Military Training and its Reflection on Civilian Earnings

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Abstract: Recently, the 2000 Census[1] stated that there are currently more than 26.4 million Veterans alive in the U.S. today. These Veterans account for 13 percent of the population, or count for one out of every eight citizens 18 and over. Due to the large portion of Veterans in today's society, I chose to study the effect of military experience on the civilian earnings of Veterans.

The effect that military experience has on earnings affects not only Veterans today, but recruits and soldiers deciding whether to stay on for a few more years as well. In this paper, I utilized the 2001 National Survey of Veterans to break away from the concentration around World War II and Vietnam Veterans, and attempt to update the available knowledge and determine the direction of today's general and specific rates of return. After running two OLS models I found that veterans over the last fifty years or so have, on average, have experienced an initial negative general skill wage premium that, with time, turned neutral and then positive. I also looked at the effect of specific skills gained in the military, by looking at years spent in a branch of the military. I found that the rate of return on specific skills is much closer to the rate of return of general military service; however the actual return is highly dependant on the branch of service. The coefficient of years spent in a branch of service indicates that it is not so much the fact that a veteran was in the military but what they did in the military that influences future earnings.

1. Introduction

According to the 2000 Census[1], an estimated 26.4 million Veterans live in the United States today. Simply stated, one out of every eight citizens 18 and over or thirteen percent of the population has served in the military at one point in their lives. With such a large portion of the civilian population having served in the United States military, questions arise as to the effect that military service is having on Veterans, specifically their civilian earnings, and whether that effect is positive or negative. To further expand upon this question, one needs to consider the effect of a military wage premium, not only on the lives of past soldiers, but of those currently serving in the armed forces and those who will do so in the future.

Furthermore, from an economic point of view, military service and its effects on civilian earnings can be boiled-down to a question of human capital. Normally, when a labor economist analyzes human capital, he or she looks at topics such as educational attainment and on-the-job training. However, education and on-the-job training are not the only ways to improve human capital. Another way to attain additional human capital is through military training and service. As such, I intend to study the rate of return on Veterans in today's society. In other words, I will question whether a Veteran who leaves the military and enters the civilian labor force is able to generate higher earnings through usage of skills acquired during military service. The topic of military rates of returns and wage premiums is not a novel idea. Many studies have been conducted to test for the existence of a military wage premium; however, the bulk of the research available has focused on the World War II and Vietnam Veterans.

[1] http://www.census.gov/Press-Release/www/2002/cb02ff18.html

By using current data, I intend my research to accomplish two goals. My primary goal will be to capture the effect that is currently being felt by Veterans and attempt to update the available research on the military wage premium. Furthermore, I intend to shed light on the direction and significance of the current general and specific skill transferability of military training. Subsequently, I will touch upon the general theory of human capital's role in the lifecycle and explain how military training fits into that theory. Following this, I will cover the research currently written on the topic of military training and human capital. Next, I will discuss the Mincer Equation and my model, built around the Mincer Equation. Finally, I will present my results and conclude with a discussion of improvements and future research on this topic.

2. THEORETICAL FRAME WORK

In this section, I will discuss the life cycle, human capital, and how the military fits into this model. For the following section, refer to figure 1, in appendix C. What is pictured in appendix C is one of many variations of the life cycle, and although different than other figures of the life cycle, it still contains the important pieces. Note however, that the lines are arbitrarily placed and may vary in actual location. Notice that in figure 1, there is a comparison of time (t) against wage. This brings up the first point that wage is a function of many things, including time. Economically speaking, the reasoning behind wage as a function of time is rooted in labor market experience: which is simply the experience that is acquired on the job over time and makes an individual laborer more productive. To understand figure 1, imagine three people who are perfect copies of each other. These three copies have everything in common and each has a decision to make. Today is the day of graduation from high school, and each of them faces the same choice of what to do with their lives. Each person chooses one of the lines to travel on, so that by the end of the day each one is progressing down a different line.

The first person chooses to go straight into the labor force. This person's life cycle is represented by line AA, which indicates that this person has a linear earnings profile from graduation through to retirement. However, this line is not representative of real-life scenarios where a person's earnings would change due to increased/decreased productivity and changes in job status. With that said, these limitations do not hinder the overall purpose of this line, and that purpose is merely to represent a theoretical person's decision to directly enter the labor force.

Subsequently, the next person decides to go straight to college. This person is represented by line CC. Person two is sacrificing earnings in the time frame of T_0 to T_1. This is in order to enhance their human capital and join the labor market, where they will face a more rapidly growing earnings profile than one would if they were to go straight into the labor force. This should give the second person enough earnings to compensate for earnings lost during time frame T_0 to T_1. As well, the person who follows line CC will ultimately have higher earnings than the person who chose line AA throughout the lifecycle.

