“Gallantry in Action”: Evidence of Favorable Selection in a Volunteer Army

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Abstract

The received wisdom of all-volunteer armies depends crucially upon selection: are volunteers better soldiers than drafted men? Using an innovative collection of data sets that covers the majority of the U.S. Army soldiers during World War II, we test for the possibility of adverse selection into the military during World War II. Rather, we find favorable selection: volunteers earned distinguished awards at a higher rate than drafted men. Performance differences between volunteers and draftees increased after Pearl Harbor. The estimated monetary benefits of increasing voluntary participation, holding the number of awards constant, are sizable.

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1 Introduction

This paper examines one of the oldest and most sensitive points in the civil-military relationship: do volunteers make better soldiers than drafted men? Economists have traditionally advocated voluntary military service, citing the capacity of markets relative to non-market based allocations to sort people according to their productive talents. Despite its intuitive appeal, this long-held view has so far rested on very thin evidence. At the present, there is no empirical evidence that would strongly suggest that volunteers make better soldiers. Moreover, in theory, even the simplest models involving self-selection (e.g., the Roy model) yield ambiguous predictions for the average performance of voluntary armies.

In this paper, we provide credible evidence of the differential performance of volunteer and drafted soliders. We examine if those who enter the military voluntarily are an *adversely selected* pool of candidates (Akerlof (1970)). If individuals willing to serve have low military skills, the average productivity of a voluntary military will be lower than that of a drafted force. This aspect is at the heart of many of the early and current criticisms against volunteer militaries, and it may make it impossible to raise an effective army through volunteering. To the best of our knowledge, no empirical evidence has been assembled to examine the nature of selectivity and the comparative performance of volunteer and drafted soldiers.

We test for adverse selection into the military using a *correlation property* characteristic of models of asymmetric information and self-selection, see, e.g., Chiappori and Salanie (2001). The tests examine the correlation between the voluntary participation in the military and *ex post* outcomes associated with military performance. We use detailed individual information on the majority of men who served in the U.S. Army during World War II, more than 8 million individual records. We link individual Army records to information on military performance during the war, including information on the soldiers who received one of the three highest military decorations awarded by the U.S. Army: the Medal of Honor, the Distinguished Service Cross, and the Silver Star. These awards are extraordinary honors that recognize acts of valor on the battlefield. The Medal of Honor and the Distinguished Service Cross are awarded for "extraordinary heroism," while the Silver Star for "gallantry in action."

We do not find evidence of adverse selection during wartime. Rather, we find that volunteers were more likely to receive a distinguished award compared to draftees. The difference is statistically as well as economically significant. In our baseline sample, volunteers were about 30 percent more likely to receive such an award. We also show that these results are robust in magnitude and statistical significance to the inclusion of a large number of controls and alternative specifications. Thus, we conclude that self-selection tended to be *favorable* or *advantageous*.[1]

We then perform a number of checks, including a test for the nature of selection at various points in time. We find evidence that volunteers who entered the army at the start of the draft, well before the U.S. entry into World War II, earned fewer awards than those men drafted at the same time. However, the surprise attacks on Pearl Harbor improved the favorable nature of voluntary selection into the military. Thus, the nature of selection into the military may depend crucially upon historical circumstances. We also complement these previous results with a variety of additional outcomes such as mortality during service, killed in action (KIA), missing in action (MIA), and prisoner of war status (POW). We are unable to find supporting evidence for adverse selection with these outcomes.

To better understand this self-selection, we provide a number of additional results. Using the method proposed by Altonji, Elder, and Taber (2005), we find that a small amount of selection on unobservables could account for the mean difference in performance between volunteers and draftees. We also examine the performance of a drafted force that mimics a voluntary force based on the observable characteristics at our disposal. We find that, in a purely statistical sense, differences in observable characteristics between draftees

[1]Much of the cited literature studies a related, though fundamentally different question. These scholars focus on the treatment effect of military service: how does serving in the military effect later life outcomes. We focus on the comparative performance of drafted and volunteer soldiers during World War II. Our focus, in other words, is on the choice of treatment, e.g., on who chooses to serve. Conceptually, this focus is related to the policy question of what happens to military productivity for a country that switches to a volunteer army from a drafted army (or the reverse). We address the caveats to such a linkage below.

and volunteers are unable to account for more than one third of their difference in military performance. This means that the performance of volunteers is largely the result of unobserved attributes or of differences in the way observable characteristics are related to relevant outcomes. In either case, this finding suggests that a draft that mimics voluntary recruitment is not likely to be as successful as volunteering. Finally, we show that the quantity and quality of volunteers responded to the proclamations of and registrations for the first two calls of the draft, in a way that understates our results. That is, the evidence of randomization bias we find suggests that selection with an all-volunteer army would be more favorable than selection in our particular historical experiment, where a draft coexisted alongside volunteering for a substantial period of time.

Our analysis is complementary to but considerably different from the early discussions surrounding the U.S. transition into a voluntary military in the 1970s: we devote considerable attention to the analysis of self-selection. Early empirical work focused primarily on the forgone earnings of draftees, the supply functions for military personnel, and the response of enlistments and retentions to economic incentives, see, e.g., Oi (1967) and Altman and Barro (1971). Existing studies have not directly confronted the quality of self-selected soldiers. The possibility of an adversely selected sample of volunteers was raised during the discussions surrounding the U.S. transition to an all-voluntary force, see the report of the Gates Commission (1970, pp. 18), and in the mid 1980s, doubts were expressed about the quality of the U.S. voluntary military, see, e.g., Meese (2002) and Sandler and Hartley (1999, pp. 174-175). However, the studies of self-selection into the military are so far quite limited. Recent discussions about the performance of voluntary armies focus on the selectivity of military service with respect to the civilian labor market, see, e.g., Teachman, Call and Segal (1993), even though military skills are not necessarily the same as those required by the civilian labor market. Similarly, Asch, Romley, and Totten (2005) investigates patterns of promotion and retention in an all-volunteer army, and how they relate to performance on standardized tests. Other discussions about military recruitment, some which originated due to the recent U.S. involvements in Iraq and Afghanistan, typically judge the quality of soldiers according to educational outcomes under the assumption that civilian and military skills are positively related, see, e.g., Golding and Adebayo (1990). None of these studies has evaluated empirically the military performance of alternative recruitment methods while in service, which is an essential outcome of interest.[2]

A number of economists have discussed the advantages and disadvantages of the draft, and this paper relates to that literature. Hansen and Weisbrod (1967) is a classical and insightful contribution. Tax (1967) contains an interdisciplinary view featuring Milton Friedman's position. These early discussions neglected self-selection, which we view as central to the recruitment problem. Sandler and Hartley (1999) and Warner and Asch (1995) recently surveyed the most relevant aspects of military recruitment policies but they do not discuss adverse selection.[3] Separately, a number of empirical studies have estimated the causal effect of military service on a variety of life outcomes such as earnings, education, crime, and life expectancy, such as Angrist (1990), Bedard and Deschenes (2006) and Galiani, Rossi, and Schargrodsky (2011). The empirical papers in this line of work focus on very different issues from those we study. An important distinction is that these scholars focus on the private costs of conscription and military service. We focus on the comparative performance of drafted and voluntary soldiers during World War II.

The rest of the paper is as follows. Section 2 presents a simple theoretical framework and derives the main testable propositions. Section 3 describes the historical circumstances and institutional features of our data. Section 4 empirically examines the performance of volunteers and draftees in the U.S. Army during World War II. Section 5

[2]To our knowledge, there is only one study that examines behavioral factors associated with high military honors. Wansink, Payne, and van Ittersum (2008) surveyed 592 World War II veterans who self-reported heavy and frequent combat experience, with a focus on qualitative measures of leadership and service. Among this subsample, those who were more eager to enlist were more likely to win an award (including Bronze Stars, as well as those under study here). The individual behaviors that led to valor recognition are difficult to quantify but they found that enthusiastic volunteers scored higher in measures of loyalty, leadership and risk taking.

[3]Mulligan and Shleifer (2005) is a recent contribution that emphasizes the fixed costs of implementing a military draft. They argue that the administrative costs of the draft make voluntary systems more desirable. In contrast to their views, voluntary enlistments were prohibited after 1943 because the draft was easier to administer according to the Selective Service System, see the Appendix. There is also a complementary literature that examines the role of the draft using principles of Ramsey taxation, see Garfinkel (1990) and Siu (2008). This literature abstracts from military outcomes and heterogeneity, and hence it is silent on the role of self-selection and military productivity.

investigates the nature of selection over time and the importance of historical events in driving that selection. Section 6 uses a back-of-the-envelope calculation to measure the monetary value associated with voluntary enlistments, as tied to differences in mortality risks among award recipients. Section 7 concludes.

2 Motivating theory and estimation framework

To frame the empirical analysis, we derive the productivity implications of a draft and a voluntary army in a simple Roy model of self-selection with and without asymmetries of information, see, e.g., Heckman and Honore (1990) and Jovanovic (1982). The Roy model is the canonical model to study the implications of exogenous ability variation for occupational choice and differential productivity across occupations. We use it to study the implications of self-selection, not its determinants. We evaluate the importance of selection on observables in our empirical analysis below.

Set up. Consider an economy populated by a continuum of individuals. An individual is represented by a pair of skills (θ, m) which measure the productivity in civilian and military activities. Population is normalized to one and skills are distributed according to a well-behaved distribution function $F(\theta, m)$ with density $f(\theta, m)$ on $[0, \infty)^2$. Thus,

$$\int_0^\infty \int_0^\infty f(\theta, m) d\theta dm = 1. \tag{1}$$

Skills are given and cannot be changed by training. This is a reasonable assumption for the outcomes of interest here: extraordinary heroism and gallantry in action. We also assume that in order to furnish a military, the government requires a fraction $R \in (0, 1)$ of the population.[4] Finally, when allowed, individuals will self-select into their most desirable occupation. Compliance with the draft is perfect. For simplicity, we consider an income maximization decision although the model can be extended to allow for taste-based selection. We do not present comparative statics with respect to changes in prices,

[4] We take the military requirement R as given because we are not interested in determining the optimal size of the military. We also neglect other margins of adjustment such as the possibility of substitution between labor and capital in the production of military services.

as these results have been discussed by Heckman and Honore (1990) and Jovanovic (1982).

Perfect information. Let p denote the relative skill price of military services. Under a voluntary system, the military compensation for an individual with military skills m is pm. Potential civilian income is θ. An individual will self-select into the military if $pm \geq \theta$, and he will stay in the civilian economy otherwise; that is, if $pm < \theta$. The skill price p will be determined such that the requirement of R soldiers is met. That is, such that $R = \int_0^\infty \int_{pm \geq \theta} f(\theta, m) d\theta dm$. The army's productivity under voluntary selection is:

$$\mathbb{E}[m|mp \geq \theta] = \frac{1}{R} \int_0^\infty \int_{pm \geq \theta} m f(\theta, m) d\theta dm. \tag{2}$$

The previous expression measures the army's productivity as the average productivity of those who join the army. Since the size of the army is fixed at R, total productivity is a simple re-scaling of (2).

