COWARDS AND HEROES: GROUP LOYALTY IN THE AMERICAN CIVIL WAR*

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What motivated men to risk death in the most horrific war in U. S. history when pay was low and irregular and military punishment strategies were weak? In such a situation creating group loyalty by promoting social capital is of paramount importance and in the Civil War was the cement of both armies. We find that individual and company socioeconomic and demographic characteristics, ideology, and morale were important predictors of group loyalty in the Union Army. Company characteristics were more important than ideology or morale. Soldiers in companies that were more homogeneous in ethnicity, occupation, and age were less likely to shirk.

I. INTRODUCTION

Decisive battle, in which two opposing forces meet face to face until annihilation or surrender, dominates western warfare strategy [Hanson 2001]. Winning this type of battle requires amassing sufficient numbers of soldiers who will stand their ground. But, throughout history soldiers have frequently deserted, and their leaders have had to devote a great deal of attention to preventing desertions. At Agincourt a large number of the French cavalry sought refuge from the rain of arrows in a nearby wood. At Waterloo the Dutch-Belgian and minor German regiments deliberately stayed out of the battle which was lost when Napolean's famed Guard collapsed and fled from the steady musket fire. During World War I the main participants all lost their will to fight—over half of the French divisions on the Western Front rebelled in May 1917, the Russian Army refused to fight in July 1917, the Italian Second Army collapsed in November 1917, the British Fifth Army fell apart in March 1918, and decisively, the German army in the west refused to continue the fight in October 1918.

What motivates soldiers to stand their ground? Mercenary armies have been motivated by pay, professional armies by pro-

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motions, and volunteers and draftees by punishments. Battle police or even men's commanding officers have stood behind them to prevent their running away. During World War II not only did Stalin's armies have special detachments who formed a second line to shoot at any soldiers in the first line who fled, but the families of all deserters were also arrested [Beevor 1998]. Democracies cannot inflict such punishments and, when fighting major wars, have never been very generous with pay. Based in part upon questionnaires administered to World War II U. S. soldiers, many sociologists, psychologists, and military historians have argued that soldiers' primary motivation for fighting is intense loyalty, to the point of self-sacrifice, to a small band of comrades [McPherson 1997, p. 86; Stouffer et al. 1949, p. 109]. Because soldiers live with the same men for so long, endangering the group leads to personal guilt and ostracism within the group. Oliver Wendell Holmes who served as an officer in the Civil War wept at not being able to be with his comrades at the battle of Fredericksburg where his regiment lost more men than in any other engagement of the war [Menand 2001, p. 43]. Ideological fervor bolsters this loyalty. Hanson [1999] argues that the moral vision commanders such as Sherman imparted to their troops led to their victories. Questionnaires administered to American volunteers in the Spanish Civil War found that ideology was the single most important factor helping men to overcome fear in battle [Dollard 1943, p. 555]. Morale also matters. The British, French, Italian, and Russian armies of World War I cracked when the total number of deaths equaled the number of fighting infantry in the divisions. The Germans cracked later, but only after their armies were no longer victorious [Keegan 1976, p. 276]. Individual characteristics matter because they determine a soldier's productivity. Studies of American soldiers in World War II found combat performance to correlate positively with social class and education, age, and being married [Stouffer et al. 1949, pp. 36–37].

This paper investigates the determinants of group loyalty among Union Army soldiers in the American Civil War, studying the relative importance of individual and community characteristics, of ideology, and of morale to group loyalty among Union Army soldiers. The Civil War was the most horrific war in United States history. The total number of deaths in the Civil War equaled the total number killed in almost all other wars combined, and more than one out of every five white men participat-

ing died, over half of them from disease [Vinovskis 1990]. The combatants faced death, the hardships and monotony of camp life, and distance from loved ones, all for low and irregular pay. If a Union Army soldier had deserted, he would have faced only a 40 percent chance of being caught and a negligible risk of death if arrested [Linderman 1987, pp. 174, 176]. A self-interested soldier would have deserted. But, over 90 percent of all Union Army soldiers did not [Linderman 1987], and among Union Army soldiers whose three-year enlistment terms were up, half of them reenlisted [McPherson 1997, pp. 81–82].[1] What motivated these men to remain loyal to the Union?

This paper provides the first large-scale quantitative assessment of the correlates of cowardice and heroism based upon soldiers' deeds rather than their words. Loyalty is expressed through such actions as desertion, arrests, and absences without leave. An unusually rich data set provides us with detailed demographic and economic characteristics of individuals, of companies, and of the geographical areas from which individuals came. Because companies contained only 100 men who were in constant close contact, we have a better measure of community than those often used in the social capital literature. Another advantage of studying group loyalty in this setting is that the stakes are high. It is costly for a military company if an individual shirks. It is also costly for soldiers to do their duty, thus allowing researchers to obtain a better measure of commitment than those commonly used in the social capital and organizational behavior literature.

Our analysis contributes to ongoing research on group loyalty, social capital, and organizational design. A growing literature has examined loyalty to organizations as diverse as gangs, Hasidic Jews, and corporations [Levitt and Venkatesh 2000; Berman 2000; Pfeffer 1997]. A distinguishing characteristic between the military and the modern firm is the military's inability (except for a mercenary army) to fully compensate individuals for risk and to link pay to performance. In an organization where workers have discretion and unobserved effort matters, altruism for others and the need for others' respect will mitigate the

1. In contrast, in the first half of the eighteenth century around 20 percent of the French Army deserted, and though no estimates are available, the leaders of other nations voiced laments about extremely high desertion rates [Sikora 1998].

agency problem. Social capital is therefore an important input into having a productive organization.[2]

II. Empirical Framework

The Union Army, like all organizations, faced agency problems. The usual solutions for mitigating these problems such as backloading pay, using promotions as an incentive, and paying bonuses to individuals [Lazear 1979; Gibbons 1998] were unlikely to have been effective in the Civil War Army. Soldiers who survived expected to be discharged from the wartime military when their enlistment term was up, were lucky if their pay arrived on time, and faced a higher risk of death on the battlefield if promoted because officers led the charges.[3] In addition, military outcomes are produced in a team setting, in which one or more regiments win or lose a battle. In such a case where only team output is observed and individual effort is not, a for profit can use pay for performance incentives to induce the efficient level of individual effort [Holmström 1982]. Unlike such an organization, the military substitutes loyalty for high-powered incentives (see Kandel and Lazear [1992] for a theoretical analysis). This loyalty needs to be built within each company and cannot be purchased in the market place.

The four hypotheses that we will examine are that loyalty to the Union was built through 1) soldiers' fighting ability (as proxied by the individual characteristics of soldiers), 2) loyalty to a small group (the community), 3) loyalty to a cause (ideology), and 4) morale. The empirical framework that we outline below will enable us to investigate the relative importance of each of these hypotheses.

Our empirical framework can be thought of in terms of the following equations:

(1) individual loyalty

$= f$(social capital, individual characteristics, ideology, morale)

2. Social capital is defined as aspects of the social structure such as trust, networks, and conventions that encourage collaboration and coordination between friends and strangers [Coleman 1990]. O'Reilly, Caldwell, and Barnett [1989] find that in work units where social integration is high, turnover is low.

