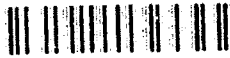
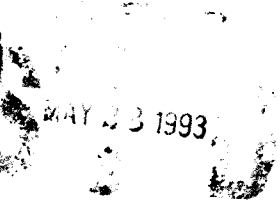


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NAVAL POSTGRADUATE SCHOOL  
Monterey, California



**THESIS**

AN ANALYSIS OF NAVY DIRECT APPOINTMENT  
PHYSICIAN RECRUITMENT

by

Kelly A. Vandever

March 1993

Thesis Principle Advisor:  
Thesis Associate Advisor:

Stephen L. Mehay  
Carol A. Mitchell

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**An Analysis of Navy Direct Appointment Physician Recruitment**

by

Kelly A. Vandever  
Lieutenant, United States Navy  
B.A., Iowa State University, 1985

Submitted in partial fulfillment  
of the requirements for the degree of

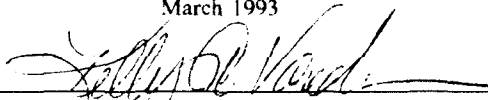
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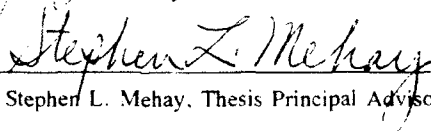
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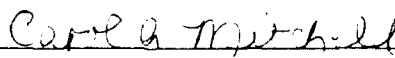


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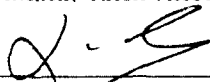
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**ABSTRACT**

The Navy recruits a portion of its physician manpower directly from the civilian work force and from medical residency programs. The Navy has had difficulty recruiting these doctors, called direct appointment physicians, for the past 13 years. This study analyzes some of the pecuniary and nonpecuniary aspects of physician recruitment in an effort to improve the recruitment process. A regression model was estimated to establish a baseline projecting model for physician supply. The results support the hypothesis that, if the pay gap between military and civilian physicians narrows or if the number of recruiters increases, the number of direct appointment physicians accessed will increase, all else constant. However, the changes necessary to increase the number of physicians recruited are substantial. A survey was conducted to ascertain what nonpecuniary factors were important to direct appointment physicians. Only one factor, patriotism, was indicated by a majority of survey respondents as a reason for joining the Navy, and that was mentioned by only 51.9 percent of the respondents. The thesis recommends that additional data be collected to estimate a more robust regression model and that the survey of all Navy direct appointment physicians be redesigned.

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## I. INTRODUCTION

The ability to recruit already qualified physicians, particularly specialists, has to be considered one of the more difficult, if not the most difficult recruiting program. (Lerroy, et. al., 1989)

Each year the Navy recruits a small portion of its total physician manpower directly from the civilian work force as well as from medical residency programs. These doctors, called direct appointment physicians, are attractive to the service because of their relatively lower cost when compared to recruiting physicians from other sources.<sup>1</sup> The Navy Recruiting Command (NAVCRUITCOM) and the Bureau of Medicine and Surgery (BUMED) have been concerned about the recruitment of direct appointment physicians because for several years the Navy has not been able to recruit the numbers and types of these doctors desired. This study will examine the recruitment of direct appointment physicians in an effort to identify potential problems in their recruitment and to suggest possible solutions.

---

<sup>1</sup>The other sources of military physicians are the Armed Forces Health Professions Scholarship Program and the School of Medicine at the Uniformed Services University of Health Sciences. The cost per physician is higher through these sources because the programs pay for the physician's medical education.

#### **A. RESEARCH OBJECTIVES**

This thesis has several research objectives. Among these are the following:

1. To examine the supply of and demand for Navy direct appointment physicians;
2. To examine personal background information of physicians brought in via the direct appointment program;
3. To specify and estimate a multivariate model to predict the effectiveness of the various policy options available to the Navy in the recruitment of physicians;
4. To survey direct appointment physicians about their reasons for joining the Navy; and
5. To make sound recommendations for policy changes if indicated by the data.

#### **B. RESEARCH QUESTIONS**

This study will attempt to answer the following questions:

1. What are the current conditions in the market for Navy direct appointment physicians and what will future conditions be?
2. How effective are the various recruiting tools (such as medical recruiters, monetary incentives and advertising campaigns)?

3. What is the elasticity of physician supply with respect to changes in these recruitment tools and incentive programs?

4. What program levels and resources are necessary to meet physician recruitment goals?

5. What are the primary reasons direct appointment physicians join the Navy? In light of the survey results, are changes needed to improve recruiting methods?

6. Are any changes to current policies indicated by the information generated in this thesis?

## II. BACKGROUND, LITERATURE REVIEW, AND ECONOMIC THEORY

### A. BACKGROUND

Since the end of the draft in 1973, all branches of the Armed Services have had difficulty recruiting and retaining the numbers and types of physicians needed (Bureau of Medicine and Surgery, 1991). Several factors besides the end of the draft reduced the numbers of volunteer physicians. These factors include the strong anti-military sentiment following Vietnam, the shortages of physicians in the private sector and the inferior pay offered to military physicians as compared to their civilian counterparts (Bureau of Medicine and Surgery, 1991). Because of these negative influences on recruitment, the Armed Forces Health Professions Scholarship Program (AFHPSP) and the School of Medicine at the Uniformed Services University of Health Sciences (USUHS) were established to provide medical training in exchange for obligated military service (Bureau of Medicine and Surgery, 1991). The Navy continued to recruit direct appointment physicians, but the majority of physicians were accessed through the AFHPSP and USUHS programs.

In the 1980's, although public support of the military increased and military physicians' salaries improved, direct

appointment physicians remained difficult to recruit. Indeed, as Table 1 shows, the Navy has not met its recruiting goals for direct appointment physicians for the past eight years, and it has met its goal only twice in the last 13 years (in 1981 and 1984). The focus of this study is to review the recruitment of direct appointment physicians in order to improve future recruitment.

**Table 1: DIRECT APPOINTMENT GOALS AND ATTAINMENT FOR FISCAL YEARS 1980-1992**

Fiscal Year	Goal	Attainment	Shortage or Surplus (+ or -)	Percent of Goal Achieved
80	234	180	-54	76.92
81	75	106	+31	141.33
82	146	136	-10	93.15
83	204	167	-37	81.86
84	92	100	+8	108.70
85	53	43	-10	81.13
86	23	21	-2	91.30
87	139	19	-120	13.67
88	150	84	-66	56.00
89	241	120	-121	49.79
90	189	118	-71	62.43
91	151	68	-83	45.03
92	99	51	-48	51.52

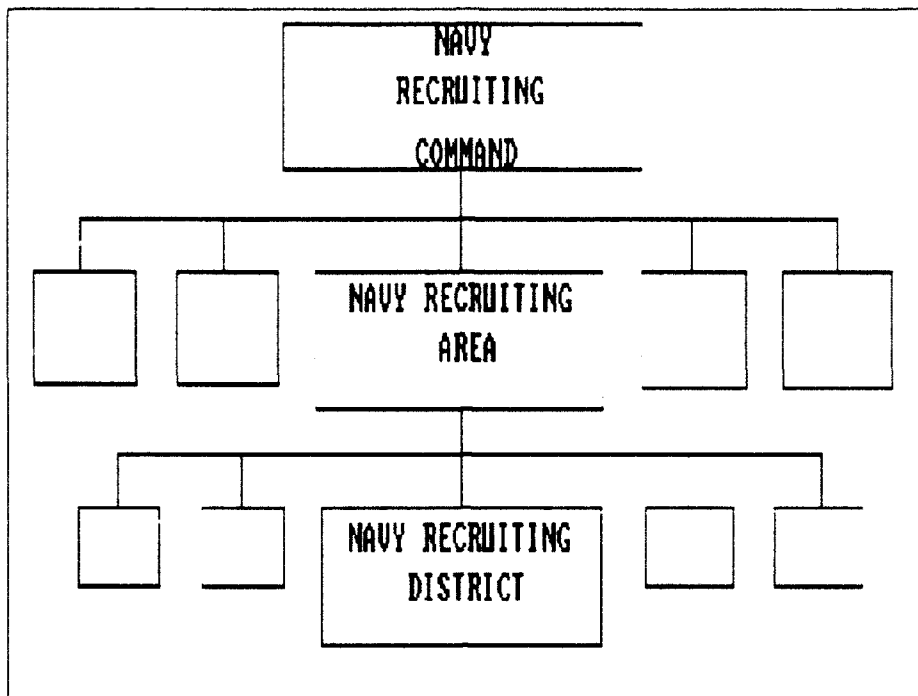
Source: Navy Recruiting Command

## B. RECRUITING NAVY PHYSICIANS

Figure 1 displays the structure of the Navy Recruiting Command. Individual Navy recruiters are assigned to Navy recruiting districts (NRD's or districts) throughout the country. The NRD's report to Navy recruiting areas (NRA's or areas), which report to the Navy Recruiting Command. Table 2 shows the organization of NRA's and NRD's as of October 1992. Over the years one NRA was absorbed by another area and several NRD's have been absorbed by other districts in an effort to consolidate and streamline Navy recruiting (see Appendix A).

The Bureau of Naval Personnel (BUPERS) assigns direct appointment physician recruitment goals to the Navy Recruiting Command (NAVCRUITCOM). The Navy Recruiting Command then uses a medical goaling model to assign goals to the five areas. Each area's share of the total physician goal is determined by the goaling model as a function of their share of the total number of medical recruiters, their share of the physician supply market and their share of past years' attainment totals. Once assigned goals, the areas decide how to distribute their goals among their recruiting districts.

Each area is assigned medical recruiters who recruit for all the medical communities, including physicians. Most of these medical recruiters are either Navy nurses or enlisted



**Figure 1:** Navy Recruiting Command Organizational Structure

hospital corpsmen. A few are medical service corps officers.<sup>2</sup> Beginning in 1991, some general officer recruiters were also designated to recruit physicians.

Direct appointment physicians occasionally are "recalled" from the Navy reserve. They may be involuntarily recalled, such as when the Navy exercises its option to recall physicians to active duty due to specialty shortages. But most are voluntary recalls. Typically, these physicians were contacted by recruiters in their reserve units and asked if

<sup>2</sup> Medical Service Corps officers are either in Health Care Administration or Health Care Science. See Bureau of Medicine and Surgery (1991) for more information.

Table 2: NAVY RECRUITING AREAS AND DISTRICTS AS OF OCTOBER 1992

Area	Navy Recruiting District	NRD Number
1	Boston	102
	Buffalo	103
	New York	104
	Philadelphia	119
	Pittsburgh	120
3	Montgomery	310
	Jacksonville	312
	Atlanta	313
	Nashville	314
	Raleigh	315
	Richmond	316
	Miami	348
5	Cleveland	517
	Columbus	518
	Chicago	521
	Detroit	522
	Minneapolis	528
	Omaha	529
	Indianapolis	542
	Milwaukee	559
7	St. Louis	724
	Kansas City	727
	Dallas	731
	Houston	732
	Little Rock	733
	New Orleans	734
	San Antonio	746
	Memphis	747
8	Denver	825
	Albuquerque	830
	Los Angeles	836
	Portland	837
	San Francisco	838
	Seattle	839
	San Diego	840



they were interested in returning to active duty. Physicians in the Navy reserve are frequently more receptive to joining than civilian physicians because they are aware of the nonpecuniary aspects of both Navy and civilian employment and have better information on which to weigh the decision of practicing medicine in the two environments. However, starting in Fiscal Year 1993, the reserve units themselves vice recruiters will be recruiting recall physicians.

The Navy Recruiting Command's primary way of reaching direct appointment physicians is via advertising. Navy advertising for physicians has generally taken two forms-- print advertisements in professional magazines and direct mailings to physicians. Both the print ads and the direct mailings include a phone number where physicians can get more information about the Navy. When physicians call the number, they are referred to a recruiter in their area.

## **C. LITERATURE REVIEW AND ECONOMIC THEORY**

### **1. Regression Analysis**

Suppose the number of physicians recruited by the Navy each year could be better predicted if a comparison of civilian and military physician salaries was conducted and if the amount of money the Navy spent on advertising for physicians was known. One method for testing this theory is regression analysis. Regression analysis is a statistical technique involving a regression equation with one dependent

A1

variable and one or more independent variables. A regression equation is used to determine if changes in a particular dependent variable can be explained as a function of several independent variables that represent causal factors. The regression equation will reveal if the independent variables are better predictors of the dependent variable than just knowing the average value of the dependent variable. In this example, the dependent variable equals the number of physicians recruited each year and the independent variables are average civilian physicians' annual income, average military physicians' annual income and advertising dollars spent per year. The next step is to collect data for several years for Navy recruiting areas or districts and use this data to estimate the regression model. The regression equation will then indicate which independent variables are statistically significant predictors of the number of physicians the Navy is able to recruit. Of course, there are several other considerations when using regression analysis. There must be an adequate sample size and no multicollinearity in the variables, among other things. Goldberg (1982) addresses the econometric issues associated with specifying and estimating military manpower supply models in great detail.

The functional form that will be used for the multivariate analysis of this thesis is the double log transformation. The relationship between the dependent

variable and the independent variables used in this thesis is not linear. The double log form is appropriate when it is believed that elasticities, rather than the slopes, are constant and that the underlying relationship between the dependent variable and the independent variable in question is nonlinear. Chapter IV details the regression analysis used in this study.

## **2. Employee Choice of Employer**

Economic theory suggests that when employees consider whom to work for, they compare the salary and bonuses (pecuniary factor) offered by various employers and the nonpecuniary factors associated with each employer, such as vacation time, work environment, and geographic location (Goldberg, 1982). Based on individual tastes and preferences, each employee chooses the employer who offers the best combination of pecuniary and nonpecuniary factors. For example, Person A and Person B may be considering employment with two companies, Company Y and Company Z. Company Y offers a high salary and is located in North Dakota. Company Z's salary is considerably lower but is located in Florida. Person A loves warmer weather, but decides the salary outweighs the negative effect of the colder climate of North Dakota. Person B prefers the warmer climate even if it means considerably lower income. While overly simplistic, this example demonstrates how individuals weigh the pecuniary and

nonpecuniary aspects of various employers and choose the one that maximizes individual utility.