Suppose now that a draft lottery selects individuals into the military.[5] Under a fair draft, the army's productivity will be determined as a replication of the skill distribution $f(\theta, m)$. Thus,

$$\mathbb{E}[m] = \int_0^\infty \int_0^\infty m f(\theta, m) d\theta dm. \tag{3}$$

Self-selection produces an efficient allocation of resources in the sense that the efficiency units in the civilian sector are maximized given the efficiency units in the military. However, as (2) and (3) illustrate, the comparative performance of a draft and a voluntary army does not necessarily favor voluntary enlistments. The comparative performance of a voluntary army depends on the variance of skills and on the association of civilian and military skills in the population. Following Heckman and Honore (1990), observed

[5] We consider the draft as an alternative recruitment policy and not as a competing strategy. If the draft takes place after volunteers are enlisted, then the average productivity of a draft will be $\mathbb{E}[m|mp < \theta]$ rather than $\mathbb{E}[m]$ as we assumed in (3). Both of these previous values are closely related via the law of iterated expectations, and the insights of the model will carry over to this alternative scenario.

military and civilian productivities satisfy

$$\mathbb{E}\left[m|\theta \leq mp\right] - \mathbb{E}\left[m\right] = \alpha \mathbb{E}\left[D|D \geq -\delta\right], \text{ and} \tag{4}$$

$$\mathbb{E}\left[\theta|\theta > mp\right] - \mathbb{E}\left[\theta\right] = (\alpha - 1)\left(\frac{R}{1-R}\right)\mathbb{E}\left[D|D \geq -\delta\right], \tag{5}$$

where $\mathbb{E}\left[D|D \geq -\delta\right] > 0$ is the conditional expectation of a random variable D properly defined to represent the way voluntary selection takes place. The correlation coefficient $\alpha \in [-1, 1]$ takes negative values if $Cov(m, \theta) > pVar(m)$. Thus, if the covariance between skills is sufficiently positive (relative to p and the variance of military skills), α will be negative.

Expressions (4) and (5) imply that *the productivity of the civilian sector is always higher under a voluntary military than under a draft.* The productivity of the military cannot be unambiguously signed. *If $\alpha > 0$, military productivity will be higher under a voluntary military.* However, *if $\alpha < 0$, military productivity will be lower under a voluntary military than under a draft.* When skills are positively associated in the population, highly-skilled civilians (who are also highly-skilled soldiers) will have less incentive to join voluntarily the military since their foregone opportunities in the civilian sector are larger. In this case, the draft would yield a more productive military.

Asymmetric information. Now suppose that the army cannot observe military skills. The assumption of private information implies that the military compensation cannot depend on individual types. Thus, the army must offer a compensation $w > 0$ independent of the military ability. While this assumption is extreme, we consider both scenarios because the association between skills in the population plays a crucial and similar role in both cases. Thus, this association is likely to also play an important role under less extreme assumptions.

An individual will self-select into the military if $\theta \leq w$, and he will stay in the civilian economy otherwise; that is, if $\theta > w$. For these individuals, military ability plays no role in their selection into the military. The military compensation w will be determined such that the requirement of R soldiers is met. That is, such that $R = \int_0^\infty \int_{\theta \leq w} f(\theta, m) d\theta dm$.

Further, the observed productivity in the military and in the civilian sector under voluntary selection satisfy:

$$\mathbb{E}[m|\theta \leq w] = \frac{1}{R}\int_0^{\infty}\int_{\theta\leq w} mf(\theta,m)d\theta dm. \tag{6}$$

$$\mathbb{E}[\theta|\theta > w] = \frac{1}{1-R}\int_0^{\infty}\int_{\theta> w} \theta f(\theta,m)d\theta dm. \tag{7}$$

A drafted army is still described by (3).

Expressions (6) and (7) also imply that *the productivity of the civilian sector is always higher under a voluntary military than under a draft*. This result is due to the fact that $\mathbb{E}[\theta|\theta > w] > \mathbb{E}[\theta]$ as long as $w > 0$. As before, the productivity of the military cannot be signed without additional assumptions on the association between skills. The weakest concept of association that we can use to sign the difference in military productivity is *positive quadrant dependence*.[6] The distribution $F(m,\theta)$ is said to be positive quadrant dependent if $\Pr(m|\theta > w) \leq \Pr(m)$. Negative dependence is defined along similar lines.

Positive dependence implies that

$$\mathbb{E}[m|\theta \leq w] \leq \mathbb{E}[m]. \tag{8}$$

Thus, *if civilian and military skills are positively associated, the productivity of a voluntary military will be lower than that of a drafted military. If civilian and military skills are negatively associated, the productivity of the voluntary military will be higher than under a draft.* As in the case of perfect information, positive association means that potentially highly-skilled soldiers would find the army less attractive than the civilian sector. In this case, the draft would also be more productive.

Empirical strategy. We test for the nature of selection into the army using a *cor-*

[6]A stronger concept of dependence is that of positive likelihood dependence. The distribution of skills $f(\theta,m)$ is said to be *positively (negatively) likelihood ratio dependent* if $f(\theta',m')f(\theta,m) \geq (\leq)f(\theta',m)f(\theta,m')$, for $\theta' > \theta$ and $m' > m$. The previous inequality implies that we are more (less) likely to observe civilian and military skills take larger values together and smaller values together than any mixture of these. Under normality assumptions, the sign of the correlation between skills determines dependence. Normality yields $\mathbb{E}[m|\theta] - \mathbb{E}[m] = \rho(\theta - \mathbb{E}[\theta])$ with $\rho = Cov(m,\theta)/Var(\theta)$. Thus, $\mathbb{E}[m|\theta]$ will be increasing or decreasing in θ depending on ρ. See Lehmann (1966) and Balakrishnan and Lai (2009) for a discussion of these concepts.

relation property implied by (4) and (5) or (6) and (7). This correlation property is also commonly employed in empirical analyses of asymmetric information, see, e.g., Chiappori and Salanie (2001); Finkelstein and McGarry (2006). In our context, we examine if the decision to voluntarily participate in the army is negatively correlated with military performance, conditional on observable characteristics and sorting while in the military.

We conduct two types of analysis. First, we estimate a regression

$$m_i = \mathbb{I}[\mathbf{X}_i\gamma + \beta v_i + \varepsilon_i > 0], \tag{9}$$

where v_i is a binary variable for whether individual i enlisted voluntarily, m_i is a binary variable that measures the performance of individual i in the army, $\mathbf{X}_i$ is a vector of exogenous covariates that control for the information available at enlistment, and γ is a vector of parameters to be estimated.

The coefficient of interest is β. Notice that (9) yields $\mathbb{E}[m_i|v_i = 1, \mathbf{X}_i] - \mathbb{E}[m_i|v_i = 0, \mathbf{X}_i] = \beta$, which is the mean difference in the military performance between volunteers and draftees, conditional on $\mathbf{X}_i$. Further, via the law of iterated expectations, $\mathbb{E}[m_i|\mathbf{X}_i] = \Pr(v_i = 1|\mathbf{X}_i)\mathbb{E}[m_i|v_i = 1, \mathbf{X}_i] + \Pr(v_i = 0|\mathbf{X}_i)\mathbb{E}[m_i|v_i = 0, \mathbf{X}_i]$. Thus,

$$\mathbb{E}[m_i|v_i = 1, \mathbf{X}_i] - \mathbb{E}[m_i|, \mathbf{X}_i] = \beta \Pr(v_i = 0|\mathbf{X}_i),$$

which is the analog of (4) and (8). Notice that a "democratic" draft with limited deferments enlarges the support set over which comparisons between volunteers and drafted soldiers can be made. If deferments are pervasive, the event $v_i = 0$ would not occur for multiple values of $\mathbf{X}_i$.[7]

[7]Since voluntary enlistments and the draft coexisted, we assume the absence of randomization bias. Let $v_i^* = 1$ denote the event: "in the absence of a draft, individual i would have voluntarily enlisted in the army." Thus, we assume that $\mathbb{E}[m_i|v_i = 1, \mathbf{X}_i] = \mathbb{E}[m_i|v_i^* = 1, \mathbf{X}_i]$. We will test for evidence of randomization bias later in the text. The limited information in the reports from the Selective Service System, SSP (1942, pp. 104), and Rowntree (1942, Table 3) suggest no major difference in the fraction disqualified for service due to medical reasons. The fraction of 20-year old volunteers disqualified for military service prior to May 31, 1941 was 12.6, whereas the fraction of 21-year old draftees disqualified for service was 12.8. We were unable to find historical accounts or evidence that volunteers and draftees were rejected under different criteria.

Alternatively, we examine a system of equations

$$v_i = \mathbb{I}[\mathbf{X}_i\gamma_v + \epsilon_i > 0], \text{ and } m_i = \mathbb{I}[\mathbf{X}_i\gamma_m + \eta_i > 0], \tag{10}$$

where (γ_v, γ_m) are vectors of parameters to be estimated, and ϵ_i and η_i are the residuals of each equation. An adversely selected sample of volunteers should result in a negative correlation between v_i and m_i conditional on $\mathbf{X}_i$, which is equivalent to $\rho(\epsilon_i, \eta_i) < 0$, see Chiappori and Salanie (2001).

It is perhaps important to stress that the purpose of (9) and (10) is not to identify the underlying distribution function $f(\theta, m)$ but simply to test for the nature of selection. Identification of this function is discussed in Heckman and Honore (1990). Traditionally, the decision to select into some group, such as the workforce or those with a college degree, is an obstacle to unbiased estimation. Because the determinants of that selection may be correlated with, but not exhausted by the explanatory variables in $\mathbf{X}_i$ we would likely get biased estimates of γ in (9) from OLS. This would be a problem if we were to study the relationship between $\mathbf{X}_i$ and military performance.

This concern is not valid here for two reasons. There was a large, non-voluntary draft of men into the army at the time under study. By considering both volunteers and a contemporaneously drafted random sample of the population of interest, we are able to compare an experimental group (volunteers) to a control group (drafted men). Second, the determinants of selection are of ancillary interest to our study. We provide some analysis as to why volunteers performed better than drafted men. Our main focus is whether they did perform better.

3 Military Performance in World War II

The first part of this section presents a brief discussion of the institutional details that make the U.S. experience during World War II ideal for our purposes. A more complete account of these institutional aspects can be found in the Appendix. The second part of this section briefly discusses our data. The Appendix also contains a more detailed discussion of the data sources and the matching of multiple files.

World War II: An Overview. An ideal experiment to test the selection into of the Army would be to construct two different fighting forces in parallel, one volunteer and one drafted, and compare their performance *ex post*. The historical record suggests that World War II was as close to this ideal as possible. During the earlier part of the war, before 1943, the U.S. Army allowed volunteers to enter at the same time as other men were drafted.

The first draft registration occurred in October 16, 1940, well before the U.S. entry into World War II. The World War II draft was also the largest and most democratic draft implemented in the history of the United States. Deferments were quite limited. The World War II draft had no college deferments. The draft boards had explicit guidelines for age and marital status, i.e., men in certain age groups (which changed over the course of the war) were the base set of eligible men, and exemptions were allowed only for married men or those otherwise with dependents, and for employment in war production or agriculture. The limited nature of deferments implies that the sample of drafted soldiers should be quite close to a random sample of the U.S. population. Moreover, the factors that lead to non-representativeness of the draft are easily detectable and correctable. This makes the estimates of (9) appealing as tests of selection.

More recent U.S. military involvements have relied exclusively on voluntary enlistments, and were incomparable to the military demands of World War II. Thus, they would fail to provide a large and representative sample of drafted or volunteer soldiers. This makes it impossible to compare volunteers to a control group of drafted men for more recent service.

Data. Our main data source is the *U.S. Army's Serial Number Electronic File 1938-1946*. Every man and woman who entered the Army during World War II had an IBM punchcard which recorded their name, serial number, and demographic information. A portion of these records were destroyed by fire in 1973 but over nine million records were preserved in digital format, and compose the U.S. Army's Serial Number Electronic File 1938-1946. The file was made available by the National Archives and Records Administration, NARA.

The data report information on the individual joining the military: name, serial number, race, citizenship status, education, prior occupation, state and county of residence, initial rank and branch, and marital status, among other things. For some records, height, weight, and performance on a military entrance test are also recorded. As described in U.S. War Department (1942), the Army assigned serial numbers in a way that allows for identification of volunteers versus drafted men. Those who voluntarily enlisted were given serial numbers beginning with 0, 1 and 2, while drafted men had serial numbers beginning with 3 and 4. There are 8,075,352 records, after removing observations with incomplete or missing data. Not all Army soldiers are included, and there are no records for Army officers, or men and women in the Navy and Marines.

