

# An Investigation of FY10 and FY11 Enlisted Accessions' Socioeconomic Characteristics

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Photo credit line: Company A recruits climb ropes at the end of the Obstacle Course May 3<sup>rd</sup> aboard Marine Corps Recruit Depot San Diego. This is the last obstacle on the course that recruits have to overcome. The course requires recruits to use a lot of upper body strength, making it even more challenging to climb the rope at the end of the course. 5/3/2012 (By LCpl Crystal Druery)

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## Executive summary

Since the start of the All-Volunteer Force (AVF) in 1973, the enlistment process has been described by some as an “economic conscription” or “poverty draft” [1, 2]. These terms are used to describe the perception that U.S. military enlisted accessions are primarily from poor families and neighborhoods. The socioeconomic characteristics of AVF accessions have, however, evolved over the years. In the 1970s and 1980s, accessions came from all income ranges (e.g., see [3, 4]), but they—particularly white accessions—were slightly *more* likely than their civilian counterparts to come from lower income backgrounds (e.g., see [5, 6]). Since 9/11, researchers have shown that accessions are predominately *less* likely than the U.S. population to come from lower income brackets [7, 8, 9, 10].

Despite this, statements about enlisted accessions coming from poor families and neighborhoods persist in the press and have been used to support changes to existing personnel policies, including reinstatement of the military draft.<sup>1</sup> To evaluate these issues and to update previous analyses, Accession Policy, in the Office of the Under Secretary of Defense for Personnel and Readiness, asked CNA to examine the socioeconomic status—particularly the income backgrounds—of U.S. military accessions.

## Approach

We analyzed FY10 and FY11 non-prior-service (NPS) enlisted accessions by the socioeconomic characteristics of geographic region and census tract income. For our income analysis, the ideal analysis would use individual-level accessions’ family incomes. Unfortunately, that detailed level of data is not available across accessions. Instead, we link accessions to the median income of their home-of-record census

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1. See, for example, [11].

tract. We classify accessions by income quintiles to compare accessions with the general population. The three income quintile classifications we use are census tract household unit, population, and counts of 18- to 24-year-olds. Using household income quintiles, we explore differences in NPS accessions' census tract incomes by service and demographic characteristics (e.g., gender and race) and by initial military occupation (for FY10 NPS accessions).

## Main findings

Socioeconomic characteristics include a number of characteristics, such as geographic location, income, and occupation. In terms of geographic area, NPS accessions are more likely to come from certain parts of the United States. Among FY11 NPS accessions, a higher share of accessions, when compared with the youth population, are from southern states. This finding has been shown for earlier accessions (including FY10 NPS accessions) in previous Department of Defense (DOD) Population Representation in the Military Services (PopRep) reports.

In terms of NPS accessions' census tract income, we find no evidence of a so-called poverty draft. Regardless of the income quintile classification used, we find that accessions come from across all income quintiles. We also find that FY10 and FY11 NPS accessions are underrepresented in the lowest income quintile. Across the services, FY10 and FY11 Army NPS accessions had the highest share in the lowest household income quintile. We also found differences by gender. Compared with their male counterparts, a higher share of FY10 and FY11 female NPS accessions were in the lowest and next-to-lowest household income quintiles. When examined by income of black heads of households in a census tract, we find that FY11 NPS black accessions are overrepresented in the highest income quintile.

Finally, we tracked FY10 accessions and observed their initial military occupations. We found differences in the shares of FY10 NPS accessions by occupation. For example, the highest shares of FY10 NPS accessions in the lowest household income quintile were functional support and administration, and service and supply handlers. By

occupational category, we found similar differences in Armed Forces Qualification Test (AFQT) scores.

## **Recommendations**

This paper is a companion paper to the FY11 PopRep. For the FY11 and subsequent PopReps, we recommend the use of a table showing the income quintiles, as determined by households, of accessions by service compared with the youth population. This presents the accession data by a common income quintile metric (households) along with a comparison to the census tract median income of the youth population.

Our findings for FY11 black and white NPS DOD accessions by black and white head of household's income quintiles suggest that socioeconomic characteristics of accessions reflect income differences by race in the United States. It was outside the scope of our study (1) to determine if there were other factors at play in differences in income characteristics of accessions by race/ethnicity and (2) to explore the socioeconomic characteristics across all racial and ethnic categories. We recommend that, if the services are interested in increasing recruitment of minorities, they consider studying this issue further.

Female accessions, relative to the share of women in the general youth population, are underrepresented as a share of accessions. Although they are underrepresented, a higher share of FY10 and FY11 female NPS accessions, compared with their male counterparts, are from census tracts in the lowest and next-to-lowest income quintiles. This gender difference suggests that an increase in recruiting goals for female recruits may change the income distribution of women entering the service. We recommend that the services take our findings into consideration-and potentially conduct further research on gender-based differences in recruiting.

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# Introduction

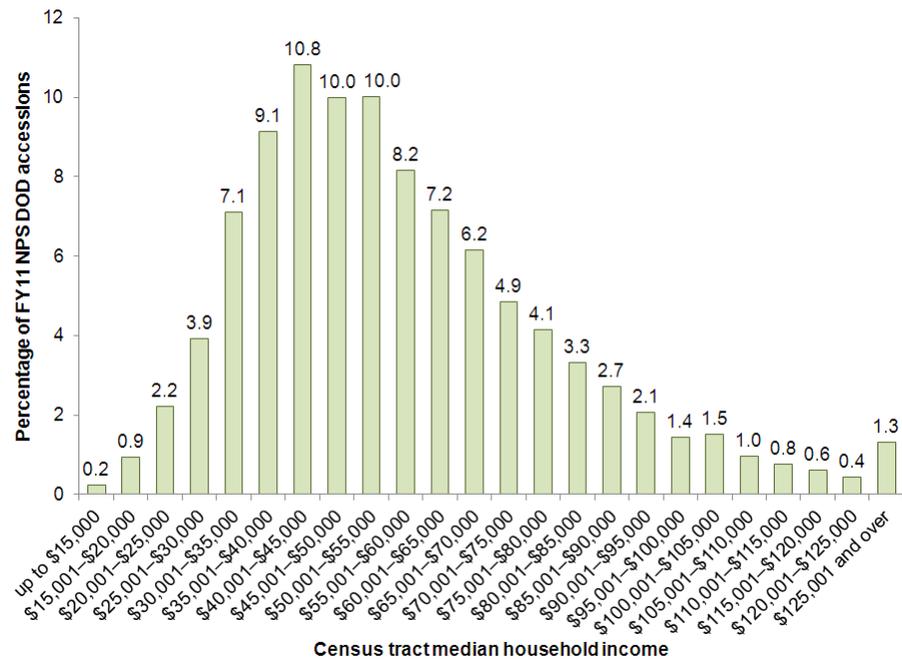
The AVF, by definition, allows qualified individuals to volunteer to fill the recruiting needs of the enlisted active component. A simplified economic view of enlistment, which ignores the nontangible incentives for joining the military, suggests that people with fewer or lower paying civilian opportunities will be the first to volunteer—resulting in a force that primarily consists of those from poorer socioeconomic backgrounds.

Since 1973, there has been discussion and concern that enlisted members come from relatively poorer socioeconomic backgrounds than their nonmilitary counterparts. This concern relates more to the risks associated with military service during war than with service in peacetime. The idea that accessions are from more disadvantaged backgrounds has been referred to as “economic conscription” and more recently as the “poverty draft” [1, 2]. This stylized fact has been used to support changes in existing personnel policies, including reinstatement of the military draft (e.g., see [11]). To evaluate these issues and to update previous analyses, Accession Policy, in the Office of the Under Secretary of Defense for Personnel and Readiness (OUSD-AP), asked CNA to examine the socioeconomic status—particularly the income backgrounds—of U.S. military accessions.

Socioeconomic status—broadly defined as a person’s social and economic standing within society—can encompass such characteristics as occupation, education, neighborhood, income, and wealth. In this document, we examine the income characteristics of the communities that military accessions come from and compare these characteristics with those of the communities of their civilian counterparts. We also explore differences in census tract median income by service and by gender and race. Finally, using socioeconomic data linked with Defense Manpower Data Center (DMDC) personnel data, we examine the socioeconomic characteristics of FY10 accessions by initial military occupation. As we will discuss in this paper, describing acces-

sions using the terms *economic conscription* and *poverty draft* does not match the existing research or the characteristics of recent (FY10 and FY11) accessions' census tract income. As figure 1 shows, accessions come from census tracts with various median incomes.

Figure 1. Percentage of FY11 non-prior-service DOD accessions by census tract median household income<sup>a</sup>



a. Source: CNA tabulations of DMDC FY11 accession data and 2006–2010 American Community Survey (ACS) data, adjusted to 2011 dollars.

## Background

### Pre-AVF implementation<sup>2</sup>

One of the motivations for replacing the draft with the All-Volunteer Force was the inequity that existed because of an unfair deferment

2. For a thorough discussion of the history of the AVF and issues surrounding its implementation, see [12].

system.<sup>3</sup> For example, the draft allowed college students to defer. As Senator Edward Kennedy put it in a 1966 article supporting a lottery system, “lower-income parents consider it unfair that their sons are drafted while college students are deferred,” and statistics confirm that “the draft bears down most heavily on those in lower-income brackets” [14, p. 4]. Research on the parental income of soldiers who died in the Vietnam War supports this assertion. Among Army soldiers and officers from Wisconsin, the poor were overrepresented among Vietnam War casualties [15]. The results were most striking among those who were the most likely to be draftees—Army privates.

Although there were concerns about socioeconomic disparity between the enlisted force and the U.S. population under the military draft, there also were concerns that replacing the draft with the AVF would result in “enlisted forces drawn almost exclusively from economically distressed blacks and members of other impoverished minorities but commanded by a predominantly white officer corps” [16, p. 326]. The rationale was that this disparity would arise because the AVF would be the best employment option for minorities with few job alternatives. The basis of this concern related more to the risks associated with military service during war than with service during peacetime. As Senator Edward Kennedy put it in 1967 (in an exchange with economist Milton Friedman), “the obligation of our defense is a national responsibility, and we cannot put that responsibility on a particular group, as it would obviously be a class obligation” [17, p. 240].

Concerns about a force not reflecting the characteristics of the general population were not necessarily dispelled by AVF proponents’ predictions of the consequences of implementing an AVF. In a *New York Times* article in support of replacing the draft with the AVF, Milton Friedman, a member of the President’s Commission on an All-Volunteer Force, recognized the opportunity that military service presented to those with few employment alternatives. He noted that

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3. In addition to the concerns about draft inequity due to an unfair deferment system, other motivations for ending the draft included “unpopularity of the Vietnam War, the civil rights movement, and general social unrest” [13].

clearly, it is a good thing not a bad thing to offer better alternatives to the currently disadvantaged....[Volunteers would be] men for whom soldiering was the best available career, and hence who would require the lowest sums of money to induce them to serve. [18, p. 114]

Acting on a campaign promise, President Nixon established a presidential commission in 1969, headed by Thomas Gates, to evaluate eliminating conscription [12]. On February 20, 1970, the Gates Commission released its final report [19, pp. 5–6], stating that “we unanimously believe that the nation’s interests will be better served by an all-volunteer force....” The report addressed many of the equity concerns surrounding the AVF’s implementation.<sup>4</sup> For example, in regard to representation concerns, the commission argued that increases in military compensation and

maintenance of current mental, physical, and moral standards for enlistment will ensure that a better paid, volunteer force will not recruit an undue proportion of youths from disadvantaged socioeconomic backgrounds. [19, p. 16]

## **Post-AVF implementation**

Research on the socioeconomic characteristics of military accessions has compared post-AVF military accessions with all or a portion of the U.S. population to determine whether they are representative of that population. That is not to imply that military accessions will or should reflect the U.S. population in all socioeconomic characteristics. For example, DOD accessions have higher median years of education than the 18- to 34-year-old population.<sup>5</sup> Note that the literature on accessions’ socioeconomic characteristics has focused on measuring or proxying for accessions’ parents’ socioeconomic characteristics.