It is in this context that the decision made by physicians to enter the Navy is explored. The individual physician makes a decision where to work. In a broad sense the physician chooses between the military and some form of civilian employment. Consider first the pecuniary aspects of these two "employers."

For civilian employment, the physician's net income is his or her gross income minus expenses such as medical malpractice insurance and medical equipment. The amount of income as well as the malpractice rates vary with experience, specialty and geographic location. Generally, physicians who are self-employed earn more than those who are employees (of a hospital or a health maintenance organization (HMO), for example) and those who are in non-solo practices earn more than those in solo practices (Gonzales, 1992). Most HMO's cover their physicians' medical expenses, such as malpractice insurance and equipment (Thomas, 1990).

A military physician's income is a combination of basic military pay and allowances (basic allowance for quarters, basic allowance for subsistence, variable housing allowance) as well as special medical pays (McMahon, et. al., 1989). The amount of the basic pay and allowances varies by pay grade and time in service. The special medical pays include variable special pay (VSP), additional special pay

(ASP), board certified pay (BCP), and incentive special pay (ISP) (McMahon, et. al., 1989). The VSP and BCP are entitlements. All physicians receive VSP and all board certified physicians receive BCP. The ASP and ISP are discretionary payments requiring an additional year of obligated service and may be denied for inadequate performance. ISP varies by specialty and typically targets undermanned, wartime-critical specialties.

Cooke (1990) discusses the Medical Officer Retention Bonus (MORB) which was later replaced by the Multi-year Specialty Pay (MSP) program (Hay, 1992). MORB and MSP both vary by specialty and by length of service obligation (two to four years). Insufficient information on these two programs was obtained to include them in this analysis.

Currently, a large disparity exists between military and civilian physician incomes (Office of the Assistant Secretary of Defense, 1988; Stone and Turner, 1992; Cooke, 1990; May, 1988). Table 3 provides an estimate of the pay gap in 1993. The last column demonstrates that for every specialty in 1993, military physicians earn only a portion of what will be earned by equivalent civilian physicians. The specialty that has the closest pay comparability between the military and civilian sectors is family practice. A military family practice physician will earn 91.71 percent of his or her civilian counterpart's salary in 1993. The greatest

**Table 3: COMPARISON OF NAVY AND CIVILIAN PHYSICIAN PAY FOR 1993**

Specialty	FY 93 Military Pay	FY 93 4 Year MSP	FY 93 ISP	Total Pay	Est Civilian Pay	Total Pay Gap	Percent of Civilian Pay
Aerospace Medicine	\$95,338	\$8,000	\$4,000	\$107,338	\$123,087	(\$15,749)	87.22
Anesthesiology	\$84,117	\$0	\$28,000	\$112,117	\$182,300	(\$69,183)	62.06
Critical Care Med	\$92,304	\$10,000	\$22,000	\$124,304	\$170,800	(\$46,496)	72.78
Dermatology	\$96,829	\$10,000	\$8,000	\$114,829	\$141,687	(\$26,858)	80.97
Emergency Medicine	\$80,077	\$14,000	\$10,000	\$104,077	\$133,933	(\$29,856)	77.71
Family Practice	\$81,710	\$14,000	\$3,000	\$98,710	\$107,633	(\$8,923)	91.71
General Surgery	\$90,957	\$10,000	\$22,000	\$122,957	\$171,232	(\$48,275)	71.81
IM/Ped Subspecialties	\$94,885	\$0	\$12,000	\$106,885	\$144,200	(\$37,315)	74.12
Internal Medicine	\$82,396	\$10,000	\$3,000	\$95,396	\$108,667	(\$13,271)	87.87
Neurology	\$90,009	\$8,000	\$10,000	\$108,009	\$140,033	(\$32,024)	77.13
OB/GYN	\$85,352	\$10,000	\$25,000	\$120,352	\$173,271	(\$52,919)	69.47
Ophthalmology	\$90,789	\$8,000	\$21,000	\$121,789	\$188,373	(\$66,584)	72.14
Orthoped Surgery	\$88,528	\$8,000	\$36,000	\$132,528	\$233,385	(\$100,857)	56.79
Otolaryngology	\$91,638	\$8,000	\$24,000	\$123,638	\$178,987	(\$55,349)	69.03
Pathology	\$94,381	\$0	\$12,000	\$106,381	\$137,633	(\$31,252)	77.33
Pediatrics	\$87,749	\$0	\$5,000	\$92,749	\$111,600	(\$18,851)	83.11
Preventive Medicine	\$96,618	\$8,000	\$4,000	\$107,618	\$177,087	(\$69,469)	60.77
Psychiatry	\$90,638	\$8,000	\$7,000	\$105,638	\$124,100	(\$18,462)	85.12
Radiology	\$89,776	\$8,000	\$26,000	\$123,776	\$178,900	(\$55,124)	68.63
Surgical Specialties	\$88,628	\$8,000	\$18,000	\$114,628	\$213,385	(\$98,757)	53.74
Urology	\$94,145	\$8,000	\$22,000	\$124,145	\$173,757	(\$49,612)	71.43

Source: Derived from Hay Management Consultant (1992).  
SEE APPENDIX B FOR DEFINITIONS OF COLUMN HEADINGS

disparity is for military surgical specialists who will earn only 56.79 percent of what civilian surgeons will earn, falling short by an estimated \$100,857 in 1993. Clearly, the pecuniary benefits of civilian employment outweigh those of military service for these specialties.

Next, the nonpecuniary benefits of civilian and military employment must be considered. There must be nonpecuniary benefits to service in the Navy which, for some people, are sufficient to outweigh the pecuniary advantages of the private sector. Otherwise, no physician would choose military service. Stone and Turner (1992) reviewed several surveys of military physicians regarding their reasons for joining and staying in the military. None of the surveys Stone and Turner reviewed dealt specifically with reasons why direct appointment physicians joined the military. Although some of the studies surveyed direct appointment physicians, direct appointment physicians make up only about 15 percent of all Department of Defense physicians (General Accounting Office, 1990). Thus, the sample sizes of direct appointment physicians in these surveys are seldom sufficient to distinguish the reasons why they enter the service.

The surveys in the review by Stone and Turner consistently indicated funded education as a significant, if not the most important, reason for joining the military. This is not applicable to direct appointment physicians as they fund their own medical education. The surveys also indicated

that patriotism, job challenge, lifestyle, and leadership and professional development were important factors in physicians' choices to join the military. Other factors mentioned as influencing the decision were avoiding the hassles associated with running a business, military income and benefits, retirement and pursuing a specialty. But again, because direct appointment physicians were not identified in these surveys, it is difficult to say how they rate various nonpecuniary factors in attracting them to the services.

Because the Navy has not been able to recruit the number of physicians it needs, economic theory would suggest that not enough physicians feel the pecuniary and nonpecuniary benefits of military service outweigh the pecuniary and nonpecuniary benefits of civilian employment. This suggests two courses of action with respect to recruiting physicians. First, the Navy can change the perspectives of doctors toward the Navy by improving some of the pecuniary and nonpecuniary factors of Navy service. (Of course, these improvements will only increase recruitment if the pecuniary and nonpecuniary aspects of civilian employment remain the same.) And second, the Navy can monitor and predict changes that may occur in the makeup of the civilian pecuniary and nonpecuniary package. Changes that improve the civilian pecuniary and nonpecuniary package relative to the Navy package will call for improvement on the Navy side to increase or maintain recruitment levels. On the other hand, if the civilian package drops in total



value, Navy recruiting would theoretically benefit, as those doctors on the margin who found the civilian package more appealing may then choose military service. The next few sections will examine some of these pecuniary and nonpecuniary factors as they have related to the Navy in the past and as they may relate to the Navy in the future.

### 3. Supply and Demand

Economic theory of labor supply and demand, as demonstrated by Ehrenberg and Smith (1991), may provide a useful framework for considering the pecuniary aspects of employment. Figure 2 shows the standard supply and demand curves for an industry that employs a particular occupation. Generally, as the wage of that profession increases, the fewer employees firms will want to hire. This is represented as the downward sloping demand curve in Figure 2. And generally speaking, the higher the wages offered by the firms, the greater the supply of individuals to the occupation. In a free market economy, the forces of supply and demand will reach a point of equilibrium as shown by point E in Figure 2. Because supply equals demand,  $W_E$  will be the going wage for the occupation; the quantity hired will be  $Q_E$ .

The implications here for the comparative value of pecuniary benefits can be seen by shifting the supply and demand curves. Suppose the supply of labor to an occupation increases from  $S_1$  to  $S_2$  while the demand remains at  $D_1$ , as in

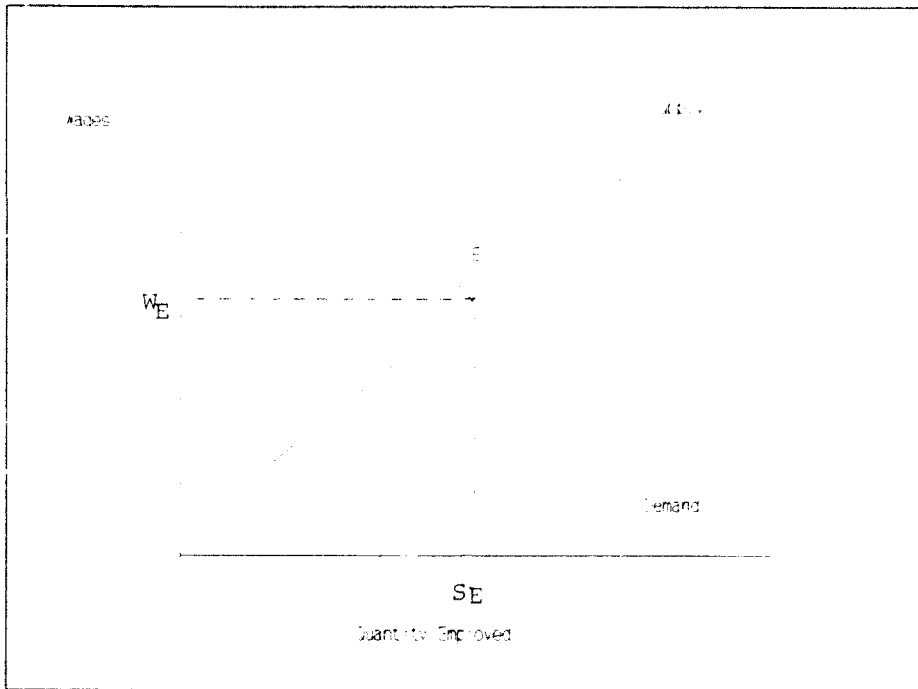
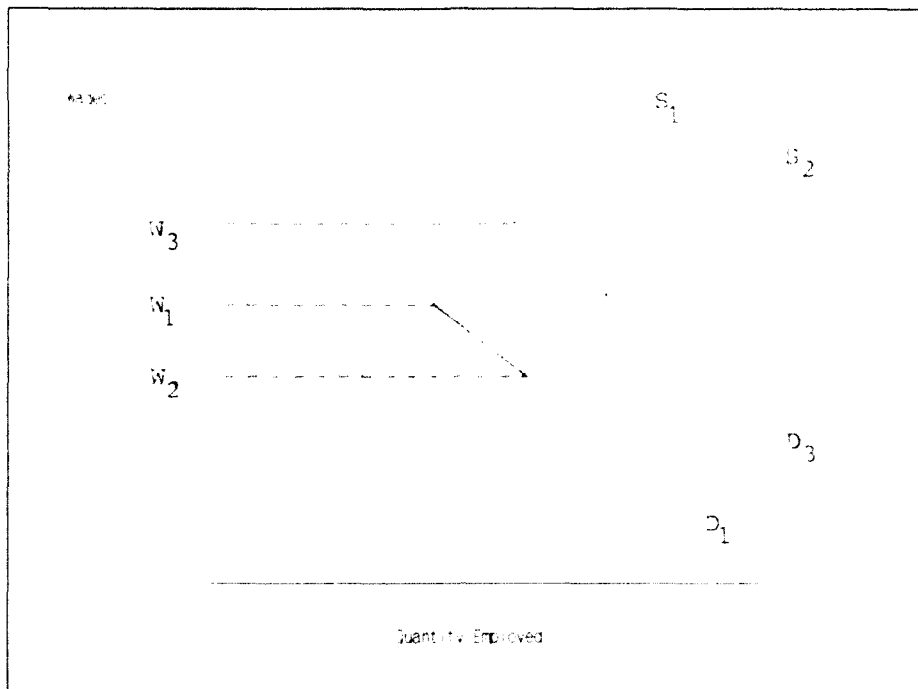


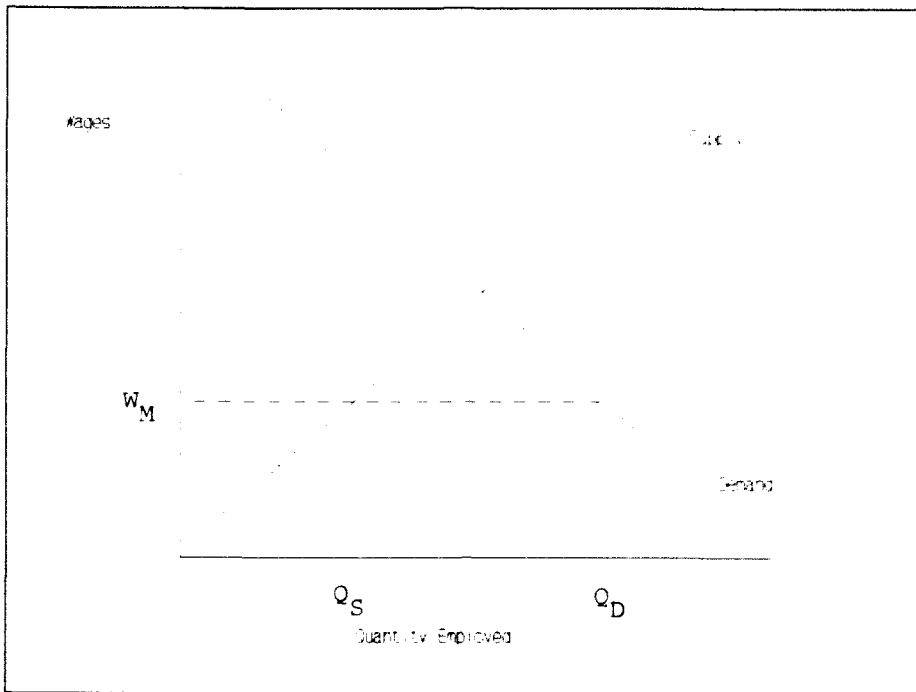
Figure 2: Supply and Demand Curve

Figure 3. Because there are more individuals willing to enter this occupation, the wages of the profession for the industry will drop, as indicated by a lower equilibrium wage, from  $W_1$  to  $W_2$ . In the same vein consider what happens if demand increases and supply remains at  $S_1$ , as in the shift from  $D_1$  to  $D_3$  shown in Figure 3. In this case the equilibrium wage increases from  $W_1$  to  $W_3$  as firms compete to hire more employees.