Finally, person three makes the decision to join the military. He/she joins right out of high school and will join at T_0 and travel along B?. The ? indicates the uncertainty of where person three may fall after leaving the military. Person three may travel along lines BA, BB, or BC. The first thing to consider about person three going into the military is the location of line B? in the time period T_0 to T_2. In this time period, person three is pictured between the other two people. However, this location may not be accurate in all cases. Depending on the characteristics of lines A or C, the military option line may be higher or lower than either of these lines. Moving beyond the uncertainty of the location of lines A, B, and C, person three serves in the military until time T_2, at which point one of many potential scenarios may happen. The resulting line that person three follows will display the impact of their time and service in the military and its effect on civilian earnings. For instance, if person three ends up on line C and thus travels line BC, then his or her military training has had a substantial effect on their civilian earnings. Alternately, a Veteran could be hurt by military training and see a fall in earnings upon reaching time T_2, however this scenario is not depicted in figure 1.

Likewise, the above discussion and accompanying figure help demonstrate the debate that is currently being waged over military training's effect on earnings. When scholars or economists discuss military training and its effects on Veterans, they are ultimately trying to determine which line military training will guide the Veteran towards. Another piece of the debate includes which part of military training, general or specific, plays the key roll in this decision.

3. LITERATURE REVIEW

In this section, I will present a summary of influential research in the field of military wage premiums. Each study sheds new light on a particular piece of the military wage puzzle. In general, when studying military training and its effect on a veteran's earnings, two types of training exist, the first being specific training. Specific training is categorized as being specific to a certain type of job. Specific training is separated from the other form of training due to its limited applicability of skills. For example: take a person who can fix only a specific type of radio or a person who can fix only one model of a jet engine. The skills involved with fixing the jet engine or repairing the specific radio have limited applicability outside of their domains, and are thus, specific skills. If the person who fixes radios or jet engines attempts to get a job at the toothpaste factory, the employer will be unwilling to give those workers a wage premium for their specific skills, because they do not apply to the making of toothpaste and thus, will have no effect on the productivity of the individual laborer inside the toothpaste factory.

Additionally, the other form of training is known as general training. This type of training is of a broad scope and nature that can be easily applied to all types of jobs. For instance: general skills that the radio repairer or the jet engine repairer might have picked up from their previous jobs include: arriving on time, limited conversation between co-workers, and showing up prepared to work. These skills can be generally applied to any job regardless of what type of job is being done. General skills may increase a worker's productivity outright or make it easier for a worker to gain new specific skills. Thus, resulting in higher earnings due to higher productivity.

With the two types of skills identified, how does military training and experience translate into civilian earnings. One of the most influential pieces on the military's impact on earnings was Mangum & Ball 1989. This study focused on the transferability of specific training and the military wage premium in the short run. To carry out this study, Mangum & Ball used data from the National Longitudinal Survey of Youth (NLSY), year 1984. Their study focused on Vietnam Veterans in the post-draft era. These findings stated that specific military skills transferred at the same rate as civilian vocational schooling. However, Mangum & Ball stipulated that there will only be a specific skill transfer if the Veteran decides to use these skills in a civilian job. In terms of the general skill transferability, they found that Veteran status, or simply being known as a Veteran is found to have a significantly positive impact only for respondents with an educational level of twelve years or below.

One of the short comings of Mangum & Ball 1989, was the relatively short time frame that the authors allowed Veterans to become re-adjusted to the civilian labor market. In the long run, as a Veteran becomes more accustomed to civilian life, builds up a network, and makes a more educated decision concerning the labor market conditions, the Veteran may have a different outcome. Where, in the short run military experience may hurt the Veteran, by depriving him or her of critical knowledge necessary to make the correct labor market decision. In the long run, they are able to adjust to labor market conditions and may be helped, rather than hindered by time spent in the military. The study Fredland & Little 1980 acts as a supplemental paper to the Mangum & Ball 1989. In Fredland and Little 1980, the authors look at the long run effects of military training on Veterans. To study the long run effects, the authors use data from the NLSY of respondents surveyed in 1966. The respondents are middle-aged white males who served in World War II. The authors' findings are very similar to the Mangum and Ball 1989 study, and indicate that Veteran's who use their skills obtained from military service receive a wage premium, which is a little less than people who sought civilian job training would have received. Veterans who did not use their military training in the civilian labor force received no wage premium for having been in the military.

