Female Educational Achievement, Earnings, and the Servicemen's Readjustment Act of 1944

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Abstract

The 1944 Servicemen's Readjustment Act (the "G.I. Bill") provided returning World War II veterans with educational benefits sufficient to cover tuition, fees, and living expenses at almost any U.S. university or college. While a number of studies examine subsequent educational attainment and future earnings for male veterans, little is known about how the G.I. Bill affected the 330,000 females who served in World War II. Using data from the 1980 5% Census Public-use Microdata Sample, I find that female World War II veteran status is associated with a 19 percentage point increase in the proportion who attend any college, a 7.8 percentage point increase in college completion, and earnings that are 19.8% greater, among those who are employed, relative to comparable females who were not veterans. Because service was entirely voluntary for females, I use enlistment timing patterns, service eligibility requirements, and the G.I. Bill's retroactive nature to establish a causal relationship between veteran status, educational attainment via the G.I. Bill, and increased earnings. In particular, I instrument for female veterans' educational attainment using age at the time of the G.I. Bill's announcement and find that female veterans' earnings increased by $1,350 (11.6%) per year of G.I. Bill-induced education. My IV estimates suggest that G.I. Bill-related education, rather than experience gained in the military, is mostly responsible for differences in female veterans' outcomes.

Keywords: Female Labor Market Outcomes, Gender Wage Gap, G.I. Bill, World War II
JEL: J31, I22, I24, I28, J71, N31, N42

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1 Introduction

The Serviceman's Readjustment Act of 1944 (the "G.I. Bill") provided a range of benefits - including unemployment assistance, favorable loans to start a business, and low-interest mortgages - to returning World War II (WWII) veterans.[1] Most notably, the G.I. Bill granted generous educational benefits; eligible veterans could receive up to $500 per year for tuition, fees, and books, along with a $50 monthly living expense allowance. For context, average tuition was just over $400 at private universities in 1948 and from 1945 to 1950 the federal minimum wage was 40 cents per hour.[2] Unsurprisingly, many veterans used their G.I. benefits: by the time the original G.I. Bill ended (July 25, 1956), the Department of Veteran's Affairs reports that more than 2.2 million veterans had used their benefits to pursue a college education.[3]

While many WWII veterans would have attended college absent their military service or any educational benefits, Bound and Turner (2002) use a cohort-based approach to show that the combined effect of war service and the G.I. Bill was responsible for at least a 16 percent increase in the number of years of college and a 23 percent increase in college completion rates among male veterans. Taking a different approach to identification, Stanley (2003) finds that WWII G.I. benefits increased years of college for male veterans by around 15 to 20 percent. However, while 19.5% of veteran females elected to use their G.I. benefits to pursue a college education (compared to only 15% of eligible male veterans), little is known about the causal effect of the G.I. Bill on educational attainment for the 330,000 females who served during WWII.[4]

To determine whether greater educational attainment among female veterans can be attributed to the G.I. Bill, I examine differences in college attendance and completion rates among veteran and non-veteran females using a cohort-based approach similar to that employed by Bound and Turner (2002). My estimates rely on data from the 1980 5% Census Public-use Microdata Sample (PUMS) as it is the first year the long-form census asked females about military service. Among female high school graduates (a requirement for female military enlistees during WWII) born

[1] Unemployment benefits were $20 per week for one year.

[2] See p. 676 in Stanley (2003) for more on tuition costs. See https://www.dol.gov/agencies/whd/minimum-wage/history/chart for historical federal minimum wage information (last accessed 8/5/2020).

[3] More information here - https://www.benefits.va.gov/gibill/history (last accessed 9/5/2020).

[4] To be precise, 64,728 servicewomen attended college under the program out of a total of 332,178 eligible female veterans. See https://www.womensmemorial.org/history-highlight (last accessed 8/5/2020) for further discussion and information.

between 1919 and 1925, my regression estimates suggest that WWII veterans were 19 percentage points more likely to attend college and 7.8 percentage points more likely to complete their degree relative to comparable non-veterans. I restrict my sample to those born between 1919 and 1925 because females had to be at least 21 to enlist while those born prior to 1919 would be very close to retirement in 1980. Further, among those who are employed, I find that female veterans earn $1,887 more per year in 1980, a 19.8% earnings boost relative to non-veteran females. My estimates are at least consistent with the idea that the G.I. Bill increased educational attainment and subsequent earnings for female veterans.

Because service in the military could provide valuable skills and education absent any additional education, I then use age at the time of G.I. Bill announcement (in 1944) as an instrument for educational attainment for female veterans. My instrument is potentially valid because G.I. Benefits varied by length of service, ensuring that those who enlisted earlier in the war effort would receive more educational support. Instrumenting for educational attainment using age as a proxy for the generosity of G.I. benefits also accounts for selection on ability, where veterans who would be likely to earn more are also those who were induced to attend college because of the G.I. Bill's generous benefits. My two-stage least squares estimates suggest that female veterans' earnings are larger by $1,350 (11.6%) per year of G.I. Bill-induced education. Combining female veterans' additional educational attainment with IV estimates of the returns to an additional year of education implies that approximately 73% of the overall earnings boost for female veterans can be explained by the additional earnings of those who used G.I. benefits to attend college.[5]

Paraphrasing Bound and Turner (2002), however, what remains at issue is the extent to which increases in college attendance (and, therefore, any subsequent education-related earnings) among female veterans represents a causal effect of G.I. Bill educational benefits. That is, my IV approach only identifies the effect of education on earnings for veterans but cannot determine whether there is a causal link between the G.I. Bill and veterans' additional education. Studies that focus on male veterans can rely on changes in manpower requirements and draft eligibility rules during

[5]My 73% approximation comes from a back of the envelope calculation that combines regression based estimates of the increase in any college (19 percentage points) and college completion (41% of those who complete any college) along with IV estimates of the returns to education for those induced to attend ($6,495) or complete college ($8,214). Specifically, $6,495×.19×.59 + $8,214×.19×.41 = $1,368, which is 73% of $1,887, the overall difference in earnings for female veterans. I explain this calculation in greater detail in Section 4.

WWII to aid identification (Angrist and Krueger, 1994; Bound and Turner, 2002; Stanley, 2003). For females, service was voluntary throughout the war period, presenting different identification challenges. One such challenge is that, because females had to be over 21 to serve, differences in educational attainment in 1980 could be due to differences in college attendance prior to service. However, focusing only on females who completed high school and who turned 21 between 1940 and 1946, summary statistics from my 1980 Census sample suggest that 33.5 percent of non-veterans and 53.8 percent of female WWII veterans attended at least some college. As I mention earlier, administrative records suggest that 19.5 percent of female veterans used their G.I. benefits to attend college, suggesting that almost all of the difference in educational attainment among veteran and non-veteran females can be explained by college attendance after military service.

