Reintegrating Veterans into the Civilian Labor Market: Evidence from the 1918 Vocational Rehabilitation Act

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This Version: April 6, 2015

Abstract

This paper measures the extent to which wounded and disabled veterans are reintegrated into the civilian labor market using a linked sample of World War I veterans. Specifically, veterans' military service abstracts are linked to the 1940 United States Census and the 1942 "Old Man's Draft" Registration Cards. This creates a new dataset that contains military service information, labor market outcomes, and physical characteristics of World War I veterans. Relative to those that were neither wounded nor disabled, I find that severely wounded and disabled veterans had higher incomes, worked more weeks, and had higher wages in 1939. Disabled veterans, however, were less likely to be in the labor force. These findings suggest that government rehabilitation programs, mandated by the 1918 Vocational Rehabilitation Act, were successful at reintegrating wounded and disabled veterans into the civilian labor market.

*I am extremely grateful to Werner Troesken, Allison Shertzer, and Randy Walsh for their support, guidance, and helpful feedback on this project. I would also like to thank Brian Beach, Daniel Jones, Martin Saavedra, Tate Twinam, and the entire University of Pittsburgh Applied Microeconomics Brownbag for their feedback and suggestions. Any mistakes are my own. **Contact:** Department of Economics, University of Pittsburgh, 4901 Wesley W. Posvar Hall, 230 South Bouquet Street, Pittsburgh, PA 15260 (comments welcome at: ejs83@pitt.edu).

1. Introduction

The burdensome task of reintegrating veterans (wounded or otherwise) into civilian life is a major problem currently facing the U.S. Department of Veterans Affairs. The Los Angeles County Veterans Study found that over two-thirds of post September 11th veterans reported difficulties adjusting to civilian life and 80% did not have a job lined-up when they left the military (Castro et al. (2014)). Furthermore, the unemployment rate for these veterans has been consistently higher than the unemployment rate for comparable nonveterans. In 2013, the average unemployment rate among male 18-24 year old veterans was 24.3% while the rate for comparable nonveterans was 15.8% (Bureau of Labor Statistics: Employment Situation of Veterans – 2013).[1] These statistics are coupled with recent reports about the efficacy of the Department of Veterans Affairs' Vocational Rehabilitation and Employment (VR&E) program, which is in charge of the rehabilitation of veterans. A 2007 audit of VR&E revealed that between 2002 and 2006 only 12% of the 464,542 veterans who participated in the program actually completed it. Furthermore, the audit revealed that the majority of veterans exited the program before completing a written rehabilitation plan, which is considered a preliminary step to rehabilitation.[2] The 2007 Veterans Employability Research Study found that 37% of VR&E participants reported being dissatisfied with the program and 20% reported that the program was not at all important in helping them prepare for a suitable job. These reports raise the question: what are features and characteristics of successful rehabilitation programs? This paper examines this question by looking at the Vocational Rehabilitation Act of 1918. There is anecdotal evidence that this Act was successful in rehabilitating veterans, such as a 72% rehabilitation rate and a 97% job placement rate for rehabilitated trainees.[3] Despite this anecdotal evidence, this paper represents the first formal empirical study of the labor market outcomes of veterans who entered the program.

To study the labor market outcomes of veterans who entered the World War I vocational rehabilitation program I construct a linked dataset that contains information on veterans' military service experiences, and labor market outcomes. The first data source is the New York Abstracts of World War I Military Service, which provide rich information on the wartime experiences of New York soldiers. Specifically, I observe whether a soldier was wounded in combat, the severity of the wound, a measure of the extent to which the soldier was disabled when discharged

[1] The unemployment rate among female veterans in the 18-24 age group is 14.3% compared to a nonveteran average of 12.8%.

[2] *Department of Veterans Affairs Office of Inspector General: Audit of Vocational Rehabilitation and Employment Program Operations*.

[3] *The Historical Development of Veterans' Benefits in the United States.*

from the Army, the soldier's ranks, and any citations the soldier was awarded. These soldiers are then linked to the 1940 United States Federal Census and the 1942 "Old Man's Draft" Registration Cards. These two data sources contain information on veterans' labor market outcomes and physical characteristics. Unfortunately, I do not observe whether a veteran entered the vocational rehabilitation program, however, rehabilitation was aimed at veterans who had been wounded or disabled in combat.[4] Accordingly, I find that severely wounded veterans have incomes that are 20% higher and work 2 weeks more a year than veterans who were neither wounded nor disabled. Disabled veterans have incomes that are 10% higher and work 2 weeks more a year than veterans who were neither wounded nor disabled. These results do not appear to be driven by unobservable characteristics of severely wounded and disabled veterans. They are also not driven by government transfer payments or wounded veterans receiving a premium from employers because they are perceived as heroes. I conclude that vocational rehabilitation was successful at reintegrating severely wounded and disabled veterans into the labor market.

This paper is most closely related to the literature on the long-run impact of veterans' wartime experiences. Costa and Kahn (2007) show that Union Army prisoners of war (POWs) during the American Civil War had higher survival probabilities if they had a friend in the POW camp. They measure friendship based on ethnicity, kinship, and hometown. Costa and Kahn (2010) find that Union Army veterans who experienced greater wartime stress — measured either as the percent of a company that died of wounds or the number of soldiers in a regiment killed in action (KIA) — had higher mortality rates later in life. However, these results were tempered if a unit was more cohesive in terms of ethnicity, occupation, and wage.

A few papers specifically look at how veterans' wartime experiences affect their labor market outcomes. Savoca and Rosenheck (2000) use the National Survey of the Vietnam Generation and find that Vietnam War veterans diagnosed with anxiety disorders, major depression, substance abuse, or Post-Traumatic Stress Disorder (PTSD) were less likely to be employed than Vietnam War veterans without these conditions. Conditional on being employed, PTSD and major depression also led to lower hourly wages. Savoca and Rosenheck did not find that exposure to high levels of wartime stress had a significant effect on employment or earnings after controlling for these psychiatric disorders. Costa (2012) examines Union Army POWs and finds that those who were under the age of 30 at imprisonment had higher mortality and morbidity rates later in life than their non-POW counterparts, while those over the age of 30 at imprisonment had lower

[4]Trainee record cards are located at the National Archives in Washington, D.C. I plan on collecting these records this summer to determine whether a veteran entered the rehabilitation program.

mortality and morbidity rates. The explanation provided for this counterintuitive result is that older men at imprisonment (over the age of 30) who were able to survive the POW camps were physically stronger. Costa also finds that POWs under the age of 30 at imprisonment were more likely to be laborers and less likely to hold wealth in 1870 than non-POWs. By 1900 there was no difference in homeownership between POWs and non-POWs. Finally, Laschever (2009) uses a sample of World War I veterans and finds that each additional veteran in one's company who gains employment increases the probability that the veteran himself will be employed. This suggests that social networks were formed amongst World War I veterans who served in the same company (approximately 200 men).

This work contributes to the literature on the long-run impact of veterans' wartime experiences in several ways. First, this is the first study, to my knowledge, that attempts a long-run labor market follow-up to determine if rehabilitation is successful at reintegrating veterans into the labor market. Second, the results in this paper provide policy implications about the characteristics and features of a successful rehabilitation program. Finally, the results indicate that, given proper rehabilitation, veterans can overcome severe disabilities and actually have better labor market outcomes than their nondisabled peers.

The remainder of the paper is organized as follows: Section 2 discusses the history of the World War I vocational rehabilitation program. Section 3 describes the data sources, and Section 4 presents the main empirical results. Section 5 discusses potential confounders to identification and argues that the main empirical results are the causal effect of rehabilitation. Section 6 concludes.

2. World War I Vocational Rehabilitation

Rehabilitating wounded and disabled veterans to help them reintegrate into civilian life was of particular interest during World War I. Europe had been at war for nearly three years before the United States of America entered the conflict. Americans expected that medical advances would allow a larger percentage of wounded soldiers to survive the war than any previous war.[5] The discovery of sodium citrate as an effective anticoagulant allowed for the first successful battlefield blood transfusions. X-ray machines saw widespread use during surgery to remove bullets and shrapnel. The use of mobile bacteriology laboratories allowed surgeons to test bacteria counts before closing a wound and the introduction of Carrel-Dakin's solution greatly reduced mortal-

[5] *The Historical Development of Veterans' Benefits in the United States*: 130.

ity due to wound infection (Gabriel and Metz (1992)). Finally, motorized ambulances allowed wounded soldiers to be quickly transported from the front lines to a hospital.[6] As a result of these medical advances, many soldiers that might have died during previous wars returned to the United States with severe wounds and disabilities. The United States Congress, recognizing the challenge that wounded and disabled veterans had reintegrating into the civilian labor market, passed the War Risk Insurance Act. This act provided five basic benefits to World War I veterans: "(1) support for the dependents of members of the Armed Forces during service; (2) low-cost life insurance on a voluntary basis; (3) compensation for the war-disabled and for the dependents of the dead; (4) vocational rehabilitation for the disabled, and (5) medical and hospital care."[7]

2.a. Vocational Rehabilitation

The goal of World War I vocational rehabilitation was to rehabilitate disabled veterans for a specific job so they could be gainfully employed. Wounded and disabled veterans could undertake two types of training: education and placement. Education training usually took place in a school and placement training placed veterans "an apprentice like arrangement for a specific job."[8] The placement or on the job training "was found to be the best form of training for a great many vocations" and veterans often trained with firms who guaranteed employment after training was complete.[9] During the course of training wounded and disabled veterans were paid $100 a month if they had no dependents and $120 a month if they had dependents. A total of 675,000 veterans applied for rehabilitation, 180,000 entered training, and 129,000 successfully completed the program.[10] In total, $645 million were spent rehabilitating disabled veterans. A 1956 report to President Eisenhower claims that the program was an enormous success. Government representatives "maintained contacts with employers to secure their cooperation" in hiring rehabilitated veterans and "in general employment representatives were successful in placing trainees."[11] By the end of the program in 1928, 97% of disabled rehabilitated veterans had been successfully placed in employment.[12]

Vocational rehabilitation was not an option for wounded and disabled soldiers, but rather a societal expectation. Wounded and disabled veterans were expected to do everything in their power

[6] See Gabriel and Metz (1992) for a more complete history of medical advances used during World War I.
[7] *The Historical Development of Veterans' Benefits in the United States*: 25-26.
[8] *The Historical Development of Veterans' Benefits in the United States*: 131.
[9] Thurber (1944): 18.
[10] About 337,000 of the veterans who applied to the program were deemed eligible to be trained and admitted to the program. Clearly, not all veterans admitted to the program accepted the offer.
[11] *The Historical Development of Veterans' Benefits in the United States* (1956): 131.
[12] Due to limited resources, no records of veteran placements were kept.

to once again become productive members of society. Linker (2011) writes "Since wage earning often defined manhood, rehabilitation was, in essence, a process of making a man manly...Relying on the breadwinner ideal of manhood, those in favor of pension reform began to define disability not by a man's missing limbs or other physical incapacity, but rather by his will (or lack thereof) to work." In fact, the World War I "Creed of the Disabled" declares: "Once more to be useful - to see pity in the eyes of my friends replaced with commendation - to work, produce, provide, and to feel that I have a place in the world - seeking no favors and given none - a MAN among MEN in spite of this physical handicap."[13] The enormous societal pressure placed on wounded and disabled veterans to become productive members of society would have pushed many veterans to participate in rehabilitation and become successfully reintegrated into the civilian labor market.

