Cover Page:

Student's name: Shawn M. Tangen

School: College of Saint Benedict-Saint John's University

Title of the paper: Estimating Earnings Differentials among Military Veterans

Abstract

This thesis analyzes whether the decision to enter the military offers a different investment in human capital as indicated by the civilian earning of veterans. Using seven one month samples from the Current Population Survey, I run three linear regressions to compare the earnings of veterans by gender, the earnings of female veterans and non-veterans, and the earnings of male veterans and non-veterans. It appears that, between 2005 and 2013, veterans enjoyed a wage premium which existed for both male and female veterans. These results suggest that military service acts as a screening device or a bridge to employment in the civilian labor force. Additionally, female veterans earn less than male veterans in the civilian labor force. Even though female veterans are more successful in the civilian labor force than women with no military experience, they still suffer a gender wage gap.

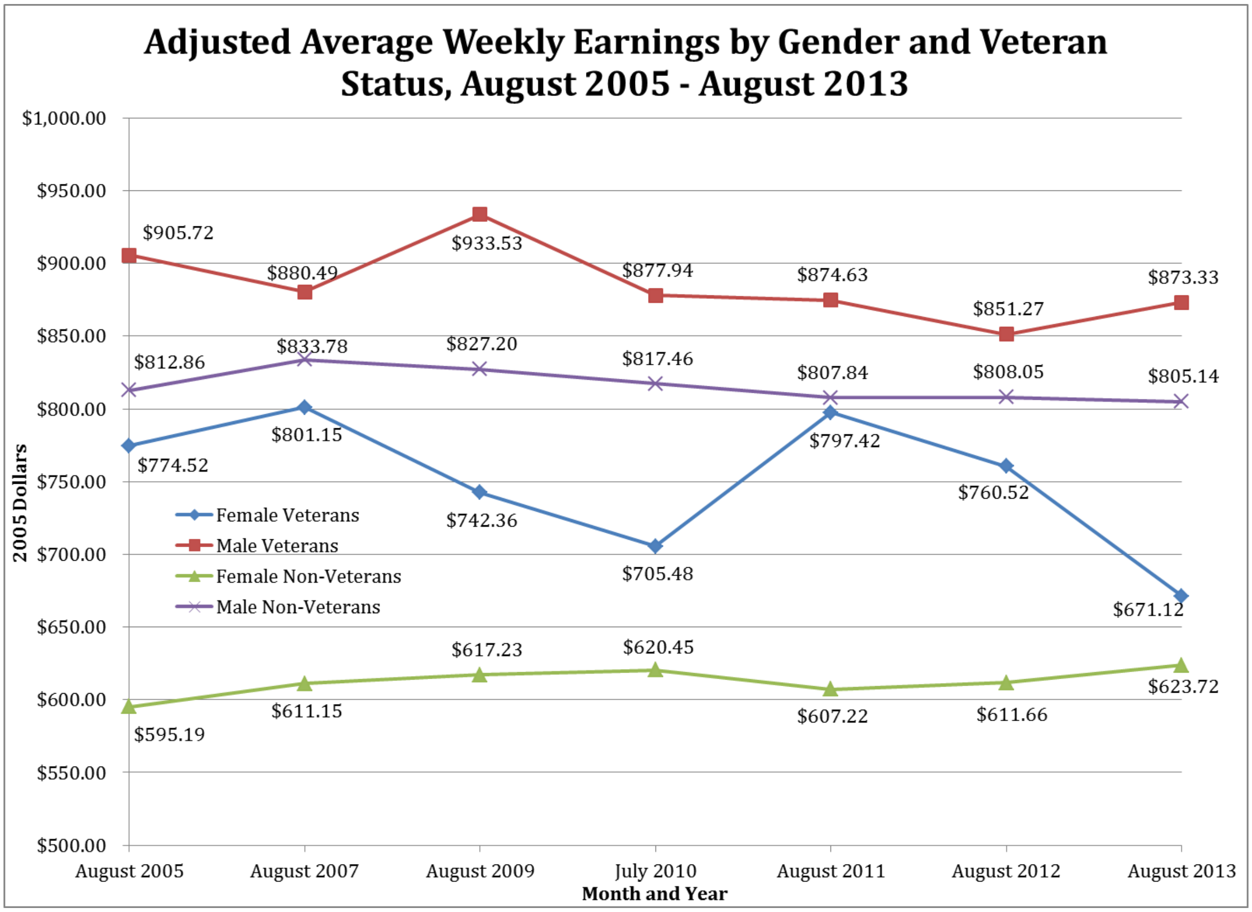
Table of Contents

I. Introduction

On January 24, 2013, U.S. Secretary of Defense Leon Panetta announced the reversal of the policy restricting women from serving in combat in the U.S. military (Roulo, 2013). This announcement grants women full access to all military occupations by 2016. The expanded role of women in the military will alter the military experience of women. The restrictions on female military service changed considerably since the beginning of the All-Volunteer Force (AVF) era in 1973. In 1991, the total number of female veterans in the United States amounted to 1.1 million (U.S. Department of Labor, 1992). Between 1991 and 2013, the number of female veterans almost doubled as it reached 2.2 million in 2013 (U.S. Department of Labor, 2014). Military veterans refer to people who served in the any of the five branches of the U.S. armed forces (Air Force, Army, Coast Guard, Marine Corps, and Navy). Female veterans' earnings upon leaving the military *may* differ to earnings of women with no military experience because the decision to enter the military offers a different kind of investment in human capital whereby the skills developed in the military may not directly transfer to jobs in the civilian labor force (Mangum and Ball, 1989). This thesis empirically investigates the wage differential in the post-military earnings of female veterans and non-veterans in the United States. In addition, this thesis investigates the differences in earnings between female and male veterans and the wage differential male veterans and non-veterans. Based on prior literature, I expect that female veterans will earn more than female non-veterans. (Mehay and Hirsch, 1996; Prokos and Padavic, 2000; Cooney, Segal, Segal, and Falk, 2003). Historically, wages in the civilian labor force have also differed based on certain demographic factors. Most notably, considerable evidence shows the existence and continuation of a gender pay gap (Becker, 1957; Thurow 1975; McConnell, Brue, Macpherson, 2013). Additionally, because women's choices after service in the military have been historically limited, their labor market outcomes after leaving the military would differ from male veterans' labor outcomes since they would acquire a different set of skills from military service.

As Figure 1 (next page) indicates, wage differentials exist by gender and veteran status. In each month examined, men, on average, earn more than women. Additionally, male veteran earn more than male non-veterans while female veterans earn more than female non-veterans in each month examined. There also appears to be a greater differential between male veteran and female veteran earnings than female veterans and female non-veteran earnings. However, the results may differ with the presence of control variables, as my research examines.

Figure 1: Adjusted Weekly Average Earnings by Gender and Veteran Status, August 2005 – August 2013.



This illustrates the importance of addressing the labor market outcomes of men and women with military experience separately.

Thus, this thesis analyzes the following hypotheses:

1. Female veterans earn less than male veterans in the civilian labor force.
2. Female veterans earn more than female non-veterans in the civilian labor force.
3. Male veterans earn more than male non-veterans in the civilian labor force.

The following section discusses the various economic models that help explain differences in wages. It also explains the two major theoretical models that explain the earnings differential between veterans and non-veterans. Section III reviews the literature that is related to this analysis. Section IV provides a description of the data used in this paper. Section VI describes the methodology used to empirically test the three hypotheses while Section VII presents the results of the regression analyses. Section VIII and Section IX summarize the findings of the results and its implications. Section X discusses the limitations of the study.

II. Theoretical Foundation

There is no single overarching economic theory that will explain all causes of wage differentials between veterans and non-veterans. Instead, multiple theories can justify the major determinants of this kind of wage differentials. For example, the theory of human capital, the most influential wage determination theory, explains the impact of educational attainment on wages. An investment in human capital through education improves one's skillset and future productivity in order to increase the present value of future earnings (Thurow, 1975). A more productive worker can also be trained more easily which also enhances a worker's future earnings. For example, an investment in college resulted in a 14.8 percent internal rate of return in 1958 (Becker, 1975). Human capital theory can also explain the differences in wages that stem from variation in age. A human capital investment later in life yields a lower return than an earlier human capital investment as one would have fewer years to work to pay off that investment (McConnell, Blue, Macpherson, 2013). Since wages tend to increase as one ages, the opportunity cost of a human capital investment is greater for an older worker who will have a lower net present value. Under this reasoning, work experience also improves the level of human capital attainment. Thus, it is important to include the amount of time served in the military as, under the definition of veteran, a veteran's experience in the military will differ based on the amount of time spent in the military.

Wage discrimination exists when wage differentials result from factors other than productivity or potential productivity differentials. Several theories of discrimination can explain the inclusion of race and gender in the model. Becker's tastes for discrimination model argues that an employer incurs a psychic cost from employing groups such as racial minorities (Becker, 1957). Minority groups earn a lower wage than other groups to offset the psychic cost that employers or fellow employees incur. Similarly, the theory of statistical discrimination can also explain the persistence of wage differentials between demographic groups of people (Becker, 1957). According to this theory, discrimination results from incomplete information and uncertainty by employers. Employers refuse to hire minority groups because they assess a worker's value based on the stereotypical average productivity of the individual's group. For example, an employer may not hire a young woman because the employer assumes the woman will leave the job market early to take care of children or after getting married. While this is not always the case, taking care of children and marriage both create a time constraint for a worker. One cannot devote as much time to the labor force if these characteristics exist. For example, Hoffman (2009) finds that the younger the child, the more likely it is for a woman to not participate in the labor force. Additionally, Cohany and Sok (2007) show that the more children a married woman has, the lower the likelihood of labor force participation. Thus, marital status and the number of children of a worker are included in the model.

Regional differences also act as a factor in explaining wage differentials in the civilian labor force. Under the theory of compensating wage differentials, employers must provide a higher wage to potential employees to compensate for an undesirable job characteristic such as location (McConnell, Brue, and Macpherson, 2013). For example, the cost of living may be higher in one region of the United States than another. Thus, employers must pay comparable workers a higher nominal wage where the cost of living is higher in order to pay a similar real wage (McConnell, Brue, and Macpherson, 2013). Workers should move to areas with higher real wages, leading to greater labor supply in these areas and a decrease in labor supply in areas with lower real wages. Employers are forced to increase wages to compete for workers while wages will fall where labor supply increases. This process should eventually result in equal wages among regions. However, regional wage differences are still present after adjusting for regional living costs (Cullison, 1984; Carlino, 1986). Areas with better amenities and living conditions will attract a larger supply of workers. Blomquist, Berger, and Hoehn (1988) show that workers will pay more to live in areas where pollution problems do not exist and that locations with more sunshine will decrease average wage rates by 7 percent.

Most research concerning a wage differential between veterans and non-veterans ascribes to the bridging hypothesis. This hypothesis indicates that those with less education and those from minority groups, for example, especially benefit from military service if military experience can serve as a proxy for formal education (Berger and Hirsch, 1983). Military service acts as a bridge for members of minority groups to acquire skills that improve their performance in the civilian labor force (Browning, Lopreato, and Poston, 1973). Studies that use the bridging hypothesis but focus solely on the socioeconomic outcomes of female veterans offer differing results. Prokos and Padavic (2000) find that younger female veterans experience a wage penalty compared to same-age non-veterans while a wage premium exists in favor of older female veterans. Poston, Segal, and Butler (1983) use the bridging hypothesis to claim that female veterans earn more than female non-veterans between 1944 and 1980. This study does not separate its analysis by era, an important characteristic in understanding its findings as results tend to differ by time period.

Veterans would likely achieve a higher level of human capital than individuals without military experience.

In contrast, military service can lead to a veteran attaining a relatively lower level of human capital. This is likely if employers do not view military service as a substitute to education (Berger and Hirsch, 1983). Lower earnings for veterans could also be attributed to a devaluation of veteran status as veteran benefits, such as subsidizing education, have waned or become a benefit that many non-veterans also receive (Cooney et al., 2003). A secondary hypothesis is that military service acts as a screening device for employers. DeTray (1982) expands on this concept and points out that employers use the presence of military service to indicate the potential productivity of an employee. Veteran status signals to employers the development of skills necessary to participate in the labor force because of the presence of required exams one must pass to enter the military and the physical and mental characteristics required for military service.

