



NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

**APPLYING THE COMBINATORIAL RETENTION
AUCTION MECHANISM (CRAM) TO A COST-BENEFIT
ANALYSIS OF THE POST 9/11 ERA GI BILL
TRANSFERABILITY BENEFIT**

by

Richard Lay

June 2009

Thesis Advisor:
Second Reader:

Gates
Pete Coughlan

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE June 2009	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE Applying the Combinatorial Retention Auction Mechanism (CRAM) to a Cost-Benefit Analysis of the Post 9/11 Era GI Bill Transferability Benefit			5. FUNDING NUMBERS	
6. AUTHOR(S) Richard Lay, LTJG, USN				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) This research determined the costs, benefits and efficiency of the Post 9/11 Era GI Bill Transferability benefit by simulating four different retention mechanisms and comparing the cost of each to provide desired retention levels among a population of sailors who valued the Transferability benefit more than or less than the Cost of the mechanisms investigated were a purely monetary auction, a Universal Incentive Package (UIP) Auction, and the Combinatorial Retention Auction Mechanism (CRAM). All three mechanisms were simulated, data were analyzed and results were compared. The CRAM clearly showed it was the most efficient method for meeting retention objectives while constraining Costs to the Navy as much as possible. Cost savings to the Navy ranged from 27% to 51% over Cash Only Selective Reenlistment Bonuses (SRB). Furthermore, this report confirms that an across-the-board benefit such as GI Bill Transferability significantly reduces the positive surplus when sailors who have a Value of Transferability less than the Cost of Transferability nonetheless exploit this benefit. Maintaining the <i>status quo</i> SRB policy combined with the estimated negative retention effects of the GI Bill Transferability benefit only magnifies the cost ineffectiveness of the Post 9/11 Era GI Bill.				
14. SUBJECT TERMS MGIB, Post 9/11 Era GI Bill Transferability, Non-monetary Incentive (NMI), retention, Combinatorial Retention Auction Mechanism (CRAM), Universal Incentive Package (UIP), Selective Reenlistment Bonus (SRB), Total Reward, Auction			15. NUMBER OF PAGES 93	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU	

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution unlimited

**APPLYING THE COMBINATORIAL RETENTION AUCTION MECHANISM
(CRAM) TO A COST-BENEFIT ANALYSIS OF THE POST 9/11 ERA GI BILL
TRANSFERABILITY BENEFIT**

Richard H. Lay, Jr.
Lieutenant Junior Grade, United States Navy
B.A., University of Oklahoma, 2005

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
June 2009**

Author: Richard Lay

Approved by: Dr. Bill Gates
Thesis Advisor

Dr. Pete Coughlan
Second Reader

Dr. Bill Gates
Dean, Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This research determined the costs, benefits and efficiency of the Post 9/11 Era GI Bill Transferability benefit by simulating four different retention mechanisms and comparing the cost of each to provide desired retention levels among a population of sailors who valued the Transferability benefit more than or less than the Cost of Transferability to the Navy. The mechanisms investigated were a purely monetary auction, a Universal Incentive Package (UIP) Auction, and the Combinatorial Retention Auction Mechanism (CRAM).

All three mechanisms were simulated, data were analyzed and results were compared. The CRAM clearly showed it was the most efficient method for meeting retention objectives while constraining Costs to the Navy as much as possible. Cost savings to the Navy ranged from 27% to 51% over Cash Only Selective Reenlistment Bonuses (SRB).

Furthermore, this report confirms that an across-the-board benefit such as GI Bill Transferability significantly reduces the positive surplus when sailors who have a Value of Transferability less than the Cost of Transferability nonetheless exploit this benefit.

Maintaining the *status quo* SRB policy combined with the estimated negative retention effects of the GI Bill Transferability benefit only magnifies the cost ineffectiveness of the Post 9/11 Era GI Bill.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
A.	BACKGROUND OF THE POST 9/11 ERA GI BILL	1
	1. Honoring a Promise from 1944 for Current and Future Veterans	1
	2. Concerns of the Post 9/11 Era GI Bill	1
B.	RESEARCH OBJECTIVES OF THE ANALYSIS OF THE POST 9/11 ERA GI BILL.....	2
	1. Primary Objective.....	2
	2. Secondary Objectives.....	3
C.	SCOPE AND LIMITATIONS	3
D.	ORGANIZATION OF STUDY	3
II.	LITERATURE REVIEW	5
A.	HISTORICAL BACKGROUND OF VETERANS EDUCATIONAL BENEFITS.....	5
	1. Intent of Previous Veterans Educational Benefits	5
	2. Previous GI Bill Costs and Benefits	6
	a. <i>Monetary</i>	6
	b. <i>Secondary Navy Benefits</i>	9
B.	MOTIVATING FACTORS OF CHANGE	9
	1. 2004 Rand Corporation Study	10
	2. American Legion	11
	3. Army Family Action Plan (AFAP)	12
	4. Army Transferability Pilot Program	12
	5. 2008 DMDC Quick Compass of Active Duty Members Poll.....	13
	a. <i>Educational Benefits</i>	15
	b. <i>Perception of New GI Bill</i>	15
	c. <i>Retention and the New GI Bill</i>	16
C.	INITIAL DOD GUIDANCE	16
	1. Expanded Army Pilot Program.....	16
D.	COSTS	19
	1. Congressional Budget Office (CBO)	19
	2. Hogan and Mackin.....	21
	3. Board of Actuaries	27
E.	SUMMARY	30
III.	METHODOLOGY	31
A.	INTRODUCTION.....	31
B.	CASH ONLY SELECTED REENLISTMENT BONUSES.....	31
	1. Auction Background Information	31
C.	AUCTION CHARACTERISTICS.....	32
	1. Bidding Strategy in a Second-Price Sealed-Bid Auction.....	33
D.	CASH SRB.....	37

E.	UNIVERSAL INCENTIVIVE PACKAGE (UIP) AUCTION	37
F.	CRAM	38
IV.	ANALYSIS	41
A.	TARGET POPULATION	41
B.	RATING INFORMATION.....	41
1.	Air Traffic Controller.....	41
2.	Fire Controlman.....	41
C.	POPULATION STATISTICS	42
D.	ENLISTED RETENTION SURVEY RESULTS.....	43
1.	Distribution of Non-Monetary Incentive Values.....	43
E.	COST ANALYSIS	46
1.	Per Capita Cost Calculations of Transferability: Estimates from the DoD Board of Actuaries and the United States Army	46
2.	Cash Only SRBs	49
3.	Cost-Effectiveness for Universal GI Bill Transferability	50
4.	Cost-Effectiveness of GI Bill Transferability Under CRAM.....	52
5.	Summary.....	55
V.	SUMMARY, CONCLUSIONS AND RECOMMENDATIONS	57
A.	SUMMARY	57
B.	CONCLUSIONS	57
C.	RECOMMENDATIONS.....	58
1.	Administration	58
2.	Implementation	58
3.	Further Research	59
APPENDIX:	ENLISTED RETENTION SURVEY	61
LIST OF REFERENCES		71
INITIAL DISTRIBUTION LIST		75

LIST OF FIGURES

Figure 1.	DD Form 2236-2 (From Army, 2007)	18
Figure 2.	Present Value of Alternative Education Benefit Incentives (From Hogan & Mackin).....	21
Figure 3.	Post 9/11 Era GI Bill Transferability Cost Calculations: Part 1 of 2 (From August 2008 Board of Actuaries Meeting Minutes).....	28
Figure 4.	Post 9/11 Era GI Bill Transferability Cost Calculations: Part 2 of 2 (From August 2008 Board of Actuaries Meeting Minutes).....	29
Figure 5.	Common Auction Variations (From Zimmerman, Introduction to Auction Economics)	32
Figure 6.	Bidding Above Your Valuation (From Zimmerman).....	35
Figure 7.	Bidding Below Your Valuation (From Zimmerman)	36
Figure 8.	Value Distribution for GI Bill Transferability (From Zimmerman, 2008).....	45

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	2008 DMDC Quick Compass of Active Duty Members Poll (Navy Enlisted Personnel Only) (continued).....	14
Table 2.	Parameters Used in Estimating Effects (From Hogan & Mackin)	22
Table 3.	Force Effects of Alternatives (From Hogan)	24
Table 4.	Costs of Producing Specified Force Profile (From Hogan).....	26
Table 5.	Population and Sample Statistics (From Zimmerman, 2008).....	43
Table 6.	Average Reservation Values for Respondents (After Zimmerman, 2008).....	44
Table 7.	Reservation Value Percentiles (After Zimmerman, 2008)	45
Table 8.	Adjusted Cost to the Navy with UIP Estimations.....	51
Table 9.	Effective Cost to the Navy	53
Table 10.	Auction Mechanism Comparison of Costs to the Navy.....	54

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ABBREVIATIONS AND ACRONYMS

AC	Air Traffic Controller
AFAP	Army Family Action Plan
AHRC	Army Human Resources Command
AVF	All Volunteer Force
BoA	Board of Actuaries
BPV	Basic Present Value
CBO	Congressional Budget Office
CNO	Chief of Naval Operations
CRAM	Combinatorial Retention Auction Mechanism
DFAS	Defense Finance and Accounting Service
DMDC	Defense Manpower Data Center
DMPM	Director of Military Personnel Management
DoD	Department of Defense
DoN	Department of the Navy
DVA	Department of Veterans Affairs
EB	Enhanced Benefit
ERS	Enlisted Retention Survey
FC	Fire Controlman
FY	Fiscal Year
GAO	Government Accounting Office
HQ	High Quality
HQDA	Headquarters Department of the Army
IHE	Institute for Higher Education
MGIB	Montgomery GI Bill
MGIB-AD	Montgomery GI Bill - Active Duty
MOS	Military Occupational Specialty
NCO	Non-commissioned Officer
NMI	Non-monetary Incentive
NPC	Navy Personnel Command
OMPF	Official Military Personnel File
PCS	Permanent Change of Station
PO	Petty Officer
QOL	Quality of Life

ROI	Return on Investment
SOCOM	Special Operations Command
SRB	Selective Reenlistment Bonus
TA	Tuition Assistance
UIP	Universal Incentive Package
VEAP	Veterans Education Assistance Program

ACKNOWLEDGMENTS

First and foremost, I would like to say how much I appreciate my wife, Belinda, and our three kids, Samantha, Willem and Kymber. Without their support I would not have made it. They inspire and motivate me to achieve whatever task is at hand. A special note to Belinda: “Thank you for your sacrifice and devotion to our family. You are the reason for our success and the source of wisdom that guides us to be the greatest we can be. Thank you and I love you.”

Second, I would like to thank Dr. Bill Gates and Dr. Pete Coughlan for their guidance, expertise and patience. Life has thrown me some ‘curve balls’ during this thesis process. Their leadership, especially Dr. Gates, allowed me to regroup and refocus my energy in an attempt to aid them in their ongoing research. Thank you to both for giving me the opportunity to learn and excel under your tutelage.

Next, I wish to thank all of my sources/friends that I have made during the course of this research. Thank you to Wayne Wagner and CAPT “Mo” Cahill for putting me in touch with the right people at the right time with the right information. Thank you to Brad Ryder and LCDR Clay Chilson for providing crucial information and expert advice. Thank you to LT Brooke Zimmerman for doing so much of the survey ‘footwork’. Thank you to all my friends at NPS for being a ‘sounding board’ when I needed it and for being the ‘great guys’ that you are.

Finally, I would like to dedicate this body of work to my parents, Richard (1941-2008) and Eden Lay. Their enduring love for each other and their kids are exemplary of what I strive to be. Thank you for being the best role models any person could ask for.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. BACKGROUND OF THE POST 9/11 ERA GI BILL

1. Honoring a Promise from 1944 for Current and Future Veterans

The Post World War II GI Bill provided veterans with enough funding to completely cover tuition costs, books, fees and housing. The current Montgomery GI Bill (MGIB) only provides a veteran who completes at least 36 months of enlisted duty with a monthly check for \$1,101 for 36 months. This equates to \$9,909 for a full nine month academic calendar year.¹ Meanwhile, the average cost of tuition, fees and housing are \$13,589² per the same academic calendar year. Obviously, there is a major gap between the intent of the Post World War II GI Bill and the current MGIB.

In order to bridge this gap, a group of Senators³, both Republican and Democrat, introduced a totally overhauled version of the MGIB. They called it the Post 9/11 Era GI Bill, which was signed into law on June 30, 2008. This bill provides the same level of benefit that post World War II veterans had, plus a little bit more. Post 9/11 Era veterans now have the ability to transfer their education benefits to spouses and dependent children. Not only does this new GI Bill reaffirm the 1944 promise that the government made to military veterans, but it takes it a step further by recognizing that military families also make sacrifices for their country.

2. Concerns of the Post 9/11 Era GI Bill

As great as the Post 9/11 Era GI Bill is expected to be, it does have some underlying issues. The most significant being the additional cost associated with the new transferability benefit. It will be quite a while until the economic impact of this GI Bill is felt. Even though it is impossible to accurately determine future monetary costs, institutions such as the Board of Actuaries (BoA) and the Congressional Budget Office

¹ Academic Calendar Year 2006.

² The College Board, *Trends in College Pricing 2007*, 6, October 2007.

³ Senator Jim Webb (D-VA), Senator Frank Lautenberg (D-NJ), Senator Chuck Hagel (R-NE) and Senator John Warner (R-VA).

(CBO) have provided estimates that are based on logical⁴ assumptions. These estimates are currently being used to aid in planning future budgetary guidelines for the different services.

Another type of cost, first term attrition, is of great concern as well. As history has shown, any significant increase in educational benefits tends to lead toward a higher attrition rate for first term enlisted personnel. Additionally, the experience of the career force⁵ tends to have a significant decline. To offset these negative impacts, services have to exert more pressure on the recruiting market and boost Selective Reenlistment Bonuses (SRB) for individuals in critically undermanned occupations.

Finally, unintended consequences are always a concern. Though this phrase tends to have a negative overtone, it is not necessarily bad. Could the Post 9/11 GI Bill foster a new sense of patriotism and commitment among American youth for this generous benefit? Could it inspire more and more American youth to enlist and then leave the military at the first opportune moment to take advantage of this generous benefit? Could it inspire more and more American young adults to view the military as a means of establishing a secure lifestyle for a family and a means to pay for their children's education? The answers to these types of questions are the unintended consequences that may or may not be negative in nature.

B. RESEARCH OBJECTIVES OF THE ANALYSIS OF THE POST 9/11 ERA GI BILL

1. Primary Objective

The primary objective of this study is to determine the cost-effectiveness of the Post 9/11 Era GI Bill Transferability clause as a force-shaping tool. Though costs are impossible to forecast in an accurate manner, using mathematical models that include logical assumptions concerning usage rates and enlistment/reenlistment rates can provide a reasonable picture for decision makers of the costs that could possibly be expected.

⁴ Assumptions include expected member usage rates, expected dependent usage rates, etc... (See pgs. 30–31 of Literature Review Section).

⁵ Enlisted Personnel with more than 4 years of active duty service and are beyond their initial term of enlistment.

Cost estimates provided in the literature will be combined with values expressed in an enlisted retention survey to determine the cost-effectiveness of the GI Bill Transferability provision as a force-shaping tool.

2. Secondary Objectives

The second objective of this study is to determine the return on investment (ROI) of this educational benefit. Will this new GI Bill Transferability provision allow the services to buck the trend that previous significant educational benefit increases have done or will it follow historical evidence? Will the new GI Bill reveal benefits that no one expected?

The third and final objective of this thesis is to determine if the Post 9/11 Era GI Bill is in fact logical; in other words, is it fiscally responsible? If it is not fiscally responsible, is it an inefficient use of taxpayer money? An important factor in determining its efficiency is retention rate. If this new educational benefit significantly decreases the career force, then could it be considered inefficient? By examining the current literature, policymaker's educational benefit guidance, current military personnel actions and predicted future military personnel actions, this analysis will analyze the costs, benefits and efficiency of the Post 9/11 Era GI Bill.

C. SCOPE AND LIMITATIONS

This thesis analyzes survey data regarding GI Bill Transferability to determine whether or not it is a cost efficient retention incentive. The Enlisted Retention Survey (ERS) conducted by LT Brooke Zimmerman is the primary data source for the analysis since it focuses on enlisted sailors who are currently eligible for Selective Reenlistment Bonuses (SRBs) and GI Bill Transferability. Additionally, this thesis does not specifically address other military services, yet the findings may be applicable to any enlisted pay grade.

