Work Boots to Combat Boots: Mass Layoffs and Military Enlistment*

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Abstract

Weak local labor market conditions may change the trajectories of young people who expected to find employment immediately after high school. Well-documented responses include increasing educational investments, moving to more prosperous labor markets or reducing labor force attachment. Military enlistment is a channel of potential adjustment that has received less study. Using data on Army recruits, we demonstrate a significant local response in enlistment to mass layoffs, characterized by increased labor supply to the military rather than increased local military recruiting. Our work documents the significance of military employment as an important arm of adjustment to local labor market shocks.

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I. Introduction

It is increasingly recognized that large shocks to local economies generated by uneven exposure to imports or industry-specific technological change may have sustained impacts on local economies (Autor, Dorn, and Hanson, 2013 and 2019; Foote, Grosz, and Stevens, 2019; Austin, Glaeser and Summers, 2018). When local labor markets have experienced declines in economic activity, workers without college degrees have seen the largest adverse effects in terms of declining in employment, wages, and labor force participation, as migration responses tend to be limited, particularly in recent years (Foote, Grosz, and Stevens, 2019; Notowidigo, 2013). For some young people, increased persistence in high school or college may be a viable response to local economic downturns (Foote and Grosz, 2019; Turner, 2019; Greenland and Lopresti, 2016). However, some young people may not find high returns to further educational investments or their local enrollment options may be limited by supply constraints (Turner, 2019).

A potential channel of adjustment which has not received consideration in the research literature is military enlistment.[1] Because the compensation (and commitments) of armed services enlistment do not vary with local labor markets, the relative attractiveness of military compensation, which includes salary, health insurance, and training for a multi-year period, increases when local labor market opportunities decline. Whether – and how – military enlistment adjusts to local labor demand changes is the empirical question addressed in this analysis.

[1] We have reviewed a number of papers examining analyses of employment and participation responses to labor demand shocks, including Autor, Dorn, and Hanson (2013, 2019), Foote, Grosz, and Stevens (2019), and Notowodigdo (2013). We searched for key words such as "enlistment", "military", and "armed forces" and found no references.

Overall, analysis of determinants of military enlistment has occurred independently of the research on local labor market dynamics. The motivating policy concern for the assessment of enlistment behavior follows from the need to staff a volunteer military in the U.S. in the absence of conscription (Warner and Asch, 2001).[2] Studies have estimated enlistment responsiveness to incentives like pay and education benefits (Asch et al., 2010; Simon, Negrusa, and Warner, 2010) and also examined the demographics of those who choose to join the military (Kleykamp, 2006; Carter, Smith, and Wojtaszek, 2017). Other observers have found that geography-based variation in factors like the availability of merit-based college aid and the flow of wartime casualties also influences enlistment at the local level (Barr, 2016; Wojtaszek, 2015; Christensen, 2017).[3]

In this analysis, we estimate the responsiveness of military enlistment to a decline in local labor demand, which we quantify using data collected on mass layoffs, following recent work by Foote, Grosz, and Stevens (2019) and Foote and Grosz (2019). Using data on Army recruits, we demonstrate a significant local response in enlistment to mass layoffs, with a 1 percentage point increase in mass layoffs at the commuting zone (CZ) level increasing enlistment into the Army by 2.83%. As a proportion of the population in the CZ, this response represents an additional 0.18 recruits per 1000 young adults relative to the nationwide average of about 7.5 recruits per 1000 young adults. We show that this enlistment behavior reflects a labor supply response, rather than increased recruitment intensity. Finally, we find that the layoff events have only modest effects on shares (by demographics and education level) of who actually enlists from

[2] See also Asch (2019) for a recent literature review and discussion of current challenges facing US Army recruiting.
[3] Similarly, Borgschulte and Martorell (2018) find that uniformed service members facing a reenlistment choice are sensitive to home-state unemployment rates.

within the CZ, indicating that military enlistment is a local labor market stabilizer rather than a force in changing selection into the military..

The rest of the paper proceeds as follows. First, the next section elaborates on the institutional details and theoretical motivation of the enlistment decision, including the alignment of this study with other analysis of local labor markets. The subsequent section outlines the empirical strategy and the key sources of data on enlistments and labor market variation. Then, we turn to the presentation of empirical results and associated specification checks, with a discussion of questions for future analysis presented in the concluding section.

II. Institutional Background and Motivation

Anecdotal evidence combined with economic theory suggests that interest in joining the military will likely drop in robust economic times and rebound in weak economic times. With the national unemployment rate below 4% in September 2018, a *New York Times* story proclaimed "As Economy Roars, Army Falls Thousands Short of Recruiting Goals." (Phillips, 2018). The All-Volunteer Force of the U.S. military is effectively among the largest employers of young people between the ages of 18-24 as enlisted personnel. Each year, each service branch (Army, Navy, Marines, Air Force) must replenish troop strength conditional on overall manpower requirements. For example, for the Army (the largest service branch), the recruiting target in 2019 for the active component was 68,000. Broadly speaking, manpower demands are tied to geopolitical circumstances and political currents, with Department of Defense personnel spending showing little cyclical variation.

Our underlying premise is that worsening local labor market conditions increase the return to military service, since the compensation does not vary regionally and continued

employment in the military is close to "guaranteed" conditional on meeting basic criteria.[4] Moreover, individuals who serve in the military learn a mix of technical and leadership skills, accrue generous education benefits through the Post-9/11 GI Bill,[5] and potentially develop new friendships and social networks. Thus, leaving home to join the military is a viable and potentially attractive option for a worker who is facing a declining local labor market.

A. Who Enlists?

Participation in the armed forces is not for everyone: not only does selection reflect individual preferences, but the military exercises selection as well. First, some number of young adults fail to meet cognitive, physical and behavioral requirements for enlistment. Recent studies estimate that 71 percent of young Americans between the ages 17-24 are ineligible to join the military due to not meeting standards in one or more of these areas. Health problems and physical fitness are the most prominent reasons disqualifying individuals from military service (Spoehr and Handy, 2018; Mission: Readiness, 2009).[6] Second, among those who have the capacity for enlistment, some will have higher return opportunities with collegiate investment or direct local labor force participation (as one might expect).

Just as the decision to enroll in college is widely modeled as an investment in which individuals weigh the expected costs and returns over a lifetime relative to an outside option, so too is the decision to enlist in the military. Serving in the armed forces inherently entails the potential hazard of facing armed conflict in addition to the requirement to commit to serving at

[4] Military recruits sign up for an initial contract of fixed length, typically 3 or 4 years. A soldier nearing completion of that first contract is typically eligible to sign up for a new term, provided he is in good standing with the military: satisfactory job performance, meeting health and physical conditioning requirements, and avoiding major disciplinary infractions (Murphy, 2019).

[5] See, for instance, Barr (2015) or Castleman, Murphy, and Skimmyhorn (2019).

[6] For popular media coverage of this analysis, see, for instance, "71% of young people are ineligible for the military – and most careers, too," *USA Today*, May 14, 2019. Available at https://www.usatoday.com/story/news/nation/2019/05/14/military-service-most-young-people-dont-qualify-careers/3665840002/

least one contract term (typically 3 or 4 years). Preferences over both the nature of work as well as the level of certainty for continued employment make these features of military life more or less desirable depending upon the individual. Additionally, for all service members, the military offers generous and multi-dimensional compensation, as briefly noted above. Considering cash alone, the average Regular Military Compensation (RMC) – essentially "gross pay" – for enlisted personnel in 2009 was $50,747, which rates at the 90th percentile of comparable civilian wages.[7] As such, we contend that military enlistment is a potentially attractive option for some young adults, perhaps even more so if they are facing a declining local labor market.

