

Get Paid Now or Get Paid Later: What Are Sailors Deciding?

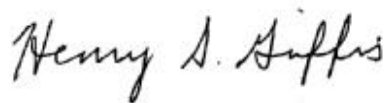
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Approved for distribution:

November 2005

A handwritten signature in black ink that reads "Henry S. Griffis". The signature is written in a cursive style with a large initial 'H' and 'G'.

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Introduction

This paper is about choices that enlisted Sailors have made when offered an early lump-sum payment in return for smaller retirement payments in the future. In short, we describe a natural experiment on the tradeoffs Sailors have made between current and future dollars. While many economists have conducted classroom experiments on these tradeoffs, there are few real-world examples in which thousands of people faced such choices and the choices have been made over several years.¹

Before August 2001, Servicemembers' retirement packages were automatic, so there was no need for a decision. Since that date, however, Servicemembers have had to make choices, and these choices involve decisions about the value of present versus future income streams. Calculating future pension income streams (the regular pension stream and the reduced one) is difficult and complicated. There are many factors to consider: when the Servicemember expects to retire, the expected paygrade at retirement, military pay increases until retirement, changes in the Consumer Price Index (CPI) over the entire retirement period, and expected longevity. These are not factors that Sailors are regularly expected to know, or even to have regularly speculated about. Now, however, Sailors have been making these choices for several years, and it's possible that they have become more knowledgeable about the relevant factors for their choices.

Thus, we want to explore the possibility that learning occurs and that Servicemembers have changed their choices in response to that learning. In particular, although the lump-sum payment looked very attractive to Sailors at the start of the program, as more information became available and more Sailors understood the magnitude of the

1. For a discussion of such experiments, as well as the economic theory of time preference, see [1]. For a discussion of another natural experiment, see [2].

reduction in pension income that would occur if they took the lump sum, the lump sum began to look increasingly less attractive.

Mechanics of military retirement

Retirement in the military is cliff vested, meaning that there are no retirement benefits if a Servicemember leaves before 20 years, but he or she is fully vested after 20 years of service. The majority of military personnel retire when they first become eligible (i.e., at 20 years of service). Retirement benefits increase for up to 30 years of service, but only about 3 percent of enlisted retirees and 15 percent of officer retirees make it to 30 years of service. About 28,000 enlisted and 6,000 officers retire from the military each year.

At present, three retirement plans are available, depending on when the member first entered service: High-1, High-3, and a third that involves a choice at 15 years of service between the High-3 retirement plan or a bonus at 15 years of service and reduced retirement plan called REDUX.²

Personnel are currently retiring under High-1 and High-3, but we will not see the first 20-year retirements under Bonus/REDUX until 2006. It is this decision—choosing the bonus and the REDUX retirement vice the High-3 option—that we analyze in this paper.

Once the final selection is made, the choice at the 15th year of service is irrevocable.³ The options are:

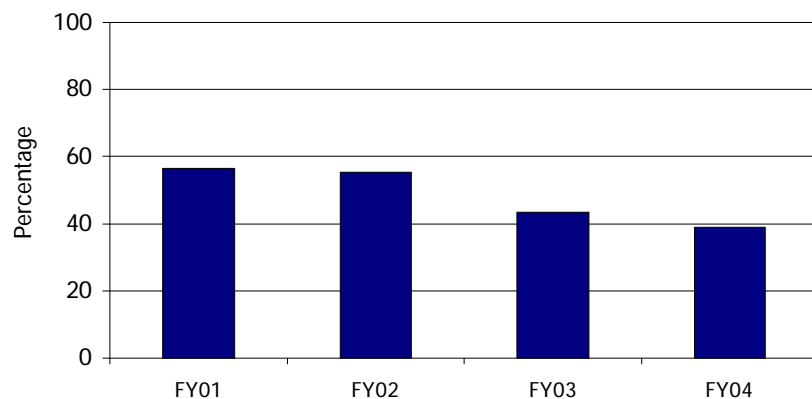
1. *High-3 retirement plan:* Retirement pay is based on the highest average basic pay for 36 months of a Servicemember's career. These are usually the last 3 years.
2. High-1 used the highest monthly basic pay as the base. High-3 averages the highest 36 months of basic pay as the pay base. Under both plans, those who retired at 20 years of service got 50 percent of the base. For most of the postwar period, the only military retirement plan was High-1. The idea that Servicemembers choose their retirement plans is very recent, with the first selections beginning in August 2001.
3. The choice applies to military personnel who entered service after 31 July 1986, who are certified eligible for continued service, and who intend to serve for 20 years.

2. *Bonus/REDUX retirement plan*: A \$30,000 bonus is given at the 15th year of service. In return for accepting the bonus, the REDUX retirement option provides smaller retirement pensions than High-3.

In other work [3], we provided information to help Servicemembers better evaluate the two options.⁴ Evaluating a lump-sum bonus now against more retirement income in future years is complicated. Here, we examine decisions that Navy enlisted Sailors have made since August 2001.⁵ Although some summary statistics have been published about the choices Servicemembers have made, there have been no analyses of how the external environment or Servicemembers' characteristics affect retirement program choice. Specifically, we focus on the decision to take the immediate bonus and the future reduced retirement pension rather than remain in the High-3 retirement plan.

From August 2001 to March 2004, over 22,000 Sailors made the choice. Figure 1 shows the proportion each fiscal year that selected Bonus/REDUX.

Figure 1. Percentage of enlisted Sailors selecting Bonus/REDUX by fiscal year of choice



4. Reference [3] is updated annually to provide information to Servicemembers making the choice each year.
5. The appendix details data that we received from the Navy for this analysis. We combined data on the retirement choice with data in CNA's Navy enlisted personnel files to perform this analysis.