D. ORGANIZATION OF STUDY

This thesis is an extension of the continuing research being conducted by Dr. Pete Coughlan and Dr. Bill Gates. The overarching focus of that research explores the cost-

effectiveness of combining monetary and non-monetary retention incentives (i.e., flexible benefit packages) for active duty enlisted personnel.

The research contained within this study merely tries to examine one aspect of their research; the cost efficiency of the Post 9/11 Era GI Bill Transferability benefit. Currently there are very few studies on the subject of transferability, however, cost estimates on a per capita basis have been provided by some government agencies that will allow the simulation of GI Bill Transferability cost effectiveness. Key questions to be answered are:

- What monetary and non-monetary incentives (NMI) do sailors in the Enlisted Retention Survey value? What is the cost per capita of GI Bill Transferability? How much does the surveyed population value GI Bill Transferability? Does the majority of the targeted enlisted population value GI Bill Transferability more than the estimated Costs of Transferability? (Chapter II)
- Have previous traditional SRB mechanisms been efficient and cost effective? Do alternative mechanisms such as auctions offer the same, if not better, result as traditional Cash Only SRBs? (Chapter III)
- Which of the cost per person estimations provide the most accurate inference of Cost to the Navy for the enlisted population in the Enlisted Retention Survey? Do the alternative retention mechanisms such as the CRAM and Adjusted SRBs prove to be cost effective and fiscally efficient? (Chapter IV)

Chapter IV also provides the simulation results and findings of the four different retention mechanisms as well. Chapter V presents the conclusions and recommendations.

II. LITERATURE REVIEW

A. HISTORICAL BACKGROUND OF VETERANS EDUCATIONAL BENEFITS

1. Intent of Previous Veterans Educational Benefits

The 1944 Serviceman's Readjustment Act (GI Bill) has been considered to be one of the most significant pieces of legislation to ever be passed. Since its inception in June 1944, the GI Bill has gone through several changes. From a national perspective, the GI Bill was intended to help the country avoid slipping back into a depression and prevent a similar situation like the Bonus March of 1932.⁶ In other words, the GI Bill was nothing more than compensation to WWI and WWII veterans for wartime services. A different point of view by which to examine the intentions of the GI Bill was through the Navy's eyes. The Navy saw the GI Bill as an excellent recruiting tool for high quality sailors. By increasing the number of high quality recruits, the Navy gained a highly exceptional force that would establish supremacy of the sea in both wartime and peacetime. From the individual sailor's point of view, this provided an opportunity to attend a college or university that he/she might not otherwise have been able to attend. Gaining an education, increasing their quality of life and enhancing their marketability in the civilian labor market in exchange for four years of duty was deemed a deal too good to pass up for many individuals.

However, when the All Volunteer Force (AVF) was conceived in 1973, a momentous modification to the GI Bill [MGIB] provided the service member with an \$1101 monthly stipend for 36 months as long as he/she voluntarily invested \$100 per month for the first 12 months of their initial enlistment and maintained a full course load per semester. The MGIB was worth approximately \$40,000 during this time. Meanwhile, veterans' educational benefits were unwittingly transformed from a service compensation award and re-assimilation program into a high-powered recruiting tool, changing its original meaning.

⁶ WWI veteran's march in Washington D.C. demanding a cash payment of Service Certificates granted to them eight years earlier via the Adjusted Service Certificate Law of 1924.

After several decades of inflation, escalating college costs and stagnation of veterans' education benefits, Senator Jim Webb and his constituents were able to magnify the value of the MGIB (aka Post 9/11 Era GI Bill) to approximately \$80,000 as well as providing the capacity to transfer this benefit to spouses or dependents (Wisnoski). Intending to truly honor today's veterans, as with the original GI Bill in 1944, the Post 9-11 Era GI Bill will do just that. It will provide the means for veterans, as well as their dependents, to increase the quality of their life through higher education.

2. Previous GI Bill Costs and Benefits

a. Monetary

1944 GI Bill of Rights→ To put the predicted costs and benefits of the Post 9/11 GI Bill in context, we need a retrospective view of the GI Bill. Veterans' education benefits have evolved over the last six decades. Initially, the GI Bill of Rights of 1944 was completely subsidized by the federal government [Veterans Administration] and payments of up to \$500 annually were issued directly to the particular higher education institution attended by the WWI or WWII veteran. In addition, separate subsistence payments, \$50/month for single vets and more for vets with dependents, were provided to the veteran to help cover the daily cost of living (Smole, 3). The GI Bill of Rights ended on July 25, 1956.

- \$50 (1944) ≈ \$589 (2007 constant dollars⁷)
- \$500 (1944) ≈ \$5,890 (2007 constant dollars)
- Total Annual Cost \$1,100 (1944)≈\$12,958 (2007 constant dollars)

1952 Korean GI Bill→ In 1952, the Korean GI Bill⁸ was authorized by Congress to help vets readjust to civilian life after their time in the Korean War. The Korean GI Bill was worth \$110 monthly for single sailors and more for sailors who had dependents. However, the monthly benefit was intended to cover the costs of both higher

⁷ 2007 constant dollars are calculated using CPI inflation calculator with respective base years and 2007 for the current year

⁸ Veterans' Readjustment Act of 1952 and successor to the GI Bill of Rights

education and subsistence. Funds were paid directly to the veteran. The reasoning for this method was to reduce fraud committed by Institutes of Higher Education (IHE) as well as encourage more responsible spending by veterans, because they would have to partially cover the cost of learning. The program ended January 31, 1965.

- \$110 (1965) $\approx$ \$724 (2007)
- Total Annual Cost \$1,320 (1965) $\approx$ \$8,688 (2007 constant dollars)

1966 Post-Korea & Vietnam Era GI Bill→ In 1966, the Post-Korea and Vietnam Era GI Bill⁹ was originally intended for Korean War era veterans and was not supposed to be as generous as the earlier veterans education assistance programs (Smole, 3). This was the first GI Bill that provided benefits to vets who were still on active duty as opposed to previous GI Bills that required vets to complete their time in service. At the same time, it decreased monthly benefits to \$100 for single vets; those with dependents were awarded a little more. Eventually, after numerous increases over a span of 18 years, the monthly benefits maxed out at \$376 per month in 1984. In addition, the total number of monthly payments for which vets were eligible under this program equaled the number of months on active duty status. This program ended December 31, 1989.

- \$100 (1966) $\approx$ \$640 (2007)
- Total Annual Cost \$1,200 (1966) $\approx$ \$7,680 (2007 constant dollars)
- \$376 (1984) $\approx$ \$629 (2007)
- Total Annual Cost \$4,512 (1984) $\approx$ \$7,548 (2007 constant dollars)

1976 VEAP→ In 1976, the Post Vietnam Era Veterans Education Assistance Program (VEAP) was established and made available to service members who entered active duty after December 31, 1976 and before July 1, 1985. Addressing a specific goal, VEAP was to be the first major recruiting tool by the services since the military became an AVF. Due to the requirement that participants had to contribute

⁹ Veterans Readjustment Benefits Act of 1966

anywhere from \$25 to \$100 maximum per month with the government matching contributions on a 1-for-2 basis, the maximum available monthly educational benefit was \$300.

- \$300 (1977) $\approx$ \$1,026 (2007)
- Total Annual Benefit \$3,600 (1977) $\approx$ \$12,312 (2007 constant dollars)

1985 MGIB $\rightarrow$ The Montgomery GI Bill (MGIB) replaced VEAP on June 30, 1985. The MGIB included two major programs: MGIB-Active Duty (MGIB-AD) and MGIB-Selected Reserve (MGIB-SR). Certain MGIB-AD participants also have the option to receive additional benefits called “kickers¹⁰” or “college fund”. This analysis will focus on MGIB-AD (less kickers or college fund) only and will be referred to as simply “MGIB”. To be eligible to participate in MGIB, service members must have had their first 12 months pay reduced by \$100 for each month, have a high school diploma/GED, an honorable discharge or active duty and completion of at least 12 credit hours towards a college degree. Participants only have 36 months of total MGIB benefits and a maximum of 10 years to exercise these benefits.

Monthly benefits vary based on time in service and class load. This analysis focuses on vets who have at least three continuous years on active duty and are enrolled as full-time¹¹ students. Service members who fall under this category currently receive a maximum of \$1,321.00 per month regardless of dependents status (Veterans Administration, 1Aug08).

- \$300 (1985) $\approx$ \$578 (2007)
- Total Annual Benefit \$3,600 (1985) $\approx$ \$6,936 (2007 constant dollars)
- \$1,272 (2007)

¹⁰ Educational benefits, in addition to the MGIB, which are used as incentives to recruit high quality recruits into critically undermanned occupations.

¹¹ 12 Credit hours per semester.

- Total Annual Benefit \$15,852 (2008)≈\$15,264 (2007 constant dollars)

b. Secondary Navy Benefits

From the Navy's perspective, previous GI Bills provided the government with unintended costs and benefits that were difficult, if not impossible, to measure. Even though non-monetary benefits are intangible in nature, it is believed by an overwhelming majority of business professionals, as well as academia, that factors such as job satisfaction, employer appreciation of employees, pride in service, etc..., are extremely significant factors that affect production and quality. For example, the 1944 GI Bill of Rights created an atmosphere among returning GI's that the U.S. government and the citizens of the U.S. were indeed grateful for their service and sacrifice. Due to the overwhelming public support for providing veterans with educational assistance, unintended consequences (i.e., benefits), including massive expansions in college enrollment, veteran participation in educational assistance and increased quality of the workforce, aided the country in avoiding a widely feared post-WWII depression.

B. MOTIVATING FACTORS OF CHANGE

For the past three decades, veterans' educational benefits have been the most powerful recruiting tool for the armed forces. Educational benefits are designed to persuade 17-19 year old men and women to enlist as members of the armed forces. There are many reasons for recruiting young adults, including acquiring individuals to man duty posts, provide guard support, and maintain a supply of infantrymen and repair ships' equipment. However, two of the most significant reasons to offer educational benefits are to incentivize highly qualified individuals to enlist in technologically advanced rates that are difficult to fill and enticing high quality individuals to stay in military service past their first enlistment. Currently, the preferred method of keeping high quality sailors in the Navy is to reward them with a sufficiently high Selective Reenlistment Bonus (SRB). Initially, monetary lump sums were very enticing and seemed like a logical response to the majority of preferences that sailors desired outside of the workplace. Nonetheless, SRBs have proven to be inefficient use of funds and

misunderstanding the current sailor's underlying motivational/decisional factors, such as a spouse's desire for the service member to remain on active duty.

"Between 1980 and 2000, at least half of the active duty force consisted of married service members" (Wisnoski, 2005, 5). Associated with this were "increased familial responsibilities" as well as spousal desires to obtain an education (GAO-02-557T). According to Government Accounting Office (GAO), service members with children increased from 43 percent to 45 percent between 1990 and 2000 (Wisnoski, 2005, 5). By understanding the demographic changes of our active duty forces, researchers can identify, define and determine what incentives are truly important to military personnel and their spouses. Steven Wisnoski writes, "When determining what influences spouses' opinions toward the retention of the significant other, their own employment and educational opportunities tend to be a major contributor".

Wisnoski's thesis clearly identifies that higher educational opportunities for family members [dependents] is a non-monetary incentive that holds a much higher value than simple lump sums of cash for service members who have dependents. In addition, the opportunity to earn a college degree while one's spouse remains on active duty has consistently been cited as a determinant of overall satisfaction with military life (aka: Quality of Life / QOL). Even though this aspect is difficult to analyze in quantitative terms, Wisnoski was able to create variables that in fact show a correlation between overall military life satisfaction, a spouse's desire for a college education and the spouse's desire for the service member to remain on active duty. After a logistical regression analysis, Wisnoski showed that military QOL was more often than not positively correlated with spousal educational opportunities.

1. 2004 Rand Corporation Study

In contrast, Wisnoski (2007) observes that a 2004 Rand Corporation Study reported that spousal education opportunities had been hindered by numerous factors (Wisnoski, 2005, 7). Examples of these factors include frequent duty relocations as well as the inflexibility and unpredictability of the service member's work schedule. Since the majority of duty station assignments tend to last three years, a spouse, under ideal

conditions for child care and tuition assistance, could only complete three years of schooling before having to transfer to another duty location. In addition, the majority of Permanent Change of Station (PCS) orders requires state-to-state relocation or even transfer to another country, therefore student/spouses must retake many courses because courses don't always transfer from one college to another.

Even though educational benefits affect how a military spouse perceives their QOL and their desire for the active duty member to reenlist, it is the administration of educational benefit policies that determine whether or not educational benefits have a positive or negative impact on retention. Therefore, a spouse's perception about their own personal educational opportunities seems critical. The challenge at this point is to quantify how much transferring a service member's educational benefit to dependents is worth to that particular individual.

Wisnoski's thesis concludes that service members are encouraged to reenlist when spouses feel their personal educational opportunities are better as military spouses. In addition, Wisnoski's thesis concludes that the ability to transfer GI Bill benefits to one's spouse or other dependents in exchange for an additional enlistment term could prove beneficial in the recruiting and retention process.

2. American Legion

Another motivating factor, educational costs beyond tuition, was brought to the public attention by the American Legion. In the August 2008 edition of the American Legion Magazine, writer Phillip Callaghan stated that "[education] benefits were failing to cover the cost of tuition" (Callaghan, 2008). This statement not only reflects the obvious tuition costs, but the additional costs of attending college that remain unaccounted for by legislation concerning veterans' educational benefits. Through numerous interviews, Callaghan discovered that the majority of his participants' comments centered on personal situations that involve living with a parent, or other family member while in school, to cover the cost of rent, food and other miscellaneous items (i.e., hygiene products, clothing). Additional costs, such as transportation to

and from school, books and parking permits are all costs that affect the majority of college students, as well, yet remain unaccounted for when making decisions about educational benefits.

The implicit policy to only cover tuition costs for universities that are reasonably affordable is the third motivational factor to change the GI Bill. Many veterans may want to attend a prestigious university (i.e., Harvard, Yale, Penn State). Callaghan (2008) maintains that the reasons for the preference are irrelevant and it is not the role of the U.S. government to dictate which university a veteran can attend, but rather a responsibility to empower a veteran to choose which university is best for him or her. Before passing the Post 9/11 Era GI Bill, many veterans incurred huge student loans to attend the best universities. Case in point, Aaron Alfson (USAF), Iraq and Afghanistan veteran, has a debt of \$90,000 and is only in his third year of college at Columbia University (Callaghan, 2008). The skyrocketing costs of college tuition are increasing exponentially beyond the previous veterans' educational benefits. Therefore, many veterans were being forced to choose between attending a cheaper, second tier public university or incurring tens of thousands of dollars of student loan debt.

3. Army Family Action Plan (AFAP)

The fourth motivational factor to improve educational benefits was feedback received from the Army Family Action Plan (AFAP) organization which advises Headquarters Department of the Army (HQDA) regarding issues such as family education benefits. After numerous surveys spanning several years, AFAP noticed that MGIB Transferability has always been a Top 5 issue. Therefore, they have consistently strongly recommended that HQDA include transferability of education benefits to spouses as well as children (Conway, 2007).

4. Army Transferability Pilot Program

In response to soldiers' desires to provide their dependents the means for higher education, the Army developed a pilot program and "implemented transferability in July 2006 for transfer of benefits to spouses only" via authorization under Title 38, U.S. Code, Chapter 30, Public law 107-107 (Conway, 2007). They further limited this transferability

option to Soldiers in critical skills, as determined by the Secretary of the Army; MGIB benefits are only transferable to spouses to enhance recruiting and retention for critical skills. Soldiers also had to be entitled to a Zone B (6-10 year mid careerist) or Zone C (10-14 year careerist) bonus. In addition, the Army was now responsible for funding this program, as opposed to the Veterans Administration (VA). They secured their funding requirements by giving the soldier a choice between a full SRB or a slightly reduced SRB with the ability to transfer over \$19,000 in benefits to a spouse. As will be detailed later, the Army estimated the per user cost of the transferability option in FY08 at approximately \$3,100 per soldier.

Initially, the program had roughly 250 soldier participants who were mid-careerists. Of those 250, the majority were assigned to Forces Command and U.S. Special Operations Command (SOCOM). Ninety six percent of the soldiers elected transferability when they reenlisted. Of the 96%, only 65% used a portion of their benefits for personal education goals, totaling 12-14 months worth of assistance on average (Conway, 2007).

5. 2008 DMDC Quick Compass of Active Duty Members Poll

In 2008, results of the Defense Manpower Data Center (DMDC) Quick Compass of Active Duty Members (all services) survey were officially released. It included 9,290 eligible respondents out of 41,027 surveyed [26%]. The results of Enlisted Navy Personnel only are presented here in Table 1 and Table 2 due to the focus of this thesis. The actual survey results, which contain information pertinent to all other military services, can be found in the DMDC 2008 Quick Compass of Active Duty Members, October 2008.