**Figure 3:** Increase in Supply

Because the military has historically paid its physicians less than their civilian counterparts, changes in supply and demand of physicians are important factors in explaining recruiting shortfalls. Figure 4 represents the military market.  $W_M$  represents the current military wage, which lies below the equilibrium wage for the occupation. Thus, the quantity needed ( $Q_D$ ) exceeds the quantity supplied ( $Q_S$ ). If supply were to increase, as in Figure 5, then the new equilibrium wage would move closer to the Navy wage and the shortfall would drop to only  $Q_D - Q_S'$ .



**Figure 4:** Market for Military Physicians

The degree of disparity between civilian and military wages may be a major influence on recruitment in the next few years. If supply increases, demand remains stable, and civilian wages decrease, the Navy will benefit as more physicians choose the military mix of pecuniary and nonpecuniary benefits. If supply and demand increase at roughly the same rate, physician recruitment will continue to be difficult. If military (or market) demand grows faster than supply, then recruitment of physicians will grow even more difficult.

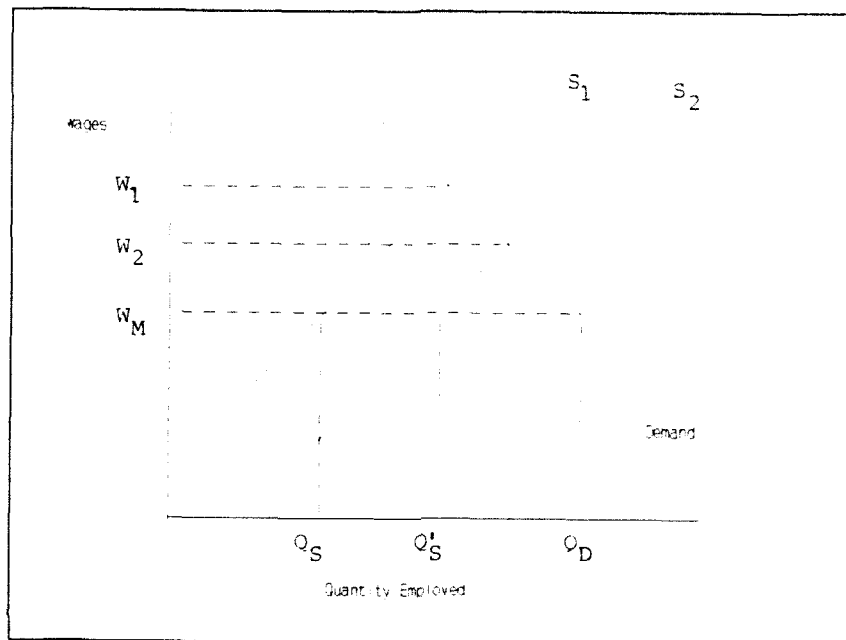


Figure 5: Increase in Supply

#### 4. Projections of Supply and Demand

Generally, the literature agrees that the overall supply of physicians has grown in the 1980's and will continue to grow through the year 2000 (Stone and Turner, 1992; U. S. Department of Health and Human Services, 1990; Kirchner, 1989; Kletke, et. al., 1987; Schwartz and Mendleson, 1990). The literature also agrees that the demand for physicians will continue to increase (Stone and Turner, 1992; U. S. Department of Health and Human Services, 1990; Kirchner, 1989; Schwartz and Mendleson, 1990). Disagreement arises in the literature over the rate at which supply and demand will change and what

the overall effect will be on the market.

*a. Supply*

The supply of physicians in the late 1980's and early 1990's shows few, if any, signs of a surplus as was predicted in the early 1980's (Stone and Turner, 1992; Schwartz and Mendleson, 1990; Kirchner, 1989). In fact, the literature discusses the recruiting efforts of health maintenance organizations (HMO's), hospitals and physician groups (Brown, 1991; Thomas, 1990; Kirchner, 1989; Schwartz and Mendleson, 1990). While the growth of the supply of physicians roughly matched the predictions, the reason frequently given for the lack of surplus is that demand for physician services increased more than anticipated (Stone and Turner, 1992; Schwartz and Mendleson, 1990).

There is conflicting information on the current and future conditions of the physician market with regard to specialties. Stone and Turner (1992) identify surpluses in primary care physicians such as general practitioners (GP), pediatricians, obstetricians/gynecologists (OBGYN) and internal medicine physicians, and shortfalls in surgical specialists, anesthesiologists, neurologists, and orthopedists. The U. S. Department of Health and Human Services (DHHS, 1990) points to future supply outpacing demand for pediatricians, OBGYN and emergency medicine physicians while demand will grow faster than supply for general

surgeons. DHHS data also indicate an oversupply of general internist and family practice physicians, an adequate supply of pediatricians and an oversupply of some nonprimary care specialists, though they point to considerable uncertainty about the market conditions in the future.

Kirchner (1989) relays the opinions of various specialties' professional organizations. As reported by Kirchner, the American Society of Internal Medicine has had second thoughts as to whether or not they had developed an oversupply. The American Academy of Pediatrics reports an oversupply but further points out that, should those children from uninsured families receive medical coverage, then the oversupply could swiftly be reversed. The American College of Obstetrics and Gynecology never accepted that a surplus might be developing, especially given the reported 12 percent drop in the number of physicians in their specialty who stopped delivering babies due to the threat of medical malpractice suits in the 1980's. They further pointed to shortages of OBGYN's all over the country. The American Academy of Family Physicians reports an adequate supply.

Kirchner further reports that family practice, internal medicine, and OBGYN physicians are in greatest demand by recruiters. Thomas (1990), however, reports that in physician groups and HMO's, the general surgeons are in "no position to bargain" in today's market and that supply exceeds demand for anesthesiologists, radiologists and pathologists.

The "hot" commodities for physician group and HMO recruiters are primary care physicians, especially women, family physicians, OBGYN's and internists. Thomas further says there is moderate demand for pediatricians, a strong or growing demand for general surgeons, orthopedists, and cardiologists, and a shortage of board certified or board eligible emergency medicine specialists.

While these reports were issued in different years, there are too many opposing positions to draw any strong conclusions about the future of various specialties. While accurately predicting these changes in supply by specialty could be very helpful to the Navy in recruiting the numbers and types of physicians desired, the lack of consensus would no doubt make any projections unreliable and could hurt recruiting efforts more than help them.

There are several factors that could cause the supply of physicians to grow more slowly than currently projected. Medical malpractice is one important factor. Glazer (1991) reports that the rapidly increasing malpractice insurance premiums of the early 1980's have stabilized in recent years. But Glazer further points to a study that indicates only one in eight patients injured by medical negligence actually files a lawsuit. Brennan, et. al., (1991) makes the point that the negligence found in the study would have lead to successful litigation under the current tort system, had the patients filed suit. If those who are truly



injured begin filing lawsuits in substantial numbers and malpractice insurance costs increase substantially as a result, then physician supply could decrease as the higher premiums drive current doctors out of medicine.

Another issue that could slow the growth of physician supply is the effort to contain health care costs, which is an important item on President Clinton's agenda (Stout, 1993). These efforts might include rationing of health care and restricting the charges for physician services, and could therefore decrease the supply as the pecuniary benefits of becoming a physician decrease (Schwartz and Mendleson, 1990). On the other hand, they might take the form of limiting jury awards for personal damages in law suits (Glazer, 1991). This might make malpractice insurance less costly and encourage growth in physician supply.

Another factor that could decrease the supply of physicians is a change in the retirement pattern of physicians. There seems to be a trend toward earlier retirement, possibly due to such things as increasing malpractice rates, the complexity of third party payment structures such as Medicare and Medicaid, competitive pressures in the market place (particularly from HMO's) and because the physicians can afford to retire sooner (Stone and Turner, 1992; Kirchner, 1989).

Yet another factor that may decrease the supply is the length of the workweek for physicians. Many have

theorized that the average physician work week will decrease as more women and young physicians enter the market because previous studies have shown that women physicians work shorter workweeks than men and because younger physicians want a more relaxed lifestyle (Thomas, 1990; Kirchner, 1989). A shorter workweek would reduce the supply of physician services and lower the growth of physician supply. Stone and Turner (1992), however, point to a study that did not show any notable decrease in hours worked each week by physicians during the period from 1984 to 1991.

As shown in Table 4, the number of institutions conferring medical degrees and the number of medical degrees conferred have been fairly consistent since 1982, although there has been a small, steady decrease in degrees conferred starting in 1986. A continuing decline in degrees conferred lowers the supply of physicians.

**Table 4: NUMBER OF DEGREES IN MEDICINE CONFERRED 1982-1988**

Year	82	83	84	85	86	87	88
Number of Institutions Conferring Degrees	119	118	119	120	120	122	120
Number of Degrees Conferred	15814	15484	15813	16041	15938	15620	15091

Source: Derived from the U.S. Bureau of the Census, 1991.

Recent years have seen increases in the amount of debt incurred by students attending medical school (Stone and Turner, 1992). Increasing medical school costs may result in lower future enrollment and thus a slower growing supply.

*b. Demand*

The literature is generally in agreement that the demand for physician services will increase. There is also agreement as to why this will occur. The first factor is the projected growth of the U. S. population (Stone and Turner, 1992; Schwartz and Mendleson, 1990; DHHS, 1990; Kirchner, 1989). A larger population leads to greater demand for physician services. Another factor that will increase demand is the aging of the population; this will increase demand because as people age, they require more frequent and more intensive medical care (Stone and Turner, 1992; Schwartz and Mendleson, 1990; DHHS, 1990; Kirchner, 1989). A third frequently reported factor is the rise in the number of cases of acquired immunodeficiency syndrome (AIDS). Those with AIDS will receive treatment from physicians (Stone and Turner, 1992; Schwartz and Mendleson, 1990; DHHS, 1990; Kirchner, 1989), and additionally, many of those who are uninfected will visit their physicians for testing and information (DHHS, 1990).

Even prior to the 1992 presidential election, the idea of providing access to health care to the estimated ten

to fifteen percent of the American population currently uninsured was an issue (DHHS, 1990). If those who are uninsured begin receiving medical care, the demand for physicians will increase (Stone and Turner, 1992; DHHS, 1990; Schwartz and Mendleson, 1990; Kirchner, 1989). Because President Clinton has made health coverage for all Americans one of the major priorities of his administration (Stout, 1993), such coverage seems more likely now than ever before. Another influence on supply is recent technological advancement. New technology now allows faster treatment at a lower cost, making procedures more accessible to more people and thus increasing demand for physician services (Stone and Turner, 1992; Schwartz and Mendleson, 1990; Kirchner, 1989).

There were other, less frequently mentioned issues in the literature that also may influence the demand for physician services. The increase in the number of people eligible for the Medicare and Medicaid programs has expanded demand for physicians since the 1960's; the growth in eligibility is expected to continue, which would serve to increase demand (Stone and Turner, 1992). Projections are that real personal income of Americans will continue to rise; a rise in real personal income increases the demand for physician care (Stone and Turner, 1992; Kirchner, 1989). On the other hand, the current trend toward increasing the amount of health insurance deductibles and coinsurance payments could decrease demand, as the additional costs make people think

twice about visiting their physicians (Stone and Turner, 1992; Kirchner, 1989).

#### **5. Desert Storm**

The decrease in the numbers of direct appointment physicians recruited in 1991 and 1992 may have been a result of media coverage during Desert Storm. Scott (1991) and Gomez (1990) relay examples of the financial problems of medical reservists during the Gulf War. Coverage of financial hardships of medical reservists was also broadcast on network and cable television. While these stories of lost earnings involved reservists, they may emphasize more dramatically the financial differences between the wages of military and civilian physicians, thus hurting recruiting of direct appointment physicians.

### III. DIRECT APPOINTMENT PHYSICIANS FROM 1981 TO 1992

#### A. THE DATA BASE

To better understand the recruitment of direct appointment physicians, the background characteristics of those physicians who have entered the Navy in past years is examined. NAVCRUITCOM's Personalized Officer Recruiting and Tracking System (PORTS) database<sup>3</sup>, which contains information on all the direct appointment physicians recruited in fiscal years 1981 through 1992 was used to profile the background of recruited physicians. The following variables are included in the database:

1. A three-digit code representing the Navy recruiting district from which the physician was recruited (see Table 2, Chapter II, for NRD codes);
2. the fiscal year recruited;
3. gender;
4. race;
5. date of birth;

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<sup>3</sup> NAVCRUITCOM uses the PORTS data base to track Navy applicants and recruits.

6. whether or not the physician had prior military service, and if so, the branch of service; and

7. the employment status of physicians recruited (i. e., in school, looking for first job, employed, unemployed).

The age at which a physician was recruited will be an important background characteristic. Because the date commissioned was not available, each physician's age at entry was estimated using the member's date of birth and the fiscal year in which the member was recruited. The entry ages were grouped into five-year increments before examining the data.

Because the current recruiting areas are different from the recruiting areas during the years of this data, a modification was made to account for this. This modification realigned the old structure so that the area and districts that no longer exist fall under their current area and district. See Appendix A for how this realignment was done. The first digit of the NRD code, which corresponds with the recruiting area, was used to derive the recruiting area. Because PORTS includes those who applied but were not accessed, only those who were actually commissioned will be examined below.