The goal of this paper is to determine whether vocational rehabilitation was successful at reintegrating veterans into the civilian labor market. Since I do not observe whether a veteran entered the rehabilitation program it is important to understand who was eligible for rehabilitation. The War Risk Insurance Act specified, in Article III, Section 304, that veterans would be rehabilitated "in cases of dismemberment, of injuries to sight or hearing, and of other injuries commonly causing permanent disability".[14] This language was progressively softened over the years beginning with the Vocational Rehabilitation Act of 1918. The War Risk Insurance Act provided the mandate for vocational rehabilitation, but the Vocational Rehabilitation Act filled in the actual details. This Act specified that a veteran could be rehabilitated if he was "disabled under circumstances entitling him, after discharge from the military or naval forces of the United States, to compensation under Article III of the [War Risk Insurance] Act...and who, after his discharge, in the opinion of the board, is unable to carry on a gainful occupation, to resume his former occupation, or to enter upon some other occupation".[15] The Vocational Rehabilitation Act removed the strict requirements for rehabilitation and placed the decision of eligibility in the hands of the Federal Board for Vocational Rehabilitation. The eligibility for vocational rehabilitation was further liberalized in 1919 when the Vocational Rehabilitation Act was amended. Vocational rehabilitation was extended to all veterans "having a disability incurred, increased, or aggravated while a member of such [Armed] forces, or later developing a disability traceable in the opinion of the board to service with such [Armed] forces, and who, in the opinion of the Federal Board for

[13] *Carry On: A Magazine on the Reconstruction of Disabled Soldiers and Sailors*. Vol. 1, No. 6, March 1919: 2.
[14] The Statutes at Large of the United States of America from April 1917, to March, 1919 Vol. 40: 407.
[15] The Statutes at Large of the United States of America from April 1917, to March, 1919 Vol. 40: 617.

Vocational Education, is in need of vocational rehabilitation to overcome the handicap".[16] In this amendment, rehabilitation was extended to veterans who developed a disability after discharge that was believed to have originated from their military service. Finally, the World War Adjusted Compensation Act of 1924 extended rehabilitation to any veteran who developed a disability prior to July 2, 1921 that was believed to have been connected to their military service.[17]

The natural result of the liberalization of vocational rehabilitation is that many veterans, who were not disabled when they were discharged from the Armed Forces, ended up entering vocational rehabilitation. It is estimated that 200,000 American soldiers were wounded during World War I, of whom only a fraction were rated as being disabled when they were discharged.[18] However, 180,000 veterans entered into a course in vocational rehabilitation.

2.b. Military compensations

Military compensations were also designed to provide support for disabled veterans. Due to the unpopularity of military pensions during the World War I era, the War Risk Insurance Act changed the name of payments made to disabled veterans from "pension" to "compensation".[19] Compensation had the connotation of reimbursement for a loss, as opposed to pension, which connoted charity. The compensation program went through several phases of liberalization and economy during the 1920's and 1930's. By 1939 (the year for which labor market outcomes are reported in the 1940 census), payments had reverted back to being called pensions, which were only made available to veterans under very stringent conditions. Veterans had to have 90 days of service, part of which must have been during the war; an honorable discharge; permanent and total disability not of their own cause, and demonstrate income less than $1,000 a year if single and less than $2,500 if married or had dependent children. If a veteran met these criteria than they would be eligible to receive a pension of $40 a month or $480 a year. Thus, it is possible that a veteran received both rehabilitation training and a pension. Veterans receiving pensions will not confound my analysis of the effect of vocational rehabilitation on labor market outcomes because I indirectly observe whether a veteran receives a pension in the 1940 census.[20]

[16] The Statutes at Large of the United States of America from May 1919, to March, 1921 Vol. 41: 159.
[17] The Statutes at Large of the United States of America from December 1923, to March, 1925 Vol. 43: 627.
[18] Leland and Oboroceanu (2010)
[19] Military pensions were unpopular at this time due to a generous Civil War pension system, which had cost over $5 billion by 1916; Glasson (1918), 123.
[20] This is discussed in greater detail in Section 5.a.

3. Data

3.a. Data

World War I provides a unique opportunity to study the effect of vocational rehabilitation on veterans' labor market outcomes due to publicly available data. Four data sources are used in this paper. The first source is the regimental histories of the 105th and 107th Infantry Regiments provided by the New York State Military Museum. The second source is the New York State Archives Abstracts of World War I Military Service. The third data source is the 1940 United States Federal Census. The final data source is the 1942 "Old Man's Draft" Registration Cards.[21] Only veterans from New York are used in this study because most records of military service during World War I were destroyed during a 1973 fire at the National Personnel Records Center of the National Archives. In 1920, the State of New York procured a duplicate copy of the service record of New York veterans who served in World War I in accord with the Laws of 1919. These laws directed the state "to compile, collect, and preserve the 'records and relics...relating to the wars in which the state participated."'[22] Therefore, the New York Abstracts of World War I Military Service represent the most comprehensive source of information on World War I veterans' wartime experiences.[23]

My sample consists of soldiers who served in the 105th and 107th Infantry Regiments of the New York National Guard. The histories of these regiments contain a roster, which lists the name of all soldiers who served in the regiment during World War I and the company they served with.[24] Panel A of Figure 1 shows the name Warren Bush in the regimental history of 105th Infantry Regiment. Note that even though the company Warren Bush served with is not listed in the figure, I do observe this information from the New York Military Museum.

The Abstracts of World War I Military Service contain a summary of service for all 514,859 New York men and women who served in the United States Armed Forces in World War I (Army, Navy, Marine, and Nurses). The abstracts record a veteran's name, race, address of residence, place and date of enlistment or induction into the Armed Forces, city and state (or country) of birth, age or date of birth, units served with (including transfer dates), ranks and dates of promotions, engagements, whether wounded in action, the severity of the wound (slight, moderate,

[21] The author gratefully acknowledges Ancestry.com for providing searchable versions for most of these data sources.

[22] *A Spirit of Sacrifice: New York's Response to the Great War A Guide to Records Relating to World War I*. New York State Archives 1993. http://www.archives.nysed.gov/a/research/res_topics_mi_wwi.pdf.

[23] The State of New York provided about 10% of all military personnel during World War I.

[24] A regiment consisted of 16 companies; companies A - M were infantry companies (there was no company J), the headquarters company, the sanitary detachment, the supply company, and the machine gun company.

severe, undetermined, or gassed), the date of the wound, the range of dates served overseas, the date discharged from the Armed Forces, the percent of physical disability at discharge, and whether the soldier was awarded any citations. Panel B of Figure 1 displays the service abstract of Warren Bush who won a Silver Star Citation.

The 1940 census includes the veterans' address of residence, marital status, citizenship status, age, occupation, whether their home is owned or rented, home value (rental value if rented), years of education, hours worked in the week prior to the census, number of weeks worked in 1939, and income in 1939. Panel C of Figure 1 displays the 1940 census entry for Warren Bush. Finally, the 1942 "Old Man's Draft" Registration Cards contain the veteran's street address in 1942, the name of someone who will always know the veteran's address (often a spouse), and the veteran's height and weight. Panel D of Figure 1 displays the 1942 "Old Man's Draft" Registration Card for Theodore T. Johnson. Note that this dataset is not fully complete. For the State of New York, only the records of individuals who lived in New York City are available. Veterans who lived in the State of New York, but not in New York City comprise a large percentage of my sample and, at the moment, it is impossible for me to find their 1942 "Old Man's Draft" Registration Card.[25] The four panels in Figure 1 allude to the fact that I will use a linking process to link the records in these four data sources. Since the 1942 "Old Man's Draft" Registration Cards are not complete, I use the information contained on these cards only to improve the accuracy of my linking algorithm and not for the actual analysis. Descriptive statistics for dependent and independent variables of interest are provided in Table 1.

3.b. Linking Process

There are three goals of the record linking process, which are described by Mill (2013): "(1) match as many records as possible; (2) make as few false matches as possible; (3) decrease bias in matching."[26] In this section I discuss the linking process, the link rates, and the representativeness of my linked sample.

Figure 2 diagrams the linking process and provides a visual aid to accompany the written description. The arrows in Figure 2 show the order in which the data sources are linked. The percentage displayed on the left side of the arrow is the link rate between the two data sources connected by the arrow. The percentage displayed on the right side of the arrow is the link rate between all data sources linked at that point. For example, the percentage to the left of the second

[25] I hope that these records will be made available through Ancestry.com in the future.
[26] See Mill (2013) or Feigenbaum (2014) for a discussion of linking methods.

arrow will display the link rate between the second and third data sources and the percentage to the right of the arrow will display the total link rate between the three data sources.

To begin the linking process, I use the regimental histories to obtain a veteran's name and the company the veteran served with. Next, I take the name and search for it in the New York State Archives Abstracts of World War I Military Service (on Ancestry.com). Once found, I digitize the information contained on the abstract.[27] Linking the name in the roster to the abstract results in a high link rate because there is usually only one veteran with a given name/surname combination that served in each company. Of the 5998 names that appear in the regimental histories of the 105th and 107th Infantry regiments, I was able to link 5228 to the military service abstract for a link rate of 87%. This is displayed in Figure 2 by the first arrow, which connects the regimental histories to the Abstracts of Military Service.

Next, I link the New York State Archives Abstracts of World War I Military Service to the 1942 "Old Man's Draft" Registration Cards (on Ancestry.com). To link to the 1942 "Old Man's Draft" Registration Cards I search for a veteran's record based on name, state of birth, city of birth, and year of birth. If there are multiple potential matches for a veteran, the veteran is left unlinked. Once a true match is identified, I digitize the information contained on the registration card. I searched for 1422 veterans in the 1942 "Old Man's Draft" Registration Cards and was able to link 486 of them for a 34% link rate. The link rate is low because, as previously mentioned, for the State of New York only individuals living in New York City can be found in the dataset. This step is also not displayed in Figure 2 for the previously mentioned reason.