B. Local Labor Markets and Youth Decisions

The question of how mass layoffs, trade shocks and the more general place-based decline in employment opportunities impact trajectories of young adults has received increased attention in economic and policy discussions (see, for example, Austin, Glaeser and Summers, 2018). Since the 1980s, local labor demand shocks due to de-industrialization and the decline of manufacturing appear to have produced widening not narrowing in employment and labor market outcomes and opportunities, with adverse impacts most prominent among minorities and non-college degree recipients (Bound and Holzer (2000)). Autor, Dorn and Hanson (2013) find that substantial reductions in manufacturing employment in areas particularly affected by unanticipated changes in the pattern of trade shocks are acute among those with a high school degree or less education, while these shocks have had extended impacts on outcomes like idleness and marriage among young adult men (Autor, Dorn, and Hanson, 2019).

[7] Regular Military Compensation is the sum of base pay (salary), allowances for meals and housing, and the tax advantage resulting from those allowances not being subject to federal income tax. For more information, see The Eleventh Quadrennial Review of Military Compensation, available at https://militarypay.defense.gov/Portals/3/Documents/Reports/11th_QRMC_Main_Report_FINAL.pdf?ver=2016-11-06-160559-590.

Beyond studies examining the wage and employment impacts of local labor demand shocks, a number of recent papers have examined responses in high school persistence and college enrollment (Burga and Turner, 2020; Greenland and Lopresti, 2016; Foote and Grosz, 2019).[8] Burga and Turner (2020) and Tuhkuri (2018), along with Greenland and Lopresti (2016) find clear effects on secondary school persistence and, to a more modest degree, high school persistence of increased import exposure. Yet, such effects – and the supply side of local education markets – may be constrained by the concurrent declines in resources for local education institutions (Feler and Senses, 2017). Most closely related to this work, Foote and Grosz (2019) demonstrate a clear link between community college enrollment and mass layoffs, with community college enrollment increasing by three students within three years for every 100 workers laid off.

Given that military enlistment tends to draw from precisely the group for whom long term prospects are most affected by declines in manufacturing, it is surprising that this channel of adjustment has not received more attention in the research literature. Unlike college enrollment, the structure of compensation in the military explicitly relieves near-term credit constraints. To this end, research like Barr's (2016) analysis of how enlistment declines in response to increased state merit aid provides suggestive evidence that young adults actively weigh the choice among military enlistment, college enrollment and immediate labor force participation. Increases in direct college costs or declines in local labor market opportunities necessarily make military enlistment a more attractive option.

[8] One of the earliest paper to examine the link between local labor market conditions and youth enrollment explicitly is the work of Black, McKinnish and Sanders (2005) who measure how the rise and fall of coal prices in communities in which coal mining is the primary industry affect the high school persistence of youth; more recently, Cascio and Narayan (2019) examine the impact of fracking on youth enrollment and find a somewhat smaller negative effect of the fracking boom on youth dropout rates.

III. Data Description and Empirical Strategy

A. Data Sources

The approach in this paper is to examine the impact of changes in local labor demand represented by mass layoffs on Army enlistment on an annual basis measured at the geographical level of the commuting zone (CZ). The geography of the CZ has been well-established as a representation of a local labor market, with definition following from Tolbert and Sizer (1996) and subsequently used in Autor, Dorn, and Hanson (2013; 2019) and other studies.

We rely on data from two primary sources. First, we use data on mass layoffs – drawn from the Bureau of Labor Statistics (BLS) – as a measure of local labor demand shocks. From 1996-2013, the BLS compiled monthly reports on layoffs as part of the Mass Layoffs Statistics program. Specifically, the BLS observed initial claims for unemployment insurance (UI) made by individuals and marked a mass layoff event when 50 or more such initial claims were made against the same establishment during a consecutive 5-week period; BLS representatives subsequently contacted those establishments to verify that at least 50 workers were separated from their jobs for at least 31 days.[9] We aggregate mass layoff events by year and at the commuting zone (CZ) level, dividing the number of workers laid off by the size of the labor force in order to obtain the share of workers affected by mass layoff events. Data on population counts by age, along with the composition by race and gender at the local level are assembled from the Surveillance, Epidemiology and End Results (SEER) program at the National Cancer Institutes.

[9] The mass layoffs data are available for public use; see https://www.bls.gov/mls/mlsover.htm#uses.

Second, we draw individual-level administrative military data on both active duty Army recruits and midcareer uniformed personnel serving on recruiting duty.[10] For the recruits, these records are a snapshot at entry into the service with counts recorded at the level of the zip code and year. These counts are available for all recruits and for categories defined by race, education and AFQT score. So, we are able to examine the within-CZ distribution of recruits by race or education, but we do not observe the joint distribution.

"Recruiters" are midcareer enlisted personnel, often at the rank of Sergeant or Staff Sergeant, who are assigned to US Army Recruiting Command and have full-time duty recruiting for the Army for a period of two or three years. In contrast to the concentrated stationing of Army personnel who fill large formations at sprawling military bases, recruiting is inherently decentralized, owing to the interpersonal nature of the work and the requirement to interact with the local population. As such, recruiters are stationed in communities across the United States and conduct the actual business of recruiting at 2-3 person stations ("Armed Forces Career Centers"), like what one would find in a strip mall. Crucially, the data on recruiters tie individuals on recruiting duty to a specific recruiting station and therefore to a zip code.[11] As with the mass layoffs data, we aggregate data on both recruits and recruiters by year and CZ, in order to facilitate meaningful analysis of how layoffs impact military enlistment in a local labor market (while also controlling for possible confounding effects of recruiter action - more on this topic in Section IV).

[10] We focus solely on active duty soldiers, who serve in the military full-time and cannot pursue other employment. In contrast, soldiers who serve in the Reserve Component - whether Reserve or National Guard - are by definition part-time, earn significantly lower military wages than full-time soldiers (as one would expect), and therefore are likely to participate in other (civilian) labor markets.

[11] We thank US Army Recruiting Command, especially Wendy Martin, for making these data available under an internal restricted use agreement.

The full analytical sample for this project consists of mass layoff shares, active Army recruits, and Army recruiters from 2006-2011, the years for which all data are available. While it would be ideal to employ a longer panel, military data on enlistments are not available at the fine level of geography before 2006 while the layoff data do not extend to the present. As already mentioned, we aggregate layoff data at the level of year and CZ – resulting in 4,296 observations (716 per year) for which the layoff measures are non-missing across the time period of interest. There are 397,002 recruits who joined the active duty Army across the time period (an average of just over 66,000 per year). 380,259 of those recruits, or 96%, enlisted from a home of record zip code is in one of the commuting zones.

Summary statistics appear in Table 1. As shown in Panel A, across the entirety of the time period, the average value of the layoff variable is 0.0075 in the CZ – meaning that close to 1% of the local labor force was subject to a mass layoff event that year. Not surprisingly, the layoff variable is highest at the peak years of the Great Recession in 2008 (0.0092) and 2009 (0.0135). There is significant variance around this mean (standard deviation = 0.0096). For our purposes, it is important to note that there is substantial residual variation in mass layoff net of year and locality fixed effects.

Young people who enlist in the military are disproportionately high school graduates who are under the age of 21. Military recruits are racially diverse, 17% black and 4% Hispanic. Relative to the population ages 18-24, the typical enlistment rate (into the active duty Army) is about 0.4%, though there is notable variation both over time and across space. Panel B provides details on the active duty Army recruits from the time period. These individuals are predominantly high-school educated white males with AFQT scores in the interquartile range.

These sample characteristics are consistent with data used in other recent studies of active duty Army recruits.[12]

Enlistments are by no means evenly distributed geographically, with some areas differing by more than a factor of 3 in enlistment rates. Enlistments as a share of the working-age population are highest in the south-central, southeast, and northwest United States.[13] We show this pattern in Figure 1.

