“Gallantry in Action”: Evidence of Advantageous Selection in a Voluntary Army

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Abstract
A voluntary army’s quality exceeds or falls below a drafted army’s average quality depending on whether selection is advantageous or adverse. Using a collection of data sets that cover the majority of the US Army soldiers during World War II, we test for adverse selection into the army. Rather, we find advantageous selection: volunteers and drafted men showed no significant difference in fatalities, but volunteers earned distinguished awards at a higher rate than drafted men, particularly after the attack on Pearl Harbor. Analyses at the level of units concur with our findings based on enlistment records.

1. Introduction
In a market economy, the pursuit of comparative advantage may reduce an occupation’s average quality relative to a random assignment of workers. This selection principle is very general in scope.\(^1\) It particularly implies that if civilian and military abilities are positively associated in the population, a voluntary army will be left with an adversely selected sample: only individuals with low civilian ability, who also happen to have low military ability, would join the military. By coercively taking high-ability individuals into the military, a draft might increase

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\(^1\) The Roy (1951) model is the standard treatment of self-selection based on comparative advantage. This model is of general relevance for analyses of occupational choice, education, unionism, migration, labor force participation, and numerous other topics. Early studies include Lee (1978) and Willis and Rosen (1979). McBride and Richardson (2012) provides a recent application of this model to study voluntary participation in terrorist organizations.

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the army’s average quality. The type of selection, that is, adverse or advantageous, is clearly fundamental to assess the merits of a market-based voluntary army.\(^2\)

Given its crucial role, there have been surprisingly few tests of the type of selection into the military and none that use war-fighting performance. The fact is that volunteers and draftees are rarely simultaneously observed, combat is infrequent, and military performance is not easily quantifiable. Since battlefield measures of performance are rarely observed, existing studies have focused on the relationship between observable characteristics such as scores on standardized ability tests and nonbattlefield measures of performance. Existing studies (for example, Asch, Romley, and Totten 2005; Winkler, Fernandez, and Polich 1992; Congressional Budget Office 1990; Orvis, Childress, and Polich 1992; Teachman, Call, and Segal 1993) infer the type of selection by relying on synthetic groups of volunteers or draftees (depending on which is not in service), using inferences from ability tests, educational differences at enlistment, local labor market conditions, and performance in simulated scenarios.\(^3\) Today, voluntary armies remain uncommon in the world (Keller, Poutvaara, and Wagener 2009; Mulligan and Shleifer 2005), probably because of the lack of convincing empirical evidence about their superior performance.\(^4\)

This paper uses a historical episode to test the type of selection into the US Army. We provide a direct comparison of battlefront performance, as measured by valor and loss, between volunteers and drafted men who entered the US Army during World War II under the same circumstances and were observationally equivalent as recorded in their enlistment records and their units’ morning reports. We find that selection into the US Army was advantageous. For example, we find no significant mortality differential between volunteers and draftees but significant differences in the rate at which volunteers were awarded highest honors compared with draftees. We also find evidence that the type of selection depended on the conditions of the war: for those who entered the army just after the attack on Pearl Harbor, men who volunteered went on to win more high-honor awards than those who were drafted at the same time.

\(^2\) The type of selection matters in just about any voluntary exchange. For example, a voluntary exchange of human organs and blood might lower average quality by motivating a supply of unhealthy individuals (Titmuss 1970; Arrow 1972; Stewart 1992). Similar concerns are common in non-market-based allocations that rely on lotteries, such as immigration visas.

\(^3\) Economists have discussed at length the theoretical disadvantages of the draft. Hansen and Weisbrod (1967) is a classical contribution. Tax (1967) contains an interdisciplinary view featuring Milton Friedman’s position. Adverse selection is absent from these early papers. Sandler and Hartley (1995) and Warner and Asch (1995) survey key aspects of recruitment policies, but they do not formally model or test for adverse 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, for example, Oi 1967; Altman and Barro 1971). In a companion paper (Birchenall and Koch 2014), we provide a Mirrleesian analysis of the draft and the voluntary army.

\(^4\) A few countries have recently ended conscription, or put in place plans to end it, including France (in 2001), Lebanon (in 2007), Sweden (in 2010), and Germany (2011); Taiwan has scheduled conscription to end by 2014. Gilroy and Williams (2006) provide an overview of the movement toward voluntary enlistments in developed countries.
World War II was the largest military mobilization in US history. As part of the war efforts, the US implemented a “democratic approach to selection” based on several peacetime and wartime drafts (Flynn 1993, p. 25). Not only were the drafts fair, but volunteers and draftees served side by side and can be easily distinguished by their army service numbers. For instance, our analysis combines 8 million historical enlistment records and over 100,000 entries from the 63d Infantry Division’s and the 10th Mountain Division’s morning reports (detailed accounts of the division’s daily activities) with fatality statistics (that is, killed and missing in action) and several lists of the highest honors awarded by the military including the Medal of Honor, the Distinguished Service Cross, the Silver Star, the Bronze Star, and the Purple Heart.

Our tests for the type of selection into the army are based on similar tests applied to established markets, such as insurance markets (see, for example, Chiappori and Salanié 2000; Finkelstein and McGarry 2006). The idea of these tests is to examine the (conditional) correlation between an individual’s choice to volunteer and his or her performance while in the army. Our empirical strategy uses such positive correlation tests, paying special attention to confounding factors. For instance, we condition on a large number of covariates, including characteristics used to sort individuals within the military and within-company comparisons.

The President’s Commission on an All-Volunteer Force (1970, p. 18) appointed to study the feasibility of an all-volunteer force (AVF) in the United States listed, as an objection to the AVF, that “a voluntary force will be less effective because not enough highly qualified youths will be likely to enlist and pursue military careers.” Similarly, as Sandler and Hartley (1995, pp. 172–73) note, “[B]y the early 1980s, doubts were expressed about the quality of recruits for the American AVF, the racial balance of ground forces, shortages of skilled military personnel, and the recruiting problems likely to result from the predicted demographic trough of young people in the 1990s.” There are several assessments of the AVF in the United States (Meese 2002; Warner and Asch 1995), but they do not make direct comparisons to soldiers drawn from a draft. The most careful existing work focuses on the causal effect of military service on a variety of life outcomes such as earnings, education, crime, and life expectancy (see, for example, Angrist 1990; Bedard and Deschênes 2006; Card and Cardoso 2012; Galiani, Rossi, and Scharf 2011). This literature is not informative about the type of selection into the military since its goal is to overcome selection biases.

Registration for the draft was almost universal (among the eligible population), there was to be no racial discrimination in selection and training, and deferments were granted only under very special circumstances (Flynn 1993, p. 18). As Flynn (1993, p. 25) notes, “[A] public poll in December 1940 showed that 92 percent of the population felt the draft was being handled fairly.” We expand on these points in the online appendix.

To our knowledge, there is only one study that examines high military honors. Wansink, Payne, and van Ittersum (2008) surveyed 526 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 those under study here); enthusiastic volunteers scored higher in measures of loyalty, leadership, and risk taking.
As with the investigation of any particular historical event, there are concerns about external validity: whether our findings are likely to hold in different settings, namely, countries, time, or military confrontations. In effect, we find that the nature of selection into a voluntary army is contingent on the opportunities and circumstances faced by those potentially choosing to volunteer. However, we consider a representative population and focus on valor and loss, which remain as central for the military today as in any historical time. We present some additional remarks about external validity in Section 7.