Determining the military’s representation of the population is sensitive to the socioeconomic parameters examined. One extreme view

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4. See [12, p. 79] for a summary of the Gates Commission’s arguments.
  5. See, for example, Table A-6, FY 2009 Applicants for Active Component Enlistment by Education, Service, and Gender with Civilian Comparison Group, in [20] and the corresponding table in [21] for FY 2010 (also numbered A-6).

of this was expressed in 1978 by Mark Eitelberg, who noted that, “depending on which groups are selected for comparison, the same military demographic data can be manipulated to either defend or criticize practically any interpretation of statistical ‘parity’” [22, p. 12]. Therefore, caution is warranted when reviewing the literature and/or undertaking an analysis that compares accessions’ and civilians’ socioeconomic characteristics.

## In this paper

Characteristics of military accessions are annually tracked and documented in DOD’s Population Representation in the Military Services report (PopRep) by many dimensions, including race/ethnicity and gender, and are compared with the civilian population.<sup>6</sup> However, the socioeconomic characteristics of military accessions in terms of income have not been tracked consistently in that report because of data limitations. In this paper, we analyze the socioeconomic characteristics of FY10 and FY11 accessions.<sup>7</sup>

In the next section, we review the literature on AVF accessions’ socioeconomic characteristics—particularly accessions’ family incomes and proxies for family income. We then present our approach and findings on the geographic locations and census tract median household incomes where FY11 non-prior-service (NPS) accessions’ lived before joining the military. We also examine the census tract incomes of FY10 accessions. Finally, we summarize our results and discuss our recommendation on which accession income table to include in the PopRep.

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6. See [13] and [23] for a discussion of the history and issues surrounding the AVF’s race representation, and see [23] for a discussion of the history and issues surrounding its gender representation.

7. Our results on FY11 accessions will be part of the FY11 PopRep.

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## Literature review: Military accessions' socioeconomic characteristics over time

The Gates Commission's 1970 report recommended replacing the draft with an all-volunteer force [19]. Since AVF implementation in 1973, there have been two main—somewhat competing—concerns about how representative the military is of the U.S. population:

[O]n one hand the *benefits* associated with military service should be available to all people regardless of race, color, creed, national origin, or socioeconomic status. On the other hand military service is a *burden* that should be borne by all members of society. [23, p. 75, emphasis added]

These concerns have been the motivation for examining who accessions are.

### 1970s and 1980s

Researchers found that AVF accessions in the 1970s and 1980s were, for the most part, representative of the U.S. population. They did find slight differences by race, with white accessions being more likely to come from lower income brackets; however, they also found improvements in accessions' socioeconomic characteristics over time.

Inadequate representation of the U.S. population, due in part to the deferment system, was one rationale for ending the draft (and, ironically, one of the criticisms of the AVF's implementation). As Richard Cooper noted in his 1977 RAND report:

[T]he issues related to social representation in the volunteer force should be put into some perspective, for no other AVF issue has received so much discussion based upon so little evidence. [3, p. 204]

To address these issues, Cooper compared the socioeconomic characteristics of accessions following the AVF's implementation with their

pre-AVF and civilian counterparts.<sup>8</sup> He found that, in terms of regional representation, the AVF force was similar to or even slightly more representative of the U.S. population than was the draft force. Examining average and median income characteristics of accessions' hometown ZIP code areas, he found that, while disproportionately fewer enlisted accessions came from higher income areas, this pattern was little changed from the two years before the AVF's implementation, "which was presumably the most socially representative period of the peacetime conscription" [3, p. vii]. Examining socioeconomic characteristics by race and comparing them with their civilian counterparts, Cooper found that, in the pre- and post-AVF eras, high- and middle-income blacks were underrepresented in the military relative to the 16- to 21-year-old U.S. population [3].

J. E. Fredland and R. D. Little [5] and Sue Berryman [6] compared military and civilian socioeconomic data, including parental education and occupations, using the 1979 National Longitudinal Survey of Labor Force Behavior, Youth Survey (1979 NLS).<sup>9</sup> By race, Berryman found that the military's "minority members tend to come from the middle classes of their subgroups; its white members, from the lower middle classes" [6, p. 16]. Fredland and Little concluded that "the conventional wisdom that whites in the military tend to come disproportionately from lower socioeconomic strata...is supported, but *not strongly*" [5, p. 22, emphasis added]. Both [5] and [6] examined youths' educational aspirations and found slightly *higher* aspirations for military accessions than for their civilian counterparts.<sup>10</sup>

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8. For his analysis on accessions' income, Cooper [3] linked 1970 Census data with DOD accession data from the 2 years before and the 2.5 years after the AVF's implementation.

9. The 1979 NLS military sample includes accessions who entered the military during the era of the 1977–1980 calibration error in enlistment aptitude testing when the Armed Services Vocational Aptitude Battery was not properly normed, resulting in the services unknowingly enlisting a higher-than-expected share of unqualified nongraduates of high school. The Army, in terms of quality, was particularly affected by the testing issues (see [12] and [13] for further discussion).

10. According to [6], 46 percent of all 18- to 21-year-old servicemembers expected to end up with 16 years or more of education, versus 40 and 17 percent of all and employed 18- to 21-year-old civilians, respectively.

Comparing an early year of the post-AVF era with a later year, the authors of [24] (Jay Teachman, Vaughn Call, and Mady Segal) and [4] (Richard Fernandez) found evidence that the socioeconomic characteristics of accessions improved over time. Teachman, Call, and Segal used the 1972 NLS and High School and Beyond data to look at a number of accessions' characteristics that proxy for socioeconomic level, such as mother's educational level. The authors found suggestive evidence that, between 1972 and 1980, "the military has become more attractive [as an employment opportunity] to some white men with higher status backgrounds" [24, p. 302].

As Cooper did in [3], Fernandez used military personnel data linked with Census data to examine the characteristics of accessions' neighborhoods between 1980 and 1987. He found that, in 1987, "male accessions [were] drawn disproportionately from lower-income areas, although *not* to a marked degree" [4, p. 42, emphasis added]. Fernandez noted, however, that male accessions were representative of all income areas, including higher income areas. His findings suggested that, among the services, "the Army show[ed] a somewhat greater tendency than the other services combined to draw from lower-income areas" [4, p. 42]. In examining 1980 and 1987 accessions, Fernandez found that 1987 black accessions were disproportionately more likely, compared with their civilian counterparts, to come from above-average black family income areas—more so than 1980 black accessions [4]. This research, coupled with Cooper's 1977 study findings, suggests an improvement in the socioeconomic backgrounds of black accessions from 1973 to 1987.

In a 2007 Congressional Budget Office study, Heidi Golding and Adebayo Adedeji speculated that Fernandez's finding of an improvement in the socioeconomic characteristics of black accessions was related to "the military's higher graduation standards and the attractiveness of the newly created Montgomery GI Bill to black youth who were interested in eventually enrolling in college" [10, p. 29].

This finding—based on ZIP-code-level data—may, however, also be partially the result of a decrease in household income variation at the census tract level. Sean Reardon and Kendra Bischoff [25] found that families in 2000, particularly black and Hispanic families, were more

likely to live in census tracts with housing units of similar income levels than were comparable families in 1970. Thus, there was less income dispersion within census tracts in 2000 than in 1970. So black accessions with high incomes were more likely to be in a comparable high-income census tract in 2000 than in 1970. It's not clear how much of the shift in the socioeconomic characteristics among black accessions was because the families of black accessions in 2000 had higher income than their 1970 counterparts and how much was the result of being more likely to live in census tracts with higher incomes and less income dispersion.

## 1990s

### **Geographic characteristics of military accessions**

Differences in recruiting and accessions' characteristics by geographic area may relate to socioeconomic characteristics that result from geographic differences in educational and employment opportunities. Although the authors of [26], an Office of the Secretary of Defense (OSD) report on the AVF, found no geographic difference between the distribution between NPS enlistees and the FY77 youth population, research on more recent military accessions has found differences. For example, the FY96 PopRep noted that, "during the last 10 years, the percentage of accessions from the North Central Region has decreased and the percentage from the South has increased" [27].

### **Self-reported and neighborhood income of military accessions**

Socioeconomic portions of the FY96 to FY99 PopReps used data from the *Survey of Recruit Socioeconomic Backgrounds*, including questions on accessions' parents' education, employment status, occupation, and home ownership. In these reports, the socioeconomic characteristics of DOD parents were compared with data on parents from the Current Population Survey (CPS), which the OSD FY96–FY99 PopReps called "CPS parents" [27 through 30]. Along a number of dimensions, DOD parents were similar to those in the general population. CPS and DOD mothers, for example, were equally educated. How-

ever, the reports found some indications that the socioeconomic backgrounds of DOD accessions were not heavily from the upper socioeconomic groups. For example, the OSD FY96 PopRep noted that “DoD parents are underrepresented in certain high-status occupations” [27, p. 7–8] and that the socioeconomic backgrounds of accessions differed by service. The authors noted that “enlisted accessions come from all socioeconomic levels. However, there is a tendency for accessions to come from families in the lower” half of the status distribution in FY96 and the lower three-quarters of the status distribution in FY97, FY98, and FY99; this finding suggests a subtle improvement in the socioeconomic backgrounds of accessions’ parents from FY96 to the FY97–FY99 period (see [27, p. 7-7], [28, p. 7-13], [29, p. 7–11], and [30, p. 7–12]). The authors concluded this based on differences in parental occupation, education, and home ownership.<sup>11</sup>

## 2000s

In the 2000s—particularly since 9/11—a number of factors have contributed to a renewed interest in the representativeness of the military and the socioeconomic characteristics of accessions. Operations Enduring Freedom and Iraqi Freedom included an intense deployment schedule (see [32], [33]) and a greater casualty burden than other recent military operations—specifically, the Persian Gulf War (see [34], [35]). In addition, there has been discussion of a disconnect between military and civilian populations, which is reinforced by survey findings comparing the characteristics and perceptions of military members with civilians (e.g., see Pew Research Study report

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11. The findings reported in the FY96 to FY99 PopReps on home ownership are caused in part by DOD parents being more likely than the general population to have housing arrangements other than buying or renting [27 through 30]. Unfortunately, the authors do not note the effect of this difference on their conclusions and whether this difference is a result of DOD parents being more likely to be in the military than the general population. For example, John Faris found a higher rate of recruitment among potential accessions whose fathers had military experience than those whose fathers did not have military experience [31].

[36]).<sup>12</sup> This shift may be caused in part by the small share of the U.S. population serving in the military.<sup>13</sup> This has implications for recruiting and the socioeconomic characteristics of military members since, as Faris found in 1981, enlistment likelihood was higher among the sons of career military fathers [31].<sup>14</sup> Faris also found that, since the sons of career military fathers came from middle- and upper-class families, they “tend[ed] to improve the representativeness of the armed forces with regard to socioeconomic status” [31, p. 551].

## Geographic area characteristics and military accessions

As was the case in the 1990s, geographic differences in recruiting have continued in the 2000s. The FY10 PopRep [37] documented that NPS enlisted accessions from FY73 to FY10 were predominately from southern states. In FY10, the states with the highest ratio of accession share to population share were Florida, South Carolina, and Georgia—all southern states.<sup>15</sup>

Reasons for geographic differences in recruiting may include differences in demographic characteristics, political ideologies, voter participation levels, active military and veteran population shares, economic opportunities, and educational opportunities. For example, using data from 1996 through 2006, Jennie Wenger and Cathleen McHugh examined differences between areas by political affiliation

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12. At the 2011 West Point graduation ceremony, Adm Mike Mullen, then Chairman of the Joint Chiefs of Staff, spoke about those without military experience: “I fear they do not know us. I fear they do not comprehend the full weight of the burden we carry or the price we pay when we return from battle.”
  13. The authors of [36] note that the share of the U.S. population serving in the armed forces is smaller now than at any time since the peacetime years between World War I and World War II.
  14. Faris used the National Longitudinal Survey from the class of 1972 (NLS-72) for his analysis. Although it is the class of 1972, the NLS-72 primarily includes data on accessions who entered the military under the AVF. As noted in [24, p. 293], “only two respondents in the NLS-72 report[ed] that they were drafted.”
  15. See in particular, Table B-16 of [38] as discussed in [37].