A common problem with studies involving an earnings function is the issue of selectivity, which is better known as selectivity bias. Selectivity bias is the idea that people select themselves into certain careers based on ability. This means that the decision to go straight into the labor force, the military, or even go off to college is not a random event. If this decision is not random, it means that some groups of people are more prone to choose certain careers over others, and this is based on factors that are unmeasured or unseen. The magnitude of this problem has been debated by economists and scholars alike. Some scholars deem this problem a nuisance, while others view it as a very large dilemma. The two previous studies did little in the way of compensating for selectivity bias, other than by using an AFQT score, to compensate for differences in ability. The study Hirsch & Mehay 2003 takes a more radical approach to selectivity bias than just adding in an AFQT score. Hirsch & Mehay 2003 believe that selectivity bias has plagued previous literature for years, therefore, they decided that using a completely different data set that compensates for unforeseen differences within groups, will eliminate any selectivity bias. The researchers use the Reserve Components Surveys (RCS) to compensate for selectivity bias. The RCS is a survey composed of Veterans who are connected to the military or in the reserves. The authors feel that the groups represented in the survey have more in common than previous surveys, thus any unobserved characteristics are equal among all respondents. When using the RCS, the authors looked at the long run effect of service during the Vietnam-era. Hirsch and Mehay 2003 found that there is an active duty effect of a 3% wage premium on Veterans. In the reserve, there is a zero premium for Veterans that were enlisted and 10% for Veterans that had officer status. When separated by race: whites benefited very little, where as African American males benefited the most. This study concludes that the general skill transferability is reflected with a positive and significant effect on earnings. The findings are very different than previous studies on Veterans who served during the Vietnam-era Other studies have found that Veterans received a zero or negative general skill wage premium.

Teachman 2004 took a look at the drafted Veteran as compared to non-Veterans and volunteer Veterans. The goal of Teachman 2004 was to focus on the effect that service in Vietnam had on the long term earnings of Vietnam Veterans. The study postulates that people who were drafted were hurt by military service, because of the interruption to their civilian plans, and ultimately to their life course. To analyze the effect of being drafted, the author relied on data form the NLSY year 1981. In his study, Teachman found that drafted Veterans received a negative impact on civilian earnings after their military service had ended. However, the drafted Veteran's earnings growth was greater than that of non-drafted veterans and of non veterans. The drafted Veteran's earnings quickly grew to the level of the volunteered Veteran and non-Veteran, and by ten years, the earnings gap between the drafted Veteran and the other two groups was found to be not significant. The findings initially indicated a negative wage premium which disappeared in ten years. Teachman 2004 finds a military wage premium that is significant, positive, and small, covering general skill transfer that was not documented in the first two studies. Teachman also suggests that Veterans are not being paid more, but are being redirected into higher paying jobs, and that this form of treatment does not show up as a wage premium.

The study Bryant et al. 1993 provides a good summary of the military wage premium debate. In Bryant et al.'s study data from the 1979 NLSY year 1985, data is used to determine the long run effects of military service. The authors came to the conclusion that once the decision to join is made, there is an earnings penalty that will occur once the individual re-enters the civilian work force. However, there is a chance for veterans to transfer specific skills which may compensate for the wage penalty. The authors also suggest that WWII Veterans had an earnings premium, and that premium has been falling ever since. The Vietnam Veterans entered the period where the wage premium became zero, and in some studies negative. In terms of how this trend continues today, the authors of Bryant et al. 1993 believe that it is still continuing down ward.

In a summary of what is generally accepted by economists today, we find that when moving from generation to generation, starting with World War II Veterans, the wage premium has fallen. The end result of this decline is that Vietnam Veterans entered the period of a zero or even negative wage premium. In today's society however, the general belief is that Veterans are experiencing a negative wage premium, however that belief is unconfirmed. In terms of drafted Veterans, military experience is seen as an interruption in the life cycle. For those drafted, it is more of an interruption than for soldiers that voluntarily joined the military. Thus, the end result is that drafted Veterans are not helped by the military service.

When looking at a person's life cycle after a person leaves military service, they are found to have a wage penalty, which can be easily explained. A Veteran is assumed to have moved and meet people from all over the world. They have built a network has spanned the country and possibly the globe. Though this may seem beneficial, the Veteran lacks a local network at the location they settle in after retiring or leaving the military. On top of this, the Veteran also has imperfect knowledge of the labor market, and may make the wrong decision when entering the civilian work force. Consequently, over time a network is built in the local area and they gain knowledge of the labor market, eventually negating any initial effects that may have been experienced. In terms of specific skills, this form of training transfers at the same rate as civilian vocational training. However, a soldier going to a school is compensated for their attendance and incurs no monetary cost of paying for the training. This may lower the cost of going to a military training program, as compared to a civilian because the civilian may have lost earnings or may be forced to pay for the schooling. Likewise, specific skills are only transferable if used. The Veterans that benefit the most (as indicated by Mangum and Ball), are Veterans form the Air Force and Navy, due to similar jobs in the civilian labor market, and their more technical in nature. In terms of general skill transferability, or the increase in earnings "Veteran status" brings, the answer is still in question. Some studies have suggested the general skill wage premium to be positive, where as others have suggested that no such premium exists.

One suggestion is that Veterans may not receive a wage premium because they are Veterans, and being thus, are simply directed into higher-paying jobs. For instance: it maybe found that most CEO's are Veterans, but they are not making more than normal CEO's, because simply being a Veteran helped them to achieve CEO status, and this effect does not show up in statistical analysis.