The paper unfolds as follows. The analytical basis for our tests is outlined in Section 2. Section 3 discusses the essential features of our data. Our analyses based on enlistment records are contained in Sections 4 and 5. Section 6 contains our unit-by-unit analysis, and Section 7 concludes.

2. Selection and Army Quality

To motivate our empirical work, the first part of this section derives analytical conditions under which a drafted army’s average quality exceeds a voluntary army’s average quality for alternative informational structures. The second and third parts discuss the implementation and interpretation of our empirical strategy, especially the issue of identification of causal effects.

2.1. Theory

Consider an economy with a civilian and a military sector. There is a continuum of individuals endowed with one unit of time and different civilian and military abilities. These abilities, denoted respectively by \( \theta \) and \( m \), are distributed according to \( \mathbb{F}(\theta, m) \). Population is normalized to 1. The government requires a fraction \( R \) of the population for the army. (We are not interested in determining \( R \).)

2.1.1. Perfect Information. Information about an individual’s abilities is perfectly observable, as in the Roy (1951) model (see, for example, Heckman and Honoré 1990). Let \( w \) denote the relative wage per unit of efficient labor in the army. Let \( v = \{0, 1\} \) denote an indicator for volunteering. The decision to join the military is \( v = 1 \) if \( wm \geq \theta \), with \( w \) determined such that the requirement of \( R \) soldiers is met:

\[
R = \int_0^\infty \int_{wm \geq \theta} \mathbb{F}(d\theta, dm).
\]

7 This assumption does not deny the importance of differences in preferences for the military, expectations about service and learning, and other static and dynamic factors that influence occupational choice. For instance, Bergstrom (1986) shows the desirability of randomization in the presence of occupational indivisibilities, Warner and Asch (1995, sec. 2) study the role of preferences in a Roy model context, and Hosek and Mattock (2003) focus on learning. We also omit sociological and political concerns such as those discussed in detail by Feaver and Kohn (2001). We provide some remarks about the role of preferences for service later in this section.

8 We do not seek to precisely define what constitutes military ability at this point. In our empirical implementation, we measure ability as receiving awards. Whether that corresponds to an innate capacity to be brave or an unusual willingness to be brave is not possible for us to discern and may not matter for the military. Empirically, tests for the type of selection would also have low power to distinguish between selection and moral hazard as they relate to the supply of effort in the military.
The voluntary army’s average quality is
\[
\mathbb{E}[m \mid v = 1] \equiv \mathbb{E}[m \mid wm \geq \theta] = \frac{1}{R} \int_0^\infty \int_0^\infty m \Phi(d\theta, dm).
\]
Equation (1) implies that the average quality of the civilian economy under a voluntary army is
\[
\mathbb{E}[\theta \mid v = 0] \equiv \mathbb{E}[\theta \mid \theta > wm].
\]

The drafted army’s average quality is
\[
\mathbb{E}[m] = \int_0^\infty \int_0^\infty m \varphi(d\theta, dm),
\]
and the average quality of the civilian economy under a draft is
\[
\mathbb{E}[\theta] = \int_0^\infty \int_0^\infty \varphi(d\theta, dm).
\]

Observed military and civilian average qualities satisfy
\[
\mathbb{E}[m \mid v = 1] - \mathbb{E}[m] = \alpha \mathbb{E}[D \mid D \geq -\delta]
\]
and
\[
\mathbb{E}[\theta \mid v = 0] - \mathbb{E}[\theta] = (\alpha - 1) \left( \frac{R}{1 - R} \right) \mathbb{E}[D \mid D \geq -\delta],
\]
where \(\mathbb{E}[D \mid D \geq -\delta] > 0\) is the conditional expectation of a random variable \(D\) properly defined to represent the way voluntary selection takes place and \(\alpha \in [1, -1]\) is a correlation coefficient that takes negative values when civilian and military abilities are strongly positively associated.\(^9\)

Equations (2) and (3) imply that the average quality of the civilian sector is always higher under a voluntary army than under a draft. The average quality of the army cannot be unambiguously signed. If civilian and military abilities are strongly positively (negatively) associated, average quality in the army will be higher (lower) under a draft than under a voluntary army. When abilities are strongly positively associated in the population, the sorting of individuals is hier-

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\(^9\) We assume that the draft is an alternative and not a competing recruitment strategy. If the draft takes place after volunteers have enlisted, then one needs to use the law of iterated expectations to derive the proper comparisons. It is possible to show that the insights of the model carry over to this alternative scenario.

\(^{10}\) The online appendix provides the details of the previous derivations. For example, letting \(\sigma_m \equiv \text{Cov}(\theta, m)\), it is possible to show that \(\alpha < 0\) if and only if \(\sigma_m > w\sigma_{mm}\). We use “positively associated” in the sense that the distribution of abilities \(F(\theta, m)\) satisfies \(\Pr(m \mid \theta > w) \leq \Pr(m)\). This inequality represents positive quadrant dependence, the weakest concept of association we can use to sign average military quality. Under normality assumptions, \(\mathbb{E}[m \mid \theta]\) will be increasing in \(\theta\) if the correlation coefficient \(\rho(\theta, m) = \sigma_{mm}/\sigma_{\theta m}\) is positive. Balakrishnan and Lai (2009) discuss stronger concepts of dependence such as positive likelihood dependence.
archical or features absolute advantage. In this case, high-ability individuals have fewer incentives to join the army, so a draft would increase average army quality. When abilities are strongly negatively associated in the population, sorting is nonhierarchical as individuals sort into the sector in which they have a comparative advantage in terms of their abilities (see, for example, Willis and Rosen 1979).

2.1.2. Asymmetric Information. The distribution of abilities $F(\theta, m)$ is common knowledge, but an individual’s abilities cannot be observed, as in Akerlof (1970) (see, for example, Jovanovic 1982). Military compensation cannot depend on individual types. An individual will self-select into the military if $w \geq \theta$, with $w$ determined by

$$R = \int_{\theta}^{\infty} \int_{w \geq \theta} F(d\theta, dm).$$

Observed military and civilian average qualities satisfy

$$\mathbb{E}[m \mid \nu = 1] = \mathbb{E}[m \mid w \geq \theta] = \frac{1}{R} \int_{\theta}^{\infty} \int_{w \geq \theta} mF(d\theta, dm)$$

and

$$\mathbb{E}[\theta \mid \nu = 0] = \mathbb{E}[\theta \mid \theta > w] = \frac{1}{1 - R} \int_{\theta > w} \int_{0}^{\infty} \theta F(d\theta, dm).$$

Equations (4) and (5) imply that the average quality of the civilian sector is always higher under a voluntary army than under a draft; that is, $\mathbb{E}[\theta \mid \theta \geq w] > \mathbb{E}[\theta]$. As before, the average quality of the army cannot be unambiguously signed. Suppose that abilities are positively associated. Thus, if civilian and military abilities are positively (negatively) associated, average quality in the army will be higher (lower) under a draft than with a voluntary army. As in the case of perfect information, positive association means that potentially high-ability soldiers will find the military less attractive than the civilian sector; a draft will also increase average army quality.