Based on the discussion above, a regression model examines the wage differentials between female veterans and male veterans where a generalized version of the regression equation is as follows:

Equation (1):

$$\ln(wage) = f(G, E, WE, LOS, R, MS, NC18, LFP, REG, TDV) \quad (1)$$

G represents gender, E stands for educational attainment, WE measures work experience, LOS stands for length of service in the military, R measures the race of individuals, MS represents marital status, $NC18$ represents the number of children under 18 in the household, LFP stands for labor force participation status, REG represents the region in which a person resides, and TDV stands for the six time dummy variables that are present.

Additionally, also based on the discussion above, a linear regression model estimates the wage differential between female veterans and female non-veterans and the same regression model to investigate the wage differential between male veterans and male non-veterans. A generalized version appears below.

Equation (2):

$$\ln(wage) = f(G, E, WE, R, MS, NC18, LFP, REG, TDV) \quad (2)$$

III. Literature Review

Much of the literature on the labor force outcomes of veterans focus on the earnings of young male veterans. The time period in which veterans serve produce differing results on the effect of military service on subsequent civilian labor force earnings. Generally, research shows that male veterans earned more than non-veterans (Martindale and Poston, 1979; Xie, 1992; Teachman and Call, 1996; Teachman and Tedrow, 2007). Martindale and Poston (1979) find that male veterans of World War II experienced a wage premium. Angrist and Krueger (1994) dispute this notion by arguing that nonrandom selection of veterans leads to the World War II wage premium and that World War II veterans do not earn more than similar non-veterans. Unlike veterans of World War II, the literature generally shows that veterans of the Vietnam War era earned less than comparable non-veterans (Teachman and Call, 1996). Xie (1992), using 1964-1984 March CPS data, shows that male veterans earn more than male non-veterans and that the earnings differential widens as veterans age.

More recently, economists studied the earnings of veterans who served during the All-Volunteer Force (AVF) era. The AVF era, beginning in 1973, is the period after conscription into the military ended. Similar to the research on veterans of World War II and Vietnam, most of this research discusses the earnings of male veterans. Teachman and Tedrow (2007) use the 1979 National Longitudinal Survey of Youth (NLSY) to examine the long-run earnings of male veterans. They find that a wage premium depends on race and level of education and that the income advantage decreases as a veteran ages. This study is one of the few to consider the income trajectories of veterans versus non-veterans.[1] They account for how earnings of male veterans and non-veterans change over time by including a quadratic term for the time after one is discharged from active duty. This is done in my analysis by including the quadratic and quartic terms of potential experience and the quadratic term of age.

Prior to 1984, few researchers focused on the effect of military service on the earnings of female veterans during the AVF era. The fact that the CPS did not begin regularly measuring women's veteran status until 1989 exemplifies the relatively recent interest in this topic (Mehay and Hirsch, 1996). Defleur and Warner (1985) examine how the level of educational attainment affects female veterans' earnings and find that female veterans earn more than female non-veterans at all levels of education. Like Poston et al. (1983), they also attribute this to the bridging hypothesis. In contrast, Mehay and Hirsch (1996) find that white female veterans experience an earnings penalty compared to white female non-veterans.

While Teachman and Tedrow (2007) include controls for selectivity in enlistment such as the Armed Forces Qualifying Test[2] (AFQT) scores, they do not fully control for selection bias. In

[1] Income trajectories refer to the slope of an individual's lifetime earnings. Earnings do not stay constant so it is important to consider how earnings and the wage differential change over time.
[2] AFQT scores are calculated from the ASVAB test, a military service enlistment test that screens potential applicants who must pass the test in order to become a member of the military.

particular, selection bias may result because of nonrandom selection as individuals choose the military over other options. Selectivity in who chooses to enter the military and who the military accepts is a common problem that most research on this topic fail to address. Any study that uses the NLSY includes a partial control for selection bias because of the presence of AFQT scores. Additionally, Hirsch and Mehay (1996, 2003), use the Reserve Components Survey (RCS) and argue that it counters military selection bias and self-selection bias. The RCS surveys veteran reservists and non-veteran reservists and creates two homogeneous groups since all reservists must meet the minimum requirements necessary for enlistment. Their results show that the RCS most effectively controls for selection bias. However, Department of Defense privacy restrictions limit one's ability to access the RCS.[3] The inaccessibility of the RCS data leaves me with only a few options which include including using the NLSY or the Current Population Survey (CPS). While the NLSY partially controls for selection bias by the military and into the military by using AFQT scores, and has been the customary choice of literature investigating the earnings of veterans, it also includes a smaller sample of female military veterans than the CPS (Mehay and Hirsch, 1996). Hirsch and Mehay (1996) choose to compare their results from the RCS data with data from the CPS because they found statistically insignificant effects of veteran status on earnings for women from NLSY data.

Mangum and Ball (1989) use the 1979 NLSY to explore the transferability of skills developed in the military to the civilian labor force for veterans of the AVF. Their results reveal that female veterans transferred skills from the military to the civilian labor force 57.8 percent of the time. However, they also observe that military-related training could not explain a difference in wages between veterans and non-veterans. Walker (2010) provides a glimpse at earning differentials as he shows similar unemployment rates for male veterans and male non-veterans and a higher unemployment rate for female veterans than female non-veterans. Cooney et al. (2003) expand on this topic by investigating the socioeconomic outcomes of female veterans and how it may differ based on race. Their results indicate that no racial group of women veterans earns more than a similar group of non-veterans. Most notably, the African-American female veteran group earns the same as its counterpart. Overall, the literature on female veteran earnings compared to female non-veteran earnings is inconclusive.

[3] Accessing the RCS requires Department of Defense access, a process that spans several months. Thus, it is not feasible for this project. For more information, see Appendix, Section XII.

IV. Data

I use data from the August 2005, August 2007, August 2009, July 2010, August 2011, August 2012, and August 2013 versions of the CPS in order to investigate the three hypotheses. The Bureau of Labor Statistics (BLS) and the U.S. Census Bureau jointly conduct this survey and it asks large representative samples of U.S. households a wide variety of questions ranging from earnings and employment to health, education, marriage, and children (U.S. Bureau of Labor Statistics and U.S. Census Bureau, 2006). My sample has 502 female veterans, 5,255 male veterans, 48,491 female non-veterans, and 43,885 male non-veterans using data from the August 2005, August 2007, August 2009, July 2010, August 2011, August 2012, and August 2013 editions of the CPS. The number of respondents in each month from each group is provided in Figure 1.

Table 1: Sample Size by Time Period and Group

Count	August 2005	August 2007	August 2009	July 2010	August 2011	August 2012	August 2013	Total
Female Veterans	68	97	67	79	69	65	57	502
Male Veterans	974	868	823	687	681	624	596	5253
Female Non-Veterans	7290	7131	7038	6791	6765	6663	6813	48491
Male Non-Veterans	6547	6477	6195	6024	6103	6209	6330	43885
Veterans	1042	965	890	766	750	689	653	5755
Women	7358	7228	7105	6870	6834	6728	6870	48993
Men	7521	7345	7018	6711	6784	6833	6926	49138
All	14881	14573	14123	13581	13618	13561	13796	98133

I transform weekly wages by taking the natural logarithm of weekly wages. I include time dummy variables in the regression in order to capture the effects of changes in wages over time. Using the natural logarithm of weekly wages and including year dummy variables absorbs the effect of inflation on nominal wages (Wooldridge, 2013). However, using weekly wages instead of the natural logarithm of weekly wages would require real wages to be the dependent variable.

In this equation, Gender is a dummy variable where a coding of 1 indicates a male while 0 indicates a female. A proxy for work experience in each model is included. Since the CPS does not contain work experience information, two different proxies for work experience are used in separate models: age and potential experience. Age is measured in the number of years one has been living. Age^2 is calculated by squaring age. Potential experience is calculated differently for veterans and non-veterans.

For a veteran: $Potential\ Experience = Age - Length\ of\ Service - Formal\ Education - 6$ (3)

For a non-veteran: $Potential\ Experience = Age - Formal\ Education - 6$ (4)

Potential experience measures the amount of time one is expected to have spent in the civilian labor force. One would expect a person to work in the civilian labor force after their formal education ends and when they are not serving in the military. We subtract this by six to account for the time in childhood before one's formal education begins. Potential Experience^2 is the quadratic function of potential experience. Potential Experience^4 is the quartic function of potential experience. Research on the Mincer equation, using CPS data, suggests that, while the Mincer equation accurately measures wages, a quartic function should be included for potential experience along with a quadratic function. Including only the quadratic function underestimates wage growth for young workers (Lemieux, 2006). Incorporating only the quadratic function would not as accurately model the effect of work experience on earnings. It can also be argued that potential experience more accurately reflects the work experience profiles of individuals than age (Mincer, 1974).

I measure one's formal education in years of formal education. However, the data must be transformed in order to calculate the potential experience variable. The CPS measured education on a scale of 31-46 where 31 indicates that an individual completed less than 1st grade while 46 indicates that one has a doctorate degree. Based on this, the variables were recoded so they equated to the usual amount of years needed to complete the level of education indicated.

I measure length of service as in years that a veteran served in the military. It rounds to the nearest year. Race is measured as a dummy variable. 1 indicates that a person is white while 0 identifies those who are non-white. The number of children that an individual currently has under the age of 18 is also measured. Additionally, I measure labor force participation as a dummy variable. 1 indicates that a person works full-time in the civilian labor force while 0 indicates that a person currently works part-time. Marital status is also measured as a dummy variable. 1 indicates that a person is married while 0 represents those who are not married. Region is measured using a set of dummy variables. In my design, the regions, Northeast, Midwest, and West, are included. The variable, South, is eliminated from the model in order to compare the results from the three other regions with the South. I also include a set of six year dummy variables: August 2007, August 2009, July 2010, August 2011, August 2012, and August 2013. August 2005 is eliminated because it is the base year. These variables measure the effect of changes in wages based on changes in the time period.

V. Research Design

Investigating the three earnings differentials requires me to identify who is a veteran and when an individual gained veteran status. The veterans supplement to the CPS, identifies if a respondent spent time in the military. The earnings of veterans prior to and during military service are excluded. From my sample, those who did not list their length of service in the military and did not earn at least one dollar per week were excluded. Only the last period in which an individual is in the military and leaves the military is considered. One becomes a veteran after serving their last stint in the military. Thus, this thesis examines how earnings of veterans and non-veterans change over time (Teachman and Tedrow, 2007).

This thesis uses the CPS as a pooled cross-section data set. A pooled cross-section data set is a combination of a set of independent cross-section datasets into one dataset (Wooldridge, 2013). Each time period that is selected uses a different random sample of households which provide the same information. Pooling the random samples result in an independently pooled cross-section. Individuals in each monthly sample are selected independently. The months used in the analysis, August 2005, August 2007, August 2009, July 2010, August 2011, August 2012, and August 2013, all include the CPS Veterans Supplement, which, among other information, asks the length of service of a veteran in the military (U.S. Census Bureau). This thesis considers earnings over a period of time rather than at one point in time in order to eliminate potential bias from unusual characteristics. Using this procedure, a linear regression is used.

In order to measure the wage differential between female veterans and female non-veterans and between male veteran and non-veterans, I use the same research design. However, a veteran status dummy variable is included rather than a gender dummy variable. Those with military experience are coded as a 1 and those without military experience are coded as a 0. Additionally, the models exclude length of service from the equation as it would not be accurate to use a variable that only applies to a portion of the sample. A linear regression is used to analyze the effect of veteran status on the earnings of men and women.

VI. Descriptive Statistics

Overall, my study includes 502 female veterans, 5,255 male veterans, 48,491 female non-veterans, and 43,885 male non-veterans using data from the August 2005, August 2007, August 2009, July 2010, August 2011, August 2012, and August 2013 monthly editions of the CPS**.** It is a micro dataset that examines demographic information about individuals.

Table 2 summarizes the descriptive statistics of the continuous variables. All earnings information is in 2005 dollars. The average weekly earnings of female veterans were $750.37. The average weekly earnings of male veterans were $885.27. The average weekly earnings of female non-veterans were $612.37. The average weekly earnings of male non-veterans were $816.05.

