Enlist or Enroll:

Credit Constraints, College Aid, and the Military Enlistment Margin

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Abstract

Money for education consistently ranks among the top answers recruits give when asked why they joined the military. A potential explanation for the prevalence of this enlistment motivation is that the actual value of veteran education benefits exceeds the expected net present value for individuals who want to attend college but face borrowing constraints. Theory predicts that only constrained individuals will respond differently to a change in costs depending on the resources available at the time of the change. Costs that accrue during a period of lower resources place a greater strain on credit-constrained individuals who are unable to borrow from future earnings to finance them. A policy that reduces the cost of immediate (lower resources) and post-enlistment (higher resources) college enrollment should result in a reduction in the enlistment of college-prepared individuals only if these constraints are present. I explore this question by examining the enlistment response of individuals to additional financial aid that can be used immediately upon high-school graduation or delayed until after military enlistment. I find that the introduction of a merit-aid program decreases the probability that a male enlists in the military by .6 percentage points (a six percent reduction), and that these effects are concentrated among applicants that are more likely to qualify for merit scholarships. These effects are located mainly in low-income areas, supporting the argument that the effects on enlistment are a result of easing financial constraints. A back of the envelope calculation suggests that between 15 and 25 percent of merit-aid eligible likely recruits face constraints.

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1 Introduction

Millions of high school students graduating each year face a choice between joining the labor market or continuing to invest in education. While the labor market return to a college degree has continued to grow, there is a concern that the high real and perceived costs of college enrollment for youth from low-income families may lead to a suboptimal level of investment. In particular, financial constraints are likely to be meaningful for individuals in low-income rural areas. As one avenue to overcome these constraints, individuals from these areas may be motivated to join the military in order to access the benefits from the GI Bill and other military financial aid. I focus on the enlistment vs. enrollment decision in order to explore the importance of borrowing constraints in the college enrollment decision of recent high-school graduates.

The military may help individuals overcome barriers to enrollment. At 3.2 million employees, the Department of Defense is the United States' and the world's largest employer, with 1.4 million individuals on active duty in the military and over 800,000 in reserve components; nearly ten percent of males will serve before turning thirty. Unlike most other options available to those coming of age, the military provides a variety of generous education benefits in return for an individual's service. These benefits consistently rank among the top two reasons provided when individuals explain their motivations for joining the military.[1]

Recruits are disproportionally drawn from the second and third lowest income quintiles, areas of the income distribution that mainly lie just outside the ranges in which individuals are eligible for large amounts of non-military financial aid.[2] Thus, many recruits live in relatively low-income households without access to the primary need-based financial aid program provided by the federal government. These individuals may then enlist in the military because they are incapable of financing college without access to

[1] The other motivation is job training.

[2] During the 1999-2000 school year, only 19% of dependents with family incomes in this range were Pell recipients. Nearly 60% of dependents with lower family incomes received a Pell grant (author's calculations using the 2000 National Postsecondary Student Aid Study (NPSAS)).

military education benefits. One respondent to a 1998 Youth Attitude Tracking Study noted, "I'm sorry . . . I can't afford [college for my children]. . . So I'm going to have at least two children gone to the Army" (Lehnus 2000). Another stated "I would have liked [my son] to go straight to college. . . He wants to have some sort of medical career. . . [But] we're not even a middle-class family. . . Money is an issue. . . the biggest idea of going in the Navy. . . was college money."

These anecdotes are supported by Table 1, which separates individuals' motivations for enlisting by their ability to pay yearly school and living expenses out of family earnings and savings. Among those able to pay 50-100% of college expenses, only 25% list education benefits as a motivation for joining the military. In contrast, among those able to pay between 1-49% or none, over 40% and 86%, respectively, list education benefits as a motivation.[3] Although the evidence on the presence of meaningful credit constraints in educational settings is inconclusive, recent work suggesting that credit constraints have become increasingly important over the last few decades furthers the concern that some individuals are enlisting in the military because they simply cannot afford to enroll in college otherwise (Lochner and Monge-Naranjo 2011).

While a substantial amount of work has been done to test for the presence of credit constraints in human capital investment decisions, much of it is focused on the relationship between family income and college enrollment and thus suffers from endogeneity concerns. Building on intuition developed in Cameron and Taber (2004), I present a new test relying on the differential effect of changes in immediate and delayed benefits for constrained and unconstrained individuals. I leverage a series of financial aid shocks, provided by the introduction of 14 broad-based merit aid programs over 12 years, to identify the effect of changing financial aid conditions on the decision to enlist. As individuals in almost all states are explicitly allowed to delay receipt of merit aid for a number of years if they entered the active-duty military, these programs increased (1) the value of enrolling

[3]The pattern for the response "Duty to Country" as a motivation for serving is a mirror image, with individuals who are able to pay for their schooling substantially more likely to indicate patriotism as a motivation for joining.

directly after high school and (2) the value of enlisting in the military and then enrolling.[4] While the increase in the value of enrolling directly may be slightly larger due to discounting, the return to both options increased by a similar amount.[5] Absent meaningful borrowing constraints, theory and prior empirical evidence on the response to education subsidies would predict a minor response to the small subsidy generated by discounting. In contrast, an observable shift in enlistment would suggest that constraints play an important role in the college enrollment decision of these individuals.

I use the American Community Survey (ACS) to illustrate that merit-aid introduction does have an effect on the decision to enlist and that among male potential recruits this effect is concentrated among individuals most likely to be eligible for merit aid (non-Hispanic white individuals). These effects suggest that constraints play an important role in the enrollment decision for some recent high-school graduates. Using a dataset of all military applications and contracts between 1990 and 2004, I show that the effects are concentrated among higher ability recruits, those more likely to be eligible for merit aid. Finally, I link the detailed recruit data with local area median household income information in order to investigate whether the effects are concentrated in areas with individuals who are more likely to be constrained. I find evidence that this is the case, supporting the argument that some enlistments (at least during the 1990s and early 2000s) were motivated by credit constraints that prevented immediate college enrollment.

In the next section, I provide an overview of the prior work on military enlistment, post-secondary investment, and credit constraints. In Section 3, I provide background information on the recruits and merit aid programs. Section 4 sets up a model that generates the predictions to be tested, Section 5 outlines the data, and Section 6 sets up the relevant tests. Section 7 presents the results, and Section 8 provides further discussion and concludes.

[4]The ability to delay merit-aid receipt in Arkansas is unclear; all results are robust to the exclusion of Arkansas from the analysis, which is done implicitly for regressions for the 1995-2004 period as Arkansas had a merit-aid program for this entire period.

[5]Furthermore, several programs cover "full tuition"; therefore, increases in the size of the merit award may outpace this discounting.