So far, sorting into the military has been based on pure pecuniary considerations. A more general and realistic characterization of the enlistment process would consider preferences for military service. To allow for some of these aspects, let $\phi$ denote a randomly distributed preference component that takes the form of a compensating differential needed to induce an individual to voluntarily join the military. In case A, this preference term implies that $\nu = 1$ if $U_M(wm + \phi) \geq U_C(\theta)$, where $U_i$ represents an individual’s utility in sector $i = C$ or M. For individuals with an affinity for military life, $\phi$ will be negative, whereas for individuals with a preference for civilian life, $\phi$ will be positive. In the absence of state-dependent utilities, $\nu = 1$ if $wm \geq \theta - \phi$. This decision is similar to our benchmark case with a civilian’s augmented ability $\tilde{\theta} = \theta - \phi$ and an augmented correlation $\tilde{\alpha}$. (Case B is similar since individuals will join the military if $w \geq \theta - \phi$. In this case, the relevant correlation between $\tilde{\theta}$ and $m$ shares the main features discussed.
here for case A.) Compared with equations (2) and (3), if the preference for military life $\phi$ and military ability $m$ are strongly negatively associated, average quality in the army will be higher under a draft than with a voluntary army because individuals willing to serve have low levels of military ability. For example, if abilities $\theta$ and $m$ are independent, willingness to serve in the army will be unrelated to pecuniary motives, but one might still obtain lower average quality in a voluntary army because high-ability individuals would not serve.

2.2. Empirical Strategy

We conduct two types of analysis. Our main approach estimates

$$m_i = \mathbb{I}[X_i \gamma + \beta v_i + \varepsilon_i > 0],$$

where $v_i$ is a binary variable for whether individual $i$ chose to enlist, $m_i$ is a binary variable for whether individual $i$ earned a military high honor, $X_i$ is a vector of observable characteristics that influence individual $i$’s military ability (that is, individual characteristics, circumstances during the war, or sorting in the army), and $\gamma$ is a vector of parameters to be estimated.

We also examine a system of equations

$$v_i = \mathbb{I}[X_i \gamma_v + \varepsilon_i > 0] \text{ and } m_i = \mathbb{I}[X_i \gamma_m + \eta_i > 0],$$

where $\gamma_v$ and $\gamma_m$ are vectors of parameters to be estimated and $\varepsilon_i$ and $\eta_i$ are the residuals of each equation. The first equation in system (7) represents the choice to volunteer, and the second equation represents the earning of military high honors.

2.3. Interpretation

The parameter $\beta$ in equation (6) measures the difference in average quality between volunteers and draftees, conditional on $X$: $E[m_i | v_i = 1, X] - E[m_i | v_i = 0, X] = \beta$. In an adversely selected sample of volunteers, $\beta < 0$. Likewise, in an adversely selected sample of volunteers, $v_i$ and $m_i$ are negatively correlated (conditional on $X_i$), which is equivalent to $\rho(\varepsilon, \eta_i) < 0$ in equation (7). Estimates based on equations (6) and (7) convey the same qualitative information (see, for example, Finkelstein and McGarry 2006). Since equation (7) is more computationally intensive because of our large number of controls, we focus on equation (6).

Our empirical strategy is not necessarily associated with counterfactual statements about what might have been. The parameter $\beta$ evaluates a correlation property: were volunteers more productive in combat than draftees? Theories of selection do not require a cause-and-effect statement. Our goal, by considering both volunteers and a contemporaneously drafted random sample of the population of interest, is to compare the performance of men who either chose to serve or were made to serve. It would be wrong to control for the endogeneity of an individual’s choices (by estimating a selection equation or by relying on exogenous
sources of variation) because the determinants of selection are of ancillary interest. For instance, the determinants of self-selection into the military are likely not entirely exhausted by $X$. This would be a problem if we were to study the causal effect of military service on life outcomes, as in Angrist (1990), Bedard and Deschenes (2006), Card and Cardoso (2012), and Galiani, Rossi, and Schargrodsky (2011). This does not mean that we are unable to obtain consistent estimates of $\gamma$; it simply means that our focus is not on how observables influence behavior but on how behavior influences performance. (If we were to restrict our sample to draftees, we would be able to estimate the predictable effect of observable characteristics $X_i$ on $m_i$ in the absence of selection bias.)

Although our strategy does not require causal statements, we can associate $\beta$ with a causal effect because we rely on a random assignment into the army. By the law of iterated expectations,

$$E[m_i \mid \nu_i = 1, X_i] - E[m_i \mid X_i] = \beta \Pr(\nu_i = 0 \mid X_i),$$

(8)

which identifies the causal effect of moving from a drafted to a voluntary army on the average quality of the army (conditional on $X_i$). This effect is composed of a difference in performance $\beta$ and a selection equation $\Pr(\nu_i = 0 \mid X_i)$. Under a draft, selection is uncorrelated with observable covariates other than by the possibility of deferments, noncompliance, and other such biases.\textsuperscript{11} Since equation (8) is defined over a support set determined by $X_i$, an advantage of a democratic draft (that is, a draft with limited deferments) is that the event $\nu_i = 0$ would occur for multiple values of $X_i$. The parameter $\beta$, however, is not enough to structurally identify $F(m)$. Even under normality assumptions, identification of $F(m)$ requires, for example, restrictions on the second moments of the distribution of the residual terms or the use of variation in prices across markets (see Heckman and Honoré 1990).

3. Military Performance during World War II

The first part of this section briefly discusses the institutional details that make the US experience during World War II ideal for our purposes. The second part briefly discusses our data. The online appendix contains a more complete account of these institutional aspects and a detailed discussion of the data sources and the matching of multiple files.

3.1. World War II Draft

An ideal experiment to examine the type of selection into the military would be to construct two different fighting forces in parallel, one volunteer and one drafted, and measure their average performance. World War II was as close to

\textsuperscript{11} For example, during World War II, voluntary enlistments and the draft coexisted, so we assume the absence of randomization bias. Let $\nu^* = 1$ denote that in the absence of a draft, individual $i$ would have voluntarily enlisted in the army. We assume that $E[m_i \mid \nu_i = 1, X_i] = E[m_i \mid \nu^* = 1, X_i]$. 

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this ideal as possible. During the early part of the war, before 1943, the US Army allowed volunteers to enter at the same time that other men were drafted. The first draft registration occurred in October 16, 1940, well before the US entry into World War II. The World War II draft was also the largest and most democratic draft in US history. Deferments were quite limited.\(^\text{12}\) The limited nature of deferments implies that the sample of drafted soldiers should be quite close to a random sample of the US population. It also implies that the factors that lead to nonrepresentativeness of the draft are easily detectable and correctable.\(^\text{13}\)

3.2. Data

Our main data source is the US Army’s Serial Number Electronic File, 1938–46 (National Archives and Records Administration 2002). Every man and woman who entered the army during World War II had an IBM punch card that recorded his or her name, serial number, and demographic information. A portion of these records were destroyed by fire in 1973, but over 9 million records were preserved in digital format and compose the US Army’s Serial Number Electronic File, 1938–46. As described in Army Regulation No. 615-30, 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 observations with incomplete or missing data are removed. Not all army soldiers are included, and there are no records for army officers or men and women in the navy and marine corps.