3. While there may have been career benefits to some men from being perceived as war heroes, this is unlikely to be true for farmers, and they were in the majority.

TABLE I
DETERMINANTS OF GROUP LOYALTY

Individual	Community	Ideology	Morale
Social status	Birthplace fragmentation	Year mustered in	Percent in company dying
Occupation	Occupational fragmentation	Volunteer status	Fraction Union victories
Family wealth	Age diversity	From pro-Lincoln county	
Literacy	Size of city of enlistment		
Nativity	Brother in company		
Native-born	Percent of own nativity		
German	Percent of own occupation		
Irish			
English			
Other			
Age			
Marital status			

$$\text{social capital} = g(\text{community characteristics}), \tag{2}$$

where equation (1) represents an individual's choice to be loyal and equation (2) models the determinants of social capital within a community. Several recent studies emphasize that participation is lower in more heterogeneous communities [Alesina and La Ferrara 2000; Costa and Kahn 2003]. Since we do not explicitly measure the social capital embodied in the community, we substitute equation (2) into equation (1) and model loyalty as a function of individual characteristics, community characteristics, ideology, and morale. Table I lists the sets of variables determining group loyalty. We will examine how these variables affect the conditional probability of desertion, arrest, or AWOL.

Socioeconomic and demographic characteristics of soldiers such as age or literacy may proxy for soldiers' productivity (e.g., older soldiers may be more disciplined), whereas other characteristics such as social status or birthplace may affect group loyalty because they influence ideas of patriotism, honor, and duty and shape soldiers' ideology (see Table I for a list of individual characteristics that determine fighting ability). Married men may be either more or less motivated to fight by the thought of loved ones. In the case of Civil War soldiers, the sense of duty and honor and the potential for public shame was greater among the more socially prominent. Germans who fled the revolutions of 1848 were more likely than Irish or British immigrants who migrated for

economic reasons to view the United States as the best hope for the survival of a form of republican government. Protestant Germans were more likely to be Republican than the Irish because a large proportion of Republican voters were anti-Catholic Know-Nothings [Fogel 1989, p. 384]. Financial hardship at home led some married men to desert, but this was truer of Confederate soldiers whose families faced food shortages [McPherson 1997, p. 138].

Community characteristics influence group participation. Within heterogeneous units team production may be harder because there is less social integration and informal communication. If social capital is low, team production may also be harder because social sanctions are less effective. Our primary measure of a soldier's community is which of the 303 companies in our sample he was in. We examine the effect of such company characteristics as birthplace fragmentation, economic fragmentation (proxied by occupational fragmentation), age diversity, and the percent of the company of own ethnicity and occupation on group loyalty.[4] Companies could increase social integration among like-minded individuals because soldiers formed their own groups within companies, ranging from debate societies to Christian associations. We also investigate the impact of other definitions of community, including whether the soldier had a brother, father, or son in the same company and population size of city of enlistment. Among Civil War soldiers, feelings of loyalty were compounded by community pressure since fellow soldiers from the same hometown could and did report on others' behavior [McPherson 1997, pp. 77–89]. The size of the soldier's town of enlistment provides some indication whether the soldier faced this kind of community pressure.

The formation of communities (companies) during the war can be thought of as an assignment problem. An unusual feature of the Civil War military is that the federal government did not explicitly control this assignment—all company formation was done at the local level. Because, as we discuss later, men had some control over what company to join, this may raise concerns about the exogeneity of community attributes. If identical excellent fighters could Tiebout sort to form an exclusive company in

4. We cannot tell a priori whether such measures of community heterogeneity as fragmentation indexes are better predictors of group loyalty than the percent of the company of own ethnicity or occupation.

order to maximize their survival probabilities, then both community heterogeneity and desertion would be low, and we would mislabel this sorting on unobservables as social capital. In this case, a person's desertion probability and the community heterogeneity measure would be simultaneously determined rather than community social capital having a causal impact on later war effort.[5] While we recognize this possibility, our empirical design minimizes its relevance. The Civil War Army was composed of civilians. Enlistees could not know whether their friends had any combat skills.[6] Although there was some sorting along ethnic lines, finding a company that was a good match was partially a matter of luck.[7] As the war progressed, some individuals would enlist away from home to receive another town's higher enlistment bounty, thus providing additional variation. In our regression models we will control for individual attributes and will perform robustness tests where we control for mean company observable skill proxies such as percent farmer or percent foreign-born.

Ideology mitigates the agency problem because it raises loyalty. During the American Civil War, not just own ideology but also ideology of the soldiers' hometown was an important factor. Soldiers' morale depended not just upon good news from the front, but also upon their families' and communities' support. We measure ideology using year of enlistment, volunteer status, and percent of the county voting for Lincoln. Men who enlisted after 1862 were commonly described as being without patriotism, honor, or interest in the cause [McPherson 1997, p. 9]. We recognize that this variable might be measuring factors other than ideology, such as an influx of inferior recruits or an influx of recruits who did not enlist together. However, we find that our results remain unchanged when we analyze late or early recruits

5. Ichino and Maggi [2000] used the records of an Italian firm to examine how individuals who entered an organization performed. In the Civil War men rarely transferred, and men who died were not replaced. We only have information on the men within a given company.

6. We have not been able to find any references in any of the regimental histories to men sorting into companies on the basis of combat skills.

7. One soldier wrote home, "We have a remarkable civil and Religious company . . . I think it is a providencial circumstance that I enlisted in this company for I hear that there is desperate wickedness in very regiments I came so near enlisting in." (Letter of David Close, November 4, 1862, 126th Ohio Volunteer Infantry, Company D, http://www.iwaynet.edu/lsci/

only.[8] The constituencies voting for Lincoln were diverse, consisting of anti-Catholics, farmers, and land reformers, among others, opposed to slavery on both economic and moral grounds [Fogel 1989, pp. 369–387].[9] Soldiers' commitment to the cause may have grown the longer they served in the army. When Lincoln ran for reelection, he received 78 percent of the soldier vote compared with 53 percent of the civilian vote, despite some 40 to 45 percent of soldiers having come from Democratic families in 1860 [McPherson 1997, p. 176]. We can test whether soldiers' commitment increased by examining whether cowardice hazards decrease with time.

Another important determinant of group loyalty is the morale of the troops. Morale will depend upon support from the home front, leadership, and also upon the unit's recent fatalities and the entire Army's success on the battlefield. Morale is a dynamic variable. World War I soldiers rebelled when casualty figures became too high [Keegan 1976, p. 276]. Past deaths proxy for the perceived costs of fighting on. We capture the dynamic aspects of morale by using the company mortality rate and the fraction of major Union victories within each half year that the recruit was in service. Of course, these variables may also reflect the competence of the officers and the troops. In 1865 desertion reached epidemic levels in the Confederate Army when it was clear that the Confederacy could not win. In the Union Army, desertion reached a high point after the removal of McClellan in November 1862 (despite his procrastination he was respected as a professional soldier), the defeats at Fredericksburg and at Chickasaw Bluffs in December 1862, the rise of the peace Democrats at home, and the controversy over emancipation. Morale revived with victories at Gettysburg and at Vicksburg in July 1863, though continued gyrations were in store for the troops [McPherson 1997, pp. 155–162].