2 The Intersection of Enlistment, Enrollment, and Aid

While there are established strands of research literature on the transition to college and the decision to enlist, researchers have largely ignored the intersection of the two. With the exception of a handful of papers that examine changing veteran education benefits (Angrist 1993; Angrist and Chen 2011; Barr 2013; Bound and Turner 2002; Stanley 2003; Lemieux and Card 2001), research on the enrollment process largely ignores the military. Similarly, research that attempts to disentangle the factors that affect military enlistment largely ignores changes in the cost of many potential recruits' most likely outside option: college.[6] Obtaining money for college is one of the biggest motivations for enlistment. In the early 1990s, 33% of those with plans to join the military mentioned money for education as a motivation for enlisting.[7] The predominant form of benefits provided through enlistment take the form of post-service conditional cash transfers with the Montgomery GI Bill being the primary aid vehicle over this period. As military education benefits are set at the national level, the few studies that attempt to identify them are forced to use the variation over time in benefit levels.[8]

However, there is no work of which I am aware that considers the effect of changes in non-military forms of financial aid on enlistment. Understanding this effect is particularly important if individuals join the military primarily because they cannot afford college. The existing evidence on the importance of credit constraints in the college-going decision is mixed. Early work examining the relationship between family income and college enrollment in the 1980s found little evidence of credit constraints (Cameron and Heckman 1998, 1999; Carneiro and Heckman 2002). In a clever study, Cameron and Taber (2004)

[6] Instead the literature tends to focus on changes in military compensation, recruiting practices, and local labor market conditions (Brown 1985; Orvis and Asch 2001; Warner, Simon, and Payne 2003; Asch, Heaton, and Savych 2009).

[7] Author's calculations using the 1991-1994 versions of Youth Attitude Tracking Study (YATS), a survey on enlistment interest and motivations conducted on behalf of the Department of Defense. This fraction appears to have grown over time.

[8] For example, a study by Warner, Payne, and Simon (1999) suggests the importance of the changing generosity of military education benefits (including the GI Bill) in driving changes in recruiting, finding that an increase in the level of education benefits of one percent results in a .2 percent increase in high quality accessions.

compared changes in the direct (ease of access) and delayed (earnings) costs and benefits of education, arguing that the effects should be equivalent in the absence of credit constraints. They found no evidence to suggest that credit constraints played an important role. However, work focusing on more recent cohorts of individuals demonstrates a stronger relationship between family income and enrollment (Belley and Lochner 2007). While the relationship between income and college enrollment is suggestive, researchers have noted that there may be other explanations for this correlation (Lochner and Monge-Naranjo 2011). In one of the only attempts to leverage an exogenous change in family resources, Lovenheim (2011) finds significant effects of changes in housing equity on college enrollment; these effects are particularly pronounced for low-income families.

Studies using data from single institutions are also mixed. Stinebrickner and Stinebrickner (2008) draw on a direct survey at a tuition-free institution in Kentucky to argue that credit constraints play a limited role in the dropout decisions of individuals already in college. In contrast, Rothstein and Rouse (2008) use the adoption of a no loan policy to argue that credit constraints play an important role in student occupational choice and alumni donations at an elite private university. In sum, the evidence on the importance of credit constraints in higher education settings is inconclusive.[9]

3 Recruits and Merit Aid

Roughly 90% of active duty recruits have at least a high-school diploma and the average and median AFQT scores have remained around 60, better than 60% of the population (Table 2). Thus, on average, recruits are more educated and score higher than the median young adult. Furthermore, nearly fifty percent of those with active-duty service obtained a high-school GPA over 2.5 and twenty-four percent over 3.0, suggesting that many recruits are qualified for post-secondary education.[10]

[9] Results from more recent structural models of lifecycle behavior are also mixed (see Lochner and Monge-Naranjo 2011 for an overview).

[10] Author's calculations using the 1997 NLSY.

While many potential recruits are academically prepared for college, they are also more likely to face constraints due to lower income, and often rural, backgrounds. The poorest and richest quintiles of neighborhoods are underrepresented among military recruits, while the middle three are overrepresented; nearly 65% of late 1990s recruits lived in neighborhoods with median incomes between $29,382 and $52,068, ranges with limited eligibility for federal need-based financial aid (Kane 2006).[11] Thus, while many recruits appear academically prepared for college, they may not have the finances to enroll.

The introduction of state-run merit aid programs may have eased financial constraints for these individuals by reducing the immediate cost of college.[12] These programs have become increasingly prevalent over the last two decades with 14 states introducing a broad-based merit aid program between 1991 and 2004.[13] With the exception of Maryland, which only had a program for one year, all of the programs studied remained implemented throughout the remaining sample period.

Eligibility for merit aid frequently depends on obtaining a high-school GPA of a 3.0 or, less commonly, a 2.5. During the sample window, merit aid programs provided between $1,000 and $4,000 per year, generally somewhat less than the approximately $4,000 per year provided by the primary military education benefit over this time period (Montgomery GI Bill).[14] In practice, eligibility and benefit levels for the Montgomery GI Bill (MGIB) are not affected by merit aid receipt. Similarly, all but one state merit aid statute enacted during the sample period has provisions explicitly allowing those that

[11] For the 1999-2000 school year, only 30% of dependent students from households with incomes between $30,000 and $39,999, 12% of those from households with incomes between $40,000 and $49,999, and 3% of those in the $50,000-$59,999 received any level of Pell grant (author's calculations using 2000 NPSAS).

[12] While much of the previous merit aid literature has found positive effects of state merit aid programs on enrollment, the evidence on attainment is mixed and sometimes even negative (Cornwell et al 2006; Dynarski 2000, 2003, 2008; Fitzpatrick and Jones 2012; Sjoquist and Winters 2012).

[13] Arkansas (1991), Florida (1997), Georgia (1993), Kentucky (1999), Louisiana (1998), Maryland (2003), Michigan (2000), Mississippi (1996), Nevada (2000), New Mexico (1997), South Carolina (1998), South Dakota (2004), Tennessee (2004), and West Virginia (2002). See the data appendix, Table A6, and Fitzpatrick and Jones (2012) or Sjoquist and Winters (2012) for more information on the merit aid programs and the distribution of pre and post merit aid cohorts.

[14] The Army College Fund and similar programs across services played an important role in increasing the size of Montgomery GI Bill (MGIB) payments somewhat during this time period. These education benefit bonuses were provided using objective measures of occupation, term of enlistment, and recruit quality set at the national level (Warner, Simon, and Payne 2003).

enlist upon graduation to delay receipt of merit aid for three or more years.[15] Similarly, the MGIB is excluded from income on the FAFSA and thus will not affect Pell grant eligibility. Thus, the introduction of a merit-aid program raises the value of both immediate and delayed (after enlistment) college enrollment; the following sections use this feature to develop a test for the presence of financial constraints.