A second challenge for identification is that females who signed up for military service could have been more likely to attend college in the future, even if there were no G.I. Bill benefits. The number of females who were high school graduates and aged 21 or older who had not already attended college and, yet, were intending to later do so is likely to be negligible, particularly in the 1940s. Indeed, any individuals who were planning to soon attend college would likely choose not to enlist in the army, further delaying their intended path, unless they knew that service would lead to generous educational benefits.[6] The G.I. Bill's benefits, however, could not have been easily anticipated - even as late as mid-1944 - because the G.I. Bill passed the U.S. Senate by just a single vote.[7] In addition, if many females enlisted only to obtain benefits, I would expect to see greater educational attainment among veterans who enlisted after the G.I. Bill was instituted. Instead, when I examine outcomes for females who were too young to enlist until 1944, I find that they were somewhat less likely to attend college compared to veterans who who were old enough to enlist prior to 1944.[8]

While I return to issues of selection in Section 4, it appears that the age profile of female veterans and the retroactive and unexpected nature of the G.I. Bill's benefits mean few female veterans would have attended college absent the G.I. Bill's educational benefits. The G.I. Bill is,

[6]Such negative selection would work against finding any treatment effect and my estimates would then represent only a lower bound on the G.I. Bill's effect. Naturally, this is less concerning than the bias introduced by positive selection.

[7]The Department of Veteran's Affairs explains that Rep. John Gibson had to be "rushed" to the Capitol to cast the tie-breaking vote. See https://www.benefits.va.gov/gibill/history.asp.

[8]See Table 3.

therefore, potentially responsible for the additional educational attainment of female veterans, rather than selection into or the experience of service itself. More formally, the G.I. Bill caused greater educational attainment for female veterans under an identifying assumption that there are no idiosyncratic shocks to educational attainment that are correlated with the decision to enlist during WWII.

My findings provide three significant contributions. First, I document that the G.I. Bill improved educational attainment for female veterans, not only male veterans. Second, I show that the G.I. Bill lead to significant later-life gains in earnings for female veterans, largely via increases in education rather than any skills developed during service. Examining how the G.I. Bill increased earnings for females via additional educational attainment is important because American economic history features persistent gender-based differences in both labor market participation and outcomes (Altonji and Blank, 1999; Blau and Kahn, 2000; Mulligan and Rubinstein, 2008; Goldin, 2014). Since the 1950s, however, female labor force participation has increased substantially (Acemoglu et al., 2004) and the gap in earnings for females, per dollar of male earnings, has decreased from about 40 cents per dollar to closer to 20 cents per dollar (Blau and Kahn, 2017). Female educational attainment has also increased over the same time period. For example, using data from the Panel Study of Income Dynamics Blau and Kahn (2017) show that, in 2011, women had higher average levels of education (by 0.2 years, on average) and were 2.8 percentage points more likely to have an advanced degree than men. My findings suggest a causal relationship between increased education and earnings for females over this time period. Finally, my IV approach provides a causal estimate of the long term "returns" to college for females during a uniquely interesting period in American economic history.

I proceed as follows. In Section 2, I situate my work within and explain how my paper expands upon the literature that studies military service-related benefits. I also consider the literature on how and why female labor market outcomes have changed since WWII. In Section 3, I summarize the 1980 5% Census Public-Use Microdata Sample and describe my approach to estimation. I present my main findings in Section 4 along with estimates using different cohorts as control groups and various checks on robustness (see Appendix A, also). I offer concluding remarks in Section 5.

2 G.I. Bill Background and Literature

Records suggest that more than 330,000 females served in the U.S. military forces during WWII, often within dedicated female-only branches of service including the Women's Army Corps (WAC), the Women Airforce Service Pilots (WASP), and the Women Accepted for Volunteer Military Services (WAVES). To a lesser degree, women also served in the Marines and the Coast Guard.[9] While 60,000 females served in the Army Nurse Corps a majority of servicewomen held clerical positions: typists, clerks, mail sorters, and so on. Such roles were essential to the war effort as having women fill these jobs freed up more men to engage in armed conflict.[10]

Despite the number of females who joined the war effort, the economics literature on the 1944 G.I. Bill focuses entirely on men. As I briefly mention earlier, Bound and Turner (2002) use data from the 1970 5% PUMS Census Sample to compare the collegiate attainment of white male veterans relative to non-veterans, finding that war service significantly increased post-secondary collegiate attainment among returning male veterans, with college completion rates increasing by about four percentage points when using a within-cohort approach. They caution that "[a]t issue is the extent to which this burst of collegiate participation reflected new demand or educational investments postponed by the war effort." A major obstacle to identification is that physical and mental fitness were prerequisites for military service, ensuring that comparisons of the educational attainment of veterans and non-veterans would be biased in favor of finding a positive treatment effect. To try to reduce the impact of such confounding factors, Bound and Turner examine between-cohort differences in veteran status. The purpose of such an approach is that "cohorts born too late to serve in World War II should have less postsecondary school education than those born a few years earlier." There, they find a 10 percentage point increase in college completion. Bound and Turner's between-cohort approach is likely biased because men who were too young to serve in WWII had a high probability of serving in the Korean War. The bias is exacerbated because those who served in WWII were exempt from Korean War-related conscription and then Korean War veterans obtained educational benefits from the Veterans' Readjustment Assistance

[9] See https://libguides.mnhs.org/wwii_women.

[10] The Nurse Corps served in both the U.S. and overseas. For more, see https://e-anca.org/History/ANC-Eras/1940-1950. Note that I present estimates where I exclude females who report being either doctors or nurses as an appendix item. Reassuringly, my findings are only very mildly attenuated when limiting the sample in this manner.

Act of 1952 (the "Korean G.I. Bill"). Further, in 1966, the Readjustment Benefits Act extended similar but less generous benefits to all veterans, irrespective of when they served.[11] The 1966 extension of benefits presents further identification challenges when examining outcomes for males because so many served in the military at some point. Note, however, that extending benefits to non-WWII veterans would likely work against finding any significant effect of WWII veteran status (because the extension of benefits would be expected to increase educational attainment in veterans who served at other times). Moreover, these later benefits were less generous and arrived more than 25 years after World War II began, limiting their impact on human capital investment and career decisions for relevant comparison groups.