The most important linking done in this paper is between the New York State Archives Abstracts of World War I Military Service and the 1940 United States Census. I use a linking algorithm proposed by Feigenbaum (2014) to perform this linking. A detailed explanation of this linking algorithm is provided in the Data Appendix at the end of this paper. Using this linking algorithm I am able to successfully link 2,570 veterans to the 1940 census, which is a 49% link rate from the abstracts to the 1940 census (2571 out of 5228). The total link rate from the regimental histories to the 1940 census is 43% (0.87×0.49 or 2570 out of 5998). This step in the linking process is depicted by the second arrow in Figure 2, which connects the Abstracts of Military Service to the 1940 census. The information contained on the "Old Man's Draft" Registration Cards is only used to improve the accuracy of the linking algorithm from the military service abstracts to the 1940 census. For example, the "Old Man's Draft" Registration Cards contain information on a

[27] Ancestry usually only digitizes information that will be used by genealogists. Thus, information about wartime experiences has not been digitized.

veteran's street address in 1942 and spouse's name. This information is valuable when trying to identify the correct individual in the 1940 census.

Of the 5228 veterans who were successfully linked to the Abstracts of Military Service, 429 (about 8% of 5,228), died during World War I.[28] Of the remaining 4,799 veterans who survived to the end of the war I estimate that an additional 507 (about 10% of 5,228) would have died before 1940 leaving only 4,242 alive in 1940.[29] Thus, the expected link rate between the Abstracts of World War I Military Service and the 1940 census is 81% (4,242 out of 5,228). As mentioned above, the actual link rate is 49%. The difference between the expected link rate and the actual link rate can be attributed to several sources. First, enumeration error is common in the United States Census. Robinson (1988) estimates that the underenumeration in the 1940 census was 5.4% of the population. This would be compounded if enumerators misspelled given names or surnames or if enumerators misrecorded birthplace or age (from which birth year is estimated). Finally, if a veteran emigrated out of the United States they would not have been enumerated in the 1940 census.

The main empirical results of this paper use the sample of veterans who have been linked to the 1940 census. My matched sample should, as much as possible, be representative of the entire sample I attempted to link since one of the three goals of the linking process is to decrease bias in the matched sample. Table 2 addresses the representativeness of my matched sample. The first column of Table 2 displays the mean value of various observable characteristics for my linked sample. The second column reports the corresponding information for the sample of unlinked veterans. The third column displays the difference between the linked and the unlinked means and the fourth column reports the probability that the difference is different from zero. The only differences that are significant at any conventional level are age and percent gassed and these differences are usually small in magnitude.[30] The fact that the linked and unlinked veterans appear very similar on observable characteristics lessens concerns about the representativeness of the linked sample.

The next section provides a brief history of the 105th Infantry Regiment. The 107th Infantry Regiment has an extremely similar history because both regiments fought in the 27th Infantry Division. The purpose of this history is to demonstrate that these infantry regiments are ideal for

[28] Not all deaths were KIA. Some soldiers died of wounds (DOW) and others died from other causes.

[29] This estimate comes from the following equation: 4799*(death probability for the average age in my sample in 1920)*(death probability for the average age in my sample in 1921)*...*(death probability for the average age in my sample in 1939). Death probabilities are taken from *Vital Statistics Rates in the United States 1900-1940.*

[30] The linked sample is, on average, about a quarter of a year younger than the unlinked sample. The linked sample has 14 veterans that were gassed and the unlinked sample contains 5 veterans who were gassed for a total of only 19 gassed veterans.

studying the effect of rehabilitation on labor market outcomes because they were heavily involved in combat and had many soldiers wounded in action.

3.c. History of 105th Infantry Regiment[31]

The 27th Infantry Division arrived in Europe in May 1918. On July 25, 1918 they were deployed into the front line. During the Ypres-Lys Offensive in late August, 1918 the 105th regiment attacked and advanced for several days facing "moderate German resistance" before they were relieved. The next major action the regiment saw was in the Battle of St. Quentin Canal which began on September 24, 1918 and lasted until October 21, 1918. The sole purpose of this offensive was to break the Hindenburg Line, which was "a complex system of German defenses with an average depth of six to eight kilometers." On September 27, 1918 the 105th attacked alongside the 106th and the two regiments successfully captured Quennemont Ferme (Farm), Guillemont Ferme, and a fortified hill called "The Knoll". A German counterattack recaptured all the land gained throughout the day. On September 29, 1918 the 105th led an attack to recapture "The Knoll", but the advance was halted by "savage amounts of machine gun fire that rained down from the elevated German positions." On October 17, 1918 the 105th once again attacked the German defenses and captured and held a part of the Hindenburg Line at L'Arbe de Guise against "vigorous counterattacks". The 105th advanced again the next day, but they were "halted by strong resistance." Finally, on October 19, 1918 the regiment advanced once again and this time they captured the main German line. They held the line until they were relieved two days later. Thus, the 105th Infantry Regiment along with the rest of the 27th Infantry Division accomplished the "supposedly impossible": they broke the Hindenburg Line. The regiment returned to the United States on March 19, 1919 and was mustered out.

I observe 2,915 soldiers in the roster of the 105th regiment. Of these soldiers, 1,284 were wounded, 253 were killed, and 72 later died of their wounds for a total of 1,537 regimental causalities. Thus, 11.1% of the regiment were killed and 52.7% of the regiment were casualties.

[31] Regimental histories are taken from the New York State Military Museums Unit History Project: http://dmna.ny.gov/historic/reghist/reghistindex.htm.

4. Empirical Strategy and Results

To estimate the extent to which vocational rehabilitation effects veterans' reintegration into the civilian labor market I use the following linear model:

$$y_i = wounded_i'\beta + X_i'\gamma + \varepsilon_i \tag{1}$$

In this equation, y_i is a labor market outcome for veteran i, $wounded_i$ is a vector of wounded categories for veteran i, X_i is a vector of individual control variables for veteran i, and ε_i is a random error term. There are seven mutually exclusive wounded categories: not wounded (the omitted category), slightly wounded, moderately wounded, severely wounded, wounded to an undetermined degree, gassed, and disabled.[32] When the labor market outcome is a binary variable, such as labor force participation, the following probit model is estimated:

$$Pr\left(y_i = 1 | wounded_i', X_i\right) = \Phi\left(wounded_i'\beta + X_i'\gamma\right) \tag{2}$$

All the variables in equation (2) are analogous to equation (1), and the function Φ is the standard normal cumulative distribution function. Recall that I do not observe whether a veteran entered vocational rehabilitation, however, veterans with more severe wounds would have been eligible for the rehabilitation program. The identifying assumption, which will be tested in Section 5, is that being wounded in combat is random. In all of the tables presented I will suppress the coefficients on moderately wounded and gassed because the moderately wounded category contains only 6 observations and the gassed category contains only 14 observations.[33]

The extent to which vocational rehabilitation effects veterans' labor market outcomes can be estimated on two extents. First, I estimate the extent to which rehabilitation effects labor market outcomes conditional on being employed (intensive margin). This will be done through outcomes such as income, number of weeks worked, weekly wage, and Occupational Income Score. Next, I estimate the extent to which rehabilitation effects veterans' participation in the labor market (extensive margin). This will be done through labor force participation and entrepreneurship.

Table 3 presents the main empirical results for the intensive margin. The dependent variable in columns (1) - (4) of Table 3 is the log of the veteran's self-reported income in 1939 conditional

[32] Most veterans who are disabled were also wounded (they are disabled because of their wound). I assign these veterans to the disabled category. This means that there are no disabled veterans in any category other than the disabled category.

[33] See the "Linked" column in Panel A of Table 7 for the number of observations in each wound category.

on being employed.[34] Column (1) controls for highest grade completed, age, age squared, and military company fixed effects.[35] Highest grade completed, age, and age squared control for ability and experience. The military company fixed effects control for heterogenous wartime experiences common to all members who served in the same military company. These fixed effects also control for unobserved place of origin effects since companies were usually formed locally.[36] The coefficient on severely wounded in column (1) indicates that severely wounded veterans earn 20% more than non-wounded veterans and it is highly statistically significant. The coefficient on disabled veterans indicates that disabled veterans earn about 9.5% more than non-wounded veterans. This coefficient is not statistically significant, but the p-value is 0.144. Recall that veterans with more severe wounds are the ones who would have been eligible for rehabilitation and it is precisely these veterans who are earning an income premium. The coefficient for veterans with all other types of wounds are small and insignificant.

Column (2) adds controls for the highest rank the veteran attained during World War I. This control can also be thought of as an ability control that is specific to the veteran's military service. The coefficients remain about the same with the coefficient on severely wounded being highly significant and the coefficient on disabled having a p-value of 0.149. Column (3) adds in a control for whether the veteran won any citations during World War I. Again, the coefficients remain about the same with the coefficient on disabled having a p-value of 0.13. Finally, column (4) reports the results of a Tobit model using the full set of controls. The Tobit model is used because of right censoring in the income data. Enumerators were instructed to only report income up to \$5,000. If an individual reported income above \$5,000 the enumerator was to record their income as \$5,000.[37] As shown in column (4), the Tobit model makes little difference in the size and significance of the coefficients. The results in columns (1) - (4) are displayed graphically in Figures 3 and 4. Figure 3 displays the estimates of the income densities for severely wounded and non-wounded veterans using Epanechnikov's kernel function. Figure 4 displays the analogous estimates for disabled and non-wounded veterans. In both figures, non-wounded veterans have a higher density at lower incomes, while severely wounded and disabled veterans have a higher

[34] I perform cross-validation on the model with income as the dependent variable and the model with log of income as the dependent variable. This demonstrates that the model using log of income provides a better fit (lower mean squared error) for the data. As a result, the analysis in the paper focuses on the specification using the log of income.

[35] I first modeled age non-parametrically and it appeared that income was decreasing parabolically in age. Therefore, I use age and age squared as controls rather than age fixed effects. The results are not changed using age fixed effects.

[36] I can, alternatively, use fixed effects for the city of residence at the time of enlistment and the results are not at all affected.

[37] In practice this was not perfectly applied. In my sample 120 veterans report an income of \$5,000, while 5 veterans are reported with an income greater than \$5,000. In all the analyses, I change the incomes that are greater than \$5,000 to \$5,000 so that my sample complies with the enumerator's instructions.

density at middle incomes. non-wounded veterans do have a higher density at higher incomes, but this is not enough to offset the previously mentioned features.[38]

Columns (5) - (7) and (8) - (10) of Table 3 are set-up in the same manner as columns (1) - (3) and are estimated only on the sample of veterans who are employed. When the dependent variable is the number of weeks worked in 1939 (columns (5) - (7)) the results show that severely wounded veterans worked about 2.2 more weeks a year than non-wounded veterans and these coefficients are all statistically significant. Disabled veterans worked about 1.8 more weeks a year than non-wounded veterans and these coefficients are also statistically significant. Finally, in columns (8) - (10) the dependent variable is an estimate of the veteran's weekly wage in 1939. This estimate is calculated by dividing a veteran's income in 1939 by the number of weeks they worked in 1939. The coefficient on severely wounded is positive and significant, and indicates that severely wounded veterans have weekly wages about 14% higher than non-wounded veterans. The coefficient on disabled is also positive, but not significant.

