models for SWOs and both models for NFOs). The lone

exception, the basic model (excluding fitrep data) for pilots, is positive, but insignificant. Similarly, the JS2 coefficient is *positive* for six of the eight models specified to predict the effect of a JS2 on promotion to Commander during the *later* promotion years (1991-94). However, the JS2 variable is statistically significant in only one these six models, the basic specification for SWOs. The JS2 coefficient is negative (but insignificant) for the two models predicting promotion for NFOs. These results support the hypothesis that officers receiving the JS2 prior to 1 October 1989 have a significantly lower probability of promotion, and officers receiving the JS2 after 1 October 1989 have a significantly higher likelihood of promotion than their non-JS2 counterparts.

Table 7.2 summarizes the JS5 coefficients for the LOGIT models predicting promotion to Commander during 1988-1994.

Table 7.2 Estimated Effect of JS5 on Promotion to O-5

		SWO	SUB	PILOT	NFO
EARLY (1988-90)	Basic Model	.17	.28	**1.93**	**1.90**
	Full Model (inc. fitrep)	-.04	-.21	1.10	**1.41**
LATE (1991-94)	Basic Model	**1.81**	.89	1.37	.39
	Full Model (inc. fitrep)	**1.88**	.62	1.41	.26

Note: Coefficients significant at the 10% level are in bold

The effect of a JS5 on promotion to Commander in the 1988-90 period was positive in six of eight models. Of these six models, this effect was significant at the 10 percent level for three: the basic pilot model, and the basic and expanded NFO model. The JS5 coefficient is negative (but insignificant) for the expanded model for both the SWO and SUB samples.

The effect of JS5 on promotion to Commander during 1991-94 is positive in all eight models, though significant in only two: the basic and expanded SWO promotion model. These results suggest SWOs receiving the JS5 designator and appearing before the 1991-94 promotion board and NFOs receiving the JS5 and appearing before the 1988-90 promotion boards have a greater likelihood of promotion to Commander.

Table 7.3 summarizes the JS2 coefficients for the LOGIT models used to predict promotion to Captain during 1988-1994.

Table 7.3 Estimated Effect of JS2 on Promotion to O-6

		SWO	SUB	PILOT	NFO
EARLY (1988-90)	Basic Model	.319	-.49	**-.92**	-.07
	Full Model (inc. fitrep)	-.55	-3.72	-.54	.57
LATE (1991-94)	Basic Model	-.30	-.53	-.32	.30
	Full Model (inc. fitrep)	**-.50**	-.11	-.40	**.66**

Note: Coefficients significant at the 10% level are in bold

The coefficient of the JS2 variable is *negative* in six of the eight O-6 promotion models during the *early* promotion years of 1988-90. Of these six models, the negative coefficient for JS2 is significant in only the basic Pilot model. The coefficient for JS2 is positive in both the basic SWO and expanded NFO model, though significant in neither. The JS2 coefficient is *negative* in six of the eight models specified to predict the effect of a JS2 on promotion to Captain during the *later* promotion years (1991-94). Only one of the six is significant (the expanded model for SWO). Of the two positive coefficients, one (the expanded model for NFOs) is significant. These results indicate there are differences

across communities when comparing the effect of a JS2 on promotion to Captain; however, the effect is largely insignificant.

Table 7.4 summarizes the JS5 coefficients for the LOGIT models predicting promotion to Captain during 1988-1994, broken down by the early and later promotion periods.

Table 7.4 Estimated Effect of JS5 on Promotion to O-6

		SWO	SUB	PILOT	NFO
EARLY (1988-90)	Basic Model	**1.33**	1.17	**1.52**	**1.42**
	Full Model (inc. fitrep)	**.72**	14.97	**1.95**	.59
LATE (1991-94)	Basic Model	**.38**	**.79**	**.66**	**1.17**
	Full Model (inc. fitrep)	.07	.52	**.79**	**-.91**

Note: Coefficients significant at the 10% level are in bold

The effects of a JS5 on 1988-90 promotion to Captain is positive in all eight models, and significant for five. The effect of JS5 on 1991-94 promotion to Captain is positive in seven of eight models, and significant in five. Only for the expanded model for NFO is the JS5 coefficient negative and significant. These results indicate that a SWO receiving the JS5 designator and appearing before the 1988-90 Captain promotion boards and pilots receiving the JS5 and appearing before any promotion board have an increased likelihood of promotion to Captain than their non-JS5 counterparts.