Table 2: Descriptive Statistics of Continuous Variables

Variable	Mean	S. D.	Min	Max
Weekly Wages (2005 Dollars)	799.26	596.84	1.00	2884.61
Female Veterans	750.37	533.39	120.00	2884.61
Male Veterans	885.27	636.66	1.00	2884.61
Female Non-Veterans	612.37	514.39	1.00	2884.61
Male Non-Veterans	816.05	649.12	1.00	2884.61
Years of Potential Work Experience	21.34	13.55	0.00	78.00
Female Veterans	20.71	10.90	0.00	64.00
Male Veterans	28.08	12.60	0.00	68.00
Female Non-Veterans	21.78	13.90	0.00	78.00
Male Non-Veterans	20.05	13.03	0.00	75.00
Age (Years)	41.22	13.72	17.00	85.00
Female Veterans	44.90	11.05	20.00	85.00
Male Veterans	51.83	12.44	19.00	85.00
Female Non-Veterans	41.55	13.85	17.00	85.00
Male Non-Veterans	39.55	13.14	17.00	85.00
Educational Attainment (Years)	13.77	2.71	1.00	22.00
Female Veterans	14.45	2.21	10.00	22.00
Male Veterans	13.82	2.23	4.00	22.00
Female Non-Veterans	13.92	2.58	1.00	22.00
Male Non-Veterans	13.60	2.90	1.00	22.00
Number of Children Under 18	0.73	1.06	0.00	10.00
Female Veterans	0.80	1.06	0.00	4.00
Male Veterans	0.56	0.98	0.00	6.00
Female Non-Veterans	0.72	1.03	0.00	10.00
Male Non-Veterans	0.77	1.10	0.00	8.00
Years of Military Service	3.99	1.73	1.00	8.00
Male Veterans	4.00	1.72	1.00	8.00
Female Veterans	3.91	1.77	1.00	8.00

Figure 2 (next page) shows a comparison of average yearly earnings of female veterans, male veterans, female non-veterans, and male non-veterans between 2005 and 2013. The averages of each period are adjusted for inflation using the CPI Inflation Calculator established by the Bureau of Labor Statistics (BLS). Each period's earnings are presented in 2005 dollars. Then, earnings are averaged from each of the seven one month periods included in the sample.

Using earnings compiled during this time period, male veterans earned, on average, more than female veterans. Female non-veterans earned, on average, less than female veterans. The weekly wage differential between female veterans and female non-veterans was, on average and in 2005 dollars, $138.00. The weekly wage differential between female veterans and male veterans was, on average and in 2005 dollars, $134.90.

Additionally, male veterans are the group with the highest average earnings. This can be partially explained by age as male veterans have the highest average age. The sample includes individuals ranging in age from 17 to 85 years old. The average age of a male veteran is 51.83 years. The average age of a female veteran is 44.90 years. The average age of a female non-veteran is 41.55 years while the average age of a male non-veteran is 39.55 years.

On average, the female veterans in my dataset completed 14.45 years of schooling. Male veterans completed 13.82 years of schooling compared to an average completion of 13.92 years of education for female non-veterans and 13.60 for male non-veterans. Female veterans served, on average, 3.91 years in the military. During the same period, male veterans served, on average, 4.00 years in the military. The average number of children belonging to female veterans is 0.80. The average number of children belonging to male veterans is 0.56. The average number of children belonging to female non-veteran is 0.72 and 0.77 for male non-veterans.

Figure 2: Adjusted Weekly Earnings of Female Veterans, Male Veterans, and Female Non-Veterans, 2005-2013.

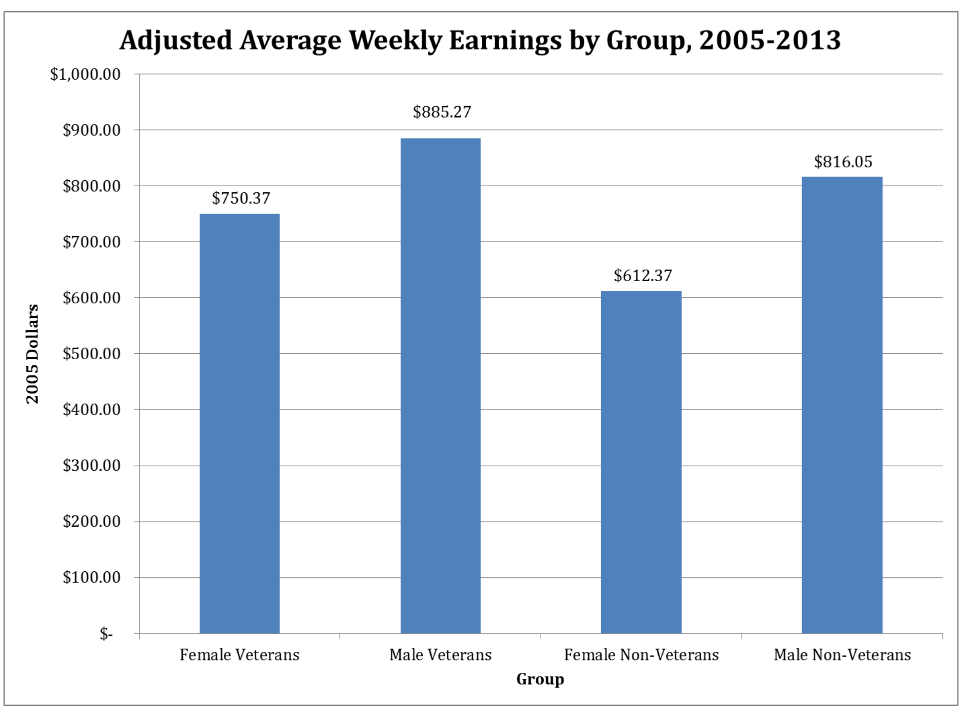


Table 3 details the descriptive statistics for the binary variables used in the analysis. It shows demographic information about individuals and the proportion of people in the sample who this represents.

Table 3: Descriptive Statistics of Binary Variables

Variable	1	0	Percent '1'	Percent '0'
Race (1=White)	81493	16638	83.05	16.95
Female Veterans	408	94	81.27	18.73
Male Veterans	4578	675	87.15	12.85
Female Non-Veterans	39639	8852	81.75	18.25
Male Non-Veterans	36868	7017	84.01	15.99
Marital Status (1 = Married)	54935	43196	55.98	44.02
Female Veterans	275	227	54.78	45.22
Male Veterans	3857	1396	73.42	26.58
Female Non-Veterans	25740	22751	53.08	46.92
Male Non-Veterans	25063	18822	57.11	42.89
Labor Force Status (1 = Full-Time)	81331	16800	82.88	17.12
Female Veterans	427	75	85.06	14.94
Male Veterans	4646	607	88.44	11.56
Female Non-Veterans	37067	11424	76.44	23.56
Male Non-Veterans	39191	4694	89.30	10.70
Northeast (1=Northeast)	20683	77448	21.08	78.92
Female Veterans	88	414	17.53	82.47
Male Veterans	1005	4248	19.13	80.87
Female Non-Veterans	10405	38086	21.46	78.54
Male Non-Veterans	9185	34700	20.93	79.07
Midwest (1 = Midwest)	24216	73915	24.68	75.32
Female Veterans	124	378	24.70	75.30
Male Veterans	1267	3986	24.12	75.88
Female Non-Veterans	12069	36422	24.89	75.11
Male Non-Veterans	10762	33123	24.52	75.48
West (1 = West)	23475	74656	23.92	76.08
Female Veterans	120	382	23.90	76.10
Male Veterans	1341	3912	25.53	74.47
Female Non-Veterans	11252	37239	23.20	76.80
Male Non-Veterans	10756	33129	24.51	75.49
South (1 = South)	29757	68374	30.32	69.68
Female Veterans	170	332	33.86	66.14
Male Veterans	1640	3613	31.22	68.78
Female Non-Veterans	14765	33726	30.45	69.55
Male Non-Veterans	13182	30703	30.04	69.96

Veterans are more likely to be married than non-veterans. Approximately 54.78 percent of female veterans are married while 45.22 percent are not married. Approximately 73.42 percent of male veterans are married while 26.58 percent are not married. Approximately 53.08 percent of female non-veterans are married while 57.11 percent of male non-veterans are not married.

The veteran population is also less racially diverse than the non-veteran population. 86.4 percent of veterans are white while 81.74 percent of non-veterans are white. It is more likely for a woman in each sample to be non-white. 81.27 percent of female veterans are white while 87.5 percent of male veterans are white. Additionally, 81.75 percent of female non-veterans are white while 84.01 percent of male non-veterans are white.

The three region dummy variables identify the effect of the region in which the respondent resides. 31.45 percent of veterans lived in the southern region while 18.99 percent of veterans lived in the western United States. 31.22 percent of male veterans lived in the southern region while 19.13 percent lived in the western region of the United States. 33.86 percent of female veterans lived in the southern region while 17.53 percent lived in the western United States. 30.45 percent of female non-veterans lived in the southern region while 21.46 percent lived in the western United States. 30.04 percent of male non-veterans lived in the southern region while 20.93 percent lived in the western United States. 25.39 percent of veterans lived in the Northeast region while 24.17 percent of veterans lived in the Midwest. 25.53 percent of male veterans lived in the Northeast region while 24.12 percent lived in the Midwest region of the United States. 23.90 percent of female veterans lived in the Northeast region while 24.70 percent lived in the Midwest region of the United States. 23.20 percent of female non-veterans lived in the Northeast while 24.89 percent lived in the Midwest. 24.52 percent of male non-veterans lived in the Northeast region while 24.51 percent lived in the Midwest region of the United States. South is the omitted region in this analysis.

Approximately 85.06 percent of female veterans worked full-time while 14.94 percent worked part-time. 88.41 percent of male veterans worked full-time while 11.59 percent worked part-time. Approximately 76.44 percent of female non-veterans worked full-time while 23.56 percent worked part-time. 89.30 percent of male non-veterans worked full-time while 10.70 percent worked part-time.

VII. Results

This section discusses the results of the regression models. Table 5 shows the effect of gender on the earnings of veterans. Table 6 displays the effect of veteran status on the civilian earnings of women while Table 7 presents the effect of veteran status on the civilian earnings of men. In Tables 5, 6, and 7, there are four different model specifications. Model 1 includes potential experience while Model 2 adds the quadratic and quartic terms of potential experience. Model 3 replaces potential experience with age and Model 4 is identical to Model 3 but also includes the squared term of age. Models 3 and 4 have a larger sample than Models 1 and 2 because more individuals in the sample included age than included all of the components necessary to calculate potential experience. Additionally, each regression uses robust standard errors. Using heteroskedasticity-robust standard errors rather than normal standard errors does not change the statistical significance or the sign of any coefficient in any of the models.

Table 5 presents the results of the linear regression for the sample of male veterans and female veterans. There are four regression models and all four models show that, holding all other factors constant, male veterans earned more than female veterans. Four models are presented to show that the effect of gender on veteran earnings, on average. The results remain similar in alternative equations.

A statistically significant effect of gender on the civilian earnings of veterans is present in all four models. In Model 1, male veterans earn 17.9 percent more per week than female veterans. Additionally, other factors play a role in explaining the earnings of veterans. A one year increase in educational attainment for veterans indicates an 8.8 percent increase in weekly earnings. A one year increase in length of military service of veterans indicates a 2.5 percent increase in weekly earnings. Results also show a wage premium enjoyed by white veterans. White veterans earned 7.8 percent more per week than non-white veterans. There is also a wage premium for veterans deriving from marriage. Married veterans earned 9.2 percent more per week than unmarried veterans. Having more children under the age of 18 also has a positive effect on earnings. The presence of an additional child in a veteran's household under the age of 18 indicates a 3.7 percent increase in weekly earnings. The region in which a person resides also affects the weekly earnings of veterans. Compared to veterans who live in the South, veterans who live in the Northeast earn 2.1 percent more per week, veterans who live in the Midwest earn 2.8 percent less per week, and veterans who live in the West earn 7.9 percent more per week. A one year increase in potential experience for veterans indicates a 0.03 percent decrease in weekly earnings. Additionally, labor force status plays an important role in understanding wages in the civilian labor force. Veterans who work full-time in the labor force earned 230.4 percent more per week than veterans who work part-time.