Table 4 continues to display the main empirical results for the intensive margin in columns (1) - (3). The dependent variable in columns (1) - (3) is Occupational Income Score. This variable was constructed by the Integrated Public Use Microdata Series (IPUMS) and takes an occupation and assigns that occupation "the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950."[39] For example, the Occupational Income Score for a plumber is 33, which means that the median total income of all plumbers in 1950 was $3,300. The coefficients on all wounded categories are insignificant indicating that they are not in occupations that would have had higher median incomes in 1950.

The remainder of Table 4 presents results for the extensive margin. Accordingly, the sample is no longer restricted to veterans who are employed. Columns (4) - (6) of Table 4 provide estimates of equation (2) where the dependent variable takes a value of one if the veteran is in the labor force and a value of zero if they are not in the labor force. Being disabled significantly decreases the probability of being in the labor force by about 5 percentage points. Being severely wounded also decreases the probability of being in the labor force by about 3 percentage points, but these coefficients are not statistically significant. Finally, columns (7) - (9) of Table 4 estimate equation (2) using a dependent variable that takes a value of one if the veteran is an entrepreneur and a value of zero otherwise. I use the census "worker class" categorizations to define an en-

[38] I test whether the income distributions between severely wounded and non-wounded veterans are different; the corrected p-value from the two sample Komolgorov-Smirnov test statistic is 0.203. The analogous test for disabled and non-wounded veterans yields a p-value of 0.379. Although the two distributions are not significantly different from each other, Figures 3 and 4 still show the income densities that are driving the results.

[39] https://usa.ipums.org/usa/chapter4/chapter4.shtml

trepreneur. The census categorizes workers into five mutually exclusive worker classes: "Unpaid family worker", "Wage or salary worker in Government work", "Wage or salary worker in private work", "Working on own account" or "Employer". I define an entrepreneur as an individual who is categorized as "Working on own account" or an "Employer". The coefficients in columns (7) - (9) are all insignificant meaning that veterans of any wounded category are no more or less likely to be an entrepreneur than non-wounded veterans. Examining entrepreneurship is necessary because the 1940 census does not record income for self-employed individuals. This means that the estimates in columns (1) - (4) of Table 3 do not take into account income earned by veterans who are self-employed.

The main empirical results provide some evidence that rehabilitation was successful at reintegrating severely wounded and disabled veterans into the civilian labor market. On the extensive margin, being disabled decreases the probability of being in the labor force compared to non-wounded veterans. However, conditional on being employed, severely wounded and disabled veterans have higher incomes and work more weeks than non-wounded veterans. The coefficients on all other wound categories are insignificant indicating that veterans in these categories are no worse off than non-wounded veterans. Despite the suggestive evidence that rehabilitation was successful, there are other possible mechanisms that could explain why severely wounded and disabled veterans earn a premium. I explore these alternative mechanisms next.

5. Alternative Mechanisms

In this section, I present and analyze alternative mechanisms for why severely wounded and disabled veterans might have better labor market outcomes. I am able to dismiss all of these alternative explanations and conclude that the relationship between rehabilitation and labor market outcomes is likely causal.

5.a. Government Pensions/Compensations

As discussed in Section 2, compensations were paid by the government to war-disabled veterans and these compensations might help veterans reintegrate into civilian life. However, as also discussed in Section 2, the criteria for receiving these compensations in 1939 were extremely stringent. It can be assumed that disabled veterans would have received a compensation while wounded veterans would not meet the criteria. Nevertheless, it is a useful exercise to empirically test if this is indeed the case. If severely wounded and disabled veterans are receiving compensa-

tions this could potentially explain why those veterans have higher incomes than non-wounded veterans. I do not directly observe whether a veteran is receiving a government pension, however, I do observe the veterans' answers to the two income questions asked on the 1940 census. The first income question reads: "Amount of money wages or salary received (including commissions)". The second income question reads: "Did this person receive income of $50 or more from sources other than money wages or salary (Y or N)"? Earnings from work were supposed to be recorded for the first question (wages, salary, and commissions), while the second question recorded any income from pensions, business profits, interest, dividends, etc. Veterans' answers to the first question were used for the income results in Section 4 and, therefore, even if severely wounded and disabled veterans were more likely to receive pensions from the government this additional income should not have been reported in the data used for those results.

Table 5 presents the results of a probit model, where the dependent variable takes a value of one if the veteran answered "Yes" to the question about income from sources other than wages or salary and a value of zero if the veteran answered "No" to that question. Column (1) of Table 5 uses only baseline controls and shows that being disabled increases the probability of reporting income from sources other than wages or salary by about 17 percentage points compared to non-wounded veterans.[40] Column (2) of Table 5 controls for the highest rank attained during World War I. The coefficient on disabled remains about the same and is highly significant. Finally, column (3) controls for whether the veteran was awarded any citations. Once again, disabled veterans are about 17 percentage points more likely to report receiving income from sources other than wages or salary than non-wounded veterans. In all three specifications, severely wounded veterans are not more likely to report receiving income from sources other than wages and salary. These probit models confirm that government compensations are being properly reported and that severely wounded veterans are not receiving compensations while many disabled veterans are receiving compensations.[41] This is consistent with the criteria for receiving a compensation at this time.

5.b. Selection into Being Severely Wounded or Disabled

The main empirical results rely on the identifying assumption that being wounded in combat is random. If this assumption is violated, the results will be biased. For instance, perhaps more naturally productive and efficient soldiers are also more likely to be severely wounded

[40] 30% of non-wounded veterans report receiving income from sources other than wages or salaries.

[41] Government compensations being properly reported in the census means that they are being reported in the question that asks about income from sources other than wages or salary.

or disabled because they are braver and more courageous in battle. This would explain why severely wounded and disabled veterans have higher incomes, higher weekly wages, and work more weeks than non-wounded veterans. The main empirical results provide some evidence that this is not happening. First, the effect is entirely concentrated amongst the severely wounded and disabled veterans. Even if the more productive and efficient soldiers were more likely to be wounded, it seems far less likely that they could have precise control over how severely they were wounded. Second, I control for whether a veteran was awarded any citations during World War I. This should, to some extent, control for a veteran's bravery and courageousness. The fact that the coefficient on being cited is negative and insignificant suggests that braver veterans are not rewarded in the civilian labor market.[42]

Another selection concern involves the hypothesis that taller individuals are rewarded in the civilian labor market and it might be the case that taller individuals are more likely to be wounded. The fact that taller individuals fare better in the civilian labor market has been well documented.[43] Furthermore, it might the case that taller individuals are more likely to be wounded because they are larger targets.

I deal with these selection concerns by using a method for assessing the amount of selection on unobservables developed by Altonji et al. (2005).[44] This method relies on the key insight that the amount of selection on observables reveals information about the amount of selection on unobservables. To apply this method consider two separate regressions: the first regression uses only the explanatory variables of interest and no controls, the second regression uses the explanatory variables of interest with the full set of controls. Let $\hat{\beta}_s^r$ denote the coefficient for severely wounded veterans from the restricted regression when no controls are used and let $\hat{\beta}_s^f$ denote the coefficient on severely wounded veterans when the full set of controls are used. Using these two estimates I calculate the following ratio:

$$\frac{\hat{\beta}_s^f}{\hat{\beta}_s^r - \hat{\beta}_s^f} \tag{3}$$

Under appropriate assumptions this ratio is interpreted as the amount of selection on unobservables versus observables needed to explain away the entire OLS effect. [45]

[42] The correlation between being severely wounded and being awarded any citations is 0.0183; the correlation between being disabled and being awarded any citations is 0.0677.

[43] See Case and Paxson (2008) for a recent explanation of this phenomenon.

[44] Altonji et al. (2005) develop the case when the explanatory variables is binary (my case) and Bellows and Miguel (2009) develop the case when the explanatory variable is continuous.

[45] See Altonji et al. (2005) for all assumptions that are needed for this interpretation. The authors note that the assumptions they make are no stronger than the OLS assumption that there is no relationship between the regressor of interest

Table 6 provides the calculation of these ratios using various sets of controls to estimate $\hat{\beta}_s^f$. The first row controls for highest grade completed, age, age squared, and military company fixed effects. As such, the estimates of $\hat{\beta}_s^f$ for the three outcome variables presented in Table 6 correspond to columns (1), (5), and (8) and Table 3. The second row also controls for the highest rank the veteran attained during military service. The estimates for $\hat{\beta}_s^f$ now correspond to columns (2), (6), and (9) of Table 3. The third row of Table 6 adds in a control for whether the veteran won any citations during World War I. Finally, the forth row of Table 6 adds in fixed effects for a veteran's city of residence when they enlisted in the military. When the dependent variable is the log of a veteran's income in 1939 the calculated ratios range from 30.5 to 129.1. The interpretation of the smallest ratio in that range is that selection on unobservables would have to be 30.5 times greater than selection on observables to completely explain away the OLS effect. When the dependent variable is the number of weeks worked the ratios range from 5.1 to 43.9. Finally, when the dependent variable is the weekly wage the ratios range from 12.6 to 29.9.

For comparison, Altonji et al. find a ratio of 3.55 and they interpret this ratio as evidence that unobservables are unlikely to explain away their entire effect. Bellows and Miguel (2009) find ratios between 9 and 17, Nunn and Wantchekon (2011) find ratios between about 3 and 12 and Collins and Wanamaker (2014) find ratios between 29 and 39. All of my ratios fall within these ranges and, in most cases, they are at the upper end of these ranges. I, therefore, conclude that selection into being wounded based on omitted variables such as productivity or height are unlikely to explain away the entire relationship between wound severity and labor market outcomes.

5.c. Mortality Selection

The next alternative mechanism for why severely wounded and disabled veterans had better labor market outcomes involves mortality selection. In particular, I cannot observe whether a veteran died between the end of the World War I and 1940. It is possible that only the severely wounded and disabled veterans who were the most robust and would have had the best labor market outcomes survived to 1940, resulting in biased OLS estimates. This type of selection should have been taken into account in the ratio tests of Section 5.b., but I can perform further tests for mortality selection. Specifically, I compare the link rates of veterans within each wounded category (not wounded, slightly wounded, moderately wounded, severely wounded, wounded to an undetermined degree, gassed, and disabled). Panel A of Table 7 presents these link rates.

and unobservables.

Panel B of Table 7 takes the link rate of each wounded category and tests if it is significantly different from the link rates of all the other wounded categories. If mortality selection had occurred we would expect soldiers who were not wounded to have a higher link rate than soldiers who were slightly wounded, soldiers who were slightly wounded to have a higher link rate than soldiers who were severely wounded, and so on. Panel B of Table 7 demonstrates that this is not the case, with the exception of the slightly wounded category. The link rate for slightly wounded veterans is statistically lower than the link rate for most other wounded categories. Importantly, the severely wounded link rate and the disabled link rate are not statistically different from the non-wounded link rate. This evidence suggests that mortality selection is likely not occurring amongst severely wounded and disabled veterans and, therefore, not driving the results.