4 Setting up the Test

The paper's estimation strategy relies on the hypothesis that the availability of merit aid should have very little effect on the military enlistment decisions of unconstrained individuals. Here, I present a relatively simple three-period model to illustrate that the introduction of merit aid results in a tiny relative subsidy to military enlistment for unconstrained individuals, but a potentially large one for those facing constraints. This argument relies on the notion that unconstrained individuals are affected similarly by changes in the direct and delayed costs of college, while constrained individuals are affected more by changes in direct costs, an idea first developed by Cameron and Taber (2004). While they compare the effects of changes in college availability (direct) and wage premiums (delayed), I compare the effect of an immediate (direct) and post-enlistment (delayed) college subsidy.

Under free borrowing and saving, the introduction of merit aid provides a small relative increase in the lifetime income of individuals that choose to enroll in college immediately, relative to those that delay enrollment to enlist in the military. Due to discounting, the delay in merit aid receipt among those that enlist results in a slightly smaller subsidy than for those that enroll immediately. As individuals are able to borrow and save freely, both types of individuals will smooth the increase in consumption across

[15] Most states statutes indicate that those enlisting within a year after graduation may delay initial merit aid receipt until one year after separation as long as this occurs within five to six years after high school graduation. Other states have no requirement on using the benefits within a certain time period after graduation. The rules outlining the Arkansas program are unclear (full details from author's review of all relevant merit aid statutes available upon request).

periods. In contrast, under the presence of credit constraints individuals are not capable of smoothing consumption across periods. For those that are constrained, the marginal return to an increase in resources during immediate college enrollment will be substantially larger than the return to an increase in the resources available for post-enlistment enrollment. Therefore, we should only observe a decrease in military enlistment if financial constraints are present.

In order to see the principles underlying this test, consider a merit aid eligible individual graduating from high school. This individual chooses between working in the civilian sector (W), going to college immediately (C), and enlisting and then going to college (EC).[16] An individual then chooses the best option from the following choice set: {V(W), V(C) , V(EC)}, where the lifetime stream of utility is given by:

$$V(\cdot) = u(c_1) + \beta u(c_2) + \beta^2 u(c_3)$$

Agents are endowed with a certain amount of resources W, and are able to borrow and save b freely across periods. Agents entering the labor market immediately following high school receive a fixed wage w in all periods. For simplicity below, I have dropped the period subscripts for wages. Agents can choose to go to college in the first period or enlist in the military and then go to college. Agents that go to college pay costs of attendance τ while in school, but receive a higher wage $w^c > w$ in the labor market in the following periods. The return to college is increasing in ability $w^c = f(a)w$ where $f'(a) > 0$. Agents that enlist in the military and then go to college also receive financial aid from the military in period two $MGIB$. This leads to the following expressions for consumption along each path prior to the introduction of merit aid:

[16] Empirically, nearly all (approximately 95%) individuals with a 3.0 GPA or higher that enlist in the military attend college within 6 years of initial enlistment, thus I ignore the option to enlist and never enroll.

	$\mathbf{c_1}$	$\mathbf{c_2}$	$\mathbf{c_3}$
W	$W + w + b_1$	$w - (1+r)b_1 + b_2$	$w - (1+r)b_2$
C	$W + b_1 - \tau$	$w^c - (1+r)b_1 + b_2$	$w^c - (1+r)b_2$
EC	$W + w^m + b_1$	$b_2 - (1+r)b_1 - \tau + MGIB$	$w^c - (1+r)b_2$

Introducing merit aid to the above setup merely reduces the cost of attendance τ for individuals with high enough ability to be eligible for merit-aid $\tau' = \tau - Aid \cdot 1(a > a^m)$. So, ignoring general equilibrium effects for the moment, lower-ability individuals are not directly affected by the introduction of a merit aid program.

Turning to higher-ability individuals, the value of entering the labor market directly is unaffected. The value of enrolling immediately $V(C)$ is increased by the effect of a reduction in the cost of attendance. Individuals are free to borrow and save freely across periods, so the increase in lifetime utility is driven by optimally spreading the additional income across periods. Similarly, the value of enlisting and then enrolling $V(EC)$ rises through an increase in lifetime income. As the merit aid comes later, we must discount it; however, under reasonable sets of assumptions, the implied difference in the increase in lifetime income for $V(C)$ and $V(EC)$ is less than \$300 per expected year of merit aid receipt.[17] This relative change is equivalent to offering a few hundred dollar increase in lifetime income (per year of expected schooling) for individuals to choose immediate college enrollment rather than enlisting and enrolling. Consequently, if individuals act as life-cycle agents and have access to credit, there is little reason to expect the introduction of merit aid to bring about observable decreases in enlistment.[18]

In contrast, the presence of credit constraints or high levels of debt aversion may distort agent optimization. Consider a binding upper bound on borrowing in period one $\bar{b}$.

[17] Assuming an interest rate of .05 and a standard three year enlistment, lifetime income for individuals that enlist and enroll is increased by 86% of the increase for those that enroll immediately. However, in most cases the award is increased over time or set to cover full tuition. As tuition increases have outpaced the nominal interest rate over this period, this is likely an upward bound for the subsidy effect.

[18] However, increases in the value of enrolling $V(C)$ and enrolling and enlisting $V(EC)$ will increase the relative value of these options in relation to entering the workforce immediately, potentially resulting in increases in enlistment. This biases against finding a negative effect on enlistment.

This constraint drives a wedge between marginal utility across periods. Faced with lower levels of period one consumption (and utility) under the college option, individuals may choose $V(EC)$ since the military affords individuals an opportunity to save money and provides them access to a number of education benefit programs. The size of this distortion depends on the quantity of individuals whose optimal first period borrowing b_1^* is greater than $\bar{b}$. Wealthier individuals are less likely to face these constraints as it is not necessary for them to borrow to smooth consumption across periods.

Under the presence of credit constraints, the availability of merit aid affects the value of enrolling $V(C)$ and enlisting and then enrolling $V(EC)$ differently; this is because merit aid is available in period one under the path of immediate enrollment and not until period two if an individual enlists and then enrolls. As suggested above, ceteris paribus, recent high school graduates likely have substantially fewer resources than young veterans with several years of income and access to military education benefits. Under standard assumptions on utility functions, lower first period consumption implies that the marginal utility of an increase in consumption is greater in period one than period two. Therefore, under the presence of credit constraints, we are likely to observe a decrease in military enlistment as agents substitute towards immediate college enrollment.