In Model 2 of Table 5, holding all other factors fixed, male veterans earn 18.6 percent more per week than female veterans. Holding all other factors fixed, a one year increase in educational attainment for veterans indicates an 8.4 percent increase in weekly earnings. A one year increase in length of military service of veterans indicates a 2.0 percent increase in weekly earnings, holding all other factors fixed. White veterans earn 8.8 percent more per week than non-white veterans. Married veterans earn 8.2 percent more per week than unmarried veterans. Having more children under the age of 18 also has a positive effect on earnings. The presence of an additional child in a veteran's household under the age of 18 indicates a 3.3 percent increase in weekly earnings. Compared to veterans who live in the South, veterans who live in the Northeast earn 1.9 percent more per week, veterans who live in the Midwest earn 3.2 percent less per week, and veterans who live in the West earn 7.1 percent more per week, holding all other factors fixed. Finally, the proxy variables for work experience indicate different effects of work experience one earnings of veterans. A one year increase in potential experience for veterans indicates a 1.9 percent increase in weekly earnings. Veterans who work full-time in the labor force earned 205.6 percent more per week than veterans who work part-time.

In Model 3 of Table 5, holding all other factors fixed, male veterans earn 18.1 percent per week more than female veterans. Additionally, other factors play a role in explaining the earnings of veterans. A one year increase in educational attainment for veterans indicates an 8.8 percent increase in weekly earnings. A one year increase in length of military service of veterans indicates a 2.5 percent increase in weekly earnings. White veterans earn 7.8 percent more per week than non-white veterans. Married veterans earn 9.1 percent more per week than unmarried veterans. Having more children under the age of 18 also has a positive effect on earnings. The presence of an additional child in a veteran's household under the age of 18 indicates a 3.8 percent increase in weekly earnings. Compared to veterans who reside in the South, veterans who live in the Northeast earn 2.1 percent more per week, veterans who live in the Midwest earn 2.6 percent less per week, and veterans who live in the West earn 8.0 percent more per week, holding all other factors fixed. A one year increase in age for veterans indicates a 0.01 percent decrease in weekly earnings. Veterans who work full-time in the labor force earned 230.4 percent more per week than veterans who work part-time.

Finally, in Model 4 of Table 5, male veterans earn 20.0 percent per week more than female veterans. Additionally, other factors play a role in explaining the earnings of veterans. A one year increase in educational attainment for veterans indicates an 8.8 percent increase in weekly earnings. A one year increase in length of military service of veterans indicates a 1.5 percent increase in weekly earnings, holding all other factors fixed. White veterans earn 9.6 percent more per week than non-white veterans. Married veterans earn 7.8 percent more per week than unmarried veterans. Having more children under the age of 18 also has a positive effect on earnings. The presence of an additional child in a veteran's household under the age of 18 indicates a 3.5 percent increase in weekly earnings. The region in which a person resides also affects the weekly earnings of veterans. Compared to veterans who live in the South, veterans who live in the Northeast earn 1.7 percent more per week, veterans who live in the Midwest earn 3.3 percent less per week, and veterans who live in the West earn 7.4 percent more per week. A one year increase in age for veterans indicates a 4.4 percent increase in weekly earnings. Veterans who work full-time in the labor force earned 199.5 percent more per week than veterans who work part-time.

Comparing Models 3 and 4 shows that the addition of the age squared term increases the estimate of the male veteran premium. The comparison of Models 1 and 3 with Models 2 and 4 shows that including the quadratic functions increases the estimate of the effect of veteran status on earnings. All independent variables in Models 2 and 4 are statistically significant at the one percent level except for the Northeast and Midwest region dummy variables as well as the month dummy variable, August 2007. Statistical significance in Models 1 and 3 are the same as Model 4 except that potential experience in Model 1 and age in Model 3 are not statistically significant. Evidence suggests that female veterans earn less than male veterans as results show a negative log wage differential for female veterans compared to female non-veterans in all four models. The results of all four models in Table 5 confirm that female veterans earn less than male veterans, *ceteris paribus*. This result confirms my first hypothesis.

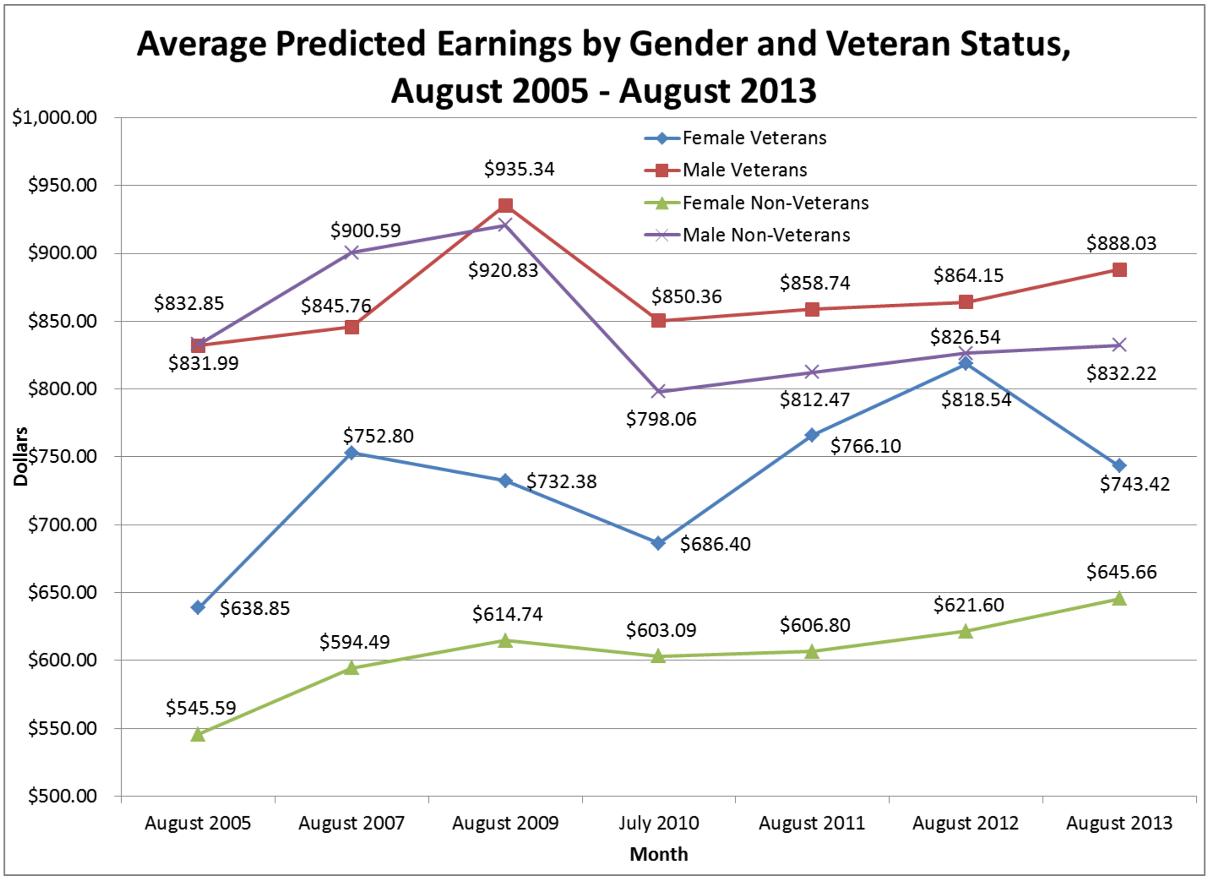
Table 6 presents the results of the linear regression for the sample of female veterans and non-veterans. All four models in Table 6 show that, holding all other factors constant, female veterans earned more than female non-veterans. Similar to Table 5, Table 6 includes four models to show that the effect of veteran status on female earnings remain similar in alternative equations. A statistically significant effect of veteran status on the civilian earnings of women exists in all four models. Across all four models, holding all other factors fixed, female veterans tend to earn more than female non-veterans. Additionally, other factors play a role in explaining the earnings of women. A one year increase in educational attainment for women indicates a statistically significant increase in weekly earnings of approximately ten percent. Results also show the wage premium enjoyed by white women. There is a statistically significant positive relationship between the natural logarithm of wages and race. There is also a wage premium for women deriving from marriage as there is a statistically significant positive relationship between weekly wages and marital status in all four models. Model 2 in Table 6 suggests that the presence of an additional child in a woman's household under the age of 18 indicates a 1.2 percent decrease in weekly earnings. Theoretically, this is the expected result, especially for a sample of women. In Model 4, the presence of an additional child in a woman's household under the age of 18 indicates a 0.3 percent decrease in weekly earnings. This result is not statistically significant. The results of all four models in Table 6 indicate that female veterans earn more than female non-veterans, *ceteris paribus*.

Table 7 presents the results of the linear regression for the sample of male veterans and non-veterans. Three out of the four models suggest that, holding all other factors constant, male veterans earned more than male non-veterans. However, it is difficult to conclude the true effect of veteran status on the civilian earnings of men from this sample as they are not statistically significant across the different specifications of the model.

However, I find a statistically significant negative relationship between the veteran status of men and their weekly earnings in Model 3. Additionally, a one year increase in educational attainment for men indicates a statistically significant positive increase in weekly earnings. Results also show that white men earn ten percent more per week than non-white men according to Models 1, 2, and 4. There is also a wage premium for men deriving from marriage in these models. Surprisingly, having more children has a positive effect on earnings. Residing in the West and Northeast has a significant positive effect on their earnings as the results are statistically significant at the one percent level. Finally, according to Model 2, a one year increase in potential experience for men indicates a 4.0 percent increase in weekly earnings, and a one year increase in the age of men indicates a 6.0 percent increase in weekly earnings, according to Model 4.

Figure 3 (next page) is a graphical representation of the wage differentials between the four groups. It displays the average predicted earnings for each month in the sample for each of the four groups. Since these are an average of the predicted earnings for each group, it accounts for the factors in the linear regression that may influence earnings. It supports the findings that one cannot conclude on whether or not a wage differential exists between male veterans and male non-veterans. While male veterans earned, on average, more than male non-veterans, this is not the case with regards to average predicted earnings. In August 2005 and August 2007, male non-veterans had higher average predicted earnings than male veterans. Figure 3 also confirms the first and second hypothesis. Female veterans suffered a wage disadvantage compared to male veterans in terms of predicted earnings in all periods. Additionally, the wage premium for female veterans over female non-veterans also holds in average predicted earnings in all seven periods.

Figure 3: Average Predicted Earnings by Gender and Veteran Status, 2005 – 2013



Given the richness of the dataset, it also became possible to explore some of the interaction effects. They are shown in Tables 8, 9, and 10. Table 8 includes an interaction term between education and gender. The results suggest that the gender wage differential among veterans narrows at higher levels of education. A one year increase in education decreases the additional earnings benefit of being a male veteran by 1.0 percent. Model 2 in the same table shows the effect of race and gender on the earnings differential among veterans. The results indicate that a white male veteran earned 38.9 percent more between 2015 and 2013. These results, however, are not statistically significant.

Table 9 displays the joint effect of education and veteran status on the earnings of women. The veteran wage premium among women becomes smaller as education increases. Given that a woman is a veteran, an additional year of education decreases the veteran wage premium by 1.4 percent. For women, there is an additional benefit of being a white female veteran beyond the already existing benefit of being a white women and the benefit of being a female veteran. White female veterans enjoyed a 15.8 percent wage premium between 2005 and 2013.

Similarly, Table 10 presents the interaction effect of education and race with respect to the veteran status of men. The veteran wage premium present among men shrinks as education increases. The results indicate that a one year increase in education decreases the additional benefit of being a male veteran by rather than a male non-veteran by 1.4 percent. Additionally, the benefit of being white male veteran is less than the combined benefit of being both a male veteran and a white male. White male veterans earned 13.8 percent more between 2005 and 2013, less than the sum of the 7.9 percent male veteran wage premium and the 13.8 percent white male wage premium.