8. Margo and Steckel [1983] find that while some skewing in the height distribution (and therefore arguably the health or productivity distribution) of soldiers appeared as the war progressed, this effect was not statistically significant.

9. Controlling for other county characteristics does not affect our coefficient on the percent of the county voting for Lincoln, suggesting that we cannot distinguish between an antislavery vote on moral versus on economic grounds. We cannot distinguish between a pro-Union and antislavery vote. The effect of the percent voting for Lincoln was statistically indistinguishable from the effect of the percent voting for Bell on desertion rates.

III. The Union Army

On the eve of the Civil War, the regular army consisted of only 15,000 enlisted men.[10] By the end of the war over two million men had served in the Union Army, with four out of five men born in the prime birth cohorts of 1837–1845 serving. From April 1861 to July 1862 the army depended solely upon volunteers enlisting for low pay. In July 1862 the Militia Act assigned quotas to each state to fill, and states in turn assigned quotas to towns. When patriotic appeals failed, states and towns began offering men bounties to induce them to enlist so that they could fill their quotas.[11] In March 1863 the Enrollment Act created a conscription system administered by the federal government. Quotas were assigned to each congressional district and then broken down into subdistricts within each district. When towns failed to meet their quotas, every able-bodied male citizen between the ages of 20 and 45 became eligible for the draft, though married men were less likely to be called. Draftees could hire a substitute to take their place, or they could pay a commutation fee of $300 (equal to the yearly wage of an average worker) to be exempt from that particular draft, though not from another. Draftees and substitutes were relatively rare, constituting no more than 10 percent of all soldiers. Paying a commutation fee was also rare. Only 87,000 men became exempt in this way.

This paper investigates the motivations of the men who fought in the Civil War. The sample that we use is representative of the Union Army. However, because a large fraction of the military age population served, it is also representative of the northern population of military age. Sixty-five to 98 percent of the cohorts born between 1838 and 1845 were examined for military service, and 48 to 81 percent of these cohorts served, the remainder rejected for poor health. The men who served are representative of the northern population of military age in terms of real estate and personal property wealth in 1860 [Fogel 2001]. They are also representative in terms of literacy rates (98 percent in

10. See Hattaway [1997], Gould [1869], and U. S. Provost Marshall General [1866] for a detailed discussion of the organization of the Civil War Armies and Linderman [1987], Kemp [1990], Mitchell [1990], and McPherson [1997] for discussions of soldiers and their communities.

11. Although higher bounties were paid to men in counties where birthplace heterogeneity was greater (controlling for state fixed effects), the effect was not statistically significant.

the Union Army sample compared with 95 percent for the northern population of military age).

States and individuals played a large role in the formation of regiments of volunteers, the basic units of the armies. The volunteer infantry regiments consisted of 10 companies, each containing roughly 100 men, commanded by a captain and two lieutenants, often volunteer officers drawn from state militias, men of political significance, or assorted prominent men in the community. Regiments were typically formed from men who came from the same area. Each company would generally contain bands of men who had known each other in civilian life. Because of the strong loyalties men felt toward their companies, a company was not replenished with new men when disease, military casualties, and expirations of enlistment terms whittled down a company's numbers. If a company's numbers were sufficiently reduced, the company disappeared, and the men who continued to fight would transfer to another company.

The Union Army was not held together by discipline. When officers were men soldiers had known all their lives, the men had trouble thinking of officers as their superiors and were slow to or refused to follow orders. Officers who commanded contempt because of their cowardice or disregard for the welfare of their men resigned their commissions, driven out by their men's ill will.

The Army's coercive powers were limited. As the war progressed, the Army designated units of provost guards to drive stragglers (men who milled at the rear) into line. However, because they were reluctant to shoot soldiers wearing the same uniform, they were not always effective. Similarly, executions for such serious penalties as desertion were relatively rare. Out of roughly 200,000 deserters, 80,000 were caught and returned to the army, and 147 were executed for desertion [Linderman 1987, pp. 174, 176].[12] The penalties for desertion, and also AWOL, generally ranged from fines and loss of pay to imprisonment (including with hard labor) to performance of the more onerous duties in the company to the social sanctions of men's home communities.

12. In contrast, of the roughly 35,000 German soldiers tried for desertion by the Third Reich, about 22,750 were executed [Knippschild 1998]. Hanson [1999, p. 320] puts the total number of executions for either desertion or cowardice at 50,000.

IV. Data

Our data consist of 31,854 white, enlisted men in 303 Union Army infantry companies.[13] The sample represents roughly 1.3 percent of all whites mustered into the Union Army and 8 percent of all regiments that comprised the Union Army. The data are based upon a 100 percent sample of all enlisted men in 331 companies, picked at random, thus allowing us to create community variables for each company.[14] Ninety-one percent of the sample consists of volunteers, with the remainder evenly divided between draftees and substitutes. The primary data source consists of men's military service records. These records provide such basic information as year of muster, age, birthplace, and height in inches, and also information on what happened to the soldier during his military service. Desertions, arrests, and AWOLs were handled by military courts convened in the field. Men were linked to the manuscript schedules of the 1860 census which provides information on the value of personal property for all individuals in the household and on illiteracy and allows us to infer marital status. (Linkage details are provided in the Appendix.) We merged data on population in city of enlistment and voting in the 1860 presidential election (see the Appendix for sources).

Table II illustrates the wide variation in shirking and mortality rates by state. Shirking was high in the border states of Kentucky and Maryland and also in New York and New Jersey (two of the more urban states) suggesting that ideology and community characteristics matter.

We constructed variables describing recruits' individual characteristics, the characteristics of their communities, their ideological fervor, and their morale (see the Appendix for details). In addition to the variables listed in Table I, our regressions control for height in inches (a measure of productivity), region fixed effects for New England, Middle Atlantic, East North Central, Border, and West, and dummies for missing information (occupation at enlistment, not linked to the 1860 census and therefore missing information on marital status and on wealth,

13. The data were collected by Robert Fogel and are available from http://www.cpe.uchicago.edu.

14. Our sample is limited to 303 companies because complete data have not yet been collected on all 331 companies. Among the original 331 companies, New England is underrepresented, and the Midwest overrepresented relative to the army as a whole. The companies that have not yet been collected are from Indiana and Wisconsin, states that were very committed to the Union cause.