B. RECOMMENDATIONS

This thesis marks the first attempt to study the effects of joint experience on a Naval Officer's career, and provides a broad overview of these effects across various warfare communities. Joint duty is a fairly complicated issue, and this thesis is but a first

step in understanding the ramifications following an officer's decision to "go joint." Further in-depth analyses into any specific community should yield additional information which could assist both community managers and individual officers alike. Defining what constitutes joint duty is a problem in and of itself. Researches may consider any form or combination of joint duty experience, education, or both. Future research should include more detailed model specification, particularly when considering promotion to the more senior grades (O-5 and O-6). Follow-on researchers would be advised to consider service schools, competitive billet assignments, and specific types of joint duty. For example, an analysis needs to be made of the effect of where the JS2 was earned as well as the effect of just possession of the JS2.

APPENDIX: LOGIT RESULTS

Table A.1 Estimated Effect of JS2 on Promotion to O-5 for Submariners

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	2.46	-2.18	-2.07	3.35	-1.54	-3.00
COMMSRCE	**1.09**	**.82**	**.81**	**.80**	**.58**	.29
UGRDTECH	**.95**	**.97**	**1.08**	**.73**	**.72**	**1.03**
MARRIED	.88	.11	.14	.49	.57	.49
DEP	-.01	.07	.08	.11	.08	-.09
GRAD	.41	.42	.46	.28	.20	.31
WHITE	-.64	-.49	-.46	NI	NI	NI
SCHOLAR	**.93**	**.93**	**.98**	-.17	-.30	-.01
AGE	**-.12**	**-.17**	**-.18**	**-.17**	**-.21**	**-.25**
JS2	-.74	-.52	-.49	.42	.68	.97
PCTREC3		**1.49**	**1.43**		**1.44**	**1.04**
PCTREC4		**6.68**	**6.35**		**5.28**	**3.82**
XOSCREEN						**4.36**
COSCREEN			.26			**1.33**
SAMPLE SIZE	305	299	297	423	423	418
-2 Log L	43.6	99.3	96.94	39.7	84.6	174.3

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.2 Estimated Effect of JS5 on Promotion to O-5 for Submariners

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	2.26	-2.31	-2.18	3.45	-1.32	-2.54
COMMSRCE	**1.09**	**.81**	**.80**	**.78**	**.56**	.28
UGRDTECH	**1.08**	**1.02**	**1.13**	**.71**	**.66**	**.91**
MARRIED	.81	.09	.12	.49	.56	.51
DEP	.01	.09	.10	.12	.10	-.07
GRAD	.35	.38	.42	.29	.20	.30
WHITE	-.40	-.46	-.43	NI	NI	NI
SCHOLAR	**.93**	**.93**	**.98**	-.18	-.32	-.03
AGE	**-.13**	**-.18**	**-.18**	**-.17**	**-.22**	**-.25**
JS5	.28	-.21	-.19	.89	.62	-.11
PCTREC3		**1.53**	**1.47**		**1.43**	**1.05**
PCTREC4		**6.69**	**6.35**		**5.20**	**3.49**
XOSCREEN						**4.29**
COSCREEN			.28			**1.30**
SAMPLE SIZE	305	299	297	423	423	418
-2 Log L	41.9	98.7	96.34	40.5	83.9	172.1

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.3 Estimated Effect of JS2 on Promotion to O-6 for Submariners

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	-3.85	-42.87	-42.87	1.13	-9.27	-9.27
COMMSRCE	**2.00**	**6.92**	**6.92**	.36	**.68**	**.68**
UGRDTECH	**1.17**	3.60	3.60	-.29	-.70	-.70
MARRIED	.51	4.16	4.16	1.60	NI	NI
DEP	-.20	-.68	-.68	.17	**-31**	**.31**
GRAD	.41	**2.90**	**2.90**	.47	.18	.18
WHITE	NI	NI	**NI**	NI	NI	NI
SCHOLAR	-.62	**-5.20**	**-5.20**	.12	-.19	-.19
AGE	.13	-.24	-.24	-.11	-.08	-.08
JS2	-.49	-3.72	-3.72	-.53	-.11	-.11
PCTREC3		**3.76**	**3.76**		.58	.58
PCTREC4		**17.65**	**17.65**		**2.39**	**2.39**
PCTREC5		**32.44**	**32.44**		**9.22**	**9.22**
COSCREEN			NI			NI
SAMPLE SIZE	117	74	74	255	183	183
-2 Log L	13.4	57.9	57.9	19.6	34.1	34.1