Finally, in order to fully understand the labor market in which veterans enter into, it is important to understand the wage differential that exists between female non-veterans and male non-veterans. Thus, Table 11 shows that male non-veterans earn 25.6 percent per week more than female non-veterans. A gender wage differential is present for the non-veteran population. Thus, gender plays an important role in understanding wages, irrespective of veteran status. Additionally, between 2005 and 2013, there is a greater wage differential between male non-veterans and female non-veterans than between male veterans and female veterans.

I also run a Chow Test for each model in Tables 5, 6, and 7 to test for structural change in the model across time. The Chow Test tests whether the coefficients estimated over one period of the data are equal to the coefficients estimated over another period. Including time dummy variables eliminates potential bias that could exist because the population may be distributed differently in each year. The Chow Test examines whether there are changes across the data due to the corresponding month used.

Table 4: Chow Test for Structural Change across Time

	Male and Female Veterans				Female Veterans and Non-Veterans				Male Veterans and Non-Veterans			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
F-Statistic	5.21	5.92	5.19	6.26	41.40	53.46	41.12	53.49	23.05	29.53	23.07	29.33
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

In a Chow Test, the null hypothesis is that the coefficients of all time dummy variables are equal to one another. As Table 4 shows, in all twelve models, the null hypothesis is rejected at the one percent level. This indicates that structural change does not exist in the model over time. This further affirms the decision to pool the seven one month samples into one larger sample.

Table 5

Regression Results on the Log Income Differential between Male Veterans and Female Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
Gender (1 = Male)	0.165***	0.171***	0.166***	0.182***
	(0.0305)	(0.0305)	(0.0305)	(0.0301)
Education	0.088***	0.084***	0.088***	0.088***
(Years)	(0.0047)	(0.0047)	(0.0046)	(0.0045)
Potential Experience	-0.0003	0.024***		
(Years)	(0.0010)	(0.0054)		
Potential Experience^2		-0.00048***		
(Years)		(0.0002)		
Potential Experience^4		-0.00000007***		
(Years)		(0.00000003)		
Age (Years)			-0.0001	0.056***
			(0.0010)	(0.0001)
Age^2 (Years)				-0.006***
				(0.0001)
Length of Service (Years)	0.025***	0.016***	0.025***	0.015***
	(0.0051)	(0.0053)	(0.0051)	(0.0051)
Race (1 = White)	0.075***	0.088***	0.075***	0.092***
	(0.0243)	(0.0241)	(0.0242)	(0.0240)
Number of Children under 18	0.036***	0.038***	0.037***	0.034***
	(0.0095)	(0.0096)	(0.0094)	(0.0093)
Labor Force Participation	1.195***	1.117***	1.195***	1.097***
(1=Full-time, 0=Part-Time)	(0.0389)	(0.0393)	(0.0387)	(0.0391)
Marital Status (1 = Married)	0.088***	0.081***	0.087***	0.075***
	(0.0263)	(0.0259)	(0.0262)	(0.0257)
Northeast	0.021	0.019	0.021	0.017
	(0.0273)	(0.0273)	(0.0273)	(0.0271)
Midwest	-0.028	-0.032	-0.026	-0.033
	(0.0233)	(0.0231)	(0.0232)	(0.0230)
West	0.076***	0.071***	0.077***	0.071***
	(0.0227)	(0.0224)	(0.0227)	(0.0223)
August 2007	0.027	0.026	0.026	0.028

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 5 (continued)

Regression Results on the Log Income Differential between Male Veterans and Female Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
	(0.0285)	(0.0283)	(0.0285)	(0.0282)
August 2009	0.133***	0.131***	0.133***	0.134***
	(0.0304)	(0.0299)	(0.0304)	(0.0299)
July 2010	0.082***	0.084***	0.080***	0.086***
	(0.0306)	(0.0303)	(0.0306)	(0.0302)
August 2011	0.096***	0.104***	0.094***	0.105***
	(0.0333)	(0.0329)	(0.0332)	(0.0328)
August 2012	0.106***	0.125***	0.106***	0.131***
	(0.0324)	(0.0320)	(0.0323)	(0.0318)
August 2013	0.128***	0.137***	0.128***	0.139***
	(0.0354)	(0.0350)	(0.0353)	(0.0349)
Constant	3.889***	3.775***	3.881***	2.680***
	(0.0915)	(0.0966)	(0.0933)	(0.1569)
Adjusted R^2	0.3506	0.3625	0.3514	0.3677
N	5,033	5,033	5,046	5,046

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 6

Regression Results on the Income Differential between Female Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
Veteran Status (1 = Yes)	0.102***	0.076***	0.076***	0.057*
	(0.0290)	(0.0289)	(0.0288)	(0.0285)
Education	0.113***	0.109***	0.106***	0.103***
(Years)	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Potential Experience	0.006***	0.038***		
(Years)	(0.0002)	(0.0014)		
Potential Experience^2		-0.001***		
(Years)		(0.00005)		
Potential Experience^4		-0.00000007***		
(Years)		(0.000000009)		
Age (Years)			0.006***	0.052***
			(0.0002)	(0.0015)
Age^2 (Years)				-0.001***
				(0.00001)
Race (1= White)	0.039***	0.043***	0.039***	0.045***
	(0.0074)	(0.0073)	(0.0074)	(0.0073)
Number of Children under 18	0.023***	-0.012***	0.024***	-0.003
	(0.0030)	(0.0033)	(0.0030)	(0.0031)
Labor Force Participation	0.930***	0.887***	0.931***	0.878***
(1=Full-Time, 0=Part-Time)	(0.0084)	(0.0084)	(0.0084)	(0.0084)
Marital Status (1 = Married)	0.093***	0.065***	0.094***	0.055***
	(0.0064)	(0.0064)	(0.0064)	(0.0063)
Northeast	0.067***	0.067***	0.067***	0.065***
	(0.0082)	(0.0081)	(0.0082)	(0.0081)
Midwest	-0.013	-0.007	-0.012	-0.007
	(0.0077)	(0.0076)	(0.0077)	(0.0076)
West	0.066***	0.065***	0.065***	0.065***
	(0.0079)	(0.0079)	(0.0079)	(0.0078)
August 2007	0.061***	0.069***	0.062***	0.069***
	(0.0120)	(0.0119)	(0.0120)	(0.0119)

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 6 (continued)

Regression Results on the Income Differential between Female Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
August 2009	0.104***	0.110***	0.105***	0.110***
	(0.0122)	(0.0121)	(0.0122)	(0.0121)
July 2010	0.114***	0.132***	0.114***	0.132***
	(0.0113)	(0.0112)	(0.0113)	(0.0111)
August 2011	0.115***	0.132***	0.116***	0.132***
	(0.0115)	(0.0114)	(0.0115)	(0.0113)
August 2012	0.131***	0.151***	0.132***	0.151***
	(0.0115)	(0.0114)	(0.0115)	(0.0113)
August 2013	0.161***	0.180***	0.161***	0.179***
	(0.0112)	(0.0111)	(0.0111)	(0.0110)
Constant	3.626***	3.518***	3.582***	2.802***
	(0.0221)	(0.0220)	(0.0226)	(0.0325)
Adjusted R^2	0.4416	0.4540	0.4437	0.4583
N	41,654	41,654	41,840	41,840

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 7

Regression Results on the Log Income Differential between Male Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
Veteran Status (1 = yes)	0.001	0.005	-0.031***	0.006
	(0.0098)	(0.0097)	(0.0100)	(0.098)
Education	0.102***	0.099***	0.094***	0.092***
(Years)	(0.0022)	(0.0011)	(0.0011)	(0.0010)
Potential Experience (Years)	0.008***	0.041***		
	(0.0003)	(0.0013)		
Potential Experience^2 (Years)		-0.001***		
		(0.00001)		
Potential Experience^4 (Years)		-0.0000000008***		
		(0.0000000001)		
Age (Years)			0.008***	0.060***
			(0.0003)	(0.0017)
Age^2 (Years)				-0.001***
				(0.00002)
Race (1= White)	0.116***	0.122***	0.008***	0.127***
	(0.0081)	(0.0080)	(0.0081)	(0.0080)
Number of Children under 18	0.048***	0.018***	0.049***	0.020***
	(0.0027)	(0.0029)	(0.0027)	(0.0029)
Labor Force Participation	1.097***	1.0006***	1.097***	0.981***
(1 = Full-Time, 0 = Part-Time)	(0.0130)	(0.0132)	(0.0129)	(0.0130)
Marital Status (1 = Married)	0.132***	0.115***	0.131***	0.105***
	(0.0078)	(0.0077)	(0.0078)	(0.0077)
Northeast	0.045***	0.047***	0.045***	0.044***
	(0.0082)	(0.0081)	(0.0082)	(0.0080)
Midwest	-0.018**	-0.015**	-0.018**	-0.017**
	(0.0076)	(0.0075)	(0.0076)	(0.0075)
West	0.066***	0.067***	0.066***	0.066***
	(0.007)	(0.0077)	(0.0078)	(0.0077)
August 2007	0.062***	0.063***	0.062***	0.064***
	(0.0112)	(0.0110)	(0.0112)	(0.0110)
August 2009	0.102***	0.106***	0.102***	0.105***

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 7 (continued)

Regression Results on the Log Income Differential between Male Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2	Model 3	Model 4
	(0.0117)	(0.0115)	(0.01216	(0.0114)
July 2010	0.083***	0.090***	0.082***	0.089***
	(0.0109)	(0.0107)	(0.0110)	(0.0107)
August 2011	0.100***	0.110***	0.099***	0.108***
	(0.0108)	(0.0106)	(0.0108)	(0.0106)
August 2012	0.102***	0.115***	0.102***	0.115***
	(0.0110)	(0.0108)	(0.0110)	(0.0108)
August 2013	0.110***	0.123***	0.110***	0.123***
	(0.0110)	(0.0108)	(0.0110)	(0.0108)
Constant	3.744***	3.633***	3.692***	2.808***
	(0.0215)	(0.0216)	(0.0218)	(0.0345)
Adjusted R^2	0.4222	0.4385	0.4256	0.4453
N	40,802	40,802	40,934	40,934

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 8

Regression Results on the Log Income Differential between Male and Female Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2
Gender (1 = Yes)	0.318*	0.255***
	(0.1875)	(0.0787)
Education	0.093***	0.084***
(Years)	(0.0121)	(0.0047)
Education*Gender	-0.010	
	(0.0130)	
Race*Gender		-0.104
		(0.0854)
Potential Experience (Years)	0.024***	0.024***
	(0.0054)	(0.0054)
Potential Experience^2	-0.0004***	-0.0004***
(Years)	(0.0001)	(0.0002)
Potential Experience^4	-0.000000008	-0.000000008
(Years)	(0.00000003)	(0.00000003)
Length of Service (Years)	0.016***	0.016***
	(0.0052)	(0.0052)
Race (1= White)	0.087***	0.180**
	(0.0242)	(0.0824)
Number of Children under 18	0.039***	0.039***
	(0.0096)	(0.0096)
Labor Force Participation	1.116***	1.118***
(1 = Full-Time, 0 = Part-Time)	(0.0393)	(0.0394)
Marital Status (1 = Married)	0.081***	0.081***
	(0.0256)	(0.0259)
Northeast	0.018	0.018
	(0.0272)	(0.0273)
Midwest	-0.032	-0.033
	(0.0231)	(0.0231)
West	0.071***	0.070***
	(0.0224)	(0.0224)
August 2007	0.027	0.027
	(0.0283)	(0.0283)
August 2009	0.130***	0.131***
	(0.0299)	(0.0299)
July 2010	0.084***	0.084***
	(0.0303)	(0.0302)

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 8 (continued)

Regression Results on the Log Income Differential between Male and Female Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2
August 2011	0.104***	0.103***
	(0.0329)	(0.0329)
August 2012	0.124***	0.125***
	(0.0320)	(0.0320)
August 2013	0.136***	0.137***
	(0.0350)	(0.0350)
Constant	3.641***	3.700***
	(0.1831)	(0.1205)
Adjusted R^2	0.3649	0.3651
N	5,033	5,033