While the National Museum of the U.S. Army explains that females had to be "high school graduates between 21 and 45 years of age, between five and six feet tall, between 105 and 200 pounds, and 'of good health and character'," the issues Bound and Turner face are less likely to undermine my approach to identification because I focus on female (rather than male) educational attainment and labor market outcomes. Estimating how the 1944 G.I. Bill affects male educational outcomes is so challenging because the majority of men born between 1920 and 1935 served in either WWII or the Korean War, and sometimes both. Problematically, those who did not serve are negatively selected. To the extent that relatively few females served, that they had to be 21 and a high school graduate, and that their selection for service did not require them to be available for armed conflict, non veteran females who were born in the same years as females who served in WWII are likely a more valid within-cohort control group. Further, because it is also true that relatively few females served in the Korean War, those born just too late (1926 or later) to serve in WWII are a more valid between-cohort control group. For that reason, I adopt Bound and Turner's between-cohort approach mainly as a robustness/sensitivity check. Specifically, I compare educational attainment and earnings for WWII veterans to those of otherwise similar females born just too late to serve in WWII.[12]

Instead of viewing the Korean War as an obstacle to identification, Stanley (2003) directly studies the effect of the Korean War G.I. Bill on educational outcomes. His approach relies on a

[11] See https://www.va.gov/opa/publications/archives/docs/history_in_brief.pdf (last accessed 8/5/2020).

[12] Moreover, my data provides an indicator for Korean War veteran status which allows me to eliminate such individuals from my between-cohort estimation sample (whereas Bound and Turner's 1970 data does not separately delineate service).

sharp cutoff in benefit eligibility. He then uses his findings to bound similar estimates for WWII veterans. Stanley's approach somewhat circumvents the identification challenges faced by Bound and Turner. Overall, using data from the 1973 Survey of Occupational Change in a Generation, Stanley finds that the Korean War "probably increased total post-secondary attainment among all men born between 1921 and 1933 by about 15 to 20 percent."

Earlier work on veterans' labor market outcomes, not only WWII veterans, also tends to focus on males. As examples, Angrist (1993), Angrist and Krueger (1994), and Card and Lemieux (2001) consider the issue of male veterans' earnings. Angrist (1993), using data on men from a 1987 survey of (mostly) Vietnam war veterans, finds that a "post-service grade increment of one year translates to an increase in earnings of about 4.3%, so that use of veterans' benefits raises annual earnings by around 6% (1.4 years times 4.3%)." Angrist notes that this premium "appears to accrue primarily to the 77% of benefit users who attended college or graduate school" but not other types of eligible training.[13] Angrist and Krueger (1994) focus on male WWII veterans and find that nonrandom selection into the military explains why male veterans earn more than similar non-veterans in their cohort. Their approach can leverage veterans' quarter of birth as instruments because from 1942 men were drafted in chronological order of birth date. Note, however, that Angrist and Krueger (1994) do not examine whether the 1944 G.I. Bill had a unique and separate impact on male WWII veterans. Indeed, identifying the causal effect of the G.I. Bill on male veterans' earnings is likely infeasible. Stanley (2003) explains that while the G.I. Bill provided benefits to "all individuals who had served in the U.S. armed forces during the World War II period [...] for a minimum of one year of training plus one additional month for each month of active duty, up to a maximum of 48 months" enlistment and conscription patterns ensured that "over 80 percent [of male veterans] qualified for the four years of support necessary to earn a bachelor's degree."[14] Females were not conscripted and were not required to serve for any particular period of time, generating greater variation in the quantity of G.I. benefits females could obtain.[15]

[13] Berger and Hirsch (1983), Angrist (1989), and Angrist (1990) also examine earnings of male Vietnam veterans.

[14] See Stanley (2003), p. 675.

[15] Indeed, females were only granted full military recognition, rather than being merely federal employees, in 1943. See https://www.nationalww2museum.org/war/articles/its-your-war-too-women-wwii for more information (last accessed 9/10/2020).

Veterans in other countries also experienced increased earnings from readjustment benefits. Card and Lemieux (2001), for example, focus on Canadian veterans and analyze patterns of education and earnings for men from Ontario, using french-speaking men from Quebec, who were significantly less likely to enlist, as a control group. Card and Lemieux position their work as avoiding the challenges facing analyses using American veterans noting that "the absence of a credible control group" ensures that "the education and earnings outcomes of later cohorts cannot be used to form simple inferences about the effect of the G.I. Bill on [American] WWII-eligible cohorts" (p. 314). Their estimates imply that veterans experienced a 7 to 15 percent return on their benefit-induced education.

Several authors have studied how veteran status affects other long term outcomes, including physical and mental health (Bedard and Deschênes, 2006; Grimard and Parent, 2007; Cesur et al., 2013). My work does not consider such outcomes but contributes by examining how the 1944 G.I. Bill affected female veterans educational attainment and labor market outcomes. My approach to examining how the G.I. Bill increased female veterans' earnings is particularly informative because my estimates, relative to those that examine outcomes for male veterans, are in many ways less clouded by enlistment requirements, conscription patterns, and selection issues. Put differently, estimates of the G.I. Bill's impact on male veterans' later-life earnings would represent only the effect on a group who were already likely to be more successful than non-veterans, because of positive selection based on mental and physical fitness.

My work also helps to explain part of what Goldin (2014) refers to as the "grand convergence" between male and female earnings. When examining how the gender earnings gap has evolved over the course of the 20th century, Goldin highlights how the "explained" portion of that gap has declined because differences "in years of education, in the content of college, and in accumulated labor market experience narrowed." Indeed, WWII was likely influential in such changes. For example, Acemoglu et al. (2004) show that female labor force participation increased throughout the 20th century, with the largest proportional increase occurring during WWII. Specifically, between 1940 and 1945 the percent of U.S. women over the age of 15 in the labor force increased by 21.5 percent (about 6 percentage points).[16] Acemoglu et al. use this response to the war effort

[16]By 1990, the female labor force participation rate exceeded 57% (p. 498 of Acemoglu et al., 2004).

to explore how increased female labor force participation affects male and female wages. Relying on differences in "military mobilization" (defined as the fraction of men who left to serve in the war) across states, they find that a 10 percent increase in female labor force participation reduced female wages by 7 to 8 percent but reduced male wages by only 3 to 5 percent.

Because differences in education and experience are now less-pronounced, explanations for remaining unexplained differences such as differences in bargaining (Babcock and Laschever, 2003) or tastes for competition (Niederle and Vesterlund, 2007; Manning and Saidi, 2010) have received more attention in the literature. Goldin notes, however, that Waldfogel (1998) finds a significant "child earnings penalty" and that these alternate explanations "do not explain why women without children generally have higher earnings than women with children and why the former's earnings are almost equal to those of comparable men." Moreover, such alternative explanations do not help us understand why the gender gap in earnings differs so much by age. Goldin then argues, convincingly, that the residual gap in earnings among men and women occurs because of idiosyncratic temporal demands across occupations, where (mostly male) workers are disproportionately rewarded for long hours or for working unusual hours. However, to get to the point where the remaining differences are so "idiosyncratic," females had to begin accumulating more human capital and that human capital had to pay dividends in the form of higher earnings. My work examines whether the G.I. Bill caused many veteran females to obtain more education and whether such education for females lead to increased earnings.