Because geographies differ in their historical "draw" of recruits, it is natural that the number of recruiters are differentially distributed across geographies. Areas such as Montana, which typically draws 8 recruits per thousand young adults, produce more recruits per capita than New Jersey (about 1 recruit per thousand). The function of recruiters is not only to "recruit" young adults to the military but to also shepherd individuals thru the process of the medical / fitness examinations, answering questions and helping to resolve problems along the way. The average recruiter strength is 7649 per year, with about 10.5 recruiters assigned to each commuting zone (and considerable variance around this mean value). [14]

B. Empirical Strategy

To quantify the effects of mass layoffs on military enlistment, we estimate an OLS model that exploits plausibly exogenous variation from layoffs on the individual's decision to join the

[12] See, for example, Carter, Smith, and Wojtaszek (2017) and Murphy (2019).
[13] As an article in the *New York Times* (Phillips, 2019) notes, "For decades, the Army has relied disproportionately on a crescent shaped swath of country stretching from Virginia through the south to Texas where many military bases are found and many families have traditions of service."
[14] The data on recruiters, provided by US Army Recruiting Command, measure recruiter strength by Recruiting Station and quarter. Since a Recruiting Station is often responsible for multiple zip codes, we allocate – by assumption – the recruiter strength across zip codes uniformly, i.e. – each zip code under a Recruiting Station gets the same fraction of that Station's strength. We then aggregate zip-level recruiter strength to CZ, to match our unit of analysis throughout the paper. Our results (presented in Section IV) are robust to allocating recruiter strength across zip codes by working-age population share of the zip code; see the Online Data Appendix for more details.

military. Our empirical strategy closely follows that in Foote, Grosz, and Stevens (2019) and Foote and Grosz (2019). Our main specification is:

$$y_{zt} = \alpha + \sum_{i=0}^{I} \beta_i * layoff_{z,t-i} + \delta_t + \gamma_z + \varepsilon_{zt} \quad (1)$$

In equation (1), the outcome variable is the log of enlistments from that commuting zone (CZ) and year. We employ two formulations of the dependent variable $y_{z,t}$ considering both the natural log of enlistments (which naturally limits observations to non-zero cases) and the representation as a share with enlistments relative to the population 18-24. Like Foote, Grosz, and Stevens (2019), we allow for lagged response in enlistment to mass layoffs though, to foreshadow, these additional terms are not significant. The key explanatory variable is $layoff_{zt}$, the share of the local labor market as defined by the CZ that was subject to a mass layoff event. Given the functional form of (1), the parameter β represents the percent change in enlistment for a one percentage point increase in the share of the labor force that experienced a mass layoff. ε_{zt} is the disturbance term, while δ_t and γ_z are fixed effects for year and CZ, respectively. These fixed effects control for time-invariant structural features of a given CZ that define the labor market and baseline proclivity for enlistment as well as the year-to-year aggregate variation including changes in military manpower requirements or secular economic changes than may impact enlistment. In additional specifications, we allow for CZ-level trends to capture different local trajectories and we also consider whether the adjustment of Army requirement efforts may impact enlistments, essentially an Army demand side adjustment.

We also estimate a modified version of (1) in which we test whether and how much the mass layoff shock affects the share of enlistments from a given demographic group or aptitude/education level classification. For this analysis, we estimate:

$$s_{ztd} = \alpha + \sum_{i=0}^{I} \beta_i * layoff_{z,t-i} + \delta_t + \gamma_z + \varepsilon_{ztd} \quad (2)$$

where the key explanatory variable and fixed effects are the same as in (1) but the left-hand variable represents the share of enlistments in CZ *z* and year *t* who are from demographic group or aptitude/education level classification d. For instance, we can estimate (2) to test how mass layoffs affect the proportion of individuals with some college (but no degree) who enlist in the Army. Finally, we consider a modest number of alternative sources of variation such as Bartik shocks to labor demand and changes in local oil extraction ("fracking") as corroborating evidence.

IV. Results

A. Responsiveness of Military Enlistment to Mass Layoffs

Increases in the level of mass-layoffs at the level of the local commuting zone (CZ) generate a significant increase in enlistments. Table 2 presents regressions results following equation (1). Specifically, we estimate that a 1 percentage point increase in the share of the labor force that was laid off leads to a 2.83% increase in enlistments, as shown in column 1. Adding lagged values of the layoff share (col. (2)) does not support the presence of lagged impacts, while leaving the main effect virtually unchanged. In addition to the CZ and year fixed effects, we add in column (3) CZ-trends and produce estimated effects which are not significantly different than the baseline (col. (1)) estimates. Using the 2.83% semi-elasticity figure from column (1), the average annual enlistment yield from a CZ is 87 recruits (as shown in Table 1), so the increase from a 1 percentage point increase in layoffs translates to about 2.5 more recruits.

An alternative formulation, presented in the right-side panel of Table 2, shows the linking between the mass layoffs measure and the recruits relative to the local-area population count for young adults. These results tell a consistent story: a 1 percentage point increase in mass layoffs ties to an increase in recruits relative to population of 0.000179 or 0.179 per thousand, which is a

2.4% increase on the baseline ratio of 7.5 per thousand. This formulation affords a somewhat broader base of coverage (approximately 31 more CZ per year) as it does not require non-zero enlistment levels.

B. Enlistment Demographic Shares Analysis

How do the demographic and achievement characteristics of recruits change with mass layoffs? Effectively, we are asking whether the selection of recruits changes in notable ways and we present results in Table 3. First, there appears to be no significant change in gender composition, though men are the overwhelming majority of recruits. Second, while standard errors are relatively large, there does appear to be a relative increase in enlistment among Hispanics.

A related question concerns where in the education and achievement distribution responses are most notable. There is a clear shift from high school graduates toward those with some college among those induced to enlist, as shown in the second column of Table 3. A 1 percentage point increase in mass layoff exposure increases the share of some college (SMC) enlistments by 0.408 x 0.01 = 0.0041. That effect is against a SMC mean share of 0.0467 from summary statistics in Table 1, so roughly a 9% increase. While estimates are somewhat imprecisely estimated, there is little evidence of a change in where recruits are drawn from the AFQT distribution.

For high school graduates, we are able to provide limited additional evidence on how mass layoffs impact the composition of recruits by age. Our data distinguish the counts of high school graduates enlisting before and after age 21. We find that among high school graduates who are over the age of 21, a 1 percentage point increase in mass layoffs increases the number enlisting by 3.90% ($p<0.01$). For those younger than 21, the enlistment response is smaller and

not statistically significant from 0 at conventional levels (see Tables B4 and B5 in the Online Appendix for these supplementary regression results). Taken together with the "some college" finding, these results suggest that a disproportionate share of the impact of mass layoffs accrues to those who are beyond the immediate high school years: either young adults who find their labor force opportunities eroding or college attendees unable to locate strong employment opportunities.

C. Army Demand Effects - Recruiter Presence

A potentially confounding influence is the allocation of Army recruiters, since the business of finding Army recruits (and shepherding them through the enlistment process) is inherently decentralized, as already discussed. While anecdotal evidence would suggest that the Army is a fairly slow moving bureaucracy, whether Army recruiting meaningfully responds to local labor markets presents an empirical question. Thus far, we have found that individuals exposed to a higher share of mass layoffs in the commuting zone are more likely to enlist in the Army, presumably as a rational response to the declining labor market prospects that they face. Our analysis proceeded under the assumption that mass layoffs are reasonably exogenous to the individual's own decision whether to enlist in the US Army. It could be, however, that the Army increased its recruiting presence in the CZ – perhaps seizing upon an opportunity presented by the layoff events or even by chance – and that individuals are actually responding to more concentrated effort by and presumably more contact from recruiters.