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 9

Regression Results on the Income Differential between Female Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	**Model 1**	**Model 2**
Veteran Status (1 = Yes)	0.303*	0.045
	(0.1795)	(0.0762)
Education	0.113***	0.113***
(Years)	(0.0012)	(0.0012)
Education*Veteran	-0.014	
	(0.0124)	
Race*Veteran		0.071
		(0.0822)
Potential Experience (Years)	0.006***	0.006***
	(0.0002)	(0.0002)
Race (1= White)	0.039***	0.038***
	(0.0073)	(0.0074)
Number of Children under 18	0.023***	0.023***
	(0.0030)	(0.0030)
Labor Force Participation	0.930***	0.930***
(1 = Full-Time, 0 = Part-Time)	(0.0084)	(0.0084)
Marital Status (1 = Married)	0.093***	0.093***
	(0.0064)	(0.0064)
Northeast	0.067***	0.067***
	(0.0082)	(0.0082)
Midwest	-0.013	-0.126
	(0.0077)	(0.0077)
West	0.066***	0.066***
	(0.0079)	(0.0079)
August 2007	0.061***	0.061***
	(0.0120)	(0.0120)
August 2009	0.104***	0.104***
	(0.0122)	(0.0122)
July 2010	0.114***	0.114***
	(0.0113)	(0.0113)
August 2011	0.115***	0.115***
	(0.0115)	(0.0112)
August 2012	0.131***	0.131***
	(0.0115)	(0.0115)
August 2013	0.161***	0.161***
	(0.0112)	(0.0112)

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 9 (continued)

Regression Results on the Income Differential between Female Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2
Constant	3.625***	3.627***
	(0.0222)	(0.0221)
Adjusted R^2	0.4418	0.4418
N	41,654	41,654

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 10

Regression Results on the Income Differential between Male Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2
Veteran Status (1 = Yes)	0.184***	0.076***
	(0.0677)	(0.0238)
Education	0.100***	0.099***
(Years)	(0.0011)	(0.0011)
Education*Veteran	-0.013***	
	(0.0050)	
Race*Veteran		-0.082
		(0.0259)
Potential Experience (Years)	0.041***	0.041***
	(0.0013)	(0.0013)
Potential Experience^2	-0.001***	-0.001***
(Years)	(0.00003)	(0.00003)
Potential Experience^4	0.0000000008***	0.0000000008***
(Years)	(0.0000000001)	(0.0000000001)
Race (1= White)	0.122***	0.129***
	(0.0080)	(0.0084)
Number of Children under 18	0.018***	0.018***
	(0.0029)	(0.0029)
Labor Force Participation	1.005***	1.006***
(1 = Full-Time, 0 = Part-Time)	(0.0132)	(0.0132)
Marital Status (1 = Married)	0.115***	0.115***
	(0.0077)	(0.0077)
Northeast	0.046***	0.047***
	(0.0081)	(0.0081)
Midwest	-0.016**	-0.015**
	(0.0075)	(0.0075)
West	0.067***	0.067***
	(0.0077)	(0.0077)
August 2007	0.063***	0.063***
	(0.0110)	(0.0110)
August 2009	0.106***	0.106***
	(0.0115)	(0.0115)
July 2010	0.090***	0.090***
	(0.0107)	(0.0107)
August 2011	0.110***	0.110***
	(0.0107)	(0.0106)

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 10 (continued)

Regression Results on the Income Differential between Male Veterans and Non-Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	Model 1	Model 2
August 2012	0.115***	0.115***
	(0.0108)	(0.0108)
August 2013	0.123***	0.123***
	(0.0108)	(0.0108)
Constant	3.622***	3.626***
	(0.0217)	(0.0217)
Adjusted R^2	0.4389	0.4389
N	40,802	40,802

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

Table 11

Regression Results on the Log Income Differential between Male and Female Non- Veterans

Dependent Variable: Natural Logarithm of Weekly Earnings

Independent Variable	
Gender (1 = Male)	0.228***
	(0.0042)
Education	0.108***
(Years)	(0.0008)
Potential Experience (Years)	0.007***
	(0.0002)
Race (1= White)	0.080***
	(0.0056)
Number of Children under 18	0.039***
	(0.0021)
Labor Force Participation	0.974***
(1 = Full-Time, 0 = Part-Time)	(0.0072)
Marital Status (1 = Married)	0.115***
	(0.0050)
Northeast	0.060***
	(0.0059)
Midwest	-0.146***
	(0.0056)
West	0.065***
	(0.0057)
August 2007	0.064***
	(0.0086)
August 2009	0.099***
	(0.0088)
July 2010	0.098***
	(0.0081)
August 2011	0.107***
	(0.0081)
August 2012	0.116***
	(0.0082)
August 2013	0.135***
	(0.0081)
Constant	3.581***
	(0.0155)
Adjusted R^2	0.4629
N	77,423

Robust standard error in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01

VIII. Discussion

The results of the model describing differences in wages between female and male veterans suggest the prevalence of a gender pay gap. The existence of a gender wage gap among veterans can be attributed to the overarching problem of discrimination towards women in the civilian labor force. Many of the problems plaguing women in the civilian labor force are felt by veterans as well even though they are a group with unique professional experiences and backgrounds. The military is a prime example of the successful integration of women (Quester and Gilroy, 2002). The military has shown the ability to satisfactorily integrate minorities and women into its ranks. Women achieve promotions at the same rate as men in terms of its population within the armed services (Quester and Gilroy, 2002). However, female veterans have not seen similar equality after leaving the military. These results here illustrate the superiority of the male experience in the civilian labor force. An integrated labor force should indicate equal opportunities for all persons in the military. While this is not the case because of the soon to be lifted military occupation specialty restrictions, women are still holding traditionally male jobs in the military. Thus, many of the equal opportunities present in the military do not translate into similar levels of success in the civilian labor force. It is difficult to compare these results with other research in the literature as no other paper estimates the wage differential of military veterans by gender.

Additionally, my results suggest a veteran wage premium for female veterans. It is clear that female veterans are more successful, in terms of wages, in the civilian labor force than female non-veterans. These results suggest that military service serves as a positive screening device for employers by distinguishing female military veterans from similar job applicants. Skills obtained in the military *may* also provide a bridge to successful employment in the civilian labor force. Military training *may* be a better investment in preparing for working in the civilian labor force than other opportunities. For example, women may be more likely to be exposed to higher-paying traditionally male jobs in the military. The military is seen as an institution that demands more from its employees than civilian labor force employers. These results show that the sacrifice that is made may payoff in terms of greater earnings after leaving the military. Government programs such as VetSuccess assist veterans in finding employment in the civilian labor force (Routon, 2013). It appears that these institutions are relatively successful in creating opportunities for veterans to succeed. However, the effect of these institutions on veteran earnings is not tested in thesis. The presence of a veteran wage premium is consistent with the results of past studies that separated veterans by gender (Mehay and Hirsch, 1996; Prokos and Padavic, 2000; Cooney, Segal, Segal, and Falk, 2003).

Unlike the results pertaining to women, the differences in wages between male veterans and non-veterans is largely inconclusive. While Model 3 in Table 7 presents a statistically significant coefficient that suggests that male veterans earn less than non-veterans, Models 1,2, and 4 contain statistically insignificant positive results. It is therefore difficult for me to determine the true effect of veteran status on the earnings of men.

These results also present an interesting discussion on the effects of the Great Recession on earnings by gender and within the veteran population. The Great Recession began in December 2007 and ended in June 2009, marking the longest recession since World War II (National Bureau of Economic Research, 2010). Even though the economy exited the recession in June 2009, the economy still continued to suffer after this date. The earnings used in this analysis reflect the state of the economy as shown by the time dummy variables. Compared to August 2005 earnings, women's earnings suffered less than men's earnings. For example, holding all other factors fixed, men earned 6.4 percent more per week in August 2007, 10.7 percent more per week in August 2009, 8.7 percent more per week in July 2010, and 10.0 percent more per week in August 2011 compared to August 2005. Men earned less in July 2010 than they did in August 2009, compared to August 2005 earnings. In contrast, women earned more in July 2010 than August 2009, compared to August 2005 earnings. Holding all other factors fixed, women earned 6.3 percent more per week in August 2007, 11.0 percent more per week in August 2009, 12.1 percent more per week in July 2010, and 12.2 percent more per week in August 2011. Earnings continued to increase in July 2010. A lack of overall data could contribute to this as only one month in 2009 and 2010 is accessible due to the limited availability of the veteran supplement[4]. Using one month per year may not reflect an accurate picture. Ideally, data from all months of 2009 and 2010 would be included to draw a conclusion. Regardless, much of the decrease in men's earnings can be attributed to male veterans. Male veterans earned, on average, $980.24 per week in July 2010 compared to $1025.48 in August 2009. During this period, the entire veteran population saw a decrease in earnings compared to August 2005. Holding all other factors fixed, veterans earned 2.7 percent more per week in August 2007, 13.3 percent more per week in August 2009, 8.5 percent more per week in July 2010, 10.1 percent more per week in August 2011, 11.2 percent more in August 2012, and 13.7 percent more in August 2013. By August 2013, veteran earnings are still lower than veteran earnings in August 2009. This indicates that veterans experienced greater hardship from the recession than other groups of people. It took longer for their earnings to recover.

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[4] See Section X Limitations and Concerns on page 30

IX. Conclusion

Women's experience after serving in the military has been historically limited. Earnings may differ because the opportunity to serve in the armed forces offers a different investment in human capital. Similarly, women's and men's experiences in the armed forces differ in terms of transferring their human capital investment from military service into success in the civilian labor force. While this is soon to change in 2016, when women will have full access to all military occupations, it is prudent to analyze the wage differential of veterans prior to the implementation of this policy. This thesis analyzes whether the decision to enter the military offers a different investment in human capital as measured in earnings in the civilian labor force. A set of control variables minimize the likelihood of bias within the results. Using seven one month samples from the Current Population Survey, it appears that, between 2005 and 2013, a veteran wage premium exists for both men and women. Considering men and women separately recognizes the differences of their experiences. This is the most recent study that separates by gender and allows for a more recent estimation of the effect of military service on earnings by gender. These results suggest that military service acts as a screening device or a bridge to employment in the civilian labor force. Additionally, female veterans earn less than male veterans in the civilian labor force. No other paper estimates the effect of gender on the earnings of military veterans. Even though female veterans are more successful in the civilian labor force than women with no military experience, they still suffer from a gender wage gap.

X. Limitations and Concerns

One limitation of the study is its inability to completely control for selection bias. This bias arises from the fact that those who choose military service are not randomly selected and that military recruiters seek out individuals who are suited for military service. They most likely exhibit unmeasured qualities that differ from the rest of the population. One dataset that is ideal for dealing with this type of bias is the *RCS.* Ideally, this thesis would use the RCS but time constraints and limited access to the dataset made this impossible[5]. Control variables are utilized in order to control for both types of selection bias: individuals choosing the military and the military selecting individuals. However, it is not possible to completely counter this flaw. No other variable in the CPS, other than education, could serve as a proxy for mental ability. Education is not included to represent mental ability but for its own capabilities in measuring human capital accumulation.

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[5] For more information on this limitation, see Appendix, Section XII.

While the NLSY includes a measure of mental ability through AFQT scores, its sample size of female veterans is smaller than that of the CPS. Initially, I started this project using data from the 1979 NLSY for the period of 1994 to 2010. Due to small sample size concerns, it became prudent to switch to the CPS dataset to complete the thesis. The results of the NLSY dataset, however, suggest similar conclusions as the results found in this thesis[6].

One concern is that only seven one month periods are included over a nine year period. These are the only months in which the veterans supplement is available from the CPS. Ideally, the veteran supplement would be available in each month of data of the CPS. My results could be strengthened if the veteran supplement was available for more than one month of each year between 2005 and 2013. It would be inappropriate to make any conclusions of the general civilian population. I do not analyze the gender wage differential of the non-veteran population.

Due to lack of proper measurements, several veteran-specific variables that could influence the earnings of veterans are not included in the model. For example, there is no differentiation made between those who served as enlisted personnel and those who served as officers. Additionally, the military occupation specialty of veterans cannot be controlled. Both of these variables are not present in the CPS data. Finally, two variables, tenure and on-the-job training, that are typically included in wage equations are not present in the dataset. The CPS does not contain an adequate representation of either of these variables. All errors and omissions are entirely my own.

[6] See the Appendix, Section XII, for more detailed information on the results of the NLSY study.