4. MODEL

In this section, I will present the base model that is the foundation from which I used to build my own model. I will also introduce the changes, alterations, and additions to the base model that come together to form my model. I will conclude this section with a description of my data set and some descriptive statistics.

Throughout the literature review, most of the studies that have been carried out have focused on the World War II and Vietnam generations of Veterans. My intentions are to move beyond the time barrier to investigate what has happened to other generations of Veterans beyond Vietnam, by updating the available research. On top of this objective, I am also aiming to determine the rate of return for both general and specific skills. By updating the available knowledge, the trend that is rooted in World War II and continued to Vietnam can be further incorporated into today's generation of Veterans, with the aim of detecting any change that may have occurred in the rate of return. By finding a change or update, a new door can be opened up to investigate what factors caused changes in the military wage gap, such as public opinion or view of the quality of the military. After all, any change in the rate of return and subsequently the military premium effects today's Veterans, recruits, and current soldiers, and can be a basis for the decision to stay in or not. Thus, knowing where the wage premium is and what it is doing directly effects people's lives and their decisions.

The basis of my model is the Mincer equation, derived in Mincer (1974) as a model of human capital. In Mincer's equation, the marginal product of labor is a reflection of the earnings of a laborer. The natural log of earnings is a function of educational attainment (in years), labor market experience, and labor market experience squared. The Mincer equation is pictured by equation 1.

(1) $\ln y = \beta_0 + \beta_1 s + \beta_2 x + \beta_3 x^2 + \mu$

In this equation, y is earnings, s is years of education, x is labor market experience, and x^2 is labor market experience squared. At the time Mincer was deriving this equation, the Census did not ask for an individual's actual labor market experience, and thus Minicer was forced to estimate labor market experience. To estimate labor market experience, Mincer took a person's age and subtracted six and s from that person's age. The subtraction of six was used for the first six years of life when an individual is not in school and not working. Education and the first six years of life were assumed, by Mincer, to be at the beginning of the life cycle, and thus there are no interruptions in the life cycle. However, when using this assumption, women must be excluded because of their tendency to have more erratic and interrupted time frames in the labor market, due to events such as maternity leave.

Using the frame work set by Mincer I form two models. The first model will determine the rate of return for a general skill gained in the military. This model says that the natural log of earnings (lny) is equal to years educated (s), labor market experience(x), labor market experience squared (x^2), health dummy variables (H), race dummy variables (R), rank in the military (enlisted or officer), and years of military service (m). This model is pictured by equation 2.

(2) $\ln y = \beta_0 + \beta_1 s + \beta_2 x + \beta_3 x^2 + \beta_4 H + \beta_5 R + \beta_6 \text{enlisted} + \beta_7 \text{officer} + \beta_8 m + \mu$

The second model is used to determine the rate of return for specific skills. This model is described by equation 3, and says that the natural log of earnings (lny) is equal to years educated (s), labor market experience (x), labor market experience squared (x^2), health dummy variables (H), race dummy variables (R), rank in the military (enlisted or officer), and years of military experience in each branch (m-army, m-navy, m-air force, m-marines, and m-coast guard).

(3) $\ln y = \beta_0 + \beta_1 s + \beta_2 x + \beta_3 x^2 + \beta_4 H + \beta_5 R + \beta_6 \text{enlisted} + \beta_7 \text{officer} + \beta_8 \text{m-army} + \beta_9 \text{m-navy} + \beta_{10} \text{m-air force} + \beta_{11} \text{m-marines} + \beta_{12} \text{m-coast guard} + \mu$

In the two models, the race dummy variables are summarized by black, Hispanic, and other. The other group consists of Asian, Pacific Islander, Hawaiian, Indian, ect. The base group for comparison is white. The health dummy variables come from the respondent's rating of their own health. They rated their health as either very good, good, fair, or poor. Results of the health dummy variables are in terms respondents who reported their health as excellent. The military rank variables are compared to a base group of warrant officers.

In the above equations, lny, s, x, and x^2 are all the same variables from the original Mincer equation. Likewise, variable s, or education in years, the coefficient is expected to be positive. This is due in part to the thinking that as someone spends more years being educated, they increase their human capital and are thus a more productive person, which results in increased earnings, which is a reflection of productivity. Labor market experience (x), is expected to be positive as well. A positive coefficient is a reflection of human capital that is added on the job. As more labor market experience accrues, the laborer is expected to have increased earnings because they are more productive. Labor market experience squared (x^2) is expected to be negative. This is because of the diminishing returns to labor market experience.

Hence the reason why the first year and the 25th year of on the job training do not equal the same increase in productivity, and therefore should not equal the same change in earnings. Additionally, as a laborer gets closer to retirement, he or she may be less willing to gain on-the-job training because of a perceived decrease in payoff due to the overall proximity to retirement. Each of the above variables lny, s, x, and x^2 were in the original Mincer equation, and their direction has been proven many times over, and are good markers to calibrate the regression equation with.