Factors in the choice

High-3 and REDUX retirement pension specifics

High-3 and REDUX pension choices share the following features:

- Both provide retirement income as a percentage of the average of the highest 36 months of basic pay. There is no risk; the retirement payments are specified by law and guaranteed by the full faith and credit of the U.S. Government.
- Both are “tax-sheltered” because the member pays no taxes on the money until retired pay is received.⁶
- Both are protected against inflation, with full inflation protection under High-3 and partial protection under REDUX. The value of inflation protection for retirement pay cannot be over-emphasized. Most military members will be retired almost 40 years. In 40 years, one can expect prices to increase at least four-fold, meaning that what costs \$1 at military retirement will eventually cost \$4.⁷

Table 1 describes the two retirement pension plans.

6. The Services pay into the retirement fund each year, and the fund grows while the member is in the Service. The Servicemember has no tax liability for the Service’s contributions to the retirement fund until the funds are withdrawn.

7. The Consumer Price Index in 2000 was over five times the level in 1960. This period includes the sharp inflation in 1974 (12.3 percent), in 1979 (13.3 percent), and in 1980 (12.5 percent). The commonly assumed 3.5-percent inflation rate leads to a fourfold increase in prices over a 40-year period.

Table 1. Retirement choices for those who entered the Service after 31 July 1986—based on highest average monthly basic pay over 36 months

	High-3 retirement	\$30,000 bonus at 15 years of service and REDUX retirement
Percentage of basic pay at 20 years of service	50.0%	40.0%
Increase for each year of service past 20	2.5%	3.5%
At 30 years of service	75.0%	75.0%
Yearly cost-of-living adjustments	Full CPI ^a	CPI minus 1 percentage point
Age 62	Retirement payments set equal to each other at age 62	
Age 63 onward	Full CPI adjustments	CPI minus 1 percentage point

a. Consumer Price Index for urban wage earners and clerical workers.

Personal discount rates, implicit interest rate or annual percentage rate (APR)

Bonus-takers get some of their retirement income early (\$30,000 at the 15-year-of-service point) in return for smaller retirement payments later. Thus, bonus-takers are effectively “cashing out” part of their pensions. There is a cost, however, to cashing out part of the pension early, and we can measure that cost by the implicit interest rate or annual percentage rate (APR) that the member is paying.

We calculated the APR for specific grades, years of service, and ages at retirement for people of a particular longevity. This is the rate of interest that the Servicemember would have to receive every year on the invested bonus money to recoup the difference between the High-3 and the REDUX retirement.⁸ But what determines whether Servicemembers will find the partial cashout of their retirement monies attractive? That depends on whether the Servicemember’s personal discount rate is higher or lower than the implicit interest rate or APR for the “loan.”

8. This is the rate of interest that would equate the \$30,000 bonus with the present value of the difference in the two retirement schemes.

Most people prefer payments sooner rather than later. Economists measure this preference by the “personal discount rate.” The personal discount rate answers the question: how much would my dollar have to be reduced today so that I am indifferent between receiving that reduced amount today and receiving a dollar one year from now? The reduction (in percentage terms) is the personal discount rate.

Personal discount rates differ from person to person. For example, some people are willing to pay for college through loans. Other potential students with identical qualifications may decide that “it just isn’t worth the price” and accept full-time employment instead. H&R Block gives customers their tax refunds immediately for a sizable fee—and gets many takers. People with high discount rates put a high value on having money today and a lower value on having money tomorrow. They are less likely to go to college, save for retirement, or otherwise invest in their futures.

Other things equal, the higher the implicit interest rate for the cash-out, the lower the probability of taking the bonus and the REDUX retirement pension. Economic theory says that a Servicemember will take the bonus if his or her personal discount rate is higher than the implicit interest rate. Table 2 shows examples of the interest rate and the reduction in income by grade, years of service, and age at retirement for Servicemembers who expect to live to age 79 and who are making the decision in 2004.⁹ The examples have years of service at retirement increase as grade increases, to match the actual retirement behavior of Navy enlisted personnel. Table 2 also assumes that military pay increases will be 3.5 percent per year and that the Consumer Price Index will increase 3.5 percent per year.

The interest rates in table 2 also can be referred to as “break-even rates” since they are the rates that the Servicemember would have to receive on the bonus to exactly break even between the two retirement choices.¹⁰ All of these interest rates are greater than the current rate for a 30-year mortgage but are usually below the current rates for credit card debt. Unlike credit card debt, however, these interest rates

9. Age 79 is the conditional life expectancy for men age 40.

10. More precisely, these are the rates that equate the present value of the bonus plus the REDUX retirement payments with the present value of the High-3 retirement payments.

are for a *long period of time*—from receipt of the bonus (in general, when the Servicemember is in his or her mid-thirties) until death. Because the “loan” is for such a long period and because of the high interest rates, a large amount of money is paid in interest. In table 2, that interest amount is referred to as the “total reduction in after-tax retirement pay.”

Table 2. The implicit interest rate for the Bonus/REDUX choice for enlisted personnel making the choice in 2004 (15% tax rate)^a

Characteristics at retirement	Implicit interest rate for bonus ^b	Total reduction in after-tax retirement pay
E-6 at 20 years of service		
Age 38	12.0%	\$265,126
Age 40	11.7%	\$233,379
Age 42	11.4%	\$204,609
E-7 at 22 years of service		
Age 40	11.1%	\$288,917
Age 42	10.8%	\$252,991
Age 44	10.5%	\$220,686
E-8 at 24 years of service		
Age 42	10.3%	\$311,195
Age 44	9.9%	\$271,303
Age 46	9.5%	\$235,769
E-9 at 26 years of service		
Age 44	9.5%	\$338,600
Age 46	9.2%	\$294,381
Age 48	8.7%	\$255,459
E-9 at 28 years of service		
Age 46	8.3%	\$321,879
Age 48	7.9%	\$279,869
Age 50	7.5%	\$243,470
E-9 at 30 years of service		
Age 48	7.1%	\$296,635
Age 50	6.7%	\$259,121
Age 52	6.4%	\$227,330

a. We use the information provided at DoD's site, <http://dod.mil/militarypay/retirement>. We assume that the Servicemember dies at age 79. See reference [3].

b. This can alternatively be called the APR or the break-even rate.