Table 1 provides summary statistics for the serial number files. We also computed the corresponding national averages for the sample of men age 15–50 in the 1940 US census. The democratic nature of the World War II draft is evident; there is no statistical difference in education between the drafted and the general population. Similarly, the drafted sample has approximately the same fraction of African Americans as in the 1940 census. The difference in the white population between the groups is mostly made up of noncitizen 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 of them are single than the national average. Volunteers are also younger, and more of them are single than their drafted counterparts.

We complement these data with information about military performance, including whether an individual received a high award offered by the army. For our analysis of enlistment records, these are the Medal of Honor, the Distinguished Service Cross, and the Silver Star. Our analysis of within-company performance

\(^\text{12}\) The World War II draft had no college deferments. The draft boards had explicit guidelines for age and marital status; that is, 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.

\(^\text{13}\) More recent US military involvements have relied exclusively on voluntary enlistments and are not comparable to the military demands of World War II: they fail to provide a large and representative sample of drafted or volunteer soldiers. It is impossible to compare volunteers with a control group of drafted men for more recent service.
adds the Bronze Star and the Purple Heart to this list. The Medal of Honor recipients are listed on the Congressional Medal of Honor Society’s website. The names of Distinguished Service Cross and Silver Star recipients were compiled by Gleim (1991–93, pp. 51, 53, 55). The list of Silver Star recipients has 56,487 names, approximately 80 percent of the total awards, according to Gleim. We merged the publicly available list with the enlistment data by name, following required steps to ensure consistency. After the merge, we have 5,479,802 observations, 22,835 of which are affiliated with honors (21,360 Silver Stars). The pre-1943 sample has 2,872,134 observations. This constitutes our baseline sample.

Awards are directly linked to acts of valor on the battlefield. Silver Stars are awarded for “gallantry in action,” while Medals of Honor and Distinguished Service Crosses recognize “extraordinary heroism.” During World War II the awards were principally given by US Army divisions though, in many cases, they were awarded by higher levels of the US military. Awards are usually accompanied by a citation. A typical citation is the following:

The President of the United States of America, authorized by Act of Congress July 9, 1918, takes pleasure in presenting the Silver Star to Moses M. Glushakow, United States Army, for gallantry in action. During the Italian campaign, he spotted two enemy soldiers

Table 1
Summary Statistics: Means

<table>
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<th>Variable</th>
<th>Serial Number Electronic File</th>
<th>1940 Census, Men Ages 15–50</th>
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<tr>
<td></td>
<td>All Serials</td>
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<td>Age:</td>
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</tr>
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<td>30–34</td>
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<td>.063</td>
</tr>
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<td>35+</td>
<td>.076</td>
<td>.048</td>
</tr>
<tr>
<td>High school education or less</td>
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<td>.847</td>
</tr>
<tr>
<td>White</td>
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</tr>
<tr>
<td>Height</td>
<td>67.68</td>
<td>67.04</td>
</tr>
</tbody>
</table>

Sources. Data using serial numbers are from National Archives and Records Administration (2002). The 1940 census data are from the Integrated Public Use Microdata Series census file.

15 For descriptions of the awards, see US Department of Defense, Military Awards for Valor—Top Three (http://valor.defense.gov/DescriptionofAwards.aspx). Conversations with Doug Sterner, who publishes lists of award recipients for the Military Times (http://www.militarytimes.com/), suggest that it is unlikely that awards were granted in a systematic way to artificially increase the likelihood that a volunteer would win an award. The announcements for the awards detail actions that would be hard to counterfeit and often cite multiple concurring firsthand accounts. These descriptions often omit the serial number of the soldier, which suggests that granting authorities may not have been able to identify volunteers versus drafted men.

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setting up a machine gun on the side of the road 30 yards to his front. He opened fire with his rifle, killing one and wounding the other, who was soon taken prisoner. Then, by himself, he advanced on a home held by the enemy, which rained fire down on him. When he got within 25 yards of the house, he threw hand grenades into it and forced six of the enemy to surrender. When his squad to the rear came under the fire from an enemy machine gun, Moe laid harassing fire upon the position and allowed his squad to withdraw in safety. Finally, his position came under mortar and artillery fire, and he was forced to rejoin his squad.\textsuperscript{16}

Other military outcomes include becoming a prisoner of war (POW), dying in service, being killed in action (KIA), or going missing in action (MIA).\textsuperscript{17} These records have been digitized by various agencies and include serial numbers, which we used to merge them with the enlistment data.

4. Main Findings

This section presents the estimation of equations (6) and (7) in our baseline sample using awards and fatality information as measures of military performance.

4.1. Awards for Valor

Table 2 reports linear probability estimates of equation (6).\textsuperscript{18} Data for the Distinguished Service Cross and the Medal of Honor are combined because they are rare events: overall, there are fewer than five in 100,000 awards.

Column 1 leaves $X_i$ empty, with $\beta$ measuring the difference 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. (Table 2 reports standard errors robust to heteroskedasticity; clustering the standard errors by state-year leaves the significance unaffected.)

Column 2 includes dummy variable controls for initial assignment, by branch and rank. These controls are important to address concerns that volunteers were assigned to different areas of the military and so had more opportunities to demonstrate valor.\textsuperscript{19}

\textsuperscript{17}We do not consider other potential outcomes such as compensation and advancement in rank. This information is not generally available, and these outcomes might not be as interesting as awards since the military operates as an internal labor market subject to pricing and mobility inefficiencies (see, for example, Rosen 1992).
\textsuperscript{18}We also estimated probit specifications and obtained the same results. Those estimates are available on request.
\textsuperscript{19}Initial branch placement could have been in the infantry, Army Mine Planter Service, Chemical Warfare Service, or Finance Department or as warrant officers initially located in the United States, among other postings. The army paid considerable attention to occupational sorting at enlistment and employed a detailed aptitude test to help sort individuals into their most productive roles. Performance on an entrance exam was accidentally recorded for several months of 1943. Unfortunately,
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any Award (average = .0056)</td>
<td>.00180**</td>
<td>.00140**</td>
<td>.00134**</td>
<td>.00144**</td>
<td>.00146**</td>
</tr>
<tr>
<td></td>
<td>(.000105)</td>
<td>(.000181)</td>
<td>(.000183)</td>
<td>(.000186)</td>
<td>(.000201)</td>
</tr>
<tr>
<td>Silver Star (average = .0052)</td>
<td>.00150**</td>
<td>.00138**</td>
<td>.00133**</td>
<td>.00140**</td>
<td>.00144**</td>
</tr>
<tr>
<td></td>
<td>(.000101)</td>
<td>(.000175)</td>
<td>(.000178)</td>
<td>(.000181)</td>
<td>(.000196)</td>
</tr>
<tr>
<td>Distinguished Service Cross or Medal of Honor (average = .0004)</td>
<td>.000296**</td>
<td>1.68E−05</td>
<td>1.25E−05</td>
<td>3.66E−05</td>
<td>1.39E−05</td>
</tr>
<tr>
<td></td>
<td>(3.00E−05)</td>
<td>(4.27E−05)</td>
<td>(4.35E−05)</td>
<td>(4.43E−05)</td>
<td>(4.83E−05)</td>
</tr>
<tr>
<td>Controls:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Height and BMI</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Agriculture, married, and dependents</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Age and year</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State-year</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2,872,134</td>
<td>2,872,134</td>
<td>2,854,018</td>
<td>2,854,018</td>
<td>2,550,151</td>
</tr>
</tbody>
</table>

