Population Representation in the Military Services
Fiscal Year 2009 Report

Summary

Introduction

This is the 37th annual Department of Defense (DoD) report on social representation in the U.S. military services and the Coast Guard. The fiscal year (FY) 2009 technical appendixes (A–E) provide current data on the demographic, educational, and aptitude characteristics of applicants, new recruits, enlisted personnel, and officers of the active and reserve components (AC and RC), as well as time-series information on selected variables. Except where otherwise noted, data are provided by the Defense Manpower Data Center (DMDC). Due to slight differences in definitions among the services, data provided may not match statistics reported by the Directorate for Information Operations and Reports, other DOD agencies, or the individual military services.

This summary provides an overview of recent personnel trends for the DoD AC and RC, and for the U.S. Coast Guard. It references data from the tables in the technical appendixes. Also included is a discussion of the 2009 economic recession and the recession's impact on some DoD personnel trends. That discussion features a review of recent studies and a presentation of some new research findings.

Section I presents an overall summary, Sections II and III cover the DoD AC and RC, respectively. Section IV discusses the US Coast Guard, while Section V provides a discussion of the relationship between labor market conditions and accession quality.

Section I: Summary statistics

Fiscal year (FY) 2009 saw a continuation of significant U.S. military involvement in Iraq (Operation Iraqi Freedom) and Afghanistan (Operation Enduring Freedom) and modest growth in both the AC and RC of the U.S. armed forces to support that involvement. During the year, troops were shifted from Iraq to Afghanistan as U.S. involvement in the one theater of operations began to wind down and involvement in the other intensified.

After the November 2008 election, President George W. Bush approved the deployment of an additional Army Brigade Combat Team (BCT) of approximately 9,000 troops to Afghanistan. In February 2009, 1 month after taking office, President Barack Obama approved plans to boost Afghanistan force levels by another 21,000 troops. A comprehensive Afghanistan strategy review that summer and fall by the Obama Administration resulted in a decision to deploy 30,000 more troops.[1] By the end of the fiscal year, troop levels in Afghanistan were approaching those in Iraq, where U.S. military involvement was drawing down from a 2007 peak of 172,000 troops.[2] U.S. troop levels in the Afghanistan and Iraq theaters together averaged 186,000 soldiers, sailors, airmen, and marines over the course of the year. Those troops were deployed from an FY 2009 endstrength base of 1.4 million active-duty troops and 850,000 reservists.

An FY 2009 snapshot of the AC and RC is provided in Table 1. It displays the by-service breakouts for endstrength (those currently serving) and accessions (those who were added to the ranks) during the fiscal year.

The FY 2009 AC endstrength for the U.S. armed forces totaled 1.405 million soldiers, sailors, airmen, and marines. That figure represented a slight increase from the DoD active-component total of 1.388 million that was contained in the FY 2008 PopRep report.[3] The largest of the military services in FY 2009 was the Army, which had an active-duty endstrength (enlisted plus officers plus warrant officers) of 549,015. That endstrength level for the Army represents growth of just under 10,000 soldiers from the service's endstrength of 539,675 in the FY 2008 PopRep report, and it reflects continued expansion toward an authorized endstrength of 569,000.[4] The Marine Corps also grew from FY 2008 to FY 2009, while the Navy and Air Force decreased in size. The growth in the Army and Marine Corps slightly more than offset the reduction in the Navy and Air Force, leading to the DoD-wide growth of roughly 2,000 troops.

[1] The decision was announced by President Obama in a speech at the U.S. Military Academy at West Point on December 1, 2009.
[2] Troop figures are taken from [1].
[3] The FY 2008 PopRep report is available for download at the following DoD website http://prhome.defense.gov/MPP/ACCESSION%20POLICY/PopRep2008/index.html.
[4] Secretary of Defense Robert Gates announced the decision to boost Army endstrength on July 20, 2009.

Table 1: Endstrength and accessions for AC and RC of the U.S. military and U.S. Coast Guard, FY 2009

	Enlisted personnel[1]		Officers		Warrant officers	
Component	End-strength	Accessions	End-strength	Accessions	End-strength	Accessions
Active duty						
Army	458,220	70,044	75,619	7,875	15,176	1,464
Navy	272,208	35,519	50,385	4,068	1,646	146
Marine Corps	182,366	31,407	18,733	1,678	1,976	265
Air Force	263,351	31,983	65,496	4,711	0	0
DoD total	**1,176,145**	**168,953**	**210,233**	**18,332**	**18,798**	**1,875**
Reserves[2]						
ARNG	317,725	57,997	33,140	4,310	7,526	1,088
USAR	169,317	36,673	33,010	3,828	2,970	413
USNR	51,999	12,100	14,387	1,896	122	19
USMCR	34,814	9,358	3,363	942	333	60
ANG	94,870	10,006	14,326	1,198	0	0
USAFR	53,233	9,027	14,753	1,619	0	0
DoD total	**721,958**	**135,161**	**112,979**	**13,793**	**10,951**	**1,580**
Coast Guard						
Active duty	34,062	3,861	6,722	530	1,642	228
Reserves	6,301	950	1,222	151	170	22

Notes:
1. Enlisted accessions for all components include non-prior service (NPS) and prior-service (PS) accessions. The numbers reported here may differ slightly from numbers previously reported because they were compiled after the Services had completed data reconciliation.
2. The RC consists of the Army National Guard (ARNG), Army Reserve (USAR), Navy Reserve (USNR), Marine Corps Reserve (USMCR), Air National Guard (ANG), and Air Force Reserve (USAFR).

The RC also grew from FY 2008 to FY 2009. RC endstrength in FY 2009 totaled 845,888 soldiers, sailors, airmen, and marines; the corresponding figure for FY 2008 (from the FY 2008 PopRep) was 838,278. The Army National Guard (ARNG) was the largest component of the reserve force. It decreased in size from FY 2008 to FY 2009, by approximately 2,000 soldiers. That reduction was more than offset by growth in the second-largest component of the reserve force, the Army Reserve (USAR), which grew by roughly 8,000 troops. None of the other four elements of the reserve force changed in size by more than 2,000 troops from FY 2008 to FY 2009.

For the Coast Guard, FY 2009 saw slight growth in the AC and a slight decrease in the size of the RC from FY 2008. The AC added 1,062 and the RC shed 277.

Section II: The DoD AC

Enlisted accessions and force

In FY 2009, the DoD AC enlisted force stood at 1,176,145 soldiers, sailors, airmen, and marines. Enlisted accessions during the year totaled 168,953 personnel, which includes both non-prior service (NPS) and prior service (PS) accessions. NPS accessions accounted for the bulk of the total—the NPS/PS split was 161,588 and 7,365, respectively.

Figure 1: Enlisted endstrength and accessions, FY 1973-2009

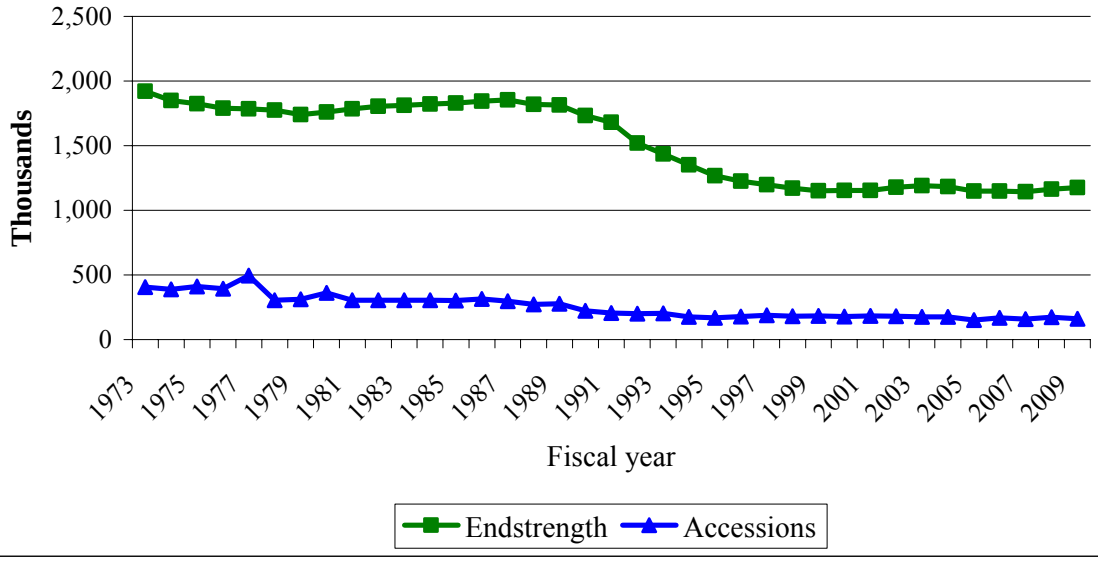


Figure 1 shows how enlisted endstrength and accessions have fluctuated since the institution of the all-volunteer force (AVF) in 1973.[5] Both accessions and endstrength were much larger then than they are today. Accessions in FY 1973 were more than double their level in FY 2009, while endstrength then was not quite double what it is today. The relatively greater decline in accessions has contributed to the enlisted force becoming more senior (more heavily weighted toward the senior pay grades). The FY 1977 blip in accessions is attributable to the extra quarter—the so-called "transition quarter"—that resulted from the redefinition of a fiscal year.[6] There was no such blip for endstrength because endstrength is a snapshot of a point in time and accessions are a flow over time.

[5] Only NPS accessions are displayed in Figure 1.
[6] For FY 1976 and earlier, the fiscal year ran from July 1 through June 30. Starting with FY 1977, the fiscal year ran from October 1 through September 30.

Of the services, the Army had the most NPS accessions in FY 2009—63,667 soldiers. Army accessions in FY 2009 were nearly twice that of the next service, the Navy, which accessed 35,216 sailors. The Army's larger accessions total reflects the push to expand the active-duty Army to an endstrength of 569,000 soldiers. The FY 2009 accessions totals were similar for the Air Force and Marine Corps—31,780 and 30,925, respectively.[7] The Marines accessed nearly as many as the Air Force and Navy despite having a considerably smaller service because the Marines are a more junior force (more heavily weighted toward the lower enlisted pay grades), and the Marines are growing while the Navy and Air Force are both downsizing.

