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**NAVAL
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THESIS

**AN IN-DEPTH ANALYSIS OF THE DEPARTMENT OF
THE NAVY'S TARGETED SEPARATION INCENTIVE
PROGRAM AS A FORCE-SHAPING TOOL**

by

Daniel P. Hudson

March 2006

Thesis Advisor:
Second Reader:

William Gates
Peter Coughlan

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**AN IN-DEPTH ANALYSIS OF THE DEPARTMENT OF THE NAVY'S
TARGETED SEPARATION INCENTIVE PROGRAM AS A FORCE-SHAPING
TOOL**

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Major, United States Marine Corps
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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
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This research examines how the Targeted Separation Incentive Program, currently underway by the Navy, is being administered to bring about the voluntary separations of junior officers to meet the requirements of the Navy's most recent force reduction. This study evaluates the effects of past separation incentive programs as well as the current compensation package that the service-member may receive which is outlined in the Fiscal Year 2006 National Defense Authorization Act. In addition, an analysis was conducted of the costs associated with retaining the service-member versus the personal costs of that individual of leaving. The objective of this thesis is to evaluate the Department of the Navy's (DoN) Targeted Separation Incentive Program in order to see if this program can adequately meet the goals of the current force reduction and whether or not savings can be realized through alternative separation programs.

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I. INTRODUCTION

A. BACKGROUND

During October 2002, Admiral Vern Clark, Chief of Naval Operations, published *Sea Power 21*, which established the cornerstone for current naval planning and preparation for future operations. Basically serving as the Navy's vision statement of how it plans to "organize, integrate and transform" itself to meet the asymmetrical threats of the 21st century, *Sea Power 21* is highlighted by Admiral Clark's redefinition of the three fundamental operational concepts which will transform the U.S. Navy: Sea Shield, Sea Strike and Sea Basing. In order to accomplish this three-pronged operational transformation, Admiral Clark envisioned a "triad of organizational processes" incorporated to "align and accelerate the development of enhanced warfighting capabilities for the fleet." One of these organizational processes is Sea Enterprise, which tasked the Vice Chief of Naval Operations to "improve organizational alignment, refine requirements, and reinvest savings to buy the platforms and systems needed to transform" the U.S. Navy.

As part of Sea Enterprise, the Navy sought to produce measured reductions in its active duty end strength through Fiscal Year (FY) 2007. These calculated cuts in personnel were designed as a cost savings initiative in an attempt to reinvest in warfighting capital while taking advantage of enhanced technical capabilities realized through the acquisition of integrated information systems and the organizational realignment of some of its core competencies. Since FY2003, the Navy has been able to cull 16,335 sailors from its rolls with an additional reduction of 20,600 sailors planned through FY2007. Although the Navy did not utilize any form of voluntary separation incentive to achieve their FY2004/2005 goals, the Department of the Navy (DoN) had budgeted for the use of "Force Shaping Tools" to release 914 officers and 781 enlisted sailors (DoN, 2005) during FY2006 with the same number being dropped, again, in FY2007 to meet its manpower goals. With the publication of the *Department of the Navy Fiscal Year (FY) 2007 Budget Estimate Submission* (DoN, 2006), these numbers were further reduced to include only the voluntary separation of 502 officers during FY2006 under the Targeted Separation Incentive program.

In order to facilitate the planned reductions in end strength for the Navy, as well as similar reductions for the U.S. Air Force, the FY2006 National Defense Authorization Act (NDAA) granted Voluntary Separation Pay Authority to the Secretary of Defense for a period from 1 October 2005 through 31 December 2011. Much like past attempts to shape the force, the 2006 NDAA authorizes each Department Secretary to offer voluntary separation incentives in the form of a lump-sum buyout to its service members, an annuity, an annuity/lump sum combination, or selective early retirement for officers with more than 15 years of service in order to shape the force. In addition, the FY2006 NDAA laid the groundwork for establishing “high year tenure” limits for targeted officer skill groups below the current statutory retirement limits (HR 1815, 2006) to further enable the services to redefine their manpower needs.

Although past voluntary separation incentive programs yielded the desired cuts in active end strength, numerous studies (which will be discussed in the following chapters) concluded that the government had absorbed sizeable losses in the form of economic rents that were paid to eligible service members who would have voluntarily left the service for a lesser amount than what their particular service was offering (Asch and Warner, 2001). In the absence of a more efficient system, these surpluses paid to departing service members would have been necessary in order to achieve the desired effect of meeting reduction goals in the form of desired separations and can simply be viewed as the “cost of doing business” associated with “fairness” on the part of the government. During the relatively peaceful nineties, this was a plausible strategy; however, as the Global War on Terrorism looks over the horizon at potential adversaries in a Hamas-led Palestinian State and a nuclear Iran, the “fairness” factor can not be overlooked as the services drive to maintain adequate manning levels while the public continues to scrutinize how the defense dollar is spent.

B. PURPOSE

Keeping the taxpayer in mind, the purpose of this research is to examine how the Targeted Separation Incentive Program, currently underway by the Navy, is being administered to bring about the voluntary separations of junior officers in order to meet the requirements of the Navy’s most recent force reduction. This study will evaluate the effects of past separation incentive programs as well as the current compensation package

that the service-member may receive which is outlined in the Fiscal Year 2006 National Defense Authorization Act. Next, this thesis will conduct an analysis of the costs associated with retaining the service-member versus the personal costs of that individual leaving. The objective is to evaluate the Department of the Navy's (DoN) Targeted Separation Incentive Program in order to see if this program can adequately meet the goals of the current force reduction and whether or not savings can be realized through alternative separation programs.

C. RESEARCH QUESTIONS

During February 2006, the Department of the Navy programmed \$28.5 million to separate 502 junior officers with six to 12 years of service through the Targeted Separation Incentive program (DoN, 2006). Although some may argue the rationale for paying people to leave the service during times of war, it is absolutely essential for the continued success of future force shaping programs that the Navy defines the true costs associated with the Targeted Separation Incentive program. For this reason, this thesis will focus on the following questions.

1. Primary Questions

Did the Navy adequately fund for the voluntary separation of junior officers through the Targeted Separation Incentive program during Fiscal Year (FY) 2006?

What is the maximum cost the Navy should offer to separating officers through the Targeted Separation Incentive (TSI) Program?

What is the minimum amount that junior officers would be willing to accept through this program and what would be the Navy's net savings as a result of the TSI program?

2. Secondary Questions

How have past voluntary separations programs worked and what are the concerns associated with using each of these programs?

Can the allocation of separation payments to junior officer be more efficiently allocated through the use of auctions?

D. SCOPE OF THESIS

Using data gathered from the Department of the Navy's Fiscal Year 2006 Budget Estimates, as well as past research on the voluntary separation incentive programs associated with the last major drawdown, this thesis will focus on the most likely target population of the Targeted Separation Incentive program: Navy Lieutenants (O-3) with six to 10 years of service. During the course of this analysis, the discount rates associated with reducing the force through separations pay will be examined as well as the range of offers the Navy should offer followed by the range of prices the sailor is most likely to take. This analysis will be based on current FY2006 pay rates and will conclude with a set of recommendations for the administration of future reductions in force by the Department of the Navy.

E. METHODOLOGY

Using the parameters laid out in the FY2006 National Defense Authorization Act and the FY2006 Department of the Navy, a model was created to evaluate the net present value of the Department of the Navy's current voluntary separation incentive program as it applies to the Navy and its sailors in terms of years of service, projected retirement benefits and the expected return on investment from the Department of the Navy. This model will use a discount rate used in similar research (Reppert, 2004) in order to provide a baseline analysis of this program which will be followed by a pointed explanation of how auction theory can be applied to eliminate inefficiencies within the current system. In addition, further analysis will be offered on the Navy's current strategy of reduced accessions to meet reduction goals and its impact on future readiness.

F. CHAPTER OVERVIEW

Chapter II takes a look at past voluntary separation incentive programs and their realized effects. In addition, this chapter provides an overview of some of the calculations involved in past efforts as well as the strengths and weaknesses associated with each attempt.

Chapter III analyzes the Targeted Separation Incentive program and the potential effects this force shaping tools may have on future readiness. This chapter also offers a net present value model of what DoN has established in the FY2006 Budget Estimates (DoN, 2006) in the form of voluntary separation incentives.

Chapter IV presents the Excel model with Crystal Ball add-in used in this research to determine the present value of foregone retirement benefits. This chapter also covers the assumptions that were made in this model as well as their potential effects the execution of the Targeted Separation Incentive program.

Chapter V provides the data analysis and interpretation of results from the Monte Carlo simulations described in Chapter IV. This chapter focuses on the effects that different discount rates and assumptions have on the volume of surplus payments made to departing officers under the Targeted Separation Incentive program.

Chapter VI offers an alternative means to conduct voluntary separations through the use of auctions. This chapter offers a basic overview of auction theory and provides insight into how loss in the form of economic rents paid to departing sailors can be reduced through auctions as well as the possibility of gaining useful data relating to the true discount rates of separating officers plus additional demographical data associated with administering such programs.

Chapter VII focuses on additional items to be considered when calling on force reductions and offers recommendations for future courses of study as DoD, no doubt, attempts to redefine the Force.

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II. THE HISTORY OF VOLUNTARY SEPARATION INCENTIVES

A. INTRODUCTION

On July 1, 1973, under the direction of President Richard Nixon, Congress followed the recommendations of The President's Commission on an All-Volunteer Armed Force and allowed the authority for the conscription of U.S. service-members to lapse, thus laying the foundation for today's All-Volunteer Force. Seen as an "economically viable and potentially more effective" (Bush, 2003) means to meet our manpower needs, the All-Volunteer Force shifted our nation's reliance on an easily accessible stream of accessions and created a dependence on our ability to compete with market forces to attain active end strength. Since that date, the Department of Defense has been dependent on catering to the sensitivities of the labor market associated with recruiting and retaining sufficient numbers to maintain its operational needs.

For this reason, when faced with the prospect of reducing the force, the Department of Defense has had to weigh heavily the long term effects of separating specific cohorts of officers and enlisted personnel as they pertain to future manpower needs. This became very evident during the last major defense drawdown, when the active duty officer population was reduced by 23 percent from 1989 through 1996 (CBO, 1999). In order to meet the demands of a post-Cold War military climate combined with the need to work within tighter budgetary constraints, the military realized that it would need to offer voluntary separation incentive payments to meet its reduction goals while preserving the incentive for others to stay and maintain adequate manning levels required to source its warfighting needs.

B. OVERVIEW OF PAST SEPARATION INCENTIVES

Throughout the history of the United States, the size and mix of our armed forces has always been tailored to meet the perceived and emerging threats to our national security. Following the collapse of the Soviet Union and the end of the Cold War during the late 1980's, the United States no longer felt the need to source an active duty military large enough to fight two regional conflicts, including one involving a robust, Soviet-led Warsaw Pact. During this period, many felt that future conflicts would require a smaller,

more technical force, which was further reinforced by the overwhelming success of Operations Desert Shield (1990) and Desert Storm (1991). To transform the military of the early 1990's to a more technical, competency-based organization, Congress and the Department of Defense sought to reinvest in military capital through savings realized by reducing active duty end strength. This marked the beginning of the first major military drawdown involving the All-Volunteer Force.

Signed into law by the *National Defense Authorization Act for Fiscal Years 1992 and 1993*, the Department of Defense was required to reduce the active end strength of our armed forces 15% by the end of Fiscal Year 1995. Faced with the challenge of bringing in enough personnel “to maintain a combat-ready force in the future and yet keep the faith with personnel already in uniform (CBO, 1999),” the FY1992 National Defense Authorization Act authorized the use of voluntary separation incentive payments to balance the requirements of the force reduction with the expectations of those who did not wish to leave. This was executed using three different options to achieve voluntary separations: the Voluntary Separation Incentive (VSI), the Special Separation Benefit (SSB) and the Temporary Early Retirement Act (TERA).