## B. SHORTCOMINGS OF THE PORTS DATA

Table 5 displays the number of Navy direct appointment physicians accessed each year by area, as reflected by the PORTS database. The final row of the table reflects the official NAVCRUITCOM recruitment figures for each year. The PORTS data used in this portion of the analysis does not accurately reflect NAVCRUITCOM's official numbers for two reasons. First, any observations with obvious errors were deleted from the data used in the thesis. Second, some observations were missing the final action code. Personnel with a missing final action code were matched with a listing from the Bureau of Medicine and Surgery Management Information System (BUMIS) data file<sup>4</sup> of direct appointment physicians in the Navy from 1985 to 1991. This yielded three additional observations. For the most part, the annual totals are off by only one or two people with the following exceptions--the 1990 PORTS total is eight people short of the NAVCRUITCOM total, or 6.78 percent, and the 1991 total is 18 people, or 26.47 percent, short. Despite these problems, the PORTS data is still useful in profiling the background characteristics of direct appointment physicians over the past 12 years.

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<sup>4</sup> The BUMIS database is maintained by the Naval Medical Information Management Center.



**Table 5: NUMBER OF NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED BY RECRUITING AREA FROM FISCAL YEAR 1981 TO 1992**

Area	Fiscal year												Total
	81	82	83	84	85	86	87	88	89	90	91	92	
PURHS Database Totals	11	38	17	13	17	17	7	18	13	28	11	16	294
	29 81.4	28 36.	22 16.	31 00.	33 06.	27 27.	38 68.	21 69.	28 06.	26 46.	22 36.	28 66.	40 27.
	27	21	24	19	7	8	3	14	20	29	10	11	194
	25 96.	16 67.	14 37.	19 00.	33 13.	18 18.	6 56.	16 66.	21 86.	23 64.	20 41.	21 36.	19 26.
	16	19	29	9	5	6	6	11	16	18	7	9	132
14 32.	14 19.	17 37.	9 00.	11 06.	11 06.	27 78.	14 06.	14 36.	16 06.	6 17.	12 11.	14 19.	
7	16	16	27	13	1	8	4	11	18	16	9	6	136
	16 38.	11 41.	16 17.	14 00.	3 76.	18 18.	22 22.	11 26.	16 11.	14 64.	16 17.	8 02.	14 69.
8	16	38	50	27	6	11	1	35	28	21	19	17	267
	14 42.	28 36.	29 84.	27 00.	28 67.	26 60.	6 86.	16 14.	24 84.	26 91.	19 66.	21 08.	26 62.
Total	104	114	167	100	44	44	18	83	119	110	49	62	1003
NAVGRUFCOM Database Totals	106	116	167	100	44	44	19	64	120	118	68	62	1017

Source: Navy Recruitment and PURHS Database.  
\* Percentage of Physicians by Area by Year - Parentheticals

### C. PROFILE OF NAVY DIRECT APPOINTMENT PHYSICIANS RECRUITED

The most striking feature of Table 5 is how dramatically the total number of physicians accessed has fluctuated during this time period. The high occurs in 1983 at 167 and the low at 19 in 1987. No clear pattern emerges. Table 1 in Chapter II showed that the Navy missed its recruiting goal of direct appointment physicians almost every year during this period.

#### 1. Area Results by Fiscal Year

Over the 12-year period, Area One has yielded the largest percentage of direct appointment physicians, 26.27 percent, while Area Five has produced the least, 14.19 percent of the total. Each area's share of the total annual recruitment, as well as the actual numbers, has varied greatly across the years. Generally speaking, the numbers all went down and up in the same years. Goals were low in 1985 and 1986 (53 and 23 respectively), but when the goal rose to 139 in 1987, attainment across all areas was low and only totaled 19 for the year. The totals increased in 1989 and 1990, but dropped again in 1991 and 1992. This may have been due to the media attention on the disparity between military and civilian physician salaries during Desert Storm, as discussed in Chapter II.

## 2. Gender by Fiscal Year

Table 6 displays the number of Navy direct appointment physicians recruited by gender for each fiscal year. The percentage of physicians recruited who are women varied from a low of 9.09 percent in 1985 to a high of 17.31 percent in 1992. The average annual percentage was 13.72 percent. Although no clear pattern emerges as to what might affect the percentage of female direct appointment physicians, the percentage of females is consistently higher in the last seven years of the period compared to the first five years.

## 3. Race by Fiscal Year

Table 7 displays Navy direct appointment physicians by race for each fiscal year from 1981 to 1992. The racial composition also varies from year to year. In 1985 none of the 44 physicians accessed were black. In 1986, none of the 21 accessed were Asian or other minority, and in 1987, of the 18 recruited, only one was a minority (Asian). The largest accession of blacks occurred in 1983, when blacks made up 11.38 percent of direct appointment physicians. The highest rate for Asians was 6.36 percent in 1990. On average, Asians made up 3.29 percent; blacks, 6.69 percent; other minorities, 5.19; and whites, 84.83 percent of all direct appointment accession physicians.

**Table 6: NUMBER OF MALE AND FEMALE NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED, FISCAL YEARS 1981 TO 1992**

Gender	Fiscal Year												
	81	82	83	84	85	86	87	88	89	90	91	92	93*
Female	10 (9.62%)	16 (11.19%)	21 (12.67%)	16 (16.00%)	4 (9.09%)	4 (19.05%)	3 (16.67%)	14 (16.87%)	19 (16.97%)	18 (19.36%)	6 (12.24%)	9 (17.31%)	1.38 (1.79%)
Male	84 (90.38%)	119 (98.81%)	140 (87.43%)	86 (66.00%)	30 (99.91%)	17 (90.96%)	16 (83.33%)	89 (83.13%)	100 (84.03%)	92 (84.84%)	41 (87.76%)	41 (82.69%)	86.1 (96.21%)
Total	104	134	167	102	44	21	18	81	119	110	48	50	100.1

Source: Navy Recruiting Command's RYRIS Database  
 \* Percentage of Physicians by Gender by Year in Parentheses

Table 7: RACE OF NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED, FISCAL YEARS 1981 TO 1992

Race	Fiscal Year												
	81	82	83	84	85	86	87	88	89	90	91	92	1000
Asian	1 (0.96)	6 (4.61)	6 (3.69)	3 (3.00)	0 (0.00)	2 (4.56)	1 (6.56)	1 (1.20)	1 (2.52)	7 (9.36)	0 (0.00)	1 (6.72)	11 (1.10)
Black	7 (6.73)	11 (8.27)	19 (11.38)	6 (6.00)	1 (4.76)	0 (0.00)	0 (0.00)	3 (3.61)	6 (6.04)	11 (10.00)	1 (2.04)	7 (4.86)	67 (6.70)
Other Minority	3 (2.88)	9 (6.77)	13 (7.78)	6 (6.00)	0 (0.00)	2 (4.56)	0 (0.00)	8 (9.64)	4 (3.36)	6 (4.56)	7 (4.08)	9 (6.10)	67 (6.70)
White	93 (89.42)	107 (80.46)	129 (77.26)	96 (86.00)	20 (96.24)	40 (90.91)	17 (94.44)	71 (86.64)	109 (89.08)	97 (79.00)	46 (91.88)	47 (30.28)	939 (94.60)
Total	104	133	167	100	21	44	18	81	119	110	49	62	1000

Frequency Missing = 1

Source: Navy Recruiting Command, PURIS Database  
 \* Percentage of Physicians by Race by Year in Parentheses

Table 8 displays the number of Hispanic direct appointment physicians accessed by the Navy. This number is broken out separately from the race variable because Hispanics, as an ethnic group, can belong to more than one race category. During 1986 and 1987, when total accessions and goals were extremely low, there were no Hispanics accessed. The high was in 1988, when 10.84 percent of the accessions were Hispanic. The overall annual average for the 12-year period was 5.99 percent.

#### **4. Prior Military Service**

Table 9 displays the incidence of prior military service of Navy direct appointment physicians. A majority, 54.3 percent, had no prior military service. And, as might be expected, of the 45.8 percent with prior military service, most had been affiliated with the Navy--15.5 percent had served in the Naval Reserve and 12.6 percent had served on active duty in the Navy. Quite a few had Army and Air Force service; almost nine percent had been affiliated with the Army and four percent with the Air Force.

**Table 8: NUMBER OF HISPANIC AND NON-HISPANIC NAVY DIRECT APPOINTMENT PHYSICIANS BY FISCAL YEAR**

	Fiscal Year												
	81	82	83	84	85	86	87	88	89	90	91	92	10 <sup>est</sup>
Hispanic	4	8	17	6	2	0	0	9	4	5	6	1	8(1)
	(J 86)*	(5 9 7)	(10 18)	(6 00)	(4 56)	(0 00)	(0 00)	(10 84)	(4 36)	(4 56)	(10 20)	(1 92)	8(1)
Non-Hispanic	100	128	150	95	42	21	18	74	115	105	44	51	941
	(99 15)	(94 03)	(89 82)	(96 00)	(85 46)	(100 00)	(100 00)	(89 16)	(95 54)	(95 45)	(89 80)	(98 08)	(94 01)
Total	104	134	167	100	44	21	18	83	119	110	49	52	1043

Source: Navy Recruiting Command, PORTS Database  
 \* Percentage of Physicians by Hispanic / Non-Hispanic by Year in Parentheses

**Table 9: INCIDENCE OF PRIOR MILITARY SERVICE OF NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED, FISCAL YEARS 1981 TO 1992**

Prior Service	Frequency	Percent
No Prior Service	544	54.3
Army Active Duty	45	4.5
Army Reserve	44	4.4
Navy Active Duty	126	12.6
Navy Reserve	155	15.5
Navy Retired	5	0.5
Marine Corps Active Duty	7	0.7
Marine Corps Reserve	5	0.5
Marine Corps Retired	1	0.1
Air Force Active Duty	20	2.0
Air Force Reserve	20	2.0
Air Force Retired	1	0.1
Coast Guard	3	0.3
Multiple Service	16	1.6
Military Officer Candidate type Training	9	0.9
Total	1001	100

Source: Navy Recruiting Command, PORTS database.



### 5. Employment Status at Accession

Table 10 displays the employment status of Navy direct appointment physicians prior to entering the Navy. The vast majority, 82.1 percent, were employed. The next largest group, 8.3 percent, were still in school, while only 2.3 percent reported being unemployed. The employment status of 5.5 percent of the observations was "unknown" or "other." This could significantly affect any conclusions drawn from Table 10 if those in the "unknown" employment status actually fall into one of the categories listed.

**Table 10:** EMPLOYMENT STATUS OF NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED FROM FISCAL YEARS 1981 TO 1992

Employment Status	Frequency	Percent
Employed	821	82.0
In School	83	8.3
Looking for 1st Job	11	1.1
Unemployed	23	2.3
Enlisted Naval Reserve	6	0.6
Enlisted Regular	2	0.2
Other / Unknown	55	5.5
Total	1001	

Source: Navy Recruiting Command, PORTS database.

#### 6. Age at Accession

The approximate age at which direct appointment physicians joined the Navy is listed in Table 11. The majority of physicians--60.7 percent--joined before the age of 40. Table 12 breaks the physicians into those who joined before and those who joined after the age of 45; 22.9 percent joined after the age of 45. This is of interest because those who joined after age 45 with insufficient prior service will not have reached the 20 years of service required to be eligible for retirement by age 65, the normal age of mandatory separation.

#### D. SUMMARY

Though comprised primarily of white males, direct appointment physicians are frequently females and minority officers, as well. Almost half have had prior military experience, and most with prior service had been affiliated with the Navy. Almost all direct appointment physicians were employed or in school, and most entered before the age of 45.

**Table 11:** APPROXIMATE AGE OF NAVY DIRECT APPOINTMENT PHYSICIANS FROM 1981 TO 1992

Approx. Age Upon Entry	Frequency	Percent	Cumulative Frequency	Cumulative Percent
25 - 29	149	14.9	149	14.9
30 - 34	267	26.7	416	41.6
35 - 39	192	19.2	608	60.7
40 - 44	143	14.3	751	75.0
45 - 49	95	9.5	846	84.5
50 - 54	71	7.1	917	91.6
55 - 59	64	6.4	981	98.0
60 - 64	20	2.0	1001	100.0
Total	1001			

Source: Navy Recruiting Command, PORTS database.

**Table 12:** NUMBER OF NAVY DIRECT APPOINTMENT PHYSICIANS ACCESSED AFTER THE AGE OF 45 FROM 1981 TO 1992

Age	Frequency	Percent
45 or younger	772	77.1
over 45	229	22.9
Total	1001	

Source: Navy Recruiting Command, PORTS database.

#### IV. REGRESSION ANALYSIS

As discussed in Chapter II, a regression analysis can help predict what factors affect the number of direct appointment physicians the Navy is able to recruit. This chapter will discuss some of the pecuniary and other quantifiable factors that theoretically could affect the number of direct appointment physicians accessed. The chapter also will discuss how these factors were converted into variables for use in a regression equation. Finally, it will discuss the results of the regression equation.

##### A. MODEL SPECIFICATION

The equation below expresses the number of direct appointment physicians the Navy is able to recruit as a function of several factors. Above each factor is its expected sign.

$$\text{NAVYDRS} = f \left( \overset{-}{\text{CIVINCOME}}, \overset{+}{\text{CIVMALPRAC}}, \overset{+}{\text{MILINCOME}}, \overset{+}{\text{DRPOP}}, \right. \\ \left. \overset{+}{\text{NAVYADVERT}}, \overset{+}{\text{MEDRCRTS}}, \overset{-}{\text{DESERTSTORM}}, \dots \right)$$

Where:

NAVYDRS = Number of Navy direct appointment physicians recruited

CIVINCOME = Net income of civilian physicians

MILINCOME = Net income of military physicians

CIVMALPRAC = Civilian personal malpractice liability  
DRPOP = Number of physicians in military supply market  
NAVYADVERT = Advertising directed at direct appointment  
physicians  
MEDRCRTS = Number of Navy medical recruiters  
DESERTSTORM = Before or after operation DESEPT SHIELD/DESERT  
STORM (negative effect on dependent variable after DESERT  
SHIELD/STORM)

The first three independent variables (CIVINCOME, CIVMALPRAC, MILINCOME) are pecuniary factors. As civilian income increases, it is expected that fewer physicians would join the Navy, if all else were held constant. And all else held constant, if civilian malpractice rates increase, more physicians would be expected to join the Navy. Conversely, if military income increases, more physicians would be expected to join the Navy, again all other factors held constant.