Table 1 provides summary statistics of the serial number files. We also computed the corresponding national averages for the sample of men age 15 to 50 in the 1940 U.S. Census. The egalitarian nature of the World War II draft is evident. The absence of discrimination in education between the drafted and the general population can be seen in Table 1, as about 89 percent of each has a high school education or less. Similarly, the drafted sample has approximately the same fraction of African-Americans as the 1940 Census. The difference in the white population between the groups is mostly made up of non-citizen whites and Puerto Ricans, about 2 percent of the drafted sample. Neither group is considered distinct in the 1940 Census. The nature of the deferments is also clear in the sample: drafted men are younger and more single than the national average. Volunteers are younger and more single than their drafted counterparts.

We complement the previous data with information about military performance during World War II. This includes whether an individual received one of the three highest awards offered by the Army. These are the Medal of Honor, the Distinguished Service Cross, and the Silver Star. Unlike other potential military outcomes, such as survival and advancement in rank, these awards are directly linked to acts of valor on the battlefield. Silver Stars are awarded for "gallantry in action." The awards were principally given by U.S. Army divisions, though, in many cases, they were awarded by higher levels of the U.S.

military. Medals of Honor and Distinguished Service Crosses recognize "extraordinary heroism."[8] The Medal of Honor recipients are listed by the military on its web site devoted to the honor. The names of Distinguished Service Cross and Silver Star recipients were compiled by Colonel Albert F. Gleim, and transcribed from his original lists as described in the Appendix. Due to the nature of the data, the records we use are not complete. The list of Silver Star recipients has 56,487 names, and lists approximately eighty percent of the total awards according to Col. Gleim. We merged the publicly available list to the enlistment data by name following required steps to ensure consistency. After the merging, we have 5,479,802 observations in total, 22,835 of which received honors (21,360 Silver Stars). In the pre-1943 sample we have 2,872,134 observations. This constitutes our baseline sample.[9]

These measures are useful both within and beyond the historical context. The external validity of our findings might be weak if the outcomes under study are related to specific technologies of the era. (E.g., Native American Code Talkers may not have the same special value today as they did in World War II due to improvements in secure information technology.) This seems unlikely for the outcomes under consideration here. These same recognitions are awarded to this day, for similar acts of bravery and valor. Moreover, other outcomes, such as advancement through the ranks, are not known to be in the historical record, and may have ambigious value out of context. (See Hosek and Mattock (2003) for an analysis of contemporary data.)

We also measure three other military outcomes: becoming a prisoner of war (POW), dying in service, killed in action (KIA), or being lost in action (MIA). POW records have been digitized and made available by the National Archives and Records Administration. Honor rolls of the dead were produced at the end of the war by the War Department. They

[8]The Department of Defense's description of the awards is available at `http://www.tioh.hqda.pentagon.mil/Awards/decorations.aspx`.

[9]Conversations with Doug Sterner, who publishes lists of award recipients for the Military Times, suggest that it is unlikely that awards were granted in a systematic way to artificially increase the likelihood a volunteer would win an award. Further, the announcements for the awards detail actions that would be hard to counterfeit, and often cite multiple concurring first-hand accounts. These descriptions often omit the serial number of the soldier, suggesting that granting authorities may not have been able to identify volunteers versus drafted men. The systematic changes in selection described below further cast doubt on these concerns.

were digitized by the American Battle Monument Commission, ABMC, for the National World War II Memorial. The data for MIA is from the Department of Defense. All these records include serial numbers, which are used to merge with the enlistment data. Since the merging of awards was made by full name, and the merging of these alternative outcomes is not, the use of these outcomes also provides a check for the potential biases introduced by our merging procedure.

4 Main Results

Table 2 reports OLS estimates of (9) in our main sample. We present linear probability estimates first because they yield a simple interpretation for the estimated coefficients since $\mathbf{X}_i$ contains many discrete and exclusive variables. Panel A pertains to any award, panel B pertains to Silver Stars only, and panel C pertains to the Distinguished Service Cross and the Medal of Honor. This last panel combines these two awards because they are each rare events. Overall, fewer than 5 in 100,000 awards are recorded in the sample.

We present several specifications. Column (1) leaves $\mathbf{X}_i$ empty, with β measuring the differences in mean awards between volunteers and drafted men. Volunteers were about 30 percent more likely to receive a Silver Star and 75 percent more likely to win either a Distinguished Service Cross or a Medal of Honor. These results are statistically significant at the usual levels of confidence.

Column (2) includes dummy variable controls for initial assignment, by branch and rank. These controls represent the military's initial assessment of the soldier. This leads to over twenty five dummy variable controls in each regression. These controls are important because we might worry that volunteers who served in World War II were assigned to different areas of the military, and had more opportunities to demonstrate valor. Initial branch placement could have been in the Infantry, Army Mine Planter Service, Chemical Warfare Service, Finance Department, or Warrant Officers initially located in the U.S., among others.

The Army paid considerable attention to occupational sorting at enlistment and even employed a detailed aptitude test to help sort individuals into their most productive role.[10] Even with these controls, volunteers are more likely than draftees to receive a Silver Star or any of the awards in our sample. In fact, the estimated difference between volunteers and drafted men only changes marginally from column (1), and retains its statistical significance for Silver Stars and all awards.

This is evidence against adverse selection. That is, evidence against the hypothesis that only individuals with low-quality military skills would enter the Army by choice. Quite the opposite, the selection appears *favorable* or *advantageous* as those who enlisted voluntarily were more likely to receive a distinguished award for military performance, conditional on the military's initial assessment.

Column (3) examines a potential source of favorable selection. Volunteers may exhibit physical traits well suited for service, as measured by their body mass index, BMI, or by their height. This is the kind of selection that a volunteer army might exploit. To examine the importance of physical strength in a flexible manner, we grouped individuals into ten and eight categories respectively according to their BMI and height. The cutoffs were chosen to create evenly-sized groups. As (3) shows, these physical characteristics do not alter the statistical or economic significance of the point estimate for volunteers. This implies that differences in strength, conditional on being in the Army and on military sorting, are not the main source of favorable selection.

Given the timing of the draft, it is possible that volunteers entered into the Army earlier than drafted men, or at an earlier age. Column (4) includes controls for year of entry into the military, and age at entry. Adding year of enlistment controls for the differences in the nature of the draft between peacetime draft and wartime draft.[11] In particular, the drafted class of men grew dramatically from 1940 to 1942 as the U.S. prepared for entry into World War II. A control for age at enlistment serves similar purposes.

The draft focused on a selected age group of individuals whose ages differed from those of volunteers, see Table 1. Column (4) also controls for additional information

[10]The Army accidentally recorded performance on an entrance exam for several months of records in 1943. Unfortunately, this coincided with a period where severe restrictions were placed on volunteering. These restrictions were put in place to resolve logistical concerns for an expanding draft.

[11]We return to specific events and differences in the nature of selection over time below.

explicitly used in the draft process. In particular, we control for marital status, whether the individual had dependents, or whether the individual worked in agriculture. These regressions include over fifty dummy variable controls. As Table 2 shows, the results for Silver Stars and any awards retain their size and statistical significance. The draft had specific age and occupational guidelines. Column (4) controls for the characteristics that were likely to differ between drafted men and the general population.[12]

Column (5) is our richest specification. In addition to the previously mentioned individual-level characteristics, column (5) includes state of enlistment and state-year of enlistment controls. These regressions include over 100 dummy variable controls. As discussed and exploited by Acemoglu, Autor, and Lyle (2004), there were many state-level characteristics that determined a state's mobilization rate, and thus, an individual's likelihood of being drafted. If the state-level effects dominate the individual characteristics, differences between draftees and volunteers in the previous specifications may be artifacts of war-time policies, instead of individual selection. Further, this controls for potential regional differences in preference for service, labor market opportunities, or any other characteristic that varies across states and time. As (5) shows, however, the estimates of β retain their size and significance.[13]

Robustness.

Probit. The results described below do no rely upon the OLS specification. We also estimate (9) using a probit procedure. The probit estimates can be found in Table 3. The estimated marginal effects and patterns of statistical significance under a probit procedure

[12]These regressions were run separately for African Americans and non-citizens. The differential selection of African Americans into the military is complicated by the many disproportionate hardships they faced. Moreover, while there was no discrimination to enter into the Army, it is quite likely that African Americans were discriminated against when awarding honors. The results for the African-American subpopulation are qualitatively similar to the entire population, but smaller in magnitude and noisily estimated. Estimates derived from the non-native population suggest adverse selection. While not statistically significant at traditional confidence levels, this may reflect the importance of national identity in the selection decision, as described in the discussion of Pearl Harbor below.

[13]We also interacted the state-level population characteristics found in Acemoglu, Autor, and Lyle (2004) with the volunteer dummy. These estimates, which measure, e.g., how coming from a heavily Japanese- or German-immigrant population impacts the relative quality of volunteers, varied across specifications, both in magnitude and statistical significance. Without any controls, volunteers from states with a large Japanese ethnic background performed better than draftees, but this differential vanished with the inclusion of controls. We did not find any differential performance for volunteers from states with large German or Italian ethnic backgrounds.

are practically the same as those provided here.

Were volunteers different from drafted men in other ways? Thus far we have focused on awards associated with valor on the battlefield. Next we examine additional outcomes associated with participation in battles. These additional outcomes complement our previous estimates but also serve to characterize in more detail differences between volunteers and draftees. For example, if volunteering in the presence of a draft conferred advantages in terms of initial placement, then this "gaming" of the system should be present in measures of risk and combat. Suppose that volunteers were motivated to enlist because they expected to be almost surely drafted, but had the option of selecting into the preferred branch or position. This "gaming" of the draft suggests volunteers should experience lower combat rates and possibly lower mortality overall.

We consider four additional outcomes: death in service, killed in action (KIA), missing in action (MIA), and prisoner of war (POW). The sources for these variables are described in the Appendix. This additional data contains virtually all of the cases of these outcomes experienced by the U.S. during World War II.

We examine these variables because they also measure military performance. In contrast to valor recognition, these outcomes cannot be unambiguously interpreted as either good or bad from a military perspective. If, for example, the death occurred in an act of valor, one man's death may have enabled others to live. The Honor Rolls do not include any notes on the circumstances of death, nor do the POW records include the circumstances under which the soldier was taken captive.

Table 4 presents the results. There are four panels. Panel A pertains to KIA, panel B to death in service, panel C to MIA, and panel D to POW. To help with the interpretation of the estimated coefficients, we also include the mean value of these outcomes. We estimate four specifications. Column (1) without any controls. Column (2) controls for initial placement, column (3) controls for age and year at entry as well as for whether the individual was any of the following upon entry into the Army: married, had dependents, or employed in agriculture. Column (4) adds to the previous controls state and state-year controls.

As column (1) shows, volunteers bore a disproportionate burden for each of these outcomes, though the size and statistical significance of that burden varies by specification. Volunteers were about 13 percent more likely to be killed in action and about 35 percent more likely to die while in service compared to drafted men. They were about 3 times more likely to be MIA and 2 times more likely to be a POW. These point estimates contradict the idea of volunteers "gaming" the draft.

Columns (2) to (4) also show that the association between volunteer status and these outcomes weakens considerably as more controls are added. This weakening also varies by outcome. In panels A and B, the value of β in column (4) is about one-third of the unconditional value, whereas in panels C and D, β is about one-sixth of the unconditional value. Finally, notice that the large decline in β as controls are added contrasts with our results on awards. In Table 2, the magnitude of β stayed steady as more controls were added. Thus, the favorable selection into the military made possible by volunteering seems most stable when it comes to valor. These other outcomes and their relationship to volunteering are more closely related to observable characteristics. Overall, Table 4 refutes the notion that volunteers entered the Army to avoid the riskier placements compared to drafted men. Further, this pattern suggests that the differences in quality between volunteers and drafted men is not purely due to opportunity or circumstance, because the observable characteristics in $\mathbf{X}_i$ are related to the unconditional differences in mortality between volunteers and drafted men.