5.d. "Hero Premium"

The final alternative mechanism for the finding that severely wounded and disabled veterans have better labor market outcomes than non-wounded veterans is that they received a "hero premium" from employers. Employers might be eager to hire the returned hero and compensate him accordingly, resulting in better labor market outcomes. This might be especially true of severely wounded and disabled veterans since their injuries and handicaps are more likely to be visible.

Identification of a "hero premium" is difficult even with good data. Nevertheless, I might be able to identify a "hero premium" by looking where severely wounded and disabled veterans are most likely to be perceived as heroes. Specifically, veterans might be more likely to receive a "hero premium" in locations where it would be well known that they were wounded or disabled during the war, namely in a smalltown or their hometown. Table 8 tests this hypothesis using the log of income in 1939 as the dependent variable. All regressions in Table 8 are estimated using the full set of controls. Column (1) of Table 8 restricts the sample to only veterans who are living in a smalltown. For the purposes of this study, a smalltown is defined as a city with a population less than 30,000 people in 1940. Column (1) shows that severely wounded veterans living in smalltowns have incomes about 24% higher than non-wounded veterans living in smalltowns. Disabled veterans living in smalltowns have incomes about 18% higher than non-wounded veterans living in smalltowns. Both of these effects are statistically significant. These coefficients in column (1) can be compared with the coefficients in column (2), which restrict the sample to only veterans living in larger cities (populations greater than 30,000 in 1940). In this sample, severely wounded veterans earn about 18% more than non-wounded veterans. The coefficient on disabled veterans is about 4%, but it is not statistically significant. Column (3) restricts

the sample to only veterans living in their hometown, which is defined to be the same town they lived in when they enlisted in the Army. Severely wounded veterans living in their hometown make about 24% more than non-wounded veterans living in their hometown. Finally, column (4) restricts the sample to veterans not living in their hometown. Severely wounded veterans not living in their hometown earn about 19% more than non-wounded veterans not living in their hometown. Comparing column (1) with column (2) reveals that there is not a large difference in the premium severely wounded veterans are being paid in smalltowns versus large cities. Similarly, there is not a large difference in the premium severely wounded veterans are paid if they live in their hometown versus another town. Taken together these results do not provide much support for severely wounded and disabled veterans being paid a "hero premium" in smalltowns or their hometown.

The previous results have ruled out many alternative reasons for why severely wounded and disabled veterans might have better labor market outcomes than non-wounded veterans. The fact that I find little support for alternative explanations leads me to conclude that vocational rehabilitation is the likely cause of severely wounded and disabled veterans having better labor market outcomes.

6. Concluding Remarks

With many post September 11th veterans struggling to adjust to civilian life it is important to understand the features and characteristics of successful veteran rehabilitation programs. The analysis in this paper revealed that the World War I vocational rehabilitation program was effective at reintegrating severely wounded and disabled veterans into the civilian labor market. This program provides several policy implications. First, the on the job training offered by this program appears to be very successful. Veterans trained with an employer and, in many instances, they would be hired by that employer when their training was complete.[46] Government representatives usually had a job lined up for veterans in the event that they were not hired by the employer that they trained under. This system allowed employers to receive cheap labor, while simultaneously allowing wounded and disabled veterans to receive valuable vocational training.[47] Second, government representatives would follow up with veterans after they became employed to assist them in meeting any difficulties of the new position. Finally, there was an effort made

[46]The trainee record cards list the firm that the veteran trained with, but no record was kept of the firm that ended up hiring the veteran.

[47]Employers received cheap labor because veterans were paid by the government while in training.

to promote the good will of the public toward rehabilitated veterans.[48] Taken together, these features of World War I vocational rehabilitation might provide a useful guide for the successful rehabilitation of current veterans.

[48] *The Historical Development of Veterans' Benefits in the United States* (1956): 131.

Data Appendix

The most important linking done in this paper is between the New York State Archives Abstracts of World War I Military Service and the 1940 United States Census. I use a linking algorithm proposed by Feigenbaum (2014) to perform this linking. First, I block the set of potential matches on gender, year of birth ($\pm$ 3 years), state or country of birth, and Jaro-Winkler string distance ($\geq$ 0.8). This results in 139,818 potential matches for 4,293 veterans, which is approximately 32.57 potential matches per veteran.[49] Next, for a subsample of veterans I identify the potential match that is the true match. For each veteran only one potential match can be identified as the true match, but it is possible to not identify any of the matches as the true match. Ideally this would be done using a randomly selected subsample of veterans. However, to identify a true match I almost always need to use information from the 1942 "Old Man's Draft" Registration Cards such as city of residence, street address, or spouse's name. As discussed in Section 3.a. of this paper, the 1942 "Old Man's Draft" Registration Cards are not yet a complete dataset. For the State of New York, only individuals living in New York City can currently be found in the dataset. Therefore, I randomly select a subsample of veterans for whom I have data from the 1942 "Old Man's Draft" Registration Card, which might not be a random subsample of all veterans. I select a subsample of 385 veterans and I am able to identify true matches for 308 of these veterans.

The next part of the linking algorithm involves generating a probability that each potential match is a true match. To do this, I perform a probit regression on the potential matches of the 385 veterans in my randomly selected subsample. The dependent variables takes a value of one if the potential match was identified as a true match and a value of zero otherwise. This dependent variable is regressed on variables that will predict true matches (whether the match is an exact match, absolute difference in year of birth, Soundex system matches for first and surnames, Jaro-Winkler distances for first and surnames, number of potential matches, etc.). The results from this probit regression are available upon request. Using the estimated coefficients from this probit regression I predict a probability score for every potential match. Using these probability scores I am able to define a true match. A potential match is defined to be a true match if: (1) it has the highest probability score of all potential matches for that veteran, (2) the probability score is above 0.12, and (3) the ratio of the highest probability score to second highest probability score is above 1.33. These parameters are suggested by Feigenbaum (2014) to give equal weight to Type I and Type II errors in the sample (false positive matches and false negative matches). These criteria

[49] I search for potential matches for 4,799 veterans meaning that 506 veterans have no potential matches. 470 veterans have only one potential match. The most number of potential matches for a veteran is 344.

result in 2,570 true matches, which is the sample that is used for the main empirical analysis.

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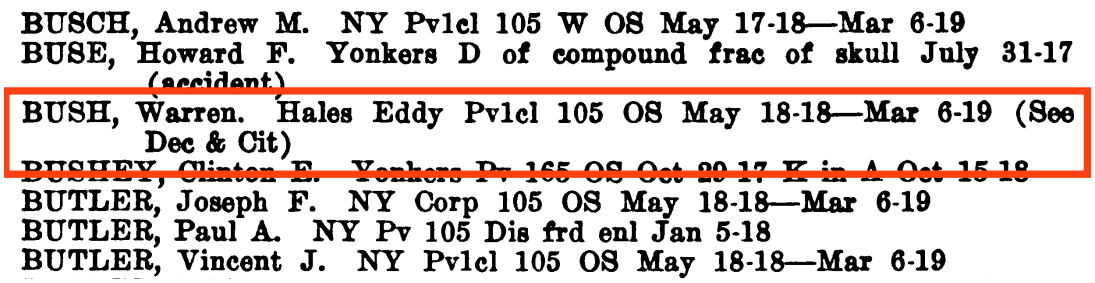
Figures and Tables

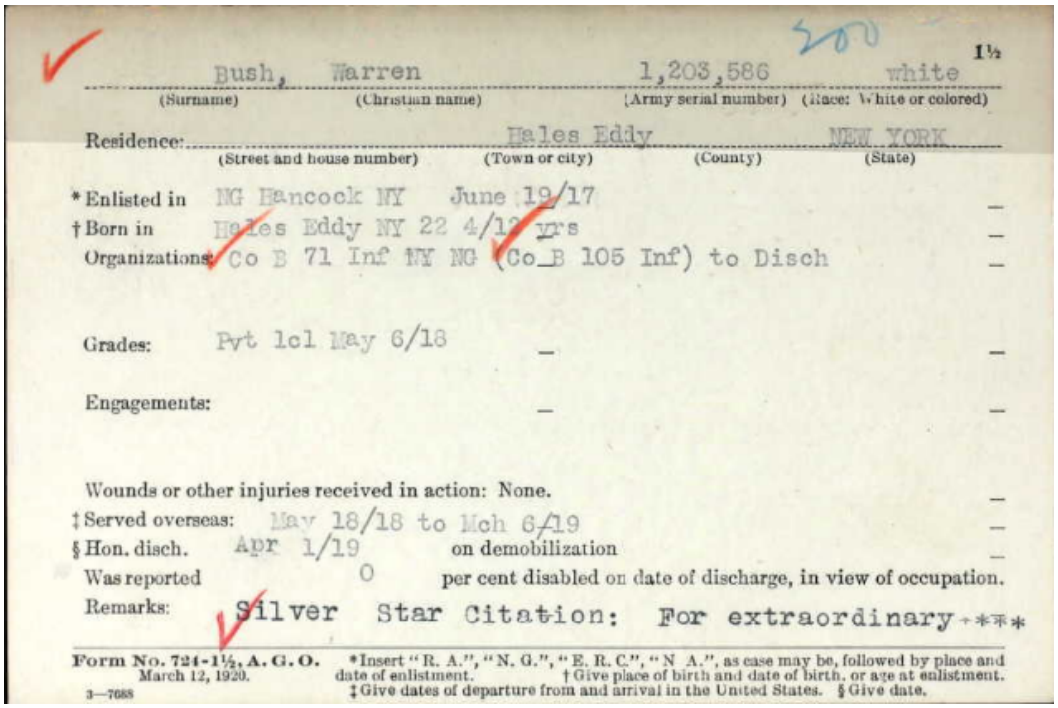
Figure 1

Panel A: Regimental Roster of 105th Infantry Regiment Showing Warren Bush



BUSCH, Andrew M. NY Pvlcl 105 W OS May 17-18—Mar 6-19
BUSE, Howard F. Yonkers D of compound frac of skull July 31-17 (accident)
BUSH, Warren. Hales Eddy Pvlcl 105 OS May 18-18—Mar 6-19 (See Dec & Cit)
BUSHEY, Clinton E. Yonkers Pv 165 OS Oct 29 17 K in A Oct 15 18
BUTLER, Joseph F. NY Corp 105 OS May 18-18—Mar 6-19
BUTLER, Paul A. NY Pv 105 Dis frd enl Jan 5-18
BUTLER, Vincent J. NY Pvlcl 105 OS May 18-18—Mar 6-19

Panel B: Abstract of World War I Military Service with a citation for Warren Bush



Bush, Warren — 1,203,586 — white
(Surname) (Christian name) (Army serial number) (Race: White or colored)

Residence: Hales Eddy — NEW YORK
(Street and house number) (Town or city) (County) (State)

*Enlisted in NG Hancock NY June 19/17
†Born in Hales Eddy NY 22 4/12 yrs
Organizations: Co B 71 Inf NY NG (Co B 105 Inf) to Disch