We test the "recruiters" hypothesis by re-estimating equation (1) with a measure of recruiter strength by CZ and year as an added covariate. Results appear in columns 4 and 8 of Table 2. The coefficient on mass layoff share remains statistically significant and is virtually unchanged (2.72, $p<0.01$) when we add the recruiter strength data, as in column 4. It is notably

the case that "recruiter strength" nevertheless does tie to enlistment, suggesting that these personnel do influence enlistment behavior. Results are similar when we add recruiter strength to the alternative specification in the right-side pane of Table 2; the coefficient on mass layoff share is practically unchanged, as shown in column 8. Crucially, these results bolster our hypothesis that individuals are in fact responding to local labor market conditions in a downturn rather than recruiter action. Moreover, the analysis strongly suggests that the presence of recruiters is unrelated to recent economic conditions in the local area, which is what one would expect given that the Army typically re-assigns midcareer personnel (like recruiters) only every 2-3 years and most often during the summer months.[15]

D. Corroborating Evidence and Specification Checks

The data on mass layoffs distinguish workers laid off by age, which enabled a test of whether enlistments are more sensitive to layoffs that disproportionately affect young workers. Indeed, we find that layoffs among workers younger than 30 have an impact on enlistment nearly twice the size of the impact of layoffs for those over 30. These results are shown in Online Appendix B8.

Also, in a series of results presented in the Online Appendix tables, we take care to show that our results are not sensitive to the extreme cases such as very large layoff events, along with localities with either historically minimal or substantial flows of young adults to the military. In addition, alternative specifications which produce qualitatively similar results include measurement at the county level of geography and weighting observations by baseline population.

[15] See Army Regulation 614-200 Enlisted Assignments and Utilization Management (available at https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN14314_AR614-200_FINAL.pdf) for details on assignment processes for enlisted personnel. See also Carter and Wozniak (2018) for a related discussion on the prevalence of military moves.

One challenge for our analysis is that available evidence on enlistments is limited to the years 2006 and later, which only allows for the observation of relatively high frequency changes in labor demand rather than measuring changes over longer periods such as the increase in import exposure over two decades employed by Autor, Dorn and Hanson (2019). What is more, our relatively short panel (6 years relative to the nearly 15 years employed by Foote, Grosz and Stevens (2019)) limits our capacity to distinguish local trends from year-to-year changes in mass layoffs. An alternative indicator of labor demand changes is the widely-employed Bartik-style labor demand indicator which generates predicted local labor demand as a function of national industrial employment shifts and baseline employment composition. Following the approach of Austin, Glaeser and Summers (2018), we employ Bartik measures at the PUMA level derived from ACS / Census enumerations as our local labor demand shifters.[16] Table 4 shows that a predicted growth of 10% in employment in the local area based on national industrial employment trends ties to 0.42% decrease in enlistments or a decreases recruits relative to the population ages 18-24 by 0.25 per thousand.

V. Discussion

While recent years have brought increased attention to the sustained and varied impact of local labor market shocks on educational participation and labor force attachment, the role of military enlistment as a local labor market stabilizer has been virtually ignored by economic researchers. This analysis brings new data to this question with the measurement of Army enlistment and recruiter intensity at a relatively fine local level.

[16] PUMAs (Public Use Microdata Areas) are often larger than CZ and are required to contain at least 100,000 people. These geographies are defined by the Census Bureau from the aggregation of census tracts and counties. These are the geographies at which data from the ACS and Census are available to compute the Bartik shift-share measures which are defined as: $\sum_i (\frac{Ei,s,t_0}{E_{s,t_0}})(\frac{E_{i,t+1}^{US\ not\ s} - E_{i,t}^{US\ not\ s}}{E_{i,t}^{US\ not\ s}})$ where $E_{i,s,t0}$ is employment in industry i, location s at baseline and the terms $E_{i,t}^{US\ not\ s}$ indicate employment outside locality s.

The takeaway evidence from this paper is straightforward: the military enlistment channel is sensitive to local economic conditions. Declines in labor demand induce young adults to increase their enlistment behavior. This would seem to be a common-sense result consistent with economic theory: the military provides a guaranteed path of employment and living expenses for at least 3 years, along with benefits including health insurance, training and educational benefits through the GI Bill. The main result of our paper – that a 1 percentage point increase in mass layoffs induces about 0.18 more Army enlistments per thousand young adults – provides important evidence to understand underlying mechanisms of adjustment reflected presented in other research. For instance, Foote, Grosz, and Stevens (2019) estimate that mass layoffs of 1% of the CZ-level working age population reduces the labor force by 0.16 percentage points (i.e. - 1.6 workers out of 1000) with the largest component of this adjustment in out-migration (0.09 percentage points or 0.9 workers per thousand). If we scale up our Army enlistment response estimate by a factor of 2.5 to account for the other service branches (i.e. – Navy, Marines, Air Force),[17] we find that a 1 percentage point increase in mass layoffs induces around 0.45 more enlistments per thousand young adults. Thus, our estimates suggest that military enlistment is likely a substantial share of this reported out-migration, particularly among those in their late teens and early 20s.[18] Moreover, we demonstrate that military enlistment is an important arm of adjustment to local labor market shocks.

An open question is whether there is a case to be made for geographic flexibility in Army recruiting, essentially increasing recruiting intensity in areas experiencing economic downturns

[17] In 2019, the active component recruiting targets for each service were: Army – 68,000; Navy – 44,000; Marines – 38,500; and Air Force – 32.050. The Army therefore accounted for 37.3% of the total armed forces recruiting target.

[18] Consistent with this result, Burga and Turner (2020) show that an increase of $1,000 in per worker import penetration in a CZ is associated with a reduction in the size of the 19-21 age cohort relative to 16-17 year olds of approximately 1.3%. Evidence presented in this paper suggests that some of this outflow is likely accounted for by military enlistment.

and shifting recruiting away from those areas experiencing economic booms. Answers to these questions ultimately depend on the strengthening of the evidentiary base. A particularly important set of unanswered questions include whether those induced to enlist in response to local labor market downturns successfully complete their tours in the military and the extent to which military enlistment for these individuals leads to positive long-term outcomes for these individuals in their initial labor markets or other parts of the country.

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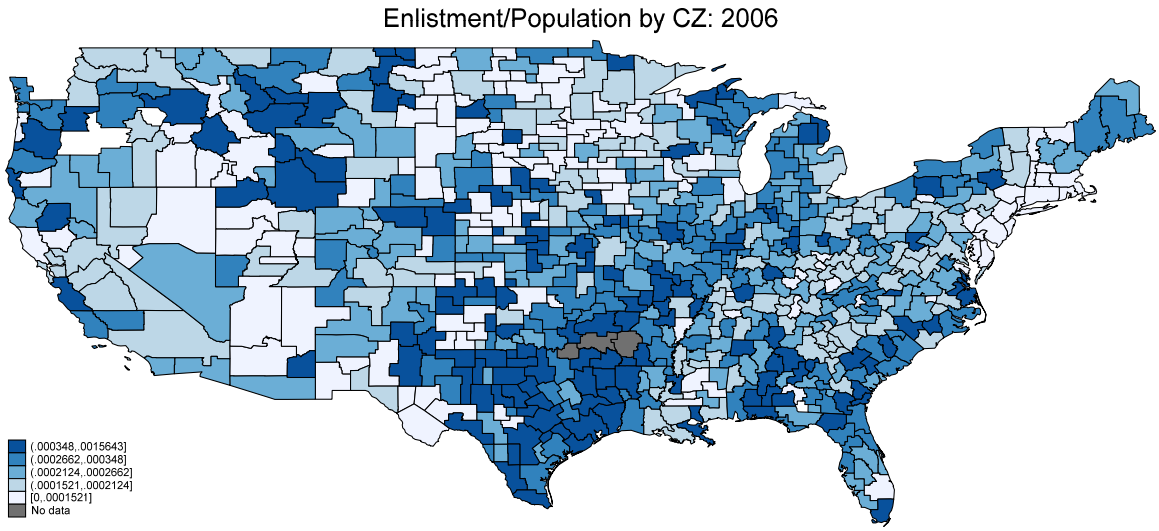
Figure 1: Enlistment/population ratios by commuting zone, 2006 and 2011