TABLE II
PERCENT SERVING BY STATE AND PERCENT DESERTED, ARRESTED, AND AWOL, AND DIED IN WAR BY STATE

	Number of observations	% Sample in state	% Deserted, arrested, or AWOL	% Deserted	% Arrested	% AWOL	% Died
Connecticut	525	1.65	24.76	19.62	2.29	6.10	16.38
Maine	415	1.31	9.62	5.29	3.61	2.16	20.19
Massachusetts	526	1.65	9.89	5.89	2.09	2.09	16.92
New Hampshire	588	1.85	22.62	17.18	2.38	6.46	23.64
Vermont	307	0.96	0.00	0.00	0.00	0.00	6.19
Delaware	444	1.39	15.54	12.61	2.70	1.35	9.00
New Jersey	881	2.77	28.60	24.86	3.75	1.59	8.06
New York	6309	19.81	19.86	13.60	3.19	4.99	15.22
Pennsylvania	2999	9.41	12.30	10.40	0.83	1.70	12.14
Illinois	3879	12.18	11.96	9.18	1.06	2.19	16.24
Indiana	1344	4.22	11.98	7.59	1.04	4.02	15.40
Michigan	1433	4.50	10.96	8.09	1.54	2.23	16.54
Ohio	5567	17.48	11.28	8.14	0.92	3.00	15.38
Wisconsin	1389	4.36	5.69	3.17	1.30	1.30	10.37
Iowa	1377	4.32	5.74	2.40	1.96	2.32	21.93
Kansas	260	0.82	5.00	3.08	1.54	0.77	3.46
Minnesota	295	0.93	5.76	3.39	1.02	1.69	4.07
Missouri	1020	3.20	12.06	8.92	1.96	2.45	18.04
Kentucky	905	2.84	27.73	18.01	1.10	10.50	16.57
Maryland	294	0.92	29.59	21.09	3.06	7.48	13.27
Washington, DC	117	0.37	26.50	13.68	9.40	11.11	0.85
West Virginia	334	1.05	7.19	2.69	1.20	3.89	6.89
New Mexico	95	0.30	37.89	24.21	13.68	1.05	1.05
California	550	1.73	31.82	18.36	13.82	1.64	5.27
Total	31,854	100.00	14.51	10.33	2.03	3.29	14.68

The column labeled deserted, arrested, or AWOL uses only the first instance or either desertion, arrest, or AWOL. Individual arrests and AWOLs are those preceding desertion only. The columns individually labeled deserted, arrested, and AWOL therefore do not sum to the single column labeled deserted, arrested, or AWOL. We do not have an explanation for why shirking rates are 0 for Vermont. However, our results remain the same when we exclude Vermont from our regressions.

literacy, and county voting). Note that both of our morale measures (the fraction of the company who died and the fraction of Union victories to all major battles) are time-varying covariates. The fraction of Union victories does not vary across companies and only varies across individuals who were mustered in at different dates. We do not treat the other company variables as time-varying covariates because there was very little change in company characteristics from the start to the end of their service. We cannot include company leader characteristics as a variable because we know leader characteristics only for internal promotions.

Table III lists all variables used in the regression tables and shows that the sample means for those who deserted, were arrested, and were AWOL differ substantially from those for the entire sample. (To simplify the tables, we do not include as covariates the fraction of the company that is of the soldier's own ethnicity or occupation or whether the soldier had a brother in the company; instead, we describe the results in the text.)

V. Econometric Framework

Our measures of cowardice and heroism are desertion, arrest, and AWOL. We combine these three as one summary measure of loyalty and also examine each of these measures individually. Desertion is the best measure of shirking. Arrests for minor infractions depend upon officer decisions. Desertion is a more serious offense than AWOL, and because 10 percent of the sample deserted, it also is the measure with the largest number of events. Absences without leave were generally failing to return from furlough on time and straggling from the company. The determination of whether a case was AWOL or desertion was made by a military court convened in the field. If a soldier was determined to have deserted, the time that he deserted was noted as when he was first missing. Arrests that were not for desertions (and because we censor on desertion we do not examine these) or AWOL were for drunkenness, assault, robbery, insubordination, and sleeping while on picket duty.

Our empirical strategy uses four time-varying independent competing risk hazard models to estimate days from entry into the company (muster-in) until 1) the first case of desertion, arrest, or AWOL, 2) desertion, 3) arrests preceding desertion, and 4) AWOLs preceding desertion. We use a competing risk framework because morale varies over time, because men can become more committed soldiers, and because of censoring—some men may have died, been discharged, changed company, become prisoners of war, or be missing in action before they could desert. We treat these men as censored in our estimation strategy. When we examine time until first arrest or AWOL, we also treat men who deserted as censored (see Figure I). Note that we are assuming that the risk of desertion, arrest, or AWOL is independent of the outcomes such as death that we censor on. Hazard models provide a framework to estimate the micro and macro determinants of

TABLE III
VARIABLE MEANS FOR ALL MEN, FOR DESERTED, ARRESTED, AND AWOL COMBINED AND FOR DESERTED, ARRESTED, AND AWOL SEPARATELY

	Combined	Std dev	All outcomes	Deserted	Arrested	AWOL
Days from muster until			237.181	190.644	385.175	356.181
Dummy = 1 if occupation						
Farmer	0.511		0.369‡	0.326‡	0.387‡	0.493
Artisan	0.200		0.266‡	0.243‡	0.195	0.191
Professional/proprietor	0.075		0.084‡	0.086‡	0.085	0.076
Laborer	0.207		0.315‡	0.338‡	0.330‡	0.236†
Unknown	0.007		0.006	0.007	0.003	0.004
Dummy = 1 if born in						
U. S.	0.755		0.663‡	0.599‡	0.591‡	0.708‡
Germany	0.071		0.077*	0.082‡	0.065	0.066
Ireland	0.084		0.160‡	0.165‡	0.203‡	0.125‡
Great Britain	0.038		0.066‡	0.071‡	0.074‡	0.051†
Other	0.052		0.075‡	0.082‡	0.067*	0.050
Age at enlistment	25.774	7.622	25.645	25.530†	25.735	25.844
Dummy = 1 if married	0.133		0.094‡	0.084‡	0.080‡	0.135
Log (total household personal property), 1860	1.639	2.699	0.914‡	0.743‡	1.014‡	1.364‡
Dummy = 1 if illiterate	0.017		0.021†	0.018	0.015	0.031‡
Company characteristics						
Birthplace fragmentation	0.564	0.204	0.612‡	0.614‡	0.648‡	0.591‡
Occupational fragmentation	0.549	0.549	0.606‡	0.620‡	0.613‡	0.566‡
Coefficient of variation for age × 100	28.373	0.284	0.283	28.394	27.492‡	28.596†
Log (population) city enlistment	8.599	1.874	9.224‡	9.377‡	9.067‡	8.870‡
Dummy = 1 if mustered in						
1861	0.210		0.234‡	0.190‡	0.302‡	0.354‡
1862	0.351		0.346	0.347	0.339	0.331
1863	0.064		0.107‡	0.126‡	0.096‡	0.057
1864	0.254		0.200‡	0.197‡	0.215†	0.204‡
1865	0.120		0.113‡	0.140‡	0.048‡	0.054‡
Dummy = 1 if volunteer	0.907		0.861‡	0.842‡	0.895	0.893
Percent in county of enlistment voting for						
Lincoln	35.525	26.607	33.829‡	35.465	31.033‡	30.281‡
Vote for other	34.777	26.187	39.089‡	40.455‡	35.686	37.212‡
Unknown	29.698	29.698	27.082‡	24.080‡	33.282†	32.507†
Percent in company dying	13.712	8.667	12.976‡	12.880‡	11.595‡	13.982
Fraction Union victories in 6 months of event	0.450	0.388	0.308‡	0.273‡	0.410‡	0.393‡
Number of observations	31,854		4623	3289	646	1049

The symbols *, †, and ‡ indicate that the mean is significantly different from the mean for those not in the category at the 10, 5, and 1 percent level, respectively. Combined outcomes refer to the first case of desertion, arrest, or AWOL. Arrests and AWOLs are those preceding desertion only. The logarithm of personal property wealth is set equal to zero for those for whom this information is missing. The standard deviations of log (total household personal property), birthplace fragmentation, occupational fragmentation, the coefficient of variation for age, the percent in the company dying, and log (population) are 2.699, 0.204, 0.181, 3.193, 8.667, and 1.874, respectively.