The next variable (DRPOP) is included because, as the quantity of available physicians increases, it is expected that recruiting would become easier and possibly more physicians to join the Navy, all else held constant. This variable may be closely linked to the civilian income variable because, as discussed in Chapter II, as the overall supply of physicians increases, generally civilian income levels should decrease. If there is a strong correlation between the two variables, there may be a problem with multicollinearity in the regression model. This could cause the variables to

appear insignificant even though they add to the significance of the equation.

The remainder of the variables are not items that directly affect the mix of pecuniary and nonpecuniary factors. They may, however, affect the way in which the physician views the mix of pecuniary and nonpecuniary factors. For instance, because Navy advertising increases awareness of Navy medical programs and provides a way for physicians to obtain more information, increases in the amount of advertising may increase the number of physicians recruited, all else held constant. Likewise, by increasing the number of medical recruiters, more personnel are available to explain Navy medicine to potential recruits and thus attract more physicians, all else held constant. As discussed in Chapter II, the publicity surrounding Desert Storm focused attention on the disparity between civilian and military physician wages. This publicity pointed out the pecuniary disadvantages of naval service, thereby decreasing the number of physicians recruited after Desert Storm, all else held constant.

The variables listed are certainly not all the factors that affect the number of physicians that come into the Navy. Even if all the factors that affect recruitment were known, they could not all be quantified. Nonetheless, the variables included are consistent with previous studies of enlistment

supply and capture a significant number of important factors. Since parsimony is an important attribute of forecasting models, the hope is that this model will provide a reliable forecasting tool.

#### **B. ESTIMATING THE REGRESSION MODEL**

This thesis uses data from 1981 to 1992. These years are far enough removed from the start of the all-volunteer force to reflect the current nature of physician recruitment, while at the same time providing data that more accurately reflect recent recruitment practices. This thesis also uses the current recruiting area configuration as the basis for each observation (see Appendix A for more information). This results in 60 usable observations. The reason for using recruiting areas is discussed below. Because perfect data do not always exist or are not always accessible, proxy variables will be used for the theoretical variables that the regression models try to capture.

##### **1. Measures of Civilian Net Income and Malpractice Insurance Rates**

Ideally, in estimating the civilian variables, information on average civilian income and malpractice rates by county would be used, and these figures would be matched to the corresponding Navy recruiting districts to see how changes

in income and malpractice affect recruiting by district. Unfortunately, data on civilian income and malpractice rates were not available at the county or even the state level; the smallest level available was the census division level. Thus, the census divisions were matched as closely as possible with the recruiting areas to create proxy variables for civilian physicians' annual average net income and malpractice liability.

To determine how far off this match was, the PORTS data and official NAVCRUITCOM attainment figures, after being realigned as indicated in Appendix A, were matched to census divisions to see if physicians may have been influenced by a proxy variable other than their source recruiting area. Table 13 outlines the states that comprise the census divisions and Table 14 outlines the states that comprise the recruiting districts. Table 15 shows how the states in the recruiting areas in Table 14 roughly line up with the states of the census divisions shown in Table 13. However, there are some major differences between the census divisions and the recruiting areas.

Table 16 outlines the gaps between the recruiting district data and the census division data. Seven hundred forty-seven physicians were in a recruiting area that matched up perfectly with the proxy variable. In other words, these



**Table 13: STATES IN EACH CENSUS DIVISIONS**

Census Division	States
New England	Maine, Vermont New Hampshire Massachusetts Rhode Island, Connecticut
Middle Atlantic	New York, Pennsylvania New Jersey
South Atlantic	West Virginia, Delaware Maryland, Virginia North Carolina South Carolina Georgia, Florida
East South Central	Kentucky, Tennessee Mississippi, Alabama
West South Central	Oklahoma, Arkansas Texas, Louisiana
East North Central	Wisconsin, Michigan Illinois, Indiana Ohio
West North Central	North Dakota, Minnesota South Dakota, Iowa Nebraska, Kansas Missouri
Mountain	Montana, Idaho Wyoming, Utah Colorado, Arizona New Mexico
Pacific	Alaska, Washington Oregon, Nevada California, Hawaii

Source: Derived from U.S. Bureau of the Census

Table 14: STATES WHICH MAKE UP THE NAVY RECRUITING AREAS

Area	States
One	Connecticut, Delaware, Rhode Island Vermont, Virginia (2 counties) West Virginia (25 counties) Massachusetts, Maryland, Maine New Hampshire, New Jersey, New York Ohio (4 counties), Pennsylvania
Three	Alabama, Florida, Georgia Indiana (20 counties) Kentucky (99 counties) North Carolina, Ohio (1 county) South Carolina Tennessee (74 counties) Virginia (134 counties) West Virginia (26 counties)
Five	Iowa, Illinois (41 counties) Indiana (5 counties), Michigan Minnesota, North Dakota, Nebraska Ohio (83 counties), Wisconsin Kentucky (11 counties), South Dakota West Virginia (4 counties)
Seven	Tennessee (21 counties), Texas Arkansas, Illinois (57 counties) Kansas, Louisiana, Missouri Mississippi, Kentucky (10 counties) Oklahoma
Eight	Alaska, Arizona, California Hawaii, Idaho, Montana, Nevada Oregon, Utah, Washington Wyoming, Colorado, New Mexico

Source: Derived from Navy Recruiting  
Command

**Table 15: NAVY RECRUITING AREAS**

Area	Census Divisions
1	New England Middle Atlantic
3	South Atlantic East South Central
5	East North Central West North Central
7	West South Central
8	Mountain Pacific

**Table 16: GAPS BETWEEN THE RECRUITING AREA AND THE AREA'S PROXY AREA USING THE CENSUS DIVISIONS**

Area	Number of Physicians in Proxy Area	Number that may be in Proxy Area	Number not in Proxy Area
1	176	87	0
3	149	44	0
5	124	18	0
7	81	34	31
8	217	40	0
Totals	747	223	31

747 physicians were theoretically influenced by the average net income and malpractice liability insurance indicated by the area's proxy variable. Thirty-one physicians were in one recruiting area but the proxy variable that influenced their choice to join was based on a different recruiting area. Two hundred twenty-three of the physicians may or may not have been influenced by the proxy variable for their recruiting area.

Table 17 looks more closely at these 223 physicians. Table 17 lists the NRD number, the number of physicians recruited from this NRD, the number of counties in this NRD that lie in the proxy census area and the number of counties that do not. NRD's 314, 316, 518 and 734 all have a large majority of their counties within the proxy census region. More than likely, the 82 physicians in these NRD's made their decisions based on the recruiting area's proxy variable. Of the remaining districts, NRD 120 and NRD 825 encompass a majority of the counties in the proxy census region while NRD's 119, 747 and 830 do not contain a majority in the proxy census region. So of the 223, there is a strong chance that 141 of these physicians may not have been influenced by the proxy variable used for their recruiting area.

The values used for civilian physician net income and malpractice liability for 1982 to 1991 were taken from

Gonzalez (1987, 1989, 1992). The values for 1981 and 1992 were estimated using an extrapolation based on a linear regression for the years 1982 to 1991.

**Table 17: BREAKDOWN OF 223 PHYSICIANS WHO MAY NOT BE WITHIN THE PROXY FOR THEIR RECRUITING AREA**

NRD	Number of Physicians	Number of Counties in the Proxy Area	Number of Counties not in Proxy Area
119	74	13	30
120	13	37	28
314	16	204	19
316	28	167	1
518	18	58	15
734	20	74	4
747	14	10	112
825	25	81	36
830	15	35	69

Source: Derived from Navy Recruiting Command

## 2. Estimated Military Income

As stated earlier, military physician income is a combination of military basic pay and allowances (such as BAQ, BAS and VHA) and of medical special pays (such as ISP, VSP, ASP and BCP). This section discusses how proxy variables were constructed for use in the regression equation.

*a. Military Base Pay and Allowances*

The first step used in estimating military basic pay and allowances was to calculate the characteristics of the average Navy physician in order to construct the proxy values. Using the 1985 rank structure, length of service and marital status data provided by Whalen (1986), the average Navy physician was estimated to be a married LCDR with seven years of service. While the estimated rank and length of service used 1985 stocks, it should be fairly representative of the entire time frame, as manning authorizations do not change dramatically from year to year. Whalen's data was compared to more current BUMIS data that corroborated the assumption of the average Navy physician being a LCDR with seven years of service.

The basic pay, BAQ (with dependents) and BAS values for a LCDR with over six years of service were used to estimate the average Navy physician's basic pay and allowances. No proxy variable was used for VHA. A VHA estimate would greatly enhance the reliability of this analysis. But because no VHA proxy was readily available and because it would be difficult to estimate VHA given the wide variation among the hundreds of geographic locations where physicians can be assigned, no proxy variable was used for VHA. The sources for the amount of basic pay, BAQ and BAS

were the Department of Defense, Office of the Secretary of Defense (1987) for fiscal years 1981 to 1987, and the *Navy Times* (1988, 1989, 1990, 1991) for the fiscal years 1988 to 1992.

**b. Medical Special Pays**

The medical special pays are based on years of medical experience rather than years of service. GAO (1990) data was used to compute years of experience. GAO stated that, on average, physicians in the Department of Defense have 10 years of experience, including post-graduate training. The distribution of Navy physicians was broken down by experience as indicated in Table 18. Because the average years of experience within the year groupings were not available, the median age of the category was used to estimate the overall

**Table 18:** PERCENTAGE OF NAVY PHYSICIANS BY YEARS OF EXPERIENCE

Percentage of Navy Physicians	Years of Experience				
	0-5	6-10	11-15	16-20	21+
	33	34	16	12	6

Source: Derived from GAO (1990)

average years of experience. For the 21-and-over group, no upper bound was given. Because mandatory retirement is

normally at 30 years of service, 30 years was used as an upper bound and 25.5 years was used as the median age for the 21-and-over category. Using these numbers, the average physician was estimated to have 9.3 years of experience. McMahon, et. al., (1989) was used as a source for VSP, ASP, ISP and BCP amounts from fiscal years 1981 to 1989. The Chief of Naval Operations (1989) was used as a source for ISP amounts from fiscal years 1989 to 1992, and the Secretary of the Navy (1990) was used for VSP, ASP, and BCP amounts from 1990 to 1992.

It is reasonable to assume that a LCDR with nine years of medical experience has finished a residency, has not become an executive/managerial medical officer (Whalen, 1986), and is therefore receiving VSP, BCP, ISP and ASP. ISP was computed using the inventory of Navy specialists provided by May, et. al., (1988) to approximate the composition of specialists. Then, an annual average ISP was computed by multiplying the percent of specialists by the amount of ISP received by each specialty in that year. As discussed in Chapter II, not enough information on MORB or MSP was obtained to add such data to this regression equation. An average annual military physician income was constructed by adding together the annual basic pay, BAQ, BAS, ISP, ASP, BCP and VSP amounts.



### **3. Estimating the Physician Market**

The physician market was estimated for the years 1981, 1983, 1985, 1986, 1988, and 1989 using the total nonfederal physician population by state provided in Roback, et. al., (1982, 1984, 1986, 1987, 1990, and 1992). The physician market by state was estimated for the years 1982, 1984, and 1987 by taking the average population of the years before and after the missing years. The years 1990 to 1992 were estimated using an extrapolation based on a linear regression for the years 1981 to 1989. Table 19 presents the states that were used as the proxy variables for each recruiting areas' physician population.

### **4. Estimating Navy Advertising**

Data were obtained on advertising costs from 1988 to 1992. Because the advertising data were not available for all of the recruiting years, it was beneficial to estimate the amounts spent from 1981 to 1987. The amount spent on advertising directed at direct appointment physicians is usually based on a combination of the total amount of money available for Navy advertising and the recruiting goals for physicians. Because no data were obtained on the amount of money available for Navy advertising, a simple correlation between the goals and the amount of advertising money spent was conducted. This revealed a strong, negative correlation;

**Table 19: STATES USED TO ESTIMATE RECRUITING AREA PHYSICIAN POPULATION**

Area	States
1	Connecticut, Delaware, Massachusetts Maryland, Maine, New Hampshire New Jersey, New York, Pennsylvania Rhode Island, Vermont
3	Alabama, Florida, Georgia, Kentucky North Carolina, South Carolina Tennessee, Virginia, West Virginia
5	Iowa, Indiana, Michigan, Minnesota North Dakota, South Dakota, Nebraska Ohio, Wisconsin, Illinois
7	Texas, Arkansas, Kansas, Louisiana Missouri, Mississippi, Oklahoma
8	Alaska, Wyoming, Arizona, Colorado California, New Mexico, Hawaii, Idaho Montana, Nevada, Oregon, Utah Washington

in other words, as the goals increased, the amount spent on physician advertising went down. Since no reliable estimate for advertising dollars spent on physician recruitment could be made, an advertising proxy variable was not used.

#### **5. Estimating Navy Medical Recruiters**

The Navy Recruiting Command provided the number of nurse corps recruiters, medical service corps recruiters, hospital corpsman recruiters, and general officer recruiters designated as medical recruiters for the years 1983 to 1992 for each recruiting area. Because there were very few changes

in the composition and number of recruiters from 1983 through 1985, these years were used to estimate the number of medical recruiters in 1981 and 1982. As discussed in Chapter II, "the designated medical general officer recruiter" was introduced in 1991.

Two more variables were created to ascertain if the total number of physicians recruited responded to the total number of medical recruiters as well as the numbers of the different types of medical recruiters. One of these variables combined all four types of medical recruiters while the second variable left out the general officer recruiters who were designated for medical recruiting. These general officer recruiters were omitted from the second variable because that program was only in effect for two of the 12 years covered by the recruiting data.

#### **6. Estimating the Effect of Operation DESERT SHIELD/STORM**

Because Operation DESERT SHIELD/STORM did not begin until August 1990, near the end of the fiscal year, the years 1981 to 1990 are considered pre-DESERT SHIELD/STORM and 1991 and 1992 are considered post-DESERT SHIELD/STORM for the purposes of this thesis. A dummy variable was created which equaled zero for the years 1981 to 1990 and one for the years 1991 and 1992.