Subsequently, the next set of variables is not new to human capital earnings functions, but they are additions onto the original Mincer equation. I use health as a dummy variable for how someone views their own health, either as, very good, good, fair, or poor. I would expect that as someone's view of their own health goes up from poor to very good, their earnings increase as well. This can be explained by the assumption that the state of someone's health limits a person's ability to carry out job specific tasks, and lowers their productivity. However, it must be said that because someone rates their health as poor, they aren't necessarily more in-efficient. Some jobs may not require the skills a person in poor health may not be able to do. For instance, a person with severe asthma may not be able to run or move quickly, and they may rate their health as poor, but as a computer programmer they are just fine.

The next set of variables are the race dummy variables Hispanic, Black, and Other. If a person responds as being of Hispanic origins or has a race other than white, I would expect the earnings of that person to be lower, and thus the sign to be negative. However, the reasoning why is not rooted in productivity. Employers may be unwilling to hire people who are "different" than they are, this would result in laborers, primarily minorities, being forced to dip their earnings demands lower in order to gain employment. Following this, the next variable is one of three that are aimed at studying the military. This variable is military experience (m), in years. Variable (m) says that the amount of years spent in the military results in higher earnings and is therefore a positive number. This variable measures the rate of return of general skills gained from the military. I would expect its sign to be positive due to a small increase in productivity for having served for another year. Based on the results of other studies, which have found the general skill wage premium to be either negative or close to zero, I would anticipate a small coefficient for the rate of return on general military training. This is due to the fact that in order for a general skill wage premium to exist the rate of return of general military training has to be higher than the rate of return of a year spent in the civilian labor force. As a supplement to military experience, two more military variables are added. The first is years of military service in a specific branch. The coefficient of m-army, m-navy, m-marines, m-air force, and m-coast guard indicates the rate of return of a year spent in a specific branch of the military, and can be used as a proxy as to the rate of return of specific military training. The coefficients of these variables are expected to be positive because as time in a branch accumulates a soldiers productivity is expected to increase because of job/branch specific skills they learn that enable them to work within the system and perform their job more efficiently. The final military variable is the rank at which the respondent retired at. This is to test to see whether or not being an officer or enlisted matters. If rank ends up significant then it would indicate that some people receive a larger piece of the military wage premium pie than others. It would indicate an inequality between the ranks in the military, as to who benefits from military training. I would expect officers to have a positive coefficient bigger than enlisted Veterans, because of the public's perception of the varying responsibilities between the two ranks, and thus an employer would reward an officer higher than an enlisted Veteran, because of the roll they played in the military.

5. DATA & DATA DECRIPTION

To test the above model, I will use the ordinary least squares method (OLS). I will be using data from the 2001 National Survey of Veterans (NSV). The NSV is a survey commissioned by the Department of Veterans Affairs to study the Veteran population in the United States in 2001. It must be highlighted that the data set's original intent was for internal use only, and some of the questions were not meant for economists, consequently making running a regression on this data difficult. The goals I set forth in my research question required the use of a current data set. So even though the data set is not perfect, it should provide some insight into today's military wage premium, its direction, and should be a stepping stone for future studies.

The data set started with 20,048 respondents. If a person was not sure, didn't know, or didn't want to tell an answer to any of the variables that I was using then they were deleted. Females were deleted due to difficulty determining labor market experience. If a respondent was not working, they were deleted as well. Veterans who served in multiple branches of the military were deleted because it would have been impossible to figure out how much time they spent in each branch. If they were not deleted they would have skewed the result of the rate of return for specific military skills. The biggest single group that was deleted was married Veterans. Married veterans had to be deleted because the survey never asked for a respondent's individual income, earnings, hourly rate, or any other means of measuring productivity. Instead, the survey asked for family income, thus anyone who wasn't their "own family" was deleted. Anyone who reported an income lower then $10,000 dollars a years was deleted. This is because people with an income lower than $10,000 is assumed to have government help and thus would not have an income reflective of their productivity. The final group that was deleted was people who had a calculated labor market experience of negative. The final number of respondents was n = 1669.

Two other approximations were also made in this regression. The first approximation made states that labor market experience was calculated just as Mincer had calculated it; hence the reason females were removed. However, I changed it to also exclude years spent in the military, due to the fact that if a person is gaining military experience, then they were not gaining labor market experience. The new labor market equation is depicted by equation 4.

(4) $x = Age - 6 - s - m$

The other approximation included years educated. The survey had asked the highest grade the respondent had reached. Taking that answer, years were given for grade attainment. For instance: a high school degree was assumed to be 12 years of schooling. This assumption was made in order to calculate x, and because in Mincer's equation required the years of education of a respondent to run the model. Appendix A tables 1 and 2 provide descriptions of each variable, their expected direction, maximum, minimum, mean, and standard deviation.