1. Voluntary Separation Incentive (VSI)

Although the Department of the Navy initially planned to meet DoD's force reduction requirements through Selective Early Retirement boards (boards designed to separate retirement-eligible officers on active duty prior to their intended retirement dates), cuts in accessions and the up-or-out policies of the promotion system (CBO, 1999), the need to cut more than 13,000 officers from 1989 through 1995 left them searching for more equitable and expedient means. For those not senior enough to accept early retirement, the option with the highest net present value of the three programs was the Voluntary Separation Incentive (VSI). The VSI was basically an annuity determined by the following formula:

$$\text{VSI annuity} = .025 * \text{years of service} * \text{final month's basic pay} * 12 \text{ months}$$

This annuity would be paid for a period determined by two times the number of years served and would be paid in annual installments on the anniversary of the separation date. Separating officers would receive no in-kind benefits and be required to serve an additional number of years equivalent to the life of the annuity in a Ready

Reserve capacity following separation. Like the other two options, the VSI program was only open to service members with more than six but less than 20 years of active service, who had just completed five years of continuous service and were not currently in the process of being involuntarily separated or reviewed for a possible disability.

2. Special Separation Benefit

Despite being significantly lower in value when comparing the present values of the three voluntary separations options, the weapon of choice for most Navy officers during this timeframe was the Special Separation Benefit (SSB) (see Table 1 below: Rogge, 2006). Unlike the VSI program, the separating officer only had a three year obligation with the Ready Reserve and received a single payment upon the date of separation plus six months of in-kind benefits. The SSB payment was based on the following equation:

$$SSB = 0.15 * \text{years of service} * \text{final month's basic pay} * 12 \text{ months}$$

This lump sum payment was equivalent to the present value of the VSI at a 16% personal discount rate. This personal discount rate was the breakeven point for the present values of the VSI and SSB programs identified in the Warner and Pleeter study (Warner and Pleeter). The SSB yielded a significantly smaller present value than the VSI as the real discount rate declines (Asch and Warner, 2001), leading some to believe that the Department of Defense grossly understated the real discount rate required to separate 13,000 officers during that timeframe.

VSI/SSB Officer Acceptance Figures			FY92	FY93	FY94	FY95
Navy		VSI	0	258	392	28
		SSB	0	432	633	40
Army		VSI	2064	1180	608	0
		SSB	2696	1267	754	1
USAF		VSI	1109	1598	95	0
		SSB	1233	1123	47	0
Marine Corps		VSI	10	149	133	0
		SSB	1	119	66	0
Department of Defense		VSI	3165	3185	1228	28
		SSB	3930	2941	1500	41
		Total	4295	6126	2728	69
Source: derived from data obtained from Defense Manpower data center (DMDC)						

Table 1. VSI/SSB Acceptance Figures from Last Drawdown (From: Rogge, 1996)

3. Temporary Early Retirement Authority (TERA)

Not available during the first year of the VSI/SSB program, the Temporary Retirement Authority offered an early retirement program to many officers with 15 to 20 years of service. Due to the involuntary separation constraints placed on officers with more than 15 years of service outlined in the *Defense Officer Personnel Management Act of 1980* (Rostker *et al*, 1993), the services found that, as they began to reduce accessions, there was a naturally occurring increase in the percentages of field grade officers. In order to offset this imbalance, Congress authorized temporary relief through the early retirement of field grade officers in the *National Defense Authorization Act for Fiscal Year 1993*.

Basically offering the same type of lifetime annuity and in-kind benefits associated with retirement at 20 years of service, the TERA program was based on a monthly calculation determined to account for what the service member would have received at twenty years in proportion to the time served on the date of separation (see Appendix B). In addition, there were added incentives for the separating member to fill needed general service billets, or equivalent jobs working for the federal government in a civilian capacity, which would allow that individual to reap full retirement benefits (50%) had they served 20 years at the age of 62 (TERA, 2006).

C. LUMP SUM VERSUS ANNUITIES

Once the drawdown had been completed, an extensive amount of research was conducted to determine which groups were takers for each respective category. Despite the fact that the annuity proved to be a wiser long term investment, the majority of officers still chose to accept the lump sum SSB payment. Some attributed this apparent miscalculation on the part of our departing officers as the government's failure to adequately address the personal discount rates of those wishing to leave the service (Rogge, 1996) while, on the other hand, it may have been the fact that lump sum payments are simply easier to understand (Hattiangadi, 2001).

Regardless of the reasoning behind making the choice between a lump sum and annuity, the General Accounting Office stated the government's preference for issuing lump sum payments in a 1985 report related to the Selected Reenlistment Bonus program. This report stated that "lump sum payments are: 1) More cost-efficient than installment

bonuses; 2) More readily visible to Congress and DoD decision-makers; and 3) Less limiting to decision-makers when fiscal reductions must be made (Ross, 2000).” Aside from eliminating any long term liability on the government’s behalf, lump sum payments ensure greater flexibility in dealing with future budgetary issues while bringing closure to the administrative burden of accounting for those who take the incentive after they separate.

D. PROBLEM AREAS WITH PAST SEPARATION INCENTIVES

Despite achieving the desired reductions in active duty end strength associated with the military’s downsizing attempts of the early nineties, many still debate the marginal success of the program as well as whether or not these programs actually saved any money *et al.* According to the Congressional Budget Office’s 1999, *The Drawdown of the Military Officer Corps* (CBO, 1999), the VSI and SSB options for mid-career officers only increased voluntary separation rates for officers during this period by 1.6 percentage points; further detailing that only 47 percent of mid-career officers who took advantage of these programs “would have stayed in the military if the services had continued their pre-drawdown retention policies.” This would indicate that 53% of the officers who separated during this timeframe would have left anyway, yet received the same compensation as a separating sailor who would have required a payment to forego any future military service. In other words, the separation payment these sailors received to leave was entirely surplus value, which is the difference between the sailor’s reservation wage, or the price he is willing to take to leave (in this case, nothing), and the price he would eventually take (the separation benefit).

Even though some would argue that the true benefit of this program was the savings realized by avoiding the accrued values of future military pay and retirement benefits for separating individuals (Rogge, 1996), there is no indication of where this savings went following completion of the last drawdown or whether or not an actual “savings” took place. Most likely, this reduction in personnel costs simply served as an income transfer to fund another program, but there is no attainable data to show which program(s) benefited from these personnel cuts. As forecasted in *Sea Power 21*, it appears that the Navy was willing to sacrifice the future opportunity costs associated with labor to invest in capital (technology), but, to have a true “savings”, the marginal benefit

associated with the Navy's investment in capital would have had to be equal to or greater than the marginal opportunity cost of what the Navy paid the departing sailor. Currently, there is no study available, which indicates if this took place.

E. RESULTS OF PAST SEPARATION INCENTIVES

As noted in a 2001 RAND study on the effects of voluntary separations incentives (Warner and Asch, 2001), all three options of the FY1992 and FY1993 National Defense Authorization Acts served as an effective measure to reduce active end strength. This study went on to note that, "generally, lower quality personnel did accept the offer," quelling any worries about a mass exodus by those whom the services feared would leave due to the opportunity for greater potential earnings in the private sector. Because of DOPMA standards and reduced accessions, these voluntary separation incentives yielded a more senior force in the short run, dropping the percentage of officers in the Navy with less than eight years of service from 42 percent to 32 percent (CBO, 1999). However, time and increased accessions in the years following the drawdown have restored officer distribution by grade to pre-drawdown levels.

F. CHAPTER SUMMARY

In the end, the Navy paid 848 officers \$48.18 million during the early to mid-nineties to leave the service through the Voluntary Separation Incentive and the Special Separation Benefit (Rogge, 1996). Although the true cost savings associated with these programs is debatable, there is no sound argument against its ability to achieve the desired effect – voluntary reductions in force levels. For this reason, when faced with the need to conduct additional cuts in active end strength as part of the modernization of the Fleet outlined in *Sea Power 21* (Clarke, 2002), the United States Navy returned to the trusted process of offering lump sum payments to meet its reduction goals via the Targeted Separation Incentive program.

III. THE TARGETED SEPARATION INCENTIVE PROGRAM

A. BACKGROUND

With the publication of *Sea Power 21* during October 2002, the Department of the Navy set out to undergo a major cultural transformation to “organize, integrate and transform” itself to meet the asymmetrical threats of the 21st Century. To accommodate the realignment of its organizational processes, while freeing up more funding to purchase the platforms and systems needed to bring about this transformation, DoN planned on separating more than 36,000 sailors from its active duty rolls. At the onset, from Fiscal Year 2003 through the end of FY2005, the Navy was able to reduce its end strength by 16,335 sailors without instituting additional reduction in force or voluntary separation incentive measures.

When the FY2006/2007 DoN Budget Estimates for military personnel was released during February 2005, the Navy was looking to offer voluntary separation incentives in the form of Force Shaping Tools as its first attempt at compensating sailors to leave since the last drawdown. At this time, the Navy was looking at releasing 914 officers and 781 enlisted sailors from active service through a program featuring a choice of an annuity or a lump sum buyout, plus six months of transition benefits and repeal of the expanded Selective Early Retirement authority. This program was to be in effect for fiscal years 2006 and 2007 and was budgeted at the rate of \$63,128.01 per officer and \$59,573.62 per enlisted sailor.

Soon thereafter, following the passage of the *FY2006 National Defense Authorization Act*, these numbers were further reduced to target only 502 officers at a rate of \$56,773.00 per officer through the Targeted Separation Incentive program. This voluntary separation option was crafted to “provide the Department of Defense (DoD) with a targetable, voluntary separation incentive to offer service members at various stages in their careers after they have served at least six years (Haynes, 2005).” The underlying concept which drove the Targeted Separation Incentive program was that the services would start with the least expensive force-shaping measures to reduce end

strength (lump sum payments) then progress to more expensive measures (annuities and early retirement) in order to achieve the proper mix of skills and experience to suit their needs.

Beginning in FY2006, the Navy has authorized a single, lump sum payment as a separation incentive to officers with more than six, but less than 12 years of service, who have served at least five years of continuous active duty service immediately preceding the date of the officer's separation from active duty. These payments are restricted to officers who have not already received a separation incentive nor are under review for an administrative discharge or a potential service-related disability separation. The officers separated under this program will be granted 6 months worth of in-kind benefits upon the date of separation and will be offered a lump sum, not to exceed 2 times involuntary separations pay (see Table 2 below). The authority for this phase of the Targeted Separation Incentive program expires on December 31, 2008 (109th Congress, HR 1815).

B. COSTS ASSOCIATED WITH THE TSI PROGRAM

Prior to the February 2006 update on the Department of the Navy's budget estimates, the Navy had budgeted for \$115.398 million to execute the targeted separation of 1,828 officers over a two year time span, FY2006 and FY2007. Following the most recent update, the Navy has reduced this sum to accommodate the departure of 520 officers at a sum not to exceed \$28.5 million. In a sense, the Department of the Navy realized an estimated \$86.90 million in savings by simply waiting a year and allowing willing officers to depart via the natural means of voluntary separation. Meanwhile, the maximum cost associated with separating specific cohorts of officers under this program is exhibited in the table below.

Maximum Cost to Separate Under FY2006 NDAA

Paygrade	6	7	8	9	10	11	12
O-3	\$64,843.20	\$75,650.40	\$90,794.88	\$102,144.24	\$117,007.20	\$128,707.92	\$147,337.92
O-2	\$55,468.80	\$64,713.60	\$73,958.40	\$83,203.20	\$92,448.00	\$101,692.80	\$110,937.60
O-3E	\$64,843.20	\$75,650.40	\$90,794.88	\$102,144.24	\$117,007.20	\$128,707.92	\$147,337.92
O-2E	\$55,468.80	\$64,713.60	\$76,314.24	\$85,853.52	\$100,353.60	\$110,388.96	\$125,038.08
O-1E	\$46,746.72	\$54,537.84	\$64,627.20	\$72,705.60	\$83,728.80	\$92,101.68	\$103,947.84

Table 2. FY2006 Authority (2 * Invol Sep pay as shown in Appendix E)

C. TARGETED SEPARATIONS AND REDUCED ACCESSIONS

Following the guidance of Grissmer and company's 1995 RAND study on the evaluation of alternative voluntary separation payments, the Targeted Separation Incentive program is buoyed in its attempt to reduce active end strength by a concurrent reduction in accessions (Grissmer, 1995). Although this is the most expedient means to reaching a reduction in end strength, the Navy must be cautious when dropping the entry of new officers below the steady state level of accessions necessary to fill future billets in more senior ranks. Since the Navy is required to compete with market forces in order to retain future cohorts of officers in necessary skill sets, any savings realized through the reduced accessions and separations could be quickly offset by increases in recruiting costs and the need for additional Special and Incentive (S&I) payments (Hansen, 2005).