C. REGRESSION RESULTS

Because collinearity between explanatory variables might cause problems in the regression analysis, a correlation procedure was run on the variables. As stated earlier, a correlation might be expected between the number of physicians in an area and the net income of the area. This does not appear to be a problem, however, as the two variables were not strongly correlated (correlation coefficient = .3421). However, the pecuniary variables, military income, civilian income, and malpractice liability, were all highly correlated.

Table 20 lists the correlations between the three pay variables. Because civilian net income already incorporates the cost of malpractice liability, the liability variable was

**Table 20:** CORRELATIONS BETWEEN THE CIVILIAN NET INCOME, CIVILIAN MALPRACTICE AND MILITARY INCOME VARIABLES

---

	Civilian Net Income	Civilian Malpractice Liability	Military Income
Civilian Net Income	1	.78	.90
Civilian Malpractice Liability	.78	1	.81
Military Income	.90	.81	1

---

dropped from consideration. Because the civilian and military incomes were so highly correlated, a single variable was created to measure the effect of changes in either one. The new variable is the pay gap or difference between civilian and military pay. As the pay gap increases, the number of physicians recruited could be expected to decrease.

Several regressions were estimated. All used the double-log transformation as discussed in Chapter II. In some of the regressions, the pecuniary variables and the recruiter variables were not combined, as detailed above. In other regressions, the variables that combined the pecuniary and recruiter variables were all used. And other regressions used combinations of both the various categories of variables. When the pecuniary variables were not in their combined form, the  $R^2$  value of the equation was stronger, but the variables did not have the expected signs. When one variable was used for the pecuniary variables vice the three variables, the single variable had the expected sign.

The three regression models that will be described in further detail are listed below.

**Model 1:**

$$\text{LNNAVYDRS} = \text{LNCIVMILINC} + \text{LNRPOP} + \text{LNTMEDREC1} + \text{DESERT}$$

**Model 2:**

$$\text{LNNAVYDRS} = \text{LNCIVMILINC} + \text{LNRPOPOP} + \text{LNTMEDREC2} - \text{DESERT}$$

**Model 3:**

$$\text{LNNAVYDRS} = \text{LNCIVMILINC} + \text{LNRPOPOP} + \text{LNNCR} + \text{LNMSCR} + \text{LNHMR} + \\ \text{GENOFFMEDR} + \text{DESERT}$$

Where:

LNAVYDRS = The natural log of the number of Navy physicians recruited by area per year

LNCIVMILINC = The natural log of the value given when the military income per year is subtracted from average civilian income by area per year

LNRPOPOP = The natural log of the number of physicians in an area per year

LNNCR = The natural log of nurse corps recruiters by area per year

LNMSCR = The natural log of medical service corps recruiters by area per year

LNHMR = The natural log of hospital corpsmen recruiters by area per year

GENOFFMEDR = General officer recruiters designated as medical recruiters by area by year. Note: This is not a natural log as the value of this variable from 1981 to 1990 was zero.

LNTMEDREC1 = The natural log of the total number of medical recruiters by area per year

LNTMEDREC2 = The natural log of the total number of medical recruiters after subtracting the general officer recruiters by area per year

DESERT = 0 for years 1981 to 1990 (pre-DESERT STORM) and equal to 1 for years 1991 and 1992 (post-DESERT STORM)

Tables 21, 22 and 23 provide the results of the above regression equations. One feature of these regressions is the low  $R^2$  and adjusted  $R^2$  values. The explanatory variables do not predict much of the variation in the number of Navy direct appointment physicians recruited. However, low  $R^2$ s seem to be

a common feature of cross-sectional data. Moreover, except for the LNDRPOP variable in Model 3, the signs of all the variables are as expected. The LNCIVMILINC variable is significant at the .1 level in all three equations. The LNTMEDREC1 and LNTMEDREC2 variables were both significant at the .1 level. However, when broken down by the types of recruiters in Model 3, only the LNNCR variable was significant at the .1 level, while LNHMR had the wrong sign (although it was not significant).

**Table 21: MODEL 1 REGRESSION RESULTS**

Dependent Variable: LNAVYDRS  
 F - Statistic: 2.227  
 Probability F: .0779  
 R - Square Value: .1394  
 Adjusted R - Square Value: .0768  
 Sample Size = 60

Variable	Coefficient of the Variable	t - Statistic
INTERCEPT	7.407	1.128
LNTMEDREC1	1.100*	2.010
LNCIVMILINC	-.727*	-1.882
LNDRPOP	.001	.001
DESERT	-.770	-1.448

\* Significant at the .1 level

**Table 22: MODEL 2 REGRESSION RESULTS**

Dependent Variable: LNNAVYDRS  
F - Statistic: 2.085  
Probability F: .0951  
R - Square Value: .1317  
Adjusted R - Square Value: .0685  
Sample Size = 60

Variable	Coefficient of the Variable	t - Statistic
INTERCEPT	7.014	1.065
LNTMEDREC2	.968*	1.875
LNCIVMILINC	-.718*	-1.850
LNRPOP	.059	.154
DESERT	-.195	-.531

\* Significant at the .1 level

Because the Navy can theoretically change the amount of income it pays its physicians, a calculation was performed to determine how much the pay gap would have to decrease in order to access 25 more direct appointment physicians annually using the average annual number of physicians recruited from 1981 to 1992. Using Model 1, the pay gap would have to narrow by 39.95 percentage points. Using Model 2, the pay gap would have to decrease by 40.45 percentage points, and using Model 3, the gap would have to decrease by 31.57 percentage points. These are fairly large reductions, which would require a significant raise in military pay.



**Table 23: MODEL 3 REGRESSION RESULTS**

Dependent Variable: LNNAVYDRS  
 F - Statistic: 1.731  
 Probability F: .1221  
 R - Square Value: .1890  
 Adjusted R - Square Value: .0798  
 Sample Size = 60

Variable	Coefficient of the Variable	t - Statistic
INTERCEPT	18.186	1.535
LNNCR	.629*	1.928
LNMSCR	.067	.384
LNHMR	-.921	-1.300
GENOFFMEDR	.064	.591
LNRPOP	-.351	-.619
LNCIVMILINC	-.920*	-1.680
DESERT	-1.148	-.644

\* Significant at the .1 level

The Navy can also increase the number of recruiters, according to these three regressions, in order to increase recruitment. Using Model 1, the total number of medical recruiters would have to increase by 26.4 percent to recruit 25 more physicians. Using 1992 levels, this would equate to an increase of 50 medical recruiters. Using Model 2, which excludes general officer recruiters, the number of medical recruiters must increase by 30.0 percent to increase the number of recruits by 25. Again, using 1992 levels, this would mean an increase of 33 recruiters. In Model 3, the

number of nurse recruiters would have to increase by 46.17 percent to recruit 25 more physicians. This would mean 16 more nurse corps recruiters, using 1992 recruiter levels. The Navy could also use a combination of the above two changes to increase the number of direct appointment physicians recruited.

The variables in Model 1 were used to form another regression omitting the 1992 observations to determine the forecasting ability of the model. The regression results are listed in Table 24. They are fairly close to the previous

**Table 24:** MODEL 1 REGRESSION RESULTS AFTER OMITTING THE 1992 OBSERVATIONS

Dependent Variable: LNNAVYDRS  
 F - Statistic: 1.876  
 Probability F: .1293  
 R - Square Value: .1394  
 Adjusted R - Square Value: .0768  
 Sample Size = 55

Variable	Coefficient of the Variable	t - Statistic
INTERCEPT	8.268	1.190
LNTMEDREC1	1.176*	1.961
LNCIVMILINC	-.737*	-1.822
LNRPOP	-.084	-.199
DESERT	-.825	-1.216

\* Significant at the .1 level

version of Model 1 (in Table 21). The main difference is that the sign of the natural log of the physician population variable changes from positive to negative. The actual values of the explanatory variables for 1992 were plugged into this regression equation to gauge the forecasting strength of the model. The prediction that resulted suggested that 23.27 physicians would be recruited in 1992. Fifty-one were actually recruited, so the equation underestimated the amount recruited by 54.37 percent. As currently specified, the model does not hold significant predictive powers. Adding more variables to the equations listed above would likely greatly enhance the predictive powers.

#### **D. SUMMARY**

This chapter explains the process used to develop three regression models. The proxy variables had flaws and the regression models had low  $R^2$ s. There appears to be an improvement in direct appointment recruitment when the civilian-military pay gap narrows and/or when the number of recruiters increases. However, the percent changes needed to make substantial increases in the number of physicians recruited are quite large, which suggests that direct appointment physician recruitment may continue to be a difficult problem.

## V. SURVEY OF DIRECT APPOINTMENT PHYSICIANS

As discussed in Chapter II, no surveys were found that dealt directly with the reasons direct appointment physicians joined the Navy. Upon reviewing the earlier surveys conducted with active duty physicians and interviewing experts and practitioners in the recruiting and medical fields, some information was obtained on the nonpecuniary factors that might entice a physician to forego civilian income for the Navy. Based on this information, a survey was constructed (see Appendix C), which incorporates reasons for joining that had been used in previous surveys. This survey also incorporates information obtained from personal field interviews.

### A. THE SURVEY

The survey began by asking the respondents for the following background and demographic information:

1. gender;
2. years of active Navy service;
3. race;
4. whether or not the physician had ever been in private practice;

5. whether or not the physician was recalled from the Navy Reserve and, if so, whether the recall was voluntary or involuntary; and

6. the age at which the physician joined the Navy as a direct appointment physician (for physicians that were recalled, this was the age at which they were recalled from the Navy Reserve, rather than the age that they joined through other accession sources).

The survey was broken down into three basic sections. The first section of the survey attempted to ascertain the reasons these physicians joined the Navy by presenting them with a list of 23 factors and asking them to select all of the items on the list that were important reasons for their joining the Navy. The list contained 17 factors that past surveys had found positively influenced physicians' decisions to join the service. In addition to these factors, six more were included:

1. promotion;
2. job security;
3. family tradition of naval service;
4. pay off medical education loans;
5. Navy spouse; and
6. blank line for "other" reasons.

It was expected that the results of the surveys would indicate the following to be strong motivators: patriotism, Navy lifestyle/culture, leadership challenge, professional challenge, no personal malpractice liability, avoiding administrative business hassles, better quality health care, and less competitive environment than private practice/more patient-oriented. It was also expected that paying off medical education loans and more personal free time would be somewhat less important motivators. The payment of medical education loans was added to the list because some medical school graduates or residents who have incurred large debts may be motivated by short run earnings to pay off loans. Navy residents earn higher salaries than their civilian counterparts, thereby offering higher short run earnings.

Of the 23 variables that could possibly be chosen in the first section, it was important to determine if some were more important than others in influencing the physician's choice to join the Navy. To this end, the second section asked which five of the 23 listed variables were the physician's most important reasons for joining the Navy.

The purpose of the third section of the survey was to ascertain how physicians' opinions of Navy life and Navy medicine have changed since they came in. The rationale was that there may be other nonpecuniary factors that would

positively influence physician recruitment more than those that originally motivated these physicians to join. These other factors could be used to motivate future recruits. The third section attempts to determine this by asking "Now that you have been in the Navy, what five factors from the list are the most positive aspects of Navy life?"

#### **B. DISTRIBUTION OF THE SURVEYS**

Surveys were distributed to 161 Navy direct appointment physicians at four naval hospitals: Naval Hospital Oakland, California; Naval Hospital Bethesda, Maryland; Naval Hospital San Diego, California; and Naval Hospital Camp Pendleton, California. The four hospitals were chosen because they were easily accessible for the researcher. Three of the four hospitals were major teaching facilities whose physician population is largely board certified.

Table 25 presents a breakdown of the ranks of those physicians who received a survey. Most were very senior; 49.01 percent were captains and 36.65 percent were commanders. Only 14.28 percent were junior officers (lieutenant or lieutenant commander). The doctors who received the surveys were from a variety of specialties, as listed in Table 26. They ranged from hard-to-recruit specialties, such as surgeons, to those whose incomes are more closely aligned to

their civilian counterparts, such as family practice physicians.

**Table 25:** RANK OF DIRECT APPOINTMENT PHYSICIANS WHO RECEIVED SURVEY

Rank	Number	Percentage*
CAPT	79	49.01
CDR	59	36.65
LCDR	22	13.66
LT	1	0.62
TOTAL	161	

\* Percentage may not equal 100 due to rounding errors.

### C. SURVEY RESULTS

Of the 161 surveys distributed, 106 were returned, for a total response rate of 65.84 percent. Each of the four individual hospitals had a response rate exceeding 50 percent. Some of the surveys were undelivered because the physicians were on temporary additional duty at other geographic locations or because the physicians were no longer assigned to the hospital or were no longer in the Navy.

Response bias may be present in this survey. Those who elected to return the survey may not be representative of those physicians who did not return the survey. Also, because



**Table 26: SPECIALTIES OF DIRECT APPOINTMENT PHYSICIANS WHO RECEIVED SURVEY**

---

Allergy / Immunology  
Aerospace Medicine  
Anesthesiology  
Cardiology  
Critical Care Medicine  
Dermatology  
Endocrinology  
Emergency Medicine  
Family Practice  
Gastroenterology  
General Surgery  
Internal Medicine  
Neurology  
Neurosurgery  
Obstetrics / Gynecology  
Ophthalmology  
Orthopedic Surgery  
Otolaryngology  
Pathology  
Pediatrics  
Psychiatry  
Radiology / Nuclear Medicine  
Urology

---

the survey did not target a random sample of all direct appointment physicians in the Navy, but rather those at the four selected hospitals, this sample may not be representative of the total Navy direct appointment physician population. This may especially be true if board certified physicians join for different reasons than non-board certified physicians, since three of the four hospitals were major teaching facilities.

As sometimes happens with surveys, the respondents did not always fill out the form as requested. Six respondents filled out only the first section with the list of 23 factors or only

the second and third sections where they listed the five most important factors for joining or staying. There were also some misunderstandings about the age of accession for some physicians who were recalls. And occasionally, the physicians did not complete one of the biographical questions. All in all, however, most respondents completed the survey as intended. Forty-one respondents added "other" reasons or added reasons to the five most important reasons for joining or added other factors to the five most positive aspects to Navy life. Eleven respondents took the time to add additional comments beyond those discussed above. All of these additions will be discussed later in this chapter.