3 Estimation Strategy and Data

To estimate the effect of the G.I. Bill on female labor market outcomes, I exploit variation in World War II service eligibility across birth-year cohorts. The general econometric specification is as follows;

$$Y_i = \alpha + \tau D_i + X_i\beta + \epsilon_i. \tag{1}$$

In equation (1), Y_i represents some educational or labor market outcome of interest for female veteran i (in 1980). Following Stanley (2003), I assume G.I. Bill eligibility is equal to WWII veteran status. Therefore, the binary indicator D_i equals 1 for those who report being World War

II veterans and 0 otherwise. The ϵ_i term is an idiosyncratic shock while X_i represents demographic controls and fixed effects. In this framework, τ represents the treatment effect of the G.I. Bill (technically, WWII veteran status) on the outcome of interest under an identifying assumption that there are no idiosyncratic shocks to educational attainment or earnings that are correlated with the decision to enlist during WWII.

I estimate the G.I. Bill's treatment effect on female veterans using data from the 1980 5% Census sample. While any females who were eligible to serve in WWII were 50+ years old in 1980, I must rely on the 1980 5% sample because it is the first to ask about veteran status for females. My estimates leverage variation in WWII service eligibility across birth-year cohorts by restricting my main estimation sample to veterans and non-veterans who turn 21 between 1940 and 1946 (born between 1919 and 1925). Because females who were eligible for WWII service had to be at least a high school graduate, I also eliminate those who do not report having at least a high school diploma from my sample. Naturally, when examining earnings I focus only on those who report that they are currently working (in 1980, the oldest individual in the main estimation sample would be 61). All dollar figures are in $1980.

I do not include those who turn 21 before 1940 (i.e., born in 1918 or earlier) in my sample because these individuals would be at least 62 years old in 1980 and my census data shows that WWII veterans born between 1915 and 1918 had much lower labor force participation rates (in 1980) relative to those born between 1919 and 1925. Specifically, among WWII female veteran high school graduates 68% of those born in 1915, 66% of those born in 1916, 57% of those born in 1917, and 51% of those born in 1918 were not in the labor force. Among those born in 1919 and 1920, 49.4% and 46% were not in the labor force. Of those born in 1925, only 35% were not in the labor force in 1980. These patterns suggest that I should exclude females closer to retirement from my main sample to avoid any bias. On the other hand, it is unclear exactly where to draw the line. I choose 1919 for two main reasons. The first is that those born prior in 1918 are the first cohort where a majority of females are not in the labor force. Moreover, those born prior to 1918 may have been significantly more likely to already be married, have children, and so on, by the time the U.S. entered WWII.

The second reason is to make my main estimation sample as similar as possible to those born too late to serve in WWII when I examine between-cohort estimates. These between-cohort estimates examine differences in educational attainment and labor market outcomes for female veterans who turned 21 during World War II (born between 1919 and 1924) relative to females who were too young to enlist (those who turn 21 from 1946 onward). The idea here, similarly to Bound and Turner's approach, is that serving in WWII ensured that veterans delayed their entry into adult civilian life by a number of years. For that reason, the appropriate control group might be those who were born too late to serve in World War II. Including those born in 1918, 1917, and so on, would make the two groups increasingly dissimilar. I present estimates that also include earlier born females (1915 to 1918) as an appendix item. Those estimates are reassuringly similar to the estimates when restricting the sample to females born between 1919 and 1925.

In Table 1, I present relevant summary statistics for female veterans and non-veterans born between 1919 and 1925 who are high school graduates. I also provide the same information for those who turn 21 between 1946 and 1951. The summary statistics demonstrate that, in 1980, WWII veterans have higher earnings, more education, are more likely to be white, and are less likely to be married. The summary statistics also demonstrate female patterns of enrollment in the army, with 3.26% (966 out of a total of 30,596) of females born in 1919 reporting that they were WWII veterans. That proportion rises to 4.54% of those born in 1922 before declining markedly for those eligible to enlist after 1944. Such a pattern helps to ease concerns that females entered the army in response to the benefits provided by the G.I. Bill.

Alongside the information on cohort sizes by year of birth, I provide the percent of each cohort that attend any college. Notice that females who were born earlier, and therefore were more likely to have enlisted before 1944, are significantly more likely to report attending at least some college. The same pattern is not evident among non-veterans. The difference in female veterans' educational attainment across cohort suggests that the G.I. Bill might have affected females differently based upon age in 1944. I later exploit this variation to instrument for the G.I. Bill's impact on educational achievement.

Table 1: Summary Statistics

		WWII Veterans		**Non-Veterans b. 1919-1925**		**All Females b. 1926-1930**	
		Summary Statistic	SD	Summary Statistic	SD	Summary Statistic	SD
% in Labor Force		57.5		52.8		62.3	
% Employed (if in Labor Force)		96.22		96.59		96.4	
Annual Earnings (All)		$ 11,597	8,592	$ 9,518	7,116	$ 9,420	7,151
Annual Earnings (HS Only)		$ 10,140	7,406	$ 8,517	6,190	$ 8,319	6,164
Annual Earnings ($\leq$3 years of College)		$ 11,316	8,097	$ 9,615	7,182	$ 9,457	7,104
Annual Earnings ($\geq$4 years of College)		$ 14,604	10,310	$ 13,339	8,916	$ 13,029	8,856
% Any College		53.8		33.5		36.2	
% Completed College		21.7		13.5		15.7	
Years of College Completed	0	4,160		164,443		126,050	
	1	863		20,397		15,943	
	2	1,151		20,944		16,969	
	3	876		8,253		7,662	
	4	1,029		19,222		17,490	
	5+	926		14,036		13,423	
# Born in (% attended any college)	1919	966 (60.8)		29,630 (33.7)			
	1920	1,371 (60.8)		33,915 (33.6)			
	1921	1,615 (56.4)		35,027 (33.9)			
	1922	1,686 (53.3)		35,434 (33.5)			
	1923	1,641 (49.9)		36,328 (32.8)			
	1924	1,227 (46.5)		38,317 (33.1)			
	1925	499 (45.7)		38,644 (34.0)			
	1926					38,351 (38.6)	
	1927					39,493 (40.0)	
	1928					39,132 (39.0)	
	1929					39,156 (39.2)	
	1930					41,405 (39.7)	
% Married		69.3		73.7		77.5	
Race	% White	97.4		93.1		91.2	
	% Black	1.9		5.4		6.8	
	% Other	0.7		1.5		2.0	
Observations		9,005		247,295		197,537	

Source: 1980 PUMS 5% Census Sample restricted to females who completed high school.