Panel A:



Panel B:

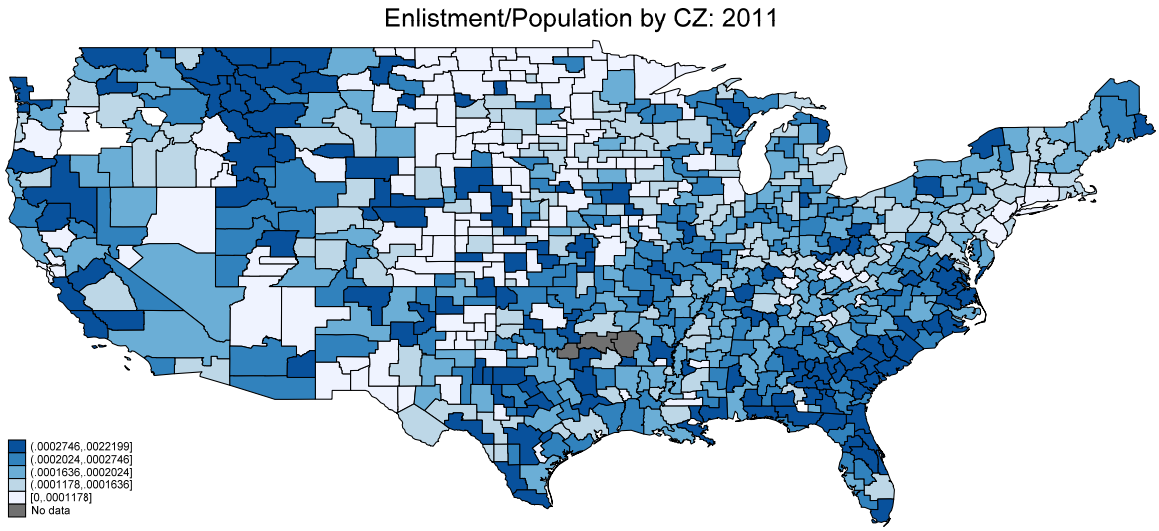


Table 1: Descriptive statistics for mass layoffs and Army enlistments, 2006-2011

A. Layoffs, Enlistments, and Recruiters by Commuting Zone (CZ)

	Layoff Share		Enlistments		Recruiters	
	Mean	SD	Mean	SD	Mean	SD
2006-2011	0.0075	(0.0096)	86.58	(190.1)	10.45	(24.0)
2006	0.0046	(0.0061)	86.95	(182.8)	9.05	(21.0)
2007	0.0048	(0.0063)	81.09	(166.4)	9.19	(21.5)
2008	0.0092	(0.0113)	94.27	(203.2)	11.64	(25.5)
2009	0.0135	(0.0143)	87.79	(193.8)	10.82	(24.9)
2010	0.0067	(0.0069)	90.91	(209.2)	10.83	(24.9)
2011	0.0061	(0.0064)	77.79	(181.2)	11.18	(25.5)
n (2006-11)	4,296	n/a	4,392	n/a	4,392	n/a

B. Characteristics of Enlistees, 2006-2011

Basic Demographics			Education/Aptitude		
	Mean	SD		Mean	SD
Male	0.839	(0.367)	Less than HS	0.010	(0.098)
Female	0.161	(0.367)	HS grad	0.882	(0.323)
White	0.779	(0.415)	Some college	0.047	(0.211)
Black	0.171	(0.377)	College	0.061	(0.239)
Hispanic	0.039	(0.194)	AFQT Q4	0.237	(0.425)
Other	0.011	(0.103)	AFQT Q3	0.376	(0.484)
			AFQT Q2	0.370	(0.483)
			AFQT Q1	0.012	(0.109)
n (2006-11)	397,002	n/a	n (2006-11)	397,002	n/a

Notes: Layoff data are from the Bureau of Labor Statistics (BLS). Data on Army enlistments are from military administrative data. Layoff share data missing for 96 CZ*year. Layoff share is the ratio of mass layoffs in a year to the working age population. Analysis limited to continental United States.

Table 2: Baseline regressions of the impact of mass layoffs on military enlistment, 2006-2011

	Ln Recruits				Recruits Relative to Pop 18-24			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total Exit Share	2.827***	3.223*	2.246*	2.720***	1.790***	1.719	1.591**	1.751***
	(0.925)	(1.609)	(1.264)	(0.921)	(0.631)	(1.081)	(0.756)	(0.627)
Total Exit Share (t-1)		-1.453				2.353		
		(1.512)				(1.737)		
Total Exit Share (t-2)		1.302				-0.242		
		(1.533)				(1.706)		
Recruiting Strength				0.00542***				0.00186***
				(0.001)				(0.001)
2007	-0.0866***		-0.0164	-0.0874***	-0.0293		-0.00808	-0.0295
	(-0.018)		(0.018)	(0.018)	(0.035)		(0.042)	(0.035)
2008	-0.027		0.120***	-0.0416	-0.0317		0.0115	-0.0365
	(-0.030)		(0.027)	(0.030)	(0.035)		(0.041)	(0.036)
2009	-0.0799**	-0.0493**	0.145***	-0.0895***	-0.0515	-0.0291	0.0136	-0.0547*
	(-0.030)	(0.022)	(0.019)	(0.030)	(0.031)	(0.022)	(0.030)	(0.032)
2010	-0.0703**	-0.0384*	0.221***	-0.0806**	-0.048	-0.0341	0.037	-0.0514
	(-0.035)	(0.022)	(0.018)	(0.034)	(0.031)	(0.028)	(0.032)	(0.032)
2011	-0.229***	0.214***	0.130***	-0.242***	-0.0687**	-0.039	0.0374*	-0.0728**
	(0.040)	(0.028)	(0.012)	(0.039)	(0.034)	(0.042)	(0.019)	(0.035)
Constant	3.368***	3.344***	6.612***	3.317***	0.424***	0.384***	0.248***	0.407***
	(0.025)	(0.025)	(0.011)	(0.024)	(0.024)	(0.015)	(0.023)	(0.020)
Observations	4,122	2,745	4,122	4,122	4,308	2,872	4,308	4,308
R-squared	0.057	0.084	0.977	0.061	0.003	0.003	0.523	0.003
CZ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ Trend	No	No	Yes	No	No	No	Yes	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: See text for data description. Total Exit Share is the ratio of mass layoffs in a year to the working age population. In the right-side panel, the dependent variable equals total recruits divided by 18-24 population, multiplied by 100.

Table 3: Effects of mass layoffs on composition of recruits by demographic group, 2006-2011

Demographic Group	Coefficient	Education/Achievement Group	Coefficient
Male	-0.018	Less Than HS	0.121
	(0.263)		(0.073)
White	-0.496	HS Grad	-0.809***
	(0.334)		(0.248)
Black	0.435	Some College	0.408**
	(0.309)		(0.198)
Hispanic	0.153**	College Grad	0.28
	(0.073)		(0.178)
HSG, Age <21	0.096	AFQT Q1	0.043
	(0.427)		(0.073)
		AFQT Q2	-0.216
			(0.478)
		AFQT Q3	-0.461
			(0.346)
		AFQT Q4	0.633
			(0.407)

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Each coefficient represents a separate regression where the share of CZ-level enlistees in a particular group is the outcome variable and the indicated coefficient is the parameter on the mass layoff share in a regression that also includes CZ and year fixed effects. Standard errors are clustered at the state level.