**1. Characteristics of Physicians Responding to the Survey**

Table 27 displays the distribution of respondents by gender: 18.6 percent of the respondents were female, while 81.4 percent were male. It appears that females are overrepresented in this survey compared to their proportion in the overall direct appointment physician population. Table 28 presents the minority representation of the respondents. At 15.2 percent, Asians are overrepresented compared to their representation in the direct appointment physician population as a whole. Blacks, hispanics, and whites may be underrepresented at 2.9 percent, 2.9 percent, and 78.1 percent, respectively.

Table 27: SURVEY RESPONDENTS BY GENDER

Gender	Number	Percentage
Male	83	81.4
Female	19	18.6
TOTAL	102	

Frequency Missing = 4

Table 28: SURVEY RESPONDENTS BY RACE

Race	Number	Percentage
Asian	16	15.2
Black	3	2.9
Hispanic	3	2.9
Other Minority	1	1.0
White	82	78.1
TOTAL	105	

Frequency Missing = 1

Table 29 reports the length of service distribution of respondents. While those who received the surveys were very senior in rank, 38.1 percent of the respondents had less than 10 years of service. The higher ranks can most likely be explained by creditable service for civilian education and experience that is granted to many physicians.

Table 30 identifies whether or not the respondent was in private practice; 61.3 percent of this sample said they had been in private practice, while 38.7 percent said they had not. Table 31 shows how many physicians were recalled, and if recalled, whether the recall was voluntary or involuntary; of those who returned the survey, 74.29 percent were not recalled from the Naval Reserve, 21.9 percent were voluntary recalls and 3.81 percent were involuntary recalls.

**Table 29: SURVEY RESPONDENTS BY YEARS OF SERVICE**

Years	Number	Percentage	Cumulative Numbers	Cumulative Percentage
0 - 4	16	15.2	16	15.2
5 - 9	24	22.9	40	38.1
10 - 14	31	29.5	71	67.6
15 - 19	22	21.0	93	88.6
20 - 24	10	9.5	103	98.1
25 - 29	1	1.0	104	99.9
over 30	1	1.0	105	100.9
TOTAL	105			

Frequency Missing = 1

**Table 30: SURVEY RESPONDENTS BY EMPLOYMENT IN PRIVATE PRACTICE**

Private Practice	Number	Percent
Yes	65	61.3
No	41	38.7
TOTAL	106	

**Table 31: SURVEY RESPONDENTS' RECALL STATUS**

Recalled From Naval Reserve	Number	Percentage
No	79	74.29
Yes, Voluntary Recall	23	21.59
No, Involuntary Recall	4	3.81
TOTAL	106	

Frequency Missing = 1

**2. First Section of the Survey: List of 23 Possible Reasons for Joining the Navy**

Table 32 lists the 23 factors mentioned in the first section of the survey and reports the numbers and percentages of physicians who indicated the factor was or was not a reason they joined the Navy. Of the 23 factors, only one, patriotism, was given as a reason for joining by a majority,

**Table 32: FREQUENCY OF RESPONSES TO THE 23 FACTORS LISTED AS REASONS FOR JOINING THE NAVY**

Factor	Specified as a reason		Not specified as a reason	
	Number	Percent	Number	Percent
Patriotism	56	51.9	51	48.1
Other	44	41.5	67	63.6
Military Lifestyle/Culture	33	30.6	63	59.4
Professional Challenge	43	40.6	63	59.4
Professional Development	42	39.6	64	60.4
Avoid Administrative Business Classes	40	37.7	66	62.3
More Personal Free Time	38	35.8	68	64.2
Military Retirement	37	34.9	69	65.1
Travel	36	34.0	70	66.0
Graduate Medical Education	30	28.3	76	71.7
Less Competitive Environment than Private Practice (more Patient Oriented)	29	27.4	77	72.6
No Personal Malpractice Liability	28	26.4	78	73.6
Pursue Specialty	28	24.6	90	76.6
Leadership Development	26	23.8	81	76.4
Job Security	23	21.7	83	78.3
30 Days Leave	18	17.0	88	83.0
Special Pays	16	14.2	91	85.8
Family Tradition of Naval Service	13	12.3	93	87.7
Better Quality Health Care	10	9.4	96	90.6
Promotion	7	6.6	99	93.4
Military Pay	6	5.7	100	94.3
Navy Housing	3	2.8	103	97.2
Pay Off Medical Education Loans	2	1.9	104	98.1

51.9 percent, of the respondents. At 41.5 percent of the respondents, the second most frequently listed reason was "other." Military lifestyle/culture and professional challenge were each given as reasons for joining by 40.6

percent of the respondents. Professional development was given by 39.6 percent of respondents as a reason and avoiding administrative business hassles was given by 37.7 percent. "More personal free time" was chosen by 38.5 percent as a reason and military retirement was chosen by 34.9 percent. Thirty-four percent gave travel as a reason while 28.3 percent indicated that graduate medical education was a reason. "The less competitive environment/more patient-oriented than private practice" was cited as a factor influencing 27.4 percent to join while 26.4 percent indicated that no personal malpractice liability was a reason. Fewer than 25 percent of the respondents chose the remaining factors as reasons for joining.

**3. Second Section of the Survey: List of the Five Most Important Reasons for Joining the Navy**

Table 33 presents factors that were mentioned most frequently as being among the five most important reasons for joining. Most frequently mentioned was patriotism, at 44.34 percent, followed by professional development and avoiding administrative business hassles (both at 34.31 percent). Also, among those most frequently mentioned were professional challenge, 32.08 percent; military retirement, 28.3 percent; military lifestyle/culture, 27.36 percent; more personal free

time, 27.36 percent; other reasons, 27.36 percent; and graduate medical education, 25.47 percent.

**Table 33: MOST FREQUENT RESPONSES TO THE FIVE MOST IMPORTANT REASONS FOR JOINING**

Reason	Number	Percentage
Patriotism	47	44.34
Professional Development	37	34.91
Avoid Administration / Business Hassles	37	34.91
Professional Challenge	34	32.08
Military Retirement	30	28.30
Military Lifestyle / Culture	29	27.36
More Personal Free Time	29	27.36
Other	29	27.36
Graduate Medical Education	27	25.47

**4. Third Section of Survey: List of Five Most Positive Aspects of Navy Life**

Table 34 presents the most frequently given responses to the five most positive aspects of Navy life once the physician is in the service. Military retirement was given by 36.79 percent of the respondents, followed by professional development and professional challenge, both at 33.96 percent. Patriotism was listed by 32.08 percent of the respondents,



more personal free time by 30.19 percent and graduate medical education by 27.36 percent. No personal malpractice liability was given by 25.47 percent of respondents, and avoiding administrative business hassles and military lifestyle/culture both received a 24.53 percent response rate.

**Table 34:** MOST FREQUENT RESPONSES TO THE FIVE MOST POSITIVE ASPECTS OF NAVY LIFE

Factor	Number	Percentage
Military Retirement	39	36.79
Professional Development	36	33.96
Professional Challenge	36	33.96
Patriotism	34	32.08
More Personal Free Time	32	30.19
Graduate Medical Education	29	27.36
No Personal Malpractice Liability	27	25.47
Avoid Administrative Business Hassles	26	24.53
Military Lifestyle / Culture	26	24.53

**5. Comparison Between Recalled and Nonrecalled Physicians**

Because the recruiting command is no longer recruiting Naval Reserve physicians to active duty, the responses to the first section were compared between recalls and nonrecalls (see Table 35) to see if there were any significant

**Table 35: COMPARISON BETWEEN NAVY RESERVE RECALLS' AND NON-RECALLS' REASONS FOR JOINING THE NAVY**

Factor	Somebody				Nobody			
	Selected as a reason		Not selected as a reason		Selected as a reason		Not selected as a reason	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Patriotism	41	52.6	37	47.4	14	51.9	13	48.1
Other	28	35.9	50	64.1	15	55.6	12	44.4
Military Lifestyle/Culture	31	39.7	47	60.3	12	44.4	15	55.6
Professional Challenge	29	37.2	49	62.8	14	51.9	13	48.1
Professional Development	29	37.2	49	62.8	13	48.1	14	51.9
Avoid Administrative Business Hassles	11	39.7	47	60.3	9	33.3	18	66.7
More Personal Free Time	10	38.5	48	61.5	4	29.6	10	70.4
Military Retirement	24	30.8	54	69.2	13	48.1	14	51.9
Travel	30	38.5	48	61.5	5	22.2	17	77.8
Graduate Medical Education	24	30.8	54	69.2	5	18.5	22	81.5
Less Competitive Environment than Private Practice - more Patient Oriented	24	30.8	54	69.2	5	18.5	22	81.5
No Personal Malpractice Liability	22	28.2	56	71.8	6	22.2	21	77.8
Pursue Specialty	21	26.9	57	73.1	5	18.5	22	81.5
Leadership Development	21	26.9	57	73.1	4	14.8	23	85.2
Job Security	17	21.8	61	78.2	5	22.2	17	77.8
30 Days Leave	15	19.2	63	80.8	4	11.1	24	88.9
Special Pays	11	14.1	67	86.9	4	14.8	23	85.2
Family Tradition of Naval Service	9	10.3	70	89.7	5	18.5	22	81.5
Better Quality Health Care	10	12.8	68	87.2	0	0.0	27	100.0
Promotion	5	6.4	73	93.6	2	7.4	25	92.6
Military Pay	5	6.4	73	93.6	1	3.7	26	96.3
Naval Spouse	3	3.8	76	96.2	0	0.0	27	100.0
Pay Off Medical Education Loans	1	1.3	77	98.7	1	3.7	26	96.3
<b>TOTAL</b>			27				79	

Frequency Missing = 1

differences between the two groups. Unfortunately, with only 27 recalled physicians, Table 35 does not provide sufficient sample sizes for a reliable comparison. Nonetheless, any differences between the two types of physicians that stand out may be indicative of an important factor.

From this sample, physicians who were recalled gave more "other" reasons than did nonrecalled physicians, 55.6 percent versus 35.9 percent. This may be because their prior service has made recalls more aware of different benefits of naval service. Recalls were more likely to indicate professional challenge than nonrecalls, at 51.9 percent versus 37.2 percent. Recalls were also more inclined to indicate professional development than nonrecalls, 48.1 percent versus 37.2 percent. Recalls listed retirement as a reason more often, with a 48.1 percent response rate compared to nonrecalls, at 30.8 percent. This makes sense, as recalls already have time invested in the Navy toward retirement.

On the other hand, nonrecalls were more likely to indicate more personal free time, at 38.5 percent, than were recalls, at 29.6 percent. Nonrecalls were also more likely to indicate graduate medical education, 30.8 percent, than recalls, 18.5 percent. Nonrecalls mentioned pursuing their specialty more often than recalls, at 26.9 and 18.5 percent, respectively. Nonrecalls indicated the less competitive

environment/more patient-oriented factor more often than recalls, 30.8 percent versus 18.5 percent. And more nonrecalls indicated leadership development, 26.9 percent, than recalls, 14.8 percent. Surprisingly, no recalled physicians indicated better quality health care, while 12.8 percent of nonrecalls did.

#### **6. Comparison of Physicians Who Had Been in Private Practice and Physicians Who Had Not**

One interesting area to explore was to determine whether the reasons for joining were different for those who had been in private practice than for those who had not. Table 36 provides such a comparison, using the first section of the survey. This time the comparison was a little more evenly weighted, with 65 physicians having been in private practice, while 41 had not been.

Those physicians who had been in private practice were more likely to indicate avoiding administrative business hassles, 41.5 percent, than were those who had not been in private practice, 31.7 percent. Those physicians who had been in private practice were also more likely to indicate more personal free time, 41.5 percent, than those who had not, 26.8 percent. The private practice doctors also cited the less competitive environment/more patient-oriented factor more

**Table 36: COMPARISON BETWEEN PHYSICIANS WHO HAVE BEEN IN PRIVATE PRACTICE TO THOSE WHO HAVE NOT**

Factor	Had been in Private Practice				Had NOT Been in Private Practice			
	Selected as a reason		Not selected as a reason		Selected as a reason		Not selected as a reason	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Patriotism	26	56.4	29	44.6	19	36.3	32	51.7
Other	26	40.0	49	50.0	38	34.9	23	56.1
Military Lifestyle Culture	28	43.1	17	56.9	15	36.6	26	63.4
Professional Challenge	28	43.1	17	56.9	15	36.6	26	63.4
Professional Development	22	33.8	43	56.2	26	39.8	37	51.2
Avoid Administrative Business Hassles	21	41.5	28	58.5	14	27.7	34	68.3
More Personal Free Time	21	41.5	28	58.5	7	13.8	37	72.2
Military Retirement	24	36.9	41	63.1	1	2.0	33	66.3
Travel	20	37.8	46	62.2	16	36.6	28	63.4
Graduate Medical Education	17	26.2	38	53.8	16	27.7	41	66.3
Less Competitive Environment than Private Practice (more Patient Oriented)	22	33.8	43	56.2	1	2.0	37	67.9
No Personal Malpractice Liability	16	24.6	49	65.4	12	29.3	29	70.7
Pursue Specialty	13	20.0	52	60.0	11	21.7	39	68.3
Leadership Development	11	16.9	54	63.1	11	24.1	35	65.9
Job Security	13	20.0	52	60.0	10	23.4	32	66.6
10 Days Leave	13	20.0	52	60.0	6	12.2	36	67.8
Spouse Pays	11	16.4	35	44.6	6	12.2	36	67.8
Family Tradition of Navy Service	9	13.8	55	66.2	4	9.8	37	66.2
Better Quality Health Care	4	6.2	51	63.8	6	14.6	35	66.4
Promotion	5	7.7	40	47.3	2	4.9	37	65.1
Military Pay	3	4.6	52	65.4	7	13.3	38	62.7
Navy Spouse	2	3.1	53	68.9	1	2.4	39	67.6
Pay Off Medical Education Loans	1	1.5	54	68.5	1	2.4	40	67.6
TOTAL	66				41			

often than the non-private practice doctors, 33.8 percent compared to 17.1 percent.