Enlisted applicants and accessions. Not everyone who applies to serve in the U.S. military is permitted to serve or ends up serving. The U.S. military defines an applicant as someone who expresses interest in military service by taking the Armed Services Vocational Aptitude Battery (ASVAB). There can be a number of reasons why an applicant may wash out rather then entering basic training: a low ASVAB score, failure to meet physical/psychological standards, prior drug use or criminal activity, or simply a change of heart on the recruit's part about serving in the military. Table 2 provides a comparison of FY 2009 applicants (those who took the ASVAB) and enlisted NPS accessions (those who entered basic training).

A key metric for evaluating prospective recruits is the Armed Forces Qualification Test (AFQT) score. A recruit's AFQT score is calculated from his or her score on the ASVAB. All recruits must take the ASVAB, which is a series of tests that indicate one's aptitude for military service and potential occupational placement within the military. ASVAB scores are sorted into six categories, which correspond to the following percentile ranges:

- Category I: 93rd to 99th percentile
- Category II: 65th to 92nd percentile
- Category IIIA: 50th to 64th percentile
- Category IIIB: 31st to 49th percentile
- Category IV: 10th to 30th percentile
- Category V: Below the 10th percentile

Recruits who score in categories I through IIIA—the 50th percentile and above—are considered to be the best candidates for enlistment. The DoD goal is that at least 60 percent of NPS accessions be drawn from those categories.

As table 2 shows, the military is selective about those accepted for service. The pool of those accessed into the military is more heavily weighted toward the higher AFQT score categories than is the pool of recruits who took the ASVAB. AFQT categories I, II, and IIIA each provided a higher share of accessions than those who took the exam. Together, those three categories provided 72.2 percent of accessions while representing 59.3

[7] These numbers differ from those in table 1 because we included both NPS and PS accessions in that table.

percent of exam takers.[8] Less than 1.0 percent of accessions came from category IV and none came from category V.

Table 2: Profile of enlisted applicants and accessions, FY 2009

Measure	Applicants (percent)	Accessions (percent)
AFQT category		
I	5.73	6.67
II	31.70	38.72
IIIA	21.85	26.81
IIIB	24.43	27.05
IV	11.43	0.75
V	2.02	0.00
Other/Unknown	2.85	0.00
Gender		
Male	80.61	83.54
Female	19.39	16.46
Race/Ethnicity		
White	67.05	71.44
Black	18.51	15.36
AIAN[1]	2.13	2.50
Asian	2.99	2.68
NHPI[1]	1.96	1.31
Two or more	2.21	3.97
Unknown	5.15	2.74
Ethnicity		
Hispanic	15.76	15.23
Non-Hispanic	84.24	84.77

1. AIAN stands for American Indian/Alaska Native. NHPI stands for Native Hawaiian/Pacific Islander.

In terms of the male/female breakdown, females represented 19.4 percent of those who applied for military service and 16.5 percent of those who entered military service.

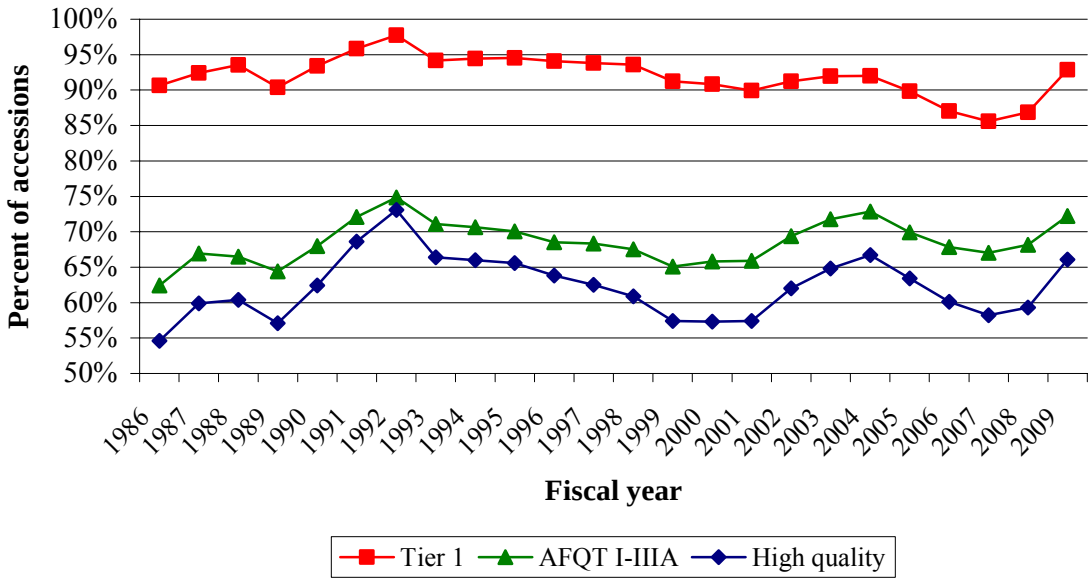
By race and ethnicity, whites provided the largest share of applicants and accessions, with blacks yielding the second-largest share of both. The unknown race category accounted for 5.2 percent of applicants and 2.7 percent of accessions. None of the other race categories exceeded 5.0 percent of either applicants or accessions. The Hispanic shares of applicants and accessions were very close: 15.8 percent of applicants and 15.2 percent of accessions.

The interpretation of Table 2 is that the military was selective FY 2009 from the standpoint of vocational aptitude, but its accessions were otherwise broadly reflective of the pool of those who were interested and applied to serve.

[8] The AFQT category I through IIIA share of 59.3 percent of exam takers is another indication of the selectivity of today's military: more than half of those who took the ASVAB scored in the upper 50th percentile.

The quality of enlisted accessions. AFQT category is one indicator of recruit quality. Possession of a high school diploma or General Educational Development (GED) certificate is another.[9] It is captured by a three-tier system: a Tier I recruit is one who graduated from high school and possesses a diploma, Tier II recruits possess a GED in lieu of graduating with a diploma, and Tier III recruits failed to graduate or obtain a GED. AFQT scores and educational tiers are combined into a third quality measure. By that measure, a "high-quality" recruit is one from both Tier I and AFQT category I through IIIA. Trends in those three quality measures for NPS accessions from FY 1986 to FY 2009 are displayed in figure 2.

Figure 2: Quality measures for NPS active duty accessions, FY 1986-2009



As seen in figure 2, recruit quality has improved since the mid-1980s. Most of the improvement occurred during the late 1980s and early 1990s, a period corresponding to the tail end of the Reagan Administration defense buildup and the lead-up to Gulf War I. From 1992 (the year following the Gulf War I cease-fire) to 2009, there was little net change in quality.

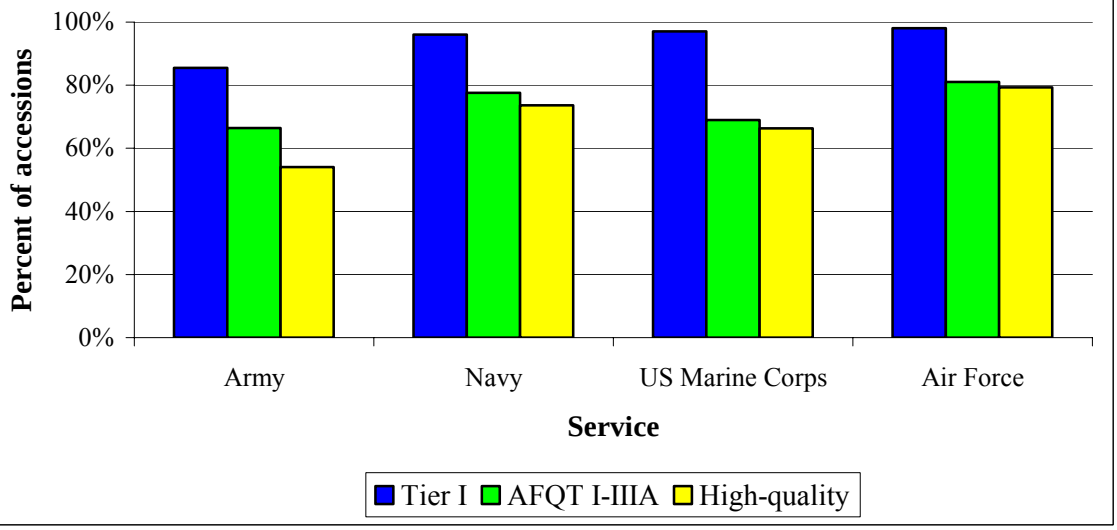
All three measures of recruit quality registered substantial improvement in FY 2009. The fraction of Tier I accessions jumped six percentage points, to 92.9 percent. The share of AFQT I-IIIA accessions rose four points, to 72.2 percent. High-quality accessions—the most selective of the three quality measures—increased in share by seven points, to 66.1

[9] Studies by the Center for Naval Analyses (CNA) for the Navy and Marine Corps have found that recruits who finish high school are more likely to finish boot camp and go on to have successful enlistments.

percent. The FY 2009 improvement in recruit quality coincided with the full force of the economic recession that began in late 2007. FY 2009 saw the nationwide unemployment rate rise from 6.6 percent at the start of the year (October 2008) to 9.8 percent at the end of the year (September 2009). The rate averaged 9.3 percent for that twelve-month period—the highest in over a quarter-century. (More on the recession and its impact on DoD recruiting will be provided in a later section.)

FY 2009 recruit quality was not uniform across the four DoD services. The breakdowns for the three quality metrics are presented in figure 3.