Consistent with previous models, unconstrained investment in education is independent of wealth W, while constrained investment is increasing in wealth; this prediction is central to most prior tests of the presence of credit constraints which regress enrollment on family income (Lochner and Monge-Naranjo 2011). Extending the underlying logic one step further, the effect of merit-aid introduction on enlistment should be increasing in wealth only if individuals are constrained.

The stylized model abstracts from several important considerations in the college-going decision related to child and parent preferences and the nature of higher education costs and benefits. In particular, the simplified model excludes the potential non-pecuniary benefit of schooling; this exclusion invalidates standard tests of credit constraints that rely

on the relationship between family resources (e.g., income or wealth) and enrollment. Under the standard Beckerian model, allowing families or individuals with greater resources to prefer additional education (due to different preferences or because education is a consumption good), leads optimal enrollment to be increasing in resources in the absence of credit constraints; clearly, this is a fatal flaw for a test that relies on a positive correlation between resources and enrollment to infer credit constraints.

In contrast, consider incorporating a consumption value of schooling in the utility function in the simple model presented here. Unlike in the standard Beckerian model, we are interested in the relative effect on the lifetime stream of utility under two different cases where the decision is about *when* to go to college and not whether to go.[19] In order for the test presented here to be invalidated, it would have to be the case that the *effect of an increase in income on the non-pecuniary value of education is much higher in period one than in period two.* While it is likely the case that the non-pecuniary value of college is higher in period one (e.g., because an individual is surrounded by same-age individuals) it is not clear why a small increase in lifetime income would cause the non-pecuniary value in period one to rise by a substantially larger amount than the non-pecuniary value in period two. It is even more difficult to understand this possibility when one considers that the income generated by the merit aid provision is tiny relative to the stream of lifetime income.

5 Data

My primary data sources are the American Community Survey (ACS) and individual level data on military recruit applications and contracts. The ACS is a nationally representative one percent sample of the population conducted each year. I use data from the 2006 through 2011 samples of the ACS. Importantly, these surveys include active-duty military living in military housing in the sampled population.[20] The ACS contains

[19] Under the prediction that drives the standard resource-enrollment correlation, an individual is deciding between more or less education, not the timing.

[20] Prior to 2006, the ACS did not survey group quarters and thus are missing some active-duty military individuals. I also present a robustness check including the 2000 Census. Results are further robust to inclusion of the 2001-2005

information on military veteran and active-duty status in addition to state of birth, state of residence, and an array of demographic variables. I use the veteran and active-duty status variables to construct my binary outcome variable indicating whether an individual was ever in the military. I restrict the sample to individuals aged 24 to 35.[21]

Complementary analyses that examine effects on the composition of recruits rely on individual level data on military recruit applications and contracts from 1990-2004 obtained via a number of FOIA requests to the Defense Manpower Data Center.[22] These data indicate both the date of the application (or contract) and the five or three-digit zip code of the home of the individual applying.[23] I use this to construct the year and state in which the individual applied and contracted into the military. They also contain the educational background of the potential recruit as well as AFQT scores, a piece of information that I do not observe in the ACS. I use these attainment and ability measures to help proxy for likelihood of eligibility for merit aid.[24] A further advantage of these data (and the paper's focus on the military) is the presence of detailed geographic information on the location of each recruit. I am able to use this to proxy for the likelihood of constraints and test whether enlistment effects are concentrated in lower income areas.[25]

ACS samples.

[21]Most individuals enlisting during the 1990s enlisted by the age of 24. The maximum age is equal to the maximum treated age in the sample.

[22]I thank Garret Christensen for providing me with the earlier portion (1990-2000) of my recruiting data.

[23]From 1990-2000 the data contain the 5-digit zip code. From 2001 forward, the data contain only the 3-digit zip code.

[24]One limitation of the data is the absence of basic demographic variables such as age, race, and gender.

[25]I link the data (1990-2000), at the 5 digit zip code level, to median household income levels. Further details of the construction of each dataset, the dates of merit-aid implementation, and the determination of delayed aid eligibility for enlistees are contained in the data appendix.

6 Estimation Strategy

In order to investigate the effect of changing financial aid conditions on the decision to enlist, I estimate the following equation[26]:

$$E_{ist} = \beta_1 X_{ist} + \beta_2 Z_{st} + \alpha_s + \lambda_t + \gamma_1 Aid_{st} + \epsilon_{ist} \quad (1)$$

Here, E_{ist} indicates whether individual i born in state s and aged 17 at time t has ever served in the military, and X_{ist} refers to observed traits of that individual, including age, sex, and race.[27] In Z_{st}, I control for changing state-level characteristics including the cohort size and economic conditions (state unemployment rate) faced by an individual in state s at the time t that that individual was 17. The terms α_s and λ_t are fixed effects for each state of birth and year, respectively. The Aid_{st} variable is an indicator equal to one if an individual was born in a state which had a merit aid program when that individual was age 17. The parameter of interest, γ_1, identifies the effect of the presence of a merit aid program on an individual's propensity to enlist.[28]

The key identifying assumption is that there were no other changes taking place at the same time as merit-aid introduction that may have affected military enlistment. While I cannot test this assumption directly, I include a large set of demographic and state level time-varying controls that may be important in the enlistment process. In particular, indicators for age, sex, and race control for changes in the composition of individuals within a state, and cohort size and the state unemployment rate control for changes in the likelihood of being accepted into college and/or the military as well as local economic conditions that may lower the opportunity cost of enlistment or proxy for the resources

[26] While I mainly present estimates from linear probability models, all results are robust to the use of probit or logit specifications.

[27] I use age 17 because this is the age at which an individual can sign an enlistment contract. Furthermore, this places the marginal cohort in the control group and thus should bias me against finding an effect. Results are similar using the presence of a merit aid program at age 18 or excluding the marginal cohorts.

[28] Ideally, I could leverage variation in eligibility across states. Unfortunately, as far as I know there are no data that provide sufficient samples of likely recruits and the associated necessary variables to produce meaningful predictions of eligibility at the state level.

available for college enrollment.[29] I also explore the presence of pre-existing trends in military enlistment that would suggest that something else may be driving any observed effect. Finally, I use proxies for eligibility to: (1) compare the effects among groups with different likelihoods of being treated, and (2) to set up a number of falsification tests for similar groups that are ineligible. I address additional threats to internal validity below.