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.4 Estimated Effect of JS5 on Promotion to O-6 for Submariners

	FY1988-1990 PROMOTION BOARDS			FY1991-1994 PROMOTION BOARDS		
INTERCEPT*	-3.97	-90.21	-90.21	1.17	-8.66	-8.66
COMMSRCE	**2.20**	21.58	21.58	.38	**.67**	**.67**
UGRDTECH	**1.33**	16.18	16.18	-.28	-.68	-.68
MARRIED	.36	-1.78	-1.78	1.61	NI	NI
DEP	-.24	-2.25	-2.25	.19	**.32**	**.32**
GRAD	.62	15.0	15.0	.48	.18	.18
WHITE	NI	NI	NI	NI	NI	NI
SCHOLAR	-.65	-18.1	-18.1	.13	-.16	-.16
AGE	.13	-1.62	-1.62	-.12	-.10	-.10
JS5	1.17	14.97	14.97	**.79**	.52	.52
PCTREC3		18.97	18.97		.59	.59
PCTREC4		**24.05**	**24.05**		**2.29**	**2.29**
PCTREC5		103.1	103.1		**8.83**	**8.83**
COSCREEN			NI			NI
SAMPLE SIZE	117	74	74	255	183	183
-2 log L	14.8	60.1	60.1	22.0	35.3	35.3

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold.
NI = Not Included

Table A.5 Estimated Effect of JS2 on Promotion to O-5 for PILOTS

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	1.86	-1.12	1.0	-2.45
COMMSRCE	**.41**	.11	.14	.09
UGRDTECH	**-.35**	**-.32**	-.20	-.07
MARRIED	.29	.08	.27	.42
DEP	.06	.08	**-.16**	-.14
GRAD	.18	.28	.15	.15
WHITE	**1.03**	.53	.54	.49
SCHOLAR	.16	-.03	.27	.14
AGE	**-.10**	**-.09**	-.02	-.09
JS2	.17	-.01	.11	.29
PCTREC3		**1.82**		**2.50**
PCTREC4		**3.39**		**3.58**
SAMPLE SIZE	793	783	763	763
-2 Log L	27.5	174.8	9.87	97.9

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold

Table A.6 Estimated Effect of JS5 on Promotion to O-5 for PILOTS

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	1.94	-1.03	.90	-2.58
COMMSRCE	**.43**	.11	.13	.09
UGRDTECH	**-.35**	**-.33**	-.21	-.08
MARRIED	.25	.07	.31	.45
DEP	.07	.08	**-.15**	-.13
GRAD	.18	.28	.15	.15
WHITE	**.98**	.52	.53	.48
SCHOLAR	.15	-.03	.28	.15
AGE	**-.10**	**-.10**	-.01	-.09
JS5	**1.93**	1.10	1.37	1.41
PCTREC3		**1.79**		**2.49**
PCTREC4		**3.36**		**3.60**
SAMPLE SIZE	793	783	763	763
-2 Log L	33.1	176.3	12.2	99.7

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold

Table A.7 Estimated Effect of JS2 on Promotion to O-6 for PILOTS

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	5.27	-11.5	-1.25	-10.53
COMMSRCE	-.27	-.34	-.19	**-.61**
UGRDTECH	-.16	-.10	.10	.32
MARRIED	.72	1.03	**1.28**	**1.57**
DEP	-.03	-.19	.06	.09
GRAD	-.17	-.15	.14	-.12
WHITE	NI	NI	.62	.25
SCHOLAR	-.28	.60	-.12	-.24
AGE	**-.24**	-.18	-.02	-.15
JS2	**-.92**	-.54	-.32	-.40
PCTREC3		**1.0**		**1.83**
PCTREC4		**2.34**		**3.37**
PCTREC5		**13.6**		**8.87**
SAMPLE SIZE	513	314	702	501
-2 Log L	18.4	124.9	18.1	155.3

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.8 Estimated Effect of JS5 on Promotion to O-6 for PILOTS