		Navy Enlisted (All)	Navy E1-E4	Navy E5-E9
EDUCATIONAL BENEFITS				
Enrolled in MGIB		86	91	84
GI Bill Usage	Yes; Currently Using the Benefit	1	1	1

	No; but Plan to use the benefit	91	98	86
Being able to x-fer benefits to dependents	Important	88	87	89
	Not important	4	3	4
Being able to use GI Bill benefit to pay existing college loans	Important	69	72	68
	Not important	16	14	18
When would you use a benefit to cover a monthly cost-of-living stipend and full tuition?	Exit military at earliest chance to use benefit	15	22	12
	Use benefit after retirement or separation	67	59	72
PERCEPTION OF NEW GI BILL				
Importance of x-fer to spouse	Important	77	81	74
	Not important	7	6	7
Importance of x-fer to children	Important	92	91	92
	Not important	3	2	4
Likelihood to x-fer some/all of MGIB to spouse	Likely	75	76	75
	Unlikely	13	13	12
Likelihood to x-fer some/all of MGIB to children	Likely	94	92	94
	Unlikely	2	NR	2
Members should be allowed to x-fer entire GI Bill to dependents	Agree	89	86	90
	Disagree	3	4	2
How likely would you be to STAY to be eligible to x-fer MGIB to dependents	Likely	67	54	72
	Unlikely	18	26	15
RETENTION AND THE NEW GI BILL				
Degree likely to stay on active duty for new MGIB x-fer benefit	Large Extent	69	61	74
	Not at all	9	9	9
Degree likely to stay on active duty for new MGIB existing college loan repayment benefit	Large Extent	51	50	51
	Not at all	20	18	21

Table 1. 2008 DMDC Quick Compass of Active Duty Members Poll (Navy Enlisted Personnel Only) (continued)

Table 1 provides a good synopsis of surveyed enlisted naval personnel's overall knowledge of educational benefits, perceptions of the new GI Bill and retention intentions when the new GI Bill is factored in.

a. *Educational Benefits*

According to the survey, a vast majority of enlisted personnel have elected to enroll in the MGIB for a cost of \$100 dollars per month, yet only one percent of those enrolled are currently using the benefit. The most likely reason for such a low usage rate is tuition assistance (TA). Since TA covers the majority (75%) of active duty members tuition costs, the remaining costs are usually covered by the TOP-UP¹² program or directly out-of-pocket. There are various reasons for choosing one or the other methods to pay for the remaining 25% of tuition costs, but experience and observation tend to lean toward the fact that many sailors want to save their MGIB benefits for school after they have separated/retired from the military. The value of a monthly stipend and tuition coverage are essential for prior service members who are going back to school and do not want to waste any of the available 36 months of MGIB benefits on tuition that can be covered by TA while on active duty.

Another important finding of the DMDC survey revealed that the majority of Navy E1-E4 respondents (59%) would use their GI Bill monthly living stipend and full tuition coverage only after retiring or separating later in their career as opposed to the 22% who stated they would "exit the military at the earliest chance to use the benefit" (DMDC). These findings lend supporting evidence to the critics of the Post 9/11 Era GI Bill who believe that most junior enlisted personnel will not 'stay Navy' to exploit the generous education benefits being offered.

b. *Perception of New GI Bill*

Enlisted Navy respondents perceive the Post 9/11 Era GI Bill Transferability clause as extremely important. Both junior and senior sailors overwhelmingly stated that transferability of educational benefits is important and that

¹² TOP-UP is an educational assistance program in which active duty service members can use part of their MGIB benefits to cover the remaining tuition costs not covered by TA.

they would most likely transfer those benefits to dependents. Even though many of these junior sailor respondents may not necessarily be married or have children, they apparently see the value of such a benefit. Observing the value they have for transferability logically foretells that this particular benefit will most likely have some impact on whether or not these junior sailors will reenlist. In fact, this survey shows that of all the Navy E1-E4 personnel who participated, 54% are likely to ‘stay’ Navy to become eligible to transfer benefits to dependents, a 10 year commitment in most cases.¹³ Only 26% of the sailors in the same category replied negatively.

c. Retention and the New GI Bill

The final focus of the DMDC survey highlights that the preponderance of all enlisted sailors in this survey are likely to remain in the service in exchange for proposed new MGIB benefits such, as transferability and existing college loan repayment; 69% of the enlisted Navy personnel would stay on active duty for the transferability option whereas only nine percent would not. This statistic, as well as the rest of the survey, suggests that this research take the next step in this analysis and compare the DMDC results with those of the Enlisted Retention Survey. The product of that comparison will be revealed in greater detail in Chapter IV.

C. INITIAL DOD GUIDANCE

1. Expanded Army Pilot Program

After the experience of the Army’s initial 2006 educational benefit transferability program, they decided to broaden it and change it into the Expanded Army Pilot Program. The expanded program came into effect on November 1, 2007 and included not only spouses but dependent children as well. According to the program’s Procedures and Guidance, only “Eligible Military Occupational Specialties (MOS)” were allowed to

¹³ On June 23, 2009, the DoD announced the rules for Post 9/11 GI Bill Transferability. Eligible career service members in the Active Component or Selected Reserve on August 1, 2009 who have served at least six years, and who commit to serve four more years, may elect to transfer all or part of their post 9/11 education benefits to a dependent spouse and/or children. Service members with 10 or more years of service who by DoD or Service policy are prevented from serving four years may be eligible for transferability if they commit to serve the maximum amount of time allowed by the policy or law.

participate in the program. The requisites for participation in the program meant that “Soldiers must be currently serving in and reenlist (minimum of 4 years) in one of the MOSs identified in the current Regular Army Active Component Selective Reenlistment Bonus (SRB) Program” (Army, 2007). Those that are eligible for the MOS specific SRB must also be in a Zone B or Zone C bonus category.

The second program requirement is that “all eligible Soldiers desiring to participate in the program must complete a DD Form 2366-2 (see Figure 1), Montgomery GI Bill Act of 1984 (MGIB) Transferability Program. This applies even in cases where a dependent is not designated at the time of reenlistment to receive benefits” (Army, 2007). The form serves as an election form and proof of program participation. The completed DD Form 2236 can be verified by viewing the Official Military Personnel File (OMPF) online at the Army Knowledge Online website at <https://www.us.army.mil>. The program guidance goes on to state that, “the program is bound by law to retention of critical skills in which soldiers must elect to participate at the time of reenlistment, and must reenlist for a minimum of 4 years. Soldiers who don’t select the MGIB Transferability option at the time of reenlistment will not be eligible to participate in the program until a subsequent reenlistment period” (Army, 2007).

Under the Expanded Army Pilot Program, the benefit was defined as “the ability to transfer up to 18 months of unused Montgomery GI Bill (MGIB) benefits to an eligible dependent. A dependent to which the entitlement is transferred may not begin using the entitlement until:

Spouse: “By law, the Soldier has completed at least six years of service in the Armed Forces.” (Army, 2007)

Child: By law, the Soldier has completed at least 10 years of service in the Armed Forces, and either: the completion by the child of the requirement of a secondary school diploma (or equivalency certificate); or the attainment by the child of 18 years of age” (Army, 2007).

MONTGOMERY GI BILL ACT OF 1984 (MGIB) <i>(Chapter 30, Title 38, U.S. Code)</i> TRANSFERABILITY PROGRAM						
PRIVACY ACT STATEMENT						
AUTHORITY: Chapter 30, Title 38, U.S. Code, Sections 3011, 3012, 3018A, and 3018B; and EO 9397. PRINCIPAL PURPOSE(S): To establish participation in the Montgomery GI Bill Transferability Program. ROUTINE USE(S): To the Department of Veterans' Affairs to ascertain an individual's benefit eligibility under the MGIB Transferability Program. DISCLOSURE: Voluntary; however, failure to provide the requested information will result in the non-transfer of MGIB benefits to family members.						
1. SERVICE MEMBER DATA						
a. NAME (LAST, First, Middle Initial)					b. SOCIAL SECURITY NUMBER (SSN)	
2. FAMILY MEMBER DATA						
a. NAME (LAST, First, Middle Initial)	b. RELATIONSHIP	c. SSN	d. DATE OF BIRTH (YYYYMMDD)	e. MONTHS TRANSFERRED	f. *START DATE (YYYYMMDD)	g. *END DATE (YYYYMMDD)
*NOTE: Start Date is at 6 years of service or today, whichever is later, unless overridden by Service member for spouse to use benefits. Start Date for child is 10 years of service or today, whichever is later, unless overridden by Service member for children to use benefits. "By Law" in this block limits period of transfer for spouses to 10 years after final separation from service, for children to 10 years after final separation or age 26. Service member may override with an earlier date. (1) I understand that I may transfer up to 18 months or any balance (if less than 18 months) of my MGIB benefits to spouse and/or children, and can revoke and/or modify my election any time in writing and must notify the service representative and the Department of Veterans' Affairs. My spouse may use this benefit immediately. My children may use this benefit after I have served 10 years, and they have either completed high school or high school equivalency or attained age 18, and cannot use after 26th birthday. (2) I understand that I must have served six years before being eligible to transfer benefits, and agree to (terms of contract) serve at least four more years in the Armed Forces in a critical military specialty as designated by the service secretary. (3) I understand that I and my family member(s) may be responsible for any overpayments due to not completing my obligation of service agreement. (4) I understand that this document serves as written notice for designating transfer of MGIB education benefits.						
h. SERVICE MEMBER SIGNATURE				i. RANK/GRADE	j. DATE SIGNED (YYYYMMDD)	
3. DEERS VERIFICATION						
I verify that the above family member(s) are on the DEERS system.						
a. SERVICE REPRESENTATIVE NAME (LAST, First, Middle Initial)		b. PAY GRADE	c. UNIT NAME AND LOCATION			
d. SIGNATURE					e. DATE SIGNED (YYYYMMDD)	
4. CONFIRMATION OF TRANSFER ELIGIBILITY						
I verify that the above service member has transferability as an option.						
a. SERVICE REPRESENTATIVE NAME (LAST, First, Middle Initial)		b. PAY GRADE	c. UNIT NAME AND LOCATION			
d. SIGNATURE		e. DATE SIGNED (YYYYMMDD)	f. TRANSFER ELIGIBILITY START DATE (YYYYMMDD)	g. TRANSFER ELIGIBILITY END DATE (YYYYMMDD)		

DD FORM 2386-2, JUN 2002

Figure 1. DD Form 2236-2 (From Army, 2007)

In addition to eligible dependents, the following eligibility requirements and procedures must have been satisfied:

- “Enrolled in the MGIB upon initial entry to active duty and paid the \$1,200 for MGIB enrollment. (Not eligible are Vietnam Era-Rollover, VEAP conversion, and Involuntary Separation).” (Army 2007)
- “Completed at least 6 years of service in the Armed Forces at the time of reenlistment.” (Army 2007)
- “Reenlist for a period of at least 4 years and complete items 1 and 2 of DD Form 2366-2 with the serving Army Retention Career Counselor.” (Army 2007)
- “Currently entitled to a MOS Specific Selective Reenlistment Bonus (SRB) and entitled to a Zone B or Zone C bonus at the time of reenlistment.” (Army, 2007)

D. COSTS

1. Congressional Budget Office (CBO)

On May 5, 2008, Senator Judd Gregg requested the Congressional Budget Office (CBO) to provide information about the cost of S.22 (The Post 9/11 Veterans Educational Assistance Act of 2008) and asked them to include its impact on military retention (CBO, 2008). In preparing their report, they “reviewed numerous versions of the bill and the most recently modified version by Senator Jim Webb’s Office on April 23, 2008” (CBO, 2008). After a thorough analysis, CBO produced a preliminary estimate of the mandatory and discretionary costs.

According to the CBO preliminary costs, S.22 would do several things:

- increase the amount of the education benefit available to veterans and to active-duty and reserve service members
- expand the number of individuals eligible to receive such benefits

- increase the period of time during which such benefits could be used
- allow benefits to be used to cover an expanded array of education-related expenses (i.e., existing students loans, fees)
- increase direct spending for veterans' and reservists' education benefit by \$51.8 billion over the 2008-2018 period (see Table 1)

The impact of S.22 would affect recruitment and retention in offsetting ways. Discretionary costs related to recruitment and retention would show an “increase of \$1.1 billion over the 2009-2013 periods” (CBO, 2008). Enhanced educational benefits make military service more appealing for initial enlistments and first term reenlistments; so other enlistment incentives can be reduced while still enlisting the same number of recruits. The estimated savings for enlistment bonuses and other recruiting costs is \$5.6 billion (CBO, 2008).

Because increased educational benefits would reduce the costs of college attendance after military service, the sheer number of service members that would separate will undoubtedly increase causing reenlistment incentives to swell to maintain appropriate reenlistment levels and appropriate experience profiles of the different services. According to CBO estimates, every \$10,000 increase in educational benefits yields a reduction in retention of slightly more than 1 percentage point. CBO estimates that “S. 22 would more than double the present value of educational benefits for service members at the first reenlistment point—from about \$40,000 to over \$90,000—implying a 6 percent decline in the reenlistment rate, from about 42 percent to about 36 percent” (CBO, 2008). Additional CBO estimates reveal that an \$8,000 bonus to personnel at their first reenlistment point increases reenlistments by approximately 2 percentage points. Therefore, an increase in SRBs of about \$25,000 ($\approx \$8,000 \times 3$) per service member for first-term reenlistments would be required to “offset the expected effects on retention” of increased educational benefits. To offset the combined effects would require an increase in total SRB payments of \$6.7 billion, for a net increase in cost of \$1.1 billion.

2. Hogan and Mackin

In addition to the CBO report, Paul F. Hogan and Patrick Mackin conducted a study on the recruiting and retention implications of proposed increases in the MGIB basic benefit (monthly stipend). Their study, which coincided with the CBO report, stated that “Although education incentives increase the ability to attract high-quality recruits, they also reduce retention as those attracted into the services in response to the education benefit leave to make efficient use of those benefits. Hence, the basic benefit offered across the board to all recruits must balance the recruiting effects with negative retention effects” (Hogan). Furthermore, they proposed that the current monthly basic benefit of \$1,101 be increased to \$1,450.¹⁴ This would enable the services to preserve their purchasing power and still use kickers such as College Funds to channel high quality recruits into critically under-manned ratings. The present value of the current MGIB, Hogan & Mackin’s \$1,450 monthly stipend proposal and the S. 22 proposal are shown here in Figure 2.

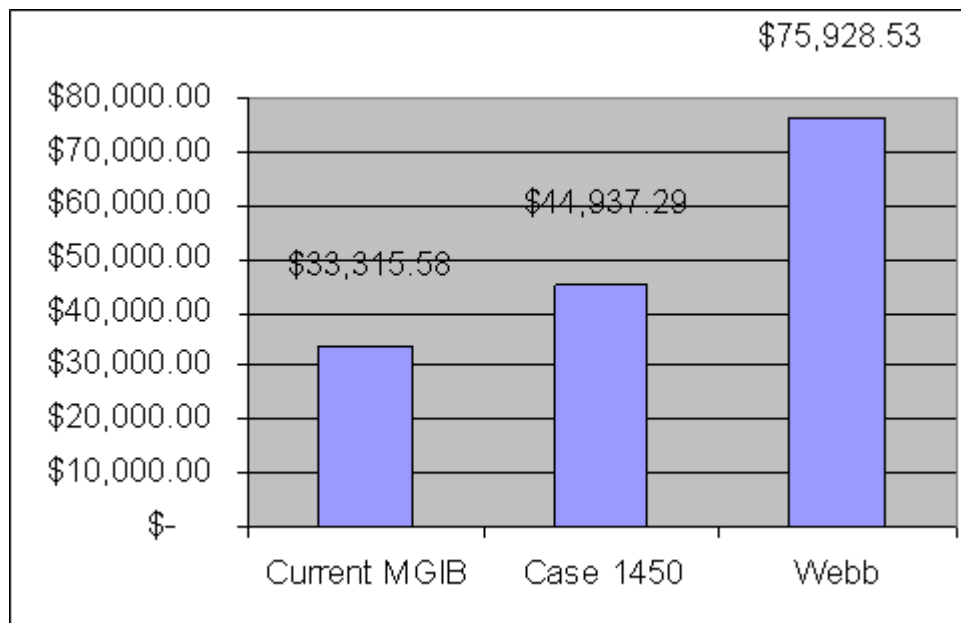


Figure 2. Present Value of Alternative Education Benefit Incentives (From Hogan & Mackin)

¹⁴ An estimate used by Hogan & Mackin in which they determined the equivalent cost of education at public universities. Costs include tuition, fees and living expenses. Additionally, \$1,450 for 36 months should enable the services to preserve their ability to channel high quality recruits to specific occupations.