In order to account for intra-group correlation, I cluster the standard errors at the state of birth (Bertrand, Duflo, Mullainathan 2004).[30] Given the stronger military presence in the South, the different demographic composition, and the fact that most broad merit aid programs were introduced in the South, I present additional estimates focusing on this subset of programs and using only other Southern states as control states.[31]

As Table 2 illustrates, the Southern states and the Southern merit aid states have much higher proportions of black individuals and lower median household incomes than the rest of the country. While using the full sample of states provides an estimate of the average effect on an individual of this type of program, the southern merit-aid programs and associated control states are likely more similar. As the identification strategy relies on the control states contributing to the identification of the counterfactual enlistment patterns, I view these estimates as the most credible. I present a final set of estimates using only the differential timing of program introduction within Southern merit aid states to identify the merit aid effect on joining the military. I estimate these basic specifications with individual-level data from the ACS.

Eligibility, particularly for likely recruits, varies substantially by race.[32] As illustrated

[29] In the appendix I also present results from a triple-difference specification that flexibly controls for state-year changes using state-year fixed effects (Table A4).

[30] The standard errors are robust to using a clustered bootstrap approach.

[31] There is suggestive evidence that access and use of credit may have been substantially lower in the South during this time period (Hogarth and O'Donnell 2000).

[32] Prior merit aid work (discussed above) finds mixed evidence of differential effects by race with some evidence that minorities were more likely to be affected by the implementation of later merit aid programs. However, the effects in the general population may differ dramatically from the effects of those on the enlistment-enrollment margin for several reasons, including the fact that the eligibility of likely black male recruits is substantially lower than the eligibility of blacks in the general population. This is not the case for white males. Furthermore, there is evidence that minorities drawn into college by the merit aid programs were substantially more likely to drop out. This may have resulted in delayed rather than avoided enlistment.

in Figure 1, the GPAs of Southern black males with military experience are substantially lower than those of Southern white males during the late 1990s. While only 10% of Southern black male veterans obtained GPAs of 3.0 or greater, nearly 28% of Southern white male veterans did.[33] These results are confirmed for likely recruits in Table 3.[34] I split the sample by race with the expectation of larger effects among white males.

I also use administrative recruiting data on the log of state-level counts of military recruit applications and contracts.[35] While the data do not contain information on the state in which an individual attended high school, most individuals enter the military before the age of 24 and thus are likely to enlist in the state in which they attended high school. However, just as there will be some degree of measurement error in assuming an individual's state of birth is the same as that individual's state of high school attendance, there will be some measurement error here.[36]

A reduction in military labor supply will not necessarily result in fewer total recruits. If military labor demand is relatively inelastic (and there is a good reason to believe that it is, as evidenced by recruiting goals) then we may observe little change in the overall number of individuals enlisting. Recruiters may substitute older recruits or transplants from other states for those affected by the introduction of merit aid; either strategy would work against finding an effect using yearly recruit totals.[37]

As the introduction of merit aid will only directly effect eligible individuals, a magnified response among higher-ability individuals would be consistent with aid availability driving the results. To see this, I use the additional count data containing abilities (AFQT) to compare the response among individuals more and less likely to be

[33]These figures are biased upwards somewhat as they are for those that completed high school; this bias is likely larger for blacks as their high school completion rates are lower.

[34]The YATS question refers to the listed grade ranges out of 100. During this time period, the first two ranges correspond to the ranges for an A and B respectively in most Southern states.

[35]I construct these counts by linking three-digit zip codes with states. Five of the nearly 1,000 three-digit zip codes cross state lines. In this case, I assign the three-digit zip code to the state that contains the majority of the population in the zip code.

[36]Dynarski (2008) and Sjoquist and Winters (2012) find no evidence that this type of measurement error is substantial or that it meaningfully affects their results.

[37]This could also occur through a reduction in recruiting standards or an increase in recruiting resources (advertising, bonuses, etc.).

affected by changing aid eligibility. While AFQT scores do not translate directly into GPA, they are positively correlated (Figure 2). I use this positive correlation to separate the application and contract data into groups more or less likely to be affected by the changing availability of merit aid. I estimate the basic specification in equation (1) using log recruits separately by AFQT category (31-50, 51-70, and 71-99), with the expectation of larger effects among the two categories containing individuals with scores above the median. Panel B of Figure 2 illustrates that only 20-30% of those with AFQT scores between 31 and 50 have a GPA at or above 3.0, but over 40% of those with an AFQT score between 71-99 meet the requirement.[38] However, from Panel A, we see that a sizable fraction of Southern males with low AFQT scores obtained GPAs in excess of a 3.0. Thus, while we might expect to see larger effects on the number of high AFQT scoring recruits, there may be some effect on low-scoring individuals as well.

We can try to get a back of the envelope estimate of anticipated effect sizes using the YATS data. We can create a rough proxy for constraints using the ability to pay for college variable (see Table 1); for our purposes we will assume that an individual is constrained if the individual can pay for no more than 50% of yearly schooling and living expenses. We can proxy for merit-aid eligibility using information on high-school grades (see Table 3); we will assume that an individual is merit-aid eligible if he or she gets grades in either the top two or top three categories. Assuming that the provision of merit-aid fully removes constraints for all eligible individuals, we can generate an a priori estimate of effect sizes. For individuals predicted to have high AFQT scores (50 or above), back of the envelope calculations using the two different grade eligibility assumptions suggest effect sizes of .05 or .08 (i.e., between five and eight percent of high-quality recruits will not enlist once merit-aid is available).[39] We can use these predictions as a framework to interpret the reasonableness of the estimates on high quality recruits presented below (Table 8).

[38]This expected effect may be attenuated by the AFQT and resource relationship which moves in the opposite direction. If resources are a proxy for the likelihood of financial constraints, then we may not see larger effects at high AFQT levels.

[39]These estimates fall to .03 to .05 if we assume an individual is constrained only if they can pay at most 49% of college costs. Full details of calculations available from author upon request.

7 Effect of Changing Financial Aid Conditions on Enlistment

Estimates from my basic specification indicate that changing merit aid availability affects the likelihood that an individual ever joins the military (Table 4), showing the importance of college costs and opportunities and suggesting that credit constraints are meaningful for this group. I present results over two periods with the years specified corresponding to the year in which an individual was 17. The first period, 1987-2004, includes the introduction of fourteen merit aid programs.[40] There is some concern that the military drawdown of the early 1990s may have differentially affected enlistment propensities of individuals in different states (Kleykamp 2010). Because of this, I also estimate specifications using the shorter window from 1995-2004, excluding the years in which recruiting was dramatically affected by force reductions.