[39]. They found that counties in 11 southern states were more likely to produce Marine Corps enlisted accessions than other states, even after controlling for political party affiliation, the unemployment rate, the veteran population, the education level of the population, and the racial/ethnic characteristics of the population.

Geographic differences are reflected in the number and the quality of accessions. Examining FY99–FY08 accessions, Lauren Malone et al. found that certain areas of the country produced more accessions who were granted an enlistment waiver than other areas and that “waivered accessions are more likely to come from the East North Central region and less likely to come from the Pacific and Mid-Atlantic regions than their nonwaivered counterparts” [40, p. 26].<sup>16</sup> These findings suggest that there are differences in the tastes of accessions at the county or regional level that have not yet been fully accounted for by the characteristics typically used in enlistment models. In addition, they highlight how recruiting difficulties are correlated with geographical region, resulting in different shares of accessions and different characteristics of those accessions.

### **Self-reported and neighborhood income of military accessions**

Research on the socioeconomic and income backgrounds of accessions enlisting in the 2000s, measured at the ZIP code and census tract level, for the most part has confirmed findings from the previous 25+ years; accessions come from diverse income backgrounds.<sup>17</sup>

Using 2000 survey data from the National Longitudinal Survey of Youth (NLSY), Golding and Adedeji wrote in a 2007 study that their “analysis suggests that youth are represented in the military at all

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16. The East North Central region includes Wisconsin, Illinois, Michigan, Indiana, and Ohio. Pacific states are California, Oregon, and Washington. Mid-Atlantic states are New York, Pennsylvania, and New Jersey.

17. Research also has shown parity among potential military accessions in their socioeconomic characteristics. Cathleen McHugh and Anita Hattiangadi found parity between *military prospects*—2002 high school sophomores who expressed an interest in joining the military—and their non-military-prospect counterparts in terms of two family income proxies: parental education and family composition [41].

socioeconomic levels. However, young people from the lowest-income and highest-income families are less likely to be represented in the enlisted force than their peers...” [10, p. 30].

In a 2005 Heritage Foundation Center for Data Analysis report, Tim Kane compared 2003 (post-9/11) accessions with FY99 accessions and found a subtle increase in the neighborhood income levels of military accessions [7].<sup>18</sup> For both accession years, in comparing military accessions with the general population, Kane “found that accessions tend to come from middle-class areas, with disproportionately fewer from low-income areas” [7, p. 2]. In 2006, Kane expanded on his 2005 report. He examined FY03, FY04, and FY05 NPS enlisted accessions and found that, compared with FY99 accessions, the “only group that is lowering its participation in the military is the poor,” where *the poor* is defined as the lowest income quintile [8, p. 2].<sup>19</sup>

Using a methodology similar to that of the 2005 and 2006 Heritage Foundation reports, Watkins and Sherk examined FY06 and FY07 military accessions in a 2008 Heritage Foundation report [9]. However, the authors of [9] used income data at the census tract level as opposed to the authors of [7 and 8] who used ZIP code level data. Using the smaller geographical area of census tract, the authors of [9] found that enlisted NPS active-duty accessions were disproportionately from middle- and upper-income quintiles compared with the 18- to 24-year-old population.<sup>20</sup> For both fiscal year cohorts, Watkins and

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18. In [7], Kane examined 1999 NPS active-duty accessions, who enlisted between October 1998 and September 1999, and 2003 NPS active-duty accessions, who enlisted between January 2003 and September 2003.

19. In the 2006 report [8], Kane redid his analysis for the 2003 accessions since, unlike the 2005 report [7], the 2006 report included the full 2003 fiscal year of NPS active-duty accessions.

20. The 2005, 2006, and 2008 Heritage Foundation reports link accessions, by address, with 2000 Census data on neighborhood median income data. They weighted the income data by the 18- to 21-year-old population share within those neighborhoods. Their methodology differed, in that Kane’s 2005 and 2006 reports [7 and 8] used ZIP code tabulation areas, whereas the 2008 report by Watkins and Sherk [9] used census tract.

Sherk estimated that 25 and 24 percent of military accessions were from the richest and the next-richest quintile, respectively (where 20 percent is representative of the U.S. 18- to 24-year-old population).

The results of the Watkins and Sherk study [9] contrast with those reported in the FY07 PopRep [42] despite both studies using FY07 accession data.<sup>21</sup> While [9] found that accessions disproportionately came from the middle- and upper-income quintiles, [42] showed that FY07 NPS accessions primarily came from the middle-income quintile. Part of the reason for this discrepancy is the FY07 PopRep's use of the U.S. population income quintile brackets from [9], which were estimated using Census 2000 *census-tract-level data*. Although [42] used income quintiles defined by census tract, [42] assigned NPS accessions the *ZIP-code-level* income amounts. Census tracts are determined by the U.S. Census Bureau, whereas ZIP codes are determined by the U.S. Postal Service; the two are not compatible.

In a National Priorities Project (NPP) report, the authors examined Army active-duty NPS accessions for FY07, FY08, and FY09 and compared their ZIP-code-level median income with the income distribution of the 18- to 24-year-old youth population [43]. The authors of the NPP report estimated that youths living in the poorest 10 percent and richest 20 percent of the household income distribution were underrepresented among Army active-duty NPS accessions. In addition, the authors noted that “for FY09, there has been a slight upwards shift of recruit representation along the income distribution,” in comparison with FY07 and FY08 [43, p. 21].

In summary, accessions enlisting in the 2000s are more likely to come from specific geographical areas than others, but they tend to come from across all income categories.

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21. See, in particular, Table B-41 of [42], FY 2007 Non-Prior Service (NPS) and Prior Service (PS) Active Component Enlisted Accessions by Socio-economic Characteristics.

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## Data and methodology

We examined the socioeconomic characteristics, particularly income backgrounds, of FY10 and FY11 enlisted NPS accessions.

### Data

For FY10 and FY11 accessions, we used DMDC accession files for all the services. At our request, DMDC linked the service-provided accession files with Military Entrance Processing Command variables to give us the home-of-record address of each accession. For FY10 accessions, we linked accession files, by pseudo-Social Security Number, with DMDC-provided quarterly snapshot personnel files. We then linked, by census tract, FY10 and FY11 DOD accessions living in the 50 states or the District of Columbia with data on their census tracts. The census-tract-level data were from the 2006–2010 American Community Survey (ACS).<sup>22</sup>

### Methodology

#### Census tract income

Ideally, we would use accession-level family and/or household income data for our analysis; however, accession-level income data are not readily available for all accessions.<sup>23</sup> In examining the income backgrounds of accessions, we used a similar approach to that of [3, 4, 7, 8, 9] in that we linked FY10 and FY11 accession addresses with U.S. census data on the median household incomes of census tracts.

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22. See appendix A for additional discussion of the data.

23. Previous surveys, such as the *Survey of Recruit Socioeconomic Backgrounds*, referenced in [12], have asked a subset of military members about the incomes of their families; however, such surveys sample only a subset of accessions and are not fielded on a consistent basis.

For our analysis on census tract median household incomes, we looked at accessions separately based on service, race, and gender. In addition, for FY10 accessions, we examined census tract median household income by initial military occupations.

## **Comparison of income quintile classifications**

Using DMDC and census linked data, we know the characteristics of the census tracts that military accessions come from, including their median incomes. We then can compare their median income with the U.S. population. We categorize the incomes of the U.S. population by income quintile. Income quintiles are the income ranges that correspond to 20 percent of a population of interest falling within that range. Each quintile, therefore, includes an approximately equal number of units, whether households or individuals.<sup>24</sup> Regardless of the income quintile classification, the income data are the 2006–2010 ACS median household incomes from all households within a census tract.<sup>25</sup>

### **Household income quintiles**

We use census data on counts of households and median household incomes within census tracts to create income quintiles based on households.<sup>26</sup> Income quintiles based on households are the median census tract household income ranges that correspond to one-fifth of households in the United States. Using a household-based income quintile, the lowest quintile includes median household incomes up to \$36,290 (see table 1). Note that these are the median household income of the census tracts that correspond to the 20 percent of households with the lowest income levels. In our analysis, we refer to these quintiles as “household quintiles.”

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24. See appendix A for further discussion on how we designated quintiles.

25. The only exception is in our analysis of accessions by race, when we use black and white head of households’ median income census tract data.

26. Households are occupied housing units.

### **Population income quintiles**

The authors of [44, 45, 46] note in their respective analyses of the distribution of household incomes that households are not all equal in terms of size, and they recommend accounting for population size in income distribution analysis. For example, households with two married wage earners are, on average, more likely to have higher incomes than households with a single wage earner.

We use census data on population counts and median household incomes by census tract to create the income quintiles based on population. Income quintiles based on population are the median census tract household income ranges that correspond to approximately one-fifth of the entire population of the United States.<sup>27</sup> Thus, in our above example, as opposed to the two-wage-earner household being counted as one household under the household income quintiles, the two wage earners are counted as two individuals. In our analysis, we refer to these quintiles as “population quintiles” (see table 1).

### **18- to 24-year-old income quintiles**

The 18-to 24-year-old population is, by age, the target population for recruiting. For that reason, [9] used quintiles “weighted” by the 18- to 24-year-old population. We use census data on all 18- to 24-year-olds and median household incomes by census tract to create 18- to 24-year-old income quintiles. Income quintiles based on the 18- to 24-year-old population are the median census tract household income ranges that correspond to approximately one-fifth of the entire 18- to 24-year-old population in the United States.<sup>28</sup> In our analysis, we refer to income quintiles defined by 20 percent of the 18- to 24-year-old population as “18- to 24-year-old quintiles.”

Table 1 lists the income amounts for each of the three income quintile classifications we have discussed. For each income quintile, the

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27. See appendix A for further discussion on how we designated quintiles.

28. See appendix A for further discussion on how we designated quintiles.

income data are census tract median incomes from the 2006–2010 ACS.

Table 1. 2006–2010 ACS unadjusted income quintile amounts for three different income quintile classifications

Income quintile classification	Quintile				
	1	2	3	4	5
Household	up to \$36,290	\$36,292– \$46,023	\$46,024– \$56,870	\$56,875– \$74,663	\$74,667 and over
Population	up to \$36,278	\$36,279– \$46,250	\$46,261– \$57,489	\$57,500– \$75,742	\$75,744 and over
18- to 24-year-old population	up to \$32,113	\$32,114– \$41,890	\$41,891– \$52,321	\$52,324– \$68,736	\$68,750 and over

The income ranges for the 18- to 24-year-old quintiles when compared with the population quintiles, reflect the fact that 18- to 24-year-olds are more likely to come from poorer census tracts than the general population. Note that this may be in part because of the 2010 Census residence rules. Under the 2010 Census residence rules, college students studying away from home are instructed to record their usual residence (i.e., their on-campus or off-campus college residence) as opposed to their home of residence for voting or paying income taxes.<sup>29</sup>

29. See [http://www.census.gov/population/www/cen2010/resid\\_rules/resid\\_rules.html#TWO](http://www.census.gov/population/www/cen2010/resid_rules/resid_rules.html#TWO).

## Findings for FY11 NPS accessions

In this section, we present our socioeconomic results in terms of geographic locations and income backgrounds for FY11 non-prior-service DOD accessions.<sup>30</sup> We focus on NPS accessions for two main reasons. First, the vast majority of FY11 DOD accessions are NPS. Second, our analysis relies on linking accessions with their original home-of-record census tracts and these are more likely to be the areas in which the accessions grew up than for PS accessions.