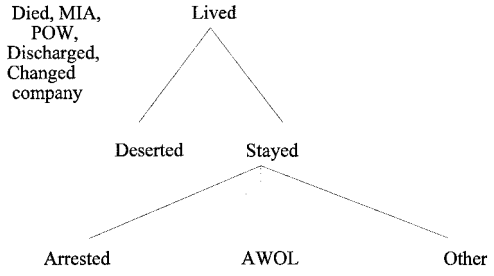

FIGURE I
Schematic of Events Studied

cowardice and heroism. Our estimated hazard, $\lambda_i(t)$, for one of our four models (i), is

$$\lambda_i(t) = \exp(x_I'\beta_I + x_C'\beta_C + x_D'\beta_D + x_M'\beta_M)\lambda_{i0}(t), \tag{3}$$

where I indexes the individual variables, C indexes the community variables, D indexes the ideology variables, M indexes the morale variables, and $\lambda_{iO}(t)$ is the baseline hazard which we assume to be Weibull. The survival function thus takes the form, $\exp((-\lambda_{ij}t_j)^p)$ for subject j, where p is the duration dependence parameter and can be interpreted as representing whether men who were in the war longer became more or less committed soldiers.[15] We present results both with and without the morale variable. The hazard ratios that we report indicate whether a one-unit change in an independent variable gives an increase/decrease in the odds of an event. Thus, a hazard ratio of 1.3 on our Irish-born dummy variable indicates that the Irish were 1.3 times as likely as the native-born to desert. We account for unobserved company-level correlation by using variance correction models [Lee, Wei, and Amato 1992; Cai, Wei, and Wilcox 2000]. Clustering on companies provides us with an upper bound on the standard error of company characteristics.

15. Because some men may be so loyal that they would never desert, we also estimated models that account for individual heterogeneity. These yielded virtually identical results. We also tested whether censoring men who served beyond three years affected the results. We found that the magnitude of the coefficients and of the duration dependence parameter was similar, but that the standard error of some of our coefficients (e.g., occupational fragmentation, percent of the county voting for Lincoln) rose, while on others it fell (e.g., age diversity). The coefficients on our morale variables remained strongly significant.

VI. Results

Our results show that individual characteristics, community characteristics, ideology, and morale were all important predictors of cowardice and heroism. Table IV presents results for our summary measure (time until first desertion, arrest, or AWOL). The relative importance of our variable categories depends upon whether we examine desertions, arrests, or AWOLs (see Table V). However, the results for our summary measure are very similar to those for desertion because desertion is by far the most common first outcome.

Consider first individual characteristics that proxy for fighting ability. In the case of desertion men who were farmers, who were older, who came from a household with high property wealth in 1860, and who were literate were less likely to desert.[16] Married men were significantly more likely to desert, but the interaction term on married and personal property wealth was insignificant, suggesting that financial hardship at home did not necessarily lead to disproportionate desertions among married men. Married men were more likely to be AWOL (but not significantly so), probably because furloughs were generally granted only to married men thus providing them with an opportunity to go AWOL. Whether a soldier was owed a bounty (as was true for many volunteers after 1862), decreased desertion rates (not shown), but the effect was not statistically significant.[17] Relative to the native-born the Irish and British were more likely to desert. They were also twice as likely to be arrested as the native-born.[18]

Community characteristics were also important predictors of cowardice and of heroism. Men who came from companies in which birthplace, occupation, and age heterogeneity was high and men who came from larger cities were all more likely desert. Although birthplace fragmentation was not a statistically significant predictor of desertion, it became a statistically significant

16. If all men in the sample had come from the wealthiest household (one in which the logarithm of personal property wealth was 10.8), the average predicted probability of desertion would have been 0.056 instead of 0.094.

17. God was not necessarily a better motivator than mammon. The higher the ratio of church seats to county of enlistment population, the higher the desertion rate. However, this ratio is probably a proxy for urbanization. We could find no clear pattern by type of religion.

18. We do not have a good explanation for high disloyalty rates among the Irish and British. These results persist even when the Irish and British were in the majority in a company.

TABLE IV
COMBINED COMPETING RISK HAZARD MODEL FOR DESERTION, ARREST, OR AWOL

	Hazard ratio	Std err	Hazard ratio	Std err
Dummy = 1 if occupation				
Farmer				
Artisan	1.240‡	0.065	1.236‡	0.065
Professional/proprietor	1.267‡	0.082	1.261‡	0.082
Laborer	1.374‡	0.085	1.372‡	0.085
Dummy = 1 if born in				
U. S.				
Germany	0.896	0.123	0.894	0.123
Ireland	1.376‡	0.094	1.374‡	0.094
Great Britain	1.399‡	0.120	1.400‡	0.119
Other	1.205†	0.093	1.204†	0.093
Age at enlistment	0.989‡	0.003	0.989‡	0.003
Dummy = 1 if married	1.287‡	0.092	1.286‡	0.092
Log (total household personal property), 1860	0.964‡	0.013	0.964‡	0.013
Dummy = 1 if illiterate	1.582‡	0.192	1.586‡	0.192
Company-level measures				
Birthplace fragmentation	1.612*	0.462	1.619*	0.464
Occupational fragmentation	2.239†	0.844	2.245†	0.844
Coefficient of variation for age × 100	1.027†	0.014	1.028†	0.014
Log (population) city enlistment	1.048†	0.023	1.048†	0.023
Dummy = 1 if mustered in				
1861				
1862	1.287‡	0.131	1.309‡	0.133
1863	1.649‡	0.264	1.702‡	0.274
1864	1.291†	0.136	1.330‡	0.143
1865	2.089‡	0.308	2.060‡	0.305
Dummy = 1 if volunteer	0.751‡	0.085	0.752‡	0.085
Percent in county of enlistment voting for Lincoln	0.993‡	0.002	0.993‡	0.002
Percent in company dying × 100 (time-varying)	1.036‡	0.009	1.035‡	0.009
Fraction Union victories (time-varying)			0.737‡	0.070
Duration dependence parameter	0.752	0.028	0.782	0.030
$\chi^2(32)/\chi^2(33)$ for				
Significance of all coefficients	752.49		752.59	

Days until first desertion, arrest, or AWOL are measured from first mustering in. The first instance of either is an event. Standard errors are clustered on the company. The symbols *, †, and ‡ indicate that the coefficient is significantly different from 1 at the 10, 5, and 1 percent level, respectively. Significance of all coefficients is for equality of all coefficients to 1. Men who died, became POWs, were discharged, were missing in action, or changed companies before the first desertion, arrest, or AWOL are treated as censored. Covariates include height in inches and dummy variables indicating missing information for occupation, the 1860 census, literacy, and county voting. Included region fixed effects are for Middle Atlantic, East North Central, West North Central, Border, and West (New England is the omitted category).