4 Main Findings

To establish that the G.I. Bill is correlated with increased female earnings and educational attainment, I first examine the impact of WWII veteran status on indicators for any college, having completed four or more years of college (i.e., a Bachelor's degree or more), labor force status, and employment status (employed/unemployed, conditional on being in the labor force). I also consider years of college completed and annual earnings from employment. As I mention earlier, because females had to be high school graduates to be eligible for WWII service, both my treatment (WWII veterans) and control (non-veterans) groups include only those with a high school diploma. Specifically, in the estimates in Panel A of Table 2, non-veterans are female high-school graduates born between 1919 and 1925 who do not enlist in the armed forces during the WWII period. I include state fixed effects and controls for marital status, age, and race in each specification. I also cluster my standard errors at the state level.

Using an OLS-based Linear Probability Model, I find that female veterans, relative to non-veteran female high school graduates, are 19 percentage points more likely to attend some college, 7.8 percentage points more likely to complete four years of college, and are 4.5 percentage points more likely to be in the labor force. Veterans, however, are not statistically more or less likely to be employed (conditional on being in the labor force). Further, using a Poisson model, I find that female veterans complete 49.8% more years of college than non-veteran females, conditional on having a high school diploma.[17] The educational attainment of veterans suggests that veterans and non-veterans differ in ways that could affect earnings from employment. Confirming this suspicion, OLS estimates in column six suggest that WWII veterans earn $1,887 more in annual wages compared to non-veterans. Given annual wages of $9,518 for non-veterans, my findings imply that being a veteran is associated with a 19.8% boost in earnings relative to similar non-veterans. Note that I intentionally do not control for education when examining wages because education is correlated with veteran status (see Table 1) and will bias estimates of veterans' additional earnings downward. I also purposely do not control for occupation or industry when looking at earnings because veteran status may predict selection into occupations or industries with higher wages.

[17] In estimates not reported here, I find that veterans complete 6.4% more years of college than non-veteran females, conditional on attending at least some college.

Table 2: Estimates for WWII Veteran Status on Female Earnings and Education

	Panel A: Non-Veterans = Non-Veteran Female HS Graduates born 1919-1925					
	(1)	(2)	(3)	(4)	(5)	(6)
	Any College	Completed Degree	Years of College	In Labor Force	Employed	Annual Wages
	(OLS)	(OLS)	(Poisson)	(OLS)	(OLS)	(OLS)
WWII Veteran	0.190***	0.078***	0.498***	0.032***	-0.004	1,887.05***
	(0.005)	(0.005)	(0.015)	(0.007)	(0.003)	(139.03)
Mean of Dep. Var. for Veteran	0.538	0.217	-	0.575	0.962	11,597
Mean of Dep. Var. for Non-Veteran	0.335	0.135	-	0.528	0.966	9,517
Observations	256,326	256,326	256,326	256,326	135,818	131,131
R-squared	0.032	0.020	-	0.070	0.003	0.30

	Panel B: Non-Veterans = All Female HS Graduates born 1926-1930					
	(1)	(2)	(3)	(4)	(5)	(6)
	Any College	Completed Degree	Years of College	In Labor Force	Employed	Annual Wages
	(OLS)	(OLS)	(Poisson)	(OLS)	(OLS)	(OLS)
WWII Veteran	0.141***	0.043***	0.319***	0.022***	-0.003	1,730.46***
	(0.009)	(0.005)	(0.022)	(0.007)	(0.003)	(182.66)
Mean of Dep. Var. for Veteran	0.538	0.217	-	0.575	0.962	11,597
Mean of Dep. Var. for Non-Veteran	0.362	0.157	-	0.623	0.964	9,420
Observations	206,543	206,543	206,543	206,543	128,328	123,671
R-squared	0.030	0.019	-	0.047	0.003	0.31

Data: 1980 PUMS 5% Census Sample. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. In Panel A, I restrict the sample to female, high-school graduates, who turned 21 between 1940 and 1946. Non-veterans are, therefore, female high-school graduates born between 1919 and 1925 who do not enlist in the armed forces during the WWII period. In Panel B, I restrict the sample to female, high-school graduates, who turned 21 between 1940 and 1951, but then exclude non-veterans born between 1919 and 1925. In those estimates, therefore, non-veterans are female high-school graduates born between 1926 and 1930 who do not enlist in the armed forces during the WWII period. All specifications include state fixed effects and control for marital status, age (measured in quarters), and race.

Note that I provide estimates where I exclude nurses and doctors from my sample as an appendix item. Those estimates are reassuringly similar to the estimates in Table 2.

To the extent that military service delayed entry into civilian life (including career choices, marriage timing, fertility choice, and so on) for younger females, females from the same age cohort (born 1919 to 1925) are perhaps not the right control group. In Panel B of Table 2, I therefore restrict my sample to female, high-school graduates, who turned 21 between 1940 and 1951, but

exclude non-veterans born between 1919 and 1925. That is, in the estimates in Panel B, I designate non-veterans to be female high-school graduates born between 1926 and 1930. These females were just too young to serve in WWII. The estimates in Panel B confirm that WWII veterans still experience large and statistically significant increases in educational attainment and annual wages, regardless of the comparison group.

As I mention earlier, at issue is whether the additional earnings of veterans are causally-related to the education benefits provided by the G.I. Bill. The problem is that being a veteran can affect earnings in at least two ways. First, veterans select into service, and may have greater (unobserved) productivity than non-veterans, whether due to innate differences or veterans becoming more productive *because* of their service (by acquiring skills and/or experience). Second, veterans had access to G.I. benefits, allowing them to obtain more education. The effect of WWII veteran status on wages in the final column of Panel A of Table 2 simply estimates the size of the veterans' earning premium and makes no attempt to disentangle such competing explanations.

For my estimates to be causal, the additional educational attainment of veterans must be explained by the benefits provided by the G.I. Bill. Moreover, it must also be the case that such educational attainment causes (at least some) of the veterans' earnings premium. In Section 4.1, to establish a causal relationship, I show that the additional educational attainment of veterans is almost entirely explained by veterans attending college after their service who otherwise would not have attended college. I also show that there is no evidence that attending college affected veterans' earnings differently relative to non-veterans. Then, in Section 4.2, I attempt to separate the effect of veteran's experience and innate characteristics from the effect of education by using age at the time of the G.I. Bill's announcement to instrument for veterans' later educational attainments.