Figure 3: Quality measures for FY 2009 NPS active-duty accessions, by service

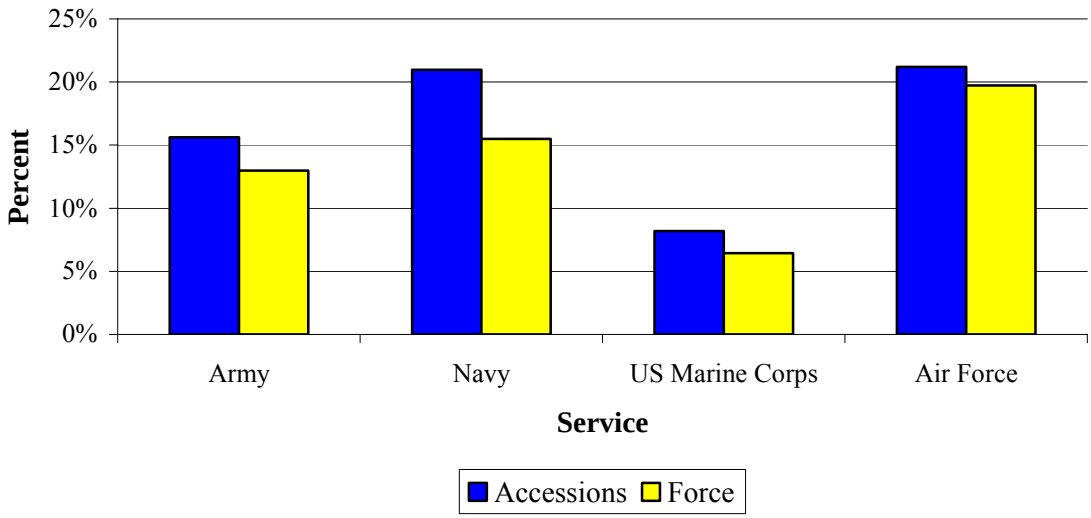


For all three recruit quality measures in figure 3, the Army was the service that posted the lowest shares—85.5 percent in Tier I, 66.4 percent in AFQT I through IIIA, and 54.1 percent high quality. The Air Force edged out the Navy and Marine Corps as the service with the highest shares for the three quality measures—98.1, 81.0, and 79.3 percent, respectively. The Air Force, Navy, and Marine Corps were very close in terms of their Tier I shares; each was at 95 percent or higher.[10] The share difference between the Air Force and the other services was greater for AFQT I through IIIA and greater still for high-quality recruits. The latter is the most selective of the three quality measures. The lower recruit quality shares for the Army (and to a lesser extent for the Marine Corps) reflect the push to expand the service and the more challenging recruiting environment that the ground-based services face with the continuing need to rotate ground-based forces through Iraq and Afghanistan.

[10] The DoD standard for the services is at least 90 percent Tier I recruits; however, any service can petition for a waiver.

The representation of women in the active duty enlisted force. As the military services have opened up more opportunities for women to serve, women have comprised an increasing share of accessions and the force. The female share of enlisted NPS accessions and the enlisted force in FY 2009, by service, is displayed in figure 4.

Figure 4: FY 2009 enlisted female share of accessions and force, by service



Women made up 16.5 percent of enlisted NPS accessions and 14.1 percent of the enlisted force for the four services in FY 2009. The 2.4 percent difference between the two meant that the female share of FY 2009 accessions contributed to a rise in the female share of the FY 2009 force. That was the case DoD-wide; it was also the case at the service level. In each service, women accounted for a larger share of NPS accessions in FY 2009 than their share of the force in FY 2009. The Air Force had the largest female shares—21.2 percent of accessions and 19.7 percent of the force. The Marine Corps had the smallest shares, at 8.2 percent and 6.5 percent, respectively. All four services are continuing to make headway in their efforts to boost the female share of the enlisted force.

The representation of racial and ethnic groups in the active duty enlisted force. The military services have also been intensifying their efforts to recruit and retain a more diverse force. Figure 5 provides a racial and ethnic breakdown of enlisted NPS accessions and the force in FY 2009.

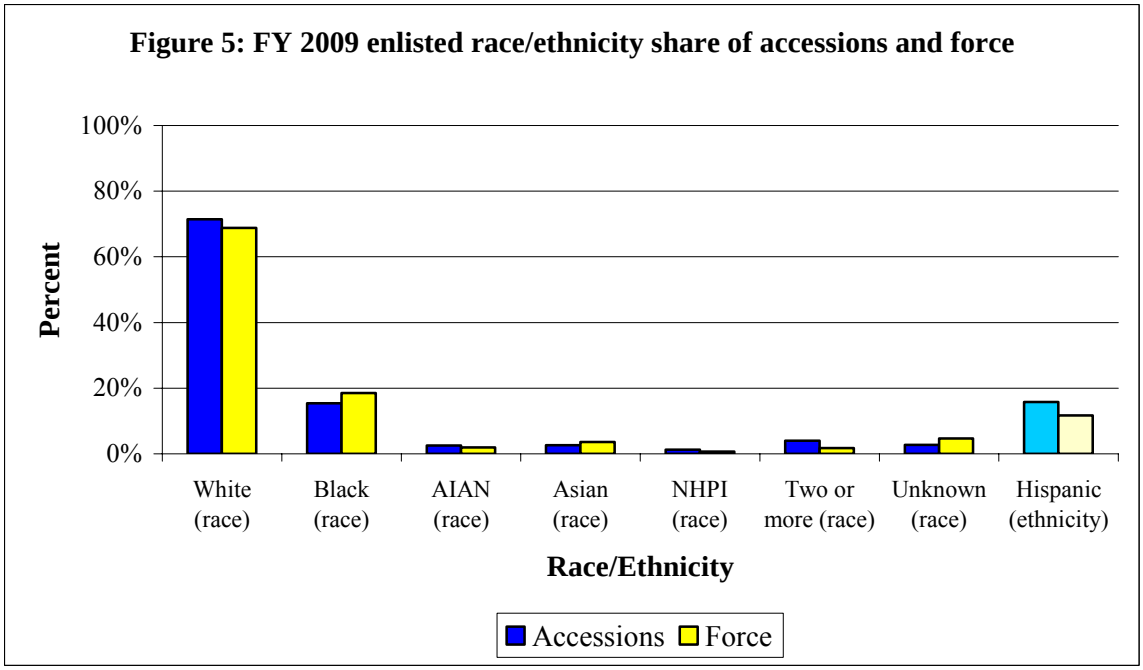


Figure 5 indicates that more than two-thirds of the FY 2009 enlisted NPS accessions and force was white. Blacks were the next-largest category, with 15.4 percent of accessions and 18.5 percent of the force. The white share of the force was slightly smaller than the white share of accessions. For blacks, it was reversed. None of the other racial categories accounted for more than 5 percent of either accessions or the force. Aside from whites, the categories of Native Hawaiian / Pacific Islander (NHPI) and Two or More saw their share of gains exceed their share of the force, meaning that their gains in FY 2009 boosted their share of the force. The similarity of each racial group's share of accessions with its share of the force suggests that FY 2009 saw a leveling off of the services' advances in attracting a more racially diverse force.

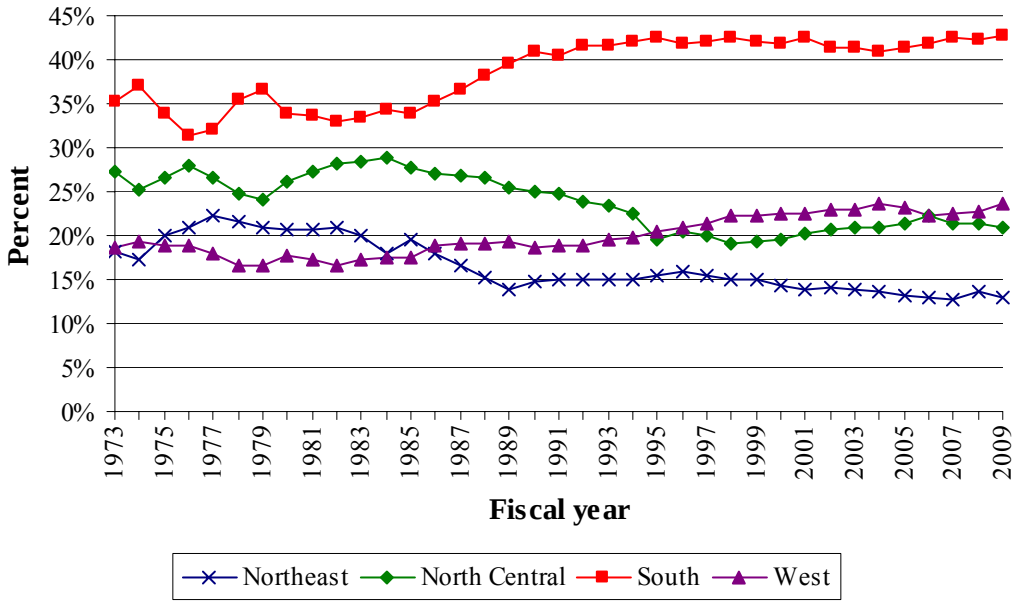
Hispanics are not broken out as a racial category, but rather, as a separate ethnic category. That category accounted for 15.8 percent of FY 2009 accessions and 11.7 percent of the FY 2009 force.

Non-whites comprised a larger share of the Navy enlisted force, 40.1 perent, than they did for the enlisted force of any of the other DoD services in FY 2009. For the other services, the nonwhite shares of the FY 2009 enlisted force were 31.0 percent in the Army, 28.5 percent in the Air Force, and 22.1 percent in the Marine Corps. The FY 2009 accessions in the Navy increased its nonwhite share of the force. It was the only service to do so. The Navy data indicated that 13.4 percent of that service's FY 2009 enlisted NPS accessions fell into the Two or More category; none of the other services reported that category's share as more than 3.0 percent. It is unclear why the data suggest that the Navy might be attracting more recruits who self-identify as being of multiple races. The magnitude of the difference between the Navy and the other services suggests that it may be a case of service-level reporting differences. A clear-cut case of service-level reporting

differences is that neither the NHPI nor the Two or More fields were included in the Army's reporting for its enlisted force. The exclusion of those two fields has the effect of skewing the service-level comparisons where the Army is involved.[11] Those fields were included in the Army's reporting for its enlisted accessions.

Where do active duty enlisted accessions come from? The services recruit throughout the country; however, their recruiting mission can be more challenging in some parts of the country than in others. The regional distribution of enlisted NPS accessions from FY 1973 through FY 2009 is displayed in figure 6.

Figure 6: Geographic distribution of NPS enlisted accessions, FYs 1973-2009



The major story here is the growing relative importance of the South and West in providing recruits. Together, those two regions provided more than 65 percent of enlisted NPS accessions in FY 2009. Their share in FY 1973 was 54.0 percent. In FY 2009, the South provided the largest share of accessions (43 percent), followed by the West (24 percent), the North (roughly 20 percent), and the Northeast (13 percent).