D. CHAPTER SUMMARY

Seeing that the average TSI payment that the Navy has budgeted for, \$56,773.00 per officer, falls well below the advertised ceiling for most targeted cohorts (see Table 2) through the Targeted Separation Incentive, it will be very interesting to see how the Department of the Navy conducts this program prior to the end of Fiscal Year 2006 and what the price for voluntary separations will be. As Fiscal Year 2007 signals the end of the Navy's measured drawdown of active forces, the future opportunities of officers within this target group must be considered as well as the prospect of extended deployments sailing off into harm's way. Taking these factors into consideration, the remainder of this thesis will search for defining that price which would clear the market for future reductions as well as whether or not this program could be more efficiently administered via alternate means.

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IV. DATA AND METHODOLOGY

A. BACKGROUND

During December 2004, Joseph Reppert developed an Excel-based forecasting model, with the Crystal Ball add-in, to determine what the maximum cost to the Navy would be using voluntary separation incentives as well as what the minimum lump sum payment amount that the separating officer would be willing to take under similar circumstances (Reppert, 2004). In Reppert's model, the intent was to observe "average" officers in the Navy "from all specialties." With the help of the Crystal Ball add-in, this model was able to contain distribution functions for a number of the key variables within the model. These distributions "were used to create a range of values during Monte Carlo simulations" which allowed the model to take into account such factors as future promotion possibilities, expected lifespan following retirement, and expected age at the time of retirement. In all, Reppert conducted 12 model simulations to evaluate 3 different incentive options, using four different interest rates with each simulation containing 5,000 trials.

Once it became apparent that the Navy would resort to issuing lump sum payments, again, in order to solicit voluntary separations, the Reppert Model seemed like the most fitting tool to evaluate the costs associated with this program. Using the sum of the weighted averages of the present values associated with the probability of the officer reaching specific points in his or her career, this model provides a sound analysis of "the maximum incentives the Navy should offer" and offers a relatively accurate baseline for assessing the current Targeted Separation Incentive program.

B. ASSUMPTIONS USED IN THE MODEL

1. Basic Pay

Found in Appendix A, this model uses the Defense Finance and Accounting Service's (DFAS) Fiscal Year 2006 Pay Charts to determine future payment streams in the form of military pay and retirement benefits. Although this model assumes away the effects of inflation over time, rationalizing that basic pay and retirement payment increases in the long run will be consistent with inflation, it is important to note that retirement pay and basic pay adjustments are based on two different principles.

Retirement pay is adjusted annually through Cost of Living Adjustments (COLAs) based on the Bureau of Labor Statistics' (BLS) Consumer Price Index (CPI: the base for inflation), while increases in basic pay are derived from another BLS index, the Employment Cost Index, which measures private sector wage growth (MMOA, 2006). In addition, these annual adjustments are a one-time increase administered on the 1st of January each fiscal year and are based on an authorization delivered in the month of October from the previous calendar year. This maneuver is designed to offset the prior year's increase in its perspective index, but, generally, leaves the service member in a constant state of economic "catch up."

2. Rank

Serving as the driving force in determining basic pay, rank is used in this model as a determinant for the present value retirement calculations of the separating officer as well as a reference for the officer being considered. Prior to running the model, the current rank is input into the model in order to determine the range of payments at different discount rates that the departing officer is willing to receive. For the purpose of the simulations used in this thesis, a Navy Lieutenant (O-3) at eight years of service and 30 years of age serves as the reference for all analysis to be reviewed in the next chapter. In addition, rank serves as a measure of potential retirement payments in the present value calculations to determine the Navy's maximum lump sum payment.

3. Promotion and Retention Rates

Taking into consideration the possibilities of future advancement coupled with the propensity for an officer to stay, this model incorporates a distribution of promotion and separation probabilities during the Monte Carlo simulations to determine the proper distribution of what the required lump sum payments to the departing officer should be (Appendix D). These probabilities are based on the decision trees in Appendix D and the Fiscal Year 2007 Board Precepts for Unrestricted Line Officers in the Navy at each designated rank. Using Reppert's original model, a simulation was run with the rank of Captain (O-6) being the most senior rank achieved. Then, in order to adjust for the line of reasoning that anyone willing to accept a lump sum payment to separate would probably

be more likely to retire at a rank no higher than Commander (O-5), another set of simulations was run to adjust for any career bias associated with the first model, yielding significantly different results.

4. Years of Service at Retirement

In order to ascertain what the maximum separation payment for the Navy should be under the Targeted Separation Incentive program, it was important to capture the actual range of years of service at retirement to determine their weighted present values for the Monte Carlo simulation. In the Reppert model, this range starts with a Lieutenant (O-3) at 20 years of service and reaches an upper limit of the rank of Captain (O-6) at 30 years of service. Since the TSI program is focused on officers with more than 6, but less than 12 years of service, the simulation which corrected for career bias was run with the most senior rank at retirement being a Commander (O-5) at 23 years to account for possible retirement payment increases under the High-3 system which states that the final retirement pay for a military retiree shall be the average of his or her highest three years of basic pay prior to the date of retirement. In addition, the original model was altered to account for the most junior rank of separating officer being a Lieutenant Commander (O-4) at 20 years of service because of the guidelines established by *The Defense Officer Personnel Management Act of 1980*.

5. Age

Using the current age of the officer at the time of separation, age factors heavily in determining the present value of retirement benefits since it, essentially, serves as the cornerstone for determining the age and life expectancy of the separating officer upon retirement. Using a non-prior service O-3 at eight years of service as the reference case in this model, the base age for the Monte Carlo simulations was 30 years of age with an age of retirement at 42 years.

6. Years of Service

Unlike the original model which examined an “average” officer with the propensity to fall under all categories of service, enlisted years of service was not accounted for in this model. Since the Targeted Separation Incentive program required five years of continuous active service, and the average first term of enlistment is at least three years, it was assumed that the Navy would not entertain separating a prior service

officer until he had been passed over once for promotion to O-3, no earlier than the eight year mark. Since there would have been the requirement for these officers to attain a degree, this would add another four years to most scenarios, pushing these officers beyond the parameters of the program and making them ineligible for a separation incentive payment. Meanwhile, years of service was used to gauge the final age at retirement while running the simulations and determining the weighted present value of retirement.

7. Life Expectancy

Outlined in Appendix C, life expectancy encompasses the number of years that the officer will remain alive following retirement. Based on the 2003 Department of Defense Actuary table used in Reppert's model, life expectancy contributes significantly to the present value of retirement calculations used in this model.

C. DISCOUNT RATES USED

Solely for the sake of comparison and further debate in Chapter VI, the discount rates used in this analysis mirror those used in the Reppert study (2004): a government discount rate of 7%, 10% and 13% ($10\% \pm 3\%$) and a personal discount rate of 16% with a standard deviation of $\pm 2\%$. In addition, a 23% personal discount rate was included to evaluate the high end of officer acceptance rates noted in the last drawdown (Warner and Pleeter, 2001). These discount rates were used to determine the present value calculations used in this model in order to establish a baseline for fixed price offers on behalf of the Navy.

D. COMPUTATIONS WITHIN THE MODEL

Prior to running this model, all decision variables had to be adjusted to account for the "staying" behavior of the separating officer. In other words, the intent was to focus on what would be an adequate separation payment to induce an officer who had every intention to remain on active duty to leave. Since the original Reppert model included the 20% of officers at O-3 who would have left without a separation incentive, anyway, the model was tailored to focus on the cost associated with separating that officer beyond the 20th percentile. This assumption was factored into the model which

corrected for career bias. In addition, solely for the sake of comparison, the original Reppert model was run using FY2006 pay tables. This data yielded the following computations:

1. The Maximum Lump Sum Offer by the Navy

Looking at this as an unconstrained optimization problem, the maximum lump sum payment by the Navy should not exceed the Net Benefit of this program where:

$$\text{Net Benefit (TSI)} = \text{Total Benefit (TSI)} - \text{Total Cost (TSI)}$$

Since the total benefit of this program could be viewed as the sum of the present value (PV) of the forecasted retirement payments plus the present value of future active duty payments in the form of regular military compensation (RMC), this equation can be translated to look like this:

$$\text{Net Benefit (TSI)} = (\text{PVretirement} + \text{PVactive duty}) - \text{Opportunity Cost to Navy}$$

Seeing that the opportunity cost to the Navy of losing one officer is roughly equivalent to the streams of RMC payments the Navy would have foregone to reap the work associated with this officer's service, the net benefit of this program is, in fact, the savings realized in the form of foregone retirement payments to the separating officer. For this reason, the Department of the Navy's maximum lump sum payment should not exceed the present value of the forecasted retirement for the separating officer. In this model, the base case will be a 30-year old O-3 at eight years of service.

Although this oversimplifies the equation, we can not forget that with each departing sailor, the Navy loses the capabilities associated with the reason that person was part of the Navy's active end strength to begin with, i.e. the skills and abilities he contributed to the national defense. While there is a dollar value associated with the opportunity cost of retaining a sailor which is reflected in the future streams of payments that sailor would receive, the Navy also loses additional capabilities associated with each sailor's departure whether it is in the form of a watch officer, supply officer or command billet somewhere in the Fleet. For this reason, the idea that the Navy is actually saving anything during a drawdown is only relative to what our nation's security requirements need. Only if the marginal benefit of future capabilities realized through the procurement

of capital exceeds the marginal cost of separating these officers under the Targeted Separation Incentive program, will there be a savings realized through the voluntary separations of mid-career officers from the Fleet.

2. The Minimum Incentive Offer for the Individual to Leave

Considering the constraints mentioned at the beginning of this section to account for separating officers who wish to stay, the minimum lump sum that an individual is willing to take is derived from discounting the present value of retirement payments and conducting sensitivity analysis to see how these payments would effect a general population under a normal distribution. This separation behavior will be analyzed using the personal discount rate as well as the 23% discount rate discussed in the study conducted by Warner and Pleeter (2001) which more accurately reflects the separation behavior of junior officers during the last drawdown. Next, this data will be assessed to determine the minimum requirement to separate roughly three percent (502) of the targeted Lieutenants (O-3's) from the general population of the officers in this cohort and used as the basis for our assessment of the Targeted Separation Incentive program.

E. SIMULATION PROCEDURES

Using an Excel model with the Crystal Ball add-in, 10 Monte Carlo simulations were run considering the assumptions listed in the preceding paragraphs. Five simulations were run in order to duplicate the results offered in the Reppert study, and, an additional five simulations were run to account for the perceived career bias of the first model. Each simulation contained 5,000 trials and conducted sensitivity analysis on the outcomes of the distributions from the trials.

F. CHAPTER SUMMARY

Upon completion of these simulations, enough data had been retrieved to offer a sound analysis of the Targeted Separation Incentive program. The remainder of this thesis will focus on the outcomes of this analysis as well as a look at alternative means to deliver voluntary separation incentive payments.

V. DATA ANALYSIS AND INTERPRETATION

Throughout the course of this chapter, the data presented for analysis centers on the cost to the Navy to separate Lieutenants (O-3's) at six, eight and 10 years of service under the Targeted Separation Incentive program. The first part of this chapter takes a look at the maximum lump sum offer the Navy should make to the departing officer based on different discount rates of the present value of the foregone retirement. The discount rates used in this analysis are based on a government discount rate of 10% with a standard deviation of $\pm 3\%$. The personal discount rate (PDR) used is 16% with a standard deviation of $\pm 2\%$. In addition, this analysis takes into consideration the 23% discount rate which Warner and Pleeter identified as the high end discount rate for takers during the last military drawdown (Warner and Pleeter, 2001).