An added feature that Figure 2 implies is that “across-the-board basic benefits,” like the Post 9/11 Era GI Bill can incur risks; those who enter the military for the educational benefit may also leave the military at the first opportunity to take advantage of those education benefits. What is left is an ‘experience vacuum’ where experienced Non-commissioned Officers (NCO) and Petty Officers (PO) leave the military en mass, inadvertently exerting tremendous pressure on recruiting to replace the members who left.

Furthermore, Hogan and Mackin reveal the inability of the services to “channel recruits to where they are needed most” (Hogan). Because all service members are eligible for the Post 9/11 Era GI Bill, there is no discretion within the services to differentially sway high quality recruits to critically undermanned rates/MOSs via enhanced educational benefits, such as the Navy College Fund or the Army College Fund (i.e., kickers). In essence, a large increase to the current MGIB “may indeed improve overall recruiting, but may be an inefficient way to increase high quality recruits” in the services (Hogan).

To validate their recruiting and retention effects estimation, Hogan and Mackin used a model to approximate the effects of changes in educational benefits with respect to the current MGIB. These estimates are presented as elasticities in the following table:

Parameter	Service			
	<i>Army</i>	<i>Navy</i>	<i>USAF</i>	<i>USMC</i>
Enlistment Pay Elasticity	1.000	1.000	1.000	1.000
Education Benefit Enlistment Elasticity	0.080	0.080	0.080	0.080
Education Benefit Retention Effect ¹⁵	0.010	0.010	0.010	0.010
Education Benefit Attrition Effect	0.006	0.006	0.006	0.006
SRB Effect ¹⁶	0.040	0.040	0.040	0.040
Marginal Cost of HQ recruit using EB ¹⁷	\$80,000	\$80,000	\$80,000	\$80,000

Table 2. Parameters Used in Estimating Effects (From Hogan & Mackin)

¹⁵ Effect is the percentage point change in the underlying rate for a \$1,000 change in the Present Value of the educational benefit.

¹⁶ Effect is the percentage point change in the underlying rate for a unit change in the Selective Reenlistment Bonus (SRB) multiplier.

¹⁷ A baseline cost relative to the current MGIB used to establish effects of enhanced basic benefits.

The behavior of this particular model enables one to “predict how changes in pay and benefits will affect the probability that individuals will enlist or reenlist in the military” (Hogan). For instance, an elasticity of .08 for ‘Education Benefit Enlistment Elasticity’ indicates that a 10% increase in the current MGIB will result in a 0.8% increase in high quality recruits, *ceteris peribus*. Empirical research conducted by Hogan and Mackin established the parameters involving recruiting and retention.¹⁸

Given the estimates of the model and the projected inefficiency of the Post 9/11 Era GI Bill, the long term effect of a larger basic benefit will only lower first term retention. “This occurs as many of those who were attracted into the Service because of education benefits leave at the first term reenlistment point in order to use them” (Hogan). To better illustrate the effects of the Post 9/11 Era GI Bill, as well as the alternative proposed by Hogan and Mackin, refer to Table 3:

¹⁸ “The estimate effect of education benefits on retention comes from Paul F. Hogan, D. Alton Smith and Stephen D. Sylvester (1991), “The Army College Fund: Effects on Attrition, Reenlistment, and Cost” in Curtis L. Gilroy, David K. Horne and D. Alton Smith, eds. *Military Compensation and Personnel Retention: Models and Evidence*. Estimates of the effects of changes in pay on first-term retention were derived from Patrick C. Mackin, Christopher D. Mackie and Kimberly L. Darling (1996), *Re-estimation of ACOL Coefficients for the CAPM Model: Final Report*. Estimates of the effects of changes in pay and economic conditions on the supply of enlistees were derived from recent empirical literature, as summarized in a RAND study by Michael P. Murray and Laurie L. McDonald (1999), *Recent Recruiting Trends and Their Implications for Models of Enlistment Supply*.” (Hogan and Mackin).

Service	\$1,450 Proposal	Post 9/11 ERA GI Bill
Army		
HQ Recruits	+1.1%	+5.9%
Career Force	-1.4%	-4.5%
Accessions	+1.1%	+2.9%
Navy		
HQ Recruits	+2.0%	+8.1%
Career Force	-1.9%	-6.3%
Accessions	+1.1%	+3.4%
USAF		
HQ Recruits	+2.8%	+10.2%
Career Force	-1.7%	-6.4%
Accessions	+1.7%	+6.9%
USMC		
HQ Recruits	+2.0%	+8.1%
Career Force	-4.3%	-15.6%
Accessions	+2.2%	+8.4%

Table 3. Force Effects of Alternatives (From Hogan)

The short term and long term effects of Cost Proposal \$1,450 and the Post 9/11 Era GI Bill are presented here. Short term effects can be seen in the projected increases in ‘High Quality (HQ) Recruits’. The Army has the smallest increase in HQ recruits with respect to the Post 9/11 Era GI Bill due to the loss of kickers whereas the Air Force has the greatest increase. The Air Force has the lowest enhanced educational benefits of all the services. Long term effects are seen in the ‘Career Force’ and ‘Accession’ rows. According to Hogan and Mackin, a “decline in the reenlistment rate will occur when those initial cohorts offered the enhanced benefit are at their first reenlistment point. In the long run, this will result in a decline in the Career Force” and an increase in the demand for Accessions.¹⁹ By comparing \$1,450 Cost Proposal and the Post 9/11 Era GI Bill, it is evident that Hogan and Mackin’s proposition seems to have a much smaller long term penalty and with a much more modest price tag.

¹⁹ The Accession demand will occur about 7–10 years after the implementation of the increased basic benefits.

To further understand the three different “levels of education benefits”, the costs of achieving a “constant force profile” were estimated [See Table 4]. In this comparison, Hogan and Mackin wanted “to achieve the increase in high quality recruits generated by the Webb proposal, while maintaining the career force levels achieved by the current version of the MGIB” (Hogan). This means they had to:

- “Determine the cost of using SRBs to buy back²⁰ the decline in the reenlistment rate expected under Senator Webb’s proposal” and the \$1,450 Cost Proposal with the current MGIB as the baseline. (Hogan)
- Use of “cash enlistment bonuses to increase the number of high quality recruits under the MGIB baseline” and the \$1,450 Cost Proposal to equal the increase under the Webb proposal. (Hogan)

In essence, the only factor that changes in the Constant Force Profile is the cost of achieving that particular force profile. All other factors, such as number of high quality recruits, the career force and the end strengths are held constant. These are the SRB estimates required to maintain a preferred force level. A more detailed explanation of this table is best stated by Hogan and Mackin. The explanation is as follows:

The top row of Table 4 shows the increase in high quality recruits that are estimated under the Webb bill, relative to the high quality recruits in the baseline MGIB for each Service. The next row, labeled ‘GI Bill Program Cost’, indicates the additional education benefit costs under Webb compared to the cost of the benefits under the current MGIB. The third row, labeled ‘Bonus Cost to Offset Career Force Losses’ is the cost of ‘buying back’ retention losses using the Selective Reenlistment Bonus program. The fourth row, ‘EB [Enhanced Benefit] Cost for Additional HQ Accession’, is the cost of using enlistment bonuses to obtain high quality recruits. Note that the additional enlistment bonus costs under Webb are zero, because the high quality recruits expected to be produced by the Webb bill is the goal high quality number for this force profile. The last two rows provide a summary. The first is the total cost of the force profile under Webb. The second row is the cost per additional high quality recruit under Webb. (Hogan)

²⁰ Buying Back is synonymous with the SRB required to persuade a First–Term service member to reenlist.

	Army	Navy	Air Force	Marine Corps
Change in HQ Accessions	2,088	1,392	1,912	1,440
Webb Bill				
GI Bill Program Cost Increase	\$599,079	\$446,540	\$423,930	\$341,099
Bonus Cost (SRB) to Offset Career Force Losses	\$143,369	\$303,850	\$241,241	\$111,233
EB Cost for Additional HQ Accession	\$0	\$0	\$0	\$0
Total Costs (\$K)	\$742,448	\$750,390	\$665,172	\$452,333
Cost per Additional HQ Accession	\$355,506	\$539,205	\$347,930	\$314,171
Cost of College Proposal (Case \$1,450)				
GI Bill Program Cost Increase	\$109,669	\$113,249	\$118,108	\$83,558
Bonus Cost to Offset Career Force Losses	\$44,128	\$87,455	\$60,290	\$34,292
EB Cost for Additional HQ Accessions	\$136,904	\$83,592	\$111,232	\$87,438
Total Costs (\$K)	\$290,701	\$284,296	\$289,629	\$205,288
Cost per Additional HQ Accession	\$139,196	\$204,285	\$151,496	\$142,585
Current MGIB				
GI Bill Program Cost Increase	\$0	\$0	\$0	\$0
Bonus Cost to Offset Career Force Losses	\$0	\$0	\$0	\$0
EB Cost for Additional HQ Accessions	\$167,074	\$111,333	\$152,944	\$115,181
Total Costs (\$K)	\$167,074	\$111,333	\$152,944	\$115,181
Cost per Additional HQ Accession	\$80,000	\$80,000	\$80,000	\$80,000

Table 4. Costs of Producing Specified Force Profile (From Hogan)

The same analysis is produced for the \$1,450 Cost case and the Current MGIB. An analysis of this table, with respect to the Webb bill and \$1,450 Cost case, shows that EB costs are more under \$1,450 Cost proposal than under Senator Webb's bill. However, the "buy back" ability (SRB) of the \$1,450 Cost proposal is much less than

Senator Webb's bill. This is due to "less lucrative educational benefits," which reduce the likelihood that individuals will not reenlist to use the enhanced educational benefits that the Post 9/11 Era GI Bill offers (Hogan). The current MGIB is the baseline for the career forces; thus, there are no additional costs associated with current SRB levels to maintain current force profile.

To summarize Hogan and Mackin's report, an across-the-board education incentive is a very costly and inefficient policy to increase the number of high quality recruits. Instead, other feasible alternatives, such as additional enlistment/reenlistment bonuses or increases in monthly costs (i.e., \$1,450 Cost proposal), are much more efficient methods to maintain desired career force levels.

3. Board of Actuaries

The final segment of this literature review is from the August 2008 Board of Actuaries Meeting Minutes involving the Post 9/11 GI Bill Transferability cost calculations [as of January 21, 2009]. According to Mr. Brad Ryder,²¹ the "cost of transferability is dependent on administration" of the program²² along with a myriad of other unknown elements (August 2008 Board of Actuaries Meeting Minutes). Mr. Ryder's calculations are problematic because so many factors are unknown; the Board of Actuaries has delayed approval of his actual calculations.

The computations are admittedly complex and theoretical, but attempt to answer a simple question: How much should the per capita cost increase so that the per capita cost can pay for transferability? Mr. Ryder's methodology is based on a Basic Present Value (BPV), in which numerous probabilities and expected usage rates will produce a per capita cost. Once the per capita costs are found, they are then discounted to present day values, or BPV. Images of Mr. Ryder's mathematical model to estimate the different costs of the Post 9/11 Era GI Bill Transferability are as follows:

²¹ Subject Matter Expert on the "Transferability" costs of the Post 9/11 Era GI Bill who works for the Board of Actuaries.

²² Administration of the Post 9/11 Era GI Bill is service specific. Currently, the instruction on the administration of the "transferability" is set to be released on June 1, 2009.

Transferability Load on EBF Normal Costs**Member-based normal cost (NC_m):**

$$(3) \quad NC_m = (P1) (U_m|P1) (avgben_m) (V_m) (36)$$

P1 = Prob of member satisfying contract conditions to be elig for benefit. For active-duty kickers this might be ${}_4P_0$ (for this paper we have assumed a 4 year contract term for active duty kickers). For reserves, it is ${}_9P_0$. Unless otherwise stated, the numbers for such prob terms in this paper are expressed in terms of years of service vice ages, so ${}_4P_0$ is the prob of making it from entry to 4 YOS.

$U_m|P1$ = Avg portion of benefit available that is expected to be used by the member if event P1 happens.

avgben_m = Avg member benefit amount. Active-duty kickers are flat, so it will be \$750, or \$950, etc. Similarly for reserve kickers. Reserve basic increases each year with CPI.

V_m = Discount factor for member usage, thus a reflection of int rate and avg timing of member usage.

36 = the maximum numbers of months that the benefit is available to be taken

If creating a second normal cost to cover dependent usage (NC_d):

$$(5) \quad NC_d = (P1) (P2) (P3) (P4) (P5) (1-U_m|P1\&P2\&P3\&P4\&P5)(U_d|P1\&P2\&P3\&P4\&P5) (avgben_d) (V_d) (36)$$

P2 = Prob the member will be married or with children at the appropriate time.

P3 = Prob of member making it from the point where he satisfies contract terms to the point he can sign up for transferability. For active-duty kickers, this is ${}_9P_4$.

P4 = Prob of member at the 6-year point signing up for 4 more years to get transferability

P5 = Prob of member who just signed up for transferability, meeting the additional service requirements that will ultimately enable his dependents to be eligible. This is expected to be ${}_4P_6$.

$(U_m|P1\&P2\&P3\&P4\&P5)$ = Avg portion of 36-month benefit entitlement expected to be used by the member among those where member satisfied all transferability conditions (P1 through P5).

$(U_d|P1\&P2\&P3\&P4\&P5)$ = Avg portion of months transferred that is expected to be used by dependents among those where member satisfied all transferability conditions (P1 through P5). So it relates to the dependents' propensity to use that which ultimately gets transferred. Note that the more the member uses, the less available to transfer.

avgben_d = In the case of kickers, will equal avgben_m.

V_d = Reflection of same interest rate as V_m but different avg timing of when benefit is used.

So to express NC_d as a load on NC_m,

$$(10) \quad NC_d/NC_m = \frac{(P1)(P2)(P3)(P4)(P5)(1-U_m|P1\&P2\&P3\&P4\&P5)(U_d|P1\&P2\&P3\&P4\&P5)(avgben_d)(V_d)(36)}{(P1) (U_m|P1) (avgben_m) (V_m) (36)}$$

Figure 3. Post 9/11 Era GI Bill Transferability Cost Calculations: Part 1 of 2 (From August 2008 Board of Actuaries Meeting Minutes)

Problem:

How do we approximate $U_m|P1 \& P2 \& P3 \& P4 \& P5$, the usage of a member that has served ten years and has family?

Solution:

- 1) Assume that family usage is similar to non-family usage
- 2) Assume that $(U_m|P1 \& P2 \& P3 \& P4 \& P5)$ can be approximated as $(U_m|P1)$
- 3) Assume that dependent usage is similar to member usage
- 4) Assume that $(U_d|P1 \& P2 \& P3 \& P4 \& P5)$ can be approximated as $(U_m|P1)$
- 5) For the kicker benefits: $avgben_d = avgben_m$
- 6) Assume for the reserve basic benefit: $avgben_d = avgben_m * (1 + BenInc)^{(td - tm)}$
 Where td = the time the dependent takes the benefit
 Where tm = the time the member takes the benefit
 Where $BenInc$ = the CPI annual benefit increase

Substituting into equation (10) for the kicker benefits gets us:

$$NC_d / NC_m = \frac{(P1) (P2) (P3) (P4) (P5) (1 - U_m|P1) (U_m|P1) (avgben_m) (V_d)^{(36)}}{(P1) (U_m|P1) (avgben_m) (V_m) (36)}$$

Which simplifies the kicker benefit load to:

$$(11) \quad NC_d / NC_m = (P2) (P3) (P4) (P5) (1 - U_m|P1) (V_d) / (V_m)$$

Substituting into equation (10) for the basic benefits gets us:

$$NC_d / NC_m = \frac{(P1) (P2) (P3) (P4) (P5) (1 - U_m|P1) (U_m|P1) avgben_m * (1 + BenInc)^{(td - tm)} (V_d)^{(36)}}{(P1) (U_m|P1) (avgben_m) (V_m) (36)}$$

Which simplifies the basic benefit load to:

$$(12) \quad NC_d / NC_m = (P2) (P3) (P4) (P5) (1 - U_m|P1) (Vbi_d) / (Vbi_m)$$

Where Vbi = the discount factor with annual benefit increases due to $BenInc$

Figure 4. Post 9/11 Era GI Bill Transferability Cost Calculations: Part 2 of 2 (From August 2008 Board of Actuaries Meeting Minutes)

Given the time constraints of this thesis and the timeline for Mr. Ryder's analysis, more accurate calculations will not be available until after June 1, 2009. Additionally, Mr. Ryder was unable to provide anymore preliminary estimates due to pending policy changes.