At the same time that the South and West have provided an increasing share of recruits, they have also accounted for a growing share of the U.S. population. Much of the recent U.S. population growth has been concentrated in the "Sun Belt" states of the South and

[11] Those fields were missing from the Army's reporting of enlisted accessions in the FY 2008 PopRep report as well. DMDC and the Army are working to improve the fidelity of the Army's reporting so that those fields will be included in the future.

West.[12] Between 1972 and 2002, the states of Arizona, California, Colorado, Florida, Georgia, Nevada, New Mexico, North Carolina, Oregon, Tennessee, Texas, Utah, Virginia, and Washington gained seats in the U.S. House of Representatives (and Electoral College votes) due to population gains.[13] Atop the list were California and Florida, which both registered ten seat gains. Those states that lost U.S. House seats (and Electoral College votes) over the same period were Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Mississippi, Missouri, Montana, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, South Dakota, West Virginia, and Wisconsin. New York posted a double-digit loss of ten seats. The shifting U.S. population means that the regional shifts in recruiting that were highlighted in Figure 6 may reflect different propensities to enlist or may be simply be a function of a shifting population base. Figure 6 does not control for population. Figures 7 and 8 do, at the level of individual states.

A new feature in the PopRep report for FY 2009 is table B-46 in appendix B, which provides state-level breakdowns for recruit shares and quality measures. Also included in the table is each state's share of the age 18-24 civilian population from which most recruits are drawn. Dividing each state's percentage share of recruits by its percentage share of the civilian population yields a ratio that indicates whether that state is contributing more or less than its share. A ratio of one means that a state is contributing recruits in exact proportion to its share of the population. States that contribute more recruits relative to their population will be marked by higher ratios; states providing fewer recruits will have lower ratios. An ordering of the states by ratio, from highest to lowest, for FY 2009 enlisted NPS accessions is provided in figure 7.

Figure 7 shows the considerable variation among states in their contributions to the FY 2009 enlisted NPS accession pool. The median state, with a ratio of 1.00, was Louisiana. That state's share of enlisted NPS accessions was essentially identical to its share of the 18 to 24 year old civilian population. Montana was the state that contributed the most relative to its population. It accounted for 0.30 percent of the population, but contributed 0.47 percent of accessions, for a ratio of 1.57. The last of the 50 states was Massachusetts, which contributed 1.34 percent of accessions against 2.26 percent of the civilian population, for a ratio of 0.59. After Massachusetts was the District of Columbia, with a ratio of 0.32.

[12] That Sun Belt growth has slowed due to the recent recession, though, according to the updated U.S. Census Bureau population estimates for 2009. The updated population estimates are available at the U.S. Census Bureau website http://www.census.gov/popest/states/states.html.

[13] According to the U.S. Electoral College website http://www.archives.gov/federal-register/electoral-college/ .

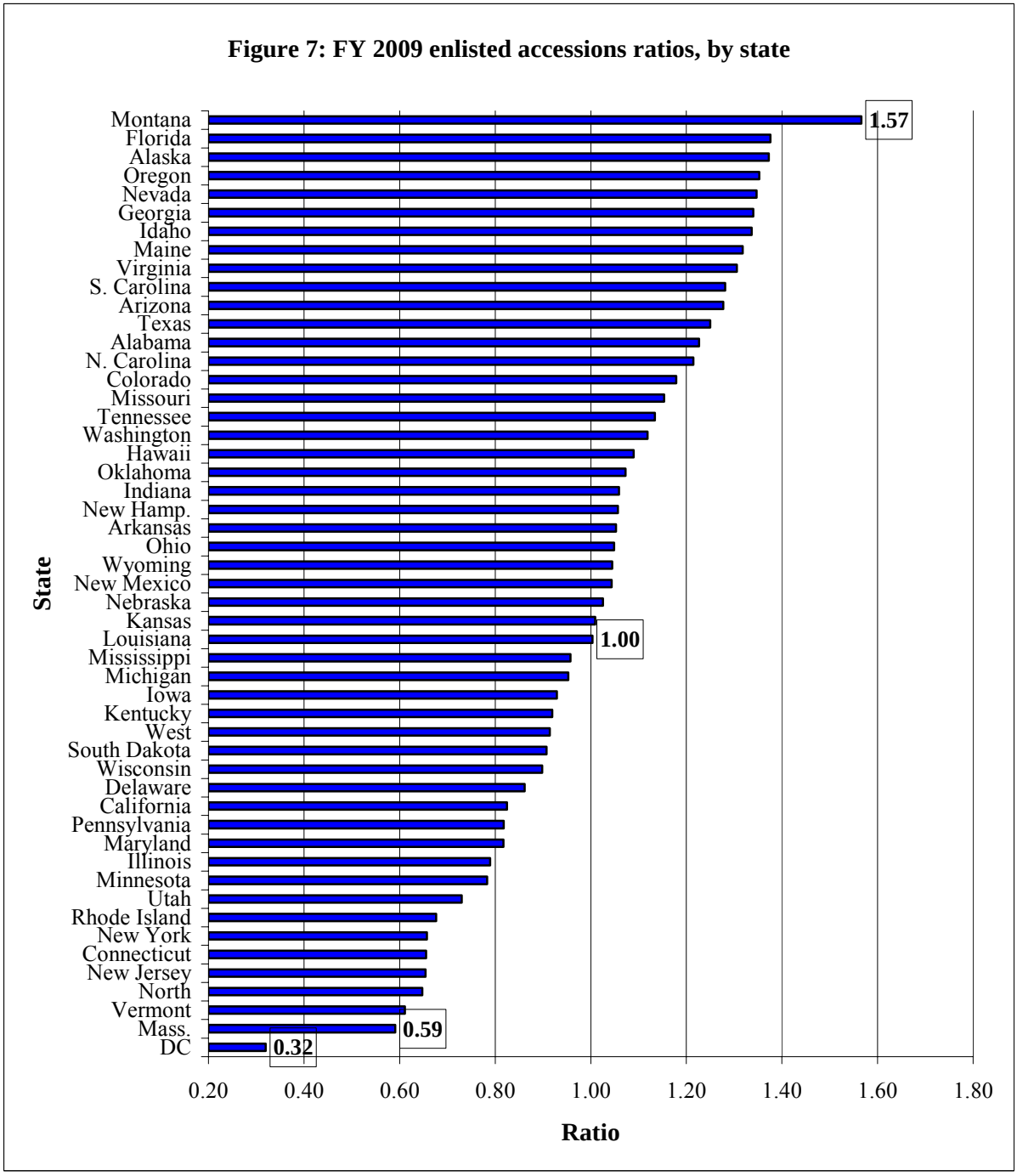
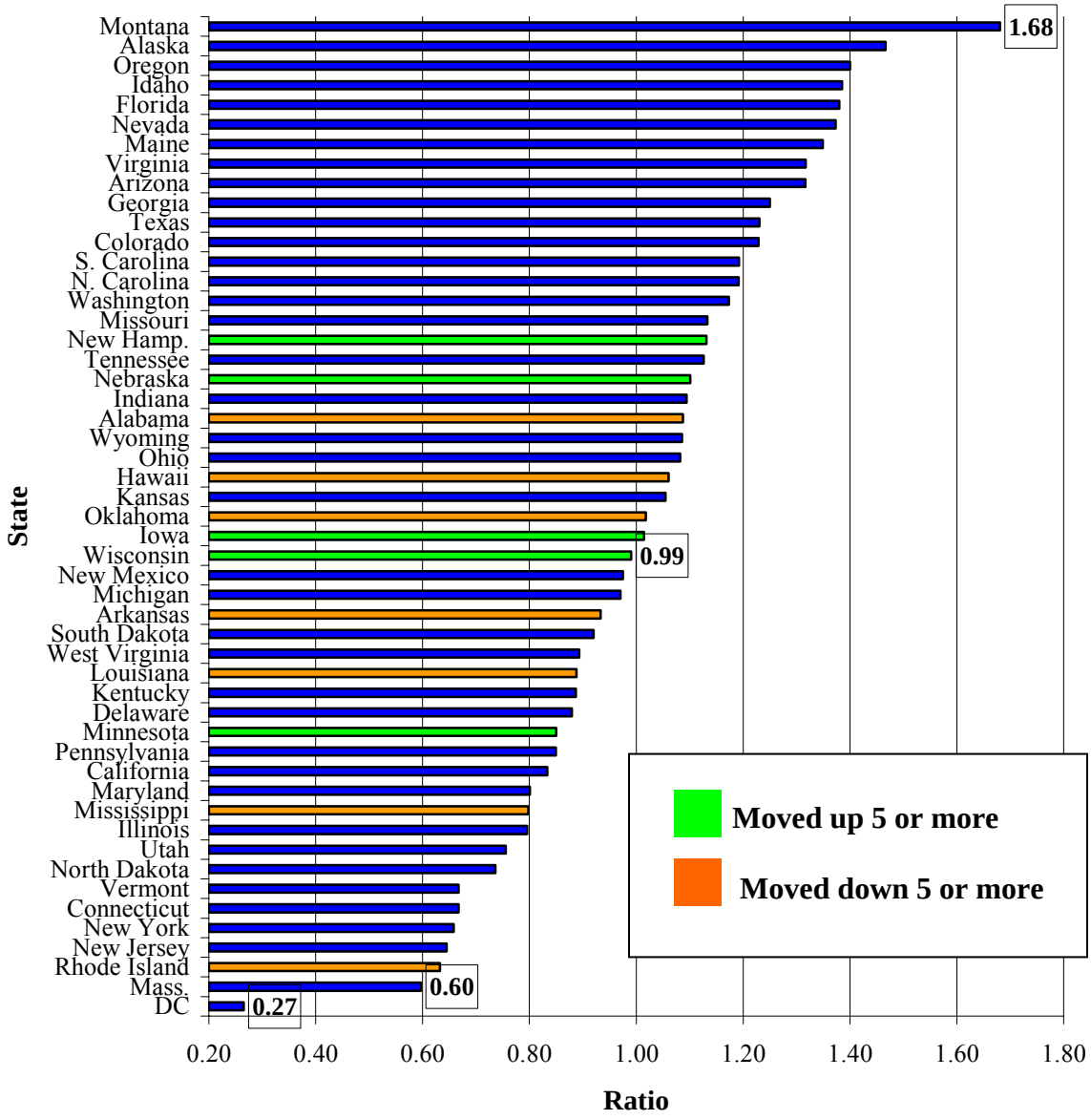


Figure 8 provides a ranking for the subset of FY 2009 accessions that met the more strict criteria of being high-quality, possessing a high school diploma and an AFQT score in Category I through IIIA.