We know that Sailors with higher discount rates—those who value money a lot more in the present than in the future—will be more likely to select Bonus/REDUX. Although there has not been any work yet on this retirement choice, John Warner and Saul Pleeter analyzed a similar choice that Servicemembers made during the military personnel drawdown program that began in 1992. To induce members to leave, separation payments were offered as a lump sum or as an annuity. According to Warner and Pleeter [2, p. 33]:

We observe the separation payment choices of 11,000 officers and 55,000 enlisted personnel who faced before-tax break-even discount rates (the rate which equated the present value of the annuity with the value of the lump-sum payment) of between 17.5 and 19.8 percent. Based on conventional interest rates, economists in DoD predicted, prior to implementation of the program, that about half of the enlisted personnel, but virtually no officers, would take the lump sum rather than the annuity. In fact, over half of the officers and over 90 percent of the enlisted personnel took the lump-sum payment, implying that the vast majority of personnel had discount rates of at least 18 percent.

If Warner and Pleeter's estimates are correct and if Servicemembers' discount rates are stable, we should have seen Bonus/REDUX take rates of over 90 percent, as all break-even rates in table 2 are under 18 percent. But we did not. Instead, we have seen take rates of less than 60 percent for all years (see figure 1).

Models for retirement choice

Warner and Pleeter [2] calculated the break-even interest rate for each Servicemember between a lump-sum separation payment and an annuity separation payment. They could do this because the choice was between a specific lump sum and a specific annuity. Unfortunately, for the retirement choice that Servicemembers are now making, we cannot calculate each Servicemember's break-even rate. To calculate the break-even rate for each Servicemember, we would need to know his or her grade, years of service, and age at retirement (and how long he or she expects to live). We know nothing about each Servicemember's longevity expectations, and, although we have information about the Servicemember at the 15-year-of-service point,

we do not know what the Servicemember's characteristics will be in 5 or more years when he or she retires.

In short, although we know the Servicemember's grade and age *at the 15-year-of-service decision*, we do not know how long the member plans to serve, what expectations the member has about future promotions before retirement, or how long the member expects to live. Without information regarding these expectations, we cannot calculate the break-even interest rate for each Servicemember. Thus, unlike Warner and Pleeter, we cannot directly estimate personal discount rates. We now turn to what we *can* do and to the two models we use to estimate the decisions.

Interest rate model

REDUX interest rate index

Even though we cannot identify a break-even interest rate for each Servicemember in our sample, we can estimate responses to the interest rate on the \$30,000 bonus because there is variation in the interest rate for the bonus over time. The variation over time comes from the fact that the bonus is fixed at \$30,000, whereas the pay tables on which retirement are based are increasing yearly. Thus, we can at least capture the variation in the interest rate over time by observing the APR for a typical enlisted retiree. We selected an E-7 who, at age 38, will retire at 20 years of service. The interest rate for this E-7 was:

- 11.3 percent in FY01
- 12.1 percent in FY02
- 12.5 percent in FY03
- 12.9 percent in FY04.

Although there is some variation in these break-even interest rates over time, there is considerably less variation than there would be if we could measure the break-even interest rate for each Servicemember. However, this index variable, which we call the REDUX interest rate, can be expected to reflect the "worsening" of the Bonus/REDUX option over time. To the extent that variation in individual

Servicemembers' discount rates is related to measurable individual characteristics, we will pick up this variation by controlling for the characteristics of Servicemembers making the choice.

Prime interest rate

Just as Servicemembers' choice of the immediate bonus should be negatively related to the interest rate on this "loan" of their retirement monies, it is expected to be positively related to the prime interest rate. As the prime interest rate goes up, the cost of alternative loans increases and the Bonus/REDUX option becomes more attractive. At the start of our data, the prime interest rate was 7 percent. It fell monotonically over the period of our data.

Learning curve model

Figure 1 showed sharp reductions in the take rate by fiscal year, from a high of 57 percent in FY01 to a low of 39 percent in FY04. These changes appear to us to be too large for the changes in either the REDUX interest rate or the prime rate to explain. Also, even though a sharp decrease in Sailors' discount rates could explain the drop over the period, we have not been able to identify any reason why there should have been such a sharp drop in their discount rates. Thus, we postulate a learning curve effect. Specifically, we suggest that, over time, Sailors have become more aware of the consequences of selecting Bonus/REDUX.¹¹

There is some recent evidence about learning in the context of social security retirement choices. Chan and Stevens [4] explore how an understanding of various incentives in the Social Security program affects choice. They combine data on retirement with information

11. Some counselors believe that Sailors receiving reduced REDUX retirement checks may not feel able to afford the Survivor's Pension Benefit Program (SPBP) that will be offered to them when they eventually retire. We will not see the first group of regular retirees under REDUX until August 2006, so we will have to wait until we can determine whether SPBP take rates will be affected.

from the Health and Retirement Study to determine how informed people are about the retirement choice. Their general finding is that

well-informed individuals are five times more responsive to pension incentives than the average individual when knowledge is ignored. [They] further find that the ill-informed individuals do respond to their own misperception of the incentives, rather than being unresponsive to any incentives [4, p. 1].