Table 4: Estimates of the effects of Bartik labor demand shocks on Army enlistment, 2006-2016

VARIABLES	Ln Recruits (1)	Ln Recruits (2)	Share Recruits (3)	Share Recruits (4)
Bartik Shock	-4.213***	-4.213**	-2.516***	-2.516*
	(0.690)	(1.666)	(0.353)	(1.277)
2007	-0.208***	-0.208***	-0.115***	-0.115***
	(0.021)	(0.053)	(0.011)	(0.041)
2008	0.0129	0.0129	-0.00209	-0.00209
	(0.010)	(0.030)	(0.005)	(0.022)
2009	-0.309***	-0.309**	-0.177***	-0.177
	(0.053)	(0.143)	(0.028)	(0.111)
2010	-0.177***	-0.177	-0.0897***	-0.0897
	(0.036)	(0.108)	(0.019)	(0.088)
2011	-0.237***	-0.237***	-0.0868***	-0.0868
	(0.021)	(0.069)	(0.011)	(0.052)
2012	-0.203***	-0.203***	-0.0482***	-0.0482
	(0.016)	(0.060)	(0.009)	(0.041)
2013	-0.0662***	-0.0662	0.0186*	0.0186
	(0.018)	(0.059)	(0.011)	(0.048)
2014	-0.277***	-0.277***	-0.0609***	-0.0609
	(0.016)	(0.060)	(0.008)	(0.037)
2015	-0.315***	-0.315***	-0.0786***	-0.0786*
	(0.017)	(0.062)	(0.009)	(0.039)
2016	-0.286***	-0.286***	-0.0764***	-0.0764
	(0.019)	(0.065)	(0.011)	(0.048)
Constant	6.356***	6.356***	0.482***	0.482***
	(0.027)	(0.077)	(0.014)	(0.059)
Observations	11,693	11,693	11,693	11,693
R-squared	0.289	0.289	0.146	0.146
Number of PUMA	1,063	1,063	1,063	1,063
PUMA FE	Yes	Yes	Yes	Yes
Cluster SE PUMA	Yes	No	Yes	No
Cluster SE State	No	Yes	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Bartik shock estimates follow from Austin, Glaeser, and Summers (2018).

Work Boots to Combat Boots: Mass Layoffs and Military Enlistment

Francis X. Murphy, Dalton Ruh, and Sarah Turner

January 2020

ONLINE APPENDICES

Appendix A: Data description

This appendix describes the data used in this project and explains the process of crafting our final sample. The sample used in for this paper combines data from two major sources. First, we use military administrative data provided by the U.S. Army. Second, we use data from the Bureau of Labor Statistics (BLS), which was cleaned and provided by Foote, Grosz, and Stevens (2019) and Foote and Grosz (2019).

Part I: Military Administrative Data

The outcome variables in this paper derive from a confidential set of data on the number of military recruits by zip-code and by year, provided by the United States Army. The data include the years 2006-2011. In addition to the total number of recruits per zip-code per year, the military data also afford us the ability to break down the effects by demographics. The data include the number of recruits in a series of demographics, such as race, education level, age, and Armed Forces Qualification Test (AFQT) quartile. For a small number of zip-codes, the raw 2006-2011 panel exhibits missing observation due to instances where there are zero recruits in a given zip-code/year. In these cases, we opt to populate these years with zero total recruits.

With our main specification using log recruits as the dependent variable, Commuting Zones (CZs) with zero recruits present an issue. However, relatively few commuting zones ever have years with zero total recruits. Out of 4,392 total observations in the Army data (732 CZs and 6 years), 212 have zero recruits and are therefore "missing" from our log specification. To

combat this, we present another specification with share recruits as the outcome variable, where share recruits is total recruits over the total 18-24 population in a given CZ. The Surveillance, Epidemiology and End Results (SEER) program at the National Cancer Institute provides the specific age-population data at the county-level; we aggregate this to the CZ-level using the U.S. Department of Housing and Urban Development's (HUD) zip code to county crosswalk.

Our recruiting strength robustness check also uses administrative data provided by the U.S. Army. This dataset includes the average number of recruiters per year in a Recruiting Station (hereafter, RSID). The Army's Recruiting Command Headquarters also provided an RSID to zip-code crosswalk. As discussed in the main body of the paper, we employ a uniformity assumption when aggregating the number of recruiters from recruiting station to zip code, where for RSIDs that fall into multiple zip codes, we assume uniformity in the distribution of recruiters per zip code. For example, if an RSID serves two different zip codes, we allocate half of the recruiting strength to one zip code, and half to the other. To test the robustness of this assumption, we repeat the analysis by allocating recruiters from RSID to zip code according to zip code population. Population data at the zip code level was obtained from the 2010 U.S. Census, and therefore, we use a baseline 2010 population when allocating recruitment strength.

Part II: Data on Local Labor Markets

We utilize the layoff data from the Bureau of Labor Statistics (BLS), which was cleaned and provided by Foote, Grosz, and Stevens (2019) and Foote and Grosz (2019), and merge to our military data. This data is native at the county-level, and is also provided by the authors at the CZ-level. The main variable of interest in this dataset is total exit share, which is the share of all employed individuals in a CZ that were laid off in a given year. We merge our military data to

the layoff data by employing David Dorn's zip code to CZ crosswalk. The raw zip-code-level recruitment values are then aggregated to the CZ-level.

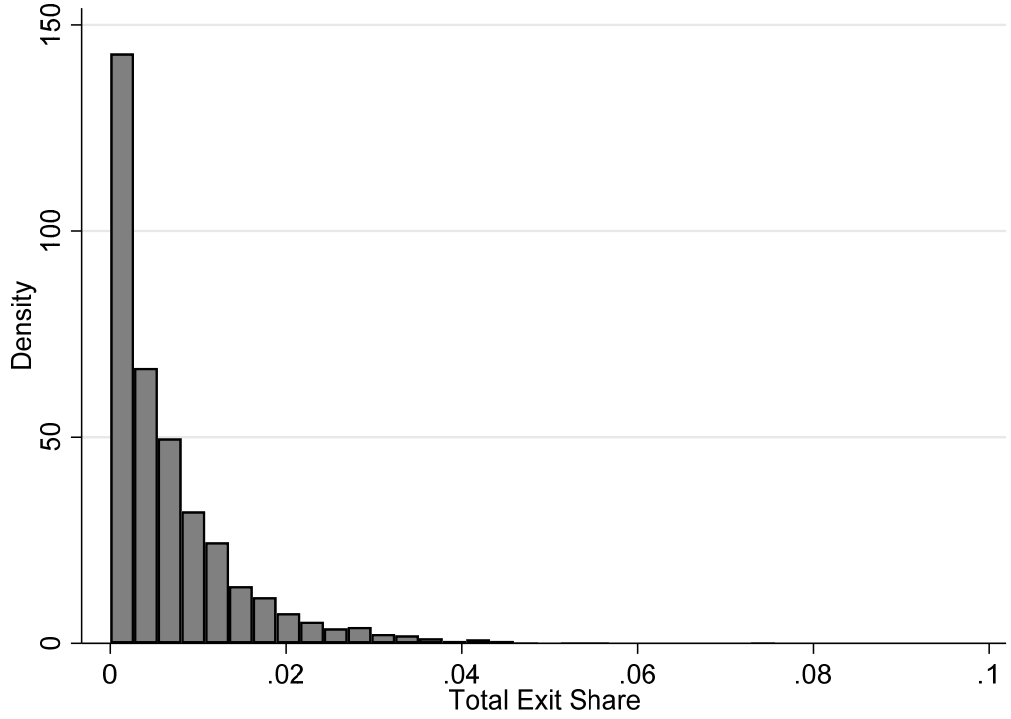
Outside of our main sample, we recreate samples at different geographical levels, specifically at (1) the county-level to mirror the analysis in Foote, Grosz, and Stevens (2019), and at (2) the Public Use Micro-Data (PUMA) level to test robustness by using by Bartik shocks as the explanatory variable. For (1), we use the BLS data at the county-level, in addition to the military data aggregated from the zip-code-level to the county-level through the HUD's zip-code to county crosswalk. For (2), we aggregate the data to the PUMA-level, with the assistance of crosswalks from Peter McHenry and IPUMS. In addition, we use the data from data from Austin, Glaeser, and Summers (2019) for Bartik shocks at the PUMA-level. These authors also provide state and region classifications, which we utilize in our main specification in order to include state trends.