E. SUMMARY

In conclusion, the saying that ‘need is the mother of all change’ is very much applicable to the military, both institutionally and individually. With difficulties in recruiting and retention, the military services had no choice but to change the way they do business. Increasing educational benefits by a substantial amount to maintain the most precious resource that the military has, its people, Department of Defense (DoD) is now equipped to acquire desired end strength levels. However, Hogan and Mackin’s comparisons show this benefit has different and complex values for different people; some stay longer and some leave sooner. As a result, universally providing an education benefit, as proposed in S.22, may do more harm than good in the long run.

As for individual service members, the skyrocketing costs of college tuition have prompted service members and their spouses to make their voices heard by upper echelon leadership about educational concerns. Consequently, this fosters the question, ‘Who is most likely to value this benefit highly and who is not’? Knowing questions like this are essential to making fiscally sound policy, decision makers will be able to make competent verdicts.

The DMDC survey cast light on how active duty military members feel about education benefits, retention and the new GI Bill usage policies. Comparing and contrasting the DMDC survey and LT Zimmerman’s Enlisted Retention Survey will provide much needed information on the matters of non-monetary incentives and the Combinatorial Retention Auction Mechanism.

Finally, the estimates provided by Mr. Ryder and the Expanded Army Pilot Program will enable simulations that should reveal whether or not the Post 9/11 Era GI Bill Transferability clause is cost effective.

III. METHODOLOGY

A. INTRODUCTION

The methodology in this study is a cost-benefit analysis of the Post 9/11 Era GI Bill Transferability Clause utilizing both qualitative and quantitative methods. The four mechanisms for administering GI Bill Transferability closely mimic those used by LT Zimmerman's thesis. Those mechanisms are Cash Only SRBs, "a purely monetary [second price] auction, a Universal Incentive Package (UIP) auction and the Combinatorial Retention Auction Mechanism (CRAM). The latter two auctions included various non-monetary incentives (NMIs) that appeared to be important to Sailors based on prior research as well as survey research conducted as part of this thesis" (Zimmerman, 2009).

A mathematical model of the four auctions was created using Microsoft Excel. The model calculated Cash Only SRB requirements, UIP SRB costs, Adjusted SRB Values, Total Costs to the Navy and Effective Costs to the Navy (CRAM costs).

The data obtained from LT Zimmerman's Enlisted Retention Survey was used to estimate the performance of the four retention auctions. In addition, the survey focused on non-monetary incentives and the valuation of those incentives with respect to each individual. Finally, the survey population consisted of Air Traffic Controller (AC) and Fire Controlman (FC) ratings in the Navy. The Appendix contains a copy of the full Enlisted Retention Survey.

B. CASH ONLY SELECTED REENLISTMENT BONUSES

1. Auction Background Information

The most straightforward approach to retention bonuses is using purely cash bonuses. The problem with this approach is determining the proper magnitude of the monetary incentive. There are currently two mechanisms to estimate the proper cash amount. The first technique is exogenous predetermination using various models such as

the ACOL²³ model. This approach can be unreliable, causing the services to over- or under-estimate the required bonus. The other market-based approach is endogenous in nature. This is achieved through “auctions or some other market mechanism” (Zimmerman).

C. AUCTION CHARACTERISTICS

There are several auction structures, as discussed by Zimmerman and described by Figure 5 below.²⁴ Auctions can be open/sequential or closed/simultaneous. In open sequential auctions, the bidders are present and the bid is openly and sequentially adjusted until a winner is declared. In sealed/simultaneous bid auctions, participants submit a single, private (sealed) bid; all bid are revealed simultaneously and a winner declared. All participants must be physically or virtually present as the bid is adjusted in a sequential auction, which is difficult in a military environment considering geographical dispersion and operational tempo of the operating forces. As such, attention will focus on sealed-bid auctions (Zimmerman, 2008, 13-15)



Figure 5. Common Auction Variations (From Zimmerman, Introduction to Auction Economics)

²³ ACOL = A labor economics modeling theory in which individuals compare their projected military earnings stream with their possible civilian earnings stream plus their taste for civilian life to determine whether to continue military service. By using this model, planners derive the estimated minimum SRB amount that would induce the requisite number of Sailors to stay in the Navy.

²⁴ This discussion draws heavily from Zimmerman’s (2008) summary of general auction theory and for consistency adopts similar conclusions regarding the optimal auction structure. For completeness but to avoid unnecessary duplication, that discussion is merely summarized here.

Sealed bid auctions can be further sub-divided into first-price and second-price sealed-bid auctions. In a first-price sealed-bid auction the transaction occurs at the price submitted by the winning bidder(s). In a second-price sealed-bid (Vickrey) auction, the transaction occurs at the price submitted by the first excluded or unsuccessful bidder (i.e., the “runner-up” bidder). While first- and second-price sealed-bid auctions have different equilibrium bidding strategies, they are likely to produce similar results in terms of both the identity of auction winners as well the total revenue generated (or cost incurred). For reasons discussed more thoroughly by Zimmerman (2008), this research stream has adopted a second-price sealed-bid structure to simulate in this analysis.

Auctions can be further classified into forward or reverse formats. Forward auctions typically involve several buyers and a single seller; competition between buyers drives the price higher. Reverse auctions involve several sellers and a single buyer; competition between buyers drives the price downward. In military labor market applications, such as this, the format can be characterized as a reverse auction; the military services are the single buyer and the service members represent the sellers providing military service.

Finally, auctions can be characterized as single or multiple winner auctions. There is only one item to buy or sell in a single winner auction, so there is only one successful bidder. There are multiple items to buy or sell in a multiple winner auction, so there are several successful bidders. Typically, force-shaping and force-management auctions are multiple winner auctions, with the retained/separated or assigned service members representing the winning bidders (Zimmerman, 2008, 13-15)

Considering these auction structure elements, the auction format discussed in this analysis can be characterized as a reverse, second-price sealed-bid auction with multiple winners.

1. Bidding Strategy in a Second-Price Sealed-Bid Auction

The definition of a reverse second-priced auction is best stated when Zimmerman writes, “In a reverse auction there is only one buyer (for example, the Navy) and many sellers (the Sailors offering their services) who are also the bidders”. Subsequently, in a reverse second-price retention auction, the lowest bidder provides their military service but for a price equal to the bid of the “runner-up” or first excluded bidder, who was the lowest bidder among those who were not retained.

In keeping with Zimmerman's analysis focusing on second-price auctions, understanding the optimal bidding strategy is essential to simulating the cost-effectiveness of cash SRBs and Non-Monetary Incentives (NMIs). The optimal bidding strategy is best explained by the following passage and Figure 6.

Under a second-price auction, the optimal bidding strategy is to bid your true valuation. For example, if you are bidding (in a forward auction) to purchase an item which is worth \$30 to you (in other words, you would be willing to pay a maximum of \$30 for the item), then your best strategy is to bid exactly \$30 for the item in a second-price auction.

To understand this result more clearly, this section will illustrate how you can never do better than by bidding truthfully in a second-price auction. For simplicity, the explanation that follows employs the following notation:

V = Your value for the object

P = Price paid for the object

S = Your surplus

B = Your bid for the object

H = Highest bid submitted by any other bidder

The following section will first demonstrate that bidding above your true value (i.e., choosing $B > V$) can only hurt you and then demonstrate that bidding below your true value (i.e., choosing $B < V$) can only hurt you. Figure 5 illustrates the three possible cases or outcomes which can result from bidding above your true value. Figure 6 illustrates the three possible cases or outcomes which can result from bidding below your true value.

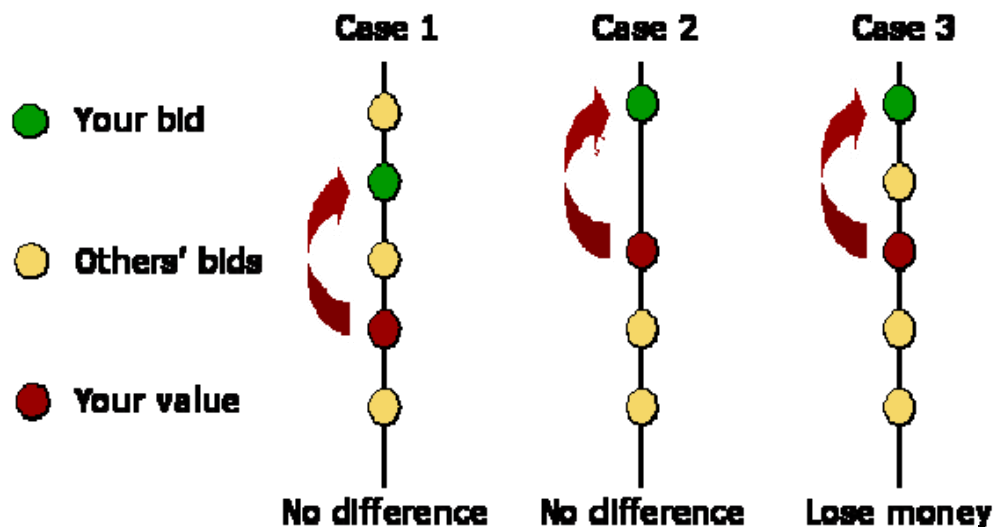


Figure 6. Bidding Above Your Valuation (From Zimmerman)

For all cases, the reader should note that your objective as a bidder is to maximize your surplus, S . If you do not submit the highest bid (i.e., if $B < H$), then $S = 0$. If you do submit the highest bid (i.e., if $B > H$), then $P = H$ and your surplus is given by $S = V - P = V - H$.

Case A1: $H > B > V$

In this case, because $H > B$, you are not the high bidder and do not win the object, therefore $S = 0$. If you bid truthfully ($B = V$), you also do not win the object (because $H > V$) and therefore would also have $S = 0$. Thus, bidding above your true value provides no benefit in this case.

Case A2: $B > V > H$

In this case, because $B > H$, you are the high bidder and win the object, therefore $S = V - H > 0$. If you bid truthfully ($B = V$), however, you also win the object (because $V > H$) and therefore would also have $S = V - H$. Thus, bidding above your true value provides no benefit in this case, either.

Case A3: $B > H > V$

In this case, because $B > H$, you are the high bidder and win the object, therefore $S = V - H$, which is *negative*, because $H > V$: you “win” the object, but pay more than it is worth to you. If you bid truthfully ($B = V$), on the other hand, you would not win the object (because $H > V$) and therefore would have $S = 0$. Thus, bidding above your true value hurts you in this case. You would be better off bidding truthfully.

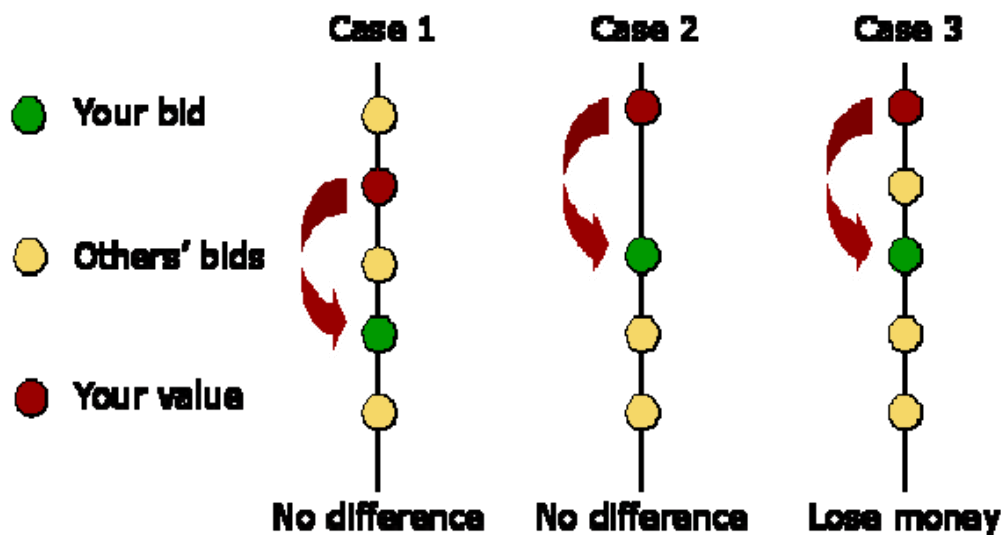


Figure 7. Bidding Below Your Valuation (From Zimmerman)

Case B1: $H > V > B$

In this case, because $H > B$, you are not the high bidder and do not win the object, therefore $S = 0$. If you bid truthfully ($B = V$), you also do not win the object (because $H > V$) and therefore would also have $S = 0$. Bidding below your true value provides no benefit in this case.

Case B2: $V > B > H$

In this case, because $B > H$, you are the high bidder and win the object, therefore $S = V - H > 0$. If you bid truthfully ($B = V$), you also win the object (because $V > H$) and therefore would also have $S = V - H$. Thus, bidding below your true value provides no benefit in this case.

Case B3: $V > H > B$

In this case, because $H > B$, you are not the high bidder and do not win the object, therefore $S = 0$. If you bid truthfully ($B = V$), on the other hand, you would win the object (because $V > H$) and therefore would have $S = V - H$, which is positive because $V > H$. Thus, bidding below your true value hurts you in this case. You would be better off bidding truthfully.

This demonstrates that bidding anything other than your true value in a second-price auction can only hurt you. (Zimmerman, 2008, 15-18)

In other words, Truthful Revelation²⁵ is the best strategy in a Second-Price Auction, and this result holds true for both forward auctions (as specifically illustrated in the example above) and reverse auctions (as in any force-shaping or force-management scenario). Moreover, although sailors would be simultaneously bidding on multiple incentives (both monetary and non-monetary) in the retention auctions described below, truthful revelation of true values remains the optimal strategy. The benefits of being truthful in the valuation of NMIs far outweigh the economic risks of trying to lowball or inflate one's bid. All three mechanisms analyzed here, purely cash SRB, universal incentive package and CRAM, will be modeled as second-price sealed-bid auctions.

D. CASH SRB

With a purely cash SRB, service members would be asked to specify the minimum cash SRB they would require to remain on active duty. The bids would be collected and simultaneously revealed. The lowest bids would be accepted up to the service's end strength target. The first excluded bid (i.e., the Nth lowest bid where N-1 is the end-strength target) would determine the cash SRB paid to all retained service members. Considering the second-price bidding strategy discussed above, the dominant strategy for all service members is to truthfully reveal their minimum acceptable cash SRB. This auction would precisely identify what is essentially the minimum feasible cash SRB for the service to meet its end-strength goal.

E. UNIVERSAL INCENTIVIVE PACKAGE (UIP) AUCTION

The Universal Incentive Package combines a cash incentive and a common set of non-monetary incentives (NMIs) that are offered to all sailors who are reenlistment eligible. This type of incentive is most easily described as a "one-size-fits-all" package that has a pre-determined set of NMIs along with a cash bonus. To attain the desired retention goals while staying within budgetary constraints, the cash bonus would be expected to be reduced in conjunction with the value of the NMI(s) being offered. The

²⁵ An experiment designed by Major William J. Norton ("Using an Experimental Approach to Improving the Selective Reenlistment Bonus Program" [masters thesis, Naval Postgraduate School, 2007]) which is used to determine whether a second price auction design would be truth revealing in a retention scenario.

allure to this mechanism is “If sailors value these NMIs more than the Navy’s cost to provide them, the total value delivered to Sailors exceeds the cost of delivery” (Zimmerman).

With the UIP, “participants would be offered a fixed package of [non-monetary retention] incentives and would submit a cash (requirement) bid to supplement that package. The auction would then follow the same process as the monetary-only auction” (Zimmerman). The auction would determine the minimum feasible cash bonus, just as with the cash SRB; all service members would receive this new cash bonus and access to the NMI(s) included in the UIP.

F. CRAM

The final mechanism utilized in this thesis is the Combinatorial Retention Auction Mechanism (CRAM), “which combines individualized monetary incentives with packages of non-monetary incentives which are similarly ‘customized’ for each individual sailor” (Zimmerman).