Similarly, Mastorbuoni [5] shows that retirement decision-making improved after the Social Security Administration sent out statements showing estimated benefits at age 62, 65, and 70.

The choice between Bonus/REDUX and High-3 is complicated for Servicemembers to evaluate. In fact, it is probably more complicated than the decision about what age to retire and take social security. The Department of Defense (DOD) established a website to provide information, but it is unclear if the typical Sailor was really able to understand the implications of selecting Bonus/REDUX, particularly at the beginning of the program.¹²

Since August 2001 (when the first choices were made), however, we have been part of a large effort to inform Sailors and Marines about these choices. The Navy Mutual Aid Society has been particularly helpful in providing information in its presentations and on its website. For example, many Servicemembers did not understand how much retirement income they would lose if they selected the bonus. Thus, we speculate that the clear trend away from Bonus/REDUX by fiscal year indicates that there is an active learning curve and that the presumably negative experience (or regret) of each preceding cohort affects the decisions of the next. At what point the decline will level off is uncertain.

We characterize the learning curve by two variables that relate to the decision date for each Servicemember:

- Months since August 2001 (date program began)

12. The address of the DOD website is <http://www.defenselink.mil/militarypay/retirement/index.html>.

- Months since August 2001 squared.

Unfortunately, the prime interest rate, the APR for the choice, and our learning curve variables are highly correlated. All are monotonic over the period: the prime rate falls continuously, the APR rises continually, and our learning curve variables increase continuously. It may be difficult to disentangle these effects in our empirical estimation or to choose between our alternative models.

Sailors' characteristics and the Bonus/REDUX choice

Previous studies of personal discount rates have found that they vary by demographic and personal characteristics. Economic theory offers few explanations as to why they might differ, other than different borrowing and lending rates or borrowing constraints. In general, research has found that personal discount rates decline with age, income, and education and that they are higher for blacks than whites. Findings by gender, marital status, and number of dependents have been mixed.¹³ Thus, we examine Sailor characteristics and the choice of Bonus/REDUX.

Paygrade at time of decision

Everyone makes this decision in the 15th year of service.¹⁴ Sailors at higher paygrades in the 15th year are either in fast-promoting occupations or they are “fast trackers.” The idea that fast trackers are higher quality Sailors compared with their peers might suggest to some that they might have lower discount rates and be less likely to select Bonus/REDUX. Paygrade also is a rough indicator of income, and those with higher incomes generally have lower personal discount rates.¹⁵ Sailors at a higher grade at 15 years of service, however,

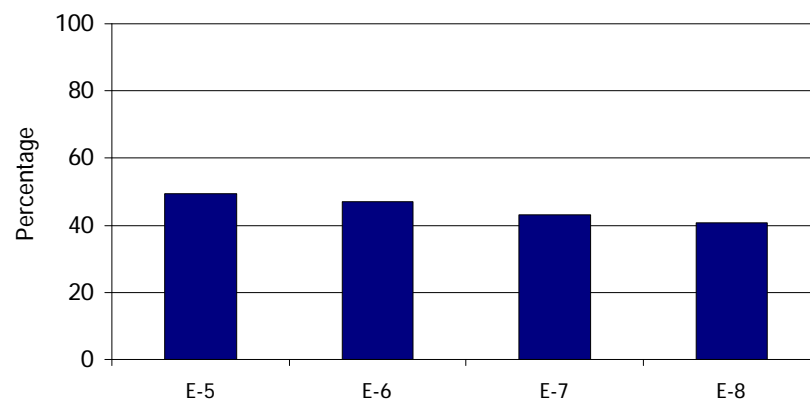
13. There is a good summary of previous research in Warner and Pleeter [2].

14. There were a very small number of Sailors in the sample who were below the grade of E5 in their 15th year of service. We eliminated them from the data set (see appendix A).

15. Paygrade, of course, tells us nothing about spousal income, investment income, or special pay and bonuses.

are also likely to be at higher grades at retirement. As table 2 shows, higher grade at retirement and higher years of service at retirement are linked, and together they imply a lower implicit interest rate for the “loan,” making it more attractive. Thus, the question is an empirical one because it depends on which effect is stronger. Tabulations of the take rate by grade show small reductions in the take rate for Sailors in higher grades (see figure 2).

Figure 2. Percentage of Sailors selecting Bonus/REDUX by grade^a



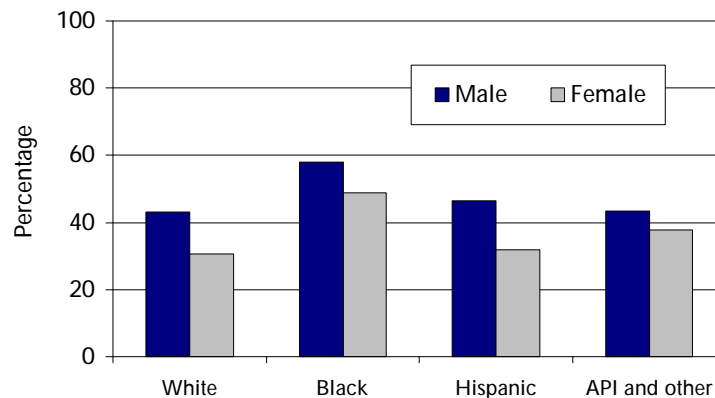
a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Gender and racial/ethnic background

Female Sailors are less likely than male Sailors to select Bonus/REDUX (39 percent for women and 47 percent for men). Warner and Pleeter [2] also found that female Servicemembers were less likely to select the lump-sum in the 1991 choice. Since the characteristics of female and male Sailors differ quite substantially, however, the lower female Bonus/REDUX selection rates may be at least partially explained by these other characteristics. Female Sailors are less likely to be white (43 versus 57 percent) and to be married or have dependents (83 versus 90 percent), and their occupational distribution is quite different from that of male Sailors; female Sailors are heavily concentrated in medical and administrative occupations.