### Geographic characteristics

Since the start of the AVF, the highest share of DOD NPS accessions has consistently been from the South. Figure 2 shows the share of accessions that came from the different regions of the United States and other territories or possessions. Of FY11 NPS DOD accessions, 42.4 percent were from the South. Since 2006, the South has been followed by the West. A little less than a quarter, 23.1 percent, of FY11 NPS accessions were from the West, followed by 19.8 percent from the North Central region. Since 1986, among the census regions, the lowest share of NPS accessions has been from the Northeast. Of FY11 NPS DOD accessions, only 12.5 percent were from states in the Northeast.<sup>31</sup>

The regions described above, however, are not equal in population size. To account for this, we compare the share of accessions with the share of 18- to 24-year-olds.<sup>32</sup> More FY11 DOD NPS accessions came from the South in FY11 than any other region in terms of the share

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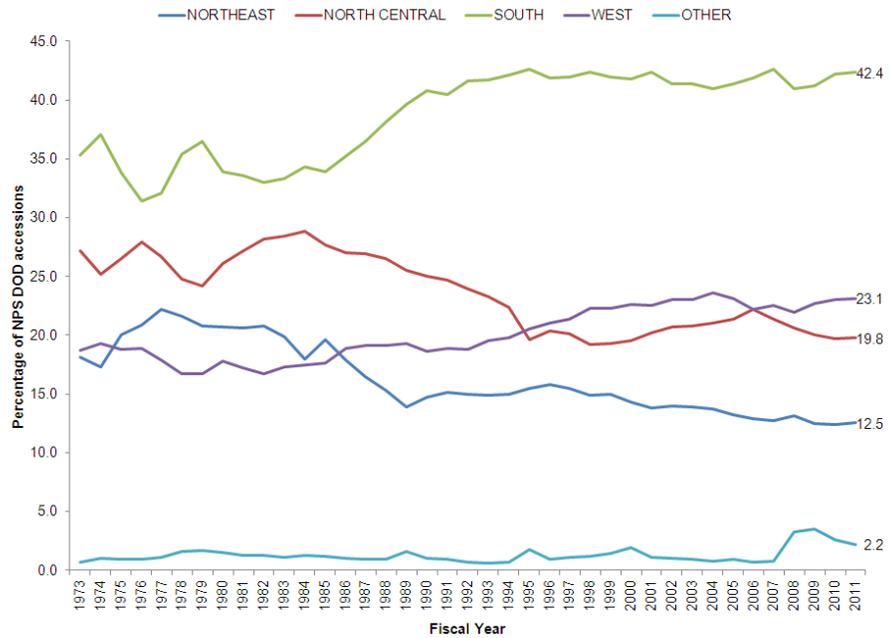
30. Results on the income background for prior-service (PS) FY11 accessions are presented in appendix B.

31. Of FY11 NPS DOD accessions, 2.2 percent were from other geographic areas.

32. The FY10 PopRep (e.g., see [37]) uses the same technique.

of all accessions and as a relative ratio to the share of 18- to 24-year-olds. The South was overrepresented at 1.21, followed by the West, which was evenly distributed at 1.00. The North Central region had a representation ratio of 0.92, and the Northeast was underrepresented at 0.70.

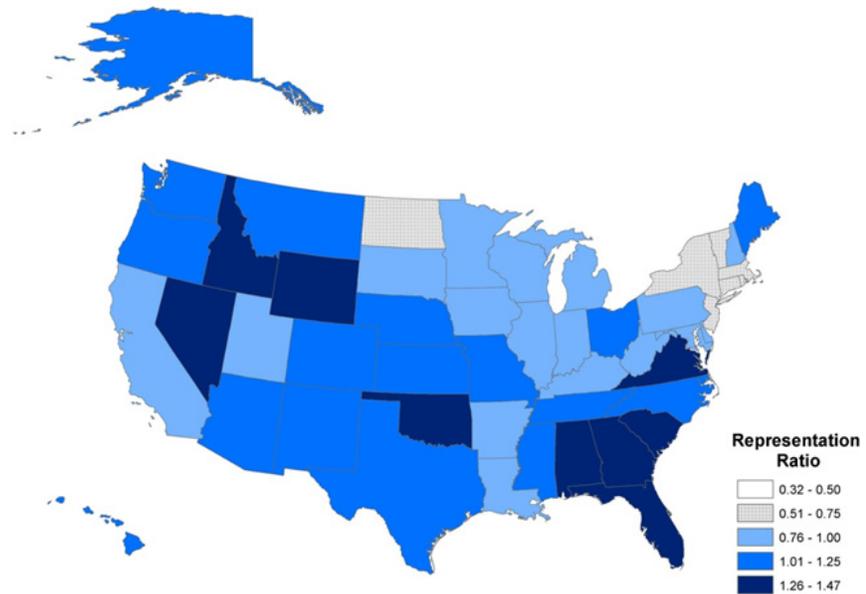
Figure 2. Percentage of FY11 NPS accessions by region<sup>a</sup>



a. Source: DMDC-provided data on FY11 NPS DOD accessions.

Figure 3 illustrates the representation ratio, by state, of the share of accessions divided by the share of the 18- to 24-year-old population (as measured by the BLS Current Population Survey). Among the states and the District of Columbia, the lowest representative ratio of FY11 accessions, at 0.32, was from the District of Columbia. The highest representation ratio was from Idaho, at 1.47, followed by Florida, at 1.42.

Figure 3. Representation ratio of FY11 NPS accessions to the 18- to 24-year-old population, by state<sup>a</sup>



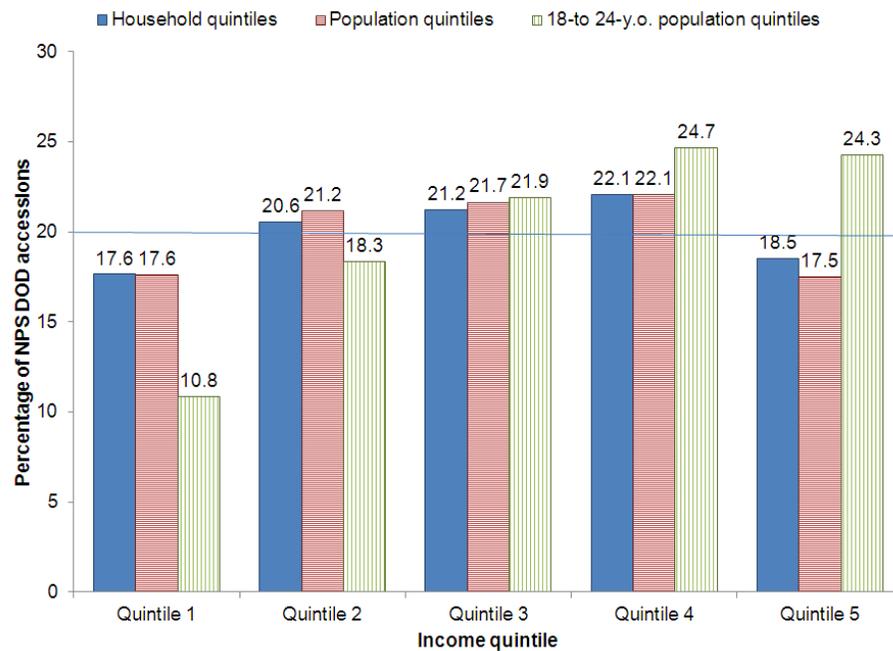
a. Source: CNA tabulations of civilian and military data. Civilian data are from BLS's Current Population Survey, 18- to 24-year-old noninstitutional civilians, Oct. 2010–Sept. 2011 average. Military data are provided by DMDC.

## FY11 NPS accessions by census tract income quintile

Our income analysis is based on the median income of an accession's census tract. As figure 1 showed, the highest share of FY11 NPS DOD accessions are from census tracts where the median income is between \$40,001 and \$45,000. However, that does not indicate how FY11 accessions compare with U.S. households, the U.S. population, or the target population of 18- to 24-year-olds. Those comparisons are presented as income quintiles in this subsection based on the income ranges presented in table 1. Figure 4 shows FY11 accessions, binned by the three previously defined income quintile classifications (see table 1). The horizontal line indicates representativeness to the classification group (i.e., households, population, or 18- to 24-year-old

population). For all income quintile classifications, we find that FY11 accessions are from census tracts with median incomes ranging from the lowest to highest income quintiles. This is consistent with previous analyses, such as [3] and [4]. We also find that FY11 accessions are underrepresented in the lowest income quintile, regardless of which classification we use. This finding is consistent with previous research on accessions in the past 10 years, such as [9]. For each of the income quintile classifications, we find that the highest share of FY11 NPS accessions is from the next-to-highest income quintile (the fourth quintile).

Figure 4. FY11 NPS accessions by census tract income quintile classifications<sup>a</sup>



a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data.

Within each income quintile in figure 4, the third bar represents the share of FY11 NPS accessions in the income quintiles when the income ranges are based on the 18- to 24-year-old population quin-

tiles. Note that the 18- to 24-year-old quintiles in figure 4 are based on the median household income for all households within a census tract, but they account for the 18- to 24-year-old population size by census tracts. The shares of FY11 NPS DOD accessions distributed across the 18- to 24-year-old quintiles are similar to those calculated by Heritage Foundation for FY06 and FY07 NPS accessions. The Heritage Foundation, in [9], found that FY07 accessions were spread across the five quintiles, respectively, as 10.7, 18.3, 21.7, 24.4, and 24.9 percent, virtually the same as our FY11 accession results using the 18- to 24-year-old population quintiles.

The differences in shares of DOD accessions when we use the 18- to 24-year-old population quintiles compared with the two other income quintile classification occur because youth are more likely than the general U.S. population to live in census tracts with lower median household incomes (as shown in table 1). Note, however, that this may result in part from the Census 2010 residence rules, under which college students studying away from home were instructed to record their usual residence (i.e., their on-campus or off-campus college residence) as opposed to their home of residence for voting or paying income taxes.<sup>33</sup>

## **FY11 PopRep socioeconomic income table**

This paper is a companion paper to the forthcoming FY11 PopRep. The income table in the FY11 PopRep will be based on the analysis presented here. For the FY11 PopRep income table for NPS and PS accessions, we recommend the use of a table similar to table 2.

By household income quintile, table 2 represents the number and share of FY11 NPS DOD accessions in each service, all DOD accessions, and all 18- to 24-year-olds. The income quintiles are the household unit income quintiles defined earlier. This presents the results for DOD accessions in a commonly seen format (income quintiles by households). It also allows for a more apparent comparison to the 18- to 24-year-old population. By presenting the share of 18- to 24-year-

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33. See [http://www.census.gov/population/www/cen2010/resid\\_rules/resid\\_rules.html#TWO](http://www.census.gov/population/www/cen2010/resid_rules/resid_rules.html#TWO)

olds, it highlights any differences between DOD accessions and the general youth population. For the rest of this paper, we present our results using the household income quintiles listed in table 2.<sup>34</sup>

Table 2. Median census tract household income, FY11 NPS accessions (percentages shown in parentheses)<sup>a</sup>

Median income <sup>b</sup>	Army	Navy	Marine Corps	Air Force	All DOD	18- to 24-year-old pop. <sup>c</sup>
Up to \$37,435	11,972 (20.1)	5,419 (16.7)	4,674 (16.2)	4,101 (15.0)	26,166 (17.6)	8,440,636 (28.1)
\$37,437–\$47,475	12,754 (21.4)	6,514 (20.0)	5,739 (19.9)	5,480 (20.1)	30,487 (20.6)	6,046,117 (20.2)
\$47,476–\$58,664	12,654 (21.2)	6,830 (21.0)	6,099 (21.1)	5,876 (21.5)	31,459 (21.2)	5,641,113 (18.8)
\$58,669–\$77,018	12,463 (20.9)	7,400 (22.8)	6,444 (22.3)	6,457 (23.6)	32,764 (22.1)	5,202,876 (17.3)
\$77,022 and over	9,803 (16.4)	6,341 (19.5)	5,915 (20.5)	5,404 (19.8)	27,463 (18.5)	4,657,218 (15.5)
Total	59,646	32,504	28,871	27,318	148,339	29,987,960