As there is variation in program features, I follow Sjoquist and Winters (2012) in presenting a separate set of results for the "strong" merit aid programs that provide generous aid packages and broad eligibility.[41] For both the strong and inclusive measures of merit aid, I find statistically significant and substantial effects of changing financial aid conditions on an individual's propensity to serve in the military. Results for the full set of states are robust across sample periods. Restricting to Southern states, where most merit aid programs were located, the presence of a merit aid program reduces an individual's propensity to have enlisted by .003, or five percent of the mean enlistment rate of .06. Results from the Southern merit aid only sample of states, which identifies the effect only from differential timing in the introduction of programs, are somewhat smaller and less precise but still suggest that changing financial aid conditions affect an individual's decision to enlist. Appendix Table A1 demonstrates that the average marginal effects from

[40] The last age-17 cohort year in the sample is 2004 as this is the last cohort year in the sample based on the lower bound age restriction of 24.

[41] These programs are broad in terms of eligibility (at least 30% of high school students) and provide relatively large awards and include the programs introduced in Florida (1997), Georgia (1993), Kentucky (1999), Louisiana (1998), Nevada (2000), New Mexico (1997), South Carolina (1998), Tennessee (2004), and West Virginia (2002). See Sjoquist and Winters (2012). "Inclusive" includes all broad merit-aid programs.

probit estimation are quite similar.[42]

Combining the reduction in enlistment with the percentage of these individuals that are likely to be eligible for merit-aid (20-30 percent) indicates that between 15 and 25 percent of merit aid-eligible potential recruits over this time period were constrained. Thus, a sizeable fraction of high aptitude individuals are enlisting in the military due to borrowing constraints. While there are very few estimates of the percentage of a particular population that is constrained, this fraction is similar to the fraction (20%) of low-income students that indicated a desire for additional loan availability at tuition-free Berea college (Stinebrickner and Stinebrickner 2008).

Restricting the sample to individuals with less than a high-school degree, a population ineligible for merit aid, serves as an initial falsification check. The estimates from this exercise are all small and statistically indistinguishable from zero (Table A2). I present additional robustness checks below after focusing the analysis on those most likely to be affected by merit-aid introduction.[43]

7.1 Demographic Heterogeneity

I restrict the analysis to men as they are far more likely to enter the military.[44] In Table 5, the estimated impact of merit aid eligibility is .5 to .6 percentage points for males, over six percent of baseline enlistment. This result is robust across samples, time frames, and measures of merit aid. As discussed above, existing patterns observed in the grade point averages of Southern potential recruits make it substantially more likely that white males will be affected by the changes in financial aid. Indeed, white males are strongly affected with estimates in the Southern merit aid only states indicating that the

[42] All linear probability estimates in the paper are robust to using Logit or Probit estimation; these estimates are excluded from the paper due to space constraints.

[43] Estimates of the effect of the merit aid programs on the proportion of individuals' with any military service that remain in the military (i.e., equation (1) with $E_{ist} = Active_{ist}$ and the sample restricted to those who ever served in the military) suggest that the programs have resulted in individuals more likely to remain in the military enlisting. This is consistent with the rest of the evidence that those interested in joining the military for a short duration to obtain GI Bill funds are less likely to join following the introduction of merit aid.

[44] Estimates for females are small and consistently indistinguishable from zero, but very low military participation rates makes it difficult to rule out sizeable percentage effects.

introduction of merit aid decreased the probability of military service by nearly a percentage point, a ten percent reduction. In contrast, the estimated effect on black males is frequently positive.[45] While this is initially surprising, it is important to remember that enlistment is determined by both supply and demand factors. As military labor demand is relatively inelastic (even within states), it is not surprising that the composition of recruits may change as factors affecting labor supply differentially affect different groups. As demonstrated in Figure 1 and Table 3 and discussed above, black male potential recruits are less likely to be eligible for merit aid.[46]

7.2 Additional Robustness Checks and Event Study Analysis

Focusing on the group most affected by the financial aid changes, I conduct a number of falsification exercises to test the validity of the results. In addition to presenting results over two time periods and two definitions of broad-based merit aid, I conduct a leave-one-out procedure. I estimate the basic merit aid effect holding each merit aid program out of the estimation in turn. These results are presented in Table A3; estimates for white males are consistently between .7 and 1 percentage points indicating that a single state is not driving the results.

I also conduct an event study analysis to examine the degree to which pre-existing trends are driving the results. Figure 3 plots the γ_k from the following specification for white males:

$$E_{ist} = \beta_1 X_{ist} + \beta_2 Z_{st} + \alpha_s + \lambda_t + \sum_k \gamma_k D^k_{st} + \epsilon_{ist} \quad (2)$$

[45] There is a statistically significant negative coefficient in column (1). One potential explanation for this disparity is that blacks in non-Southern states are arguably a worse control group for those in the predominantly Southern merit aid states. While inconclusive, a comparison of black characteristics across states suggests this may be the case.

[46] It is possible that military recruiters, driven by relatively stringent recruiting targets, are forced to substitute lower GPA recruits for those with higher GPAs who are now able to enroll in college.

I include indicator variables D_{st}^k which take on the value of one if state s at time t is k years removed from the last cohort ineligible for merit aid. In other words, if an individual was 17 in Florida in 1998 (one year after merit aid implementation), $D_{st}^1 = 1$ and $D_{st}^k = 0$ $\forall k \neq 1$. Thus, if k is positive, γ_k provides some measure of the effect of merit aid on cohorts k years after the introduction of the program. Examining γ_k when k is negative, or before the introduction of the program, illustrates any pre-existing trends in military enlistment in states that adopted merit aid programs.

Panels A and B of Figure 3 suggest no pre-existing trend in military enlistment prior to the adoption of merit aid. Following the introduction of aid, we observe a drop in the propensity that an individual has been in the military using both measures of broad based merit aid. As there are very few state-year cohorts further than ten years from the adoption of merit aid in the sample, the estimates move more erratically over these ranges. In Panels C and D, I limit the window to eight years before or after the introduction of merit aid. Here, we can see more clearly the reduction in military service that occurs following the introduction of merit aid. As in Panels A and B, there is no evidence that the propensity to serve was falling prior to the introduction of these programs.[47] As might be expected if the military responds to recruiting shortfalls by increasing effort, these effects appear to fade out after five to six years.[48]

7.3 Recruiting Results and Heterogeneity by Ability

Using the administrative military recruiting data, I further probe the composition of the effect. I begin with an attempt to confirm the overall results in Tables 4 and 5. It is important to keep in mind that the detailed recruit data includes only enlisted individuals and that I cannot restrict the sample to recruits who attended high school in the state in which they are recruited as this information is not in the data. Furthermore, I do not observe the age of recruits, so the degree that recruiters are able to replace younger

[47] Figure A1 provides similar figures with estimates obtained after restricting the sample to Southern states.
[48] This fadeout will bias my estimates toward zero.

merit-aid eligible recruits with older ineligible individuals will dampen the estimated effect. Despite these differences from the ACS specifications, I find similar results (Table 6).[49] The introduction of a merit aid program results in a 2-5% reduction in total contracts.[50] This result is similar, but slightly smaller than the effect found in the ACS data.[51] As I cannot identify state of birth, state of high school attendance, or age in the military data, there are several potential explanations for this difference.[52] The magnitude of the effects on total applications is somewhat larger, consistent with the military responding to a more difficult recruiting environment by increasing effort or an excess supply of applicants.