The CRAM incorporates three elements, each serving a separate purpose:

- Second price auction format - Provides accuracy in setting bonus level;
- Non-monetary incentives - Provide lower cost to retain sailors with value > cost for those NMIs;
- Combinatorial auction - Provides individualized incentive packages with no "wasted" incentives.²⁶

Zimmerman also goes on to state:

Under the CRAM, a retained Sailor receives a particular NMI only if he values the incentive more than it costs the Navy to provide. This eliminates the need to determine which incentives to offer. All incentives are offered to all Sailors and allocated to those whose value exceeds cost. For non-monetary incentives whose cost varies significantly depending on the number of participants, there are a number of variations of the CRAM which can be adopted to accommodate such varying (presumably

²⁶ Peter J. Coughlan, email message to LT Zimmerman, November 2, 2008.

increasing) unit cost, including the use of equilibrium prices (where the supply or marginal cost curve intersects the demand or value curve), average costs, or quantity limits (quotas) for each NMI.

In other words, using the CRAM is a cost efficient method that will enable the Navy to offer retention packages to each sailor that is specific to each sailor so cost effectiveness is maximized with respect to each sailor.

Specifically, the CRAM process works as follows. All service members are asked to specify the minimum cash bonus they would require to remain on active duty. They are then asked to specify the amount by which they would reduce this cash requirement for different NMIs or combinations of NMIs; this establishes their value for all potential NMIs or NMI combinations. Each service member is then tentatively allocated the NMI or combination of NMIs which maximizes his or her surplus value, where the surplus value is the excess of the service member's value over the service's cost to provide the NMI(s). In this process the (potential) retention incentive package is individualized for each service member, as opposed to the UIP where all service members receive the same NMIs.

The service then determines the effective cost to retain each service member, where the cost to retain is (a) the "stand-alone" cash bonus the service member would require to retain without any NMIs, (b) minus his/her value of the NMIs in the individualized package, (c) *plus* the cost of the NMIs included in that package. The service retains the least cost service members until reaching their end-strength target; the effective cost of the first excluded service member determines the service's cost for each retained service member. Each retained service member receives an individualized package of NMIs plus a cash bonus equal to the effective cost to retain the first excluded service member minus the cost of the NMIs in his or her package. Thus, although different retained service members may receive different NMIs and different cash bonuses, the total cost to the Navy of each retained service member's retention "package" is exactly the same.

As demonstrated by Zimmerman (2008), the dominant bidding strategy under CRAM is for each service member to truthfully reveal their minimum acceptable cash

SRB and their true value for all NMIs and combinations of NMIs. As such, CRAM is truth revealing and can precisely determine the minimum retention cost required for the services to meet their end-strength targets.

IV. ANALYSIS

A. TARGET POPULATION

The Enlisted Retention Survey focuses on two different ratings that are considered to be critically undermanned in the Navy. The reasoning for the targeted population as dictated by NPC and best stated by Zimmerman follows:

The Air Traffic Controller (AC) and Fire Controlman AEGIS (FC AEGIS) ratings were selected by the research sponsor based on each community's size and retention challenges. These groups were chosen by NPC [Navy Personnel Command] due to their historical retention challenges. The Department of the Navy indentified these ratings as two of the 20 "most undermanned critical skills."²⁷ (2008, 49-59)

B. RATING INFORMATION

The Rating Information section of this chapter provides an overview of the two ratings that are in the survey. Demographic information for each rate (AC and FC) is illustrated when Zimmerman writes:

1. Air Traffic Controller

Navy Air Traffic Controllers (AC) perform duties similar to civilian air traffic controllers and play a key role in the effective use of Naval airpower throughout the world in operational and training environments. Navy ACs are responsible for safely and effectively directing aircraft operating from airfields or the decks of aircraft carriers. They also control the movement of aircraft and vehicles on airfield taxiways and issue flight instructions to pilots by radio. Standards for entry into the AC field are high, but once accepted into the field, Navy ACs enjoy a demanding and highly rewarding career. This is a five-year enlistment program.²⁸

2. Fire Controlman

Only two Navy job specialties, called "ratings," are included in the Advanced Electronics / Computer Field: Electronics Technician (ET) and

²⁷ U.S. Department of the Navy, *Department of the Navy Fiscal Year (FY) 2009 Budget Estimates Submission: Justification of Estimates, February 2008, Military Personnel*, Navy (Washington, DC: Government Printing Office, 2008), 85. http://www.finance.hq.navy.mil/FMB/09PRES/MPN_Book.pdf (accessed: November 6, 2008).

²⁸ Michael J. Otten, PERS 4011, email message to the author, November 18, 2008.

Fire Controlman (FC). The rating in which an Advanced Electronics / Computer Field candidate is trained is determined in the initial phase of the Advanced Electronics Technical Core Course in Great Lakes, Ill. However, eligibility requirements are the same for both ratings in the Advanced Electronics / Computer Field.

Jobs performed by ETs and FCs are performed throughout the Navy's fleet of surface ships including aircraft carriers and Aegis cruisers, and at repair activities ashore....

FCs operate, maintain and repair the Fire Control Radars, mainframe computers, large screen displays, LANS, weapon control consoles, automatic gun systems and associated electro-mechanical systems utilized in weapons systems.

These ratings comprise the basis of the ship's Combat Systems department aboard ships and are responsible for maintaining the ship's readiness for combat operations.²⁹ (Zimmerman 2008, 49-59)

Although the AC and FC ratings are varying in terms of duties and shipboard functions, they are very similar in obligatory requirements, training intensity and relevance to civilian employment opportunities.

C. POPULATION STATISTICS

To avoid “reinventing the wheel”, Zimmerman’s explanation of the population statistics is ideal for this thesis. They are as follows:

There were 2,306 ACs at the time of the survey. The population was 20.4% female; with 2,115 E-6 and below; and 29.7% of the rating’s billets at sea. Of the 2038 FC AEGIS personnel, only 6.4% were female. There were 1,733 E-6 and below and 76.7% of these billets at sea. There were 4,032 Non-AEGIS FCs in the fleet of which 8.9% were female and 62.7% of these billets were at sea.³⁰ The AC and FC ratings provide an excellent contrast to each other in terms of the above demographic characteristics.

Due to the relatively small size and 15% expected response rate, the researchers chose to distribute the survey to the entire population (including non-AEGIS FCs).

²⁹ Earl Salter, BUPERS-322C, email message to the author, November 6, 2008.

³⁰ Edward Ferber, ETCM(SW/AW), email message to the author, July 28, 2008.

Because of the second-hand nature of contacting the Sailors, a response rate was difficult to determine. Dependent on the number of sailors actually contacted, response estimates ranged from 8.6 to 11.5%.

Although the response rate was relatively low³¹, there was a fairly representative sample. Table 6 shows a comparison of the population versus the sample in key demographics. Hispanics were considerably over-represented in the FC (AEGIS) rating. Air Traffic Controller was under-represented at sea and Fire Controlman was over-represented. (Zimmerman, 2008, 49-59)

	AC		FC(non-AEGIS)		FC(AEGIS)	
	Population	Sample	Population	Sample	Population	Sample
Female	20.81%	21.62%	8.93%	11.76%	7.50%	11.80%
Black	23.59%	22.27%	10.97%	8.11%	11.45%	12.57%
Hispanic	15.62%	9.55%	1.36%	5.95%	10.62%	10.18%
Under 27	59.66%	57.14%	48.45%	58.82%	46.13%	54.80%
28-42	37.96%	42.38%	47.73%	39.57%	49.83%	42.94%
Over 42	2.38%	0.48%	4.27%	1.60%	4.34%	2.26%
E6 & below	92.11%	97.76%	82.49%	96.79%	85.39%	95.51%
E-5	37.20%	41.70%	34.76%	54.55%	40.43%	51.12%
E-4 & below	30.35%	19.28%	24.39%	17.11%	14.52%	11.80%
At sea	29.29%	19.00%	62.72%	98.26%	72.54%	90.51%

1. FC(NON-AEGIS) significantly under-represented (Hispanic)
2. Under-representation expected due to targeting of E-6 and below
3. AC under-represented and FC over-represented (at sea)

Table 5. Population and Sample Statistics (From Zimmerman, 2008)

D. ENLISTED RETENTION SURVEY RESULTS

1. Distribution of Non-Monetary Incentive Values

The results of the ERS show that only 604 of 688 completed surveys were usable. Missing crucial data forced 84 of the surveys to be deleted from the tabulation of results. An explanation of the survey results follows:

There were 688 completed surveys. Only 604, however, were usable. The deleted observations were missing crucial data (i.e., reservation values). It

³¹ Kraus et al., *Choice-Based Conjoint Survey*, 31.

was not possible to infer this data from the other available information. Derived numbers were contained in 17 observations.³²

Table 6 lists the average reservation values for a purely monetary reenlistment bonus and the dollar amount, of that bonus, the respondents indicated they would be willing to give up in exchange for a particular incentive [GI Bill Transferability]. The values in column one include outliers (initial values in excess of \$500,000³³) and currently infeasible amounts (in excess of \$150,000³⁴). Column 2 excludes outliers and Column 3 excludes infeasible requirements. All usable responses, except one,³⁵ were included in the thesis simulations (Zimmerman, 2008, 49-59).

	All Usable Responses	Outliers Excluded	Outliers and Infeasible Exclusions
Number of Observations	603	600	592
SRB Required	\$66,779	\$49,978	\$45,539
GI Bill Transferability	6,778	6,814	6,901

Table 6. Average Reservation Values for Respondents (After Zimmerman, 2008)

The following figure illustrates how traditional ways of determining central tendencies of the survey results can be misleading in non-normal distributions. In fact, many of the NMIs in the ESR have “large clusters at zero dollars, smaller clusters at certain ‘focal’ values and long right-hand tails with few high values” (Zimmerman,

³² Of these individuals, 15 indicated that they would reenlist for free (no SRB). They proceeded, however, to indicate a willingness to pay (WTP) a percentage of their SRB for the non-monetary incentives listed. We inferred that they were aware of their eligibility for an SRB and were basing their WTP percentages on this amount. SRB amounts, for calculation of WTP only, were derived from demographic information provided. The Navy’s online SRB calculator (<https://staynavytools.bol.navy.mil/SRB/Default.aspx>) was used. SRB amounts for these individuals were entered as zero. The remaining two individuals indicated that they would require the “current SRB” to reenlist. Their SRB amounts were derived using the above link.

³³ Values above \$500,000 seemed to indicate that no amount of money would entice the respondent to reenlist. There were only three responses in this category: \$500,000, \$1,000,000, and \$10,000,000. These observations significantly skew the summary statistics and are considered true outliers.

³⁴ Although current maximum SRB amount can not exceed \$90,000 (OPNAVINST 1160.8A), the researchers chose \$150,000 as a maximum feasibility level to ensure future viability of this analysis.

³⁵ Respondent 623144606’s responses were deleted. The Sailor’s SRB requirement (\$10,000,000) and two NMI values (\$5,000,000 each) significantly skewed results.

2008). The Value Distribution for GI Bill Transferability, as shown below, exemplifies how misleading it is to rely on just the mean values alone to characterize such non-normal distributions.

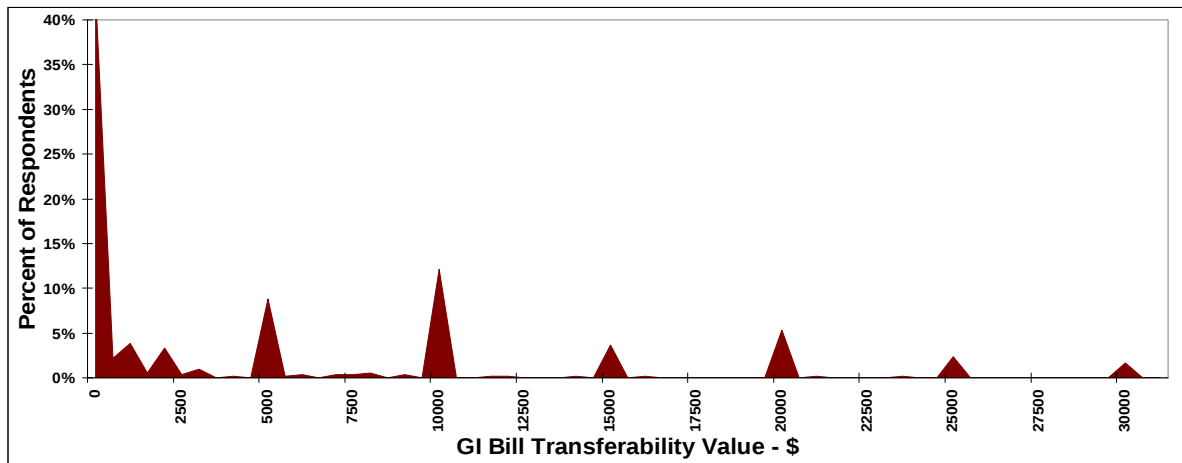


Figure 8. Value Distribution for GI Bill Transferability (From Zimmerman, 2008)

To better understand the distribution of responses in the ERS, Zimmerman's interpretations of the asymmetric distribution of values in Table 7 provide clarity. The 10th, 25th, 50th, 75th, and 90th percentile values [of NMIs] more accurately describe the value distribution for each incentive.

	PERCENTILE				
	10th	25th	50th	75th	90th
SRB Required	\$10,000	\$25,000	\$45,000	\$70,000	\$89,000
GI Bill Transferability	0	0	1,000	10,000	20,000

Table 7. Reservation Value Percentiles (After Zimmerman, 2008)

An interesting characteristic that is illustrated in Table 8 is that both the 10th and 25th percentiles of the distribution of reported values for GI Bill Transferability are equal to zero. In fact, 43% of the respondents in the enlisted survey expressed no value for education benefit transferability.

E. COST ANALYSIS

1. Per Capita Cost Calculations of Transferability: Estimates from the DoD Board of Actuaries and the United States Army

The monetary breakdown of the Post 9/11 Era GI Bill Transferability Clause includes numerous costs. The first cost coincides with the expected spouse/dependent education benefits usage rates. The sample of usage rates and per capita costs is the Expanded Army Pilot Program, which was two years in length. It was also a logical approach to see if education transferability was in fact a worthwhile incentive to maintain force numbers. This program was implemented in November 2007. For active duty soldiers and their dependents to participate in this program, they had to meet a set of qualifying criteria.

Soldier's criteria included:

- Enrollment in MGIB upon initial entry into the service
- Completed at least 6 years of service at the time of reenlistment
- Reenlist for a period of at least 4 years
- Qualify for a MOS Specific SRB and entitled to a Zone B or Zone C³⁶ bonus at the time of reenlistment.

Eligible dependents include:

- The spouse of the individual making the transfer
- One or more of the children of the individual making the transfer; or
- A combination of the individuals referred above

After defining the criteria for both active duty members and their dependents, the process of enrolling participants began. To ensure correct processing, participants and their career counselors had to be conversant on policy guidance from Director of Military Personnel Management (DMPM) and the Army Human Resources Command (AHRC), Alexandria, Force Alignment Division.

³⁶ Zone B is for people who are about to move into the 6–10 years of service window where as Zone C is for people who are about to move into the 10–14 years of service window.

Widely publicizing the pilot program through Commanders Calls³⁷, newspapers and Daily Bulletins, retention career counselors were able to canvas as much of the Army as possible to ensure that program eligibility, opportunity and participation rates were as representative of the Army population as possible. For soldiers who were in their reenlistment window and entitled to a Zone B or Zone C SRB, the Army had to identify whether or not the soldiers wanted to participate in the Transferability program. Additionally, Soldiers were informed that if they “elect MGIB Transferability, their SRB will be reduced in order to fund the actuary per capita cost of transferring benefits” (Expanded Army Pilot Program). The SRB funds that were taken through the SRB reduction were placed in the DoD Education Benefit Fund by the Defense Finance Accounting Service (DFAS). The value of the benefit transferred in FY08 was \$1,101 (indexed annually) and only 18 out of 36 months were available for transfer to spouse and dependents. This total entitlement was \$19,818. For soldiers who elected the Army College Fund kicker or the \$600 per month MGIB Additional Opportunity, their expanded benefit (ACF, MGIB, and MGIB Additional Opportunity) was transferred as well. All participating soldiers had to ensure they provided the Department of Veterans Affairs (DVA) all pertinent paperwork.

After gathering participant information for the program’s first year (FY 2008), the Board of Actuaries developed the per capita cost for transferability (spouse only). There were a number of assumptions in this estimate, including:

- a distribution of expected months transferred
- a distribution of months used in each future year
- benefit amount (\$1,101 per month)
- CPI³⁸ increases
- Usage rate
- an assumed interest rate to discount all of the expected future payments back to present day values

³⁷ Daily or weekly gathering of all personnel within a command in which pertinent information from upper echelon’s of the Army chain of command are disseminated.

³⁸ Consumer Price Index.