** Significant at the 1% level.

Note. Estimates are for linear probability models, with robust standard errors in parentheses. BMI = body mass index.
Column 3 examines a potential source of selection. Volunteers may exhibit physical traits well suited for service, as measured by their body mass index (BMI) or height. To examine the importance of physical strength, we grouped individuals into 10 and eight categories, respectively, according to their BMI and height. (The cutoffs were chosen to create evenly sized groups.)

Given the timing of the draft, it is possible that volunteers entered the army earlier than drafted men or at an earlier age. Column 4 includes controls for year of entry into the army and age at entry. Adding the year of enlistment controls for the differences in the nature of the draft between peacetime and wartime. In particular, the drafted class of men grew dramatically from 1940 to 1942 as the United States 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 (Table 1). Column 4 also controls for the characteristics that were likely to differ between drafted men and the general population, that is, information explicitly used in the draft process: marital status, with dependents, or employed in agriculture. As Table 2 shows, the results for Silver Star and Any Award retain their size and statistical significance.

Column 5 is our richest specification. In addition to the previously mentioned individual-level characteristics, it includes state-of-enlistment and state-year-of-enlistment 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 wartime policies instead of individual selection. Further, this specification controls for potential regional differences in preference for service, labor market opportunities, or any other characteristic that varies across states and time. In column 5, the estimates of $\beta$ retain their size and significance.

---

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

21 We also interacted the state-level population characteristics found in Acemoglu, Autor, and Lyle (2004) with the volunteer dummy. These estimates, which measure, for example, how coming from a heavily Japanese- or German-immigrant population impacts the relative quality of volunteers, varied across specifications, in both magnitude and statistical significance. Without any controls, volunteers from states with a large Japanese ethnic background performed better than draftees, this coincided with a period when severe restrictions were placed on volunteering. These restrictions were established to resolve logistical concerns for an expanding draft. For drafted men, Army General Classification Test scores (a precursor of the Armed Forces Qualification Test) correlate positively with honor awards.

22 These regressions were estimated separately for African Americans and noncitizens. The differential selection of African Americans into the military is complicated by the many disproportionate hardships they faced. Moreover, while there was no discrimination when entering the army, it is quite likely that African Americans were discriminated against when honors were awarded. The results for the African American population are qualitatively similar to the entire population but smaller in magnitude and noisily estimated. Estimates derived from the nonnative 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 the attack on Pearl Harbor below.
None of these alternative specifications alter the unconditional difference: volunteers earned more awards than drafted men. This is evidence against the hypothesis that only individuals with low-quality military ability would enter the army by choice. Quite the opposite is the case, since selection appears advantageous, as those who enlisted voluntarily were more likely to receive distinguished awards for military performance, conditional on their initial placement.

4.2. Fatalities

We next examine additional outcomes associated with battle participation. These complementary outcomes characterize in more detail differences between volunteers and draftees. For example, suppose that volunteers expected to be almost surely drafted but had the option of selecting into a preferred branch or position. Then volunteers gaming the system should experience lower combat rates and possibly lower mortality rates overall.

We consider four additional outcomes: death in service, KIA, MIA, and POW. These additional data contain virtually all of the cases of these outcomes in the United States during World War II. These measures of military performance cannot be unambiguously interpreted as either good or bad from a military perspective. If, for example, a death occurred during an act of valor, one man’s death may have enabled others to live. The honor rolls do not include notes on the circumstances of death, nor do the POW records include the circumstances under which soldiers were taken captive.

Table 3 presents the results. To help with the interpretation of the estimated coefficients, we include the mean value of these outcomes. We estimate four specifications: without any controls, with controls for initial placement, with individual controls, and with 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 than drafted men to be killed in action and about 36 percent more likely to die while in service. They were about three times more likely to be MIA and twice as likely to be a POW. These point estimates contradict the idea of volunteers gaming the draft.

The association between volunteer status and these outcomes weakens considerably as more controls are added. The tenuous statistical significance of these differences vanishes when we cluster the standard errors by state-year (not reported). This weakening also varies by outcome. For KIA and death in service, the value of $\beta$ in column 4 is about one-third of the unconditional value, whereas for MIA and POW, $\beta$ is about one-sixth of the unconditional value. The large decline in $\beta$ as controls are added contrasts with our results for awards in Table 2. Overall, Table 3 refutes the notion that volunteers entered the army to avoid the riskier placements they would have faced had they been drafted. The findings

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 populations.
Table 3
Additional Military Outcomes and Volunteer Status

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Killed in action (average = .0137):</td>
<td>.00182**</td>
<td>.00204**</td>
<td>.000688**</td>
<td>.000695**</td>
</tr>
<tr>
<td></td>
<td>(.000136)</td>
<td>(.000243)</td>
<td>(.000249)</td>
<td>(.000269)</td>
</tr>
<tr>
<td>N</td>
<td>4,223,498</td>
<td>4,223,498</td>
<td>4,200,972</td>
<td>3,761,128</td>
</tr>
<tr>
<td>Died in service (average = .0227):</td>
<td>.00813**</td>
<td>.00450**</td>
<td>.00297**</td>
<td>.00297**</td>
</tr>
<tr>
<td></td>
<td>(.000188)</td>
<td>(.000328)</td>
<td>(.000336)</td>
<td>(.000364)</td>
</tr>
<tr>
<td>N</td>
<td>4,223,498</td>
<td>4,223,498</td>
<td>4,200,972</td>
<td>3,761,128</td>
</tr>
<tr>
<td>Missing in action (average = .0024):</td>
<td>.00521**</td>
<td>.00143**</td>
<td>.00193**</td>
<td>.000971**</td>
</tr>
<tr>
<td></td>
<td>(8.20e−05)</td>
<td>(.000121)</td>
<td>(.000125)</td>
<td>(.000132)</td>
</tr>
<tr>
<td>N</td>
<td>4,223,503</td>
<td>4,223,503</td>
<td>4,200,977</td>
<td>3,761,129</td>
</tr>
<tr>
<td>Prisoner of war (average = .0091):</td>
<td>.00920**</td>
<td>.00218**</td>
<td>.00228**</td>
<td>.00146**</td>
</tr>
<tr>
<td></td>
<td>(.000128)</td>
<td>(.000187)</td>
<td>(.000193)</td>
<td>(.000209)</td>
</tr>
<tr>
<td>N</td>
<td>4,223,498</td>
<td>4,223,498</td>
<td>4,200,972</td>
<td>3,761,128</td>
</tr>
</tbody>
</table>

Initial placement
- No
- Yes

Age, year, agriculture, married, and dependents
- No
- Yes

State-year
- No
- Yes

Note. Estimates are for linear probability models, with robust standard errors in parentheses.
** Significant at the 1% level.
for fatalities also suggest that the differences in quality between volunteers and drafted men are not solely due to opportunity or circumstance.