4.1 Selection on Educational Attainment

It is plausible, but unlikely, that female veterans might have been especially likely to attend college relative to non-veterans (who were also high school graduates) before their WWII service. To see that this is unlikely, note that the VA reports that 19.5% of eligible females used their benefits to attend college and the estimates in column one of Table 2 highlight that WWII veterans are 19 percentage points more likely to report attending at least some college. The available

evidence therefore suggests veterans were not especially more likely to have attended college prior to their service, relative to other female high school graduates.[18] If my census sample is representative, it therefore appears that differences in educational attainment between female veterans and non-veterans are entirely explained by those veterans who attend college *after* serving in WWII.

It is still possible, however, that those who attended college after serving in WWII would have attended college absent any G.I. Bill benefits. For this to be a significant source of bias, there would have to be a large number of females who enlisted who were high school graduates and yet (because females had to be 21 to enlist) did not attend college between the ages of 18 and 21. On the other hand, given such requirements, selection is just as likely to work in the opposing direction. That is, the overall probability of attending college for females (or, indeed, males) age 21 or older, conditional on not attending college between age 18 and 21 is likely small. Furthermore, among those choosing to enlist (because few could have anticipated any educational benefits at the time they enlisted) the *ex-ante* probability of subsequent college attendance, absent G.I. benefits, could be lower relative to those who choose not to enlist.

The mid-1944 announcement of the G.I. Bill additionally limits the value of selecting into service primarily to obtain educational benefits. Given WWII G.I. benefits were awarded to those who served between September 1940 and July 1947 (see Stanley, 2003 p. 674), only those who were already enlisted at the time of the announcement would have enough time to obtain the quantity of G.I. Bill benefits sufficient to complete a college degree (each month of active duty provided an additional month of G.I. Bill benefits).[19] It is possible that some delayed their exit from service to maximize their G.I. Bill benefits. Such behavior clouds identification only if there is a correlation between that delay (thereby increasing the quantity of G.I. benefits) and the individual's pre-enlistment likelihood of attending college after their period of service. In such a case, the causation would be reversed, college attendance would, at least to some degree, "predict" G.I. Bill benefits. Given the available evidence suggests few female veterans were likely

[18] It is possible that some veteran females did not use their G.I. Bill benefits to attend college (lack of eligibility, attending outside of the benefit time period, and so on). Unfortunately, my data does not allow me to determine eligibility for benefits or when females attended.

[19] The July 1947 cut-off ensures that any who turn 21 in 1947 essentially could not obtain any significant quantity of benefits, which is why I limit my main sample to those born no later than 1925 (and turn 21 in 1946).

Table 3: Selection After G.I. Bill Announced

	(1) Any College (OLS)	(2) Completed Degree (OLS)	(3) Years of College (Poisson)	(4) In Labor Force (OLS)	(5) Employed (OLS)	(6) Annual Wages (OLS)
WWII Vet × (Birth Year ≥ 1923)	-0.090***	-0.064***	-0.271***	0.010	-0.004	-116.09
	(0.011)	(0.009)	(0.028)	(0.008)	(0.007)	(269.73)
Observations	256,326	256,326	256,326	256,326	135,818	131,131
R-squared	0.032	0.020		0.062	0.003	0.30

Data: 1980 PUMS 5% Census Sample. In all specifications, non-veterans are female high-school graduates born between 1919 and 1925 who do not enlist in the armed forces during the WWII period.

to attend college without G.I. benefits, and the fact that enlistment is concentrated prior to the announcement of G.I. benefits, it seems unlikely that such behavior could be a significant source of bias.

At the same time, because I do not observe the quantity of benefits available nor individual army enlistment dates I cannot completely rule it out. Instead, to try to directly address this potential source of bias, I present estimates where I interact WWII veteran status with an indicator for those who turned 21 after June 1944 in Table 3. These later-born individuals could be aware of the available G.I. benefits prior to being old enough to enlist, and could be driving the increased educational attainment of veterans purely via selection effects once the benefits became known. On the other hand, data on college attendance in Table 1 illustrates that those who were old enough to enlist in 1943 or earlier (rather than after 1943) were significantly more likely to attend college. The estimates in Table 3 reinforce that pattern. Looking at the interaction term only, veterans who served in WWII but who were only eligible to serve after 1943 are somewhat less likely to attend college, complete their degree, and have fewer years of college compared to those who could enlist before the G.I. Bill was announced. These estimates suggest that females selecting into service upon learning of the G.I. Bill's potential benefits are not driving my estimates.

The estimates in Table 3 also ease concerns that those who were planning to attend college in the future (for whatever reason) were significantly more likely to enlist across the WWII period. For example, if veterans were generally more likely to attend college after service, theory would suggest that the G.I. Bill's announcement should further increase that proportion, at least at the

Table 4: Education Interaction Estimates

	(1) Annual Wages	(2) Annual Wages	(3) Annual Wages
Any College?	6,342.98***		
	(155.30)		
WWII Veteran × Any College?	-286.66		
	(190.95)		
Years of College		745.86***	
		(97.69)	
WWII Veteran × Years of College		-213.78	
		(313.52)	
Degree (= Completed 4 or more Years of College)			6,361.64***
			(157.91)
WWII Veteran × Degree (= Completed 4 or more Years of College)			-583.55**
			(234.25)
Observations	131,163	131,163	131,163
R-squared	0.11	0.11	0.11

Data: 1980 PUMS 5% Census Sample. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. All estimates include controls for age, race, marital status, and state.

margin. In turn, then those who turn 21 after 1943 should be especially likely to attend college relative to enlistees in prior years, but they are not.

To further ease concerns that those who took up the offer of G.I. Bill benefits were positively selected, I present estimates that interact veteran status with indicators for educational attainment in Table 4. There, I find suggestive evidence of mild negative selection, in the sense that veterans experience a smaller boost in earnings from education relative to non-veterans. It is possible therefore, that instrumental variable (IV) estimates will be larger than OLS estimates of the impact of education on earnings when focusing on veterans. Essentially, a valid IV may estimate a larger local average treatment effect because the instrument changes the behavior of veterans only for whom the positive effects of more education might be larger than average. Such a pattern is consistent with the higher average wages of veterans relative to non-veterans among those who do not attend any college (see Table 1).