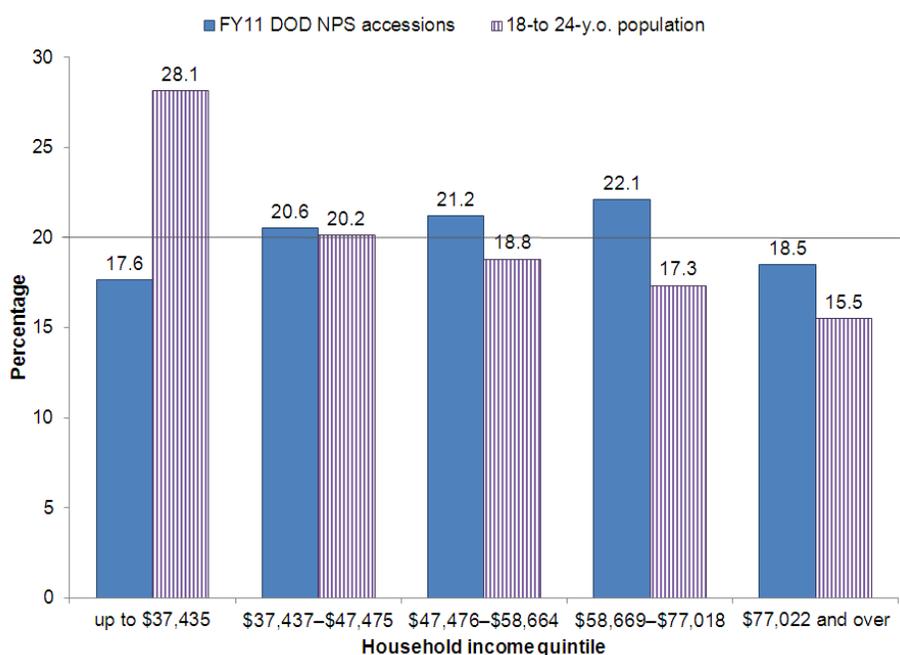
- a. Source: CNA tabulations of DMDC FY11 accessions data and 2006–2010 ACS data, adjusted to 2011 dollars. Information applies to the census tract reported by individual NPS accessions, who report a home of record in the 50 states or the District of Columbia and who were matched to a census tract.
- b. The median census tract income ranges used in this table represent the income quintiles for all U.S. households (as reported in the 2006–2010 ACS).
- c. The 18- to 24-year-old population only includes individuals living in census tracts with non-missing median household incomes.

Figure 5 graphically depicts the last two columns of table 2. Using the household quintiles, figure 5 shows FY11 accessions with the 18- to 24-year-old population. Of DOD accessions, 17.6 percent are from the lowest household income quintile versus 28.1 percent for 18- to 24-year-olds. Likewise, FY11 DOD accessions are more likely to come from middle and higher income quintiles than all 18- to 24-year-olds. For example, 18.5 percent of DOD accessions are from the highest

34. The table for PS accessions is in appendix B. FY10 accessions by the three quintile classifications are presented in appendix C. Note that the numbers presented in table 2 are the same as those in figures 5 and 6.

household income quintile compared with only 15.5 percent of all 18- to 24-year-olds.

Figure 5. FY11 DOD NPS accessions compared with the youth (18- to 24-year-old) population, by household census tract income quintile<sup>a</sup>

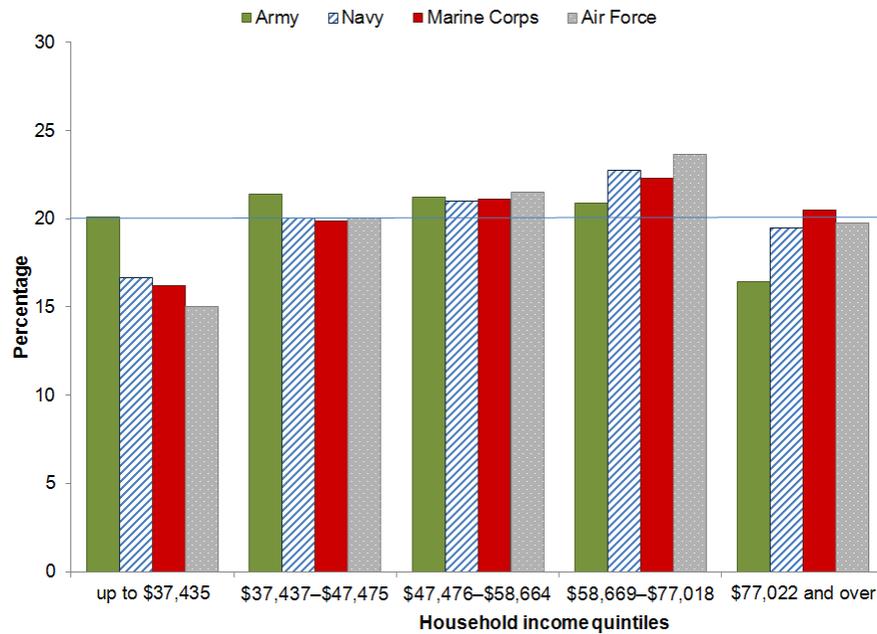


a. Source: CNA tabulations of DMDC FY11 DOD NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

As table 2 did, figure 6 shows the percentage of FY11 DOD NPS accessions by service and household income quintile. Among the four services, the Army has the highest share of FY11 accessions, 20.1 percent, who came from the lowest income quintile, or census tracts with median household incomes up to \$37,435. Note, however, that the 20.1 percent of Army FY11 accessions is lower than the 28.1 percent of 18- to 24-year-olds who live in census tracts within the lowest income quintile (as shown in table 2).

The Marine Corps had the highest share of FY11 accessions, 20.5 percent, coming from the highest income quintile, with median census

Figure 6. FY11 NPS accessions by service and census tract household income quintile<sup>a</sup>



a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

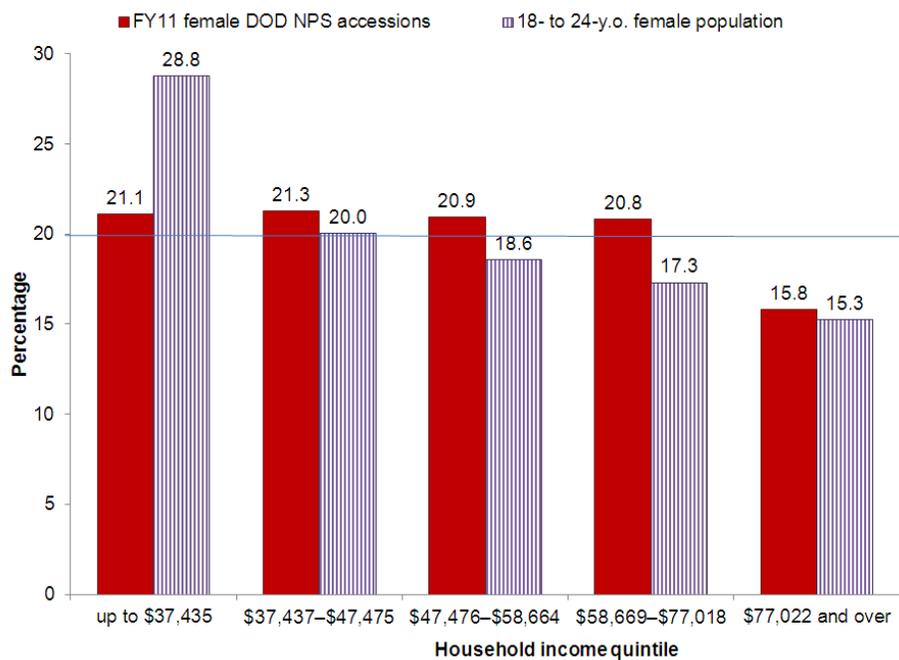
tract median household incomes of \$77,022 and over. This finding is likely attributable, in part, to the gender composition of the services. As we discuss next, we find differences in the census tract incomes of male versus female accessions, and the Marine Corps accesses a higher share of men than the Army, Navy, or Air Force. For example, among NPS FY11 accessions, 92 percent of Marine Corps accessions were men compared with 81 percent of Air Force accessions.

## FY11 NPS accessions by gender

The gender composition of accessions entering the military does not reflect the U.S. population. Relative to the U.S. population, men are overrepresented in the services: 50 percent of the 17- to 35-year-old civilian population and 83 percent of FY11 DOD NPS accessions are

men.<sup>35</sup> Figures 7 and 8 show male and female FY11 DOD NPS accessions compared with the 18- to 24-year-old population by household income quintiles. Both figures reflect similar patterns as shown in figure 5; a higher share of accessions are in the three highest median household income quintiles than the 18- to 24-year-old population.

Figure 7. FY11 female NPS accessions compared with the 18- to 24-year-old female population<sup>a</sup>



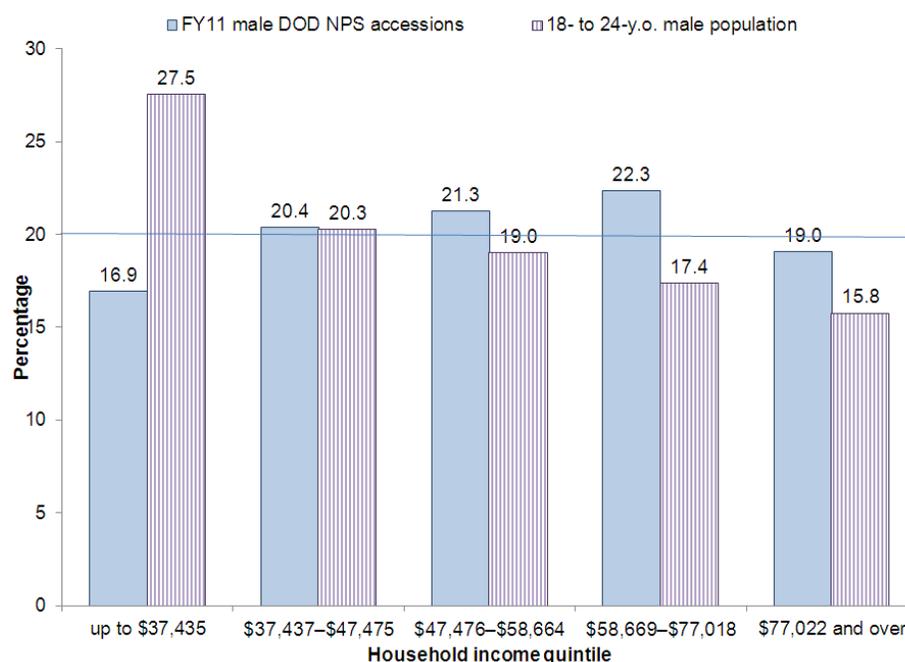
a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

Figures 7 and 8 illustrate a difference in the socioeconomic characteristics of accessions by gender. Female accessions, compared with male accessions, are slightly more likely to come from the lowest income quintile. Among female accessions, 21.1 percent were from the lowest

35. Data on the noninstitutional civilian population are from the BLS’s Current Population Survey, October 2010 through September 2011 average. Accessions data are provided by DMDC.

income quintile compared with 16.9 percent of male accessions. This difference by gender in the lowest income quintile is true for all the services, particularly the Army (not shown). Among FY11 DOD NPS Army accessions, 25.1 percent of women were from the lowest income quintile compared with 19.1 percent of men.