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XII. Appendix

I. Reserve Components Survey

Hirsch and Mehay (1996, 2003), for example, use the 1986 Reserve Components Survey: Selected Reserve Officer and Enlisted Personnel (RCS) and argue that it counters military selection bias and self-selection bias. The RCS surveys veteran reservists and non-veteran reservists and creates two homogeneous groups since all reservists must meet the minimum requirements necessary for enlistment. The RCS is conducted by the Department of Defense to assess reserve personnel policies (Mehay and Hirsch, 1996). Their results show that the RCS most effectively controls for selection bias. However, I am unable to access the RCS data because of Department of Defense privacy restrictions. Accessing the RCS requires Department of Defense access, a process that spans several months. I personally contacted Dr. Hirsch and Dr. Mehay in order to understand the process for acquiring the dataset they use or a more recent version. Dr. Mehay, Professor of Economics Emeritus at the Graduate School of Business & Public Policy Naval Postgraduate School, responded to my email and explained many of the issues facing those who want to use Department of Defense data of personnel. Dr. Mehay and Dr. Hirsch no longer have the 1986 RCS and, if they did, would not be allowed to give it to me because of privacy issues. Additionally, he explained the arduous process for obtaining Department of Defense personnel data. First, I have to set up an account with the Defense Manpower Data Center (DMDC) in order to request data from the DMDC Data Request System (DMDCRS). DMDCRS is typically only accessible to Department of Defense staff including civilians and contractors. In order to apply to access the data, I would need to apply for authorization to access the site. This is very unlikely to be approved as I am not employed by the Department of Defense. However, if I were to be approved, I would then need approval from multiple *Institutional Research Boards* (IRB). The IRB process, by itself, according to Dr. Mehay, takes several months to complete. Thus, accessing the dataset was not feasible for my thesis.

II. 1979 National Longitudinal Study of Youth

I used the 1979 NLSY to compare the earnings of female veterans during the All-Volunteer Force (AVF) era with female non-veterans. The Bureau of Labor Statistics (BLS) conducts this survey and it contains a sample of 12,686 respondents (Pergamit, et al., 2001). The NLSY is a longitudinal dataset. It asks respondents a wide variety of questions ranging from earnings and employment to health, education, marriage, and children (Pergamit, et al., 2001). The survey also includes an oversample of those in the military which makes it more effective in analyzing veteran data (Pergamit, et al., 2001). The NLSY first interviewed 14 to 22 year old respondents in 1979.

The same respondents were between 45 and 53 years old in 2010. Between 1979 and 2010, the NLSY interviewed these individuals annually through 1994 and biannually after 1994 leading to 24 interviews for those in the sample. Respondents to the 1979 NLSY are most likely already established in their careers or thinking about retirement.[7]

At this initial stage of this thesis, I attempted to analyze the following hypotheses:

1. Female veterans earn less than female non-veterans in the civilian labor force during the AVF era.
2. Female veterans earn less than male veterans in the civilian labor force during the AVF era.

I define an AVF era veteran as one who enlisted, served as an active-duty member, and left the military after 1973. Investigating the earnings differential of female veterans and non-veterans during the AVF era requires identifying who is a veteran and when an individual gained veteran status. Using 1979 NLSY data, I was able to identify the year in which a respondent enlisted in the military and left the military. The survey asked the respondents if they left the military since the last interview or asked, in the case of the first interview, if they had ever previously left the military. The survey measures if and when a respondent entered the military between 1978 and 2010.

Investigating the earnings differential of female and male veterans during the AVF era also requires identifying when a male respondent becomes a veteran. Using 1979 NLSY data, I identified the year in which a respondent enlisted in the military and left the military between 1978 and 2010. I signaled that a respondent is a veteran by looking at interview questions of whether a person enlisted since the previous interval. Then, I found one's starting and ending dates of military service to determine when they served. Next, I cross-referenced this information with the response to their weekly labor force experience. I eliminated those who served in the military after 1990, those who did not provide dates of military service, and those who served less than one year. Additionally, I excluded the earnings of veterans prior to and during military service.

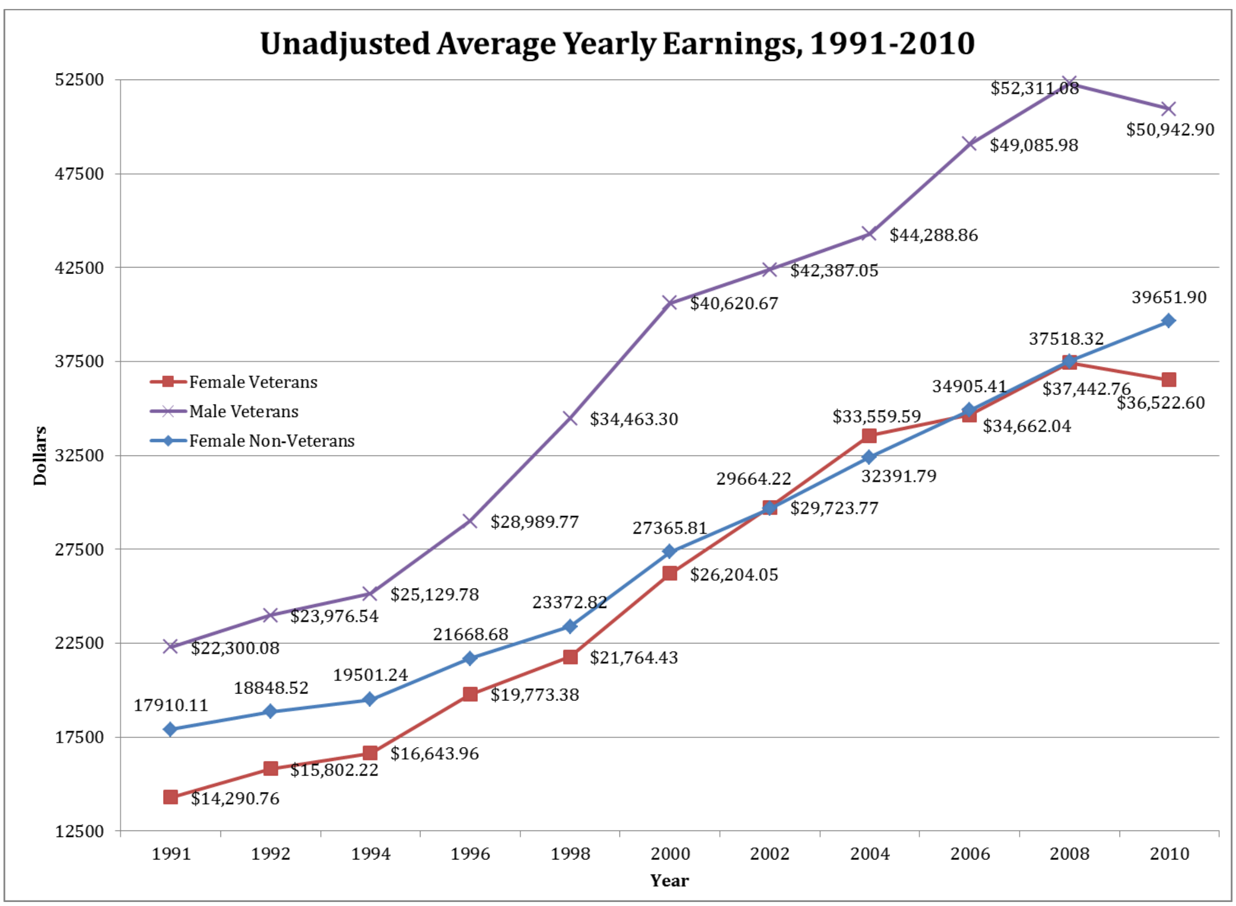
I only considered the last period in which an individual is in the military. One becomes a veteran after serving their last stint in the military. Earlier periods of service are disregarded. Thus, I can examine how earnings of female veterans and non-veterans change over time (Teachman and Tedrow, 2007). I use the abovementioned dataset to estimate a relationship between earnings and veteran status of women using a random-effects regression.

[7] There is also a 1997 NLSY. However, the 1997 NLSY is not equipped to handle a long-run analysis as its participants are currently between 29 and 34 years old and in the beginning of their careers. (Routon, 2014).

Figure 4 shows a comparison of average yearly earnings of female veterans, male veterans, and female non-veterans between 1991 and 2010. Additionally, because the 1979 NLSY surveyed respondents biannually beginning in 1994, I do not have earnings data on respondents in even years after 1994. Please note that the y-axis begins at $12,500.

The average earnings of a female veteran are $14,290.76 in 1991 with 49 of 512 female veterans responding. In 2010, the average earnings of female veterans were $36,522.60 in 2010 with only 44 of 512 female veterans responding. The average earnings of male veterans were $22,300.08 in 1991 with 442 male veterans responding. In 2010, on average, male veterans earned $50,942.90 with 309 male veterans responding. The average earnings of female non-veterans were $17,910.08 in 1991 with 3,111 female non-veterans responding. In 1991, the highest earnings reported by a female non-veteran was $90,325. In 2010, the average earnings of female non-veterans were $39,651 with 2,633 female non-veterans responding. I do not adjust earnings for inflation.

Figure 4: Unadjusted Average Yearly Earnings of Female Veterans, Male Veterans, and Female Non-Veterans in the NLSY, 1991-2009.



Between 1991 and 2010, male veterans earned, on average, more than female veterans in every year. Female non-veterans earned, on average, more than female veterans in every year except for 2001 and 2003. The wage differential between male veterans and female veterans was, on average, $11,646.04 between 1991 and 2010. The wage differential between female veterans and female non-veterans was, on average, $1,491.75 between 1991 and 2010. The differential in earnings appears to narrow as time progresses. This is consistent with the results of Prokos and Padavic (2000) which indicate that female veterans earn less than female non-veterans at every age but that the differential between the two groups diminishes with each year's increase in age.

I only consider the last period in which an individual is in the military. One becomes a veteran after serving their last stint in the military. Earlier periods of service are disregarded. Thus, I can examine how earnings of female veterans and non-veterans change over time (Teachman and Tedrow, 2007). I use the abovementioned dataset to estimate a relationship between earnings and veteran status of women. I estimate the following earnings equation:

$$\ln(Y_{it}) = \alpha_i + \beta_{it}VETERAN_{it} + \gamma_{it}RACE_{it} + \delta_{it}EDUC_{it} + \epsilon_{it}AGE_{it} + \vartheta_{it}AFQT_{it} + VETERAN_{it} * (\varphi_{it}LOS_{it}) + \tau_{it}PC_{it} + \rho_{it}MS_{it} + \sigma_{it}MH_{it} + \mu_{it}SOUTH_{it} + \pi_{it}MIDWEST_{it} + \beth_{it}NORTHEAST_{it} + \omega_{it}POR_{it} + \varepsilon_{it} \quad (5)$$

In equation 1, the dependent variable is the natural logarithm of yearly income (Y_{it}) of each survey participant, *i*, at time *t*. I take the natural logarithm of yearly income to correct for the non-linearity of income data. The random-effects regression equation, equation 1, uses a dummy variable to indicate veteran status. The random-effects model is useful in examining the effect of military service on future outcomes while also controlling for other characteristics that could influence the relationship between earnings and veteran status (Teachman and Tedrow, 2007). The coefficient of the veteran status dummy variable (β_{it}) indicates the net log wage difference between veterans and non-veterans.

$RACE_{it}$ measures the race of each survey participant. It can also be expressed as two dummy variables: Hispanic and Black. Non-Hispanic and non-black is the omitted category. $EDUC_{it}$ measures the level of formal education attained. AGE_{it} controls for differences in age among female veteran and non-veterans. LOS_{it} measures a characteristic specific to female veterans: length of military service. $AFQT_{it}$ measures mental ability using AFQT scores. Three dummy variables, $SOUTH_{it}$, $MIDWEST_{it}$, and $NORTHEAST_{it}$, measure the region in which a person resides in the interview year. West is the omitted region. POR_{it} measures whether respondents lived or did not live in the south at age 14. PC_{it} measures the presence of children and MS_{it} denotes marital status. MH_{it} represents mental health which I measure by using scores on the Center for Epidemiologic Studies Depression Scale (CES-D).