5. Additional Findings

Our main sample shows significant differences in the rate at which volunteers were awarded high honors, despite no significant difference in fatalities. This section presents comparisons based on richer controls and peacetime and wartime subsamples. Later we rely on company-level data to address concerns about confounding factors.

5.1. Selective Placement and Replacement

We first investigate in greater detail the possibility that differences in opportunity between volunteers and drafted men drive the observed difference in awards. One way we control for the selective formation of army groups is to include controls for initial placement; such controls do not vary the statistical significance or magnitude of the coefficient of interest (Table 2). An alternative way to control for the dangers (and opportunities) faced by soldiers is to take advantage of the fact that army units were often composed of recruits and draftees from the same geographic areas and the same time of enlistment. To allow for the possibility that the state-year fixed effects are not sufficiently detailed, we construct month-by-county mortality rates. These additional controls reflect the mortality rates for all men who enlisted from a particular county in a particular month. (We group the county-months into 17 evenly sized categories.)

As Table 4 demonstrates, there is a great deal of variation in these controls. Weighting by the number of enlistees by county-month, the mean mortality rate for the county-month groups varies from under .06 percent to 12 percent. Table 4 also shows that the difference in performance between volunteers and drafted men does not vary when the county-month controls are included either linearly or with separate indicator variables for each group. Including the full set of controls from the earlier discussion (initial placement, age at entry, year of entry, BMI, and so forth) changes neither the magnitude nor the statistical significance of the point estimate. The controls (not reported) are statistically significant. Serving in a county-month that experienced 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.

Another confounding factor is that US Army procedures may have induced the differences in awards through selective replacement of soldiers into groups
that suffered heavy casualties. Historical documentation suggests that selective replacement is unlikely. As described in Rush (2001), selective replacement is unlikely for several reasons. First, injured soldiers routinely returned to their former organization; injured enlisted men almost exclusively returned to their former company. Second, US Army policy was to supplement units with new soldiers instead of rotating fresh units onto the front line to replace those with the heaviest losses. Finally, noncombat troops were often mobilized into combat situations. Overall, even if there were selective initial placements (of which we find no evidence), such differences would be scrambled by the chaotic and haphazard realities of the battlefield.

5.2. Selection over Time

We next investigate the possibility that the type of selection changed with the conditions of the war. Figure 1 plots the estimates of equation (6) calculated separately for each quarter of entry into the army, including controls for initial placement, age at entry, marital status, having dependents, and employment in agriculture. The first estimate corresponds to the fourth quarter of 1940, with a point estimate of −.0058 (standard error of .0015). This estimate is the only statistically significant evidence we find to support adverse selection; the point estimates for the rest of peacetime are insignificant. In contrast, the point estimates for awards during wartime consistently support the idea of advantageous selection. Figure 2 plots the quarterly regression coefficients for individuals who died in service. The lack of a systematic trend reinforces the notion that the differences in awards are

Table 4
Controls for County-Month Mortality: Likelihood of Winning an Award

<table>
<thead>
<tr>
<th>Controls for county-month mortality:</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volunteer</td>
<td>.00159**</td>
<td>.00151**</td>
<td>.00139**</td>
</tr>
<tr>
<td></td>
<td>(.000106)</td>
<td>(.000106)</td>
<td>(.000186)</td>
</tr>
<tr>
<td>Linear</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Nonlinear</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>All controls</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>2,858,551</td>
<td>2,858,551</td>
<td>2,841,425</td>
</tr>
</tbody>
</table>

Note. Estimates are for linear probability models, with robust standard errors in parentheses. The full set of controls includes initial placement, height, body mass index, employment in agriculture, marital status, having dependents, age at entry, year of entry, and state-year. Means for county-month mortality rates in the 17 categories are weighted by the number of enlistees in each county-month cell and are as follows: .000618, .011138, .014575, .016696, .018552, .020066, .021432, .023068, .024808, .026674, .031274, .034708, .039439, .046799, .059909, and .123722.

**Significant at the 1% level.

24 Several months’ worth of morning reports for the 22d Infantry Regiment of the 4th Infantry Division are analyzed in Rush (2001). 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, p. xiii). Rush generously supplied us with unpublished research conducted with the data used in his book. Some of that research is reflected in the discussion below.
Figure 1. Regression coefficients of awards with 95 percent confidence intervals

Figure 2. Regression coefficients of mortality with 95 percent confidence intervals
Advantageous Selection

not due to differences in opportunities to exhibit valor, since those opportunities
should also correspond to a higher risk of dying.

To further examine changes in the type of selection, we focus on the event that
triggered the US entry into the war, the attack on Pearl Harbor. We consider a
difference-in-differences specification

\[ m_i = \mathbb{I}(X_i \gamma + \beta_1 v_i + \beta_2 \text{After Pearl Harbor}_i + \beta_3 \text{After Pearl Harbor}_i) \times v_i + \epsilon_i > 0 \]  

(9)

where \( \beta_3 \) is the difference-in-differences estimate of volunteer quality. That is,
how did volunteer quality (relative to drafted men) change after this event?

For the estimate of \( \beta_3 \) to be consistent, there must be convincing evidence that
US entry into the war was unanticipated. If the event was anticipated, then the selec-
tion prior to the start of war would respond to the looming entry into the war.
This anticipation would bias \( \beta_3 \) 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 7, 1941, and the state of open war after it, we take the attack to be
an unanticipated shock to the type of selection into the military.

Processing drafted men could take 6 weeks (Flynn 1993, p. 24), so we chose
a date to separate pre- and post–Pearl Harbor army entrants. Figure 3 presents
the histogram of entries into the army 85 days before and after January 4, 1942,
which is 28 days after the attack on Pearl Harbor. There is a demonstrable lag be-
tween the Pearl Harbor attack and the jump in entry into the army via the draft.
This lag does not appear for volunteers. The clear jumps in enlistment suggest
that the attack on Pearl Harbor was unanticipated. The jumps also provide pre-
cise dates to separate the post–Pearl Harbor period. For drafted men, this is De-
cember 28, 1941, and it is 20 days prior for volunteers.

Table 5 presents the estimates of equation (9). We employ two windows: 60
and 120 days before and after January 4, 1942. The post–Pearl Harbor volunteers
earned more awards than the pre–Pearl Harbor volunteers, relative to their cor-
responding cohort of drafted men. For those who died in service, the double-
difference estimate with the 60-day window is statistically different from 0 at the
usual confidence levels. That is, fewer volunteers who entered the war after Pearl
Harbor would go on to die in service than all other groups. Volunteers won more
awards at a lower cost of life.

5.3. Selection on Unobservables

Controlling for a large number of observable characteristics potentially rele-
vant for sorting and military productivity does not mitigate the difference in high
honors between volunteers and draftees. We next rely on the method proposed in
Altonji, Elder, and Taber (2005) to quantitatively assess if selection on unobserv-
able characteristics can explain the difference between the groups.