TABLE V
SEPARATE COMPETING RISK HAZARD MODELS FOR DESERTION, ARREST, AND AWOL

	Desertion		Arrest		AWOL	
	Hazard ratio	Std err	Hazard ratio	Std err	Hazard ratio	Std err
Dummy = 1 if occupation						
Farmer						
Artisan	1.435‡	0.093	0.925	0.115	0.910	0.088
Professional/proprietor	1.359‡	0.105	1.132	0.195	1.045	0.146
Laborer	1.572‡	0.121	1.063	0.136	1.043	0.121
Dummy = 1 if born in						
U. S.						
Germany	0.884	0.146	0.918	0.164	0.857	0.143
Ireland	1.310‡	0.103	2.007‡	0.287	1.181	0.152
Great Britain	1.396‡	0.148	1.691‡	0.280	1.247	0.219
Other	1.245†	0.120	1.100	0.170	0.935	0.148
Age at enlistment	0.985‡	0.003	0.985†	0.006	1.004	0.005
Dummy = 1 if married	1.382‡	0.128	1.141	0.218	1.211	0.147
Log (total household personal property), 1860	0.950‡	0.017	0.987	0.027	0.968	0.021
Dummy = 1 if illiterate	1.601‡	0.243	1.076	0.314	1.551	0.464
Company-level measures						
Birthplace fragmentation	1.405	0.496	3.001‡	1.230	2.593‡	1.007
Occupational fragmentation	3.428†	1.682	2.983†	1.451	0.759	0.376
Coefficient of variation for age × 100	1.032*	0.017	0.993	0.025	1.014	0.022
Log (population) city enlistment	1.058†	0.028	1.006	0.037	1.027	0.036
Dummy = 1 if mustered in						
1861						
1862	1.632‡	0.200	1.390†	0.216	0.749†	0.099
1863	2.338‡	0.437	1.748‡	0.322	0.729	0.154
1864	1.472‡	0.196	2.505‡	0.400	1.326	0.232
1865	2.628‡	0.437	1.921†	0.503	1.191	0.333
Dummy = 1 if volunteer	0.749†	0.100	0.854	0.144	0.651†	0.113
Percent in county of enlistment voting for Lincoln	0.995†	0.003	0.994	0.004	0.990‡	0.003
Percent in company dying (time-varying)	1.036‡	0.011	0.990	0.019	1.068‡	0.014
Fraction Union victories (time-varying)	0.610‡	0.075	0.599†	0.128	0.605	0.105
Duration dependence parameter	0.682	0.027	1.325	0.072	1.298	0.050
χ^{33} for significance of all coefficients	784.32		349.34		217.06	

Days until desertion, arrest, or AWOL are measured from first mustering in. In addition, for arrest and AWOL men who deserted are treated as censored. Standard errors are clustered on the company. The symbols *, †, and ‡ indicate that the coefficient is significantly different from 1 at the 10, 5, and 1 percent level, respectively. Significance of all coefficients is for equality of all coefficients to 1. Men who died, became POWs, were discharged, were missing in action, or changed companies before first desertion are treated as censored. Covariates include height in inches and dummy variables indicating missing information for occupation, the 1860 census, literacy, and county voting. Included region fixed effects are for Middle Atlantic, East North Central, West North Central, Border, and West (New England is the omitted category).

predictor when we dropped occupational fragmentation from the regression. Men in companies in which birthplace and occupational diversity was high were significantly more likely to be arrested. The only company socioeconomic and demographic characteristic that significantly predicted AWOL was birthplace diversity. When we included the company Gini coefficient for both personal and property wealth calculated from the 1860 census, we found that while men in companies where inequality was high were more likely to desert, the effect was statistically insignificant.

We tested whether our birthplace and occupation fragmentation measures proxy for average skills within the company characteristics instead of company heterogeneity. The percent of the company of foreign birth or of a given occupation and the mean age of the company had no predictive power. We also tested whether our company fragmentation measures perform better than county-level fragmentation measures for the male population of military age. Higher birthplace fragmentation in county of enlistment increased desertion rates, but the effect was not statistically significant.[19] Finally, we tested whether unobserved sorting on ability is driving our results by excluding large counties where men had more companies to choose from in enlisting. In the case of desertion, occupational fragmentation became an insignificant predictor as variation in this variable fell, but birthplace fragmentation became a statistically significant predictor.

We investigated using alternative measures of birthplace and occupational diversity such as percent of own nativity or occupation and concentration ratios. Concentration ratios for birthplace and occupation were collinear, but individually a higher concentration ratio significantly decreased the probability of desertion. Measures such as percent of own nativity or occupation are not suited to the Union Army data because there was no dominant ethnic group. However, we did find some evidence of ethnic favoritism when we investigated whether there was any interaction between own ethnicity and that of an officer for the limited set of companies for which we know something about the officers because they rose from the ranks. In the case of AWOL, the Irish were significantly more likely to be AWOL if the com-

19. We used the 1860 census of population and created fragmentation measures for men age 16 to 39 in counties with at least 25 such men. We found no effect at all of county-level occupational fragmentation.

pany had an Irish officer, but we could not determine whether punishments for AWOL were lower in these companies. However, both the Irish and the British were more likely to be arrested if the company contained an Irish or British officer, and the British were significantly less likely to desert if the company contained a British officer. We also investigated whether the interactions between own occupation and the proportion of men in the company in that occupation and own birthplace and the proportion of men of that ethnicity were at all significant. We only obtained significant results for laborers. They were more likely to desert and to be arrested if the proportion of laborers in the company was high.

We have the opportunity to study peer groups for brothers, fathers, and sons among men linked to the 1860 census. These men might either be more likely to shirk because collusion is easier or be less likely to shirk because of loyalty. We find that having close kin in the same company increased the probability of desertion, but the coefficient was not statistically significant. It significantly decreased the odds of going AWOL and did not affect arrests.

We have not tested whether there was a contagion effect leading to increased individual probabilities of desertion when company desertion rates rose. However, because of the nonlinearity of our estimation equation (3), this endogenous interaction can be estimated off of the functional form [Manski 1993, 2000; Brock and Durlauf 2001]. We therefore included a time-varying measure of the fraction in the company deserting in our desertion specification. We found that this measure significantly increased desertion rates, but that the company death rate became an insignificant predictor of desertion and that the significance of the coefficient on the proportion of Union victories fell from 1 to 10 percent. All other coefficients were unaffected.