Figure 3 shows differences by Sailors' gender and racial/ethnic backgrounds. Female Sailors in each racial/ethnic group are less likely to select Bonus/REDUX. Black Sailors have a significantly higher propensity to take the Bonus/REDUX than their peers. Warner and Pleeter had similar findings for the take rates for the lump-sum separation payments.

Figure 3. Percentage of Sailors selecting Bonus/REDUX by gender and racial/ethnic background^a



a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Educational background

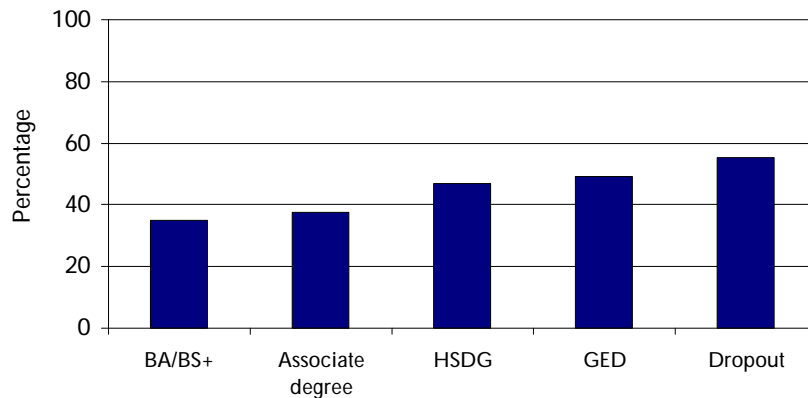
Figure 4 shows the propensity to select Bonus/REDUX and educational attainment. The most educated Sailors are least likely to select Bonus/REDUX among their peers, whereas high school dropouts are most likely. This finding matches that of other studies that show higher discount rates for those with less education.

Ability: Armed Forces Qualification Test (AFQT) scores

The AFQT is a nationally normed ability test given to all military applicants. A score of 70, for example, means that the Servicemember scored in the 70th percentile in ability. Figure 5 shows the Bonus/REDUX take rate by AFQT percentile score. There is no discernible

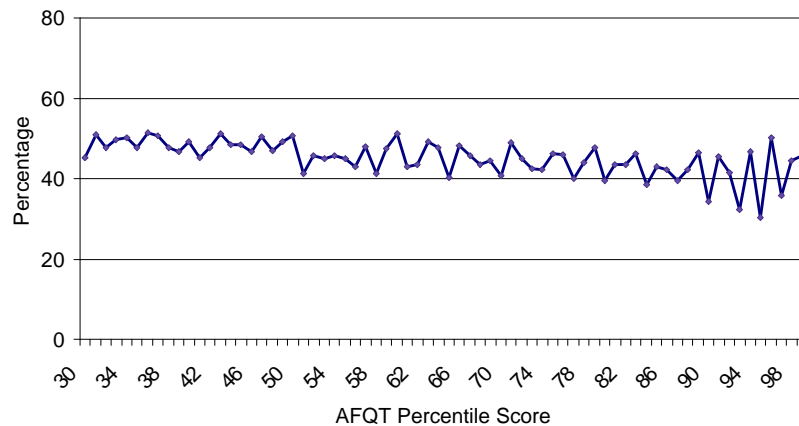
pattern between the take rate and AFQT scores. This finding is somewhat counterintuitive since one might expect the AFQT result to follow the same pattern as the educational attainment result, and we found that more educated Sailors had lower Bonus/REDUX take rates.

Figure 4. Percentage of Sailors selecting Bonus/REDUX by educational background^a



a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Figure 5. Percentage of Sailors selecting Bonus/REDUX by AFQT percentile score^a

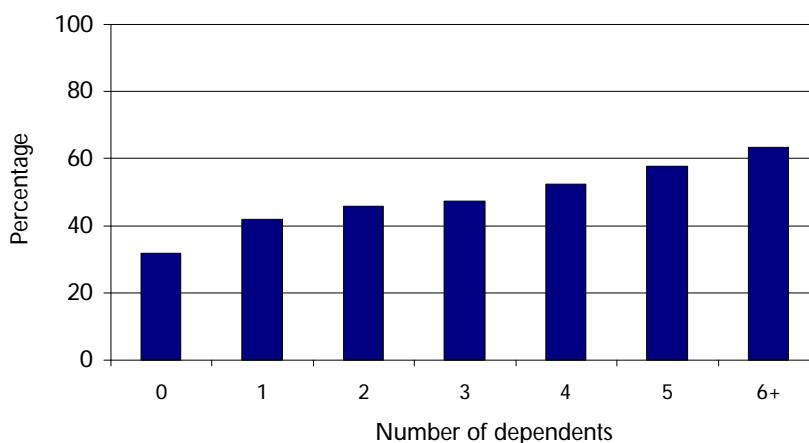


a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Number of dependents

Figure 6 clearly shows a positive trend toward selection of Bonus/REDUX for Sailors with more dependents. As the number of dependents increases, so does the percentage choosing this option. Intuitively, this is not surprising because a large number of dependents would require immediate, as opposed to deferred, compensation. Thus, all else equal, Sailors with more dependents would have higher discount rates.