We find that, given the amount of selection on observable characteristics in the
data, only one-tenth of 1 percent of the standardized selection on unobservable
characteristics is needed to account for the mean difference in awards between
Figure 3. Daily entry into the army for volunteers (top) and drafted men (bottom) with a focus on Pearl Harbor.
Table 5
Volunteer Quality before and after Pearl Harbor

<table>
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<tr>
<th></th>
<th>60-Day Window</th>
<th>120-Day Window</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Any Award (average = .006)</td>
<td>−.00440**</td>
<td>−.000737</td>
</tr>
<tr>
<td></td>
<td>(.000475)</td>
<td>(.000550)</td>
</tr>
<tr>
<td>After Pearl Harbor</td>
<td>−.000844*</td>
<td>−.00153**</td>
</tr>
<tr>
<td></td>
<td>(.000474)</td>
<td>(.000484)</td>
</tr>
<tr>
<td>After Pearl Harbor × Volunteer</td>
<td>.00296**</td>
<td>.00143*</td>
</tr>
<tr>
<td></td>
<td>(.000637)</td>
<td>(.000634)</td>
</tr>
<tr>
<td>Died in Service (average = .030)</td>
<td>−.00165*</td>
<td>−.000136</td>
</tr>
<tr>
<td></td>
<td>(.000860)</td>
<td>(.000980)</td>
</tr>
<tr>
<td>After Pearl Harbor</td>
<td>−.000933</td>
<td>−.00100</td>
</tr>
<tr>
<td></td>
<td>(.000783)</td>
<td>(.000788)</td>
</tr>
<tr>
<td>After Pearl Harbor × Volunteer</td>
<td>−.00359**</td>
<td>−.00393**</td>
</tr>
<tr>
<td></td>
<td>(.00113)</td>
<td>(.00113)</td>
</tr>
<tr>
<td>N</td>
<td>448,306</td>
<td>448,306</td>
</tr>
<tr>
<td>Initial placement</td>
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</tr>
<tr>
<td>Height and BMI</td>
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<td>No</td>
</tr>
<tr>
<td>Age at entry, agriculture, married, and dependents</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Note. Estimates are for linear probability models, with robust standard errors in parentheses. BMI = body mass index.

* Significant at the 10% level.
* Significant at the 5% level.
** Significant at the 1% level.
volunteers and drafted men. This reinforces the notion that selection according to unobservable characteristics is an important factor driving the performance of volunteers.

5.4. How Much Can Observables Explain?

Let $\hat{\gamma}_0$ denote the estimates of the parameter vector $\gamma$ in equation (6) for the sample of drafted men. Let $X_{i,0}$ and $X_{i,1}$ denote the vector of observable characteristics of draftees and volunteers, respectively. The contribution of observable differences between volunteers and drafted men to the difference in awards is

$$\frac{(X_{i,1} - X_{i,0})\hat{\gamma}_0}{\mathbb{E}[m_i \mid v_i = 1, X_{i,1}] - \mathbb{E}[m_i \mid v_i = 0, X_{i,0}]}.$$

We do not separately report the estimates $\hat{\gamma}_0$. However, 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 implies that 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; making the draft more selective according to observable information does not drastically increase average quality.

6. Unit-by-Unit Analysis

The findings obtained thus far control for conditions at entry but do not control for intermediate circumstances. Given the variety of experiences faced by soldiers during World War II, these controls leave open the possibility of confounding influences in the opportunity to demonstrate valor. We now turn to the service records of men who served in the 63d Infantry Division and the 10th Mountain Division.

6.1. The 63d Infantry Division

The 63d Infantry Division, known as Blood and Fire, was activated in June 1943 and served in the European theater from December 1944 until its deactivation in September 1945. Lists of the men who served in the 63d Infantry Division were collected by reviewing the division’s wartime documents, primarily its rosters and morning reports.

25 Notice that the estimate $\hat{\gamma}_0$ is consistent since there is no selection bias in the sample of drafted men. An alternative way to decompose mean differences in awards is to consider an estimate of $\gamma$ for the sample of volunteers, $\hat{\gamma}_1$. Since these estimates are influenced by selection, the inferences in this case are less transparent than those based on $\hat{\gamma}_0$.

26 Daily morning reports, filed for each basic army unit (for example, infantry company or artillery battery), reflect the daily changes to the personnel in the unit: who left the unit because of casualties, transfers, and so forth, and who joined the unit. The morning reports include the name, rank, and serial number for those listed. The list of the 63d Division’s morning reports is under the stewardship of Fred Clinton, the webmaster for the 63d Division’s association.
Table 6
Volunteers versus Drafted Men in the 63d Infantry and 10th Mountain Divisions

<table>
<thead>
<tr>
<th></th>
<th>63d Infantry</th>
<th></th>
<th></th>
<th>10th Mountain</th>
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<td>(2)</td>
<td>(1)</td>
<td>(2)</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>KIA</td>
<td>.00131</td>
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<td>.000198</td>
<td>.00247</td>
<td>.00100</td>
<td>.00130</td>
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<td></td>
<td>(.00177)</td>
<td>(.00179)</td>
<td>(.00424)</td>
<td>(.00423)</td>
<td>(.00124)</td>
<td>(.00125)</td>
</tr>
<tr>
<td>Bronze Star</td>
<td>.00100</td>
<td>.00130</td>
<td>.00924*</td>
<td>.00816*</td>
<td>.0144**</td>
<td>.0133**</td>
</tr>
<tr>
<td></td>
<td>(.000826)</td>
<td>(.00179)</td>
<td>(.000556)</td>
<td>(.00125)</td>
<td>(.00187)</td>
<td>(.00407)</td>
</tr>
<tr>
<td>Silver Star</td>
<td>.0478**</td>
<td>.00247</td>
<td>.0370**</td>
<td>.00816*</td>
<td>.0106**</td>
<td>0</td>
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<tr>
<td></td>
<td>(.00179)</td>
<td>(.000424)</td>
<td>(.000556)</td>
<td>(.00423)</td>
<td>(.00125)</td>
<td>(.00471)</td>
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<tr>
<td>Purple Heart</td>
<td>.00315**</td>
<td>.00130</td>
<td>.00187</td>
<td>.00407</td>
<td>.00153</td>
<td>(5.32e−07)</td>
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<tr>
<td></td>
<td>(.00423)</td>
<td>(.00423)</td>
<td>(.00125)</td>
<td>(.00423)</td>
<td>(.00471)</td>
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<tr>
<td>Unit fixed effects</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Constant</td>
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<td>−.000456</td>
<td>.0370**</td>
<td>−.00816*</td>
<td>.0106**</td>
<td>0</td>
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<tr>
<td></td>
<td>(.000826)</td>
<td>(.00179)</td>
<td>(.000556)</td>
<td>(.00125)</td>
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<td>(.00407)</td>
</tr>
</tbody>
</table>

Note. Estimates are for linear probability models, with robust standard errors in parentheses. The unit fixed effects are separate indicators for each company-level battle group (for example, the C Company in the 253d Infantry Regiment). N = 13,542 for the 63d Infantry Division; N = 5,458 for the 10th Mountain Division. KIA = killed in action.