These four outcomes are merged by serial number, while the awards were merged by full name. In the Appendix, we re-estimate our regressions for death in service on the records with unique names, to replicate the name-merged award samples. The effects on this reduced sample are attenuated relative to the serial-number merged sample, as is the case with classical measurement error. This suggests that the matching based on names attenuates our results. Thus, the estimates we present for awards are likely to underestimate the true value of the point estimates of (9).

Selective Placement and Replacement U.S. Army procedures may have induced these effects, without any underlying advantageous selection. There are two potentially confounding mechanisms that could induce this: selective formation of groups, and selective replacement of soldiers into groups that suffered heavy casualties.

One way we have controlled for the selective formation of Army groups is to include controls for initial placement. As demonstrated above, such controls do not vary the statistical significance or magnitude of the coefficient of interest. An alternative way to control for the dangers (and opportunities) faced by soldiers it to take advantage of the fact that Army units were often created from recruits and draftees from the same geographic areas at the same time of enlistment. The state-year fixed effects are one way to control for such differences. To allow for the possibility that the state-year fixed effects are not sufficiently detailed, we construct month-by-county mortality rates. These rates reflect the mortality rates for all of those men who enlisted from a particular county in a particular month.

As Table 5 demonstrates, there is a great deal of variation in these controls. To allow for non-linear relationships between the county-month mortality rates and opportunities for service, we group the county-months into seventeen different categories. These groups were designed to be evenly sized, with each group containing approximately 140,000 observations. Weighing by the number of enlistees by county-month, the mean mortality rate for the county-month groups varies from under one half of one tenth of one percent, to twelve percent. The difference in performance between volunteers and drafted men does not vary when the county-month controls are included either of two ways—either linearly, or with separate indicator variables for each group. Including the full set of controls from the earlier discussion (initial placement, age, year of entry, BMI, etc.) changes neither the magnitude nor the statistical significance of the point estimate. The controls themselves (not reported) are statistically significant—serving from a county-month that exhibited greater levels of mortality is linked to an individual's likelihood of winning an award. But accounting for that correlation does not diminish the difference in awards won between volunteers and drafted men.

Once these men saw combat, U.S. Army policy, as well as historical documentation, suggest that selective replacement is unlikely. As described in Rush (2001), U.S. Army policy was to supplement units with new soldiers, instead of rotating fresh units onto the front line to replace those units with the heaviest losses. Because these new soldiers may have entered the army at a later (or earlier) date, from a different geographic location, selective replacement is unlikely.

The Daily Morning Reports, filed for each basic Army unit (e.g., infantry company or artillary battery), provide an opportunity to investigate this policy in situ. These reports reflect the daily changes to the personnel in the unit: who left the unit due to casualties, transfer, etc; and who joined the unit. The morning reports include the name, rank and serial number for those listed. Due to the archival nature of the data, and retrieval restrictions placed on them, we do not currently have access to a substantial collection of morning reports. However, several months worth of morning reports for the 22nd Infantry Regiment of the 4th Infantry Division were analyzed in Rush (2001).[14] Infantry provides a useful case in point, in that "[s]ixty-four percent of all casualties suffered by American forces during World War II were in infantry regiments, which made up about 10 percent of the mobilized forces." (Rush (2001, pp xiii)) This group is of particular interest, as it landed on Utah Beach as part of the D-Day Invasion and would subsequently serve in the Battle of Hürtgen Forest, the longest single battle the U.S. Army has ever fought.

The evidence from these reports suggests that this replacement policy did bind. Injured soldiers routinely returned to their same organization; injured enlisted men almost exclusively returned to their same company. The regiment was kept together as a unit; casualties were replaced, either by returning men or those joining from the U.S. Initial placement away from combat did not keep you there. One man, who was initially assigned to be a cook would eventually be trained for infantry service, and serve as a replacement. This was not uncommon—ad hoc infantry groups were commonly formed from "cooks, clerks, and support companies." (Rush (2001, pp 305))[15] The mobilization of non-combat troops into combat situations serves to dull concerns about selective placement. Even if there were selective initial placement (which we find no evidence of), such differences

[14] Dr. Rush generously supplied us with unpublished research conducted with the very same data used in his book. Some of that research is reflected in the discussion below.

[15] As a rule, these men called to the front lines did receive infantry training. Their initial assignments called for non-combat roles.

would be scrambled by the chaotic and haphazard realities of the battle field.

How important could selection on unobservables be? The evidence presented thus far controls for a large number of variables potentially relevant for sorting and military performance. These variables, however, do not mitigate the difference in military performance between volunteers and draftees.

To reinforce this point, we estimated the simultaneous equations of (10) as a biprobit. The key estimate of interest is the correlation of the errors. We do this for earning any award, using either no controls, or controlling for initial placement, age at entry, year of entry, and whether the recruit was married, a farmer or had dependents. As suggested by the main results, adding these controls does impact the estimated correlation of errors, though not in any quantatively important way. Without the controls, the correlation of the errors is estimated to be 0.0643, with a standard error of 0.0036. Including those controls, the point estimate of the correlation of the errors is 0.0485, with a standard error of 0.0057. These results are also reported in Table 3.

We next rely on the method proposed by Altonji, Elder, and Taber (2005) to quantitatively assess if selection on unobservables could explain the difference between the previous volunteers and drafted men. As in Altonji, Elder, and Taber (2005, pp. 175-177), we ignore that our estimates are based on a probit. Recall the system of equations in expression (10) and let $\hat{v}_i$ denote the predicted value of a regression of v_i on $\mathbf{X}_i$; that is, $\hat{v}_i = \mathbf{X}_i\hat{\gamma}_v$. The fact that $v_i - \hat{v}_i$ is orthogonal to $\mathbf{X}_i$ leads to estimates of β in (9) given by

$$\hat{\beta} = \frac{Cov(v_i - \hat{v}_i, \varepsilon_i)}{Var(v_i - \hat{v}_i)} = \left(\frac{Var(v_i)}{Var(v_i - \hat{v}_i)}\right)\left\{\frac{\mathbb{E}[\varepsilon_i|v_i = 1] - \mathbb{E}[\varepsilon_i|v_i = 0]}{Var(\varepsilon_i)}\right\}. \quad (11)$$

This previous expression is identical to the one obtained by Altonji, Elder, and Taber (2005, pp. 176) under the assumption that all differences between groups are the result of self-selection (keeping in mind that $Var(\varepsilon_i) = 1$). Expression (11) also validates the notion of using (9) to test for the nature of selection, i.e., adverse or favorable. Our positive point estimates of β and (11) suggest that the unobserved factors that determine volunteering and those that determine awards are positively associated, $\mathbb{E}[\varepsilon_i|v_i = 1] > \mathbb{E}[\varepsilon_i|v_i = 0]$.

To assess how important selection on unobservables would need to be to explain the difference in awards between volunteers and draftees, we use the degree of selection on observables as a guide to the degree of selection of unobservables, see Altonji, Elder, and Taber (2005).

Let the standardized amount of selection on unobservables relative to the standardized selection on observables be

$$\frac{\mathbb{E}[\varepsilon_i|v_i=1]-\mathbb{E}[\varepsilon_i|v_i=0]}{Var(\varepsilon_i)}=\lambda\left[\frac{\mathbb{E}[\mathbf{X}_i\gamma|v_i=1]-\mathbb{E}[\mathbf{X}_i\gamma|v_i=0]}{Var(\mathbf{X}_i\gamma)}\right]. \tag{12}$$

Thus, (12) implies that selection on unobservables is λ times as strong as selection on observables. Combining (11) and (12) it is possible to write

$$\hat{\beta}=\lambda\left(\frac{Var(v_i)}{Var(v_i-\hat{v}_i)}\right)\left\{\frac{\mathbb{E}[\mathbf{X}_i\gamma|v_i=1]-\mathbb{E}[\mathbf{X}_i\gamma|v_i=0]}{Var(\mathbf{X}_i\gamma)}\right\},$$

which is a single equation in λ.

The notion that the amount of selection on unobservables is the same as the amount of selection on observables means that $\lambda=1$, see Condition 4 in Altonji, Elder, and Taber (2005). Low values of λ imply that even modest amounts of selection on unobservables are able to account for the mean difference between volunteers and draftees. On the other hand, if λ is large, one would need a large relative amount of selection on unobservables to account for mean differences in military performance.

The point estimate of λ in our analysis of military awards is 0.001. Thus, given the amount of selection on observables in the data, only one tenth of one percent in the standardized selection on unobservables is needed to account for the mean difference in awards between volunteers and drafted men. This reinforces the notion that selection according to unobservables is an important factor in driving the superior performance of volunteers. For our analysis of death in service we obtained $\lambda=0.0005$, even stronger evidence in favor of selection on unobservables.

Can observables explain performance? In order to examine how much of the difference in military performance can be explained based on differences in observables consider (9) estimated separately for drafted and volunteer men. Then, $\mathbb{E}[m_i|v_i=0,\mathbf{X}_{i,0}]=$

$\mathbf{X}_{i,0}\hat{\gamma}_0$ and $\mathbb{E}[m_i|v_i = 1, \mathbf{X}_{i,1}] = \mathbf{X}_{i,1}\hat{\gamma}_1$, where $\hat{\gamma}_{0,1}$ denotes estimates of the drafted and volunteer parameter vectors, and $\mathbf{X}_{i,0}$ and $\mathbf{X}_{i,1}$ the observable characteristics of draftees and volunteers respectively.

One way to decompose the mean difference in awards is the following:

$$\mathbb{E}[m_i|v_i = 1, \mathbf{X}_{i,1}] - \mathbb{E}[m_i|v_i = 0, \mathbf{X}_{i,0}] = [\mathbf{X}_{i,1}\hat{\gamma}_1 - \mathbf{X}_{i,1}\hat{\gamma}_0] + [\mathbf{X}_{i,1}\hat{\gamma}_0 - \mathbf{X}_{i,0}\hat{\gamma}_0]\,,$$

where the first term corresponds to a gap due to "behavior" and the second term to a gap due to "characteristics." In other words, $\mathbf{X}_{i,1}\hat{\gamma}_1 - \mathbf{X}_{i,1}\hat{\gamma}_0$ asks how would volunteers fare if they "behaved" as drafted men, whereas $\mathbf{X}_{i,1}\hat{\gamma}_0 - \mathbf{X}_{i,0}\hat{\gamma}_0$ asks how would draftees fare if they had the same set of observable characteristics as volunteers. The gap due to "characteristics" reveals the fraction of the difference in awards attributed to differences in observables characteristics evaluated using the drafted parameter values, i.e., $\hat{\gamma}_0$.