The lump sum total of all known costs and assumed/unknown costs provided the Board of Actuaries (BoA) with the per capita transferability cost estimates.³⁹ The FY 2008 per capita cost was \$2,032 with a usage rate of 12.9%⁴⁰. This rate is fairly low compared to the results of the program's second year. The FY 2009 per capita cost of the Expanded Army Pilot Program was \$4,508 with a usage rate of 30.0%. The dramatic increase in the program's second year costs reflects the basic usage rate assumptions and the manner in which the Army administered the program to its soldiers. During the first year, "the program was offered to many and chosen by few⁴¹" (Ryder). In contrast, the members had to pay to participate in the FY 2009 program, thus increasing the usage rate. In essence, "folks that have to pay money to participate in a program are more than likely to end up using it" (Ryder).

In addition to the BOA estimates, the Army conducted its own analysis of the Expanded Pilot Program and determined the cost per participant to be approximately \$3,100. This is only a fraction of the potential benefit because not every participant uses all 18 months of MGIB transferability. Also, this reflects a discrepancy between the Army and BoA idea of fixed and variable costs and basic assumptions about how the program would be received by soldiers and their dependents.

For the purpose of this thesis, the medium-case cost per person for the transferability clause of the post 9/11 Era GI Bill will be \$3,100 reflecting the Army cost estimate. The reason for this assumption is that a \$3,100 cost per person lies between the two extremes provided by the BoA. The low- and high-cost cases will assume \$2,032 and \$4,508 as costs for GI Bill Transferability.⁴² From Figure 8 above, note that this cost range only encompasses a small group of respondents. Most have lower values for this

³⁹ These per capita costs represent the average annual cost per participant who used the transferability benefit. The annual cost may only represent a fraction of the available benefit.

⁴⁰ FY 2008 Transferability Program was open to all soldiers in the Army with no 'buy-in'. Since participants did not have to purchase the option, the personal value of the benefit was low. Theoretically, the low personal value for GI Bill Transferability translated into a low usage rate.

⁴¹ Approximately 250 participants were in the program. This is equivalent to about 2% of those eligible for the transferability option.

⁴² Because these costs are annual costs per user, as opposed to total cost per user they may significantly understate the total expected cost per user.

benefit; GI Bill Transferability represents an ineffective retention tool for these sailors. GI Bill Transferability can represent an effective retention tool for those with values that exceed this cost range. Cost-effectiveness would suggest targeting this benefit to those with the highest values, or at least values that exceed the Navy's cost.

2. Cash Only SRBs

The first step for estimating cost-effectiveness to the Navy entails the more traditional method of dealing with retention issues; Cash Only SRBs. Estimating the cash only SRBs will establish the base-line for comparing SRB costs with GI Bill Transferability. The desired retention percentages that will be targeted in this section will be 25%, 50% and 75% of the survey population. To attain the retention levels, only SRB cash is utilized to determine an individual's cost of retention as revealed in Zimmerman's ERS data. The data was sorted in an ascending order so that SRB amounts could be determined according to the first excluded value/bid. This 'auction' type technique is based on a second-price auction in which individuals actually reveal the SRB cash required to reenlist. Also, four assumptions were included in this analysis. The assumptions are as follows:

- Sailors specifying \$0 SRB will retain for free and do not require any additional incentives to remain on active duty.
- Retention levels of 25%, 50% and 75% are used to illustrate required SRB levels to retain potential desired end-strength numbers.
- All personnel represented by the ERS are eligible for SRBs.
- No other reenlistment incentives are available to any personnel.

To better illustrate the Cash Only SRB method, a simple equation will do:

$$\text{Retention Cost to the Navy} = (\text{SRB Cost of First Excluded Sailor}) \times (\text{Number of Sailors Reenlisted})$$

At the 25% retention level, a \$30,000 SRB is required to contract the targeted enlisted population to reenlist. If \$30,000 is required to retain 25% of this population

(151 sailors), \$4.53 million is the Navy's total Retention Cost.⁴³ At the 50% retention level, 302 sailors would require \$48,000 per person, for a total of \$14.5 million in SRB payments. The 75% retention level reveals that the Cash Only SRB costs \$72,500 per person for 453 sailors in this population; the Navy's total cost would be \$32.8 million.

3. Cost-Effectiveness for Universal GI Bill Transferability

The second method of Transferability Cost estimation is organized much like the first method where stated SRB values are sorted in an ascending fashion. The only nuance in this method is the sailors' Value of GI Bill Transferability is deducted from the stated SRB required to reenlist. This represents the Adjusted SRB Cash payment required to retain the targeted enlisted population if all sailors are provided GI Bill Transferability.

One complication in this analysis involves sailors stating a \$0 value for Transferability. Some of these sailors reported that their required SRB was also zero; others required positive cash SRB but were not willing to sacrifice any of this cash payment in exchange for GI Bill Transferability. In either case, some of these sailors might still exploit the option if it were offered as part of a universal incentive package. Three transferability usage rates are explored in this analysis to reflect these uncertain intentions. The UIP usage will be estimated at the 0%, 50% and 100% level for those individuals whose GI Bill Transferability Value is expressed as zero. The calculations in this section will also take into account the estimated cost per person of transferability indicated earlier in the text. The costs per person are \$2,032; \$3,100; \$4,508; low, mid, and high cost scenarios, respectively. The mathematical model for this method is as follows:

$$\text{Adjusted SRB Cash Payment} = (\text{SRB cost}) - (\text{Transferability Value})$$

$$\text{Cost to the Navy} = (\text{Adjusted SRB Cash Payment for first excluded bid} + \text{GI Bill Transferability Cost} * \text{number of Sailors using the benefit})$$

⁴³ There are 151 sailors whose SRB value is less than the first excluded value which is the SRB paid per person for retention.

The Adjusted Cost to the Navy calculations show how the GI Bill Transferability option can affect the Cost to the Navy when it is used as part of a Universal Incentive Package. At 25% retention of the surveyed personnel, only 82 of 151 (54%) personnel expressed a positive value for the Transferability of GI Bill. The remaining 69 (46%) sailors expressed no value for GI Bill Transferability. The Navy is potentially wasting money providing this benefit to these sailors because it does not provide any retention value, yet they may still use the benefit if offered free of charge.

The same calculations were completed for the 50% and 75% retention levels. These results are summarized below in Table 8. The Navy's retention costs include the cash SRB (equal to the first excluded Adjusted SRB Cost or the SRB bid minus transferability value for the first excluded sailor) and the cost of GI Bill Transferability. Table 8 below demonstrates the Navy's costs associated with the desired retention rates (25%, 50% and 75%), the various GI Bill transferability usage rates for those sailors expressing no value (0%, 50% and 100%), and the different GI Bill Transferability cost estimates (\$2,032, \$3,100, \$4,508). The Adjusted Cost to the Navy calculations is displayed in the following table:

25% Retention Level (151 Sailors)				
# Using GI X-fer	Low (\$2,032)	Mid (\$3,100)	High (\$4,508)	UIP %
82	\$3,488,624	\$3,576,200	\$3,691,656	0%
117	\$3,559,744	\$3,684,700	\$3,849,436	50%
151	\$3,628,832	\$3,790,100	\$4,002,708	100%
50% Retention Level (302 Sailors)				
# Using GI X-fer	Low (\$2,032)	Mid (\$3,100)	High (\$4,508)	UIP %
233	\$12,855,456	\$13,104,300	\$13,432,364	0%
268	\$12,926,576	\$13,212,800	\$13,590,144	50%
302	\$12,995,664	\$13,318,200	\$13,743,416	100%
75% Retention Level (453 Sailors)				
# Using GI X-fer	Low (\$2,032)	Mid (\$3,100)	High (\$4,508)	UIP %
384	\$27,914,988	\$28,325,100	\$28,865,772	0%
419	\$27,986,108	\$28,433,600	\$29,023,552	50%
453	\$28,055,196	\$28,539,000	\$29,176,824	100%

Table 8. Adjusted Cost to the Navy with UIP Estimations

4. Cost-Effectiveness of GI Bill Transferability Under CRAM

The third method of estimating the Cost to the Navy for Transferability is the CRAM. This mechanism only provides GI Bill Transferability to those sailors who value the benefit more than the Navy's expected cost. Because CRAM is truth-revealing, sailors will accurately report their value for GI Bill Transferability in the retention auction. For those sailors expressing a value that exceeds the Navy's cost of this non-monetary incentive, their required cash SRB will be provisionally reduced by their value minus the Navy's cost; the cash SRB is not adjusted for sailors not granted GI Bill Transferability. In this case, the effective cost to the Navy is the sailor's required cash SRB ($V(\text{srb})$) reduced by the sailor's expressed value for GI Bill Transferability ($V(x)$) plus the cost of GI Bill Transferability for all of those granted that benefit.

$$\text{Effective Cost to the Navy} = V(\text{srb}) - V(x) + (\text{Estimated Cost per Person}),$$

$$\text{where } V(x) > (\text{Estimated Cost per Person})$$

$$\text{Effective Cost to the Navy} = V(\text{srb}),$$

$$\text{where } V(x) \leq (\text{Estimated Cost per Person})$$

Under CRAM, sailors are sorted on their Effective Cost to the Navy. The least cost sailors are retained until the Navy meet's their retention target (25%, 50%, or 75%). All retained sailors are paid a cash SRB equal to the Navy's effective cost for the first excluded sailor. The cash SRB is reduced by the cost of GI Bill Transferability for those sailors receiving that non-monetary incentive. The following assumptions were utilized in the analysis for this mechanism:

- All respondents with SRBs values of \$0 were included assuming that these individuals would reenlist regardless without any incentive (a \$0 value does not indicate that there is no payment that could induce retention).
- Sailors citing the value of GI Bill Transferability as \$0, or not expressing a value, are assumed to place no value on this benefit.
- All personnel are eligible for SRBs.

- Retention levels of 25%, 50% and 75% are used to illustrate required SRB levels to retain desired end-strength numbers.

After applying the formula to the Enlisted Retention Survey data, the results for Effective Cost to the Navy results were sorted in an ascending fashion to reveal an Effective Cost for each retention level. A 25% retention level found the first excluded Effective Cost to be \$22,000. The Cost to the Navy [*based on the ‘low’ estimated transferability cost of \$2,032*] for this targeted enlisted population is \$3.3 million. Next, a 50% retention level shows a \$42,032 Effective SRB and the Effective Cost to the Navy is \$12.7 million. Finally, a desired retention level of 75% indicates an Effective SRB worth \$60,000 and an Effective Cost to the Navy of \$27.2 million. Table 9 shows a complete breakdown of the low, mid and high estimated Costs to the Navy at the varying retention levels.

Retention Level	\$2,032 -low-	\$3,100 -mid-	\$4,508 -high-
25%	\$3,322,000	\$3,035,100	\$3,247,708
50%	\$12,693,664	\$12,261,200	\$12,686,416
75%	\$27,180,000	\$27,180,000	\$27,180,000

Table 9. Effective Cost to the Navy

Now that all simulations are complete, a comparison of the three different auction mechanisms reveal how much cost savings is produced by the CRAM. At the 25% retention level and all three per capita cost estimates, the CRAM clearly outperformed the other mechanisms with a minimum of 26.7% in savings. Additionally, the 50% and 75% retention levels of all three per capita cost estimates utilizing the CRAM produced savings that ranged from 12.4%-15.4% and 17.2%, respectively. A detailed breakdown of the different GI Bill Transferability cost scenarios and savings possibilities when Transferability is used as an NMI is shown in Table 10.

	LOW COST ESTIMATE (\$2,032)		
Retention Level	25%	50%	75%
Cash Only Cost	\$4,530,000	\$14,496,000	\$32,842,500
Adjusted Cost -UIP 0%-	\$3,488,624	\$12,855,456	\$27,914,988
Adjusted Cost -UIP 50%-	\$3,559,744	\$12,926,576	\$27,986,108
Adjusted Cost -UIP 100%-	\$3,628,832	\$12,995,664	\$28,055,196
Effective Cost -CRAM-	\$3,322,000	\$12,693,664	\$27,180,000
% Savings (CRAM vs. CASH)	26.7%	12.4%	17.2%
	MID COST ESTIMATE (\$3,100)		
Retention Level	25%	50%	75%
Cash Only Cost	\$4,530,000	\$14,496,000	\$32,842,500
Adjusted Cost -UIP 0%-	\$3,576,200	\$13,104,300	\$28,325,100
Adjusted Cost -UIP 50%-	\$3,684,700	\$13,212,800	\$28,433,600
Adjusted Cost -UIP 100%-	\$3,790,100	\$13,318,200	\$28,539,000
Effective Cost -CRAM-	\$3,035,100	\$12,261,200	\$27,180,000
% Savings (CRAM vs CASH)	33.0%	15.4%	17.2%
	HIGH COST ESTIMATE (\$4,508)		
Retention Level	25%	50%	75%
Cash Only Cost	\$4,530,000	\$14,496,000	\$32,842,500
Adjusted Cost -UIP 0%-	\$3,691,656	\$13,432,364	\$28,865,772
Adjusted Cost -UIP 50%-	\$3,849,436	\$13,590,144	\$29,023,552
Adjusted Cost -UIP 100%-	\$4,002,708	\$13,743,416	\$29,176,824
Effective Cost -CRAM-	\$3,247,708	\$12,686,416	\$27,180,000
% Savings (CRAM vs CASH)	28.3%	12.5%	17.2%

Table 10. Auction Mechanism Comparison of Costs to the Navy

5. Summary

The three methods of analysis utilized in this section examine possible avenues of using the Post 9/11 Era GI Bill Transferability option to aid in retaining skilled sailors who are in critically undermanned ratings. Although method one focuses solely on the traditional retention mechanism of Cash Only SRBs, it is shown to be a very cost inefficient method to retain high quality sailors.

In methods two and three, the effect of employing the individuals Value of Transferability in conjunction with SRBs seems to be a more practical system in which to maximize cost effectiveness in the Navy's favor. Adjusted SRBs are shown to be more efficient than Cash Only SRBs; however, the problem of UIPs still exists. To eliminate this, Effective SRBs produced by the CRAM are given to sailors who have a Value of Transferability greater than the Cost of Transferability. In other words, UIP costs are purged from retention costs thereby decreasing the Total Cost to the Navy.

THIS PAGE INTENTIONALLY LEFT BLANK

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

The goal of this research was to determine the cost-effectiveness of the Post 9/11 Era GI Bill Transferability clause. Though cost-effectiveness is impossible to forecast in an accurate manner, use of alternative mechanisms such as the CRAM and UIP provide a reasonable picture of future cost-effectiveness at various retention levels, based on estimated per capita costs. When compared to each other, CRAM proved to be an efficient and flexible mechanism that drastically reduced the Navy's costs while achieving its retention objectives.

Furthermore, the analysis also revealed that the ROI for an across-the-board retention incentive like GI Bill Transferability is not as fruitful as some might hope. It is less effective for retention when offered to all. However, using GI Bill Transferability as an NMI offered only to those who value this benefit the most, in conjunction with monetary incentives, has proven to be more efficient than Cash SRBs alone.

Finally, the determination of whether or not the Post 9/11 Era GI Bill is fiscally prudent is the final goal for this research. The results of the simulations demonstrate that the more sailors who use this benefit, the higher the Navy's cost. Alternatively, if the benefit is only provided for those who value transferability more than its actual cost, then providing the benefit to that specific population produces a cost effective means of retaining personnel that are in high demand. In essence, it creates a win-win situation for the Navy and for the individual sailor.

B. CONCLUSIONS

Currently, there is ample evidence that a Cash Only SRB is an inefficient method to meet retention goals. Additionally, auction style simulations combining Cash SRBs and non-monetary incentives (CRAM) achieve the retention goals while decreasing the Navy's overall cost. However, providing the Post 9/11 Era GI Bill as an across-the-board benefit, as opposed to a targeted non-monetary incentive for select sailors in critically undermanned rates, is a less economically attractive retention tool, and possibly very

expensive depending on utilization and per capita costs. The analysis provided by this thesis illustrates the need for a new approach to Post 9/11 Era GI Bill Transferability policy.

C. RECOMMENDATIONS

1. Administration

The author suggests reclassifying the Post 9/11 Era GI Bill from an educational benefit for all military personnel who satisfy current eligibility criterion to a non-monetary incentive for those who place a value on transferability greater than the per capita cost of transferability, particularly for critically undermanned ratings. Reclassifying the new GI Bill Transferability option as a non-monetary incentive for retention purposes is cost-effective. Implementing this change incorporates major policy and legislation changes at the highest levels of government.