* Significant at the 5% level.
** Significant at the 1% level.
The collection of the division’s morning reports and other documents is incomplete, as a few months of reports are missing from the army’s archives. However, from that which has been transcribed from the reports, we are able to determine who served in which group in the division (for example, who served in Company A of the 253d Infantry Regiment). Infantry regiments typically consist of three headquarters units (with approximately 400 men) that serve four lettered companies (600–900 men) and several other support groups, such as a medical company (200–300 men). In the data for the 63d Infantry, we have over 100 of these company-level battle groups and the rank of the soldier at the time of the reporting. Because men often switched groups during the war, they frequently appear in multiple company listings. We merged these listings with our enlistment files and fatality records. With the completed merge, we have 48,357 observations that reflect the service associated with 32,108 unique serial numbers.

Also included in the collection of rosters is an indicator if the soldier won a Bronze Star or Purple Heart while serving in the group. Bronze Stars are awarded for acts of valor that do not meet the level of the Silver Star, while Purple Hearts reflect injury or death during service.

We reapply the selection tests we use for the enlistment records using these three new outcomes instead. The first specification is performed without separate controls, while the second includes separate fixed effects for each of the over 100 battle groups. Thus, we test whether there is any difference in outcomes between volunteers and drafted men overall and to what extent any difference may be associated with the battle group in which they served. Table 6 reports the results from these specifications.

The sample size for these specifications is just over 13,500 observations, with some differences due to missing data. Because men could volunteer freely only before 1943, we include those men who entered the army prior to 1943. From this subsample, about one-quarter of the men were volunteers. The results in Table 6 suggest evidence of advantageous selection, even with controls for battle group. However, the small sample limits statistical power. Just under 5 percent of drafted men in the subsample earned Bronze Stars; volunteers were only slightly (.02 percent) more likely to earn a Bronze Star. The coefficient for volunteers grows substantially, to .025 percent, when unit-level controls are added, though this is still not large enough to be statistically significant with such a limited sample. The coefficient for Silver Stars is proportionally the same (one-third) as the fraction of the underlying frequency of the award, though the limited sample leaves the point estimate not statistically significant from 0.

The one instance of effects large enough to be measured is for Purple Hearts. Almost 4 percent of drafted men in the subsample were awarded Purple Hearts; volunteers were over a third more likely to be awarded Purple Hearts. This likely reflects differences in being wounded but not killed, as there is no difference in mortality between volunteers and drafted men either here or in the entirety of service records we collected. This effect grows slightly when unit-level fixed effects are included.
6.2. The 10th Mountain Division

The 10th Mountain Division served in the invasion of Italy during World War II. Specializing in mountain and winter warfare, the division fought important battles through the Apennines of northern Italy, across the Po River, and to the foothills of the Alps by the war’s end. An active group of volunteers has processed official documents for the 10th Mountain Division and produced a list of men who served during World War II. This list is available on the Denver Public Library’s website. It includes the name of each service member with his regiment or battalion and company but does not include a separate list of awards. We purged this list of all duplicate names and merged it with our list of service awards. After these cuts and the removal of men who were drafted in 1943 or later, we are left with nearly 6,000 usable records out of an original 30,000 names.

Compared with the 63d Infantry, the company-level groups are smaller, consisting of 100–200 men in the lettered companies and about half that in the headquarters companies and medical company equivalents. In the documentation of the list, no reason for this is given; it appears simply to be an artifact of the data. Eighty-five men of the 5,458 in our final sample earned a Silver Star. Because of the limits of our sample, no one in the sample earned a Medal of Honor, and only three men earned a Distinguished Service Medal. Thus, our main outcome of interest is the Silver Star. Table 6 reports the differences in winning a Silver Star by volunteer status. Regardless of whether company-level controls are added, volunteers were two-and-a-half times more likely than a drafted man to win a Silver Star. This point estimate is statistically significant both with and without those additional company-level controls.

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27 See Denver Public Library, 10th Mountain Division Name Lookup Index (https://history.denverlibrary.org/sites/history/files/10th_mountain_index.pdf).

28 We also considered lists for the 21st Infantry and June 6, 1944, activities provided on the Internet by AmericanDay.org. Unfortunately, repeated efforts to contact that site’s administrator were unsuccessful. We extracted the data from the website and found results in line with those for the 63d Infantry Division. However, we were not able to verify the way names were collected for these lists. Similarly, the Indiana Military Organization hosts lists of men who served in the 30th (http://www.indianamilitary.org/30TH/SoThinkMenu/30thSTART.htm), 31st (https://creator.zoho.com/jimdwest/31st-infantry-division/#View:st_Infantry_Division_Roster_View), and 83d (https://creator.zoho.com/jimdwest/83rd-infantry-division/#View:rd_Infantry_Division_Roster_View) Infantry Divisions. These lists appear to have been collected from reports of awards, instead of morning reports, at least partially. Using lists collected primarily, or even substantially, from such reports would cloud any empirical results drawn from such data, and so we did not conduct analysis using these lists.

29 It is hard to say, a priori, why this difference is larger than in the other groups. It should be noted that this division fought under exceptionally difficult, and unusual, circumstances. The 87th Mountain Infantry Battalion (which later became part of the 10th Mountain Division) was originally created in response to the stunning and unexpected Finnish victories over Soviet forces in the latter’s invasion; Finnish soldiers on skis devastated two Soviet tank divisions. The 10th Mountain Division was created with winter and mountain combat in mind, training in Colorado and specializing in cold-weather and high-altitude combat.
7. Concluding Remarks

In this paper we investigate selection into the US Army during World War II. In particular, we test if volunteers represented an adversely selected sample of soldiers. Instead, we found evidence of advantageous selection. For men entering during the period in which volunteers and draftees could enter the US Army in parallel, volunteers and drafted men exhibited no significant difference in fatality outcomes, but volunteers received more recognition for valor through the highest distinctions conferred by the US Army.

We also attempt to shed some light on why volunteers performed better than draftees. We find 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 provide prima facie evidence of some of the most important limitations that drafted armies face. We also find some weak evidence for adverse selection during peacetime: volunteers who entered the army 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 advantageous selection.

The validity of these findings outside of our historical context is an empirical issue that requires further testing. Although we rely on representative populations of drafted and volunteer soldiers, today’s volunteers are different from World War II volunteers. Volunteers during World War II enlisted in the shadow of a draft and at a time when military needs were at one of the highest historical peaks. The natures of military service and civilian opportunities were also quite different. In particular, the large personnel needs meant different entry standards and a likely reduced impact of or exposure to training on performance. Current military needs are relatively small, so the voluntary army has become more selective and more professional. In observable aspects such as ability (as measured by Armed Forces Qualification Test scores, for example) and physical traits such as BMI and physical endurance, current volunteers would likely represent a more advantageously selected sample of soldiers than the World War II volunteers. Military technology has also advanced considerably but not to the point that it would make our findings valuable only as a historical exercise.

References


Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber. 2005. Selection on Observed


Lee, Lung-Fei. 1978. Unionism and Wage Rates: A Simultaneous Equations Model with