A point that needs to be stressed here is that $\hat{\gamma}_0$ is the predictable effect of observable characteristics $\mathbf{X}_{i,0}$ on awards *in the absence of selection bias*. Thus, we can use $\hat{\gamma}_0$ to obtain a proper counterfactual for the behavior of draftees with volunteer characteristics. In other words, the fact that the sample of individuals with $v_i = 0$ is a random sample of the population implies that $\hat{\gamma}_0$ is not contaminated by self-selection (i.e., a fair lottery and not individual decisions determined participation). This point is important because the gap due to "characteristics" represents the mean behavior of a drafted force that would select men to mimic voluntary enlistments.[16]

We first estimate the "characteristics" gap in a linear probability specification when the set of observable characteristics used are: height and BMI linearly; initial placement dummies; year of entry dummies; age at entry dummies; and dummies for being married, having dependents, and having worked in agriculture just prior to entry into the Army. To avoid unnecessary details, we do not report the estimates $\hat{\gamma}_0$. Our findings for the

[16]An alternative way to decompose mean differences in outcomes is to consider the following gaps: $[\mathbf{X}_{i,1}\hat{\gamma}_1 - \mathbf{X}_{i,0}\hat{\gamma}_1] + [\mathbf{X}_{i,0}\hat{\gamma}_1 - \mathbf{X}_{i,0}\hat{\gamma}_0]$. This decomposition evaluates the difference in "characteristics" using $\hat{\gamma}_1$, the volunteer parameter values. Since these estimates are influenced by selection, the inferences in this case are less transparent than in our preferred specification.

previous gap imply that

$$\frac{\mathbf{X}_{i,1}\hat{\gamma}_0 - \mathbf{X}_{i,0}\hat{\gamma}_0}{\mathbb{E}[m_i|v_i = 1, \mathbf{X}_{i,1}] - \mathbb{E}[m_i|v_i = 0, \mathbf{X}_{i,0}]} = 0.33.$$

When using a probit-based estimator, the importance of "characteristics" drops to twenty-four percent. In all specifications, observable characteristics can account for less than one third, and perhaps as little as a quarter, of the differences in performance between volunteers and drafted men.

This result implies that selection and the differential "behavior" of volunteers are the main source for the difference in mean performance. Thus, mimicking a voluntary force through a selective draft would not lead to a drafted army that performed similarly to the volunteers in World War II.[17]

5 Selection Over Time

Thus far, we have assumed that the nature of selection remained stable across time. In this section, we examine different time periods separately. Given the strong historical currents in this period, the nature of selection may have changed over time. In our sample, we have men who volunteered when this was the only way to enter the military; others joined in the shadow of the draft. Meanwhile, volunteers entering the Army in early 1940s joined a prophylactic force; by the end of 1941, there was an active state of war. Historical coincidence allows us to separately address volunteering in peacetime and in wartime, because the draft began before the attack on Pearl Harbor.

Figure 1 plots the estimates of (9), run separately for each quarter of entry into the military, including controls for initial placement, age at entry, marital status, having dependents, and whether the pre-Army profession was in agriculture. The first estimate corresponds to the fourth quarter of 1940, with a point estimate of −0.0058 (standard error: 0.0015). That is, when considering men who joined the Army at the very beginning

[17] This is consistent with the findings of Wansink, Payne, and van Ittersum (2008), which documents significant self-reported differences in leadership, loyalty and risk-taking behavior between those who enlisted eagerly and those who did not.

of the draft, volunteers would go on to win fewer awards than drafted men, with an estimate that is statistically significantly different from zero. This estimate is the only statistically significant evidence we have found to support adverse selection. However, this estimate corresponds to peacetime recruitment, and this may provide a misguided picture of recruitment during a war.

The point estimates for the rest of peacetime are insignificant, and they do not suggest further adverse selection. As Figure 1 shows, all point estimates during wartime support the idea of favorable selection. These point estimates are consistently of the same magnitude. This suggests that the only dramatic change in selection occurred when the U.S. went to war. Once at war, the relative performance of newly enlisted volunteers remained stable over time.

Did volunteers experience different outcomes over time, relative to drafted men in the same entry cohort? Figure 2 plots the quarterly regression coefficients as before for died in service. There is no systematic trend apparent in these results. The lack of a systematic trend reinforces the notion that the differences in awards are not due to differences in opportunities to exhibit valor, since those opportunities should also correspond to a higher risk of dying.

Pearl Harbor. The only evidence for adverse selection appears during peacetime. This suggests that entering the war significantly altered the nature of selection. In order to examine this possibility, we focus on the event that triggered the U.S. entry into the war, the attack on Pearl Harbor.

To test for changes in voluntary selection, we consider a standard difference-in-difference specification:

$$m_i = \mathbb{I}[\mathbf{X}_i\gamma + \beta_1 v_i + \beta_2 post_i + \beta_3 post_i \cdot v_i + \varepsilon_i > 0], \qquad (13)$$

where β_3 estimates the difference-in-difference of volunteer quality. That is, how did volunteer quality (relative to drafted men) change after this historical event. The two other coefficients, β_1 and β_2 measure the difference between volunteers and drafted men before Pearl Harbor, and the difference between drafted men before and after Pearl Harbor, respectively.

In order for the estimate of β_3 to be consistent, there must be convincing evidence that the U.S. entry into the war was unanticipated. If the event were anticipated, then the selection prior to the start of war would respond to the looming entry into the war. This anticipation would bias β_3 as a measure of the difference in selection due to the entry into war. Given the lack of active hostilities prior to the surprise attack on December 7th, 1941, and the state of open war after it, we take the attack as an unanticipated shock to the nature of selection into the military.

Processing drafted men could take six weeks (Flynn (1993, pp. 24)), so we must find a date to separate pre- and post-Pearl Harbor Army entrants. Figure 3 presents the histogram of entries into the military, 85 days before and after January 4, 1942, 28 days after Pearl Harbor. The date of the attack on Pearl Harbor is marked on the graph. There is a demonstrable lag between the Pearl Harbor attacks, and the jump in entry into the military via the draft. This lag does not appear for volunteers. The clear jumps in enlistment suggest that the attacks on Pearl Harbor were unanticipated. The jumps also provide precise dates to separate the post period. For drafted men, this is December 28, 1941, and 20 days prior for volunteers.

Table 6 presents the estimates of (13). We employed two windows: 60 and 120 days before and after January 4, 1942. There are four specifications for each window: (1) with no other explanatory variables; (2) with initial placement controls; (3) with initial placement, BMI and height, as above; an (4) with the same as the (3), as well as age-at-entry dummies, marital status, dependent status, and having an agricultural job prior to joining the Army.

The point estimates of β_3 indicate that the post-Pearl Harbor volunteers earned more awards than the pre- volunteers, relative to their corresponding cohort of drafted men. This effect is statistically significant across specifications, though it does fall by half once the controls are added. Still, the size of the smallest point estimate is one third the average incidence of awards among men entering the Army in this period. These point estimates demonstrate that Pearl Harbor had a dramatic effect on the nature of voluntary selection into the Army.

The coefficient β_1 estimates the difference in awards between volunteers and drafted men prior to Pearl Harbor. The negative sign for the smaller window across specifications suggests that prior to Pearl Harbor, volunteers adversely selected into the Army, though the statistical significance of this result varies across specifications. This is consistent with our previous findings in Figure 1.

These results suggest that volunteers who entered the Army in the shadow in the draft, but not in wartime, performed slightly worse than those drafted at the same time. However, the attacks on Pearl Harbor dramatically altered the nature of selection. Once the country declared war, those who joined the Army voluntarily went on to serve with more distinction than those who entered via the draft.

Panel B in Table 6 reproduces the previous estimates for died in service as the outcome in (13). The double difference estimate with the 60-day window is statistically different from zero at the usual confidence levels. That is, volunteers who entered the war after Pearl Harbor would go on to die in service less than all other groups, as the other coefficients are not as large or consistently statistically significant. This changes with the larger window, but the relative-to-entry-cohort mortality of volunteers was lower for post-Pearl Harbor volunteers than it was for pre-Pearl Harbor volunteers. This suggests that volunteers may have won more awards at a lower cost in life. The next section considers that result for the balance of the sample.

6 What Price Valor

Acts of valor such as those recognized by the Medal of Honor, the Distinguished Service Cross, and the Silver Star involve many risks for soldiers, including an increased risk of death. Using this differential risk we can estimate how much pay is required to compensate soldiers for engaging in such acts of valor. As in the value of life literature, we can use these differentials to "price" valor. These back-of-the-envelope estimates are useful since they provide a direct economic measure of the cost of alternate recruitment methods, holding military performance constant.

The monetary value associated with the higher risk of death in acts of valor is equal to the risk of dying multiplied by the money premium required to bear a small increase in the probability of death, the value of statistical life. There are several estimates of the value of life in 1940 which typically coincide with a value of $1 million, 2000 dollars. This amount was obtained by Rohlfs (2006) in his estimate of how much the U.S. government valued soldiers' lives in World War II.[18]

The increase in the probability of dying due to acts of valor can be estimated from the data. We estimate regressions of the form:

$$d_i = \mathbb{I}[\mathbf{X}_i \gamma_d + \mu m_i + \xi_i > 0], \tag{14}$$

where d_i is a binary variable for whether individual i died in service. The coefficient μ captures the extra risk of dying while in service for those individuals who received an award.

Table **??** presents estimates of (14), with and without controls for initial placement, height, weight, age, marital status/dependents, year of enlistment, and if prior occupation was agricultural.

Individuals who earned awards were five and a half times times more likely to die in service than typical soldiers: among men who earned awards, there was a 15.37 percent mortality rate, which is the point estimate of μ plus the intercept term (not reported), whereas the average mortality rate was 2.75 percent. This difference in mortality is statistically significant. Further, the point estimates remain the same with controls. These differences are even larger for killed in service: men winning awards were eight times more likely to die than the rest of the soldiers (12.4 percent vs. 1.56). This result is also robust to the inclusion of controls in the regression.

To examine the differences in the risk of death for drafted men versus volunteers, we interact awarded with volunteer status, as well as a control for volunteering. The

[18]Rohlfs (2006) estimates assume that the Army could have reduced soldiers' fatalities by increasing its use of tanks and decreasing its use of ground troops. Using this margin of adjustment, and holding mission accomplishment constant, the estimate of the value of life is of $1 million per life saved. This value coincides with alternative estimates of young men's private valuations of fatality risk in 1940.

interaction term measures the mortality rates of volunteers relative to drafted men, among those who won awards. As the estimates show, earning an award for volunteers was associated with a reduced risk of death compared to drafted men who won awards. Thus, not only were volunteers more likely to receive awards, but their mortality rate among award recipients was lower compared to drafted men.

This result strengthens the claim that volunteers make better soldiers and mitigates concerns that volunteers are measured as being better only because they had more opportunities to demonstrate "gallantry in action." Here, we are holding such opportunities and outcomes constant, and are finding that volunteers make less costly soldiers.

How valuable would the military find such a drop in the mortality rate? In our subsample, 10,532 drafted men won awards, of whom 1,714 died. If these drafted men instead died at the rate of volunteer award winners (16 percent vs. 13 percent), 276 fewer men would have died. This would represent a monetary difference of $276 million, 2000 dollars.

This calculation is a lower bound for a series of reasons. First, our sample only covers men with unique names and serial numbers who entered the Army before 1943. Of these men, 15,970 won awards, out of the 56,000 in our list. The mortality rates among award winners is virtually identical for men who entered the Army before or after 1943 (15.4 vs. 15.6 percent). Thus, we can scale the previous monetary value to extrapolate the gains for the entire wartime period.

Second, the awards in our data represent only 80 percent of the awards earned in service. If whether an award makes it into our list is random, this means our estimates are understating the effect by another twenty-five percent. Thus, the total estimate among award-winners should be $\frac{1}{0.8} \cdot \frac{56{,}000}{15{,}970} = 4.3$ times larger than our original calculation. This represents 1,186 lives saved (out of the 56,000 who won awards), valued by the military at $1.12 billion, 2000 dollars.

7 Conclusion

This paper empirically examined the nature of voluntary selection into the U.S. Army during World War II. Using a comprehensive data collection that covers the majority of the individuals who served in the U.S. Army, we tested if volunteers represented an adversely selected sample of soldiers. Rather, we found evidence of favorable selection. During the period in which volunteers and draftees could enter the Army in parallel, volunteers made better soldiers than draftees. Our measure of performance has been valor recognition through the highest distinctions conferred by the U.S. Army: the Silver Star, the Distinguished Service Cross, and the Medal of Honor. This finding is robust to the inclusion of a large number of controls and across multiple specifications.