6. RESULTS

After running OLS on both of the models tables 3 and 4 in appendix B show the results with the variable name, their Beta value, and p-test/significance. For the first model, which tested for a general military wage premium, the r squared and adjusted r squared values where 0.1284 and 0.1216 respectively. This means that the model accounts for 12.84 percent of the variation of incomes between Veterans, and when adjusted for the amount of variables in the model, explains 12.16 percent of the variation in the income of Veterans. When determining if a general military wage premium exists one must compare the rate of return of one year spent in the civilian labor force verses one year spent in the military. According to the first model a year spent in the military results in a 1.048% increase in earnings. For a year in the civilian labor force a year is reflected by the gains from a year of labor market experience minus the loss by the x^2 term which compensates for the non-liner nature of the function. Figure 2 in appendix D show a graphical representation of returns to military experience. Essentially, at first when someone joins the military there is a negative wage premium. As time goes on there is some break even point when a year in the military is equal to a year in the civilian work force, and then a military wage premium exists. In the model military experience was estimated as being constant returns to scale. I attempted to model military experience as a non-linear function but the results were the m turned in significant. Therefore, for this model and data set a linear approximation is best.

As a litmus test to see if the model is accurate the results of s, x, and x^2 were as expected and in the correct direction. If the variables had not come out in the right direction or as insignificant they would act as flags indicating potential problems. The health variables were located in the originally predicted order; increasing in value as they went from poor to very good, however a very good response proved to be insignificant. The coefficients for the health variables came out to be negative, except for very good. The negative values are attributable to the fact that the comparison group was of respondents who reported their health as excellent. Excellent respondents would be expected to have the highest increase in wage, for the same reason a very good respondent would be higher than a poor respondent. Therefore any respondent below excellent would be expected to be negative or simply a less substantial effect on earning which would result in a negative coefficient. In terms of the rank of a respondent an officer was found to be positive and enlisted was negative but insignificant. Since the coefficients for officer and enlisted were not equal to each other it indicates that effects of military training are not felt evenly throughout the ranks of the military. The final group of variables, race, turned out to be negative as expected when compared to white. However, none of the race variables turned out significant except for black, which is reported having a -57.044% decrease in earnings.

When looking at the results of the second model all the common variables race, health, rank, and Mincer equation variables were similar to the first model. The Litmus test variables s, x, and x^2 are still significant and in the predicted direction, thus indicating no major errors were made. The health variables are in the same order and still negative as expected when compared to excellent respondents. Officer status still ranked highest followed by warrant officers and then, enlisted who were insignificant. The second models largest contribution is in the rate of return for specific skills gained from a year in the Army, Navy, Air Force, Marines, or Coast Guard. The results indicate that a year spent in the Marines Corps results in the largest rate of return. It is followed by Navy, Air Force, Army, and then the Coast Guard. These results are surprising because Mangum and Ball 1989 had indicated that the return by branch should order with Navy first followed by the Air Force, Army, and then the Marines. The reasoning Mangum and Ball presented was that the Navy and Air Force were more technical and therefore in more demand in the civilian sector and the Army and Marines gave soldiers less skills that were applicable in the civilian sector. The results of model two indicate that the ordering originally predicted is maintained, however the Marines have completely shifted spots, going from the bottom to the top. To explain the Marines movement it would either a change in the skills offered by the Marines or a change in the skills desired by the civilian labor force. Since the Army didn't move with the Marines it rules out any possibility of a change in the skills desired by the civilian labor force. Indicating that the Marines training are now more applicable to the civilian then when Mangum and Ball were writing in 1989.

7. CONCLUSION

When starting this model, the two goals I set forth were to update existing knowledge on this topic and to see what the specific and general rates of return were. From the data, I have been able to conclude that the gains from general skills gained in the military is originally negative but there is a break even point where after that point a military wage premium exists. In terms of the specific skills I was able to determine the rate of return of specific skills gained in the military. If I could have the rate of return of specific civilian training I could then estimate the specific skill wage premium of the military. However, I lack a base of civilians to compare my findings the thus have no ability to find a specific skill wage premium. When looking at the rate of return for general and specific skills most of the time the specific skills have a higher rate of return than general training. This indicates that it is not so much important that a person served in the military but what they did in the military. The rate of return for general skills and the rate of return for specific skill that was reported may be misleading. First of all, the data set used did not just interview people from post-Vietnam or even post-draft eras. The respondents were from all time periods. Some could have been drafted; others freshly retired from Operation Enduring Freedom. With such a wide array of Veterans, this data encompasses the values for multiple generations. The rates of return reported are simply averages of the rates of return for approximately the last fifty years.