Those who had not been in private practice were more likely to indicate professional development, 48.8 percent, than those who had been in private practice, 33.8 percent. They were also more likely to indicate pursuing their specialty, 31.7 percent, than were those who had been in private practice, 20 percent. And finally, those who had not been in private practice were more likely to indicate leadership development, 34.1 percent, than those who had been in private practice, 16.9 percent.

**7. Other Factors Given for Joining the Navy and Listed as Positive Aspects of Navy Life**

Table 37 provides the other reasons for joining and staying given by the physicians who either filled in the "other" blank or wrote in comments in the space provided for listing the five most important reasons for joining and the five most positive aspects of Navy life. Because three of the four hospitals were teaching facilities, it is not surprising that nine people mentioned the ability to teach and work in an academic environment, and five people mentioned research. Table 38 presents additional comments made by survey respondents. Most responses pointed to the negative side of

**Table 37: OTHER REASONS GIVEN FOR JOINING THE NAVY OR OTHER POSITIVE ASPECTS OF NAVY LIFE**

Factor	Number of ratings
Ability to Learn Academic Environment	4
Location (including specific geographic areas (e.g. San Diego) and/or general geographic conditions (e.g. warm water ports, overseas)	4
Berry Plan (Dhah Vietnam)	3
Research (e.g. Clinical Research, HIV)	3
Nontraditional Medicine (Flight Surgeon, Undersea Medicine)	3
Patient Population (e.g. tertiary patients, patients have free access to medical care)	2
Esprit de Corps	2
Prior Service Experience	2
The Uniform	2
THE FOLLOWING REASONS WERE GIVEN BY ONLY ONE RESPONDENT EACH	
Practice subspecialty	
Self imposed "Thank you" to U.S.A.	
Guaranteed equal pay for equal work, active nondiscrimination policy	
Quit over leaving just as Desert Storm hit, voluntary recall	
Role model for younger female medical corps officers	
Influence of a mentor	
Personal challenge	
Practice medicine as more of a true profession, rather than letting it become mostly a business driven occupation	
Physical fitness	
Knights group	
Discipline	
Did not have to commit to group practice, then leave them for a fellowship when they would have expected me to stay on	
Interesting opportunities, positive aspect of Navy life	
Set the pace in managed care and healthcare management	
Professional colleagues, second to none	
None of these referring to the positive aspects of Navy life	

**Table 38: ADDITIONAL COMMENTS FROM SURVEY RESPONDENTS**

GENERAL COMMENTS	
I am getting out of this less than a year.	
I don't think benefits have outweighed the disadvantages of being in the Navy.	
The pay is not adequate to the work.	
I have had a variety of very interesting and satisfying assignments. I am personally quite satisfied with the USN. However, despite the fact that I am happy, I have had adverse experiences which should have been avoidable. I have had many problems with the education system. Many people within the USN do not have been able to get satisfactory work assignments or the approval of their superiors. The balance of the desire to put up with some of the USN's problems associated with providing medical care in the primary aspects of service practice within the USN system are desirable with some modifications. The system can be made even more attractive to medical personnel.	
THE FOLLOWING COMMENTS WERE WRITTEN NEXT TO A FACTOR	
Factor	Comments
Pay	Not Factor
30 days leave	A very negative factor. I had over 30 days per year in private practice.
Military pay	Less than 50% of private practice income. Disappointing.
Less competitive environment than private practice. More patient oriented	Definitely not a true statement. When I was promoted, I entered service because of career largely to enter into training facility. I did not do this after 15 years in Army command because this physician served as a military physician prior to entering civilian practice.
Better Quality Health Care	Based upon training and an immediate community.
Inadequate Medical Education	Not Available. Higher pay than civilian.
Special Pay	None. Disappointing.
Avoid Administrative Business Hassles	No longer avoid administrative hassles. On cutting edge of total quality leadership. Quality Assurance. Joint Commission for the Accreditation of Healthcare Organization. And healthcare management. More paperwork. None. Worse than private practice.
More personal free time	None. No one I know has more personal free time. All physicians are up for 80 hour weeks gladly because they are dedicated to a civilian practice.
Pay	Said: Some all?
Job security	None.

Navy life and Navy medicine, though a few had positive comments to make.

**8. Summary**

As expected, patriotism, military lifestyle/culture, professional challenge, avoiding administrative business



hassles, more personal free time, less competitive environment than private practice/more patient-oriented, and no personal malpractice liability were most frequently mentioned as reasons for joining the Navy. However, leadership development was not as frequently mentioned as anticipated, while graduate medical education, military retirement, travel, professional development, and "other" reasons were mentioned more often than anticipated.

When comparing recalled physicians to nonrecalled physicians, recalled physicians more frequently indicated more personal free time, graduate medical education, travel, less competitive environment than private practice/more patient-oriented, and better quality health care; nonrecalled physicians more frequently indicated "other" reasons, professional challenge, professional development and military retirement. When comparing private practice physicians to those who had not been in private practice, private practice physicians more frequently indicated that avoiding administrative business hassles, more personal free time, and less competitive environment/more patient-oriented were reasons for joining the Navy. On the other hand, physicians who had not been in private practice more frequently responded that professional development and leadership development were reasons for joining.

Once again, however, it bears repeating that this survey may not be representative of Navy direct appointment physicians as a whole because of selectivity bias and because it was not a random sample. It would be interesting to take the input given in Tables 37 and 38, redesign the survey, and distribute the survey to a random sample of all direct appointment physicians to see if more can be discovered about the nonpecuniary benefits that attract and keep physicians in the Navy.

## VI. SUMMARY AND RECOMMENDATIONS

### A. SUMMARY

The results of this thesis clearly support the quote from Lerro, et. al., (1989) which began this thesis about the difficulty of recruiting direct appointment physicians. The regression analysis supports the hypothesis that, if the pay gap between military and civilian physicians narrows, or if the number of recruiters increases, that the number of direct appointment physicians recruited will increase, all else constant. However, to recruit 25 more physicians annually, the pay gap would have to decrease anywhere from 31.57 to 40.45 percent. Likewise, an annual increase of 25 physicians would require an increase in the total number of recruiters of 26.4 percent or an increase in the number of nurse corps recruiters of 46.17 percent, all else held constant. There do not, however, seem to be any strong nonpecuniary factors which affect direct appointment physician recruitment. Only one factor, patriotism, was indicated by a majority of survey respondents as a reason for joining the Navy, and that was by a bare majority at 51.9 percent.

## B. RECOMMENDATIONS

Major improvements in this thesis would involve two projects; (1) improving the regression forecasting model, and (2) revising the survey.

### 1. Improve the Regression Model

The regression analysis can be improved by increasing the forecasting accuracy of existing proxy variables and including additional variables in the model.

#### *a. Improving Existing Variables in the Model*

(1) *Number of Observations.* The regression can be greatly improved if the number of observations were increased by using recruiting districts vice recruiting areas. This may be possible if the American Medical Association (AMA) will provide the physician income and malpractice liability data used by Gonzalez (1987, 1989, and 1992) grouped by county or even by state rather than by census divisions.

(2) *Military Pay.* The accuracy of the military pay proxy can be increased if the measures of VHA, MORB, and MSP are included. This would allow more precise measurement of the impact of special pays and bonuses on recruitment.

(3) *Physician Population.* The physician population variable would more accurately reflect the military supply market if it were restricted to the number of physicians under

the age of 45. These data are available in Roback, et. al., (1982, 1984, 1986, 1987, 1990, and 1992).

*b. Adding Additional Variables to the Model*

(1) *Advertising.* As discussed in Chapter IV, the amount spent on advertising for direct appointment physicians is a function of the total amount available for Navy advertising and the recruiting goals for direct appointment physicians. The goals and the amounts spent on direct appointment physicians for the years 1988 to 1992 were obtained for this thesis, but these two alone were not enough to accurately estimate the amount spent from 1981 to 1987. An accurate value for the earlier years could be estimated if the total amount spent on Navy advertising from 1988 to 1992 were known. Adding an estimate for the advertising dollars spent could improve the regression's accuracy.

(2) *Real Income of the Population.* Increases in the real income of the population may increase the demand for physicians and thus increase physician income. Adding a variable to measure changes in real income for the district or area population may improve the predictive power of the regression equation.

(3) *Local Medical Community.* Physicians have expressed preferences for the locations that have a strong medical community (i.e., practicing physicians, group

practices, and hospitals) (Stone and Turner, 1992). A proxy variable for the number of hospitals and medical practices could help to measure the impact of the local medical community and improve the regression model. It is unclear, however, where such information could be obtained, but perhaps the AMA keeps such data.

(4) *Individual Civilian Data.* If individual physician vice aggregate data could be obtained on civilian physicians from the AMA or other sources, this data could be compared to Navy direct appointment physicians to see how the civilian and military populations differ. Additionally a logit regression could be built to see if the decision to join by physicians could be predicted given the factors already discussed, plus the following additional factors:

1. gender;
2. race;
3. home town<sup>5</sup>;
4. location of medical school, intern and residency programs.

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<sup>5</sup> Physicians have shown a preference for locations close to family.

## 2. Revise and Redistribute Survey

### a. Revisions

Add the following as possible reasons for joining the Navy in section one of the survey:

1. opportunities to teach;
2. research opportunities;
3. Berry Plan/draft;
4. location of Navy hospitals;
5. location of Navy duty stations;
6. esprit de corps;
7. patient population;
8. nontraditional medicine (i. e., undersea medicine, flight surgery);
9. personal challenge;
10. not having to commit to group practice, free to leave for a fellowship opportunity;
11. set the pace in managed care;
12. professional colleagues.

### b. Redistribute Surveys

Redistribute the surveys to all Navy direct appointment physicians to obtain a more representative sample. There will still be response bias as a 100 percent response rate cannot be guaranteed. But the responses should be more representative of the population as a whole. These changes

will be crucial to understanding the strength of nonpecuniary factors affecting military affiliation by physician. Together, the regression model and the survey will provide complementary information that will assist in understanding the factors that motivate direct appointment physicians to join the Navy.



## APPENDIX A

This thesis realigns the recruiting areas and districts from 1981 to 1992 in a way that most closely resembles the current geographic configuration. This was done so that the results of this thesis would be more useful for current recruiting managers. It should be noted that the changes listed below are not all of the changes made to the NRD's from 1981 to 1992. There are other NRD's that have not recruited more than one physician from 1981 to 1992, so changes in these districts were not of concern for this thesis. Only NRD's that recruited more than one physician were used in this thesis, so only those NRD changes affecting physician recruitment are listed below.

The NRD's that have been eliminated are listed below in Table 39, along with the current NRD that absorbed the area. Two NRD's, 526 and 326, were absorbed into two other NRD's, 314 and 316. The PORTS data were not clear on which portion of NRD 526 went to 314 and which went to 316, and likewise which portion of NRD 326 went to NRD 314 and which went to 316. These NRD's were realigned using odd and even fiscal years to arbitrarily assign a portion of each district to NRD 314 and a portion to NRD 316.

**Table 39: REALIGNMENT OF NAVY RECRUITING DISTRICTS THAT RECRUITED MORE THAN ONE PHYSICIAN FROM 1981 TO 1992**

Previous NRD	Current NRD
417	517
418	518
420	120
422	522
524	724
406	306
409	309
526	326
527	727
309	119
725	525
730	830
526 (odd FY's)	316
526 (even FY's)	314
326 (FY 90)	314
326 (FY 91)	316

Source: Navy Recruiting Command

APPENDIX B

EXPLANATION OF COLUMN HEADINGS ON TABLE III

FY 93 Military Pay - Based on a modal military physician using weighted average for 03-96. Includes base pay, basic allowance for quarter, basic allowance for subsistence, variable housing allowance, variable special pay, board certified pay, and additional special pay.

FY 93 4 Year MSP - Multi-year Specialty Pay. Replace MORB. Varies by specialty and length of obligation from two to four years.

FY 93 ISP - Incentive Special Pay

Estimated Civilian Pay - Estimated civilian pay for 1993 of employed physicians. Employers are hospitals, group practices, and health maintenance organizations. Partnership distributions and other such nonsalaried monetary payments are excluded.

Total Pay Gap - Civilian pay minus total military pay.

Percent of Civilian Pay - Percentage of military pay compared to civilian pay.

APPENDIX 7

SURVEY OF DIRECT APPOINTMENT PHYSICIANS'  
REASONS FOR JOINING THE NAVY

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The information on this survey will be used for research in recruiting direct appointment physicians. Your answers will be kept strictly confidential.

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■ Please circle or fill in the blank

Gender: Male Female      Years of Active Navy Service \_\_\_\_\_

Race: Asian Black Hispanic White Other

Have you ever been in private practice? yes no

Were you a recall from the U.S. Naval Reserve? yes no  
If yes, were you: Voluntary Recall Involuntary Recall

Age When Joined the Navy as Direct Appointment Physician \_\_\_\_\_  
Note: For those recalled from the Reserves, please give age at which you were recalled.

■ Which of the following were reasons you joined the Navy as a direct appointment physician? Circle all that apply.

- |  |                                    |                                      |
|--|------------------------------------|--------------------------------------|
| a. Graduate Medical Education  | b. Special Pays                    | c. Patriotism                        |
| d. Military Retirement   | e. Travel                          | f. Promotion                         |
| g. Leadership Development  | h. 30 Days Leave                   | i. Military Pay                      |
| j. Professional Development  | k. Job Security                    | l. Pursue Specialty                  |
| m. No Personal Malpractice Liability   | n. Professional Challenge          | o. Family Tradition Of Naval Service |
| p. Avoid Administrative Business Hassles                                     | q. Pay Off Medical Education Loans | r. Better Quality Health Care        |
| s. Military Lifestyle, Culture   | t. More Personal Free Time         | u. Navy Spouse                       |
| v. Less Competitive Environment Than Private Practice: More Patient Oriented |                                    |                                      |
| w. Other _____   |                                    |                                      |

■ From the list above, what were the five most important reasons you joined the Navy?

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_

■ Now that you're in the Navy which five items from the list above do you consider to be the most positive aspects of Navy life?

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_

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