Lastly, we use data from other papers for demographic characteristics, which allows us test for heterogeneity of effects in our main specification. Feyrer, Mancur, and Sacerdote (2017) provide CZ level economic characteristics, which we use for data on wages and employment. Autor, Dorn, and Hanson (2018) provide CZ level demographic characteristics, which we use for information on manufacturing composition and fraction of college educated individuals. We merge these samples by CZ to our final sample.

We remain grateful to all authors listed in this appendix who shared their data with us in support of this project.

Appendix B: Additional figure and regression results

Figure B1: Share of working-age population subject to mass layoff events, 2006-2011.



Notes: The figure depicts mass layoff (total exit) shares across a set of 716 commuting zones with 6 years each, for a total of 4,296 observations. The horizontal axis measures the share of total workers in a CZ that exit the workforce due to mass layoff events. This histogram contains 36 bins with a width of 0.0027. Source: Bureau of Labor Statistics data.

Table B1: Estimates of the effect of mass layoffs on enlistment accounting for recruiter intensity, 2006-2011

VARIABLES	Ln Recruits (1)	Ln Recruits (2)	Ln Recruits (3)	Recruiting Strength (4)
Total Exit Share	2.827***	2.720***	2.745**	19.76
	(0.925)	(0.921)	(1.317)	(21.59)
Recruiting Strength		0.00542***	0.00287**	
		(0.001)	(0.001)	
Recruiting Strength (t-1)			-0.000233	
			(0.001)	
Recruiting Strength (t-2)			0.00140**	
			(0.001)	
2007	-0.0866***	-0.0874***		0.135
	(0.018)	(0.018)		(0.108)
2008	-0.0270	-0.0416		2.694***
	(0.030)	(0.030)		(0.437)
2009	-0.0799**	-0.0895***	-0.0505**	1.780***
	(0.030)	(0.030)	(0.020)	(0.257)
2010	-0.0703**	-0.0806**	-0.0470**	1.902***
	(0.035)	(0.035)	(0.020)	(0.307)
2011	-0.229***	-0.242***	-0.208***	2.320***
	(0.040)	(0.039)	(0.026)	(0.400)
Constant	3.368***	3.317***	3.300***	9.552***
	(0.025)	(0.024)	(0.030)	(0.266)
Observations	4,122	4,122	2,745	4,122
R-squared	0.057	0.061	0.084	0.080
Number of CZ	718	718	717	718
CZ FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Recruiting strength indicates the number of Army recruiters present in a CZ in a given year. Source: U.S. Army.

Table B2: Estimates of the effect of mass layoffs on enlistment accounting for recruiter intensity (without uniformity assumption), 2006-2011

VARIABLES	(1) Log Recruits	(2) Log Recruits	(3) Log Recruits	(4) Recruiting Strength
Total Exit Share	2.827***	2.726***	2.751**	19.05
	(0.925)	(0.920)	(1.316)	(21.68)
Recruiting Strength		0.00532***	0.00284**	
		(0.001)	(0.001)	
Recruiting Strength (t-1)			-0.000240	
			(0.001)	
Recruiting Strength (t-2)			0.00141**	
			(0.001)	
2007	-0.0866***	-0.0873***		0.124
	(0.018)	(0.018)		(0.108)
2008	-0.0270	-0.0413		2.684***
	(0.030)	(0.030)		(0.440)
2009	-0.0799**	-0.0895***	-0.0506**	1.800***
	(0.030)	(0.030)	(0.020)	(0.256)
2010	-0.0703**	-0.0805**	-0.0470**	1.910***
	(0.035)	(0.035)	(0.020)	(0.303)
2011	-0.229***	-0.242***	-0.208***	2.319***
	(0.040)	(0.039)	(0.026)	(0.395)
Constant	3.368***	3.317***	3.301***	9.570***
	(0.025)	(0.024)	(0.028)	(0.264)
Observations	4,122	4,122	2,745	4,122
R-squared	0.057	0.061	0.084	0.077
Number of CZ	718	718	717	718
CZ FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: These specifications mirror those in Table B1. The difference here is that recruiters are allocated from RSID to zip-code by a baseline 2010 zip-code population, rather than through our uniformity assumption. We obtained the 2010 population data from the U.S. Census. These results, which are essentially identical to those in Table 2, confirm the validity of our assumption and the robustness of our findings.

Table B3: Main specification with trimmed outliers, 2006-2011

VARIABLES	(1) Trim Bottom 2% CZs by Population	(2) Trim Top 2% CZs by Layoff Share	(3) Trim Top 2% CZs by Enlist/Pop
Total Exit Share	2.826***	3.344**	2.879***
	(0.928)	(1.627)	(0.936)
2007	-0.0866***	-0.0888***	-0.0873***
	(0.0179)	(0.0183)	(0.0180)
2008	-0.0272	-0.0297	-0.0297
	(0.0299)	(0.0314)	(0.0297)
2009	-0.0812***	-0.0851***	-0.0841***
	(0.0299)	(0.0302)	(0.0295)
2010	-0.0719**	-0.0734**	-0.0740**
	(0.0347)	(0.0357)	(0.0347)
2011	-0.230***	-0.232***	-0.232***
	(0.0395)	(0.0400)	(0.0394)
Constant	3.372***	3.365***	3.349***
	(0.0247)	(0.0257)	(0.0248)
Observations	4,122	4,039	4,042
R-squared	0.057	0.057	0.057
CZ FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes
State Trend	No	No	No
CZ Trend	No	No	No
Balanced Panel	No	No	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: The specifications here are identical to the left-side panel of our main specification (Table 2), with ln recruits as the dependent variable. Here, we present three sets of coefficients that are a result of trimming outliers from our data, to confirm that our results are not being driven by a select few commuting zones. In (1), we trim according to the CZ population in the Bureau of Labor Statistics Data. In (2) we trim according to our layoff share variable. In (3), we trim according to our share recruits measure, which is total recruits per CZ per year, divided by the 18-24-year-old CZ population.