We also attempted to shed some light on why volunteers performed better than draftees. We found that differences in performance can be ascribed to selection on unobservable characteristics and that differences in observable characteristics explain only a minor fraction of the volunteer-draftee differential. These findings are highly relevant from a policy point of view as they provide *prima facie* evidence of some of the most important limitations conscripted armies face.

We examined whether selection differed over time. We found some weak evidence for adverse selection during peacetime: volunteers who entered the Army in the shadow in the draft, but just prior to the attack on Pearl Harbor, received fewer awards than their observably equivalent drafted cohorts. Once the country declared war, those who joined the Army voluntarily went on to serve with more distinction than those who entered via the draft. In fact, the attack on Pearl Harbor seems to be the defining event that triggered favorable selection.

We evaluated the differences in military performance between volunteers and draftees according to the increased risk of death associated with acts of valor. We showed that volunteers who won awards died at lower rates than draftees. That is, not only are volunteers more likely to demonstrate valor, but their acts of valor involved a reduced risk of death. Holding the total number of awards constant, and using a value of statistical life of one million dollars, we found that the savings if draftees were substituted by volunteers are in the order of one billion dollars.

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Table 1: Summary statistics.

Variable	All Serials	Volunteer	Drafted	1940 Census Men, Age 15-50
Age 15-19	0.211	0.346	0.171	0.169
20-24	0.388	0.394	0.387	0.155
25-29	0.209	0.150	0.226	0.149
30-34	0.116	0.063	0.132	0.138
35+	0.076	0.048	0.085	0.390
HS Education or less	0.877	0.847	0.886	0.892
White	0.856	0.91	0.84	0.901
Black	0.097	0.034	0.116	0.094
Married	0.230	0.138	0.257	0.578
Single	0.720	0.817	0.692	0.401
Height	67.68	67.04	67.90	–

Note: The first three columns represent means from the U.S. Army Serial Number Electronic File 1938-1946. The 1940 Census data comes from the IPUMS Census file.

Table 2: Who Earns Awards: Drafted vs. Volunteer.

	(1)	(2)	(3)	(4)	(5)
	A: Awarded (0.0056 average)				
Volunteer	0.00180***	0.00140***	0.00134***	0.00144***	0.00146***
	(0.000105)	(0.000181)	(0.000183)	(0.000186)	(0.000201)
	B: Silver Star (0.0052 average)				
Volunteer	0.00150***	0.00138***	0.00133***	0.00140***	0.00144***
	(0.000101)	(0.000175)	(0.000178)	(0.000181)	(0.000196)
	C: Distinguished Service Cross or Medal of Honor (0.0004 average)				
Volunteer	0.000296***	1.68e-05	1.25e-05	3.66e-05	1.39e-05
	(3.00e-05)	(4.27e-05)	(4.35e-05)	(4.43e-05)	(4.83e-05)
Initial Placement		X	X	X	X
Height, BMI			X	X	X
Farmer, Married, Dependents				X	X
Age, Year				X	X
State-Year					X
Observations	2,872,134	2,872,134	2,854,018	2,854,018	2,550,151

Note: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different dependent variable. The average incidence of the outcome in each sample is in parentheses next to the name of the outcome.

* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Drafted vs. Volunteer, Alternate Specifications.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Probit					Bivariate probit	
	A: Awarded						
Volunteer	0.00180***	0.00135***	0.00126***	0.00124***	0.00121***		
	(0.00011)	(0.00017)	(0.00017)	(0.00016)	(0.00017)		
$\rho(\varepsilon_i, \eta_i)$						0.0643***	0.0485***
						(0.0036)	(0.0057)
	B: Silver Star						
Volunteer	0.00150***	0.00132***	0.00123***	0.00119***	0.00118***		
	(0.00010)	(0.00016)	(0.00016)	(0.00015)	(0.00016)		
	C: Distinguished Service Cross or Medal of Honor						
Volunteer	0.000296***	2.01e-05	1.64e-05	3.86e-05	1.68e-05		
	(0.00003)	(0.00004)	(0.00004)	(0.00004)	(0.00004)		
Initial Placement		X	X	X	X		X
Height, BMI			X	X	X		
Farmer, Married, Dependents				X	X		X
Age, Year				X	X		X
State-Year					X		
Observations	2,872,134	2,872,346	2,853,427	2,853,315	2,545,509	2,872,134	2,853,315

Notes: Estimates for probit models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different dependent variable. The average incidence of the outcome in each sample is provided in the previous table.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Alternate Outcomes and Volunteer Status.

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	A: Killed in Action (0.0137)				B: Died in Service (0.0227)			
Volunteer	0.00182***	0.00204***	0.000688***	0.000695***	0.00813***	0.00450***	0.00297***	0.00297***
	(0.000136)	(0.000243)	(0.000249)	(0.000269)	(0.000188)	(0.000328)	(0.000336)	(0.000364)
Observations	4,223,498	4,223,498	4,200,972	3,761,128	4,223,498	4,223,498	4,200,972	3,761,128
	C: MIA (0.0024)				D: POW (0.0091)			
Volunteer	0.00521***	0.00143***	0.00193***	0.000971***	0.00920***	0.00218***	0.00228***	0.00146***
	(8.20e-05)	(0.000121)	(0.000125)	(0.000132)	(0.000128)	(0.000187)	(0.000193)	(0.000209)
Observations	4,223,503	4,223,503	4,200,977	3,761,129	4,223,498	4,223,498	4,200,972	3,761,128
Initial Placement		X	X	X		X	X	X
Other Initial Controls			X	X			X	X
State- Year				X				X

Notes: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different dependent variable. The average incidence of the outcome in each sample is in parentheses next to the name of the outcome.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Controls for County-Month Mortality

	(1)	(2)	(3)
	Any Award		
Volunteer	0.00159***	0.00151***	0.00139***
	(0.000106)	(0.000106)	(0.000186)
Linear control for county-month mortality	x		
Non-linear controls for same		x	x
Other Controls			x
Observations	2,858,551	2,858,551	2,841,425
	Means for County-month Mortality Rate Groups		
	0.000618	0.021432	0.034708
	0.011138	0.023068	0.039439
	0.014575	0.024808	0.046799
	0.016696	0.026607	0.059909
	0.018552	0.028674	0.123722
	0.020066	0.031274	

Note: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different dependent variable. The average incidence of the outcome in each sample is in parentheses next to the name of the outcome. Means for County-month mortality rates are weighed by number of enlistees in each county-month cell.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Volunteering Before and After Pearl Harbor.

	+/− 60 Days				+/− 120 Days			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	A: Awarded (0.006)							
Volunteer	−0.00440***	−0.000737	−0.000760	−0.000865	−0.00354***	−0.000306	−0.000277	−6.33e-05
	(0.000475)	(0.000550)	(0.000552)	(0.000558)	(0.000324)	(0.000394)	(0.000395)	(0.000400)
Post Pearl Harbor	−0.000844*	−0.00153***	−0.00155***	−0.00112**	−0.00122***	−0.00172***	−0.00174***	−0.000454
	(0.000474)	(0.000484)	(0.000486)	(0.000502)	(0.000284)	(0.000289)	(0.000290)	(0.000313)
Post · Volunteer	0.00296***	0.00143**	0.00141**	0.00141**	0.00345***	0.00226***	0.00218***	0.00136***
	(0.000637)	(0.000634)	(0.000637)	(0.000643)	(0.000426)	(0.000422)	(0.000425)	(0.000434)
Observations	309,105	309,105	307,543	307,543	658,557	658,557	654,417	654,417
	B: Died in Service (0.030)							
Volunteer	−0.00165*	−0.000136	7.85e-05	−0.00187*	−0.000117	0.00394***	0.00407***	0.00237***
	(0.000860)	(0.000980)	(0.000983)	(0.00101)	(0.000644)	(0.000752)	(0.000756)	(0.000768)
Post Pearl Harbor	−0.000933	−0.00100	−0.000871	0.00176**	−0.00339***	−0.00363***	−0.00336***	0.000303
	(0.000783)	(0.000788)	(0.000790)	(0.000824)	(0.000489)	(0.000492)	(0.000494)	(0.000531)
Post · Volunteer	−0.00359***	−0.00393***	−0.00368***	−0.00374***	−0.00351***	−0.00560***	−0.00546***	−0.00638***
	(0.00113)	(0.00113)	(0.00114)	(0.00116)	(0.000793)	(0.000800)	(0.000805)	(0.000822)
Observations	448,306	448,306	446,311	446,311	954,157	954,157	949,100	949,100
Initial Placement		X	X	X		X	X	X
BMI, Height			X	X			X	X
Other Initial Controls				X				X

Notes: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different dependent variable. The average incidence of the outcome in each sample is in parentheses next to the name of the outcome.
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Volunteering Before and Dates of the Draft Administration.

	Announcement				Registration			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	September 16, 1940				October 16, 1940			
Volunteer	-0.00257***	-0.00548	-0.00886***	-0.0101***	0.000172	-0.00857***	-0.0114***	-0.0128***
	(0.000979)	(0.00395)	(0.00311)	(0.00312)	(0.000721)	(0.00205)	(0.000599)	(0.000677)
Post	0.00109	-0.000509	-0.000554	-0.000521	-0.000310	0.00214**	0.00230**	0.00234**
	(0.000953)	(0.000995)	(0.000996)	(0.000999)	(0.00102)	(0.00106)	(0.00106)	(0.00106)
Observations	120,372	120,372	119,728	119,728	108,548	108,548	108,054	108,054
	May 17, 1941				July 1,1941			
Volunteer	0.00176**	0.00231	0.00236	0.00247	-0.00319***	-0.000616	-0.000543	-0.000716
	(0.000739)	(0.00150)	(0.00151)	(0.00151)	(0.000612)	(0.00106)	(0.00107)	(0.00108)
Post	0.00149***	0.00156***	0.00153***	0.00131***	3.37e-05	0.000240	0.000245	-0.000223
	(0.000363)	(0.000364)	(0.000365)	(0.000366)	(0.000456)	(0.000461)	(0.000461)	(0.000471)
Post · Volunteer	-0.00426***	-0.00321***	-0.00310***	-0.00291***	0.00229**	0.00185**	0.00188**	0.00231***
	(0.000945)	(0.000980)	(0.000986)	(0.000991)	(0.000900)	(0.000884)	(0.000887)	(0.000897)
Observations	235,028	235,028	234,551	234,551	186,242	186,242	185,870	185,870
Initial Placement		X	X	X		X	X	X
BMI, Height			X	X			X	X
Other Initial Controls				X				X

Notes: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression, while each panel corresponds to a different date. Dates that correspond to announcements are in the left column, while dates of registration are in the right column.
* significant at 10%; ** significant at 5%; *** significant at 1%

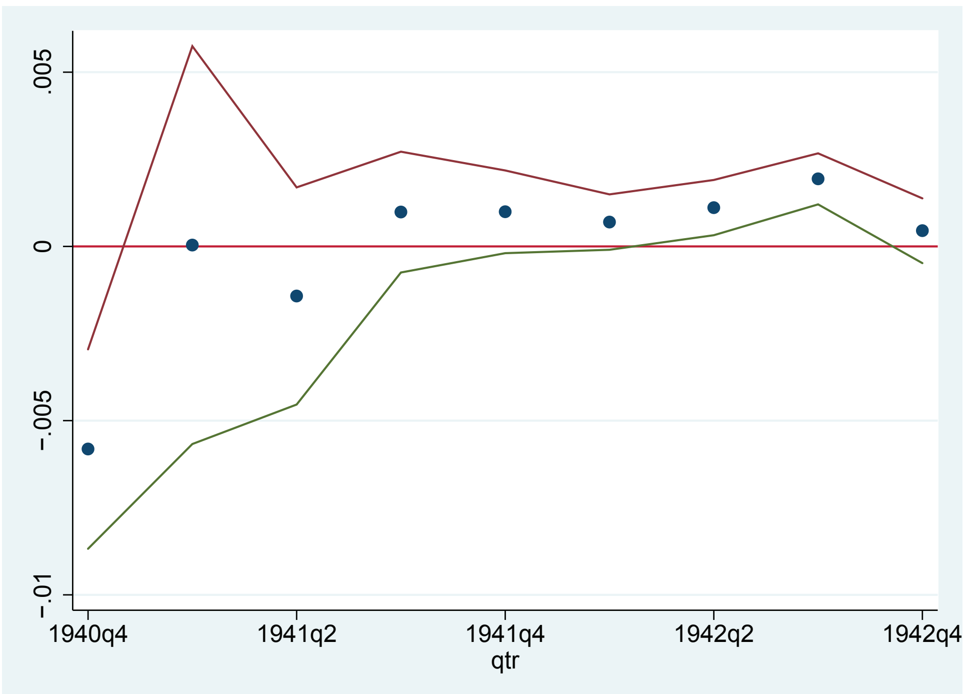

Figure 1: Regression coefficients of volunteer on award with 95 percent confidence intervals.