Were there any individual benefits to soldiers of being in a homogeneous company? Because the fighting unit sent to battle was the regiment but because regiments contained both homogeneous and heterogeneous companies, we can examine time until death on the battlefield as a function of company characteristics, individual characteristics, and regimental fixed effects to control for battlefield experience. Our results are mixed. Mortality was lower among men in companies with high birthplace fragmentation (hazard ratio = 0.420, $\hat{\sigma} = 0.196$), but it was higher among men from large cities (hazard ratio = 1.071, $\hat{\sigma} = 0.039$) and higher

among men in companies with high occupational fragmentation (hazard ratio = 2.382, $\hat{\sigma} = 1.180$).

Our ideology proxies predicted desertion, arrest, and AWOL. Men who enlisted in 1861 were less likely to desert or to be arrested. Surprisingly, soldiers mustered in 1862 and 1863 were less likely to be AWOL than soldiers mustered in 1861. Men who volunteered and men from pro-Lincoln counties were less likely to desert or to be AWOL. Using the percentage of the county voting for Fremont in the 1856 presidential election as an alternative measure of ideology yielded virtually similar results to using the percentage of the county voting for Lincoln in 1860. We find mixed evidence that soldiers became more committed to the cause the longer they remained in the army. Although desertion hazards decrease with time, arrest and AWOL hazards increase with time.

Lastly, our morale proxies were predictors of all of our measures of cowardice and of heroism. Men were more likely to desert when company mortality was high and when the Union was losing. Arrest rates were higher when the Union was losing. A high company mortality rate significantly reduced time until AWOL.

We experimented with different outcome variables as robustness checks. We investigated what predicted reenlistment for another three-year term among men who enlisted in 1861 and who had already served a three-year term. Approximately half of reenlistees in the sample received a bounty upon reenlistment. Generally, men reenlisted as regiments or companies [Hess 1997, p. 89]. Older men, men from large cities, and Germans were less likely to reenlist, and men who received a bounty for reenlisting were more likely to reenlist, but these were the only characteristics that predicted reenlistment.[20] We also examined the determinants of promotion from the ranks to officer, finding that such individual characteristics as social status (being a professional, proprietor, or artisan rather than a farmer or laborer), being native-born, and being tall increased the likelihood of promotion.

We performed further robustness tests by experimenting with state fixed effects for all regressions. One of the difficulties

20. There was no dishonor in not reenlisting. Newton Scott, a private in the 36th Iowa Infantry, Company A, wrote to Hannah Cone, "I think it the Duty of Every Able Bodied man If Necessary to Help Defend His country But I think 3 years Sufficient long for one man to Serve while they all take there [sic] turns . . . " http://www.civilwarletters.com

we faced is that when the number of companies within a state was small, correlation between birthplace and occupational fragmentation was high. In the case of AWOL and arrest, the coefficients on company socioeconomic and demographic characteristics, the percentage of the county voting for Lincoln, and the company death rate remained unchanged. For desertion, both birthplace and occupational fragmentation were statistically significant predictors of desertion, but the proportion of the county voting for Lincoln (a measure that varies more across states than within states) became an insignificant predictor. We also experimented with regimental fixed effects. In the case of arrest and AWOL, our results were very similar to those presented in our tables. In the case of desertion, the size of the coefficients on birthplace and occupational fragmentation increased markedly, and both were statistically significant in all specifications, but the coefficient on age diversity became statistically insignificant.

VII. Implications

Our results show that the same types of variables that predict commitment to organizations in civilian life today predicted loyalty to the Union Army in the past.[21] Group loyalty requires interactions with fellow workers or community members, but commitment to interacting with others varies by demographic group [Glaeser, Laibson, and Sacerdote 2000]. Previous studies have found that community heterogeneity lowers public expenditures [Luttmer 2001; Poterba 1997; Alesina, Baqir, and Easterly 1999; Goldin and Katz 1999] and reduces time allocation and organizational membership [Alesina and La Ferrara 2000; Costa and Kahn 2003]. Studies of firms have found that heterogeneity in age, education, tenure, race, and sex is positively related to turnover, but which of these heterogeneity measures is more important depends upon the organization studied.[22]

Table VI shows the relative importance of community socioeconomic and demographic characteristics and of our morale and ideology proxies for the predicted probability of desertion, arrest,

21. Our results stand in contrast to Bearman [1991] who argues that among Confederate soldiers from North Carolina, local homogeneity led to high desertion rates. However, heterogeneity within the state may have led to high desertion rates. Weitz [2000] finds that among Georgia soldiers men most likely to desert were from the subsistence farming areas of the Upcountry whose families faced starvation without them and who had nothing to gain from secession.

22. See Pfeffer [1997, pp. 83–85] for a review.

TABLE VI
PREDICTED PROBABILITIES OF DESERTION, ARREST, AND AWOL, BY COMPANY CHARACTERISTICS, MORALE, AND IDEOLOGY

	Desertion, Arrest, or AWOL	Desertion	Arrest	AWOL
Using true variable values	0.131	0.094	0.020	0.033
Community characteristics				
If birthplace fragmentation = 0	0.101	0.078	0.010	0.019
If occupational fragmentation = 0	0.085	0.047	0.010	0.039
If coefficient of variation for age = 0	0.065	0.042	0.023	0.023
If all of above	0.031	0.016	0.006	0.016
If population in city of enlistment = 2500	0.125	0.088	0.020	0.032
If all of above	0.030	0.015	0.006	0.015
Morale				
If company death rate = 0	0.118	0.084	0.020	0.027
If fraction Union victories = 1	0.108	0.067	0.015	0.034
If both	0.097	0.060	0.022	0.028
Ideology				
If volunteer	0.128	0.091	0.020	0.032
If 86.6% county voted for Lincoln	0.103	0.079	0.015	0.022
If mustered in 1861	0.107	0.066	0.015	0.039
If all of above	0.082	0.054	0.011	0.025

Our summary measure (the first desertion, arrest, or AWOL) is predicted from the second specification in Table IV. All other probabilities are predicted using the specifications in Table V. Predictions are based upon the predicted survival function from the time of muster using the actual data and averaging over the whole sample. In this sample the largest share of the vote Lincoln received in a county was 86.6 percent. Cities with a population of less than 2500 were not even listed in the census and are therefore considered small towns.

and AWOL. Predictions are based upon the predicted survival function from the time of muster, calculated for every individual, and then averaged over the whole sample. In the case of our summary measure of disloyalty and of desertion the single most important variables were age and occupational diversity within the company. In the case of arrests, birthplace and occupational fragmentation, the fraction of Union victories, the percentage of the county voting for Lincoln, and year of muster were the single most important predictors. Birthplace diversity, age diversity, and the fraction of the county voting for Lincoln were the most important predictors of AWOL. On the whole, company socioeconomic and demographic characteristics were the most important

predictors of desertion, arrest, and AWOL and our ideology proxies were relatively more important than our morale proxies.[23] We also examined predicted probabilities for our summary measure of all recruits being literate, native-born, 30-year old, single farmers with personal property wealth equal to the mean plus a half standard deviation. Being literate and a being a farmer were the single most important individual predictors of loyalty, and all of our individual characteristics combined were better predictors of loyalty than our ideology or morale proxies.