4.2 IV Estimates

In Table 2, I show that WWII veterans' educational attainment and annual earnings from employment are significantly greater than comparable non-veterans. Combining administrative data along with enlistment patterns and requirements, I then show that the additional educational attainment must be due to veterans obtaining education after their service, that veterans were not especially likely to be those that attend college even if they did not obtain G.I. benefits (Table 3 and related discussion), and that veterans were not likely to benefit disproportionately from education (Table 4 and related discussion). My final empirical exercise demonstrates that those induced to attend college by the G.I. Bill's generous benefits are driving most of the overall earnings premium experienced by female veterans. Specifically, to try to isolate how increased education, caused by the G.I. Bill, affected veterans' earnings, I use age at the time of the G.I. Bill's announcement to instrument for increased educational attainment among veterans;

$$Educ_i = \alpha + \tau Age_{i,1944} + X_i\beta + \epsilon_i. \tag{2}$$

The idea with this approach is that army enlistment patterns, the 1944 announcement of the G.I. Bill, and the fact that longer periods of service granted more G.I. benefits, mean that female veterans born in 1919, and therefore old enough to enlist several years prior to the G.I. Bill's announcement, could take greater advantage of the G.I. Bill's unexpected benefits. My data are at least consistent with such a claim; in Table 1, I show that female veterans born earlier were much more likely to attend college compared to later-born veterans. Using predicted education values ($\widehat{Educ_i}$) I then estimate how additional education affects veterans' earnings;

$$Wages_i = \theta + \phi\widehat{Educ_i} + X_i\Gamma + \mu_i. \tag{3}$$

In practice, I use age in 1944 to instrument for three different measures of educational attainment for veterans: any college, four or more years of college (equivalent to a Bachelor's degree or more), and total years of college. I present the associated two-stage least squares estimates, alongside the associated reduced-form OLS estimates, in Table 5. All specifications adjust standard errors for clustering at the state level and include state fixed effects while controlling for marital status

and race. My OLS estimates further control for year-quarter of birth. My IV estimates do not control for year-quarter of birth because I use age as an instrument. The OLS estimates show that attending any college increases veteran's earnings by $2,392, completing at least four-years of college increases earnings by $3,567, and that each additional year of college corresponds to a $919 increase in earnings relative to veterans with only a high-school education.[20] Each estimate is significant at the 1% level. Because veterans obtained more education, and because more education appears to increase earnings, my OLS estimates suggest it is possible that the G.I. Bill (via increased education) explains most or all of the $1,887 earnings premium for female veterans in 1980.

On the other hand, the OLS estimates combine veterans who already attended college (or would have attended absent any G.I. benefits) with those who attended only because of the G.I. Bill. In my IV estimates, where I instrument for later educational attainment using age in 1944, I find evidence that the OLS estimates likely underestimate the effect of G.I. Bill-induced education on earnings for female veterans. Specifically, the estimates suggest that female veterans induced to attend at least some college by the G.I. Bill have $6,485 greater annual earnings, those who complete four or more years of college experience $8,214 greater annual earnings, and that each additional year of college corresponds to a $1,350 increase in annual earnings. Each estimate is significant at the 10% level and first stage F-statistics indicate that the instrument is not weak. Note again that using age in 1944 as an instrument (among individuals born between 1919 and 1925) is conceptually valid because age in 1944 is clearly correlated with educational attainment (see Table 1) and is unlikely to be directly correlated with differences in earnings in 1980, other than through its effect on education. Furthermore, the difference between the OLS and IV estimates is aligned with the literature on the returns to education described by Card (2001). Card explains that "instrumental variables estimates of the return to schooling typically exceed the corresponding OLS estimates - often by 20 percent or more." Examples of such findings using U.S. data include Angrist and Krueger (1991), Kane and Rouse (1995), and Staiger and Stock (1997).

My two-stage least squares estimates suggest that 72.5% of the overall earnings boost for female veterans can be explained by the additional earnings of those who used their G.I. benefits

[20]Note that the OLS estimates in Table 5 refer only to veterans and are therefore not directly comparable to the estimates in Table 4.

Table 5: Two-Stage Least Squares Wage Estimates

	OLS Estimates			IV Estimates (IV = Age at time of GI Bill Announcement)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Annual Wage	Annual Wage	Annual Wage	Annual Wage	Annual Wage	Annual Wage
Any College	2,391.88***			6,495.00*		
	(213.60)			(3,354.15)		
≥Bachelor's Degree		3,566.96***			8,214.15*	
		(220.78)			(4,322.14)	
Years of College			918.80***			1,350.18*
			(53.65)			(696.94)
F-Stat First Stage				32.92	24.60	46.78
Observations	4,984	4,984	4,984	4,984	4,984	4,984
R-squared	0.07	0.08	0.09	0.02	0.03	0.08

Data: 1980 PUMS 5% Census Sample restricted to female veterans born 1919 to 1925. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. All specifications include state fixed effects and control for marital status and race. My OLS estimates also control for year-quarter of birth. My IV estimates do not control for year-quarter of birth because I use age as an instrument.

to attend college. My back-of-the-envelope calculation relies on my earlier OLS estimates of the increase in any college (19 percentage points) and college completion (41% of those who complete any college) along with my IV estimates of the returns to education for those induced to attend ($6,495 per year) or complete college ($8,214 per year). Using those values, $6,495×.19×.59 + $8,214×.19×.41 = $1,368, which is 72.5% of the $1,877 overall increase in earnings for female veterans.

My IV estimates further limit concerns regarding positive selection relative to future earnings potential. Given the pattern of estimates, we would not expect veterans to be significantly more productive absent their additional education, as might be the case if IV estimates were smaller than OLS estimates. Moreover, because the estimates in Table 5 are restricted to veterans, they ease concerns that military service itself, by providing experience or on-the-job training, explain all of the veterans' earning premium.

5 Conclusion

By providing generous benefits to veterans, the 1944 Servicemen's Readjustment Act (the "G.I. Bill") improved access to higher education for millions of Americans. The G.I. Bill's educational benefits were considerable: veterans could receive up to $500 (nominal dollars) per year for tuition, fees, and books, plus a $50 monthly allowance for living expenses. For context, average tuition in 1948 was just over $400 at private universities and from 1945 to 1950 the federal minimum wage was 40 cents per hour. To date, however, little is known about how the G.I. Bill affected female veterans. Because of persistent differences in wages by gender, it is particularly important to study whether greater access to education can improve female labor market outcomes. To do so, I examine the long term effects of the G.I. Bill on female World War II veterans who appear in the 1980 Census 5% Public-use Microdata Sample. My estimates focus on differences in educational attainment and labor market outcomes. I find that, in 1980, female veterans are 19 percentage points more likely to report having attended at least some college, 7.8 percentage points more likely to report completing four years of college or more, and are 4.5 percentage points more likely to be in the labor force relative to non-veteran female high school graduates. Further, using a Poisson model, I find that female veterans complete 49.8% more years of college than non-veteran females, conditional on having a high school diploma. Given such differences in educational attainment, it is not surprising that veteran status is associated with $1,887 in additional annual earnings for female veterans relative to non-veterans.