After reviewing the maximum cost the Navy should offer, followed by the minimum amount the separating officer would be willing to take, the costs associated with the Targeted Separation Incentive program are considered later in this chapter as they relate to the ceilings established in the Fiscal Year 2006 National Defense Authorization Act and the Department of the Navy Budget Estimates for FY2006.

A. NAVY'S MAXIMUM RECOMMENDED OFFER

1. Based on an Average 0-3

In the original Reppert model, all computations were based on the probability of an average officer retiring at 26 years of service as a Captain (O-6), indexed to consider the normal distributions of promotion opportunities, life expectancy following retirement and the stay or leave behavior of the officer at a certain point in his career. As seen in Appendices C and D, these probabilities are based on the information provided in the decision trees which reflects promotion and retention probabilities, stating the probability that 52.7 percent of all Lieutenants who decide to make the Navy a career will be afforded the opportunity to retire as a Captain (O-6) while only 80 percent of that cohort will stay until reaching the rank of Lieutenant Commander (O-4). This decision tree does not account for retirement trends or factors involving other forms of involuntary separation. Using weighted averages, a present value of future payments was determined to serve as the maximum payment the Navy should offer the departing individual. The

payments listed in this section reflect what it would take to induce the 25 percentile of officers currently serving on active duty to depart through a voluntary separation incentive program. Any price below this can be viewed as surpluses realized by the government. For the sake of this thesis, this model (Table 3) will serve as the reference for further analysis.

Active Duty Retirement Cost Calculations (Present Value)					RM-WA
Retirement	7%	10%	13%	PDR	23%
O-3 @ 6	\$160,889	\$70,216	\$33,003	\$16,449	\$3,836
O-3 @ 8	\$184,201	\$84,961	\$42,142	\$22,134	\$5,803
O-3 @ 10	\$210,892	\$102,803	\$53,811	\$29,784	\$8,780

Table 3. Calculations Based on Average Officer

2. Based on an Average O-3 Determined to Stay

In the original model, the probability for future advancement of these officers was dependent upon the probability of these officers advancing or remaining on active duty to reach the next rank. Because of this, 20% of the O-3 population which would have left, anyway, without the incentive, was factored into this equation. By manipulating the model, we were able to omit this population to indicate that all O-3's would remain on active duty, providing a clearer picture of how much it would cost to separate an officer who had no intentions of leaving. The table below (Table 4), accounts for those that do not plan on leaving and offers the maximum lump sum payment the Navy should offer to those who would not leave without a separation payment. Understandably, the totals for each category are much higher than those displayed in the first model.

Active Duty Retirement Cost Calculations (Present Value)					RM-Stay
Retirement	7%	10%	13%	PDR	23%
O-3 @ 6	\$201,802	\$88,072	\$41,396	\$20,632	\$4,811
O-3 @ 8	\$231,043	\$106,567	\$52,858	\$27,763	\$7,279
O-3 @ 10	\$264,522	\$128,946	\$67,495	\$37,358	\$11,012

Table 4. Calculations Based on Average Officer Determined to Stay

3. Average 0-3 Model Corrected for Career Bias

After realizing that there was a significant difference in the maximum lump sum offer for the Navy based on the intentions to leave or stay, I wanted to examine the effects on one’s intentions to stay beyond the 20-year mark for retirement. Using 20 years for O-4’s and 23 years at O-5 as the high year tenure limits for officers, the model was altered to account for a career bias that was evident in the baseline model. For this reason, the model was manipulated, once again, to ensure that the probability of reaching O-6 was equal to zero, as was the probability of staying beyond 23 years at O-5. Comparing these figures to the “average” O-3” (Table 5), it was clear that these officers placed a higher value on their retirement at the higher discount rates while de-valuing it as the discount rate dropped. This would account for the timing and magnitude of savings these officers would place on their future retirement associated with the opportunity costs related to staying beyond the 20-year mark.

Active Duty Retirement Cost Calculations (Present Value)					CP-WA
Retirement	7%	10%	13%	PDR	23%
O-3 @ 6	\$150,887	\$69,820	\$34,789	\$18,343	\$4,817
O-3 @ 8	\$172,750	\$84,482	\$44,423	\$24,683	\$7,287
O-3 @ 10	\$197,782	\$102,224	\$56,723	\$33,213	\$11,025

Table 5. Calculations Based on Average Officer: No Career Bias

4. Corrected for Career Bias; Determined to Stay

Upon reviewing the first three models, it was determined that the most accurate method for assessing the true cost of separating those who would not, otherwise, leave under normal circumstances, was to evaluate the cost associated with separating a member determined to stay until 20 years of service; then abruptly leave. Using the same rationale stated in the paragraph above, this model was altered to only account for those who would have preferred to remain on active duty. As expected, this model indicated a lower present value for retirement at the 7-10 percent discount rate range than the “average” O-3, while showing a higher value for the larger discount rates (Table 6). Again, this would reflect this individual’s lower value placed on serving beyond twenty years while placing a higher value on the time-value of money marked by this individual’s immediate intentions to stay.

Active Duty Cost Retirement Calculations (Present Value)					CP-Stay
Retirement	7%	10%	13%	PDR	23%
O-3 @ 6	\$188,608	\$87,275	\$43,487	\$22,929	\$6,021
O-3 @ 8	\$215,938	\$105,603	\$55,528	\$30,853	\$9,109
O-3 @ 10	\$247,227	\$127,780	\$70,904	\$41,516	\$13,781

Table 6. Calculations Based on Staying Officer: No Career Bias

B. INDIVIDUAL’S MINIMUM REQUIREMENT

Using the personal discount rate of 16 percent described in Chapter IV, a mean value was determined to separate the target population of Lieutenants with eight years of service. As shown in Table 7 below, there was a marked increase in the lowest price that the “stayer” was willing to take versus the minimum requirement for the “average” officer. This margin was, again, increased when the model was corrected for career bias. For the remainder of this thesis, the CP-Stay category (“stayers”; corrected for career bias) will serve as the benchmark for further analysis.

Minimum Individual Requirement – PDR

	RM-WA	RM-Stay	CP-WA	CP-Stay
O-3 @ 6	\$16,449	\$20,632	\$18,343	\$22,929
O-3 @ 8	\$22,134	\$27,763	\$24,683	\$30,853
O-3 @ 10	\$29,784	\$37,358	\$33,213	\$41,516

Table 7. Minimum Individual Payment Based on PDR

Meanwhile, even though the personal discount rate was used in this analysis to account for the rationale decision-making abilities of our junior officers, the Warner and Pleeter study did show a tendency for junior officers to accept separation payments at much higher discount rates than previously thought. Using a log linear model, Warner and Pleeter determined that the “average” officer at nine years of service would have accepted the Special Separation Benefit at a 23.2 percent discount rate. For the sake of argument, this discount rate was observed for the O-3 at eight years of service used as the base for the Monte Carlo simulations, yielding the results below:

Minimum Individual Requirement - 23% Discount Rate

	RM-WA	RM-Stay	CP-WA	CP-Stay
O-3 @ 6	\$3,836	\$4,811	\$4,817	\$6,021
O-3 @ 8	\$5,803	\$7,279	\$7,287	\$9,109
O-3 @ 10	\$8,780	\$11,012	\$11,025	\$13,781

Table 8. Minimum Individual Payment Based on 23% Discount Rate

As expected, these figures were substantially lower than the expected values using the personal discount rate even though they probably offer a more accurate portrayal of the minimum offer these officers would have been willing to receive. This raises an excellent prospect for future research where an experiment could be run to determine if the Navy could attain the required number of separations if they were to advertise the lump sum targeted separation payments at this rate. This would serve as an excellent model for a discussion on rationale human behavior.

C. COST TO SEPARATE UNDER FY2006 NDAA AUTHORITY

Annex E displays the costs associated with separating officers under the maximum authority outlined in the FY2006 National Defense Authorization Act. Under the provisions of the FY2006 NDAA, the Department of the Navy may use a targeted separation incentive, payable in a single, lump sum payment, not to exceed twice involuntary separations pay. With this as our measure for determining the surplus values paid to departing sailors, the minimum lump sum payment using the personal discount rate was subtracted from the figures found in Annex E. The surplus payments made to departing sailors are shown in the table below:

Surplus Cost to Separate Under FY2006 NDAA

	RM-WA	RM-Stay	CP-WA	CP-Stay
O-3 @ 6	\$48,394	\$44,211	\$46,500	\$41,914
O-3 @ 8	\$68,661	\$63,032	\$66,112	\$59,942
O-3 @ 10	\$87,223	\$79,649	\$83,794	\$75,491

Table 9. Surplus Payments to Departing Officers Due to Separations Under FY2006 NDAA

As disturbing as these numbers may seem to the average taxpayer during times of war, the original recommendation from the Department of Defense that was approved by

the Vice President (Haynes, 2005) in the original Voluntary Separation Incentive program considered authorizing four times involuntary separations pay as the standard for distributing targeted separations. The surplus values associated with voluntary separation incentive payments under this program are reflected in Table 10 below.

Surplus Cost to Separate Under Original House Plan

	RM-WA	RM-Stay	CP-WA	CP-Stay
O-3 @ 6	\$113,237	\$109,054	\$111,343	\$106,757
O-3 @ 8	\$159,456	\$153,827	\$156,907	\$150,737
O-3 @ 10	\$204,230	\$196,656	\$200,801	\$192,498

Table 10. Surplus Payments to Departing Officers Separating Under Original VSI Plan

In order to fully appreciate these numbers, one only has to consider the surplus payments associated with separating a specific cohort of officers under the Targeted Separation Incentive program. For instance, if the Navy planned to separate 502 “average” (RM-WA) Lieutenants at 10 years of service, the Department of the Navy would have paid roughly \$102.5 million beyond what that same cohort would have taken to separate under similar conditions – roughly \$14.95 million. Had this measure gone through, officers would literally be jumping overboard to contact the separations officer en route to joining the Republican Party.

Fortunately for the Navy, this measure did not go through. But, this serves as a perfect example of how broad interpretations of the costs associated with separating an officer can have a tremendous effect on the cost of a program and end up defeating its original intent. While examining a number of other studies that have been conducted on the costs associated with the last drawdown (Reppert, Rogge, Warner and Pleeter, *et al*), most viewed the present value of future active duty compensation as an additional factor to consider when determining the service’s net savings. The error in this rationale is that while the service does recoup the money from paying the separating officer, they also lose the capability they were paying for in terms of that individual’s net contribution to the organization. This contribution, which is the opportunity cost associated with employing the separated officer in the first place, will then need to be either outsourced through government contracts or eliminated altogether. Since the intent of the Navy’s

reduction in force from *Sea Power 21* is to reinvest in capital, the saving realized from the future pay streams of the separating member amount to nothing more than an income transfer, thus making the present value of the foregone retirement as the only potential cost savings to the government.

D. COSTS ASSOCIATED WITH TSI PROGRAM

Under the Targeted Separation Incentive program, a different approach was taken to craft a strategy to induce officers to leave. Basically, the Navy budgeted for the separation of 502 officers at a rate equivalent to the average officer lump sum payment during the last drawdown (\$56,773.00). Since the Navy will reach its steady state end strength at the end of Fiscal Year 2007 under the current plan, this will be a one-time adjustment for the current officer population which will most likely be executed prior to the start of the final quarter of this fiscal year (no guidance has been submitted as of 12 March 2006). Although it may seem a bit sophomoric to plan based on the last drawdown’s average take rate, this method comes much closer to the actual value of what the separating officer would take under the FY2006 NDAA and the original House of Representatives’ plan.

Using the budgeted amount for separations as the baseline for the evaluation of this program (\$56,773.00), another table was created to show the added payments that would be issued to separating officers in the form of surplus payments under the TSI program. This table was derived from taking the four categories for analysis outlined in Section A of this Chapter at the personal discount rate of 16 percent (taking into account leave/stay behavior and correcting for career bias) and subtracting each number from the budgeted amount for the Targeted Separation Incentive program. The results are shown in the Table 11 below.