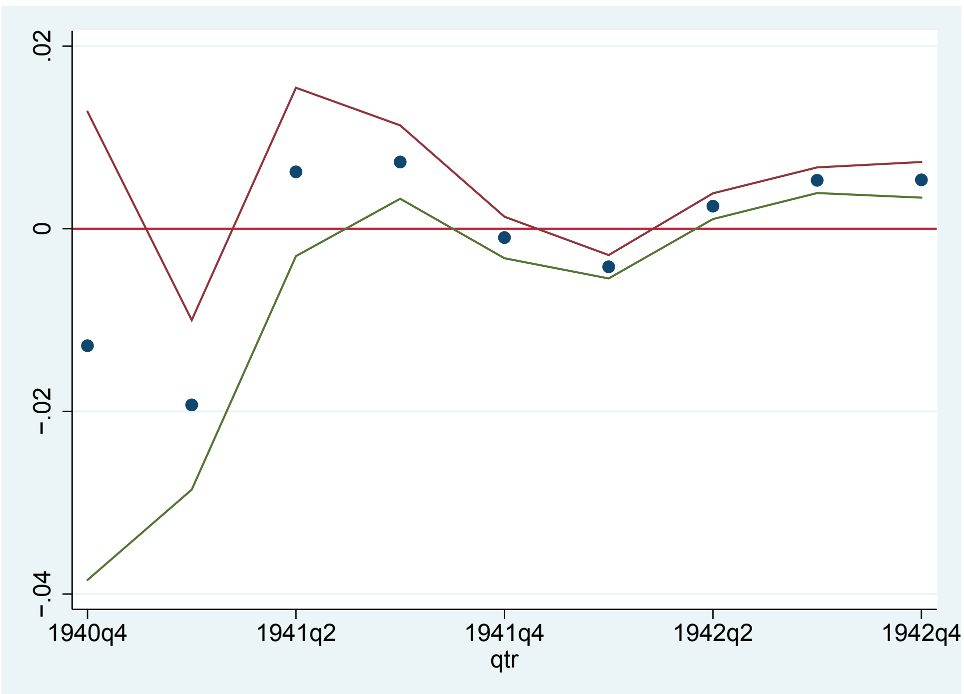

Figure 2: Regression coefficients of volunteer on mortality with 95 percent confidence intervals.

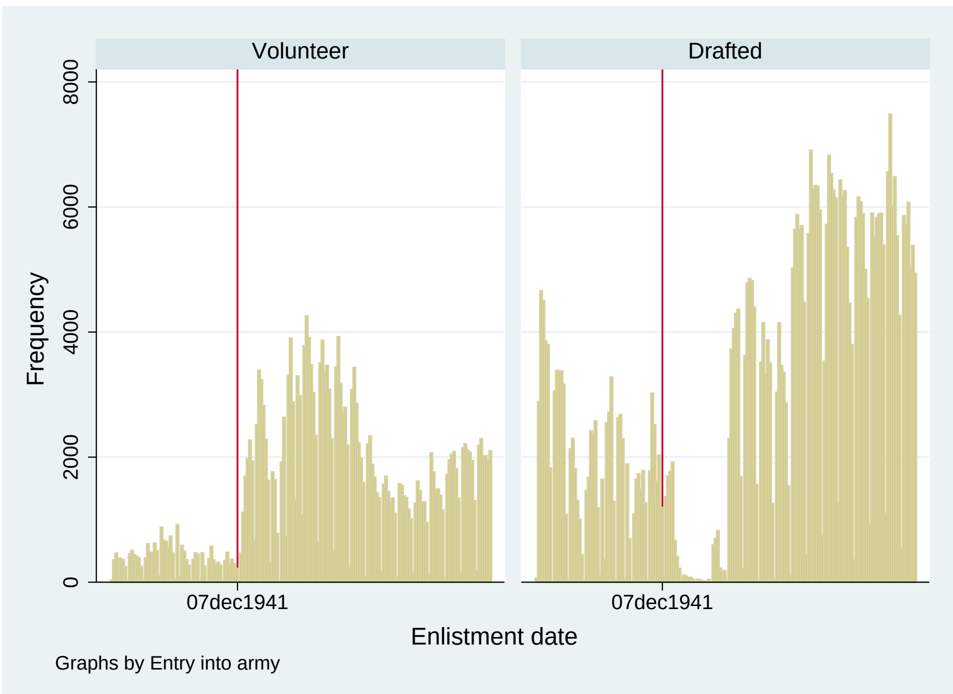

Figure 3: Number of men entering the Army on a given day, by volunteer vs. drafted, with a focus on Pearl Harbor.

A Derivation of (4) and (5), NOT FOR PUBLICATION

As in Heckman and Honore (1990), individual productivities can be written as the sum of mean values and random terms (adequately defined) by $pm = p\mathbb{E}[m] + U_m$ and $\theta = \mathbb{E}[\theta] + U_\theta$. Define the random terms such that

$$pm = p\mathbb{E}[m] + \alpha D + V, \text{ and } \theta = \mathbb{E}[\theta] + \beta D + V,$$

with $U_m = \alpha D + V$ and $U_\theta = \beta D + V$, where V is defined as $\alpha U_\theta - \beta U_m$ and $D = U_m - U_\theta = p(m - \mathbb{E}[m]) - (\theta - \mathbb{E}[\theta])$, to be consistent with the previous definition of random terms U_m and U_θ. Further,

$$\beta = \frac{Cov(D, U_\theta)}{Var(D)} = \frac{-\sigma_{\theta\theta} + p\sigma_{m\theta}}{p^2\sigma_{mm} + \sigma_{\theta\theta} - 2p\sigma_{m\theta}} = \alpha - 1.$$

Voluntary selection into the army corresponds to

$$\begin{aligned} pm - \theta &= p\mathbb{E}[m] - \mathbb{E}[\theta] + (\rho - \beta) D, \\ &= p\mathbb{E}[m] - \mathbb{E}[\theta] + D = \delta + D \geq 0. \end{aligned}$$

Then, average productivity in the army under voluntary selection is: $\mathbb{E}[m|pm \geq \theta] = \mathbb{E}[m] + \rho\mathbb{E}[D|D \geq -\delta] + \mathbb{E}[V|D \geq -\delta]$.

The following conditions hold: $\mathbb{E}[D] = \mathbb{E}[V] = Cov[D, V] = 0$. If in addition V and D are independent, $\mathbb{E}[V|D \geq -\delta] = Cov[D, V|D \geq -\delta] = 0$. Finally, if δ is not to the left of the support of D, $\mathbb{E}[D|D \geq -\delta] > \mathbb{E}[D]$. This yields

$$\mathbb{E}[m|pm \geq \theta] = \mathbb{E}[m] + \alpha\mathbb{E}[D|D \geq -\delta], \text{ and}$$

$$\mathbb{E}[\theta|pm \geq \theta] = \mathbb{E}[\theta] + \beta\mathbb{E}[D|D \geq -\delta] = \mathbb{E}[\theta] + (\alpha - 1)\mathbb{E}[D|D \geq -\delta].$$

Since $\mathbb{E}[\theta] = R\mathbb{E}[\theta|pm \geq \theta] + (1 - R)\mathbb{E}[\theta|pm < \theta]$, we have that

$$\begin{aligned} \mathbb{E}[\theta|pm < \theta] &= \frac{\mathbb{E}[\theta] - R\mathbb{E}[\theta|pm \geq \theta]}{1 - R}, \\ &= \mathbb{E}[\theta] + (\alpha - 1)\left(\frac{R}{1 - R}\right)\mathbb{E}[D|D \geq -\delta]. \end{aligned}$$

Finally, rearragments of previous expressions yield

$$\alpha = \frac{p^2\sigma_{mm} - p\sigma_{m\theta}}{p^2\sigma_{mm} + \sigma_{\theta\theta} - 2p\sigma_{m\theta}}, \text{ such that } \alpha < 0 \Leftrightarrow \sigma_{m\theta} > p\sigma_{mm} > 0.$$

This implies that if correlation between skills is sufficiently positive, the draft will yield higher productivity compared to a voluntary military.

B A Brief History of the U.S. Draft, NOT FOR PUBLICATION

This section contains a brief description of the most relevant aspects of the draft and the voluntary enlistments during World War II. We also present a brief discussion about the assignment of soldiers within the Army, as this form of selection also influences the outcomes we are interested in. The discussion we present here is not comprehensive but it serves as a guide for our empirical analysis. The material is drawn primarily from the many reports of the Selective Service System, SSP (1942), SSW (1943), SSWT (1945) and SSV (1948).

On September 16, 1940, Congress passed the Selective Service Act that required civilian males between the ages of 21 and 36 to register later to be classified and selected by over 6,400 local draft boards, see SSV (1948, Table 44). As in previous wars, the Selective Service System provided that quotas were assigned to each State, Territory, and the District of Columbia, on the basis of the number of registrants liable for service. This initial registration and the first calls of the draft were precipitated by the German invasion of France and the Low Countries in the spring of 1940 and took place before the declaration of war by the United States. After the U.S. entered World War II, in December 1941, legislation amended the act to require all men from 18 to 65 to register with those aged 18 to 45 being immediately liable for induction. For the duration of the war, men aged 18-26 were the main source of military manpower. Similarly, the initial terms of one year of training and service were also extended to accommodate the manpower needs as the war progressed.

In total, there were seven national draft registrations. The first occurred in October 16, 1940, and the last took place between November 16 and December 31, 1943, SSV (1948, 60). Once men registered, the local boards' first step was to send out information forms to each potential draftee in order to classify them based on the ability to serve and eligibility for deferments.[19] After the classification procedure, each potential draftee received an order number to be used in the national lottery that determined the random selection. These national lotteries went to extraordinary lengths to ensure independence and transparency, see, e.g., Flynn (1993, pp. 24-5) and Clifford and Samuel R. Spencer (1986)).