Why does the Army today not make greater use of social capital by creating socioeconomic and demographically homogeneous fighting units? Desertion on the modern battlefield is now harder because the battlefield is larger, more congested in the rear with administrative soldiers, and also more leveled by bombing [Keegan 1976, p. 316]. Two additional reasons include diversification and human capital specialization in the modern army. Highly publicized losses to communities during World War II ended any practice of locally based companies. In the modern army, soldiers perform a myriad of tasks requiring different training. In contrast, during the Civil War the job of a soldier was unskilled, largely consisting of learning the movement of linear formations, of obeying orders without hesitation, and of mastering the nine steps of loading a musket and firing in the direction of an enemy hidden by the smoke of the battlefield [Hess 1997, pp. 18–19, 137]. Worker skills were perfect substitutes.

VIII. Conclusion

Why do ordinary soldiers fight when pay is low and when desertion is a choice that many have the opportunity to exercise? Is it the attributes of the person, is it loyalty to a small group of individuals, ideology, or morale? Most sociologists and psychologists have emphasized the importance of loyalty to a small group of individuals. Military historians, however, have reminded us of the importance of a moral crusade in motivating democratic soldiers and of morale in keeping an army from faltering. We have shown that among Union Army soldiers in the Civil War individual socioeconomic and demographic characteristics that proxy for

23. If the Union Army had had the power to construct companies at random, it could not have reduced shirking by following this policy because birthplace, occupational, and age fragmentation would have increased for many companies.

fighting ability, company socioeconomic and demographic characteristics, ideological commitment, and morale were all important determinants of group loyalty. Company socioeconomic and demographic characteristics were particularly important, even more so than ideological commitment and morale in one of our country's more ideological wars. Heterogeneity is an important determinant of participation in organizations today [Alesina and La Ferrara 2000; Costa and Kahn 2003], and it was also an important predictor in a very different environment in the past.

Data Appendix

This appendix describes the construction of our dependent variables, our demographic and socioeconomic variables, our community variables, our ideology variables, and our morale variables. All data on Union Army recruits are obtained from *Aging of Veterans of the Union Army,* Robert W. Fogel, Principal Investigator, http://www.cpe.uchicago.edu.

Dependent Variables

We calculated days from muster until desertion, arrest, or AWOL. We allowed for censoring by also calculating days from muster until death, discharge, changing company, becoming prisoner of war, or missing in action. In examining time until arrest or AWOL individually, we treated men who deserted as censored. First arrests therefore exclude those for desertion, but could be for AWOL, insubordination, theft, sleeping on picket duty, drunkenness, or other infractions. Men who were AWOL illegally extended their leaves or straggled from the company after a battle or during a march. A military court convened in the field determined whether a man deserted. Those determined by the court to have deserted are listed as having deserted from when they were first missing.

Socioeconomic and Demographic Characteristics

1. **Occupation.** Dummy variables indicating whether at enlistment the recruit reported his occupation as farmer, artisan, professional or proprietor, or laborer. Farmers' sons who were not yet farmers in their own right would generally report themselves as farmers.
2. **Birthplace.** Dummy variables indicating whether at en-

listment the recruit reported his birthplace as the United States, Germany, Ireland, Great Britain, or other.

3. **Age at enlistment.** Age at first enlistment.
4. **Height in inches.** Height in inches at first enlistment.
5. **Married in 1860.** This variable is inferred from family member order and age in the 1860 census. This variable was set equal to zero if the recruit was not linked to the 1860 census.
6. **Log (total household personal property) in 1860.** This variable is the sum of personal property wealth of everyone in the recruits' 1860 household. This variable is set equal to zero if the recruit was not linked to the 1860 census.
7. **Missing census information.** A dummy equal to one if the recruit was not linked to the 1860 census. Linkage rates from the military service records to the 1860 census were 57 percent. The main characteristic that predicted linkage failure was foreign birth.
8. **Illiterate.** This variable is from the 1860 census and provides illiteracy information only for those age 20 and older.
9. **Missing illiteracy information.** A dummy equal to one if we do not know whether the recruits were illiterate, either because he was not linked to the 1860 census or because he was less than age 20 in 1860.
10. **Region effects.** Our region dummies are New England, Middle Atlantic, East North Central, West North Central, Border, and West.

Community Characteristics

1. **Birthplace fragmentation.** We calculated, by company, the fraction of individuals born in the United States in New England, in the Middle Atlantic, in the East North Central, in the West North Central, the Border states, the south, and the west and born abroad in Germany, Ireland, Canada, Great Britain, Scandinavia, northwestern Europe (France, Belgium, Luxembourg, the Netherlands), other areas of Europe, and other areas of the world. Our birthplace fragmentation index f_i is then

$$f_i = 1 - \sum_k s_{ki}^2,$$

where k represents the categories and where s_{ki} is the share of men of born in place k in company i.

2. **Occupational fragmentation.** We calculated, by company, the fraction of individuals who were farmers, higher class professionals and proprietors, lower class professionals and proprietors, artisans, higher class laborers, lower class laborers, and unknown. Our occupational fragmentation index is then calculated similarly to our birthplace fragmentation index.
3. **Coefficient of variation for age.** We calculated, by company, the coefficient of variation for age at enlistment.
4. **Population in city of enlistment.** We obtained population in city of enlistment from *Union Army Recruits in White Regiments in the United States, 1861–1865 (ICPSR 9425),* Robert W. Fogel, Stanley L. Engerman, Clayne Pope, and Larry Wimmer, Principal Investigators. Cities that could not be identified were assumed to be cities of population less than 2500.

Ideology Variables

1. **Year of muster.** Dummy variables indicating the year that the soldier was first mustered in.
2. **Volunteer.** A dummy equal to one if the recruit was a volunteer instead of a draftee or a substitute.
3. **Percent of vote in 1860 Presidential election.** We obtained by county of enlistment the fraction of the vote cast for Lincoln and for other candidates from *Electoral Data for Counties in the United States: Presidential and Congressional Races, 1840–1972 (ICPSR 8611),* Jerome M. Clubb, William H. Flanigan, and Nancy H. Zingale, Principal Investigators. Because we cannot attribute a county to each recruit, our categories are percent in county of enlistment voting for Lincoln, other candidate, and unknown.

Morale Variables

1. **Fraction in company dying.** We calculated, by company, the fraction dying overall and the fraction dying (among all men at risk to die) within all half-years that each recruit served. Our means present the fraction dying overall. Our regression results use the time-varying

covariate, fraction of men at risk dying during all half-years that each recruit served.

2. **Fraction of major Union victories.** This is a time-varying variable that indicates for each half-year that the recruit was in the service the fraction of major Union victories to all major battles in that half-year. It takes the value zero if there were no major battles.

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