Figure 8. FY11 male NPS accessions compared with the 18- to 24-year-old population<sup>a</sup>



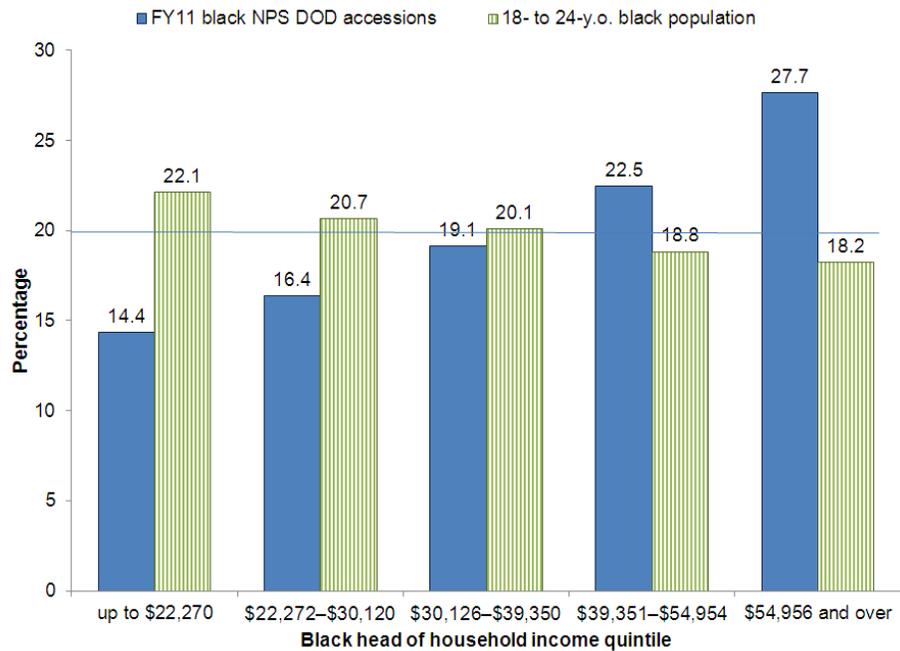
a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

## FY11 white and black NPS accessions

Figures 9 and 10 show black and white NPS accessions, respectively, by black and white head of household income quintile distributions. In figure 9, we use the median income of census tracts of black heads of households to determine income quintiles. When black accessions are tabulated based on black head of household income quintile ranges, we find that FY11 black accessions are overrepresented in the highest and second-highest income quintiles. The 18- to 24-year-old

black population is more reflective of black households (in terms of income) than black FY11 NPS DOD accessions.

Figure 9. FY11 black NPS accessions compared with the 18- to 24-year-old black population, by black head of household census tract income quintile<sup>a</sup>



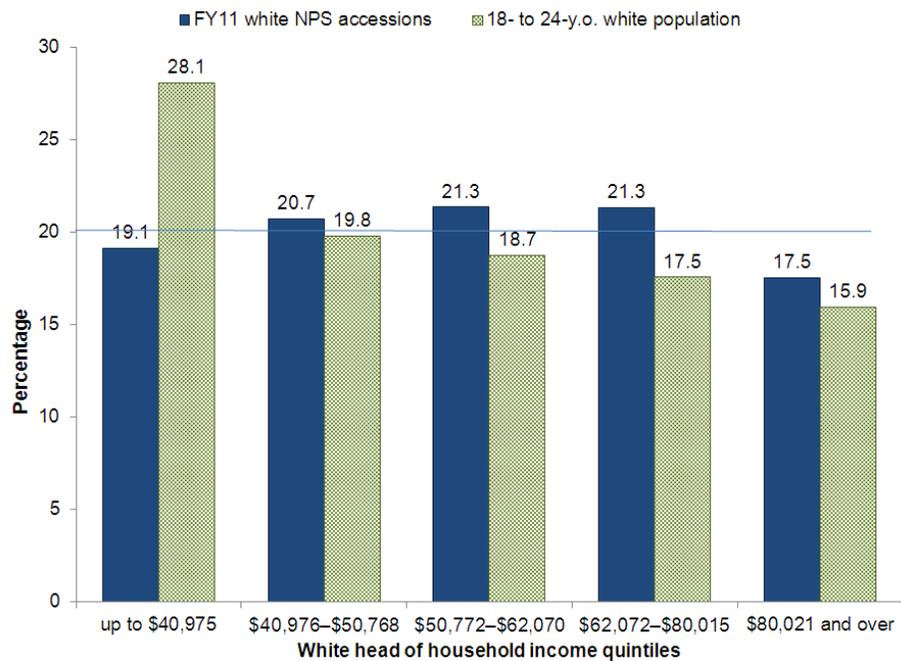
a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

In figure 10, we use the median income of census tracts for white heads of households to determine income quintiles. By these quintiles, white accessions are slightly underrepresented in the lowest quintile. This is in comparison to the 18- to 24-year-old white population, which is overrepresented in the lowest white head of household income quintile.

Note that the black head of household income quintile dollar amounts (in figure 9) differ from the white head of household income quintile dollar amounts (in figure 10). Those differences

reflect differences in the income characteristics of the census tract within which whites and blacks live. For example, the top 20 percent of black heads of households fall within a wider income range than the top 20 percent of white heads of households. This difference is consistent with the findings of [47], which also used the 2006-2010 ACS. The author of [47] note that whites and Asians are “more likely to live in tracts with lower poverty rates than in tracts with higher poverty rates,” while blacks “were over-represented in tracts with higher poverty rates and under-represented in tracts with lower poverty rates”[47, p. 6].

Figure 10. FY11 white NPS accessions compared with the 18- to 24-year-old white population, by white head of household census tract income quintile<sup>a</sup>



a. Source: CNA tabulations of DMDC FY11 NPS accession data and 2006–2010 ACS data, adjusted to 2011 dollars.

Note that our findings on the income characteristics of where accessions come from by race does not explore the extent to which income differences between white and black accessions are attributable to

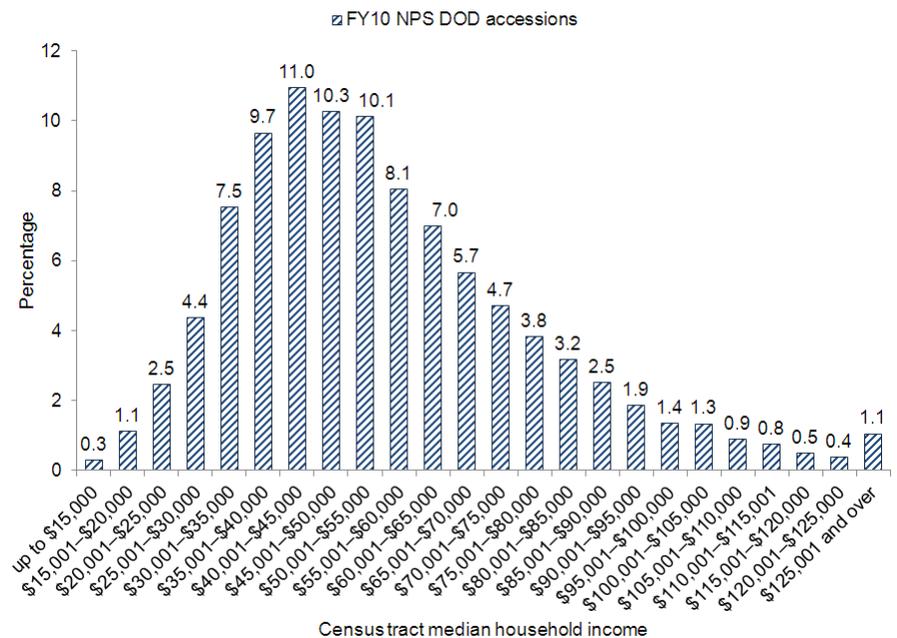
those aforementioned differences in income by race in society versus any potential recruiting differences. Teasing those factors out, as well as exploring the socioeconomic characteristics across all racial and ethnic categories, was outside the scope of this current study effort.

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## Findings for FY10 NPS accessions by income quintile and occupational category

In this section, we analyze the income backgrounds of FY10 NPS accessions.<sup>36</sup> As with FY11 accessions, we linked the FY10 accessions with the 2006–2010 ACS to get data on census tract median household incomes. We focus on NPS accessions, who were the majority of FY10 accessions. Figure 11 shows the income distribution of FY10 NPS accessions by census tract median household income.

Figure 11. NPS accessions' census tract median household income<sup>a</sup>



a. From CNA tabulations of DMDC FY10 NPS accession data and 2006–2010 ACS data.

36. We do not include a geographical analysis since that can be found for FY10 DOD accessions in [37]. Additional analysis on FY10 accessions is included in appendix C.

The socioeconomic income characteristics of FY10 NPS accessions are similar to the characteristics of FY11 NPS accessions. As with FY11 accessions (refer back to table 2), we find that FY10 accessions across the services tended to come from higher median income census tracts than the 18- to 24-year-old population. Also presented in appendix C, FY10 Army accessions tend to come from lower median income census tracts than do accessions from the other services. For example, 20.5 percent of FY10 Army accessions were from the lowest income quintile compared with 15.3 percent of Air Force accessions. Although Army accessions are more likely to come from lower income census tracts than other accessions, they are less likely to come from lower income census tracts than the general youth population (the 18- to 24-year-old population). As with FY11 accessions, we also find that a higher share of FY10 female accessions are from the lowest and next-to-lowest income quintiles compared with male accessions.<sup>37</sup> One difference between our FY10 and FY11 accession data is that, for FY10 accessions, we have data on military occupation.

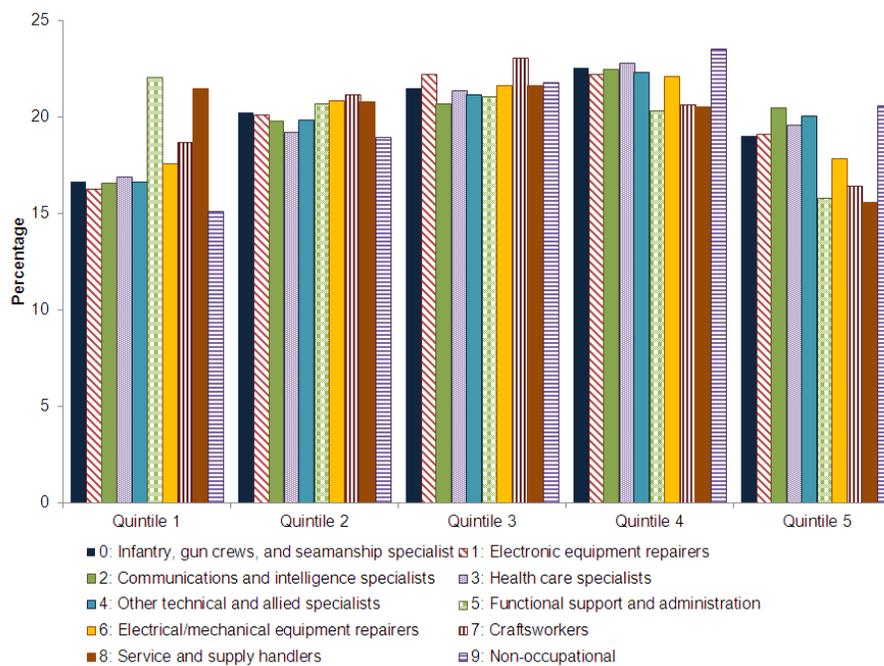
As mentioned earlier, socioeconomic characteristics include type of job. Accessions are engaged in different types of occupations. Military occupations can vary, for example, by the level of training needed to qualify, casualty risk, advancement opportunities, and occupational-specific bonuses, such as selective reenlistment bonuses. We tracked accessions 16 months after enlistment and observed their initial military occupations, on the DMDC personnel files.<sup>38</sup> Figure 12 shows, for each second-digit DOD occupational category, the income quintiles from which those accessions came. The broad two-digit DOD occupational codes illustrate a variety of jobs ranging from administrative positions to occupations that are termed *Non-Occupational*, a category that includes patients, students, and trainees who—for various reasons—are not (yet) occupationally qualified.

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37. See appendix C.

38. The first digit of the DOD occupational code designated all of our FY10 accessions as enlisted. Our analysis excludes FY10 accessions with a missing occupational category. FY10 accessions in the missing occupational category include those who left the military before 16 months of service.