Surplus Cost to Separate Under FY2006 TSI

	RM-WA	RM-Stay	CP-WA	CP-Stay
O-3 @ 6	\$40,324	\$36,141	\$38,430	\$33,844
O-3 @ 8	\$34,639	\$29,010	\$32,090	\$25,920
O-3 @ 10	\$26,989	\$19,415	\$23,560	\$15,257

Table 11. Surplus Payments to Departing Officers Associated with Separations Under TSI

Even under a significantly tighter budget there is still a substantial surplus paid to the separating officers. Using the same 502 “average” (RM-WA) Lieutenants at 10 years of service, the Department of the Navy would still forego an additional \$13.55 million in costs associated with paying the departing service member more than he would “take” under a more efficient system. For this reason, another Monte Carlo simulation was run to determine the cost to separate only the targeted group which accounted for roughly 3 percent of the population of active duty Lieutenants. This was done by, once again, eliminating the 20 percent of Lieutenants who would otherwise leave the Navy under normal circumstances and focusing on the additional 3 percent the Navy is targeting for separations.

The results, shown in the frequency chart below, shows that a lump sum payment of \$8,895.00 is all that it would take to induce an additional 3.18 percent of the O-3 population at eight years of service, beyond the 20% that would leave without an incentive payment, to leave at the personal discount rate. This encompasses a range of payments that starts with the minimum value of \$3,958.00 for the first officer to separate and an upper limit for a lump sum payment of \$8,895.00 to separate the last. By using a baseline, lump sum payment of \$8,895.00, the Navy should be able to achieve its desired end state in force reductions at the lowest fixed price. Even under this scenario, there is still government loss in the form of surplus payments issued to all departing sailors except for the last one who is just willing to separate for \$8,895 as is reflected in the shaded area in the chart below.

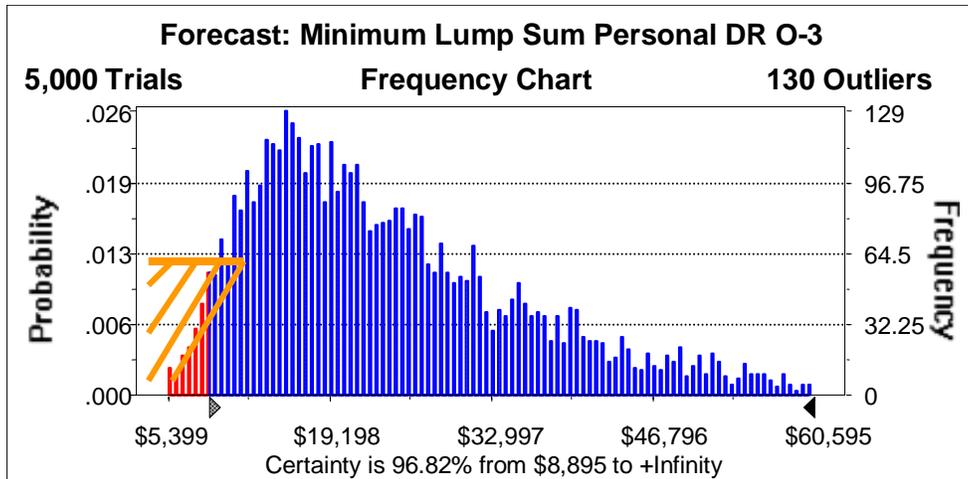


Figure 1. Frequency Chart: O-3 at 8 YOS PDR

E. CHAPTER SUMMARY

It is impossible for the Navy to effectively separate the 20 percent willing to leave without a separation incentive at no cost, then effectively separate the remaining 3.18 percent targeted for separation at a fixed price of \$8,895; the Navy must determine if it is worth paying the total 23.18 percent of the officer population targeted for separations \$8,895 to leave when, in reality, the only portion they would be required to pay to separate is just 3.18 percent. Using this example for the Targeted Separation Incentive program, the Navy would have to pay a lower limit value of \$4.47 million to separate 502 officers when the actual total cost needed to separate those not willing to leave without compensation would only be \$612,580.77.

Meanwhile, the Department of the Navy has budgeted \$28.5 million for this program. This shows that roughly \$27.9 million of the \$28.5 million allocated for the Targeted Separation Incentive program will be paid to junior officers who would normally leave without the lump sum payment based on the assumptions mentioned above. This begs an even larger question of whether or not this program is actually worth its actual cost. Although a reduction in force has the potential to have a negative effect on morale (Grissmer *et al.*, 1995), the \$28.5 million price tag needed to separate an additional 3.18 percent of the Navy officer corps may be worth the risk of not executing this program at all.

Based on these findings, it is apparent that there will always be loss in the form of surplus costs paid to separating officers while using a fixed price to determine the minimum value to separate a targeted percentile of junior officers. This minimum price is further complicated by the individual's own perceived value of future cash flows in terms of benefits and regular military compensation. For this reason, the following chapter will focus on alternative means to reaching targeted separations, which will be followed by the final chapter relating to policy considerations.

VI. POSSIBLE USE OF AUCTIONS AS FORCE SHAPING TOOL

Having examined the effects of various discount rates and assumptions as they relate to the Department of the Navy's Targeted Separation Incentive program, the next step in this process is to determine the most efficient mechanism for realizing the desired number of officer separations. As palatable as the original House of Representatives plan may have seemed (see Appendix E), there is obviously a clear divide between the lump sum separation benefit that the government deems affordable and what the departing officer needs. In addition, one must consider the fact that all regression results linked to the last military drawdown would be clearly biased by a booming economy during the nineties complemented by a nation at peace.

To define that balance between an efficient way to clear the market for force reductions while exhibiting some form of fiscal constraint, the government has sponsored volumes of studies on the factors affecting one's desires to leave or stay in the military in an attempt to reach a fixed price solution for their force shaping needs. The end result has always led to follow-on discussions of the surplus values associated with such programs since there is always a surplus paid to all departing sailors except one, assuming the government is able to accurately reach that precise, fixed price solution targeted at achieving the desired number of separations. As illustrated by Figure 1 in Chapter V, and shown once again below, a fixed price solution only matches the reservation price of the last person separated, creating a varying surplus paid the other separating sailors. As a result, most departing sailors will leave with a separation payment, which is greater than what they would have been willing to accept.

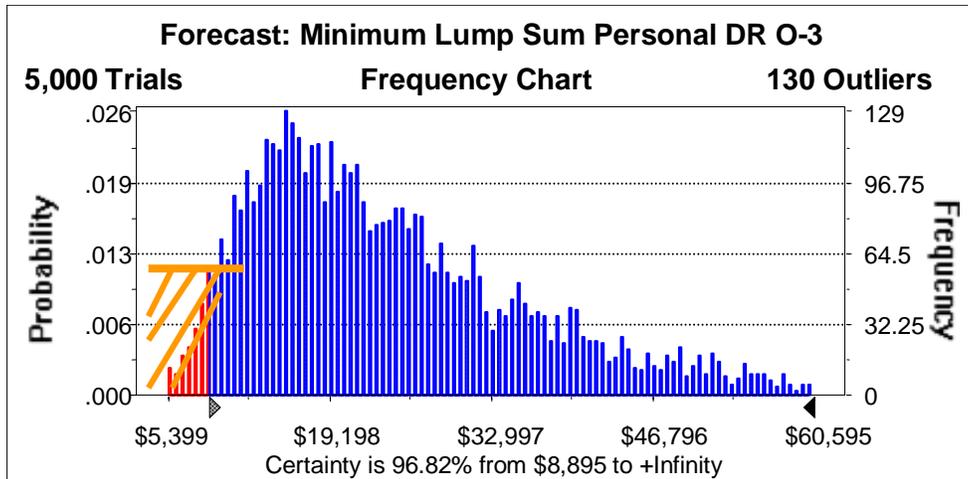


Figure 2. Frequency Chart: O-3 at 8 YOS PDR

For this reason, some have viewed auction theory as a viable alternative for eliminating the surplus payments doled out by the government under a fixed price system. Citing problems associated with trying to avoid an offer that is “too good to be true” that would encourage an excessive amount of talented individuals to leave or offering a fixed price that is not high enough to achieve the desired effect, many see an auction mechanism as the most efficient means to cull targeted groups for separation at the lowest government rate. However, before we start discussing auction theory, we must first understand auctions as they pertain to the individual’s reservation price, which is the lowest value that sailor is willing to take to separate from the Navy.

A. DETERMINING THE INDIVIDUAL’S RESERVATION PRICE

In the book, *Quasi-Rational Economic Behavior*, author Richard Thaler examines reasons why two individuals faced with the same budget constraints generally would apply their resources to attaining two different baskets of goods, or “consumption bundles.” Thaler outlines three distinct reasons for this: “(1) the individuals have different tastes (utility functions); (2) the individuals have different information; [and/or] (3) one of the individuals has made a mistake.” Regardless of the reasoning behind the madness, all three factors, either independently or combined, yield what is most commonly referred to as the reservation price that the individual is willing to forego in order to gain that basket of goods (Thaler, 2001).

In microeconomics, the reservation price is the maximum price (opportunity cost) a buyer is willing to pay, or the opportunity cost he is willing to forego, in order to buy a good or service. As it pertains to the seller, the reservation price is the minimum price for which a seller is willing to sell a good or service or the least opportunity cost the seller is willing to forego. The reservation price will vary for buyers and sellers according to their disposable income and their desire for the good or service, as well as the prices of and information relating to substitute goods (like items which will be consumed in different proportions based on the relative price of one of the goods, i.e. margarine and butter or Pepsi and Coke). This is important to research on the separation behavior of all service members because the reservation price is, ultimately, what drives the decision of the individual whether to stay or go. Any price above the reservation price for a targeted cohort of individuals would provide the incentive for a larger number of quality individuals to depart, while any amount lower would cause such a program not to achieve the desired number of separations.

B. REDUCING ECONOMIC RENT ASSOCIATED WITH PAST PROGRAMS

Because of the huge variance associated with separating large populations of sailors at their reservation price, past attempts have focused on offering an equitable price targeted at clearing a defined percentile of individuals at a fixed price. This reliance on a fixed price system left the perception that the Department of the Navy realized substantial losses in the form of surplus payments paid to departing officers (more than \$33.24 million)¹ above their reservation price during the last drawdown (Rogge, 1996). To recapture these lost costs during the life of the Targeted Separation Incentive program and avoid the forecasted losses described in Chapter V, the distribution of lump sum payments determined by auctions could help the government avoid loss associated with the paying surpluses to separating officers.

¹ In Frank Roffe's 1996 study, *An Analysis of the Separation Bonus (VSI/SSB) Program Using the Annualized Cost of Leaving Model*, the author determined that, with an average SSB payment of \$56,813 paid to the 848 Navy officers who left under the previous program, that \$48.18 million was distributed to these officers in paid separation incentives. Rogge's research concluded through a probit regression model that 68.99 percent of those officers would have left without the incentive, yielding \$33.24 million "accrued to separatees as economic rent."

C. A BASIC UNDERSTANDING OF AUCTIONS

In layman's terms, an auction is simply "a market institution with an explicit set of rules determining resource allocation and prices on the basis of bids from the market participants (McAfee and McMillan, 1987)." There are basically two methods for conducting auctions: 1) the open or sequential bid auction and 2) the sealed or simultaneous bid auction. Like its namesake, the open bid auction is one where all the participants have equal knowledge of the current bid and have an equal opportunity to either raise or lower the price dependent on the intent of the auction. In a sealed, simultaneous bid auction, the participants are afforded a single, concurrent opportunity to present their offer to the bid-taker. When referring to auctions, most people think of the ascending order, open bid auction, called the English auction, where the first thing that comes to mind is a fast-talking gentleman "opening the floor" by announcing to "let the bidding start" at what is referred to as the reserve price of the seller in the auction. The reserve price is basically the lowest amount the seller is willing to take for a good or service in the forward auction or the highest price the buyer is willing to forego in a reverse auction.