A score between one and fourteen is coded as zero and indicates that the respondent shows no signs of depression while one indicates that the respondent shows signs of minor depression. α_i is the intercept term and ε_{it} is the error term.

I use the 1979 NLSY to measure the log wage differential between male veterans and female veterans of the AVF era. I estimate the following earnings equation:

$$\ln(Y_{it}) = \alpha_i + \beta_{it}GENDER_{it} + \gamma_{it}RACE_{it} + \delta_{it}EDUC_{it} + \epsilon_{it}AGE_{it} + \theta_{it}AGE_{it}^2 + \vartheta_{it}AFQT_{it} + \varphi_{it}LOS_{it} + \tau_{it}PC_{it} + \rho_{it}MS_{it} + \sigma_{it}MH_{it} + \mu_{it}SOUTH_{it} + \pi_{it}MIDWEST_{it} + \beth_{it}NORTHEAST_{it} + \omega_{it}POR_{it} + \varepsilon_{it} \quad (6)$$

Equation 2 is identical to equation 1 except that equation 2 uses a dummy variable to indicate gender. The coefficient of the gender dummy variable (β_{it}) indicates the net log wage difference between female veterans and male veterans. LOS_{it} does not include veteran status as an interaction term because all respondents from both groups consist of veterans.

This section discusses the results of the regression models. Table 12 discusses the effect of veteran status on the earnings of female veterans compared to female non-veterans. Table 13 discusses the effect of gender on the civilian earnings of veterans.

Table 12 presents the results of the random effects regression for the sample of female veterans and non-veterans[8]. There are four regression models and all four models find a negative effect of veteran status on female earnings. Model 1 shows the overall effect of race on female earnings. Model 2 replaces the race variable with two dummy variables: Hispanic and Black. I cannot economically interpret the categorical variable, Race. Model 2 gives a better idea of how racial classifications (Hispanic and Black) affect female earnings while controlling for veteran status. Model 3 introduces a variable that captures the effect of residence at the age of 14 on female earnings. I delete the region of residence variable from Model 4 as it has little effect on the model and is statistically insignificant. Model 4 also eliminates the AFQT variable because it has a

[8] In order to use a fixed effects model, variability must exist within variables over time. Since many of my dummy variables do not change over time (time-invariant), a fixed effects model will not accurately capture the effects of these independent variables. Additionally, a fixed effects model attempts to control for variables that do not change over time. A random-effects model estimates the effect of variables that change over time (Allison, 2009).

negligible effect on the natural logarithm of earnings. Model 4 shows the results of a more specific regression equation. I provide four models to show that the effect of veteran status on female earnings remain the same in alternative equations. It is only in Model 3 that I find some statistical significance.

The results of Model 1, 2, and 4 indicate that, between 1991 and 2010, female veterans earn less than female non-veterans, *ceteris paribus*. This relationship is not statistically significant so I cannot confirm this finding. Evidence suggests that female veterans earn less than female non-veterans because regression results show a negative log wage differential for female veterans compared to female non-veterans in all four models. Only veteran status in Model 3 is statistically significant at the 0.10 level. According to Model 3, earnings decrease by 78.1 percent for a one unit increase in veteran status, *ceteris paribus.* Female veterans earn 78.1 percent more than female non-veterans, *ceteris paribus.* This result confirms my first hypothesis. In all three models, education, the score on the CES-D at age 50, marital status, number of children, age, age^2, and AFQT score are statistically significant at the 0.01 level. Length of service is statistically significant at the 0.05 level in all three models. Hispanic is statistically significant at the 0.10 level in Model 2. None of the region variables are statistically significant in any of the models.

Table 13 presents the results of the random effects regression for the sample of female veterans and male veterans. Model 1 includes the AFQT variable to estimate the effect of natural intelligence on veteran earnings. Model 2 eliminates the AFQT variable as the variable has a negligible effect on the natural logarithm of earnings and is not statistically significant. The results indicate that, between 1991 and 2010, male veterans earn more than female veterans, *ceteris paribus*. This result is statistically significant at the 0.01 level in all three models. In both models, education is statistically significant at the 0.05 level. CES-D score at age 50 and the region South are statistically significant at the 0.10 level in Model 1. I provide multiple models to show that male veterans consistently earn more than female veterans. This is a statistically significant result in both forms.

Table 12
Regression Results on the Log Wage Differential between Female Veterans and Non-Veterans

Independent Variable	Model 1	Model 2	Model 3	Model 4
Veteran Status (1 = yes)	-0.742	-0.753	-0.781*	-0.734
	(0.4686)	(0.4690)	(0.4686)	(0.4758)
Education (Years)	0.095***	0.093***	0.098***	0.123***
	(0.0118)	(0.0120)	(0.0129)	(0.0104)
CES-D at Age 40	-0.009	-0.013	-0.014	-0.062
	(0.1610)	(0.1612)	(0.1612)	(0.1547)
CES-D at Age 50	-0.378***	-0.376***	-0.375***	-0.431***
	(0.1422)	(0.1423)	(0.1421)	(0.1398)
Race	-0.087**			
	(0.0437)			
Hispanic		0.163*	0.104	0.067
		(0.0888)	(0.0941)	(0.0816)
Black		0.064	0.057	-0.020
		(0.0398)	(0.0407)	(0.0346)
Marital Status	0.046***	0.047***	0.041***	0.049***
	(0.0127)	(0.0127)	(0.0127)	(0.0126)
Length of Service	0.178	0.179	0.185	0.171
(Years)	(0.1243)	(0.01243)	(0.1242)	(0.1261)
Number of Children	-0.075***	-0.076***	-0.075***	-0.081***
	(0.0165)	(0.0165)	(0.0166)	(0.0165)
AFQT	0.000006***	0.000006***	0.000006***	
	(0.000001)	(0.000001)	(0.000001)	
Age (Years)	0.148***	0.178***	0.154***	0.156***
	(0.0249)	(0.0249)	(0.0250)	(0.0247)
Age^2	-0.001***	-0.001***	-0.001***	-0.001***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Age 14 Region of Residence			-0.006	
			(0.0850)	
Northeast	0.019	0.010	-0.075	0.011
	(0.0845)	(0.0857)	(0.0883)	(0.0844)
Midwest	-0.034	-0.041	-0.121	-0.030
	(0.0792)	(0.0800)	(0.0826)	(0.0790)
South	-0.060	-0.070	-0.107	-0.075
	(0.0710)	(0.0730)	(0.0847)	(0.0717)
Constant	4.403***	4.145***	4.051***	3.886***
	(0.5404)	(0.5355)	(0.5402)	(0.5311)
R^2	0.1977	0.1982	0.1955	0.1917
N	6,839	6,839	6,576	7,090

Standard error in parentheses
*p < 0.10; **p < 0.05; ***p < 0.01

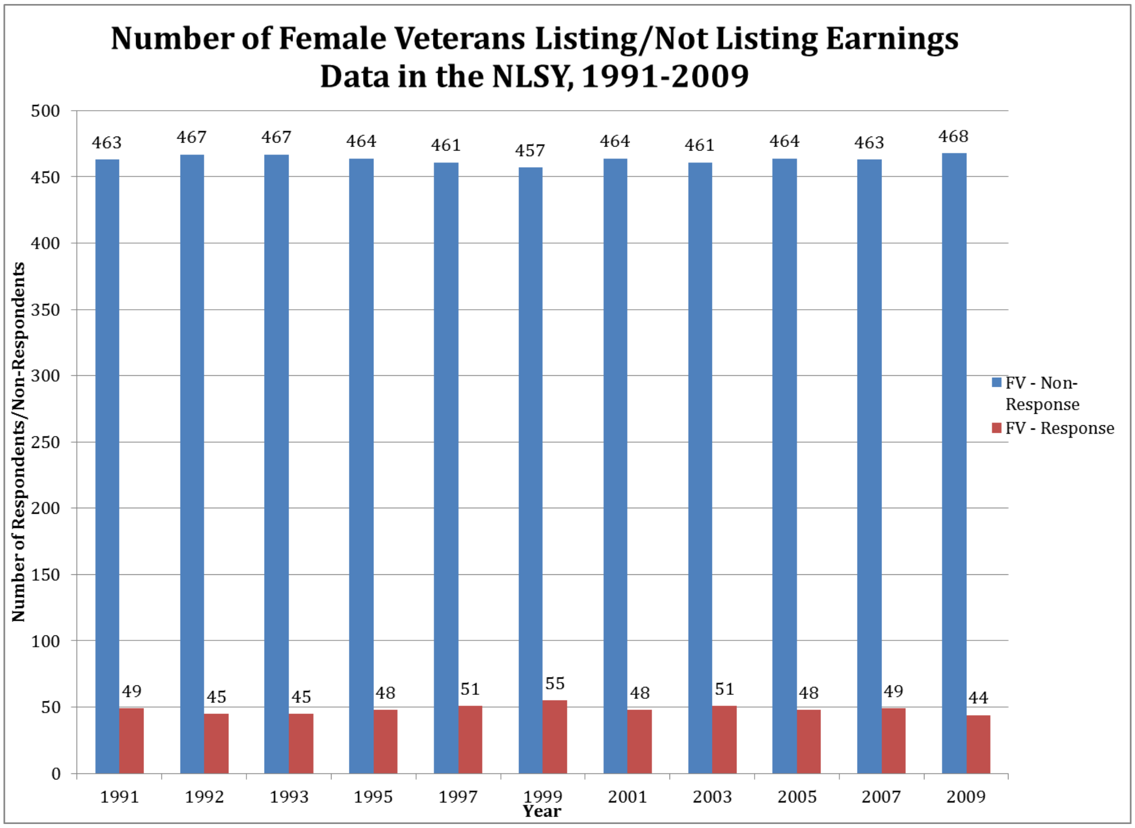
Table 13
Regression Results on the Log Income Differential between Male and Female Veterans

Independent Variable	Model 1	Model 2
Gender (1 = male)	1.159***	0.893***
	(0.3518)	(0.3096)
Education (Years)	0.174**	0.156***
	(0.0695)	(0.0583)
CES-D at Age 40	-0.699	-0.708
	(0.5164)	(0.5162)
CES-D at Age 50	1.022*	0.686
	(0.5986)	(0.4809)
Hispanic	-0.127	-0.008
	(0.5552)	(0.4887)
Black	-0.224	-0.192
	(0.1710)	(0.1278)
Marital Status	-0.020	-0.011
	(0.0615)	(0.0604)
Length of Service (Years)	0.086*	0.064
	(0.0502)	(0.0481)
Number of Children	0.020	0.031
	(0.0567)	(0.0557)
AFQT	-0.000001	
	(0.000008)	
Age (Years)	0.063	0.066
	(0.0921)	(0.0881)
Age^2	0.0001	0.0001
	(0.0012)	(0.0012)
Age 14 Region of Residence	0.291	0.325
	(0.3528)	(0.2827)
Northeast	0.290	0.358
	(0.3065)	(0.2974)
Midwest	-0.178	-0.043
	(0.2824)	(0.2715)
South	-0.448*	-0.279
	(0.2499)	(0.2280)
Constant	4.313**	4.610***
	(1.7945	(1.7263)
R^2	0.3628	0.3016
N	259	279

Standard error in parentheses
*p < 0.10; **p < 0.05; ***p < 0.01

I abandoned this project using the NLSY because of a concern on the response rate of female veterans. Figure 5 (next page) compares the number of female veterans who list earnings information between 1991 and 2010.

Figure 5: Number of Female Veterans Listing or Not Listing Earnings Data in the NLSY, 1991-2009.



The number of female veterans listing income between 1991 and 2010 is very small. The 1978 to 1990 period essentially excludes those who choose to serve a long career in the military. These results could suggest that male veterans either serve longer than female veterans (and are not included in the 1978-1990 group) or serve shorter periods than female veterans. Additionally, the minimum length of service required in the armed forces varies based on branch of service and military occupation (Glaser, 2011). Assuming a large group of female and male veterans are serving the minimum required period of service, men could be more likely to choose occupations or branches of service that require shorter minimum required service time. 57 female veterans responded in 2010. 487 male veterans responded to this question in 1991. 403 male veterans responded in 2010. 4,278 female veterans responded to this question in 1991. 3,668 female veterans responded in 2010.