Figure 12. FY10 NPS accessions by occupational category and household income quintile<sup>a</sup>



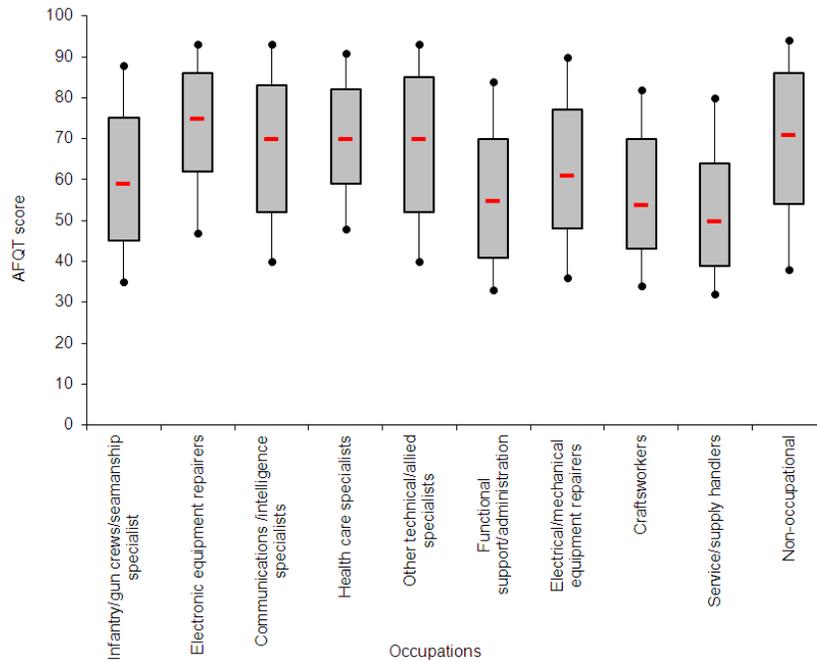
a. Source: CNA tabulations of DMDC FY10 NPS accession data and 2006–2010 ACS data.

We find differences in the household quintile characteristics of FY10 NPS accessions by occupational category. For example, the highest share of FY10 NPS accessions in the lowest income quintile were in the functional support and administration or the service and supply handlers occupations. That is, accessions that go into these two occupations are more likely than their peers to be from lower income census tracts.

However, accessions are not randomly assigned to occupations. For example, accessions are assigned, in part, based on their test scores on the Armed Forces Qualification Test (AFQT). Accessions' AFQT scores could be correlated with their families' socioeconomic characteristics, such as neighborhood income levels. For example, schools in high-income census tracts may differ from schools in low-income census tracts.

For FY10 accessions, figure 13 shows the AFQT score distribution by occupational group. The red marks in the boxes in figure 13 show the 50<sup>th</sup> percentile, or median, AFQT scores of FY10 accessions by occupational category. So, among the occupation categories, FY10 accessions in functional support and administration, craftworkers, and service and supply handlers had the lowest median AFQT scores. In contrast, FY10 accessions in electronic equipment repairers and non-occupational occupations had, on average, the highest median AFQT scores. FY10 accessions, from all services, had a median AFQT score of 60. Figure 13 also shows the spread of AFQT scores within the two-digit DOD occupational categories.<sup>39</sup>

Figure 13. FY10 NPS accessions AFQT scores by DOD occupational group<sup>a</sup>



a. Source: CNA tabulations of DMDC FY10 NPS accession data.

39. The bottom and top edges of the box plots, respectively, show the 25<sup>th</sup> and 75<sup>th</sup> percentiles of those AFQT scores. The bottom and top dots in figure 15 represent the 10<sup>th</sup> and 90<sup>th</sup> percentiles, respectively.

# Summary and concluding thoughts

## What was already known

Previous research on the income backgrounds of military accessions consistently finds that accessions come from a wide range of neighborhood income levels [4, 5, 7, 8, 9]. There are differences, however, in the income backgrounds of military accessions; namely, there are changes in income backgrounds over time and differences in those characteristics cross-sectionally, by service and by race/ethnicity. Studies on accessions in the 1970s and 1980s suggested that, while accessions did come from diverse income levels, they—particularly white accessions—were slightly more likely to come from lower income backgrounds than their civilian counterparts (e.g., see [5, 6]). In the past 10 years, the literature shows that accessions generally are less likely to come from lower income brackets [7, 8, 9] and are more likely to come from middle-income and upper-middle-income neighborhoods.

In addition, research has found differences in accessions' socioeconomic characteristics by service (see [4 and 27 through 30]). Across studies, findings suggest that there are differences in socioeconomic characteristics by race and changes in the socioeconomic characteristics of accessions over time. For example, improvements in the family income backgrounds of black accessions have been noted [4] and are suggested by comparing studies—in particular, [3] and [4]. It is not clear from the existing research, however, whether or to what degree these findings reflect increased census tract income segregation [25] versus true changes in the income of accessions' families. This uncertainty highlights how the use of neighborhood income only approximates accessions' family incomes.

Although there are differences in enlistment proclivity by geographic region, such as at the state and county level (as shown, for example, by [39]), the almost 40 years of literature on the income backgrounds

and family incomes of military accessions has found that accessions come from a diverse range of neighborhoods in terms of income.

## What we did

In this paper, our analytical focus was on the income of DOD accessions' neighborhoods—measured at the census tract level—compared with that of the U.S. population. Our approach was similar to that of [9] in that we linked DMDC-provided accession addresses with census income data. We updated the previous analysis by examining FY10 and FY11 non-prior-service accessions with homes of record in the United States. We first determined the census tract income of accessions and binned them into income quintile ranges based on household, population, and 18- to 24-year-old population quintiles. Then using household income quintiles, we examined FY11 accessions by service, gender, and differences between black and white accessions. For FY10 accessions, we examined NPS accessions' census tract income by their initial military occupations.

## What we found

Socioeconomic characteristics encompass a number of factors, including geographic location, income, and type of occupation. In terms of geographic area, NPS accessions are more likely to come from certain parts of the United States. For example, among FY11 NPS accessions, a higher number and relative population share of accessions are from southern states. This finding has been shown for enlisted accessions in previous fiscal years' PopRep reports.

In terms of income of the census tract from which an NPS accession comes, in FY10 and FY11, we find no evidence of a so-called poverty draft or accessions disproportionately coming from the lowest income quintile. We considered three separate income quintile classifications. Regardless of the classification used, we find that accessions come from across all census tract income quintiles. Regardless of quintile classification, we also find that FY10 and FY11 NPS accessions are underrepresented in the lowest income quintile. In addition, we find that a lower share of FY10 and FY11 NPS accessions than the U.S. youth population are in the lowest income quintile.

We do find differences among NPS accessions in their census tract income quintiles by service and gender. For example, compared with the other services' FY10 and FY11 NPS accessions, the Army had the highest share of accessions from the lowest household income quintile.

FY10 and FY11 female accessions are underrepresented relative to the share of women in the youth population. Although they are underrepresented, compared with their male counterparts, a higher share of FY10 and FY11 female NPS accessions are in the lowest and next-to-lowest income quintiles.

For FY11 black and white NPS DOD accessions, we found differences in the income characteristics of the census tracts from which they come. We classified FY11 black and white NPS DOD accessions by black and white head of household income quintiles and compared them with the 18- to 24-year-old population. We find that black accessions are overrepresented in the highest income quintile when those income quintiles are designated by black heads of households. Compared with our findings for blacks, we find that white accessions are more representative of households headed by whites.

Finally, we tracked FY10 accessions for 16 months and observed their initial military occupations. By occupational category, we found differences in the share of FY10 NPS accessions across income quintiles. For example, by occupational category, FY10 NPS accessions in the functional support and administration and the service and supply handler occupations had a higher share in the lowest income quintile than any other occupational category. We found suggestive evidence that some of those differences relate to differences, by occupational category, in AFQT score distributions.

## What we recommend

This paper is a companion paper to the FY11 PopRep. The income table used in the FY11 PopRep will be based on the analysis presented here. For the FY11 PopRep income table for NPS and PS accessions and for future PopReps, we recommend the use of a table similar to table 2. Table 2 presents the percentage of accessions in each U.S.

household income quintile based on census tract median incomes. We also present the same for all DOD accessions and for all 18- to 24-year-olds. By presenting the share of the 18- to 24-year-old population by these income quintiles, it clearly illustrates differences between DOD accessions and the youth population.

Women are underrepresented in the military compared with their share in the U.S. population. Despite this, we find higher shares of female accessions, compared with male accessions, from census tracts with lower median incomes. This gender difference suggests that an increase in recruiting goals for female recruits may change the income distribution of women entering the service. We recommend that the services take our findings into consideration-and potentially conduct further research on gender-based differences in recruiting.

For FY11 black and white NPS DOD accessions, we presented our findings by black and white head of household income quintiles. Among black accessions, we find that they are overrepresented from census tracts within the highest income quintile of households headed by blacks. Note, however, that the quintile income ranges differ between households headed by whites and those headed by blacks. For example, the top 20 percent of white households are from higher income census tracts than the top 20 percent of black households. There are differences by race in the socioeconomic characteristics of accessions reflecting race/ethnicity income differences in the United States. It was outside the scope of this study (1) to determine if there were other factors at play in differences in income characteristics of accessions and (2) to explore socioeconomic characteristics across all racial and ethnic categories. We recommend that, if the services are interested in increasing recruitment of minorities, they consider studying this issue further.

## Appendix A: Census tract income

### Considerations in analyzing recruits' income backgrounds

Following the AVF's implementation, researchers began to explore whether the volunteer U.S. military was representative of the U.S. population in terms of socioeconomic characteristics. At that time, as is true today, individual-level data on *all* recruits' parents' or caregivers' socioeconomic characteristics, particularly income, were not readily available. Thus, studies on the socioeconomic representation of recruits in terms of family income have used either survey data on family income (or family income proxies) or the income characteristics of recruits' neighborhoods.

Unfortunately, survey data are subject to measurement error (i.e., recruits may not have an accurate idea of their parents' incomes) and/or small sample sizes. As Golding and Adedeji, who used data from the 2000 National Longitudinal Survey of Youth (NLSY) in their 2007 CBO report, noted:

[T]he disadvantage of using the NLSY is that the sample of enlisted servicemembers in the survey totaled *just over 100 people*. [10, p. 30, emphasis added]

The Defense Manpower Data Center (DMDC) collects accession data on recruits that include a recruit's last known address. The existing literature using personnel data uses recruits' neighborhood incomes as a proxy for recruits' family incomes (e.g., see [3, 4, 7, 8, 9]). How the recruits' neighborhood is defined, however, is important because population differences in geographic areas, such as between ZIP code and census tracts, are not trivial. ZIP code areas are typically larger in population size than census tract areas. Census tracts cover between 1,200 and 8,000 people and are optimally 4,000 [48]. In comparison, ZIP codes are organized for mail distribution, are not geographic areas, are not established to reflect a specific population size, and

change frequently. Thus, the Census “created the ZCTAs [ZIP Code Tabulation Areas] specifically to address the inadequacies of ZIP codes for Census data tabulation” [49]. As Fernandez noted in his 1989 CBO report,

the finer the geographic breakdown of home areas that is available, the closer will be the average population characteristics to the characteristics of the individuals’ own families. [4, p. 39]

Using median income within a designated geographic area, as done by [3, 7, 8, 9], will account for nonsymmetrically distributed income data, more so than using average income.<sup>40</sup> In addition, [3] estimated in the early years of the AVF that ZIP code neighborhood-level income data closely matched the distribution of individual-level income as reported on the *Armed Forces Entrance and Examination Survey*. Since then, income segregation at the census-tract neighborhood level has increased, particularly for black and Hispanic families [25]. These two studies [3, 25] provide *suggestive evidence* that census-tract-level neighborhood income data, while not exact, will most closely approximate recruits’ family incomes.

The studies of Cooper, Fernandez, Kane, and Watkins and Sherk used data from the Decennial Censuses. However, these studies used different U.S. population comparison groups. Cooper used income by ZIP code but did not weight the income [3]. Fernandez [4] and Kane [7, 8] also used ZIP-code-level income, but Fernandez weighted by population size per neighborhood, while Kane weighted by the 18- to 21-year-old population. In an update of Kane’s work, Watkins and Sherk used census-tract-level income weighted by the 18- to 21-year-old population [9].