Figure 6. Percentage of Sailors selecting Bonus/REDUX by number of dependents^a



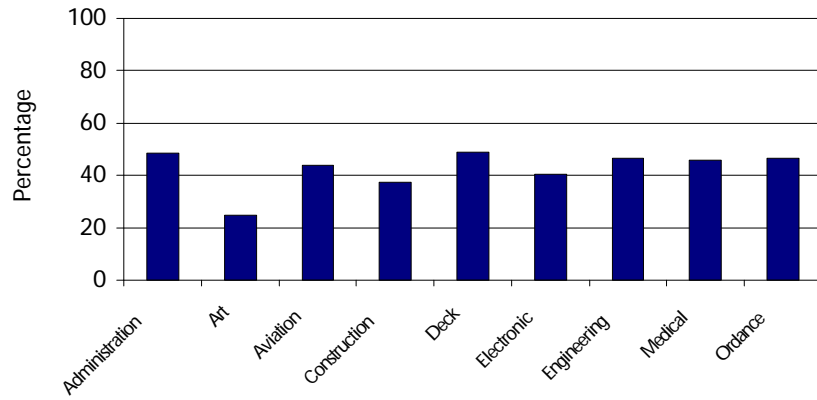
a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Occupation group

There may be differences in the take rate for Bonus/REDUX by occupation group. We have no a priori insight on what these might be, but we control for them in the statistical analysis. We also separately control for occupations in which Sailors spend considerable amounts of their time at sea (sea-intensive occupations).¹⁶ Figure 7 shows the percentage of Sailors selecting Bonus/REDUX by occupation group.

16. Appendix B identifies the occupation groups.

Figure 7. Percentage of Sailors selecting Bonus/REDUX by occupation group^a



a. FY01 through FY04 decisions. The first choices were made in August 2001 so there are only 2 months of data for FY01.

Statistical analysis of the choice

We estimate the probability that individual Sailors in our sample will select the Bonus/REDUX option. We can estimate the probability that $y = 1$ by noting that:

$$Prob(y_i = 1) = Prob(y_i^* > 0) = Prob(\varepsilon_i > -X_i\beta) = 1 - F(-X_i\beta) .$$

If we make the appropriate assumptions about the distribution of the error terms across Sailors in this sample, we can estimate this model using a logit function. In this case,

$$Prob(y_i = 1) = \frac{1}{1 + \exp(-\beta'x_i)} .$$

This equation is estimated using maximum likelihood techniques. Because the function is nonlinear, the derivatives or marginal effects depend on the point at which they are evaluated.¹⁷

Logit regression analyses

Because the prime interest rate, the REDUX interest rate, and the learning curve variables are too colinear to enter together, we estimate two different specifications. The first contains the prime and REDUX interest rate variables; the second specification has the learning curve variables (see table 3).

Two specifications: Learning curve or prime and REDUX interest rates

Our logit estimates show the Bonus/REDUX take rate dropping about .8, .6, and .3 percentage point per month at the August 2002, August 2003, and August 2004 points, respectively.

17. To calculate derivatives for such characteristics as racial/ethnic background, we set all other backgrounds equal to zero and the background subgroup of interest to 1.

Table 3. Logit regressions for the selection of the Bonus/REDUX

Variable	Specification 1		Specification 2		Variable means
	Coefficient ^a	Marginal effect	Coefficient	Marginal effect	
Female	-0.287** (-5.52)	-0.067**	-0.284** (-5.45)	-0.066**	.088
Race/ethnic background ^b					
Black	0.573** (15.61)	0.136**	0.575** (15.63)	0.136**	.253
Hispanic	0.057 (1.08)	Not sig.	0.054 (1.03)	Not sig.	.080
Asian Pacific Islander	0.066 (1.29)	Not sig.	0.060 (1.16)	Not sig.	.102
Other race/ethnic	-0.001 (-0.00)	Not sig.	0.014 (0.07)	Not sig.	.004
Married or dependents	0.271** (4.69)	0.063**	0.271** (4.68)	0.063**	.898
Number of dependents	0.144** (12.15)	0.034**	0.144** (12.18)	.034**	2.47
AFQT percentile	0.102 (1.29)	Not sig.	0.086 (1.08)	Not sig.	.560
Educational background ^c					
Bachelor's degree	-0.570** (-5.93)	-0.131**	-0.555** (-5.77)	-0.127**	.052
Associate degree	-0.452** (-4.51)	-0.105**	-0.441** (-4.40)	-0.102**	.037
High school diploma graduate	-0.107 (-1.54)	Not sig.	-0.082 (-1.18)	Not sig.	.849
Dropout	0.330** (2.87)	0.078	0.336** (2.92)	0.079**	.022
Grade ^d					
E-6	0.033 (0.88)	Not sig.	0.029 (0.78)	Not sig.	.572
E-7	-0.110** (-2.40)	-0.026**	-0.111* (-2.43)	-0.026*	.218
E-8	-0.204 (-1.52)	Not sig.	-0.226^ (-1.68)	-0.052^	.012
To officer	0.243* (2.52)	0.057*	0.232* (2.41)	0.054*	.021
Sea-intensive occupation	0.070^ (1.84)	0.017^	0.062 (1.61)	Not sig.	.382