Table B4: Estimates of the effect of mass layoffs on enlistment of high school grads equal to or younger than 21 years old, 2006-2011

VARIABLES	(1) Ln HS Grads <21	(2) Ln HS Grads <21	(3) Ln HS Grads <21
Total Exit Share	1.976	0.891	2.671
	(1.384)	(1.475)	(1.748)
Total Exit Share (t-1)		0.323	-0.321
		(1.088)	(1.273)
Total Exit Share (t-2)			3.228**
			(1.375)
2007	-0.131***		
	(0.0181)		
2008	-0.0850***	0.0507**	
	(0.0215)	(0.0200)	
2009	-0.146***	-0.00841	-0.0674***
	(0.0238)	(0.0239)	(0.0236)
2010	-0.109***	0.0214	-0.0356
	(0.0220)	(0.0230)	(0.0260)
2011	-0.237***	-0.107***	-0.183***
	(0.0216)	(0.0215)	(0.0244)
Constant	2.994***	2.874***	2.900***
	(0.0148)	(0.0141)	(0.0231)
Observations	4,009	3,333	2,665
R-squared	0.044	0.028	0.043
Number of CZ	713	712	709
CZ FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Our high school graduate demographic category is further split up into two categories: high school graduates who are less than 21 years old when they enlist in the military, and high school graduates who are greater than or equal to 21 years old at the time of enlistment. These variables separate those who enlist straight out of high school, and those who are likely to be leaving the labor force to enlist in the military. Appendix Tables B4 and B5 exhibit the full results of our main specification with these age break demographics as the dependent variables.

Table B5: Estimates of the effect of mass layoffs on enlistment of high school grads greater than 21 years old, 2006-2011

VARIABLES	(1) Ln HS Grads >21	(2) Ln HS Grads >21	(3) Ln HS Grads >21
Total Exit Share	3.902***	4.356***	4.082**
	(1.285)	(1.360)	(1.652)
Total Exit Share (t-1)		0.108	-0.799
		(1.500)	(1.541)
Total Exit Share (t-2)			-2.180
			(2.036)
2007	0.000949		
	(0.0205)		
2008	0.0961***	0.0954***	
	(0.0227)	(0.0233)	
2009	-0.0698***	-0.0731**	-0.162***
	(0.0260)	(0.0284)	(0.0244)
2010	-0.0549**	-0.0581**	-0.133***
	(0.0243)	(0.0286)	(0.0294)
2011	-0.286***	-0.287***	-0.361***
	(0.0250)	(0.0251)	(0.0298)
Constant	2.431***	2.428***	2.547***
	(0.0161)	(0.0196)	(0.0295)
Observations	3,689	3,076	2,452
R-squared	0.096	0.116	0.156
Number of CZ	698	691	686
CZ FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table B6: Baseline regressions of the impact of mass layoffs on military enlistment, weighted by population aged 18-24, 2006-2011

	Log Recruits				Recruits Relative to Pop 18-24			
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total Exit Share	4.485**	4.966***	-0.377	2.969**	1.068**	1.230***	0.0899	0.763***
	(2.181)	(1.229)	(0.868)	(1.149)	(0.475)	(0.365)	(0.238)	(0.260)
Total Exit Share (t-1)		2.935**				0.639**		
		(1.270)				(0.294)		
Total Exit Share (t-2)		4.288**				1.000*		
		(1.902)				(0.535)		
Recruiting Strength				0.00211***				0.000425***
				(0.001)				(0.00007)
2007	-0.0792***		-0.0325*	-0.0823***	-0.0176***		-0.00465	-0.0183***
	(0.015)		(0.019)	(0.014)	(0.003)		(0.003)	(0.003)
2008	0.0577**		0.172***	0.0379	0.0157**		0.0459***	0.0118
	(0.025)		(0.021)	(0.027)	(0.007)		(0.006)	(0.007)
2009	-0.0166	-0.0906***	0.167***	-0.0299	-0.00824	-0.0278***	0.0394***	-0.0109
	(0.033)	(0.016)	(0.017)	(0.033)	(0.008)	(0.005)	(0.004)	(0.009)
2010	0.044	-0.0604***	0.241***	0.0212	0.0081	-0.0180***	0.0622***	0.00352
	(0.032)	(0.021)	(0.013)	(0.030)	(0.009)	(0.006)	(0.004)	(0.009)
2011	-0.107***	-0.213***	0.132***	-0.136***	-0.0300***	-0.0566***	0.0362***	-0.0356***
	(0.035)	(0.024)	(0.011)	(0.033)	(0.009)	(0.008)	(0.002)	(0.0092)
Constant	5.639***	5.648***	6.616***	5.512***	0.252***	0.256***	0.244***	0.227***
	(0.023)	(0.037)	(0.011)	(0.032)	(0.006)	(0.010)	(0.002)	(0.006)
Observations	4,122	2,745	4,122	4,122	4,308	2,872	4,308	4,308
R-squared	0.193	0.291	0.994	0.220	0.132	0.209	0.916	0.144
CZ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CZ Trend	No	No	Yes	No	No	No	Yes	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Regressions weighted by military age population (18-24 years old). Population data obtained from SEER at county-level and aggregated to the CZ-level. These specifications are similar to those in Table 2 of the main body, with the only addition being population weights. In the right-side panel, the dependent variable equals total recruits divided by 18-24 population, multiplied by 100.

Table B7: County-level estimates of the effect of mass layoffs on enlistments, 2006-2011

VARIABLES	Share Recruits (1)	Share Recruits (2)	Share Recruits (3)	Share Recruits (4)
Total Exit Share	0.499*	0.418	0.558	0.687***
	(0.258)	(0.280)	(0.340)	(0.248)
Total Exit Share (t-1)		0.287	0.316	
		(0.271)	(0.307)	
Total Exit Share (t-2)			0.525	
			(0.411)	
2007	-0.0203**			-0.0146***
	(0.009)			(0.003)
2008	0.00417	0.0249***		0.0155**
	(0.012)	(0.007)		(0.006)
2009	-0.0201	-0.000384	-0.0260***	-0.00324
	(0.012)	(0.010)	(0.008)	(0.007)
2010	-0.0111	0.00683	-0.0204	0.0098
	(0.015)	(0.014)	(0.013)	(0.008)
2011	-0.0659***	-0.0460***	-0.0751***	-0.0240***
	(0.016)	(0.014)	(0.015)	(0.009)
Constant	0.358***	0.337***	0.358***	0.221***
	(0.010)	(0.008)	(0.008)	(0.005)
Observations	18,336	15,280	12,224	18,198
R-squared	0.011	0.013	0.018	0.048
County FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes
Pop 2006 Weighted	No	No	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Share recruits equals total recruits divided by total 18-24 population, multiplied by 100. Population data obtained from SEER.

Table B8: Estimates of the effect of age-group mass layoffs on enlistments, 2006-2011

VARIABLES	(1) Ln Recruits	(2) Ln Recruits	(3) Ln Recruits	(4) Ln Recruits
Under 30 Exit Share	16.33***			
	(5.369)			
30-44 Exit Share		8.041***		
		(2.586)		
45-54 Exit Share			8.964***	
			(2.956)	
Over 55 Exit Share				9.567**
				(4.594)
2007	-0.0868***	-0.0870***	-0.0867***	-0.0864***
	(0.0179)	(0.0179)	(0.0179)	(0.0179)
2008	-0.0292	-0.0269	-0.0251	-0.0220
	(0.0301)	(0.0298)	(0.0298)	(0.0299)
2009	-0.0818**	-0.0794**	-0.0768**	-0.0717**
	(0.0306)	(0.0302)	(0.0302)	(0.0305)
2010	-0.0734**	-0.0694*	-0.0686*	-0.0694*
	(0.0345)	(0.0348)	(0.0348)	(0.0348)
2011	-0.232***	-0.229***	-0.228***	-0.230***
	(0.0393)	(0.0397)	(0.0398)	(0.0395)
Constant	3.368***	3.369***	3.370***	3.373***
	(0.0247)	(0.0247)	(0.0246)	(0.0246)
Observations	4,122	4,122	4,122	4,122
R-squared	0.057	0.057	0.057	0.056
Number of CZ	718	718	718	718
CZ FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
State Cluster SE	Yes	Yes	Yes	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Age group exit shares are the total number of layoffs in a given age group, divided by the total number of individuals in the labor force (denominator the same for each).