The Decennial Census long-form questionnaire, which included questions on income, has been replaced by the American Community Survey (ACS).<sup>41</sup> On average, the long-form Census surveyed 1 in

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40. Cooper found similar results when using median and average neighborhood income [3].

41. See [50] for further discussion of the differences between the Decennial Census long-form questionnaire and the ACS.

every 6 Americans, compared with 1 in 40 for the ACS. However, unlike the long-form Census that was administered every 10 years, the ACS is fielded every year to generate 1-year, 3-year, and 5-year data samples. Each sample differs by the geographical area and population size it reflects, in that the 1-year, 3-year, and 5-year ACS samples cover population sizes of 65,000 plus, 20,000 plus, and census tracts, respectively. Some data variables on the 5-year ACS are also available at the census block group level. Thus, the 5-year ACS is the most comparable instrument to the Decennial Census long form.<sup>42</sup>

## DOD accession data

We used FY10 and FY11 accession files linked with Military Entrance Processing Command data on addresses. There were 159,242 and 153,314 FY10 and FY11 NPS DOD accessions, respectively. Of those, we only include NPS DOD accessions with homes of record in the 50 states and the District of Columbia.<sup>43</sup> As part of our data analysis, we cleaned the accession addresses to increase our match rate with census tracts. For our NPS analysis, we linked 153,955 and 148,339 of FY10 and FY11 accessions, respectively, to their census tract.<sup>44</sup>

## Census tract median income data

For our analysis, we used the ACS 2006-2010 median household incomes. The 5-year ACS has replaced the decennial Census long form, and the 2006–2010 ACS is weighted by the 2010 Census data. The median income on the 2006–2010 ACS is already inflation-

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42. The 2006–2010 ACS 5-year estimates at the census tract level are available at the Census' New American Factfinder (<http://factfinder2.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>) and available in CD format from the Census Bureau

43. Among FY10 and FY11 NPS accessions, 2,056 and 1,959 accessions, respectively, had home of record addresses that were not in the 50 states or in the District of Columbia. These accessions' addresses either were outside the United States or were unknown.

44. For the 2,446 FY11 prior-service accessions, we linked 2,299 with their census tract.

adjusted to 2010 dollars. When we present 2011 dollars, we adjust the 2010 ACS dollars for inflation using the Bureau of Labor Statistics (BLS) research series of the Consumer Price Index for All Urban Consumers (CPI-U-RS), all items. In our analysis, we included only census tracts with reported median household income. We included 37 census tracts that had reported median household income values of \$2,499 or \$250,001. Those values indicate that the actual median income was either below \$2,499 or above \$250,001. When we exclude those 37 census tracts there is virtually no difference in the distribution of accessions across quintiles. Our median household incomes for all, white, and black households were from tables B19013, B19013A, and B19013B, respectively, of the 2006–2010 ACS. We used household and population numbers only for census tracts with a “non-missing” median household income. Households are occupied housing units. In determining income quintiles by households, by total population, and by the 18- to 24-year-old population, we ranked census tracts by median household income and then designated 20-percent breaks. In cases where the 20-percent break fell within a census tract, we assigned that census tract to the higher of the two quintiles.

## Appendix B: FY11 prior-service accessions

Table 3 shows the share of FY11 prior-service (PS) accessions by household income quintile.

Table 3. Median census tract household income, FY11 DOD PS accessions (percentages shown in parentheses)<sup>a</sup>

Median income <sup>b</sup>	Army	Navy	Marine Corps	Air Force	All DOD	18- to 24-year-old pop.
Up to \$37,435	369 (18.9)	11 (13.4)	3 (15.8)	34 (13.7)	417 (18.1)	8,440,636 (28.1)
\$37,437–\$47,475	429 (22.0)	15 (18.3)	1 (5.3)	47 (19.0)	492 (21.4)	6,046,117 (20.2)
\$47,476–\$58,664	403 (20.7)	21 (25.6)	4 (21.1)	57 (23.0)	485 (21.1)	5,641,113 (18.8)
\$58,669–\$77,018	423 (21.7)	21 (25.6)	5 (26.3)	62 (25.0)	511 (22.2)	5,202,876 (17.3)
\$77,022 and over	326 (16.7)	14 (17.1)	6 (31.6)	48 (19.4)	394 (17.1)	4,657,218 (15.5)
Total	1,950	82	19	248	2,299	29,987,960

- a. Source: CNA tabulations of DMDC FY11 PS accessions data and 2006–2010 ACS data, adjusted to 2011 dollars. Information applies to the census tract reported by individual PS accessions who report a home of record in the 50 states or the District of Columbia and who were matched to a census tract.
- b. The median census tract income ranges used in this table represent the income quintiles for all U.S. households (as reported in the 2006–2010 ACS).

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## **Appendix C: FY10 NPS DOD accessions' income quintiles, by service and gender**

In this appendix, we present additional FY10 NPS DOD accession results by census tract income quintiles, service, and gender. The sources for the three figures that follow are the same: CNA tabulations of DMDC FY10 NPS accession data and 2006–2010 ACS data.

### **FY10 NPS DOD accessions by census tract income quintiles**

Figure 14 shows FY10 NPS DOD accessions assigned to income quintiles based on quintiles of households, the total population, or the youth population (18- to 24-year-olds). Regardless of the classification, FY10 NPS accessions are underrepresented in the lowest income quintile. Using household and population quintiles, accessions are underrepresented in the lowest and highest quintiles. Under our 18- to 24-year-old quintile classification, FY10 NPS DOD accessions are overrepresented in the highest income quintile.

### **FY10 NPS DOD accessions by service**

Figure 15 shows the share of NPS accessions, by service, using median census tract income ranges for the household quintiles. Of the four components, Army accessions have a higher share, 20.5 percent, of accessions in the lowest household income quintile than the other components.

### **FY10 NPS DOD accessions by gender**

As with FY11 accessions, female FY10 accessions are more likely than male accessions to be from the lowest or next-to-lowest income quintiles (see figure 16). For example, 21.5 percent of FY10 female accessions were from the lowest income quintile compared with 17.5 percent of male accessions.

Figure 14. FY10 NPS accessions by census tract income quintile

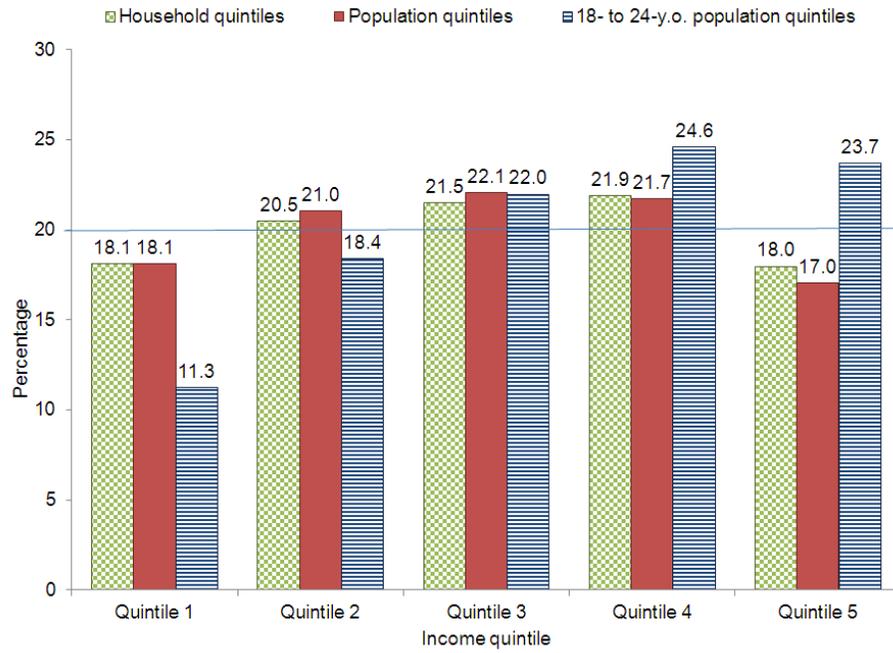


Figure 15. FY10 NPS accessions by household income quintile by service

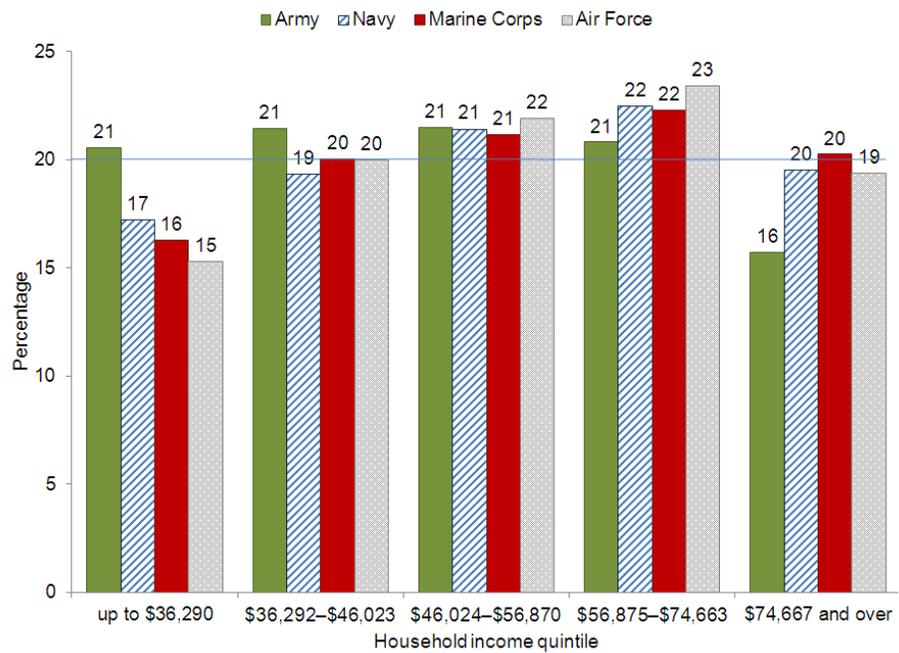
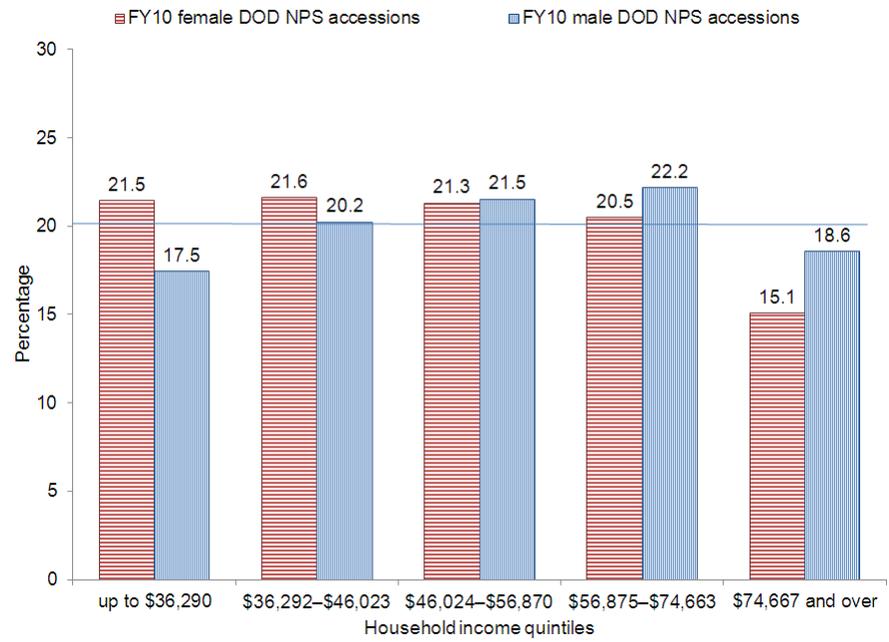


Figure 16. FY10 NPS accessions by gender and household income quintile



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