Subsequently, this topic is not yet closed for discussion. In terms of my study, certain things need to be included that were not, due to data issues and other problems. Selectivity bias was an issue I generally ignored, but should not have. Selectivity bias occurs when the participation in an activity, like joining the military, is not done randomly. There is a potential that people select themselves into the military due to some unobserved attributes like motivation, attitude towards country, or parental background that leave a person predisposed to military service. With out compensating for selectivity bias it is possible that rates of return from military service are over stated. This is because I only observe people who joined the military. A Veteran would not have joined the military unless they felt they would benefit from military service, therefore overstating any benefits from military service. To compensate for selectivity bias most studies include and AFQT or ASVAB test score as a measure of ability, however I did not have that ability to compensate with an AFQT or ASVB test score. Another way to compensate for selectivity would be to study a period of drafting/conscription. This is because the choice to join the military is now random and selectivity bias is thus voided out. However, because of the existence of exemption programs there is some debate over how well selectivity bias is voided out

Another issue is seen in the explanatory power of this model. I believe that a few changes in variables could increase the power of this model. Normally in earnings functions, there is an industry and occupation piece to the equation. This data was unavailable as well as true labor market experience, rather than the estimation of x. As shown in the descriptive statistics, the minimum labor market experience was a negative five, which is impossible, and must be chalked up as an error of the function used to estimate labor market experience. Finally, in terms of variables, it must be pointed out that income is only a proxy for earnings, and may not be true to individual earnings. Earnings, by definition, is a reflection of a person's productivity. Where as income is a person's earnings plus other forms of payment, like transfer payments and dividends. Income reflects other sources of revenue that are not directly attributable to a person's productivity. Income was the best available, but in future data sets an hourly wage or some other sort of wage approximation is a good way to reflect a person's earnings.

I believe this study gives a good idea of what the military wage premium was like in the 80's and 90's, as well as what the average is for the past fifty years or so. Future studies during the 80's and 90's should compensate for selectivity, and use and improved data set with all the missing variables. As well, I neglected topics concerning the military such as the role of women and minorities in the military. These groups are often neglected from military studies, but with there ever growing numbers as Veterans a good grasp is needed concerning the wage premium of these groups. As one final suggestion in about ten to twenty years, the NLS of 1997 will be a good place to start when conducting research of the early twenty first century military wage premium. This data set has the variables that were missing out of this study, however time needs to pass to allow respondents time to enter, exit, and readjust to the civilian world.

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Appendix A

Table 1—Variable Descriptions and Expected Direction			
Variable Name	**Variable symbol**	**Variable Description**	**Expected Direction**
Family Income	y	Since veterans who are married are deleted the family should be the individual and thus their family income is a proxy of their earnings	N/A
Years Educated	s	The amount of times in years a person was educated. This is estimated based on the highest degree or grade they achieved	Positive
Labor Market Experience	x	The time spent in the civilian labor force, in years. Found by age minus six, s, and m.	Positive
Labor Market Experience Squared	x^2	The time spent in the labor force, in years, squared. Found by squaring x.	Negative
Health—Poor	Poor	A dummy variable if the person indicated their health was poor (1) or not (0).	As health moves from Poor to Very Good the coefficient should move from a smaller/lower number to a lager/higher number. Moving from negative to positive would be speculative.
Health—Fair	Fair	A dummy variable if the person indicated their health was fair (1) or not (0).	
Health—Good	Good	A dummy variable if the person indicated their health was good (1) or not (0).	
Health—Very Good	Very Good	A dummy variable if the person indicated their health was very good (1) or not (0).	
Hispanic	e	A variable indicated weather a person identified themselves as Hispanic (1) or not (0)	Negative
Race—Black	Black	A dummy variable if the person indicated their	Negative

		race as black (1) or not (0)	
Race—Other	Other	A dummy variable if the person indicated their race was other (1) or not (0).	Positive
Military Experience	m	The amount of time in years a veteran spent in the military. Calculated the year exited minus the year entered.	Positive
Years in the Army	M—Army	The amount of time, in years a respondent spent in the Army	Small and Positive
Years in the Navy	M—Navy	The amount of time, in years a respondent spent in the Navy	Large and Positive
Years in the Air Force	M—Air Force	The amount of time, in years a respondent spent in the Air Force	Large and Positive
Years in the Marine Corps	M—Marines	The amount of time, in years a respondent spent in the Marines	Small and Positive
Years in the Coast Guard	M—Coast Guard	The amount of time, in years a respondent spent in the Coast Guard	Large and Positive
Rank—Officer	Officer	A dummy variable if the person served as an officer (1) or not (0).	Large and Positive
Rank—Enlisted	Enlisted	A dummy variable if the person served as an enlistee (1) or not (0).	Small and Positive