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	4.48	-12.6	-1.22	-10.03
COMMSRCE	-.33	-.53	-.19	**-.61**
UGRDTECH	-.14	-.07	.13	**.36**
MARRIED	.62	.93	**1.32**	**1.61**
DEP	-.01	-.19	.04	.07
GRAD	-.18	-.23	.10	-.17
WHITE	NI	NI	.52	.11
SCHOLAR	-.19	**.82**	-.20	-.32
AGE	**-.21**	-.14	-.02	-.15
JS5	**1.52**	**1.95**	**.66**	**.79**
PCTREC3		**1.26**		**1.83**
PCTREC4		**2.49**		**3.25**
PCTREC5		**13.73**		**8.53**
SAMPLE SIZE	513	314	702	501
-2 Log L	29.2	136.2	24.8	160.2

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.9 Estimated Effect of JS2 on Promotion to O-5 for NFOs

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	4.51	-.01	3.07	-4.43
COMMSRCE	.26	.15	.26	-.003
UGRDTECH	**-.53**	**-.61**	**-.30**	-.25
MARRIED	**.57**	.51	**.63**	.47
DEP	.02	.02	-.13	-.09
GRAD	.15	.23	.13	**.33**
WHITE	.07	-.83	-.41	**-1.65**
SCHOLAR	**.88**	**.63**	-.10	**-.51**
AGE	**-.20**	**-.12**	**-.11**	**-.08**
JS2	**-.80**	**-.93**	-.33	-.35
PCTREC3		**2.11**		**2.30**
PCTREC4		**3.28**		**6.89**
SAMPLE SIZE	602	586	657	657
-2 Log L	71.34	207.5	23.6	162.0

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold

Table A.10 Estimated Effect of JS5 on Promotion to O-5 for NFOs

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	4.32	-.22	3.04	-4.43
COMMSRCE	.34	.25	.27	.007
UGRDTECH	**-.49**	**-.58**	**-.29**	-.24
MARRIED	**.66**	.56	**.64**	.47
DEP	.02	.03	-.12	-.08
GRAD	.13	.21	.12	**.32**
WHITE	.12	-.77	-.40	**-1.67**
SCHOLAR	**.87**	**.66**	-.08	**-.49**
AGE	**-.20**	**-.12**	**-.11**	**-.08**
JS5	**1.90**	**1.41**	.39	.26
PCTREC3		**2.0**		**2.28**
PCTREC4		**3.32**		**6.92**
SAMPLE SIZE	602	586	657	657
-2 Log L	70.2	201.82	23.6	161.5

* Dependent Variable: Promotion to Grade 5 (Commander)
Note: Coefficients significant at the 10% level are in bold

Table A.11 Estimated Effect of JS2 on Promotion to O-6 for NFOs

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	.37	-10.82	.03	-9.44
COMMSRCE	-.35	.05	-.34	-.44
UGRDTECH	-.29	-.34	-.05	.10
MARRIED	-.33	-.31	1.15	1.20
DEP	.18	.14	.01	-.03
GRAD	.06	-.34	.01	-.03
WHITE	NI	NI	1.49	NI
SCHOLAR	-.12	-.25	-.02	-.36
AGE	-.04	-.05	**-.14**	**-.17**
JDUTYA (JS2)	-.07	.57	.30	**.66**
PCTREC3		**1.84**		**1.60**
PCTREC4		**3.95**		**1.38**
PCTREC5		**8.41**		**9.80**
SAMPLE SIZE	223	146	369	265
-2 Log L	2.79	66.27	10.7	55.3

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

Table A.12 Estimated Effect of JS5 on Promotion to O-6 for NFOs

	FY1988-1990 PROMOTION BOARDS		FY1991-1994 PROMOTION BOARDS	
INTERCEPT*	.23	-10.65	-.06	-9.35
COMMSRCE	-.29	.04	-.33	-.42
UGRDTECH	-.28	-.30	-.08	.03
MARRIED	-.34	-.28	1.32	1.26
DEP	.21	.16	.02	-.01
GRAD	.03	-.35	.01	-.04
WHITE	NI	NI	1.78	NI
SCHOLAR	-.08	-.12	.01	-.33
AGE	-.04	-.04	**-.16**	**-.16**
JS5	**1.42**	.59	**1.17**	**-.91**
PCTREC3		**1.83**		**1.60**
PCTREC4		**3.86**		**1.26**
PCTREC5		**8.16**		**9.61**
SAMPLE SIZE	223	146	369	265
-2 Log L	10.27	66.5	23.6	57.6

* Dependent Variable: Promotion to Grade 6 (Captain)
Note: Coefficients significant at the 10% level are in bold
NI = Not Included

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