Much like the format favored by the auctioneer, the forward auction is one which generally consists of one seller and multiple buyers. The bid-taker is the one selling the good or service and the person who walks away with the prize is the high bidder. On the other hand, a reverse auction is marked by one buyer and multiple sellers. The buyer in this case is the bid-taker and the winner in this format is the participant who offers the lowest bid. Regardless of the *modus operandi*, the Revenue Equivalence Theorem tells us that when bidders are risk neutral and some other basic assumptions are satisfied, then each auction "yields on average the same price" (McAfee and McMillan, 1987).

However, as McAfee points out, "when assumptions that underlie the benchmark model are relaxed, particular auction forms emerge as being superior" (McAfee and McMillan, 1987). Since the Department of the Navy lacks the resources to pull its sailors from all corners of the globe to sit down and realistically conduct a sequential, open bid auction, regardless of the individual's access to the Internet, the most likely mechanism to conduct any form of targeted separation program would be through the use of a

simultaneous, sealed bid auction. The two types of sealed bid auctions we will examine for the sake of this analysis will be the first price sealed bid auction (FPSB) and second price sealed bid auction (SPSB).

D. FIRST PRICE VERSUS SECOND PRICE AUCTION

Given the nature of what the Navy is attempting to achieve through the Targeted Separation Incentive program, the separation of a specific number of officers at the lowest cost to the government, the most appropriate medium for conducting the sealed bid auction would be using a reverse auction format. In this case, the Department of the Navy would serve as the sole buyer with the departing officers serving as multiple sellers of their foregone retirement benefits plus the opportunity costs associated with the present value of their work as a Navy officer. Before this auction would be conducted, it would fall on the Navy to ensure that all participants were granted access to all figures associated with their service in regard to the present value of compensation and retirement benefits.

1. First Price Sealed Bid Auction (FPSB)

Most commonly used for soliciting government procurement contracts, first price sealed bid auctions are a mechanism where potential buyers submit a one-time, sealed bid to the seller for the good or service he desires. In a forward FPSB auction, the equilibrium strategy for the person willing to pay at a given value, v , with n number of bidders and m computers for sale, where v is a value with a range from 0 to V , the maximum limit of v , such that $v \sim U [0, V]$, the strategic bid, $B = [(n-m)/n] * v$. So, if there are 502 computers being sold out of a total population of 15,000 bidders with a hypothetical reservation price, or maximum value, of \$56,773.00, then the strategic bid for these computers would be \$54,804.87 $\{B = [(15,000-520)/15,000] * 56,773\}$. As the number of bidders increases, with a fixed number of computers, the expected value of B will approach the true value of v . However, as the number of computers sold increases with a fixed number of bidders, then there will be a tendency for the value of B to approach zero.

Using the same values for the reverse auction, which is the proper format for the TSI program, given a reservation wage (price) w , where $w \sim U [0, V]$, the strategic bid in this case, $B_r = V - [(n-m)/n] * (V - w)$. Now, if the maximum reservation wage, V , is

equivalent to \$56,773 and there are 502 officers being separated out of a population of 15,000, then $\mathbf{Br} = \$56,773 - [.96533] * (\$56,773 - \mathbf{w})$. In this scenario, the bid is truly driven by the reservation wage of the departing individual when the total population and number of bidders are set. When looking at providing a separation incentive payment designed to separate a targeted percentile, \mathbf{p} , the strategic bid, \mathbf{Br} , therefore, would be $\mathbf{Br} = \mathbf{V} - (1 - \mathbf{p}) * (\mathbf{V} - \mathbf{w})$. Any surpluses gained or lost in this environment would be strategically determined by the number of bidders and individual's reservation wage.

As Gates, *et al*, determined, this is the most efficient manner to conduct separations auctions because of its “efficiency, cost effectiveness, equitability and practicality, based on recent market design and auction theory” (Gates, 2005). As shown in the graph below, the equilibrium bid for any reservation wage, \mathbf{w} , would be above the true value of \mathbf{w} , with the difference being greater for lower values of \mathbf{w} . Using the formula mentioned above, $\mathbf{Br} = \mathbf{V} - (1 - \mathbf{p}) * (\mathbf{V} - \mathbf{w})$, would produce the equilibrium bid line which shows that as the targeted percentile for separations decreases, that the bid line and cumulative distribution function (CDF) will converge. This shows, once again, that as the number of winning bidders decreases, the optimal bidding strategy for the departing sailor would be to bid his true reservation price, \mathbf{w} . Payments to the departing sailors by the Navy under a FPSB auction (shown by the dashed line area) would be roughly equivalent to the total payment to departing sailors under the optimal (i.e. minimal market clearing) fixed price solution (shown by the dotted line area). This would eliminate the need for establishing a baseline discount rate and would provide valuable information in determining the separations behavior of officers needed for additional research despite the fact that the sailor's true valuation would be biased by his dependence on a strategy to determine the winning price.

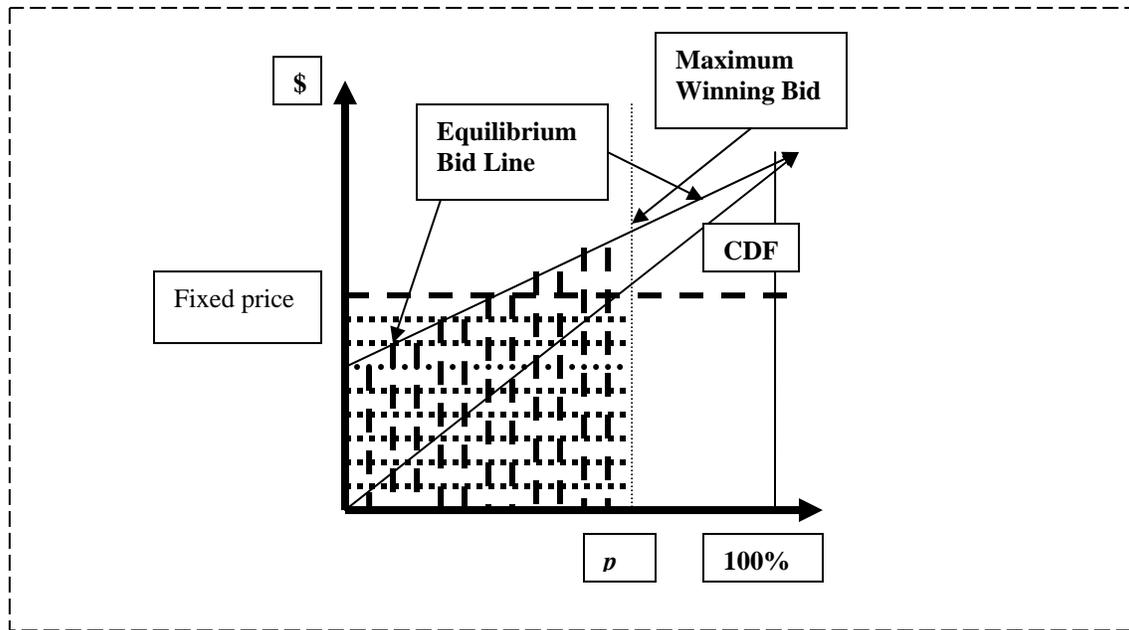


Figure 3. Surpluses Associated with FPSB Auction

2. Second Price Sealed Bid Auction (SPSB)

Unlike the first price sealed bid auction, the dominant strategy in the second price sealed bid auction is to simply bid one's true private valuation. In a reverse auction setting, the winner would be the departing officer who offers the lowest bid for separations; however, that officer would be paid the next higher bid. When there are multiple winning bidders, this format is called an "nth" price sealed bid auction. Using this method, where there would be a number of winners equal to $n-1$, the entire group would be paid the final bid from the nth lowest bidder. As shown in the graph below, this would yield similar surplus values to the original fixed price system, assuming that the fixed price is set correctly, even though it would provide a much better perspective on the bidder's true reservation price.

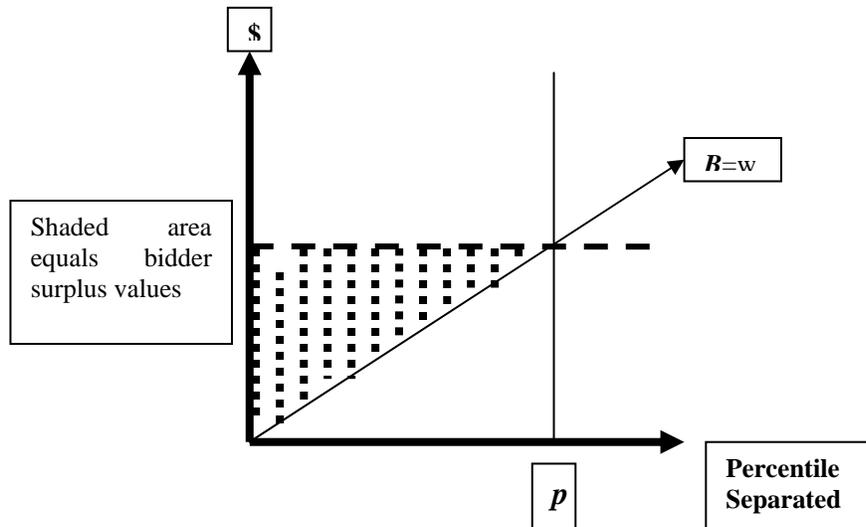


Figure 4. Surpluses Associated with “nth” bid SPSB Auction

E. RELATIVE VALUE OF FUTURE STUDIES TO DETERMINE THE DISCOUNT RATES OF SAILORS

As mentioned in the earlier paragraphs of this chapter, the use of auctions provides an even greater benefit to the Department of the Navy than just realizing a more cost-effective means for reducing end strength, this mechanism offers first hand data on the behavior of our sailors with a more easily definable discount rate based on the price each sailor associates with his prospective departure. Since past analyses on separation incentive programs were based on estimates of take rates for these separation programs as they related to previous data derived from Department of Defense surveys, the use of auctions would help the researcher gain a greater understanding of the decision-making process of the sailor’s intentions to leave or stay as it relates to a snapshot of the current military socio-economic environment. With this data, our leaders and policymakers can better tailor future decisions affecting the shape of the force in order to address the challenges to come.

F. CHAPTER SUMMARY

While some may point to an auction mechanism as the Navy’s “silver bullet” when it comes to delivering separation incentive payments, one can not forget that these tools can only facilitate setting a more accurate fixed price for inducing those to separate. In an auction environment, those with a low reservation price will be encouraged to bid

closer to their maximum value than their lowest bid, eliminating any hope of attaining these individuals' true reservation price. In addition, there will still be a requirement to finance the departure of those who would have been willing to leave without the incentive payment, resulting in nothing more than a total cost of the program that is equivalent to what the cost of the program would have been if the established fixed price was accurately set.

Basically, this means that the Navy is still paying 23 percent of the junior officer corps to separate when the actual target is only 3 percent. Because of this, the net benefit of separating the 3 percent of officers who would require that a separation payment must exceed the present value of separating the entire 23 percent. Using the Targeted Separation Incentive Program as a reference, this can be explained in the equation below:

$$\text{Net Benefit of Separations} * 3\% = \text{Cost of TSI} * 23\%$$

Therefore, the Net Benefit of Separations must be greater than or equal to the cost of this program multiplied by 23 percent and divided by 3 percent. In net terms, this would mean that the present value of separating this 3 percent of officers would have to be greater than $[(23/3) * \$56,773.00]$ which is equal to \$435,259.67 per officer separated further begging the question if the Targeted Separation Incentive program is really worth the investment.

Nevertheless, auctions ensure that the separation payment is accurately set, so they are a cost-effective means to ensuring officer separations that reduce the substantial surpluses associated with a fixed price plan. Additionally, this mechanism would offer greater insight into the separations behavior of our service members than the standard survey because of the heightened stakes associated with the opportunity costs of the bidder in relation to one participating in a survey: the opportunity cost of the bidder is equivalent to a life-changing decision while the opportunity cost of the individual completing a survey is nothing more than the time associated with getting the survey done.