Table 3. Logit regressions for the selection of the Bonus/REDUX

Variable	Specification 1		Specification 2		Variable means
	Coefficient ^a	Marginal effect	Coefficient	Marginal effect	
Occupation group ^e					
Admin	0.043 (0.77)	Not sig.	0.048 (0.87)	Not sig.	.309
Art	-0.928** (-3.58)	-0.203**	-0.920** (-3.53)	-0.182	.004
Aviation	-0.170** (-2.70)	-0.040**	-0.165** (-2.62)	-0.036	.201
Construction	-0.351** (-3.56)	-0.081**	-0.340** (-3.44)	-0.091	.028
Deck	0.015 (0.23)	Not sig.	0.029 (0.43)	Not sig.	.117
Electronic	-0.270** (-2.98)	-0.063	-0.253** (-2.78)	-0.053	.046
Engineering	-0.081 (-1.22)	Not sig.	-0.065 (-0.99)	Not sig.	.167
Ordnance	-0.076 (-0.91)	Not sig.	-0.059 (-0.70)	-0.002	.051
Months	omitted		-0.045** (-7.85)	See text	19.5
Months squared/100	omitted		0.039** (-2.75)	See text	4.38
REDUX interest rate	-0.506** (-6.11)	-.119**	omitted		12.5
Prime interest rate	0.209** (3.34)	.049**	omitted		.194
Constant	4.614** (3.59)		-0.117** (-0.97)		1.00
Number of observations	22,715		22,715		22,715
Chi Square	1319.4		1408.0		

a. ** indicates statistically significant at the 1-percent level, * indicates statistically significant at the 5-percent level, and ^ indicates statistically significant at the 10-percent level.

b. White is the omitted racial/ethnic group.

c. GED (Tier II) is the omitted education group.

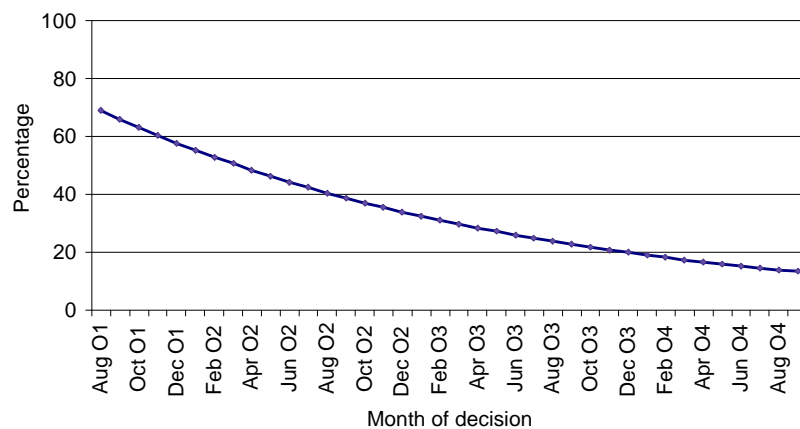
d. E-5 is the omitted grade.

e. Medical is the omitted occupation. See appendix B for occupation group definitions.

In the first specification, we estimate the take rate as negatively related to the REDUX interest rate and positively related to the prime interest rate. For every 1-percentage-point increase in the REDUX interest rate, the Bonus/REDUX take rate drops by 11.9 percentage points; for every 1-percentage-point increase in the prime interest rate, the take rate increases by 4.9 percentage points. Although these results are statistically significant, the predicted changes in the take rate from these interest rate changes are too large to be plausible responses to a 1-percentage-point increase in either interest rate. The problem is that, for the period of our analysis, the prime interest rate went down monotonically and the REDUX interest rate went up monotonically. When we have more variation in the prime interest rate, it will be worthwhile to reestimate the model.

Both specifications fit the data very well, but the Chi-square in the second specification (learning curve) is somewhat larger. Since we have specified the learning curve as a quadratic, it is easier to see the effect of learning by looking at the logit predictions for the Bonus/REDUX take rate from August 2001 through September 2004 (see figure 8).

Figure 8. Take rates for Bonus/REDUX predicted from specification 2 in Table 3^a



a. Predictions are at the mean of the data for all variables except month and month squared.

Sailor characteristics and the Bonus/REDUX choice

The marginal effects in the logit regressions generally confirm the findings of our earlier tabulations. Since the marginal effects estimated by the two specifications are virtually identical, we discuss the effects estimated in the second specification.

Other things equal, female Sailors are 6.6 percentage points less likely than male Sailors to select Bonus/REDUX. This gender difference that we found in the multivariate framework is virtually identical to that found in the simple tabulations reported earlier. Given the significant differences in the characteristics of male and female Sailors, this result is surprising.

Black Sailors are 13.6 percentage points more likely than white Sailors to select Bonus/REDUX. Hispanics, APIs, and other racial/ethnic groups' take rates are not statistically different from white take rates for Bonus/REDUX.

Most Sailors at 15 years of service are either married or have dependents (89.8 percent). Take rates are strongly related to the marital and dependent statuses of the Servicemember. Those who are married or with dependents are 6.3 percentage points more likely to select Bonus/REDUX than are single Sailors without dependents. Each additional dependent increases the probability of taking Bonus/REDUX by 3.4 percentage points.

The educational category omitted from the logit regressions is alternative high school degree holders—overwhelmingly GEDs. Relative to this group, Bachelor's degree holders and Associate degree holders are much less likely to take Bonus/REDUX (12.7 and 10.2 percentage points, respectively). Dropouts are 7.9 percentage points more likely to take Bonus/REDUX. The high school diploma graduates, who make up the largest educational background group by far, are less likely to take Bonus/REDUX than the GEDs, but the result is not statistically different from the take rate for GEDs. As in the simple tabulations, AFQT scores are not significantly related to the take rate for Bonus/REDUX.

The tabulations showed small differences in take rate by paygrade, and we estimate similar small differences in the regression. Relative to E-5s, E-7s are 2.6 percentage points less likely to take Bonus/REDUX. We estimate a negative effect for E-8s (relative to E-5s), but the effect is not statistically significant.