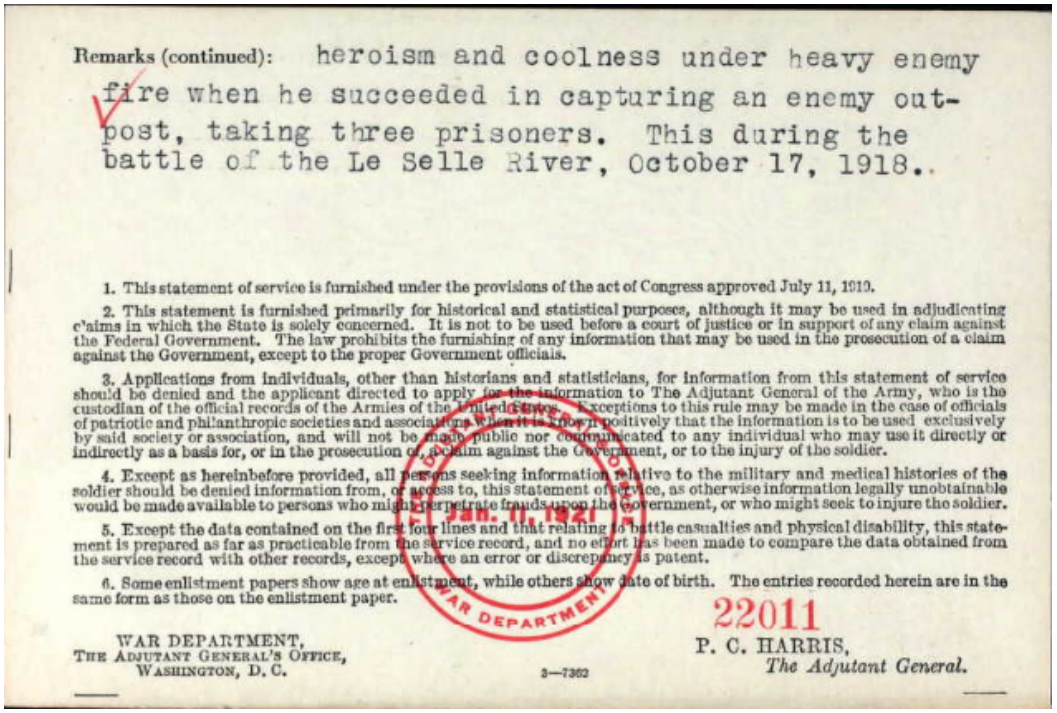
Grades: Pvt 1cl May 6/18

Engagements:

Wounds or other injuries received in action: None.
‡Served overseas: May 18/18 to Mch 6/19
§Hon. disch. Apr 1/19 on demobilization
Was reported 0 per cent disabled on date of discharge, in view of occupation.
Remarks: Silver Star Citation: For extraordinary ***

Form No. 724-1½, A. G. O. March 12, 1920. 3—7688

*Insert "R. A.", "N. G.", "E. R. C.", "N A.", as case may be, followed by place and date of enlistment. †Give place of birth and date of birth, or age at enlistment. ‡Give dates of departure from and arrival in the United States. §Give date.



Remarks (continued): heroism and coolness under heavy enemy fire when he succeeded in capturing an enemy outpost, taking three prisoners. This during the battle of the Le Selle River, October 17, 1918..

1. This statement of service is furnished under the provisions of the act of Congress approved July 11, 1919.

2. This statement is furnished primarily for historical and statistical purposes, although it may be used in adjudicating claims in which the State is solely concerned. It is not to be used before a court of justice or in support of any claim against the Federal Government. The law prohibits the furnishing of any information that may be used in the prosecution of a claim against the Government, except to the proper Government officials.

3. Applications from individuals, other than historians and statisticians, for information from this statement of service should be denied and the applicant directed to apply for the information to The Adjutant General of the Army, who is the custodian of the official records of the Armies of the United States. Exceptions to this rule may be made in the case of officials of patriotic and philanthropic societies and associations when it is known positively that the information is to be used exclusively by said society or association, and will not be made public nor communicated to any individual who may use it directly or indirectly as a basis for, or in the prosecution of, a claim against the Government, or to the injury of the soldier.

4. Except as hereinbefore provided, all persons seeking information relative to the military and medical histories of the soldier should be denied information from, or access to, this statement of service, as otherwise information legally unobtainable would be made available to persons who might perpetrate frauds upon the Government, or who might seek to injure the soldier.

5. Except the data contained on the first four lines and that relating to battle casualties and physical disability, this statement is prepared as far as practicable from the service record, and no effort has been made to compare the data obtained from the service record with other records, except where an error or discrepancy is patent.

6. Some enlistment papers show age at enlistment, while others show date of birth. The entries recorded herein are in the same form as those on the enlistment paper.

JAN. 11, 1921 WAR DEPARTMENT

22011

WAR DEPARTMENT,
THE ADJUTANT GENERAL'S OFFICE,
WASHINGTON, D. C.

P. C. HARRIS,
The Adjutant General.

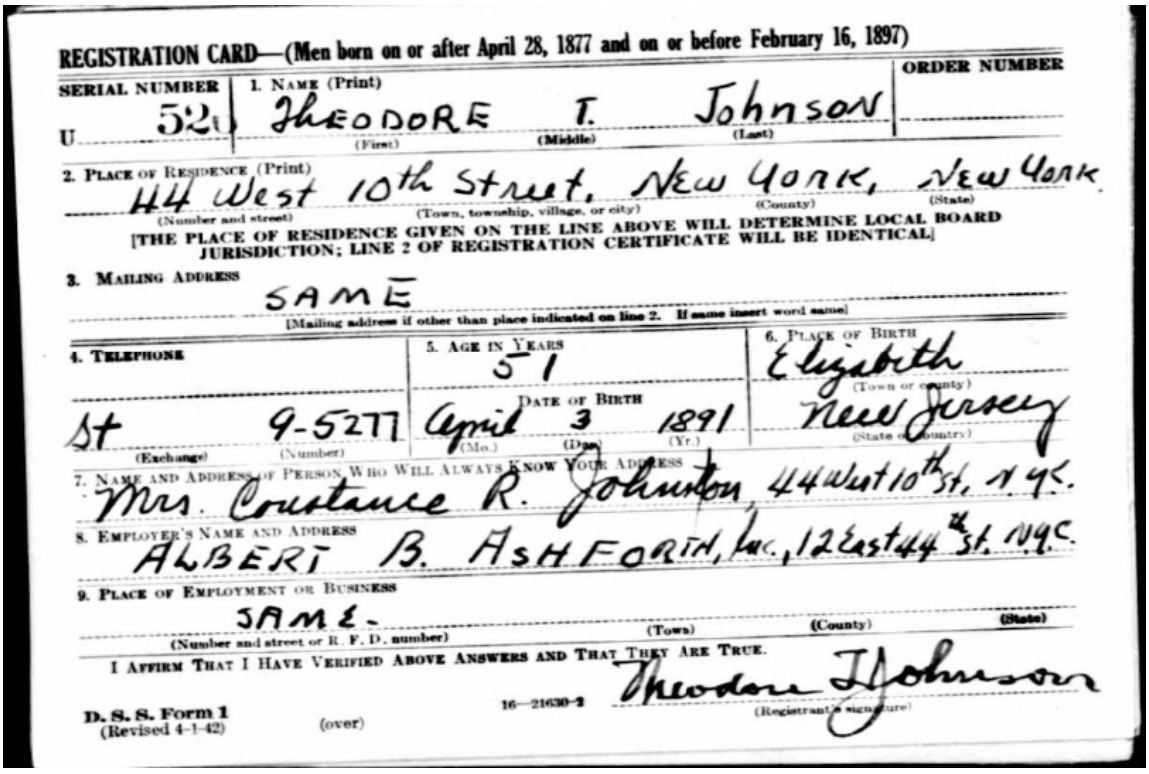
3—7362

Panel C: 1940 United States Federal Census for Warren Bush

1940 United States Federal Census

Name:	**Warren Bush**
Age:	45
Estimated Birth Year:	abt 1895
Gender:	Male
Race:	White
Birthplace:	New York
Marital Status:	Married
Relation to Head of House:	Head
Home in 1940:	Deposit, Delaware, New York
Map of Home in 1940:	
Farm:	No
Inferred Residence in 1935:	Deposit, Delaware, New York
Residence in 1935:	Same House
Sheet Number:	1B
Number of Household in Order of Visitation:	27
Occupation:	Laborer
Industry:	Lumber
House Owned or Rented:	Owned
Value of Home or Monthly Rental if Rented:	500
Attended School or College:	No
Highest Grade Completed:	Elementary school, 4th grade
Class of Worker:	Wage or salary worker in private work
Weeks Worked in 1939:	52
Income:	480
Income Other	No

Panel D: 1942 "Old Man's Draft" Registration Card



REGISTRATION CARD—(Men born on or after April 28, 1877 and on or before February 16, 1897)

SERIAL NUMBER U 52(illegible) | 1. NAME (Print) Theodore T. Johnson (First) (Middle) (Last) | ORDER NUMBER

2. PLACE OF RESIDENCE (Print) 44 West 10th Street, New York, New York (Number and street) (Town, township, village, or city) (County) (State)

[THE PLACE OF RESIDENCE GIVEN ON THE LINE ABOVE WILL DETERMINE LOCAL BOARD JURISDICTION; LINE 2 OF REGISTRATION CERTIFICATE WILL BE IDENTICAL]

3. MAILING ADDRESS SAME

[Mailing address if other than place indicated on line 2. If same insert word same]

4. TELEPHONE St 9-5277 (Exchange) (Number)

5. AGE IN YEARS 51 DATE OF BIRTH April 3 1891 (Mo.) (Day) (Yr.)

6. PLACE OF BIRTH Elizabeth (Town or county) New Jersey (State or country)

7. NAME AND ADDRESS OF PERSON WHO WILL ALWAYS KNOW YOUR ADDRESS Mrs. Constance R. Johnston, 44 West 10th St. N.Y.C.

8. EMPLOYER'S NAME AND ADDRESS ALBERT B. ASHFORTH, Inc., 12 East 44th St. N.Y.C.

9. PLACE OF EMPLOYMENT OR BUSINESS SAME. (Number and street or R. F. D. number) (Town) (County) (State)

I AFFIRM THAT I HAVE VERIFIED ABOVE ANSWERS AND THAT THEY ARE TRUE. Theodore T Johnson (Registrant's signature)

D. S. S. Form 1 (Revised 4-1-42) (over) 16—21630-2

REGISTRAR'S REPORT

DESCRIPTION OF REGISTRANT

RACE	HEIGHT (Approx.)	EYES	WEIGHT (Approx.)	HAIR	COMPLEXION
White ✓	5'-11"	Blue ✓	163	Blonde	Sallow
Negro		Gray		Red	Light ✓
Oriental		Hazel		Brown ✓	Ruddy
Indian		Brown		Black	Dark
Filipino		Black		Gray	Freckled
				Bald	Light brown
					Dark brown
					Black