While my findings are at least consistent with a claim that the G.I. Bill caused an increase in educational attainment and subsequent earnings among veterans, there are at least three plausible alternate explanations. The first is selection on existing or planned educational attainment. The second is selection on ability or productivity. The third is that WWII service exerts its own impact, absent any G.I. Benefits or selection effects. To limit such concerns, I show that attendance after service explains virtually all of the gap in female veterans' educational attainment. I further show that female veterans who obtain a college education do not experience a larger overall "return" to education relative to non-veterans, which suggests that veterans overall are not especially likely to benefit from college. Mild differences in the overall returns to education also suggest that service itself does not exert an important independent impact on future labor market outcomes.

Indeed those estimates, combined with IV estimates that use age in 1944 as an instrument suggest that veterans who used their G.I. benefits to attend college may have been somewhat negatively selected.

Age in 1944 works as an instrument because it is correlated with educational attainment but is unlikely to directly affect differences in earnings in 1980. Notably, my IV estimates imply that 72.5% of the overall earnings boost for female veterans can be explained by the additional earnings of those who used their G.I. benefits to attend college. Further, my IV estimates suggest that those induced to attend college by the G.I. Bill experience a $6,495 increase in annual earnings, which amounts to 69.4% of the overall wage gap among males and females at the time (the overall gender wage gap was $9,496 in 1980 among male and female high school graduates who work full-time and were born between 1919 and 1925). Overall, my findings suggest that the G.I. Bill caused significant additional educational attainment among females, and that such education lead to substantial increases in earnings for those females across their lifetime.

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Appendix A Additional Estimates

A.1 High School Completion Status

The National Museum for the U.S. Army states that female enlistees had to be "high school graduates between 21 and 45 years of age."[A1] Despite the stated requirements, my data has a small number of females who report being a WWII veteran and who do not report having a high school diploma. As a robustness check, I present estimates that expand my sample to all females, regardless of high-school completion status, in Table A1. Unsurprisingly, because including those without a high school diploma tends to reduce the overall sample means for educational attainment and earnings, expanding the sample in this manner tends to increase the effect of WWII service on the various outcomes.

A.2 Medical Professions

Because one source of problematic selection could be that those in medical occupations may have been more educated prior to enlistment, I present estimates in Table A2 where I again exclude those who do not report having a high school diploma but also exclude any who report being a nurse or doctor in 1980. Reassuringly, when my sample excludes such females, my findings are only very mildly attenuated.

A.3 Wider Sample of Birth Years

Another source of problematic selection is that, by 1980, anyone born in 1915 would be 65 years old. For females, as I mention in the main text, those age 62 (= b. 1918) are the first birth year cohort for whom a majority (51%) are retired (technically, "not in the labor force"). That means that the oldest birth year cohort for whom a majority are not retired in 1980 are those who were born in 1919, and who therefore turn 21 in 1940. Because those born prior to 1919 are more likely to be retired, and because they would have been 23 or older when the U.S. entered WWII (they may have already married, had kids, and so on), I exclude them from my main estimates. One further reason to restrict the sample this way is to ensure it is more comparable to those

[A1] See https://armyhistory.org/skirted-soldiers-the-womens-army-corps-and-gender-integration-of-the-u-s-army-during-world-war-ii/.

born between 1926 and 1930, who are my "between-cohort" control group. To formally illustrate, however, that I am not cherry-picking my sample, I present estimates in Table A3 where I once again exclude those who do not report having a high school diploma but expand the sample to include females born as early as 1915. Reassuringly, when my sample includes such females, my findings are essentially the same as when I restrict the sample to those born in 1919 or later.

Table A1: Estimates Including All Females b. 1919-1925

	Non-Veterans = All Non-Veteran Females born 1919-1925					
	(1)	(2)	(3)	(4)	(5)	(6)
	Any College	Completed Degree	Years of College	In Labor Force	Employed	Annual Wages
	(OLS)	(OLS)	(Poisson)	(OLS)	(OLS)	(OLS)
WWII Veteran	0.236***	0.096***	0.795***	0.039***	0.001	2,372.37***
	(0.005)	(0.006)	(0.023)	(0.006)	(0.003)	(126.20)
Observations	426,163	426,163	426,163	426,163	203,649	194,883
R-squared	0.032	0.015		0.073	0.003	0.04

Data: 1980 PUMS 5% Census Sample. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. Here, I restrict the sample to females who turned 21 between 1940 and 1946, regardless of whether they report having a high school diploma or not. Non-veterans are, therefore, all females born between 1919 and 1925 who do not enlist in the armed forces during the WWII period. All specifications include state fixed effects and control for marital status, age (measured in quarters), and race.

Table A2: Estimates Excluding Nurses and Doctors

	Non-Veterans = Non-Veteran Female HS Graduates born 1919-1925					
	(1)	(2)	(3)	(4)	(5)	(6)
	Any College	Completed Degree	Years of College	In Labor Force	Employed	Annual Wages
	(OLS)	(OLS)	(Poisson)	(OLS)	(OLS)	(OLS)
WWII Veteran	0.166***	0.071***	0.451***	0.017**	-0.006*	1,610.11***
	(0.005)	(0.006)	(0.013)	(0.008)	(0.004)	(140.46)
Observations	249,677	249,677	249,677	249,677	130,470	125,890
R-squared	0.031	0.019		0.070	0.003	0.05

Data: 1980 PUMS 5% Census Sample. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. Here, I restrict the sample to females who turned 21 between 1940 and 1946, who have a high school diploma, and do not report being either a nurse or a doctor. Non-veterans are, therefore, all females with a high-school diploma born between 1919 and 1925 who do not enlist in the armed forces during the WWII period and are not nurses or doctors in 1980. All specifications include state fixed effects and control for marital status, age (measured in quarters), and race.

Table A3: Estimates for Female High-School Graduates b. 1915-1925

	Non-Veterans = Non-Veteran Female HS Graduates born 1915-1925					
	(1)	(2)	(3)	(4)	(5)	(6)
	Any College	Completed Degree	Years of College	In Labor Force	Employed	Annual Wages
	(OLS)	(OLS)	(Poisson)	(OLS)	(OLS)	(OLS)
WWII Veteran	0.201***	0.091***	0.526***	0.029***	-0.003	1,846.68***
	(0.005)	(0.005)	(0.016)	(0.005)	(0.003)	(137.37)
Observations	369,905	369,905	369,905	369,905	175,652	169,616
R-squared	0.032	0.021		0.095	0.003	0.04

Data: 1980 PUMS 5% Census Sample. Standard errors, clustered at the state level, in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Dollar values are $1980. Here, I restrict the sample to females who turned 21 between 1936 and 1946, who have a high school diploma. Non-veterans are, therefore, all females with a high-school diploma born between 1915 and 1925 who do not enlist in the armed forces during the WWII period. All specifications include state fixed effects and control for marital status, age (measured in quarters), and race.