Figure 8: FY 2009 enlisted high-quality accessions ratios, by state



The key difference between figure 7 and figure 8 is that the numerator in calculating each state's ratio is now that state's share of high-quality accessions (as opposed to its share of all accessions). Montana again tops the list. Montana's ratio in figure 8 rose slightly from that in figure 7, to 1.68. The state provided 0.50 percent of high-quality accessions, against its 0.30 percent share of the civilian population. For the rest of the states, there was some movement up and down in the rankings. The median states were Iowa and Wisconsin, with ratios of 1.01 and 0.99, respectively. Each provided a share of high-

quality accessions that was nearly equal to its share of the population. Massachusetts, with a ratio of 0.60, was still the last state, followed by the District of Columbia with 0.27.

Few states (fewer than ten) did not move at all in the rankings. Upward movement in the rankings means that a state's accessions are weighted toward meeting the high-quality criteria; downward movement means that a state's accessions are less likely to satisfy the criteria. Color codes have been added to figure 8 to designate those states that displayed the most movement. Those that rose by five or more (colored green) were New Hampshire, Nebraska, Iowa, Wisconsin, and Minnesota. Those that fell by five or more (colored orange) were Alabama, Hawaii, Oklahoma, Arkansas, Louisiana, Mississippi, and Rhode Island. Mississippi moved the most of any state, dropping by eleven in the rankings from 30th to 41st. Four of the five states that rose the most were from the Midwest, while four of the seven states that fell the most were from the South. High-school graduation rates tend to be higher in the Midwest than in the South, so, all else being equal, accessions from the Midwest will be more likely to meet the DoD high-quality criteria than those from the South.

Marital status of active duty enlisted personnel. With the advent of the all-volunteer force (AVF), the services have adopted "family-friendly" policies to lessen the perception of a trade-off between serving in the military and raising a family. Figures 9 and 10 present some evidence of the services' success in becoming more family-friendly. Figure 9 provides a comparison of the marital status of the FY 2009 male AC enlisted force with that of its male civilian counterparts 17 through 44 years of age.[14] Figure 10 provides the same comparison for females.

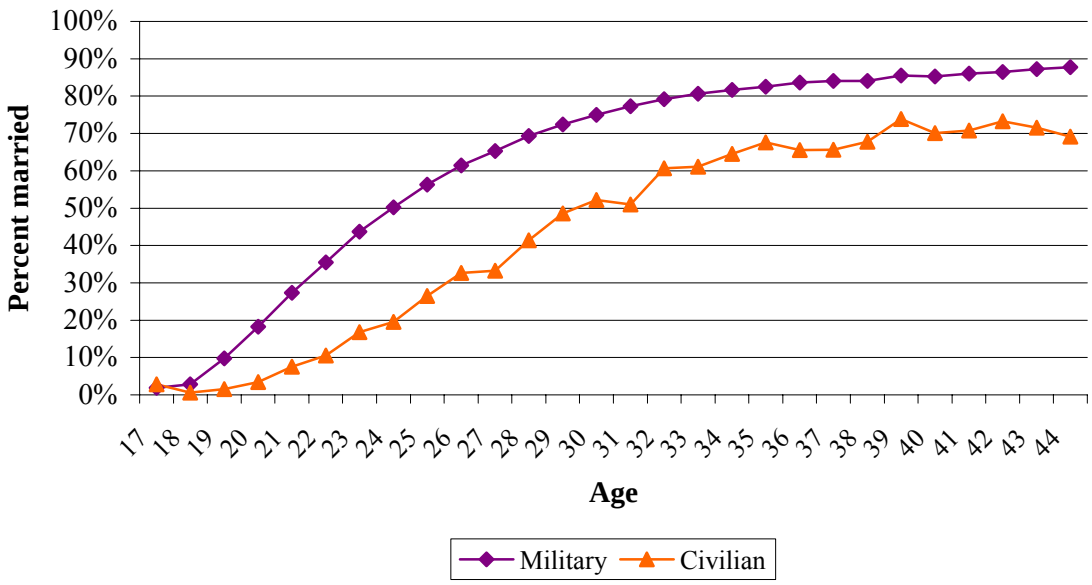
A comparison of the two curves in the figure reveals that enlisted males on active-duty in FY 2009 were more likely to be married than their male civilian counterparts. Only at age 17 were enlisted males less likely to be married than male civilians. For 17-year-old men, 2.8 percent of civilians were married, against 1.8 percent of those who were enlisted on active-duty.[15] Starting at age 18, males in the military were more likely to be married. Both curves display an upward slope, showing that the likelihood of marriage increases with age. The difference between the two curves was greatest at age 27, where 65.3 percent of enlisted AC males were married, as against 33.3 percent of male civilians—a 32.0-point gap. After that, the gap began to shrink as the military curve flattened out. By age 44, the gap had narrowed to 19.7 points—the difference between the 87.8 percent of enlisted AC males who were married and the 69.1 percent of civilians who were married.

For enlisted males, then, the FY 2009 data show that active-duty service is not incompatible with marriage. In fact, the data suggest that for enlisted AC males military service may be more compatible with marriage than is civilian life. The link is suggestive rather than conclusive: an alternative explanation for the data is that men who are drawn to military service may possess certain traits that render them more likely to marry.

[14] The explanation for the age-45 cutoff in figure 10 is that less than 2 percent of the 1.2 million members of the AC enlisted force in FY 2009 were aged 45 or older.

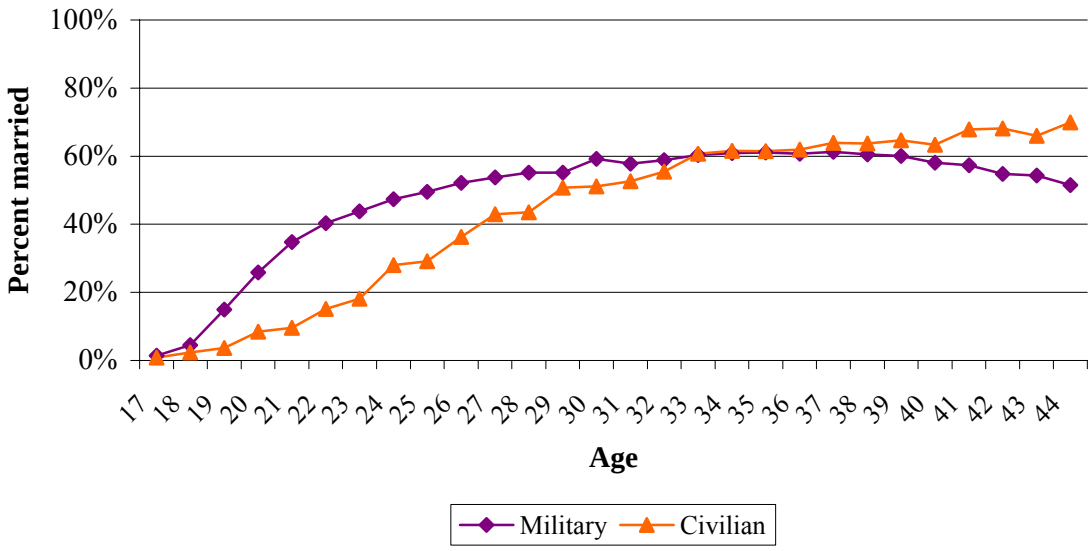
[15] It should be noted that 17-year-old men were a tiny fraction of the enlisted AC force, accounting for less than one-tenth of 1 percent of the force in FY 2009.

Figure 9: Percent of FY 2009 male AC enlisted force that is married, by age, with civilian comparison



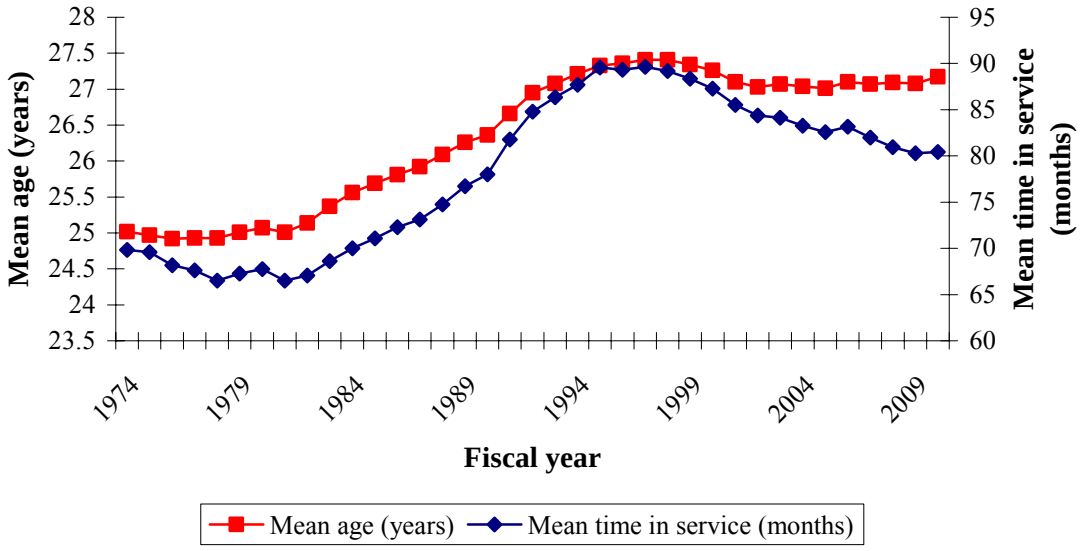
It was a somewhat different story for enlisted AC women, as figure 10 shows. Once again, both the military and civilian curves trend generally upward, indicating a higher likelihood of marriage with age. From age 17 through their twenties, enlisted AC women are more likely to be married than their female civilian counterparts. There is a crossover point where the curves intersect, at age 33. From age 33 on, enlisted AC females are less likely to be married than female civilians. The military curve levels off for the rest of the thirties and registers a slight decline in the early forties. By age 44, 69.9 percent of civilians were married versus 51.5 percent of enlisted AC females. The FY 2009 data suggest that the services may still have some work to do to make active-duty service fully compatible with marriage, at least on the female enlisted side.