Other obvious physical characteristics that will aid in identification

I certify that my answers are true; that the person registered has read or has had read to him his own answers; that I have witnessed his signature or mark and that all of his answers of which I have knowledge are true, except as follows:

James E. Quatro (Signature of registrar)

Registrar for Local Board New York, N.Y. (Number) (City or county) (State)

Date of registration April 26, 1942

(STAMP OF LOCAL BOARD)

(The stamp of the Local Board having jurisdiction of the registrant shall be placed in the above space)

16—21630-1

Figure 2: Diagram of Linking Process

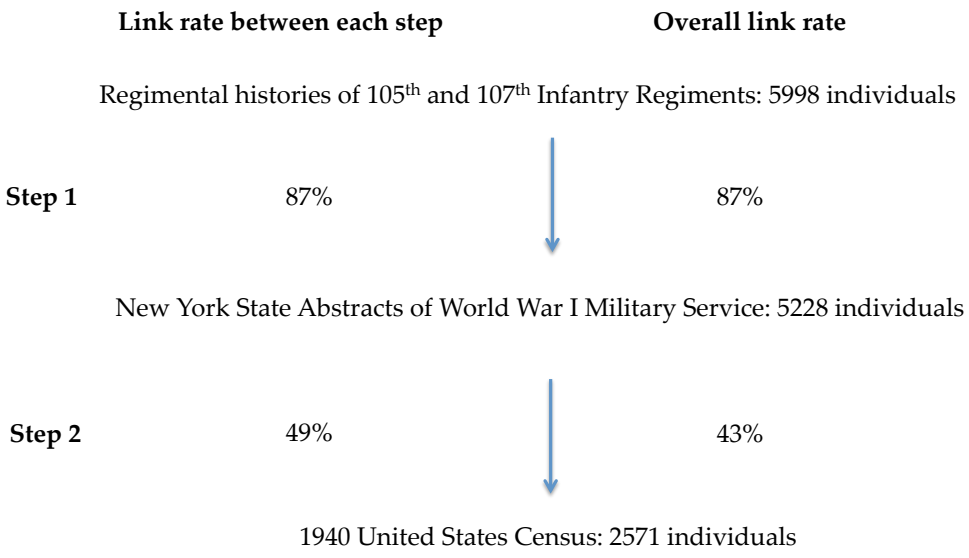


Figure 3: Kernel Density Estimates of 1939 Income if Severely Wounded

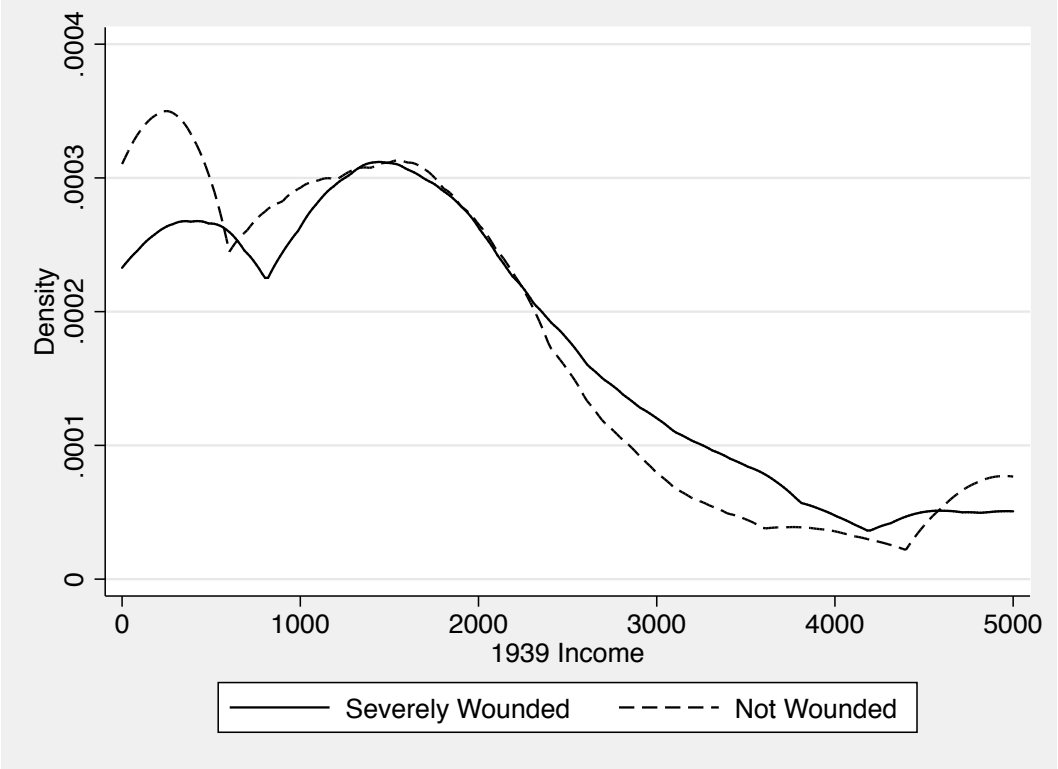


Figure 4: Kernel Density Estimates of 1939 Income if Disabled

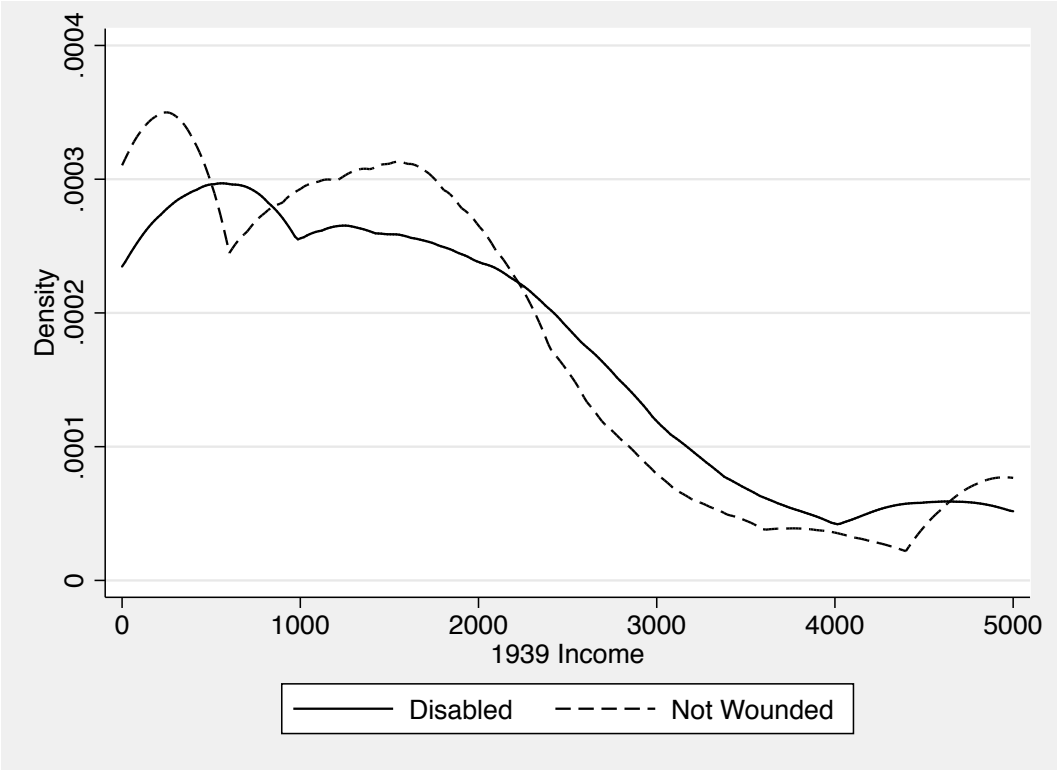


Table 1: Descriptive Statistics

	Mean	Standard Deviation	Min	Max	Observations
1939 Income	1531.81	1323.18	0	5000	2395
1939 Weeks worked	42.78	16.26	0	52	2459
Occupational income score in 1940	27.95	9.76	0	80	2071
Labor Force	0.89	0.32	0	1	2571
Entrepreneur	0.15	0.36	0	1	2303
Total Wounded	0.44	0.5	0	1	2571
Slightly Wounded	0.17	0.38	0	1	2571
Moderately Wounded	0.002	0.5	0	1	2571
Severely Wounded	0.13	0.33	0	1	2571
Wounded to an Undetermined Degree	0.06	0.23	0	1	2571
Gassed	0.005	0.07	0	1	2571
Disabled	0.08	0.28	0	1	2571
Cited	0.09	0.28	0	1	2571
Age in 1940	45.5	4.12	38	76	2571
Years of education	9.59	3	0	17	2504

Notes: Occupational Income Score was constructed by the Integrated Public Use Microdata Series (IPUMS). This variable indicates "the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950."

Table 2: Comparison of linked and unlinked veterans

	Linked Mean	Unlinked Mean	Difference	p-value
Age in 1940	45.718	46.003	-0.284	0.0199**
	(0.0780)	(0.0956)	(0.1221)	
Total Wounded	0.439	0.432	0.007	0.6205
	(0.0098)	(0.0106)	(0.0144)	
Slightly Wounded	0.172	0.180	-0.008	0.4924
	(0.0074)	(0.0082)	(0.0111)	
Moderately Wounded	0.002	0.001	0.001	0.0011943
	(0.0010)	(0.0006)	(0.0012)	
Severely Wounded	0.126	0.123	0.003	0.7574
	(0.0065)	(0.0070)	(0.0010)	
Wounded to an Undetermined Degree	0.057	0.054	0.003	0.6539
	(0.0046)	(0.0049)	(0.0067)	
Gassed	0.005	0.002	0.003	0.0867*
	(0.0015)	(0.0010)	(0.0018)	
Disabled	0.084	0.081	0.003	0.7322
	(0.0055)	(0.0059)	(0.0080)	
Cited	0.086	0.078	0.008	0.3473
	(0.0055)	(0.0057)	(0.0080)	
City of residence at enlistment has population	0.486	0.472	0.014	0.3426
less than 30,000 in 1920	(0.0099)	(0.0107)	(0.0146)	
Born in New York	0.791	0.774	0.017	0.1545
	(0.0080)	(0.0090)	(0.0171)	
Observations	2571	2178		

Notes: The "Linked Mean" column is calculated using 2571 observations, while the "Unlinked Mean" column is calculated using 2178 observations. Note that 2571+2178 = 4749, which is less than the 5228 veterans that were linked to the New York State Abstracts of World War I Military Service. This is because the 5228 veterans include veterans who were killed in action, died of wounds, or died of another cause while in the Army. The above sample does not include any man who died while in the Army, explaining the number 4749.