Of the 22,498 Sailors in our sample, 388 separated from the enlisted ranks to join the officer ranks almost immediately after making their retirement choice decision. These Sailors who are moving to officer rank are more likely (5.4 percentage points) to select Bonus/REDUX than Sailors who remain enlisted. Since the take rate for Bonus/REDUX is considerably lower for officers than for enlisted personnel, this finding may seem strange.¹⁸ We speculate, however, that two events have occurred for these personnel: (1) a long-term wealth effect, as officers are paid considerably more than enlisted, and (2) a short-term cash flow problem because of the demands of their new status. Unlike enlisted personnel, officers must buy uniforms and may feel required to upgrade their general lifestyle. We speculate that many are using the bonus to do that.

Sailors in sea-intensive occupations are somewhat more likely to select Bonus/REDUX, but the result is only marginally significant in one specification. Relative to the omitted occupation group of medical, Sailors in art, aviation, construction, and electronic occupation groups are less likely to select Bonus/REDUX.

18. For example, the Navy reports that the officer Bonus/REDUX take rate was 11.3 percent for FY04.

Concluding comments

Sailors' take rates for Bonus/REDUX have declined steadily since the choice was first offered in August 2001. We estimated two different specifications that could explain this decline:

- Economic model of competing interest rates
- Information learning curve model.

Unfortunately, the data series to estimate the economic model of competing interest rates lacks the variation to allow us to unambiguously evaluate this model. As long as the lump-sum payments are fixed at \$30,000 and military pay increases, our REDUX interest rate variable will increase. Although the prime interest rate usually moves up and down, it moved monotonically down in the period of our sample. In addition, although the estimates for the two interest rates were statistically significant and of the correct sign (a decrease in the take rate if the Bonus/REDUX interest rate rises and an increase if the prime interest rate rises), the magnitude of the estimated effects for changes in these variables is too large to be plausible.

Perhaps the magnitude of the drop in the Bonus/REDUX take rates over time is too large to attribute to changes in interest rates. In FY01, 57 percent of Sailors selected Bonus/REDUX. By FY04, only 39 percent were selecting the bonus and the associated smaller future pension streams. Or, to put it another way, the take rate for Bonus/REDUX in FY04 was only 68 percent of the take rate at the start of the program in FY01.

However, we suggest that the information-learning model is more plausible. As more Sailors made the choice, more information became available to the average Sailor. The education work of the Navy Mutual Aid Society clarified for Sailors what they would lose in future pension income if they selected Bonus/REDUX. And, as a consequence of both more and better understood information, larger

numbers of Sailors decided against taking the lump sum and reduced pension streams. At some point, reductions in the take rate for bonus/REDUX will slow down because they will no longer be driven by learning; Sailors will have sufficient information to make the best choices for themselves.

Finally, personal characteristics do play a role in these choices. We find substantially *lower* Bonus/REDUX take rates for female, better educated, and single Sailors without dependents and *higher* Bonus/REDUX take rates for black Sailors, those who have more dependents, and Sailors moving from the enlisted to officer ranks. Partitioning these differences into tastes, differences in budget constraints, or differences in borrowing rates are subjects for another paper.

Appendix A: Data used in the analyses

We received the Navy Bonus/REDUX selection information from N130G for Navy officer and enlisted personnel for the period of August 2001 to September 2005. This data file contained all the information about the selection, but no personal characteristics (except paygrade). We then matched the information to CNA's Navy enlisted personnel files, adding background information at the time of each Servicemember's selection.¹⁹ Because the default selection is High-3 and because the dates in the Navy file were unclear, we decided to restrict the analysis to Sailors who made their decisions during FY01 through FY04.²⁰

CNA's personnel files have information for each quarter, and we used the quarter that was closest to the decision date in the Navy Bonus/REDUX files. We eliminated all Sailors whose grades were below E-5 from the main statistical analysis because many were not permitted to select the bonus (they represented less than 1 percent of the sample).

Thus, from the information on the retirement choice selection that we received from N130G, we dropped Sailors who made the 15th year decision at paygrades below E-5, Sailors for whom information was missing on some of the variables of interest, and Sailors who separated at the same time of decision. The sample size for the estimated logit regressions was 22,715 Sailors.

19. David Reese appended the CNA Navy personnel data to the Bonus/REDUX data.

20. We received data through FY04 in one format and data from FY05 in another format. Because of the format and content of the FY05 data, it was difficult to tell whether final elections had been made. Thus, it seemed safer to restrict our analysis to data through FY04.

Appendix B: Occupation group definitions

The occupation groups used in the regressions follow:

- *Admin* occupations are AK, AZ, CTA, CTI, CTM, CTO, CTR, CTT, DK, DP, IS, JO, LN, MS, NC, PC, PN, RM, RP, SH, SK, and YN.
- *Medical* occupations (the omitted category in the logit regressions) are DT and HM.
- *Aviation* occupations are AB, ABE, ABF, ABH, AC, AD, AE, AF, AG, AM, AME, AMH, AMS, AO, AS, AT, AV, AW, PH, PR, ADR, ADJ, AX, ASM, AQ, ASE, ASH, and TD.
- *Construction* occupations are BU, CE, CM, CU, EA, EO, EQ, SW, UC, UT, and CN.
- *Deck* occupations are BM, EW, MA, OS, OT, OTA, OTM, QM, SM, STG, STS, and ST.
- *Electronics* occupations are DS, ET, IM, OM, PI, ETR, and ETN.
- *Arts* occupations are DM, LI, and MU.
- *Engineering* occupations are BT, DC, EM, EN, GS, GSE, GSM, HT, IC, ML, MM, MR, PM, and BR.
- *Ordnance* occupations are FC, FT, FTG, GM, GMG, GMM, MN, MT, TM, WT, FTB, FTM, and GMT.
- *Sea-intensive* occupations are LI, EW, GSE, FT, AME, ABE, QM, SH, STS, GSM, GM, FC, EN, AE, OS, EM, AT, AO, AM, ET, and MM.

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