2. Implementation

Basic ideas on how to implement transferability as a NMI are as follows:

- Revamp reenlistment system to one that is a total rewards approach where NMIs are combined with cash SRBs.
- Incorporate CRAM on a small scale, two or three critically undermanned ratings, in a pilot program.
- Have ‘pilot program’ participants purchase GI Bill Transferability at a price that is equal to the Cost of Transferability [*purchased through an SRB reduction, cash payment or monthly allotment from paycheck over a pre-determined time period*].
- Track participation rates of sailors who opt for GI Bill Transferability.
- Track retention rates of sailors and which NMIs were opted for.

By revamping the current reenlistment system to a second price combinatorial auction system in which NMIs are offered to sailors facing the reenlistment decision who value the benefit more than its associated cost, allows participants to truthfully reveal how much they value each NMI and which NMIs they want in their respective retention package. Incorporating CRAM with only a couple of ratings allows planners and enlisted participants to become comfortable with the program. It will also allow for proper adjustments to any unforeseen situations that may arise.

Finally, a ‘pilot program’ enables planners and decision makers to see the costs and benefits of a total rewards package that coalesces cash SRBs and NMIs. It also provides guidance for future expansion to a Navy-wide pilot program. Expansion will only be viable if essential data, like participation rates and retention rates, are tracked. This type of information will be extremely useful in providing direction on how best to administer and implement a Navy wide reenlistment program overhaul.

3. Further Research

Continued research in the area of GI Bill Transferability as an NMI is essential to the overarching research involving the Chief of Naval Operations (CNO) goal for the Navy to become a Top 50 employer. For the Navy to achieve this goal, combinatorial benefits packages will improve cost-efficiency for funds that are being stretched more and more each year. Even though the data utilized in this thesis was relatively small (604 observations) and the scope was narrow (E-6 and below Navy ACs and FCs), it provided insight as to what might be expected with further research.

The author suggests conducting a Navy-wide survey much like LT Zimmerman’s Enlisted Retention Survey (see Appendix). The additional information would provide a more accurate value distribution of GI Bill Transferability at all Navy pay grades. Additionally, the results of such a survey could be used to model similar programs in other military services.

Next, tracking usage rates for GI Bill Transferability in the near future will provide more precise transferability cost estimates. The Board of Actuaries, Congressional Budget Office are the leading organizations in cost estimation.

Finally, researching retention rates after \ implementing the Post 9/11 Era GI Bill will show exactly how much a hike in education benefits affects retention. In particular, the retention rates for individuals who elect GI Bill Transferability will reveal how effectively this benefit designed for retention actually affects retention.

APPENDIX: ENLISTED RETENTION SURVEY

Naval Postgraduate School Participant Consent and Risk Management Statement

Introduction:

We invite you to participate in our survey entitled "Non-Monetary Retention Incentives Survey" being conducted by the Naval Postgraduate School of Business and Public Policy.

We appreciate your participation in assessing the current and future state of Naval Enlisted Personnel Reenlistment Incentives.

The purpose of this survey is to assess how much you would value the included non-monetary benefits if they were offered as a part of your reenlistment package. Their inclusion in this survey does not imply that they will be offered in the future.

Compensation:

No tangible rewards will be given for completion of this survey. Results of the survey will be available for review upon research completion.

Procedures:

If you agree to participate in the survey, please complete the survey. The survey will take approximately 10 minutes to complete. Please read each question carefully prior to answering. Questions 4-12 require actual dollar amounts as answers.

Confidentiality and Privacy Act:

Results of this survey will be kept confidential and all privacy will be safeguarded. Personal identity will not be compromised as a result of participating in this survey.

Points of Contact:

Should you have any questions or comments regarding this survey, please contact the Principal Investigator Bill Gates, (831) 656-2754, bgates@nps.edu. Any other questions or concerns may be addressed to the Institutional Review Board Chair, LT Brent Olde, (831) 656-3807, baolde@nps.edu.

Consent:

I have read and understand the above information. My participation is completely voluntary, and I have the right to withdraw at any time without penalty or obligation. I have asked all questions and have had my questions answered. I agree to participate in this study. I will be provided a copy of this form for my records.

Survey Questions

1. I agree to participate in this survey?

- ☐ A. Yes
☐ B. No

2. How would you describe your current level of job satisfaction?

- ☐ A. Very Satisfied
☐ B. Satisfied
☐ C. Somewhat Satisfied
☐ D. Somewhat Dissatisfied
☐ E. Dissatisfied
☐ F. Very Dissatisfied

3. What was/will be your primary reason for accepting/declining the Selective Reenlistment Bonus (SRB), if offered?

A. Reason _____
for

Accepting

B. Reason _____
for

Declining

The following questions allow you to place a dollar value on the included non-monetary benefits by establishing a baseline dollar amount (SRB) you would require for reenlistment (question 4) and then asking how much in dollars of that bonus you would be willing to give up to receive the indicated non-monetary benefit.

These values are critical to establishing the cost-effectiveness of offering each benefit.

4. What is the minimum amount of money (in dollars) you would require as a total Selective Reenlistment Bonus (SRB) payment (above and beyond your salary and other pays) to commit to 4 more years of active duty?

- ☐ A. I would reenlist even if no SRB were offered.
- ☐ B. No amount of money would entice me to reenlist.
- ☐ C. I would require a minimum of \$_____ to reenlist for 4 years.

Each letter option in each question (5-11) should be considered separately.

5. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:

- A. Homeport of Your Choice _____
- B. Platform Type of Your Choice _____
- C. Billet Type of Your Choice _____

6. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:

- A. One Year Sabbatical (sabbatical is defined as an unpaid year to spend as you wish, while retaining benefits, but not accruing retirement time) _____
- B. Telecommuting (telecommuting would allow you to work from home on scheduled days) _____
- C. Geographic Stability – 2 tours (average 6 years) (geographic stability allows personnel to serve two consecutive tours in the same geographic area) _____
- D. Geographic Stability – 3 tours (average 9 years) (geographic stability allows personnel to serve three consecutive tours in the same geographic area) _____

7. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:

- A. Professional Certification Program in your rating _____
- B. Compressed work schedule (a compressed work schedule allows personnel to fulfill their work-hours obligation by working longer hours in fewer days; for example five 8-hour days could be compressed into four 10-hour days) _____
- C. Transferability of GI Bill benefits (to spouse or child) _____

8. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up, if you were guaranteed the following while assigned to a ship (please indicate if Not Applicable to you (for example, you already receive BAH while assigned to a ship)):

- A. Single Barracks Room while in port
- B. Basic Allowance for Housing (BAH)

9. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up, if you were offered a single, lump sum payment of your SRB instead of the existing policy? The existing policy calls for fifty percent of the SRB to be paid at the time of reenlistment with the remaining fifty percent paid in equal annual installments each October over the contract period. For example, a four year reenlistment contract would have one lump sum payment of fifty percent and three annual installments (OPNAVINST 1160.8A).

10. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:

- A. Homeport of Your Choice and Geographic Stability (2 tours)
- B. Homeport of Your Choice and Compressed Work Week
- C. Geographic Stability (2 tours) and Compressed Work Week
- D. Homeport of Your Choice, Geographic Stability (2 tours) and Compressed Work Week

11. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:

- A. Lump Sum SRB and Telecommuting
- B. Lump Sum SRB and Homeport of Your Choice
- C. Telecommuting and Homeport of Your Choice
- D. Lump Sum SRB, Telecommuting and Homeport of Your Choice

12. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed your choice of two of the following, please indicate which two you would choose.

Please Check Two Options:

- ☐ A. Homeport of Your Choice
- ☐ B. Platform Type of Your Choice
- ☐ C. Billet Type of Your Choice
- ☐ D. One Year Sabbatical
- ☐ E. Telecommuting
- ☐ F. Geographic Stability (2 tours)
- ☐ G. Geographic Stability (3 tours)
- ☐ H. Professional Certification Program
- ☐ I. Compressed Work Schedule
- ☐ J. Guaranteed Barracks Room while In-Port
- ☐ K. BAH while on sea duty
- ☐ L. Lump sum SRB
- ☐ M. Transferability of GI Bill benefits (to spouse or child)

***Dollar Value (of SRB) you would be willing to give up for the checked options:

13. Assuming the SRB amount you specified is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed your choice of three of the following, please indicate which three you would choose.

Please Check Three Options:

- ☐ A. Homeport of Your Choice
- ☐ B. Platform Type of Your Choice
- ☐ C. Billet Type of Your Choice
- ☐ D. One Year Sabbatical
- ☐ E. Telecommuting
- ☐ F. Geographic Stability (2 tours)
- ☐ G. Geographic Stability (3 tours)
- ☐ H. Professional Certification Program
- ☐ I. Compressed Work Schedule
- ☐ J. Guaranteed Barracks Room while In-Port
- ☐ K. BAH while on sea duty
- ☐ L. Lump sum SRB
- ☐ M. Transferability of GI Bill benefits (to spouse or child)

***Dollar Value (of SRB) you would be willing to give up for the checked options:

14. List any other non-monetary incentive(s) that the Navy could offer which would be attractive to you and the amount of the bonus (in dollars) you would be willing to give up to receive that incentive. "Out of the box" answers are encouraged and accepted. (Example: Designated Parking Spot-\$1000.00)

...

...

The following demographic questions are necessary for data/trend analysis. This information will not be used to identify individuals.

15. What is your age?

- ☐ A. Under 21
- ☐ B. 21-27
- ☐ C. 28-42
- ☐ D. Over 42

16. What is your current marital status?

- ☐ A. Single, never married
- ☐ B. Married
- ☐ C. Married to military member
- ☐ D. Divorced, Separated, Widowed

17. What is your gender?

- ☐ A. Male
- ☐ B. Female

18. What is the highest level of education you have completed?

- ☐ A. GED or equivalent
- ☐ B. High School
- ☐ C. Associates Degree
- ☐ D. Bachelors Degree
- ☐ E. Masters or Higher

19. How many dependents (not including your spouse) do you have?

- ☐ A. 0
- ☐ B. 1-2
- ☐ C. 3-4
- ☐ D. 5 or greater

20. What is your current paygrade?

- ☐ A. E-1 – E-3 (undesignated)
- ☐ B. E-1 – E-3 (designated)
- ☐ C. E-4
- ☐ D. E-5
- ☐ E. E-6
- ☐ F. E-7 or above

21. What is your current rating?

- ☐ A. AC
- ☐ B. FC
- ☐ C. FC (AEGIS)
- ☐ Other (please specify)

22. What NECs do you hold?

23. Where are you currently serving?

- ☐ A. Sea
- ☐ B. Shore
- ☐ C. Overseas
- ☐ D. Student
- ☐ E. Individual Augmentation (IA) – please give location and length of IA

24. Have you ever been assigned an IA? If yes, when, where and for how long? (excluding present duty)

25. Which fleet is your homeport?

- ☐ A. COMSECONDFLT (Norfolk/Mayport/Ingleside)
- ☐ B. COMTHIRDFLT (San Diego/Everett/Pearl)
- ☐ C. COMFIFTHFLT (Bahrain)
- ☐ D. COMSIXFLT (Naples)
- ☐ E. COMSEVENTHFLT (Yokosuka/Sasebo/Guam)
- ☐ F. Other (please specify) _____

26. How many years of active service have you completed?

- ☐ A. 0-2 years
- ☐ B. more than 2 but less than 4
- ☐ C. more than 4 but less than 6
- ☐ D. more than 6 but less than 10
- ☐ E. 10 years or more

27. What is your race/ethnic descent?

- ☐ A. White/Caucasian
- ☐ B. Black/African American
- ☐ C. Asian/Pacific Islander
- ☐ D. Native American/Aleut/Eskimo
- ☐ E. Spanish/Hispanic/Latino
- ☐ F. Other (please specify) _____

28. What is your home of record (state/country)?

***Home of record is where you were living when you enlisted.**

Thank you for participating in our survey!

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

- Callaghan, P (2008 August). The Road to a Better GI Bill. *The American Legion Magazine*, 26-3434.
- Carden, M (2009, March 11). Budget Would Transform VA to 21-st Century Organization, Shinseki Says. *American Forces Press Service*, Retrieved March 18, 2009, from <http://www.defenselink.mil/news/newsarticle.aspx?id=53422>.
- Center for Career Development. (2007). *Transfer of Montgomery GI Bill*. Millington, TN: Commander, Navy Personnel Command.
- Congressional Budget Office. (2008). *CBO Preliminary Estimates of Costs for S. 22*. Washington, DC: Peter Orszag.
- Congressional Research Service. (2008). *A Brief History of Veterans' Education Benefits and Their Value*. Washington, DC: David Smole.
- Cornell University, (2006, January, 2). Transfer of Entitlements to Basic Educational Assistance: Members of the Armed Forces with Critical Military Skills. *38 USC 3020*, Retrieved June 4, 2008, from <http://www.law.cornell.edu/uscode/uscpint.html>.
- Data Center. (Department of Veterans Affairs Evaluation of S.22, 110th Congress: A bill to amend Title 38, United States Code 3020, 2008).
- Defense Manpower Data Center. 2008 QuickCompass of Active Duty Members, (2008).
- Department of the Army. (2006). *MGIB Transferability of Benefits to Spouses Army*.
- . (2007). *Procedures and Guidance Transfer of Montgomery G.I. Bill (MGIB) Benefits to Dependents Expanded Army Pilot Program 1 November 2007*. Washington, DC:
- Department of Defense. (2008). *Response To Honorable Carl Levin, Chairman: Committee on Armed Services*. Washington, DC: Secretary of Defense Robert Gates.
- . (2002). *Department of Defense Directive*. Washington, DC: Paul Wolfowitz.
- Department of Veterans Affairs: 38 CFR Part 21 RIN2900-AN10: Post 9/11 GI Bill. *Federal Register*. 74, 14654-14687.

- . (2008). *The Post 9/11 Veterans Education Assistance Act of 2008*. Washington, DC:
- DoD - Board of Actuary. (2007). *2007 Signed Minutes*. Washington, DC: Brad Ryder.
- . (2008). *2008 Signed Minutes*. Washington, DC: Brad Ryder.
- Eisman, D (2009, May, 1). Veterans Can Now Ask For New GI Bill Benefit For College. *Piltonline.com*, Retrieved May 5, 2009, from <http://hamptonroads.com/2009/04/veterans-can-now-ask-new-gi-ill-benefit-college>.
- Executive Office of the President: Office of Management and Budget. (2008). *Statement of Administration Policy: H.R. 2642 -- Supplemental Appropriations Bill of 2008*. Washington, DC: President George W. Bush.
- Hogan, P, & Mackin, P (2008). *Recruiting and Retention Implications of Proposed Increases in the Montgomery GI Bill Basic Benefit*. The Lewin Group.
- Houston, Michael (2009 April). Post 9/11 GI Bill Benefits Explanation & FAQs. Retrieved June 9, 2009, from Iraq and Afghanistan Veterans of America Web site: <http://www.gibill2008.org/benefits.html>.
- Library of Congress. (2008). *Making Appropriations for Military Construction, the Department of Veterans Affairs, and related*. Washington, DC: Representative Chet Edwards.
- McMichael, W (2008 February 8). Pentagon Starts New Benefits Push. *Armytimes.com*, Retrieved March 4, 2009, from http://www.armytimes.com/news/2008/02/military_payraiseside_080207/.
- Philpott, T (2009, May, 2). New GI Bill Transfer Rules Offer More Control. *Military Update*, Retrieved May 5, 2009, from <http://www.stripes.com/article.asp?section=104&article=62422>.
- Rhode Island Board of Governors For Higher Education. (2008). *The Post 9/11 Veterans Education Assistance Act of 2008 Background and Historical Information*. Cranston, RI.
- Secretary of Veterans Affairs, *Department of Veterans Affairs Evaluation of S.22, 110th Congress: A bill to amend Title 38, United States Code 3020*. (2008). In *2008 Quick Compass of Active Duty Members* Washington, DC: Defense Manpower.

Shea, Carleen (2008). *Emily*. Pittsburgh, PA: Dorrance Publishing.

Wisnoski, S. (2005). *An Analysis of Factors Affecting the Retention Desires of Spouses of U.S. Navy Junior Enlisted Personnel*. Monterey, CA: Naval Postgraduate School.

Zimmerman, B (2008). *Integrating Monetary and Non-Monetary Reenlistment Incentive Utilizing the Combinatorial Retention Auction Mechanism (CRAM)*. Monterey, CA: Naval Postgraduate School.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California
3. LCDR Raquel Gladieux
Office of the Chief of Navy Reserve Training and Education Policy
Washington, DC
4. Mr. Brad Ryder
Defense Human Resource Activity/ Office of the Actuary
Arlington, Virginia
5. Mr. Wayne Wagner
N1 Strategy Office
Washington, DC