Figure 10: Percent of the FY 2009 female AC enlisted force that is married, by age, with civilian comparison



Seniority of the active duty enlisted force. Today's enlisted force is a more senior force than it has been in the past. Recruits are more likely to have spent time attending college after graduating from high school. Upon joining the military, they tend to serve longer, due to an intensified focus by the services on retention. Figure 11 tracks the mean age and time in service for the AC enlisted force from FY 1973 through FY 2009.

Figure 11: AC enlisted age and time in services, FYs 1973-2009



The average member of the AC enlisted force in FY 2009 was 27.2 years old and had served 80.4 months on active-duty. Both metrics have moved together since FY 1973 (see figure 11), although the movement in service time has been more pronounced than the movement in age because the numbers are larger. They both rose during the Reagan-era defense buildup, peaked during the mid-1990s, and declined with the post-Cold War drawdown.

The Marine Corps was the youngest of the DoD services in terms of the age of its AC enlisted force: 66.6 percent was under age 25 in FY 2009. The corresponding under-25 age shares of the other services were 42.0 percent in the Army, 43.0 percent in the Navy, and 38.9 percent in the Air Force. The Marine Corps was also the most junior DoD service in FY 2009, as the three most junior enlisted pay grades (E1, E2, and E3) accounted for 46.8 percent of its AC enlisted force. The Army, Navy, and Air Force were clustered together, with the bottom 3 pay grades accounting for 25 to 26 percent of their AC enlisted force in FY 2009. What causes the Marine Corps to be younger and more junior than the other services is its expectation of higher turnover in its junior enlisted ranks. Because of that higher turnover, a larger share of the Marine Corps consists of brand-new (or recent) accessions that are younger and occupy the lowest enlisted pay grades.

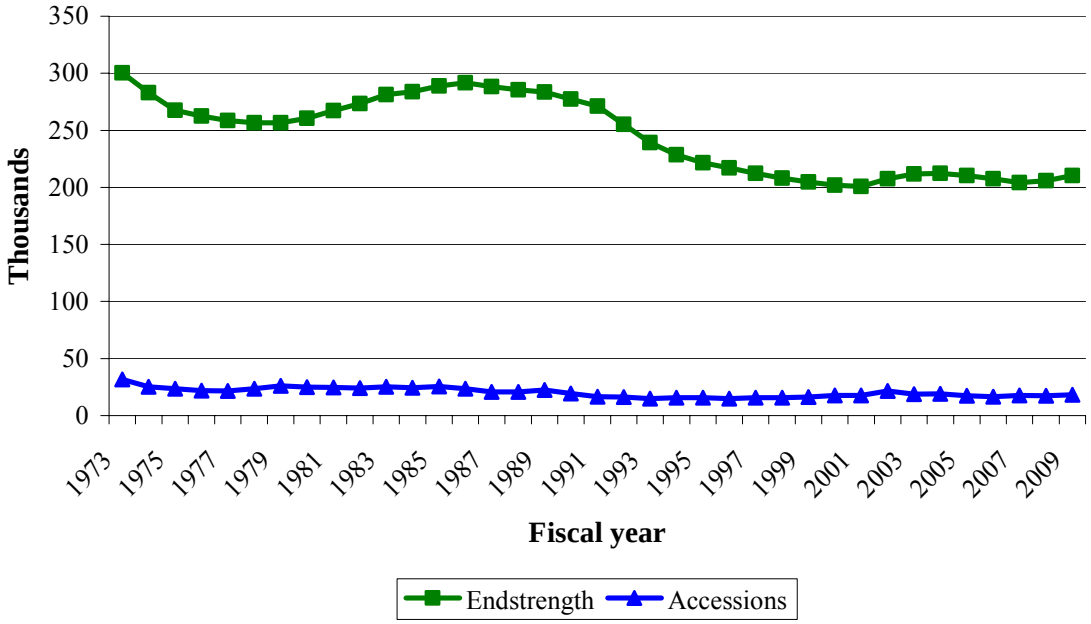
Seniority measures such as these are of interest because research has shown that the so-called "hollow force" of the late 1970s and early 1980s[16] was linked to declines in seniority in terms of time in service and time in grade.[17] Those seniority declines forced the services to rely more heavily upon more junior personnel who failed to possess the necessary skills. A "hollow force" is one that lacks the trained personnel and equipment support to enable it to perform its assigned missions. The relative seniority of today's force portends against a return to the "hollow force" days.

Officer accessions and force

In FY 2009, the AC officer force stood at an endstrength of 210,233. During the year, 18,332 officers were added to the active-duty rolls.[18] Of the services, the Army had the most officers, 75,619, and added the most officers, 7,875. The Army's 43.0 percent share of officer accessions exceeded its 36.0 percent share of the officer force, which reflects the recent growth of that service relative to the other services. The historic officer endstrength and accessions since the 1973 institution of the AVF are shown in figure 12.

[16] The term "hollow force" dates to 1980 congressional testimony by General Edward "Shy" Meyer, who was at the time the U.S. Army Chief of Staff.
[17] One such study was [2].
[18] The officer endstrength and accessions figures in this section do not include warrant officers serving in the Army, Navy, or Marine Corps. No warrant officer program exists for the Air Force.

Figure 12: Officer endstrength and accessions, FY 1973-2009

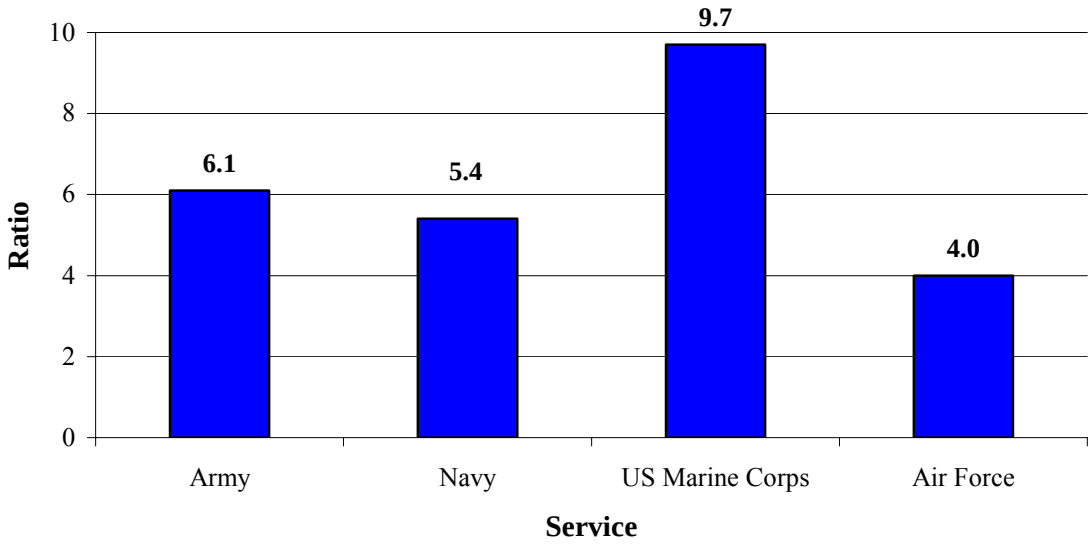


As we see in figure 12, officer endstrength and accessions have registered net declines since the early 1970s. The declines have not been steady, though. Steep declines in the late 1970s and early 1990s reflected the draw downs from the Vietnam War and the Cold War. The overall downward trend was interrupted by increases from the Reagan Administration buildup of the mid-1980s and the George W. Bush Administration response to the 9/11 attacks. Neither of the increases fully offset the decline that had preceded it, so the overall downward trend in the size of the officer force continued.

As we said earlier, the Army's officer corps was the largest of the services in FY 2009, accounting for more than one-third of all officers across the four services. The Army also had the most officer *accessions* in FY 2009, accounting for more than 40 percent of all officer accessions. The Army's larger share of accessions reflects the recent push to expand the service. For the other services, the Marines held steady at just under 10.0 percent of the officer force in FY 2009, while the Navy and Air Force saw their share of the officer force decline.

Each of the services has far fewer officers than enlisted personnel in its active-duty ranks. The different ratios of enlisted personnel to officers for the services reflect the services' different roles and missions. The active-duty FY 2009 enlisted/officer force ratios for the services are displayed in figure 13.

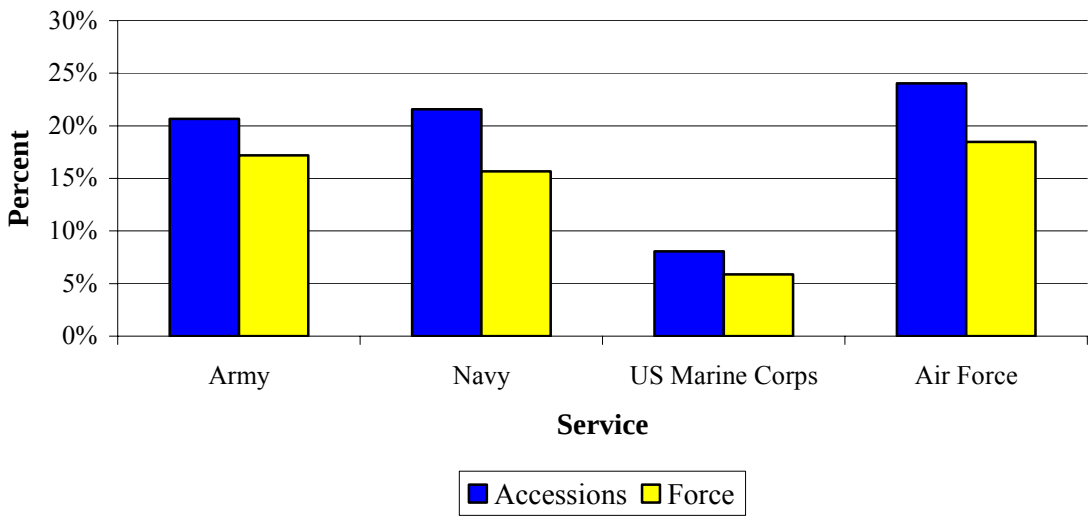
Figure 13: FY 2009 enlisted/officer force ratios, by service



In FY 2009, the Air Force was the most officer-heavy of the services, with the lowest ratio of enlisted personnel to officers (4.0). The Marine Corps was the least officer-heavy service, with the highest enlisted/officer ratio (9.7). The enlisted/officer ratios for the Army and Navy were close together (6.1 and 5.4, respectively). The relatively officer-heavy nature of the Air Force reflects that service's special responsibility for satellites and space systems. The Marine Corps is the least officer-heavy of the services due to its higher turnover in the most junior enlisted ranks. The Marines' higher rates of turnover in the junior enlisted ranks mean that relatively more brand-new enlisted personnel must be brought in each year, which elevates that service's enlisted/officer ratio with respect to the other services that have less turnover.