I conduct an additional falsification test here. As those with less than a high-school diploma are ineligible for merit aid, I expect to find no negative application effect of changing merit aid conditions on this group. The estimates for this group are consistent with this expectation with most estimates positive or close to zero and no significant negative results (Table A4).[53]

Table 7 estimates similar effects to Table 6 separately by AFQT category. As expected, the point estimates are significantly larger for the 51-70 and 71-99 AFQT ranges than the lower ranges, consistent with those scoring in the lower range being less likely to be eligible for merit aid.[54] The largest and most significant effects are for the 71-99 category where the most individuals are eligible for merit aid.[55]

[49]Recall that I use an individual's state of birth to assign state of high school attendance in the ACS specifications. Here I am using the state in which an individual is recruited as their state of high school attendance.

[50]Results are robust to using a Poisson specification.

[51]The effects appear somewhat weaker outside of the South. As we do not observe this in the ACS data, this is potentially explained by higher enlistment probabilities (30% higher) in the South which make it more difficult for ineligible recruits to fully substitute for eligible ones. As I demonstrate below, the pattern of larger effects on higher ability individuals (Table 7A and 7B) and the analyses that restrict to current high-school seniors (Table 8) do not exhibit this type of heterogeneity.

[52]One possibility is that recruiters shift focus to those individuals that attended high school in another state and moved, thus ineligible for the merit aid.

[53]We might also expect the composition of recruits to shift to those less interested in joining the military as a route to college. Estimates from the ACS (using a similar difference-in-differences specification) indicate that veterans from states that had merit aid programs when they were 17 were less likely to have gone to college (full results available from author upon request).

[54]These results are qualitatively robust to perturbations in the AFQT bands.

[55]Appendix Table A5 contains estimates from a triple-difference approach. Here I am able to control for state-by-year fixed effects. Thus, any changes in labor market conditions or other supply and demand factors that affect recruits of all abilities similarly in each state and year are subsumed in the state-by-year fixed effects. The identification comes from comparing the change in the enlistment of high-ability recruits relative to low-ability from before to after the

In Figure 4, I present event study figures for each of these AFQT ranges for the introduction of "strong" merit aid programs. The pictures indicate a reduction in the number of high ability contracts (AFQT: 51-99) following the introduction of a merit aid program (Panel A and B). The number of lower ability recruits (AFQT: 31-50) appears unaffected by the introduction of a merit aid program.[56]

7.4 Focusing on Current High-School Recruits

I use additional education information contained in the applications data to focus the analysis on those most likely to be affected by the introduction of aid. I restrict the sample to high-quality (AFQT 51-99) applicants that are currently high-school seniors. This restriction is important as it overcomes concerns related to the potential substitution of older or out-of-state individuals that may dampen the observed effect. As older students (that graduated prior to merit aid introduction) and individuals from out-of-state (that did not attend high-school in the state) are ineligible for merit aid, they bias against finding an effect of merit-aid introduction.

The estimates using this sample are larger, a 5 to 8 percent reduction in applications. This estimate is fairly consistent across samples, classifications of merit-aid, and specifications. Dividing the estimates by the percentage of high-quality applicants that are likely to be eligible for merit aid (40%) suggests that 13 to 20 percent are constrained. This is similar, but slightly lower, than the fraction estimated using the ACS data.

7.5 Competing Explanations

While the estimates in Tables 4-8 show that constraint-easing financial aid shocks have sizeable effects on whether an individual joins the military, there may be other factors driving this response. I have undertaken several strategies to address this concern

introduction of merit aid programs in states that experienced the introduction of a program versus those that did not. These estimates similarly suggest that the number of high-ability applicants falls relative to the number of low-ability applicants.

[56] Figures for the introduction of "inclusive" programs are qualitatively similar and available from the author upon request.

throughout the paper; here, I consider a variety of general equilibrium effects that could account for the estimates. One potential explanation is peer effects. If the value of college is dependent on peer quality, and this characteristic is more important to students of traditional age, the introduction of merit-aid programs may be responsible for the observed effects if they draw higher quality students into college.[57] There are at least two reasons why this is unlikely to drive the results. First, the effects on college enrollment are likely too small (5-7%) to have a meaningful effect on peer quality. Second, it is not clear what the direction of the effect on peer quality would be as many of the marginal students are likely of lower ability than the inframarginal students.

A second alternative explanation is that the military is actively reallocating effort to target individuals for recruitment that are unlikely to be affected by merit aid. My review of several Department of Defense commissioned reports on military recruiting uncovered no evidence of this type of targeting. Similarly, recruiting goals at the state level suggest that this type of reallocation did not take place across states.[58] A reallocation within state would require a relatively high level of sophistication on the military's behalf; while this is possible, it is not clear why this would result in overall reductions in recruit totals. Despite the limited support for these alternative hypotheses, I draw on the model's secondary prediction regarding the interaction of resources and effect sizes as a supplementary test.

Ideally, I could use detailed information on availability of credit and household income and assets to design more refined tests for the presence of constraints. Unfortunately, this information is not available in surveys with large enough samples of potential recruits to proceed along this path. A second-best approach, but superior to state-level averages, would be to use finer geographic data to proxy for the likelihood of financial constraints.[59] An advantage of using military enlistment as the outcome variable is the presence of finer

[57] A related issue is that merit-aid programs may induce individuals to work harder in school, altering the AFQT distribution. However, an upward shift in the AFQT distribution should result in more high quality recruits, opposite of what I observe.

[58] Results available from author upon request.

[59] As discussed in the theory section, there should be no relationship between resources and college enrollment in the absence of credit constraints.

geographic detail. I estimate similar specifications to equation (1) but split the sample at the 5-digit level by median household income (in 2000 dollars) into four groups: (1) between $9,521 and $28,726, (2) between $28,726 and $32,735, (3) between $32,735 and $35,563, and (4) between $35,563 and $65,865.[60] I only have data at this level from 1990-2000, so I limit the analysis to these years. I estimate specification (1) separately for each quartile on the log of applications with an AFQT score of 51 or greater (Table 9). The effects are largest in the lowest income quartile (highly rural) areas, consistent with the merit aid programs easing constraints.[61] These results suggest that more attention should be paid to these low-income rural areas which potentially lack the means to make optimal schooling decisions.