The World War II draft was the largest and notably the most democratic draft implemented in the United States. There were no general protests against the draft, registration was universal, and approval of the implementation and administration of the draft was unanimous, see, e.g., SSP (1942, 19). Draft evasion accounted for less than five percent of the total inducted and there was to be no racial discrimination in the selection and train-

[19]The classification system under the Act was dynamic but at the core it had four categories: Class I, persons available for training and service after the physical examination; Class II, persons available for service but temporarily deferred because of occupation; Class III, persons who had dependents requiring their support, and Class IV, persons who are except from training and service by statute, or were non-declaring aliens, or had completed military service (up to Pearl Harbor), or conscientious objectors against both combat and non-combat service, or who were physically, mentally, or morally unfit for service, see SSV (1948, 62).

ing.[20] Deferments were offered but they were quite limited especially as war progressed. The World War II draft had no college deferments.[21] Other than mental and physical disabilities, the primary reasons for deferment were employment in war production or agriculture, or the presence of dependents. These deferments, however, were considerably weakened or granted disproportionately to older individuals as war progressed and the manpower pool of young men was depleted.[22]

The contribution of draftees to the U.S. armed forces was substantial. The total number of inductions is listed in Table 9 where the number of inductions is broken down by year. A total of 10,110,104 men were drafted between November 1940 and October 1946. During 1942 alone, more than 3 million people were incorporated into the Army. This year is of special importance for our analyses as during 1942, voluntary enlistments were also possible.

Of key importance for our analyses is the fact that voluntary enlistments did not end with the enactment of the draft. Congress and the public expected that voluntary enlistments would hold down inductions as much as possible. In fact, extensive newspaper and radio campaigns and a Nation-wide recruiting service were in place to secure volunteers, see, e.g., SSW (1943, 68-69). However, nearly a year after Pearl Harbor, on December 5, 1942, voluntary enlistments of men aged 18-37 were prohibited and not reinstated until after the end of the War. From the reports of the Selective Service System, there is no indication that this prohibition was associated with shortages of volunteers.[23]

For the remaining of the war, volunteering was allowed to a very limited degree. Volunteering through the Selective Service System, known as voluntary induction, was permitted but “it was restricted and made more difficult of accomplishment,” see, SSW

[20]There was a particular interest on the draft status of notable figures. Their status conformed well to the idea of a random assignment, see, Flynn (1993, pp. 26-8). Evidence of inappropriate behavior from local board members was limited and assessments suggest that “incidences of this sort were relatively rare,” see Flynn (1993, pp. 29). On the other hand, the total number of individual violations to the Act reported by the Department of Justice was 13,986 which mostly represented conscientious objectors, see SSV (1948, Table 42).

[21]Initially, a minimum level of fourth-grade literacy was required for service but after the summer of 1942, “any registrant who is able to understand simple orders in English and possesses sufficient intelligence to absorb military training rapidly is eligible for induction into military service,” see SSV (1948, 120). The minimum (60 inches) and maximum (78 inches) height for usual admittance in the Army were not limiting factors even during peacetime, see, SSP (1942, 212).

[22]Married men with dependents were initially deferred and there is evidence of an increase in marriage rates to avoid the draft, see SSW (1943, Section VIII). After Pearl Harbor, the information used for claiming deferments became public knowledge and these deferments required explicit proof, see SSW (1943, 133). On June 1942, the President approved the Servicemen’s Dependent Allowance Act which ensure a monthly family allowance and also served to liberalize the induction of married men.

[23]Voluntary enlistments were terminated by the Executive Order 9279 which argued that “In order to promote the most effective mobilization and utilization of the national manpower and to eliminate so far as possible waste of manpower due to disruptive recruitment and undue migration of workers.” No evidence of practices associated with disruptive recruitment and undue migrations are discussed in detail in the multiple Selective Service Systems reports. Among the “evils” of voluntary enlistments, these reports, however, argue that volunteers “evade the orderly process of the Selective Service. The armed forces told these men that by enlistment they could determine their own assignment,” see, SSW (1943, 68).

(1943, 68). Among the groups eligible for voluntary induction were convicts and individuals formerly considered morally disqualified, U.S. citizens of Japanese extraction, and 17-year-olds, SSWT (1945, 228). Evidence on the restrictions on volunteering is evident in our sample which only includes 68,671 volunteers in 1943, less than four percent of those who joined the Army in our records. The majority of these individuals entered into the Army during the first months of 1943 since individuals who applied for voluntary enlistment before December 5, 1942, were allowed to enter the Army.

Overall, volunteers represented a considerable fraction of the men furnished to the armed forces during World War II. According to the SSV (1948, Table 135) reproduced in Table 9 below, volunteers represented about 34 percent of all men in the armed forces. The fraction of volunteers in our sample is also included for comparability purposes although our data only covers the Army and the Air Force.

Our sample of enlistment records represents a large portion of the entire enlistment records for the U.S. Army. The records used here were digitized, as part of an effort to reconstruct records lost in the 1973 fire at the National Military Personnel Records Center in St. Louis. Our sample from the National Archives is comparable to that of the entire armed forces, though it excludes officers. A small fraction records from the original data provided by the National Archives were dropped due to data inconsistency for key variables, such as year of enlistment (e.g., drop if 1990). Also, we remove the enlistment records of Women's Army Auxiliary Corps. The final set of data includes entry records for over fifty-seven percent of the entire military.

Figure 4 plots the number of draftees and volunteers in our sample and the total number of inductions according to the selective service system. Between 1940 and 1942, the total number of draft inductions was 4,775,836 and our sample includes two thirds of them. After 1943, the available record becomes less complete. The total number of draft inductions was 9,685,945 and the total number of volunteers was 4,987,144. In our sample, these values are 6,233,210 and 1,555,351. In the pre-1943 period, volunteers make up twenty-eight percent of those who entered the Army, which is representative of the overall conditions of the war. This is one of the reasons for our focus on the pre-1943 period. A more important reason for our pre-1943 focus is that volunteering virtually ended at the end of 1942.

The data report information on the individual joining the military: name, serial number, race, citizenship status, education, prior occupation, state and county of residence, initial rank and branch, and marital status, among other things. As will be described below, for some records, height, weight, and performance on an military entrance test are also recorded. There are 8,075,352 records, after removing observations with incomplete or missing data.

Whether a soldier entered the Army as a volunteer or a induced via the draft can be determined by the assigned serial number (U.S. War Department (1942)). Men already in the Army kept their original serial number, which was less than 10,000,000. In order to satisfy the demands of a drastically growing Army, new serial numbers starting with 11,000,000 were used. Men who enlisted on or after July 1, 1940, or had their National Guard units inducted into Federal service, were assigned numbers from 11,000,000 to 30,000,000. Men inducted into the Army under the Selective Training and Service Act of 1940 were given serial numbers starting with 31,000,000, independent of prior service. We identify volunteers by the first digit of their serial number: 0, 1, or 2. Drafted men are those with first digits of 3 or 4. Two tenths of a percent of the sample have first digits of five or higher. Because the original documentation does not provide a context for such serial numbers, they are dropped from the sample. (This is why the final column of Table 9 sums to 99.8.)

C Data on Death, POW, MIA and Awards, NOT FOR PUBLICATION

In order to measure the outcomes of each individual in the serial number data file, we merge it with a series of lists constructed by the military. The awards garnered by any particular soldier can be accessed by requesting the Department of Defense. However, there is no definitive published list for Silver Stars.

The U.S. government does not have a centralized electronic database of awards; instead, the announcements of the awards have been collected from a series of books published by the U.S. government. The list of Silver Star and Distinguished Service Cross recipients used here was compiled by Colonel Albert F. Gleim, from military records, in an effort to identify those who falsely claim distinguished military service. By Col. Gleim's rough estimate, his listing should include eighty percent of all of those who received Silver Stars and nearly all of the Distinguished Service cross recipients. These names were transcribed by hand by C. Douglas Sterner, and posted on his website, `Homeofheroes.com`. We have cross-referenced the list from his web site with several pages of Col. Gleim's books.

The list of Silver Star recipients has 56,487 names. We merged the publicly available list to the enlistment data by name. In order to guarantee a proper merging, we purged the enlistment data of all non-unique names. After merging, there are 5,479,802 observations in total, 22,835 of which received honors (21,360 Silver Stars). Because volunteering was drastically limited at the end of 1942, we focus on this earlier period, leaving us with 2,872,134 observations.

The lists of killed in service used here were compiled by the War Department at the close of World War II. Those listed died between President Roosevelt's declaration of unlimited national emergency on May 31, 1941, and January 31, 1946. Each listing includes, name, rank, serial number, type of casualty. The types of casualty allowed were killed in action (KIA), died of wounds (DOW, wounded in battle but died later), died of injury (DOI, the same), and died, non-battle (DNB, e.g., sickness, suicide, homicide, training). The names were compiled by each state and county. These records were digitized by the American Battle Monuments Commission as part of the World War II National Monument. The ABMC provided their digitized list to us.

The list of prisoners of war was provided by the National Archives and Records Administration (NARA). NARA digitized the list of names from the War Department's Adjutant General's Office, which compiled the names. Each record includes name, rank, serial number, and prisoner-status information, such as detaining power. An official list of

World War II soldiers still missing in action is available from the Department of Defense.[24] These records include name and serial number.

As the varying sample sizes in each regression suggest, the nature of merging varies across the outcome considered. The merge success rate of each merge can be found in Table 10. The files listing those who died in action, as well as the missing in action and prisoner of war lists, include the soldier's serial number. The merge rate of the award recipients is 40 percent, versus three quarters of the outcomes merged by serial numbers.

Because we do not have the serial numbers of the award recipients, we cannot distinguish between the enlisted men and officers. Officers are not included in the serial number file, so this can artificially diminish the merge rate of the awards. For both the POW and the killed in service lists, non-numeric serial numbers consist of approximately 17 percent of the sample. These three conditions (uniquely named non-officer in our sample) suggests a merge rate in the area of 40 to 50 percent.

To test if these different merging methods have an impact on the results, we re-run the regressions on died in service, each twice. The first time includes the entire sample, while the second drops all soldiers with duplicate names. Table 11 reports the results of these regressions. The general trend of results is the same: all of the effects are of similar size, typically within 95 percent confidence intervals of each other, and shrinking as more explanatory variables are included.

[24] `http://www.dtic.mil/dpmo/wwii/reports/`

Table 9: Sources of Armed Forces in World War II

	Total		Enlistment Data	
	No.	Percent	No.	Percent
Armed Forces	14,673,089	100	8,431,273	100
Inductions	9,685,945	66	6,483,649	76.9
Enlisted	4,987,144	34	1,929,384	22.9
Registrants	2,625,941			
Non-registrants	2,361,203			

Note: Number of persons joining the Army and how, according to official records, and our data.

Table 10: Merging Success Rates

	Serial	Serial	SS	SS + MOH + DSC	POW	MIA	DIS
Observations	8,345,908	5,665,158	52,875	57,124	99,544	26,665	257,879
Name Duplicates?	Yes	No	No	No	Yes	Yes	Yes
Merged by	-	-	Name	Name	Serial	Serial	Serial
Merged	-	-	22,038	23,553	75,839	19,733	189,840
Merge Rate	-	-	0.41	0.41	0.76	0.74	0.74

Note: The merging success rates by data courses. SS stands for Silver Star data; MOH and DSC for Medal of Honor list and Distinguished Service Cross lists. The Prisoner of War (POW) list was provided by NARA. The missing in action (MIA) list is kept by the U.S. Army. The died in service list was compiled by the War Department at the end of the war, and was digitized by the ABMC.

Table 11: Estimates by Sample: Duplicate Names

	Died in service							
Volunteer	0.00813***	0.00778***	0.00450***	0.00396***	0.00297***	0.00254***	0.00297***	0.00262***
	(0.000188)	(0.000219)	(0.000328)	(0.000380)	(0.000336)	(0.000390)	(0.000364)	(0.000423)
Initial Placement			X	X	X	X	X	X
Age, Year, Hgt., Weight Dummies					X	X	X	X
State-Year Dummies							X	X
Duplicate Names Dropped		X		X		X		X
Observations	4,223,498	3,119,294	4,223,498	3,119,294	4,200,972	3,101,256	3,761,128	2,772,295

Notes: Estimates for linear probability models, with robust standard errors in parentheses. Each column represents a different set of controls for a regression. The average incidence of the outcome in each sample is in parentheses next to the name of the outcome.
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 4: Enlistment by year and source