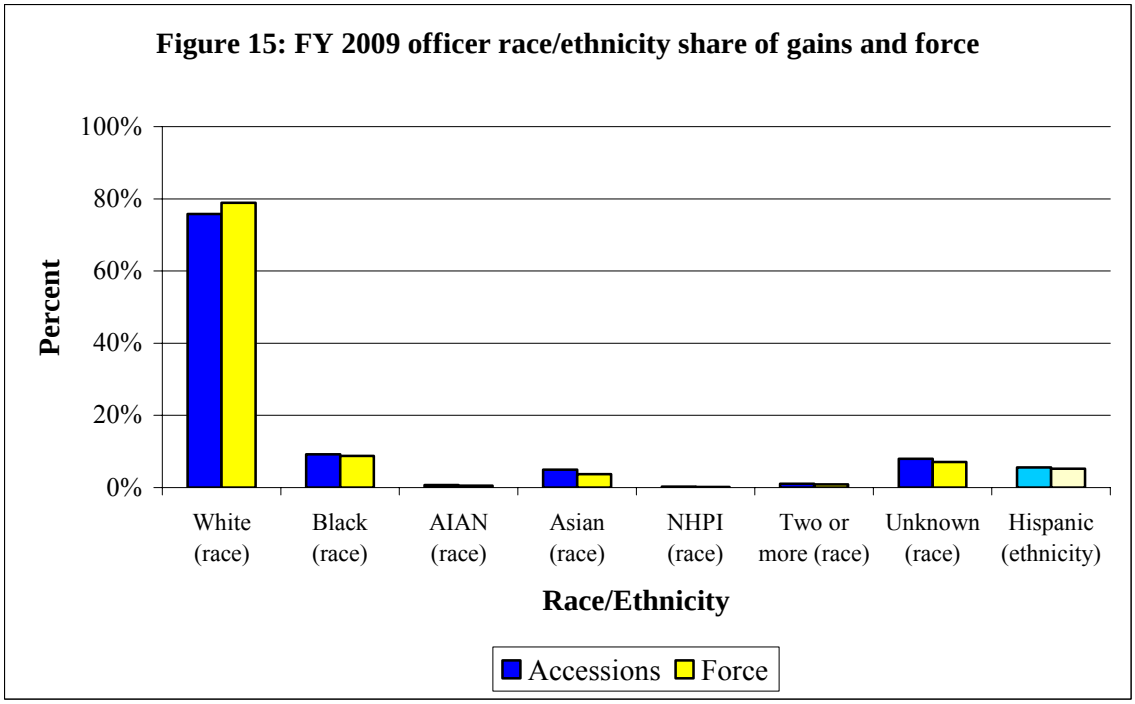
The representation of women among the active duty officer corps. For all the services, women make up an increasing share of the enlisted force; they also make up an increasing share of the officer force. The female share of active-component officer gains and the force in FY 2009, by service, is displayed in figure 14.

Figure 14: FY 2009 officer female share of accessions and force, by service



Overall, women comprised 20.6 percent of AC officer gains and 16.2 percent of the AC officer force in FY 2009. The 4.4 percent gap between the two indicated that the female share of FY 2009 accessions boosted the female share of the force. FY 2009 saw all four services make progress in their efforts to boost the female share of the officer force. The Air Force was the service with the largest female shares of the gains and the force—24.1 percent of gains and 18.5 percent of the force. The Marine Corps had the smallest female shares—8.1 percent of gains and 5.9 percent of the force.

The representation of racial and ethnic groups in the active duty officer corps. Looking to attract a more diverse officer corps, the military services have strengthened their recruitment efforts at historically black colleges and universities and those with large Hispanic student bodies. Figure 15 provides a racial and ethnic breakdown of AC officer gains and the force in FY 2009.



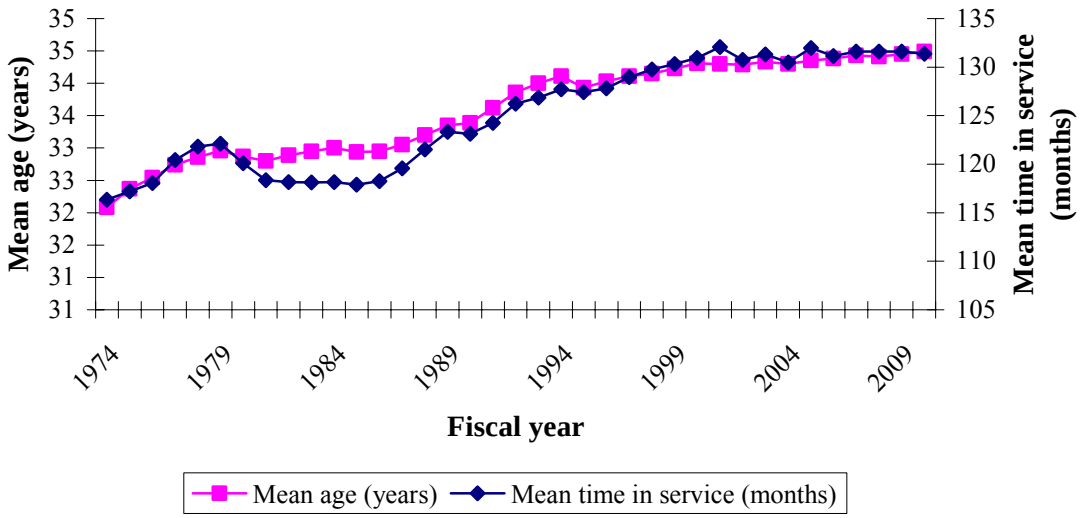
Whites comprised 78.9 percent of the officer corps in FY 2009; the corresponding figure for the enlisted force was 68.8 percent (see figure 5). The ten-point difference was mirrored by a ten-point difference in the share of blacks: blacks accounted for 8.7 percent of the officer force and 18.5 percent of the enlisted force. Unknowns represented 7.1 percent of the officer force, while none of the other racial categories represented more than 5 percent. With regard to ethnicity, Hispanics accounted for 5.2 percent of the officer force – less than their 11.7 percent share of the enlisted force. Hispanic made up 5.6 percent of officer accessions in FY 2009, a figure which slightly exceeded their share of the force. Excluding the whites, each of the racial and ethnic groups had a share of gains which was near its share of the force—within one percentage point, which suggests that the services' advances in attracting a more diverse officer force may have slowed.

Of the services, the Army had the highest non-white share of the officer force in FY 2009—25.6 percent. The other services were clustered closely together in terms of their non-white force shares, with the Air Force at 19.3 percent, the Navy at 18.2 percent, and the Marine Corps at 17.4 percent. The Army, Navy, and Air Force all saw their FY 2009 accessions increase their non-white force shares. The increase in the non-white share of the force was marginal for the Army—a 0.5 percentage-point difference between the non-white share of gains and the non-white share of the force. It was greater for the Navy (a difference of 2.8 percentage points) and Air Force (6.9 percentage points). For the Marine Corps, the non-white share of FY 2009 officer gains was no different from the non-white share of the force. Because the Army accounted for the largest share (43.0 percent) of the FY 2009 officer gains, it had the greatest impact in terms of slowing the overall rate of increase in the non-white share of the AC officer corps. A data caveat is that the Army's FY 2009 reporting for both officer gains and the force was missing the NHPI and Two or More fields. Any service-level comparisons involving the Army are skewed by the exclusion of those fields. (As noted earlier, those racial categories were also missing from

the Army's FY 2009 reporting for the NPS enlisted force, but not from the NPS enlisted accessions.)

Seniority of the active duty officer corps. In terms of seniority, today's AC officer corps is the most senior since the advent of the AVF. Two seniority measures for the AC officer corps, age and time in service, are displayed in figure 16. The data go back to FY 1973.

Figure 16: AC officer age and time in service, FYs 1973-2009



Both seniority measures have risen slowly but steadily since the mid-1970s. In FY 2009, the officer corps averaged 34.5 years in age. Time in service averaged 131.4 months. The FY 1973 averages for both metrics were 32.1 years and 116.3 months, respectively. The greater seniority of today's AC officer force in figure 16 mirrors the greater seniority of today's AC enlisted force in figure 11. Together they suggest that a return to the "hollow force" is unlikely in the near future.