Standard errors in parentheses

* p<0.10, ** p<0.05, *** p<0.01

Table 3: Effect of being wounded on labor market outcomes

Variables	Log of 1939 Income				1939 Weeks Worked			Log of Weekly Wage		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Slightly Wounded	0.0108	0.0218	0.0230	0.0100	0.766	0.973	0.981	-0.0177	-0.0134	-0.0128
	(0.0473)	(0.0476)	(0.0476)	(0.0494)	(0.729)	(0.737)	(0.738)	(0.0361)	(0.0363)	(0.0364)
Severely Wounded	0.201***	0.208***	0.209***	0.210***	2.005**	2.207**	2.219**	0.135***	0.135***	0.136***
	(0.0558)	(0.0562)	(0.0562)	(0.0585)	(0.860)	(0.870)	(0.871)	(0.0426)	(0.0429)	(0.0429)
Wounded to an Undetermined Degree	-0.00152	0.0220	0.0241	0.0187	-1.022	-0.830	-0.814	-0.00670	0.0103	0.0115
	(0.0737)	(0.0741)	(0.0742)	(0.0771)	(1.137)	(1.148)	(1.149)	(0.0566)	(0.0571)	(0.0571)
Disabled	0.0952	0.0951	0.100	0.0928	1.810*	1.790*	1.828*	0.0333	0.0315	0.0343
	(0.0652)	(0.0658)	(0.0661)	(0.0687)	(1.005)	(1.019)	(1.024)	(0.0498)	(0.0504)	(0.0506)
p-value	[0.144]	[0.149]	[0.13]	[0.177]						
Cited			-0.0512	-0.0452			-0.389			-0.0287
			(0.0646)	(0.0674)			(1.000)			(0.0493)
Baseline Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Rank Controls	NO	YES	YES	YES	NO	YES	YES	NO	YES	YES
Observations	1,910	1,910	1,910	1,910	1,910	1,910	1,910	1,904	1,904	1,904
Model	Linear	Linear	Linear	Tobit	Linear	Linear	Linear	Linear	Linear	Linear

Notes: Baseline controls include: education fixed effects, age, age squared, and company fixed effects. Columns (1) - (3) and (5) - (10) report estimates from equation (1) in the text. Column (4) reports estimates from a Tobit model. In columns (8) - (10) the dependent variable, Log of Weekly Wage, is constructed as follows: log(1939 Income/1939 Weeks Worked). The model is estimated with moderately wounded and gassed veterans included. The coefficients on moderately wounded and gassed veterans are suppressed because the sample size for moderately wounded is 6 and the sample size for gassed is 14.
Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 4: Effect of being wounded on labor market outcomes

Variables	Occupational Income Score			Labor Force			Entrepreneur		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Slightly Wounded	0.129	0.293	0.280	0.00680	0.000251	-0.000245	-0.0299	-0.0242	-0.0249
	(0.566)	(0.568)	(0.568)	(0.0174)	(0.0178)	(0.0178)	(0.0200)	(0.0205)	(0.0205)
Severely Wounded	0.855	0.970	0.948	-0.0237	-0.0303	-0.0302	0.0106	0.0188	0.0181
	(0.674)	(0.676)	(0.677)	(0.0218)	(0.0221)	(0.0221)	(0.0251)	(0.0258)	(0.0258)
Wounded to an Undetermined Degree	-0.880	-0.568	-0.591	0.0279	0.0192	0.0192	-0.0334	-0.0253	-0.0259
	(0.875)	(0.879)	(0.880)	(0.0245)	(0.0257)	(0.0257)	(0.0302)	(0.0311)	(0.0311)
Disabled	0.742	0.956	0.895	-0.0468*	-0.0460*	-0.0485*	-0.0115	-0.00570	-0.00795
	(0.785)	(0.790)	(0.795)	(0.0264)	(0.0263)	(0.0267)	(0.0275)	(0.0283)	(0.0282)
Cited			0.569			0.0308			0.0218
			(0.765)			(0.0252)			(0.0271)
Baseline Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Rank Controls	NO	NO	YES	NO	NO	YES	NO	NO	YES
Observations	1,633	1,633	1,633	2,487	2,469	2,469	2,238	2,223	2,223
Model	Linear	Linear	Linear	Probit	Probit	Probit	Probit	Probit	Probit

Notes: Baseline controls include: education fixed effects, age, age squared, and company fixed effects. Columns (1) - (3) report estimates from equation (1) in the text and columns (4) - (9) report estimates from equation (2) in the text. In columns (1) - (3) the dependent variable, Occupational Income Score, was constructed by the Integrated Public Use Microdata Series (IPUMS). This variable indicates "the median total income (in hundreds of 1950 dollars) of all persons with that particular occupation in 1950." The dependent variable in columns (4) - (6), Labor Force, takes a value of one if the individual is employed or unemployed, and a value of 0 otherwise. A person is considered unemployed if the individual reports a positive duration of unemployment. I do not count an individual as unemployed if they do not report a positive duration of unemployment and report working zero hours during the reference week (March 24 - 30, 2014). The census enumerator instructions are explicit that hours worked in the reference week should be recorded only if an individual is employed and it should be left empty otherwise. Thus, if an individual reports zero hours of work during the reference week it should be interpretted that they are employed, but did not work at their job during the reference week. There are seventy-five individuals who report working more than one hour during the week the reference week and also report having an unemployment duration greater than one week. These individuals are considered to be employed. The dependent variable in columns (7) - (9) takes a value of one if the veteran is an "entrepreneur". The census categorizes workers into five mutually exclusive worker classes: “Unpaid family worker”, “Wage or salary worker in Government work”, “Wage or salary worker in private work”, “Working on own account” or “Employer”. An entrepreneur is defined as an individual who is categorized as “Working on own account” or an “Employer”. The model is estimated with moderately wounded and gassed veterans included. The coefficients on moderately wounded and gassed veterans are suppressed because the sample size for moderately wounded is 6 and the sample size for gassed is 14. The reported coefficients are marginal effects.
Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 5: Effect of being wounded on reporting income from sources other than money wages or salary

Variables	Income from sources othan than money wages or salary		
	(1)	(2)	(3)
Slightly Wounded	-0.0172	-0.0115	-0.0117
	(0.0259)	(0.0262)	(0.0262)
Severely Wounded	0.0309	0.0408	0.0406
	(0.0302)	(0.0307)	(0.0307)
Wounded to an Undetermined Degree	-0.0512	-0.0385	-0.0387
	(0.0385)	(0.0393)	(0.0393)
Disabled	0.166***	0.173***	0.172***
	(0.0370)	(0.0374)	(0.0375)
Cited			0.00534
			(0.0347)
Baseline Controls	YES	YES	YES
Rank Controls	NO	YES	YES
Observations	2,409	2,390	2,390

Notes: Baseline controls include: education fixed effects, age, age squared, and company fixed effects. Columns (1) - (3) report estimates from equation (2) in the text. The model is estimated with moderately wounded and gassed veterans included. The coefficients on moderately wounded and gassed veterans are suppressed because the sample size for moderately wounded is 6 and the sample size for gassed is 14. All coefficients reported are marginal effects.
Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 6: Ratios of Selection on Unobservables to Selection on Observables

Restricted Controls	Full Controls	Log of 1939 Income (1)	1939 Weeks Worked (2)	Log of Weekly Wage (3)
None	Highest grade completed, age, age squared, military company fixed effects	129.1	13.2	29.9
None	Highest grade completed, age, age squared, military company fixed effects, highest rank in military	39	43.9	28.6
None	Highest grade completed, age, age squared, military company fixed effects, highest rank in military, military citation	30.5	35.8	24.3
None	Highest grade completed, age, age squared, military company fixed effects, highest rank in military, military citation, place of residence at enlistment fixed effects	86.5	5.1	12.6

Notes: Each cell of the table reports the ratio from Equation (3) in the text. This ratio is calculated using the coefficient for severely wounded from two separate regressions. The coefficient from the restricted regression corresponds to the "Restricted Controls" column and the coefficient from the full regression corresponds to the "Full Controls" column.

Table 7: Link rates and probabilities that they are different

Panel A: Link rates by wounded status

	Linked	Unlinked	Total	% Linked
Non-wounded/Non-disabled	1423	1217	2640	53.90%
Slightly	441	442	883	49.94%
Moderately	6	2	8	75.00%
Severely	323	268	591	54.65%
Undetermined	147	118	265	55.47%
Gassed	14	5	19	73.68%
Disabled	216	177	393	54.96%
Total	2570	2229	4799	53.55%

Panel B: Probability link rates are not different from 0

	Not Wounded	Slightly	Moderately	Severely	Undetermined	Gassed	Disabled	Total
Non-wounded/Non-disabled	1							
Slightly	0.0413**	1						
Moderatly	0.2319	0.1582	1					
Severely	0.7409	0.0761*	0.2505	1				
Undetermined	0.6249	0.1142	0.2729	0.8236	1			
Gassed	0.0846*	0.0406**	0.943	0.1006	0.1218	1		
Disabled	0.694	0.0976*	0.259	0.9238	0.8973	0.1085	1	
Total	0.7721	0.0482*	0.2242	0.6128	0.5418	0.0791*	0.5899	1

* p<0.10, ** p<0.05, *** p<0.01

Table 8: Effect of being wounded on income by location

Sample:	Veterans living in smalltowns in 1940	Veterans living in big cities in 1940	Veterans living in hometowns in 1940	Veterans not living in hometowns in 1940
Variables	Log of 1939 Income			
	(1)	(2)	(3)	
Slightly Wounded	0.0565	0.0186	0.155	-0.0313
	(0.0748)	(0.0607)	(0.0955)	(0.0563)
Severely Wounded	0.246***	0.180***	0.234**	0.188***
	(0.0938)	(0.0689)	(0.110)	(0.0666)
Wounded to an Undetermined Degree	0.0727	-0.0349	0.000206	0.0215
	(0.127)	(0.0896)	(0.153)	(0.0868)
Disabled	0.184*	0.0355	0.0318	0.119
	(0.103)	(0.0856)	(0.130)	(0.0791)
Cited	-0.0748	-0.0376	0.0196	-0.0414
	(0.101)	(0.0843)	(0.130)	(0.0764)
Baseline Controls	YES	YES	YES	YES
Rank Controls	YES	YES	YES	YES
Observations	871	1,039	535	1,375

Notes: Baseline controls include: education fixed effects, age, age squared, and company fixed effects. Columns (1) - (4) report estimates from equation (1) in the text. Column (1) restrict the sample to veterans living in a city with population less than 30,000 in 1940. Column (2) restrict the sample to veterans living in a city with population greater than 30,000 in 1940. Column (3) restrict the sample to veterans living in the same city in 1940 that they enlisted in. Column (4) restrict the sample to veterans not living in the same city in 1940 that they enlisted in. The model is estimated with moderately wounded and gassed veterans included. The coefficients on moderately wounded and gassed veterans are suppressed because the sample size for moderately wounded is 6 and the sample size for gassed is 14.
Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.01