Table 2—Descriptive Statistics				
Variable	**Mean**	**Minimum**	**Maximum**	**Standard Deviation**
lny	10.4495266	9.2103404	13.1223634	0.5852695
s	13.7471540	4	20	2.1087489
x	22.5014979	0	66	13.7999854
x^2	696.6428999	0	4356.00	718.3784695
Poor	0.0425404	0	1	0.2018791
Fair	0.1569802	0	1	0.3638912
Good	0.3259437	0	1	0.4688668
Very Good	0.3079688	0	1	0.4617920
Hispanic	0.9310965	0	1	0.2533659
Other	0.0083883	0	1	0.0912298
Black	0.0029958	0	1	0.0546683
m	5.3852606	0	42	5.7750226
M—Army	2.3571001	0	42	4.5490379
M—Navy	1.2510485	0	30	3.5591786
M—Air Force	1.1575794	0	30	3.9048605
M—Marines	0.5829838	0	26	2.0822069
M—Coast Guard	0.0365488	0	30	0.7853464
Officer	0.0551228	0	1	02282883
Enlisted	0.9328939	0	1	0.2502806

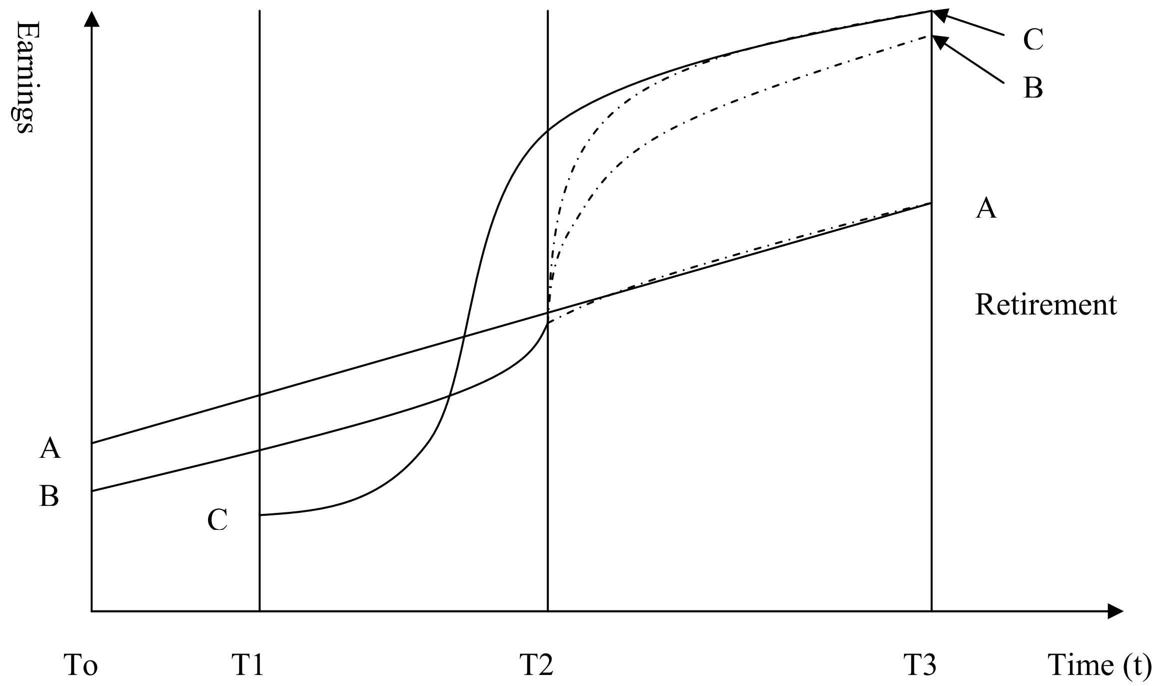
Appendix B

Table 3—Results—Model 1		
Variable	**Beta Value**	**Significance**
Intercept	9.62173	<.0001
s	0.06100	<.0001
x	0.01048	0.0011
x^2	-0.00018118	0.0028
Poor	-0.29221	<.0001
Fair	-0.15334	0.0016
Good	-0.11290	0.0067
Very Good	0.01016	0.8058
e	-0.06145	0.2664
Other	-0.16463	0.2758
Black	-0.57200	0.0229
m	0.01048	<.0001
Officer	0.24715	0.0726
Enlisted	-0.06428	0.6066
r^2 = 0.1284 or 12.84%		
adj. r^2 = 0.1216 or 12.16%		

Table 4—Results—Model 2		
Variable	**Beta Value**	**Significance**
Intercept	9.61435	<.0001
s	0.06140	<.0001
x	0.01042	0.0012
x^2	-0.00017926	0.0031
Poor	-0.28923	0.0001
Fair	-0.15094	0.0021
Good	-0.11114	0.0080
Very Good	0.01058	0.7988
Hispanic	-0.05878	0.2895
Other	-0.16300	0.2818
Black	-0.57044	0.0237
M—Army	0.00918	0.0069
M—Navy	0.01137	0.0054
M—Air Force	0.01086	0.0039
M—Marines	0.01631	0.0165
M—Coast Guard	0.00398	0.8169
Officer	0.24546	0.0753
Enlisted	-0.06794	0.0753
r^2 = 0.1291 or 12.91%		
adj. r^2 = 0.1202 or 12.02%		

Appendix C

Figure 1



Appendix D

Figure 2