For this reason, the Department of the Navy should seriously consider using an auction format in order effect separating junior officers through the Targeted Separation Incentive program. This, as well as other policy considerations, will be addressed in the next chapter.

VII. SUMMARY AND RECOMMENDATIONS

A. SUMMARY

Having tracked this program for the last six months when it was known only as the Force Shaping Tools that were designed to induce voluntary separations, the Targeted Separation Incentive program has hardly grown despite the original optimism reflected in Chapter V with the publishing of the original House plan (Haynes, 2005). Since then, the maximum price the government was willing to forego has sequentially dropped from four times involuntary separations pay, to three times, to twice as much as we sit here, now, with a budget that has been allocated to fund this program at a rate that, realistically, does not cover the involuntary separation of a Lieutenant at 10 years of service for failure to select for promotion to O-4 (\$56,773 for the TSI program versus \$58,503 for the O-3 failing to promote, Appendix E). Meanwhile, the Department of the Navy has systematically met its force reduction goals despite the requirement to cull 36,955 sailors from Fiscal Year 2003 through FY2007.

So, what has been happening over the last couple of years and how has the Department of the Navy met such unparalleled success? Well, the answer may lie in the fact that there appears to be a significant retention crisis for the Navy looming on the horizon which may gradually offset any savings realized during the most recent measured drawdown. Instead of creating a strategically sound program to offset reduction goals with future Fleet requirements, the Navy sought a strategy marked by reduced accessions and the failure to select officers for promotion to meet their force shaping needs. In Fiscal Year 2005 alone, the Navy paid involuntary separation payments to 11,780 officers for non-promotion which is more than double the numbers for each of the prior two years (FY2003-2004) as well as the forecasted numbers for the following two Fiscal Years, 2006 and 2007 (DoN, 2005 and 2006). In addition, during Fiscal Year 2005, the Navy was the only service which failed to meet a specific cohort retention goal (mid-career officers and sailors) despite the fact that the average Navy officer makes roughly \$480/month more than the average Marine Corps officer when you add Special and Incentive (S&I) payments. This leads one to question whether or not they will be able to

meet their requirements for mid-career officers (Kapp, 2006) following the Navy's force shaping experiment in Fiscal Year 2007 when the active duty end strength levels off to its steady state level of 345,000 sailors.

Regardless of the Navy's current manpower trends, the present scenario provides a glaring example of how the miscalculation of discount rates associated with government projects, coupled with a lack of foresight as it pertains to human behavior, can have a devastating effect on any program. Although there are no current studies readily available to assess the Fiscal Year 2005 (FY2006 promotion boards) spike in non-selections for officer promotions, one could assume that the specter of another round of voluntary separations payments may have encouraged numerous officers to avoid their professional military education (PME) requirements or meet the minimum standard. Of course, we will not know the answer to that question until the data becomes available, but this would be an interesting topic for further research.

In the meantime, the Department of the Navy needs to find a better way to evaluate its incentive pay system and the determination of the discount rates they associate with these programs. Following the national surge in patriotism in the United States after the events of 9/11 and the overwhelming success of the race to Baghdad, it did seem that Navy would have to pay a hefty price to entice junior officers to leave. However, with the prospects of longer deployments and increased chances of being placed in harm's way, the All-Volunteer Force of sailors who jumped aboard for the education benefits and technical skills that would jumpstart their post-military careers now seem to be jumping ship (Kapp, 2005).

B. RECOMMENDATIONS

Even though it appears that the Navy may have missed its mark with the Targeted Separation Incentive program, this program serves as a perfect example of many of the problem areas associated with the delivery of incentive payments and forecast modeling as they relate to manpower issues in the military. First of all, when the Navy was looking to offer a voluntary separation payment to sailors in order to meet its reduction goals, it was a pretty good idea. The Navy had a surplus of labor which needed to be reduced in

order to affect an income transfer in support of future acquisitions. This seemed to be the perfect strategy for modernizing the Navy as envisioned under Admiral Clark's *Sea Power 21* vision statement.

However, as the socio-political landscape quickly took a turn both here and abroad, many of the assumptions which led to the decision to re-administer voluntary separation payments quickly dissolved. As seen in Figure 5 below, the Programming, Planning, Budgeting and Execution System (PPBES) which replaced the six-year Programming, Planning and Budgeting System (PPBS) cycle, falls on a four-year cycle to allocate discretionary spending designed to fund the Department of Defense's policy decisions. As mentioned above, at the time of the birth of the Targeted Separation Incentive program, the Navy had the daunting task of getting rid of all these patriotic people. Seeing that the Department of Defense seems to have a harder time trying to fire someone than they do sending that person in harm's way, the most likely solution was the TSI.

Year 1: Review and Refinement	Year 3: Execution of Guidance
• Early National Security Strategy	---
• Restricted fiscal guidance	• Restricted fiscal guidance
• Off-year DPG, as required (tasking studies indicative of new Administration's priorities; incorporating fact-of-life acquisition changes, completed PDM studies, and congressional changes)	• Off-year DPG, as required (tasking studies; incorporating fact-of-life acquisition program changes, PDM studies and congressional changes)
• Limited Changes to Baseline Program	• Limited Changes to Baseline Program
• Program, Budget, and Execution Review initializes the on-year DPG	• Program, Budget, and Execution Review initializes the on-year DPG
• President's Budget and Congressional Justification	• President's Budget and Congressional Justification
<hr/>	
Year 2: Full PPBE Cycle - Formalizing the Agenda	Year 4: Full PPBE Cycle - Ensuring the Legacy
• Quadrennial Defense Review	---
• Fiscal guidance issued	• Fiscal guidance issued
• On-year DPG (implementing QDR)	• On-year DPG (refining alignment of strategy and programs)
• POM/BES submissions	• POM/BES submissions
• Program, Budget, and Execution Review	• Program, Budget, and Execution Review
• President's Budget and Congressional Justification	• President's Budget and Congressional Justification

Figure 5. Summary of PPBE Cycle
Source: Secretary of Defense Management Decision 913, 2003:3.

And, under most circumstances, except for the one which actually occurred, the most likely answer would have been the Targeted Separation Incentive. This points to a tremendous flaw that is inherent in the way the Department of Defense budgets for future programs. As the future Under Secretary of Defense for Personnel and Readiness, David S. Chu stated in 1997: “future DoD strategy may require more flexibility in our human resources management system (Asch and Warner, 2001).” Seeing the effects of a delayed budgeting program that executes policy four years after it is relevant only reinforces the idea that future incentive payments can be managed more effectively through the use of an auction mechanism. Had the original House plan been executed as

planned, it is easy to assume that there would have been an even greater outcry concerning the economic rents paid to our departing sailors than what occurred with the first drawdown.

For this reason, the Department of the Navy should look at using auctions as the mechanism for accomplishing their future force shaping programs. Not only does an auction setting offer a medium which greatly reduces the surplus payments to departing sailors associated with prior programs, thus yielding a more cost-effective product, but, an auction can serve as a more graphic substitute for the endless surveys the Department of Defense conducts to determine the current state of the fleet. Furthermore, auctions could be used to deliver re-enlistment and special pay incentives, as well.

Through the use of an auction system, the Department of the Navy can capture real data as it pertains to a specific program vice simply guessing at the appropriate discount rate to use. In addition, the auction system would allow policy analysts to gain a clearer perspective on just how the service member views his or her military compensation package, which continues to be a difficult factor for both the sailor and the policy maker to grasp. However, most important, the auction would serve as a true gauge of what type of incentive it would take the average sailor to stay or to leave.

C. CONCLUSION

With the end of the Department of the Navy's latest force reduction drawing near, it is apparent that the Targeted Separation Incentive program will prove to be a very effective tool in meeting the Navy's steady state goal. While the total opportunity cost of this program still remains debatable, the aftermath of this program will serve as a valuable area for further research for the Department of Defense when all the numbers are in and the analysts can evaluate this program's true role. In the meantime, the Navy should start looking at recent trends in retention to ensure that they did not over shoot the bow with the Targeted Separation Incentive program and that the future force will be able to "guide our Navy as we defend our nation and defeat our enemies in the uncertain century before us (Clarke, 2002)."

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APPENDIX A. FY2006 PAY CHARTS

BASIC PAY—EFFECTIVE JANUARY 1, 2006^{1/}															
Pay Grade	<i>Cumulative Years of Service</i>														
	2 or less	Over 2	Over 3	Over 4	Over 6	Over 8	Over 10	Over 12	Over 14	Over 16	Over 18	Over 20	Over 22	Over 24	Over 26
O-10 ^{2/}	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13,365.00	13,430.40	13,709.70	14,196.30
O-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11,689.50	11,857.50	12,101.10	12,525.60
O-8	8,271.00	8,541.90	8,721.60	8,772.00	8,996.10	9,371.10	9,458.10	9,814.20	9,916.20	10,222.80	10,666.20	11,075.40	11,348.70	11,348.70	11,348.70
O-7	6,872.70	7,191.90	7,339.80	7,457.10	7,669.80	7,879.50	8,122.50	8,364.90	8,607.90	9,371.10	10,015.80	10,015.80	10,015.80	10,015.80	10,065.50
O-6	5,094.00	5,596.20	5,963.40	5,963.40	5,985.90	6,242.70	6,276.60	6,276.60	6,633.30	7,263.90	7,634.10	8,004.00	8,214.60	8,427.60	8,841.30
O-5	4,246.50	4,783.50	5,115.00	5,177.10	5,383.50	5,507.40	5,779.20	5,978.70	6,236.10	6,630.60	6,818.10	7,003.80	7,214.40	7,214.40	7,214.40
O-4	3,663.90	4,241.40	4,524.30	4,587.60	4,850.10	5,131.80	5,482.20	5,755.80	5,945.40	6,054.30	6,117.60	6,117.60	6,117.60	6,117.60	6,117.60
O-3	3,221.40	3,651.90	3,941.70	4,297.50	4,503.00	4,728.90	4,875.30	5,115.90	5,240.70	5,240.70	5,240.70	5,240.70	5,240.70	5,240.70	5,240.70
O-2	2,783.10	3,170.10	3,651.00	3,774.30	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00	3,852.00
O-1	2,416.20	2,514.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60	3,039.60
O-3E ^{3/}	0.00	0.00	0.00	4,297.50	4,503.00	4,728.90	4,875.30	5,115.90	5,318.40	5,434.50	5,592.90	5,592.90	5,592.90	5,592.90	5,592.90
O-2E ^{3/}	0.00	0.00	0.00	3,774.30	3,852.00	3,974.70	4,181.40	4,341.60	4,460.70	4,460.70	4,460.70	4,460.70	4,460.70	4,460.70	4,460.70
O-1E ^{3/}	0.00	0.00	0.00	3,039.60	3,246.30	3,366.00	3,488.70	3,609.30	3,774.30	3,774.30	3,774.30	3,774.30	3,774.30	3,774.30	3,774.30
W-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5,720.10	5,916.30	6,113.10	6,311.10
W-4	3,328.80	3,581.10	3,684.00	3,785.10	3,959.40	4,131.30	4,305.90	4,475.70	4,651.50	4,927.20	5,103.60	5,276.10	5,454.90	5,631.00	5,811.00
W-3	3,039.90	3,166.80	3,296.40	3,339.30	3,475.50	3,631.50	3,837.30	4,040.40	4,256.40	4,418.40	4,579.80	4,649.10	4,720.80	4,876.80	5,032.50
W-2	2,673.90	2,826.60	2,960.40	3,057.30	3,140.70	3,369.60	3,544.50	3,674.40	3,801.30	3,888.30	3,961.50	4,100.70	4,239.00	4,379.10	4,379.10
W-1	2,361.30	2,554.50	2,683.80	2,767.50	2,990.40	3,124.80	3,243.90	3,376.80	3,465.00	3,544.80	3,674.70	3,773.10	3,773.10	3,773.10	3,773.10
E-9 ^{4/}	0.00	0.00	0.00	0.00	0.00	0.00	4,022.10	4,113.30	4,228.20	4,363.50	4,499.40	4,717.80	4,902.30	5,097.00	5,394.00
E-8	0.00	0.00	0.00	0.00	0.00	3,292.50	3,438.30	3,528.30	3,636.30	3,753.30	3,964.50	4,071.60	4,253.70	4,354.80	4,603.50
E-7	2,288.70	2,498.10	2,593.80	2,720.70	2,819.40	2,989.50	3,084.90	3,180.30	3,350.40	3,435.60	3,516.30	3,565.80	3,732.60	3,840.60	4,113.60
E-6	1,979.70	2,178.00	2,274.30	2,367.60	2,465.10	2,685.00	2,770.50	2,865.30	2,948.70	2,978.10	2,998.50	2,998.50	2,998.50	2,998.50	2,998.50
E-5	1,814.10	1,935.30	2,028.60	2,124.60	2,273.70	2,402.10	2,496.60	2,526.60	2,526.60	2,526.60	2,526.60	2,526.60	2,526.60	2,526.60	2,526.60
E-4	1,662.90	1,748.10	1,842.60	1,935.90	2,018.40	NOTES:									
E-3	1,501.20	1,595.70	1,692.00	1,692.00	1,692.00	1 While serving as JCS/Vice JCS, CNO, CMC, Army/Air Force Chief of Staff, commander of a unified or specified combatant command, basic pay is \$15,615.90 (See note 2).									
E-2	1,427.40	1,427.40	1,427.40	1,427.40	1,427.40	2 Basic pay for an O-7 to O-10 is limited by Level III of the Executive Schedule which is \$12,666.60. Basic pay for O-6 and below is limited by Level V of the Executive Schedule which is \$11,158.20.									
E-1	1,273.50	1,273.50	1,273.50	1,273.50	1,273.50	3 Applicable to O-1 to O-3 with at least 4 years & 1 day of active duty or more than 1460 points as a warrant and/or enlisted member. See DoDFMR for more detailed explanation on who is eligible for this special basic pay rate.									
E-1 -4 mos	1,178.10	0.00	0.00	0.00	0.00	4 For the MCPO of the Navy, CMSgt of the AF, Sergeant Major of the Army, Marine Corps or Senior Enlisted Advisor of the JCS, basic pay is \$6499.50. CZTE for O-1 and above is based on this basic pay rate plus HFP/IDF which is \$225.00.									