8 Discussion and Conclusion

Changing non-military financial aid conditions play an important role in the decision to enlist. Those most likely to be eligible for merit aid are ten percent less likely to join the military when merit aid is available. A back of the envelope calculation indicates that between 15 and 25 percent of merit-aid eligible likely recruits face constraints. The magnitude of these effects suggests the presence of meaningful credit constraints in the college enrollment process. Furthermore, these effects are concentrated in rural areas with lower median household incomes, buttressing the argument that financial constraints may be driving some individuals' decisions to enlist. Evidence that those individuals who are unable to pay for much of college are more likely to mention education benefits as a motivation for enlisting support the conclusion that a number of high aptitude individuals are located in low-income rural areas with limited access to the resources and information available to similar individuals in more densely populated high-income areas; these

[60] The zip codes are split by taking the quartile median household income levels in the states that implemented merit aid between 1990 and 1999 after weighting by number of recruits such that the bottom quartile of zip codes contains roughly one quarter of the total number of recruits.

[61] There is also some evidence of sizeable effects in the highest median income quartile. This is still potentially consistent with greater responsiveness among low-income individuals as a large portion of Southern high median income counties lie in urban areas with high income inequality.

individuals use the military as a path to leave these areas and eventually attend college.

Whether this is the most efficient method to encourage college enrollment is unclear. In some sense, the military is providing a great service to these individuals who otherwise may not have been able to attend college at all. But, it is an open question whether it is the military that should be providing this service. If instead these individuals were provided other financial aid opportunities (which has increasingly been the case) or additional information about college costs and aid availability, they might immediately enroll upon graduating from high school and contribute additional years in a labor market that is more suited to their interests and skill sets. In order to better understand the degree to which veteran subsidies are optimal, further work is needed to understand the relative values of traditional versus delayed enrollment for different types of individuals.

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9 Appendix: Data and Methods

A. Merit-Aid Programs

The merit-aid programs vary in terms of their eligibility conditions and generosity (Fitzpatrick and Jones 2012; Sjoquist and Winters 2012). Sjoquist and Winters place some focus on the "strong" merit aid programs that provide generous aid packages and broad eligibility.These programs are broad in terms of eligibility (at least 30% of high school students) and provide relatively large awards and include the programs introduced in Florida (1997), Georgia (1993), Kentucky (1999), Louisiana (1998), Nevada (2000), New Mexico (1997), South Carolina (1998), Tennessee (2004), and West Virginia (2002). These are a subset of the programs focused on by Fitzpatrick and Jones (2012). The additional programs included are Arkansas (1991), Mississippi (1996), Michigan (2000), Maryland (2003), and South Dakota (2004). Maryland's program only lasted for one year, while all other programs remained implemented throughout the remaining sample period.

I reviewed the statute and associated documentation for each state in order to determine whether it allowed individuals entering active-duty to delay merit-aid receipt . In Table A6, I present the year of implementation of each program as well as representative quotes and information from my review supporting the determinations discussed in the main body of the paper (sources for each are available on request).

B. American Community Survey

I use the American Community Survey (ACS) public use micro samples from 2006 through 2011.[62] The 2006 ACS is the first to survey group quarters and thus includes active-duty military as well as individuals in dorms. I restrict the sample to individuals age 24 to 35. I construct a binary variable indicating whether an individual has ever been in the military: $E_{ist} = max\{Active_{ist}, Veteran_{ist}, Reserve_{ist}\}$.[63] All samples are restricted to

[62] I use the 2000 Census and 2001-2005 ACS samples in robustness checks. See Table A7 for robustness of the results including the 2000 Census.

[63] The results are not sensitive to the exclusion of $Reserve_{ist}$ from this measure. Individuals with reserve service are included as military call ups directly affect the proportion of individuals with active duty service in a particular state, but do not directly affect the proportion with reserve or active-duty service.

individuals born in the United States. Where noted, the sample is restricted to Southern states and Southern merit aid states.

C. Applications and Contracts Data and Linking

My data on applications and contracts were produced by the Defense Manpower Data Center through a number of FOIA requests and contain a record for each application and contract.[64] I produce aggregate counts by state, year, and AFQT category after restricting the sample to all active-duty service components. I exclude reserve and national guard data as these series appear to be missing data. In order to aggregate counts at the state level, I link three digit zip-codes (provided in the recruit data for all years) to states. Five of the nearly 1,000 three-digit zip codes cross state lines. In this case, I assign the three-digit zip code to the state that contains the majority of the population in the zip code.[65]

In some specifications, I aggregate the data at the five-digit zip code level before splitting the sample and aggregating further. I use the same procedure to assign each zip code to a state. I also link median household income information to the five-digit zip codes. I use data obtained from the Census Small Area Income and Poverty Estimates (SAIPE) on the 1993 median household incomes at the county level.[66] I generate a population weighted median household income at the five-digit zip code level. As five-digit zip codes are relatively small, this generally consists of assigning the median household income level of a county to the zip code.

[64] I thank Garrett Christensen (Swarthmore College) for providing me with data from 1990-2000.
[65] Usually, the vast majority of the population resides in one state.
[66] These statistics can be obtained here: http://www.census.gov/did/www/saipe/downloads/estmod93/est93ALL.dat.

Table A7

Impact of Merit Aid Availability on Veteran Status: 2000 Census and 2006-2011 ACS

		1987-2004			1995-2004		
Merit-Aid Measure	DV Mean	All	South	South Merit Only	All	South	South Merit Only
STRONG	0.059	-0.00400***	-0.00337**	-0.00228	-0.00254***	-0.00220**	-0.00402***
		(0.000824)	(0.00126)	(0.00157)	(0.000836)	(0.000899)	(0.000952)
INCLUSIVE		-0.00366***	-0.00376***	-0.00156	-0.00180*	-0.00231**	-0.00289**
		(0.000817)	(0.00111)	(0.00132)	(0.000961)	(0.000966)	(0.00118)
N		2,044,699	672,341	286,499 / 361,505	1,300,422	430,795	183,637 / 230,664

Note: Each cell represents a separate regression. Coefficients are for indicator variable indicating presence of merit aid program (robust standard errors clustered at the state of birth level in parentheses). All regressions include state of birth and year of birth fixed effects. See Data Appendix or notes to Table 4 for more details of "Strong" and "Inclusive" definitions. Regressions are limited to age-17 years indicated using data from the 2006-2011 ACS surveys. For example, inclusion of age-17 year 1987 indicates that individuals that were 17 during 1987 are included in the sample. ***Significant at the 1 percent level. **Significant at the 5 percent level. *Significant at the 10 percent level.