(Source: DFAS Website:
[<http://www.dod.mil/dfas/militarypay/newinformation/WebPayTableVersion2006updated.pdf>], Accessed 2 March 2006)

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APPENDIX B. TERA CALCULATION FIGURES

Length of service		
Years	Months	% of basic pay
15	0	35.625
15	1	35.854
15	2	36.084
15	3	36.314
15	4	36.544
15	5	36.775
15	6	37.006
15	7	37.238
15	8	37.469
15	9	37.702
15	10	37.934
15	11	38.167
16	0	38.4
16	1	38.634
16	2	38.867
16	3	39.102
16	4	39.336
16	5	39.571
16	6	39.806
16	7	40.042
16	8	40.278
16	9	40.514
16	10	40.751
16	11	40.988
17	0	41.225
17	1	41.463
17	2	41.701
17	3	41.939
17	4	42.178
17	5	42.417
17	6	42.656
17	7	42.896
17	8	43.136
17	9	43.377
17	10	43.617
17	11	43.859

Length of service		
Years	Months	% of basic pay
18	0	44.1
18	1	44.342
18	2	44.584
18	3	44.827
18	4	45.069
18	5	45.313
18	6	45.556
18	7	45.8
18	8	46.044
18	9	46.289
18	10	46.534
18	11	46.779
19	0	47.025
19	1	47.271
19	2	47.517
19	3	47.764
19	4	48.011
19	5	48.259
19	6	48.506
19	7	48.754
19	8	49.003
19	9	49.252
19	10	49.501
19	11	49.75

Source: http://www.dmdc.osd.mil/tera/owa/ShowPage?p=payoff&p_SID=VOPUOSGXWIS

(Source: Reppert, 2006)

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**APPENDIX C. AVERAGE LIFE EXPECTANCY FOR OFFICER
FOLLOWING RETIREMENT**

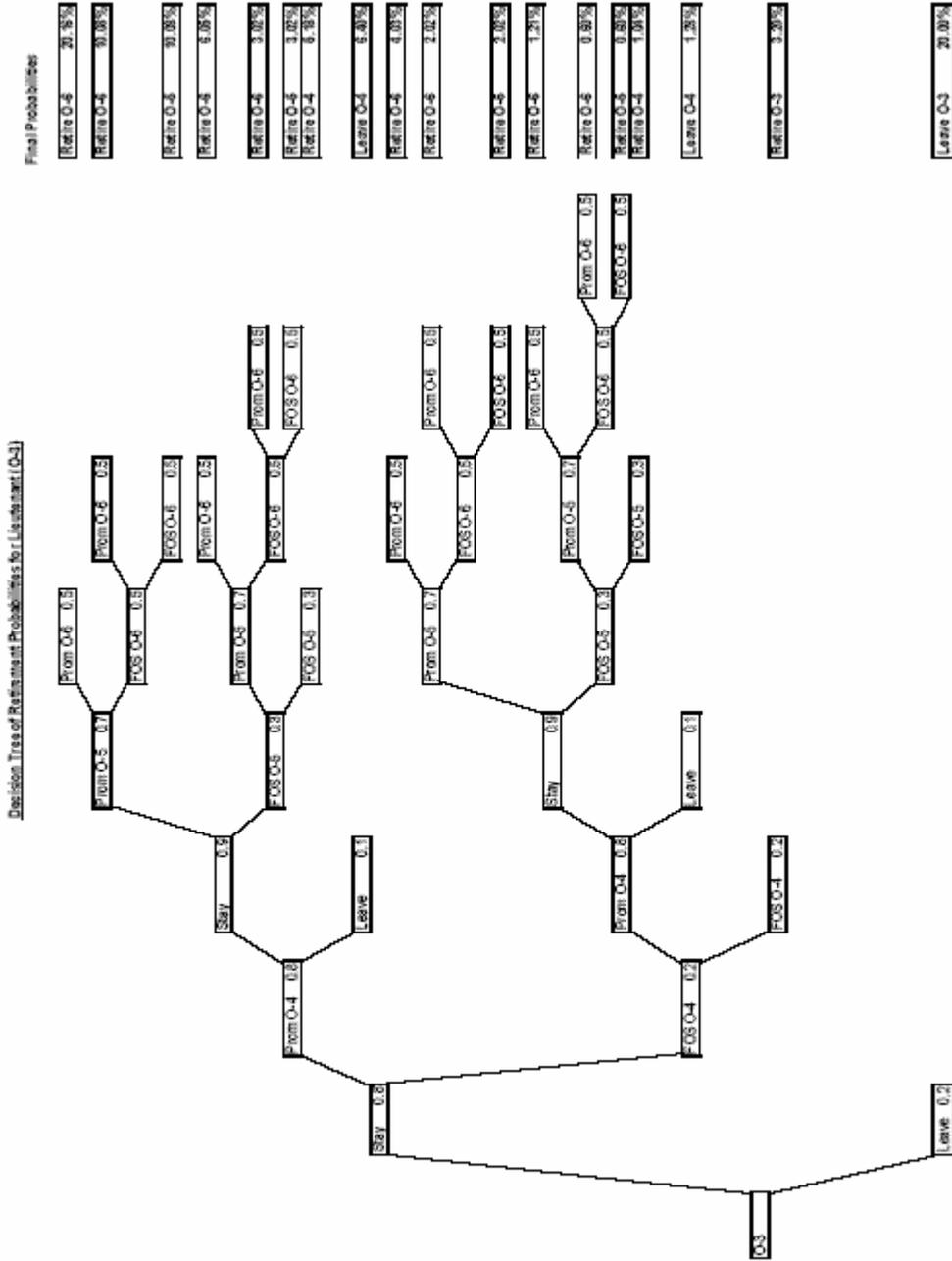
Age (nearest birthday)	Officers
38	46.19
39	45.15
40	44.11
41	43.07
42	42.02
43	40.98
44	39.94
45	38.90
46	37.86
47	36.82
48	35.78
49	34.74
50	33.70
51	32.65
52	31.62
53	30.58
54	29.55
55	28.53

Source: DoD Actuary (2004), <http://www.dod.mil/actuary/statbook03.pdf> p. 270

(Source: Reppert, 2004)

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APPENDIX D. DECISION TREE FOR PROMOTION AND RETENTION PROBABILITIES FOR AN O-3



Decision Tree is based upon mean values of promotion probability distributions

(Source: Reppert, 2004)

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APPENDIX E. INVOLUNTARY SEPARATION PAYMENTS FOR OFFICERS

INVOLUNTARY SEPARATIONS PAY FOR FY2006

Paygrade	6	7	8	9	10	11	12
Commissioned officers							
O-5	\$38,761.20	\$45,221.40	\$52,871.04	\$59,479.92	\$69,350.40	\$76,285.44	\$86,093.28
O-4	\$34,920.72	\$40,740.84	\$49,265.28	\$55,423.44	\$65,786.40	\$72,365.04	\$82,883.52
O-3	\$32,421.60	\$37,825.20	\$45,397.44	\$51,072.12	\$58,503.60	\$64,353.96	\$73,668.96
O-2	\$27,734.40	\$32,356.80	\$36,979.20	\$41,601.60	\$46,224.00	\$50,846.40	\$55,468.80

(Source:

[http://www.marinecorpstimes.com/content/static/mon/2006_involuntary_separation.php]
 Accessed: 16 February 2006)

MAXIMUM COST TO SEPARATE UNDER FY2006 NDAA

Paygrade	6	7	8	9	10	11	12
O-3	\$64,843.20	\$75,650.40	\$90,794.88	\$102,144.24	\$117,007.20	\$128,707.92	\$147,337.92
O-2	\$55,468.80	\$64,713.60	\$73,958.40	\$83,203.20	\$92,448.00	\$101,692.80	\$110,937.60
O-3E	\$64,843.20	\$75,650.40	\$90,794.88	\$102,144.24	\$117,007.20	\$128,707.92	\$147,337.92
O-2E	\$55,468.80	\$64,713.60	\$76,314.24	\$85,853.52	\$100,353.60	\$110,388.96	\$125,038.08
O-1E	\$46,746.72	\$54,537.84	\$64,627.20	\$72,705.60	\$83,728.80	\$92,101.68	\$103,947.84

NDAA MAX COST TO SEPARATE - SENATE

Paygrade	6	7	8	9	10	11	12
O-3	\$97,264.80	\$113,475.60	\$136,192.32	\$153,216.36	\$175,510.80	\$193,061.88	\$221,006.88
O-2	\$83,203.20	\$97,070.40	\$110,937.60	\$124,804.80	\$138,672.00	\$152,539.20	\$166,406.40
O-3E	\$97,264.80	\$113,475.60	\$136,192.32	\$153,216.36	\$175,510.80	\$193,061.88	\$221,006.88
O-2E	\$83,203.20	\$97,070.40	\$114,471.36	\$128,780.28	\$150,530.40	\$165,583.44	\$187,557.12
O-1E	\$70,120.08	\$81,806.76	\$96,940.80	\$109,058.40	\$125,593.20	\$138,152.52	\$155,921.76

NDAA MAX COST TO SEPARATE - ORIGINAL HOUSE PLAN

Paygrade	6	7	8	9	10	11	12
O-3	\$129,686.40	\$151,300.80	\$181,589.76	\$204,288.48	\$234,014.40	\$257,415.84	\$294,675.84
O-2	\$110,937.60	\$129,427.20	\$147,916.80	\$166,406.40	\$184,896.00	\$203,385.60	\$221,875.20
O-3E	\$129,686.40	\$151,300.80	\$181,589.76	\$204,288.48	\$234,014.40	\$257,415.84	\$294,675.84
O-2E	\$110,937.60	\$129,427.20	\$152,628.48	\$171,707.04	\$200,707.20	\$220,777.92	\$250,076.16
O-1E	\$93,493.44	\$109,075.68	\$129,254.40	\$145,411.20	\$167,457.60	\$184,203.36	\$207,895.68

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