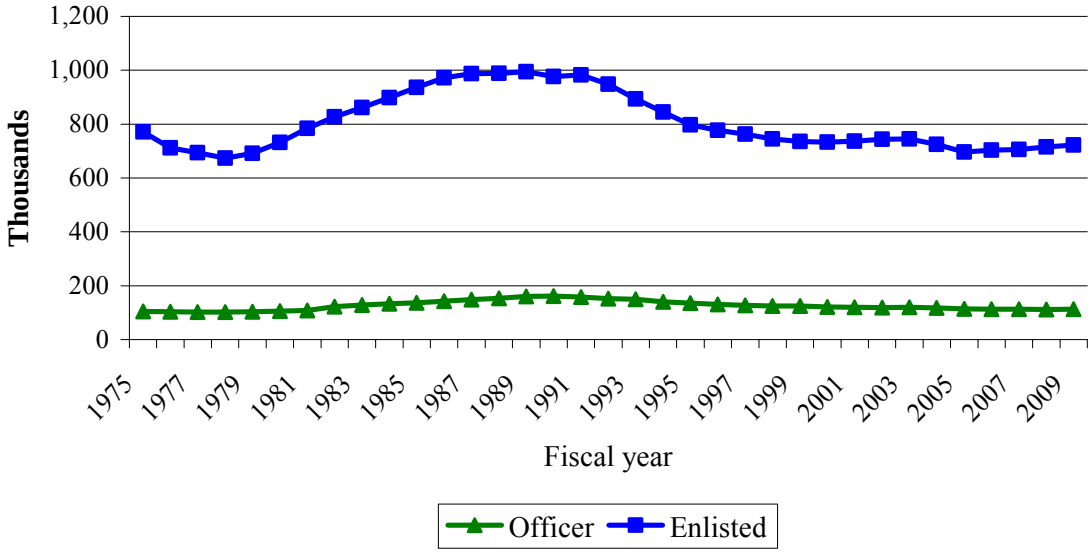
It was shown earlier that the Marine Corps is the youngest and most junior of the DoD services in terms of its AC enlisted force in FY 2009. The Marine Corps is also the youngest and most junior of the services in terms of its AC officer force in FY 2009. The other DoD services were clustered together in terms of their officers' age and seniority. By age, 41.3 percent of the Marine Corps' AC officer force was under 30 in FY 2009. The under-30 shares for the other services ranged between 31 percent and 34 percent. By pay grade, 65.9 percent of Marine Corps officers were in the three most junior officer pay grades. The other services' shares in these pay grades ranged between 57 percent and 60 percent. What drives the difference between the Marine Corps and the other services for these age and seniority measures is the Marines' expectation of higher turnover in the lower pay grades.

Section III: The DoD RC[19]

Endstrength

The DoD RC consists of six elements: the Army National Guard (ARNG), the Army Reserve (USAR), the Navy Reserve (USNR), the Marine Corps Reserve (USMCR), the Air National Guard (ANG), and the Air Force Reserve (USAFR). Historically, the Army National Guard and Army Reserve have together accounted for the bulk of the reserves. In FY 2009, the RC comprised 845,888 officers and enlisted personnel. Figure 17 tracks RC officer and enlisted endstrength for the 35 years since FY 1975.

Figure 17: RC endstrength, FY 1975-2009

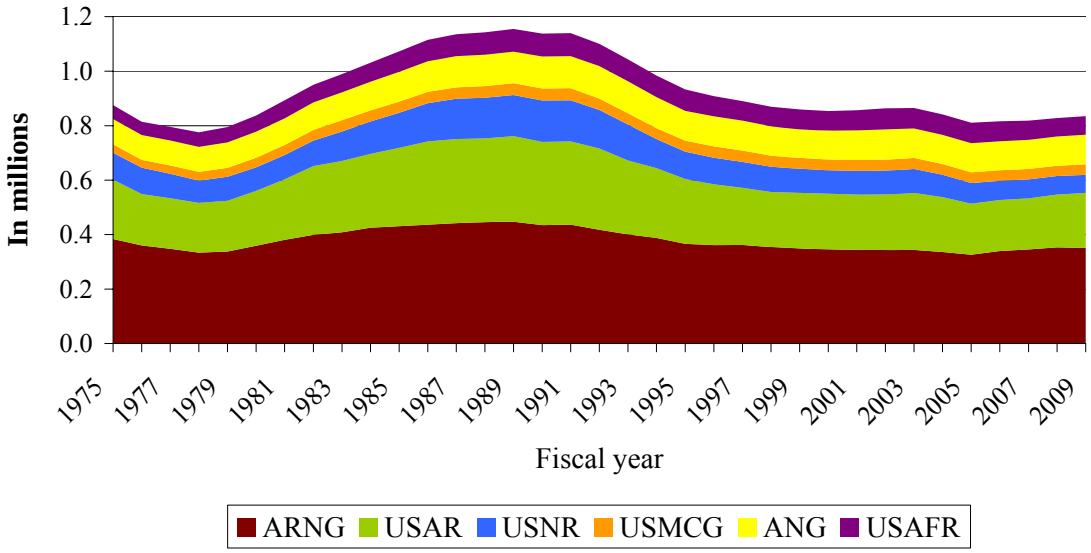


RC endstrength, both officer and enlisted, has been relatively stable over the last decade. The quarter-century prior to that witnessed some sizeable swings. During the late 1970s there was a decline in reserve endstrength that corresponded with the post-Vietnam War drawdown. That was followed by a larger increase under the Reagan-era buildup, and then another decline with the post-Cold War drawdown. Because the enlisted numbers in figure 17 are so much larger than the officer numbers, the variation in enlisted endstrength is more apparent than the variation in officer endstrength. In proportionate terms, though, both enlisted and officer reserve endstrength have moved in tandem. Both rose sharply during the 1980s, peaked in FY 1990, and by FY 2009 were well off their peak levels. RCt endstrength in FY 2009 stood at 112,979 officers and 721,958 enlisted

[19] In this section we focus on the Selected Reserve (SELRES), which is that part of the Ready Reserve consisting of Reserve units, as designated by the Secretary concerned, and of individual Reservists, in pay status, required to participate in Inactive Duty for Training periods and annual training. The SELRES also includes Active Guard and Reserve and Individual Mobilization Augmentee personnel. (See Section 10143 of 10 U.S.C. (reference (c)).)

personnel.[20] That combined officer and enlisted endstrength is broken out among the six RC service elements, for the FY 1975-2009 period, in figure 18.

Figure 18: RC endstrength, by service element, FY 1975-2009



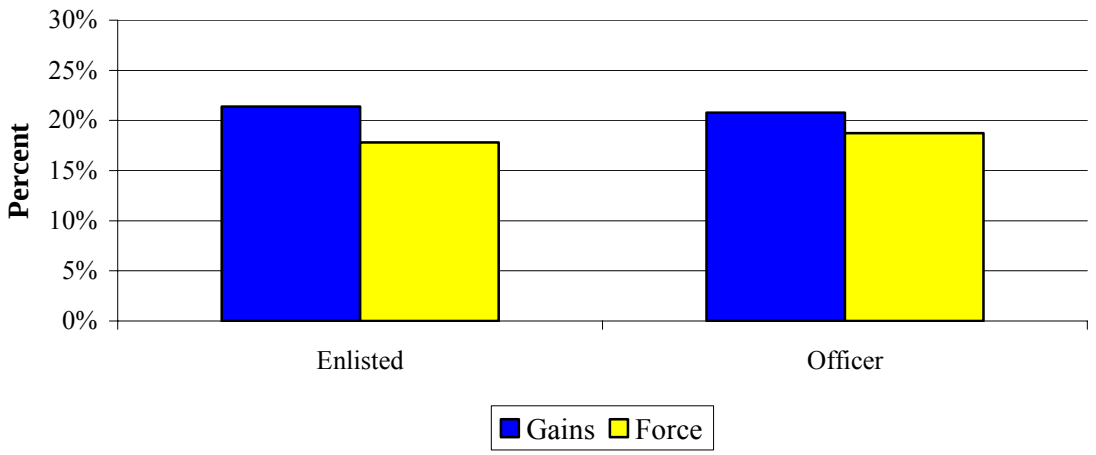
Of the six RC service elements, the Army National Guard has consistently been the largest. Its 350,865 citizen-soldiers in FY 2009 represented 42.0 percent of the DoD reserve force endstrength. It was followed by the Army Reserve (24.2 percent), Air National Guard (13.1 percent), Air Force Reserve (8.1 percent), Navy Reserve (8.0 percent), and Marine Corps Reserve (4.6 percent). Nearly two-thirds of the reserve force is associated with the Army: the Army National Guard and Army Reserve.[21] The two reserve elements of the Air Force, the Air National Guard and Air Force Reserve, are together more than twice as large as the Navy's one reserve element, the Navy Reserve. The Marine Corps, the smallest of the DoD services, had the smallest reserve element in FY 2009.

The representation of women and racial/ethnic groups

The RC, like the AC, has been striving to attract more women and minorities into its ranks. Figure 19 provides the female share of RC gains[22] and force in FY 2009. Figures 20 and 21 do the same for enlisted and officer race and ethnicity.

[20] For purposes of comparison, the warrant officers have been excluded because the historic reserve data dating back to FY 1975 do not include warrant officers.
[21] The Army's historically greater reliance upon the reserves dates back to the U.S. Constitution, which states in Article I that Congress shall have power "to raise and support Armies" and to "provide and maintain a Navy". The distinction between "raise and support" versus "provide and maintain" was intended by the document's framers to discourage a standing Army but not a standing Navy.
[22] The RC gains, like the AC gains, only include NPS accessions.

Figure 19: FY 2009 female share of RC gains and force, officer and enlisted



In terms of female shares, the enlisted and officer forces of the reserve component in FY 2009 were very similar, as figure 19 shows. Less than a single percentage point separated the female share of enlisted gains (21.4 percent) and the female share of officer gains (20.8 percent). One percentage point separated the female share of the enlisted force (17.8 percent) and the female share of the officer force (18.8 percent). For both the enlisted and officer side, the female share of gains exceeded the female share of the force, meaning that FY 2009 gains boosted the female share of the force.

A comparison of the RC with the AC shows that women accounted for a larger share of the RC force than the AC force. A 3.7-percentage-point gap separated the 17.8 percent female share of the RC enlisted force from the 14.1 percent female share of the AC enlisted force (from figure 4). The difference between the 18.8 percent female share of the RC officer force and the 16.2 percent female share of the AC officer force (from figure 14) was 2.6 percentage points.

Females made up a larger share of the Air Force Reserve than they did any of the other reserve elements in FY 2009—24.9 percent of its enlisted force and 25.3 percent of its officer force. The Air Force Reserve also had the highest share of FY 2009 female gains—33.7 percent of its enlisted gains and 29.3 percent of its officer gains were female. All but one of the six reserve elements saw their FY 2009 gains boost their female share of the enlisted force. The lone exception was the Marine Corps Reserve, for which females were 3.1 percent of enlisted gains against 4.7 percent of the enlisted force. All six service elements saw their FY 2009 female officer gains boost their female officer share of the force.

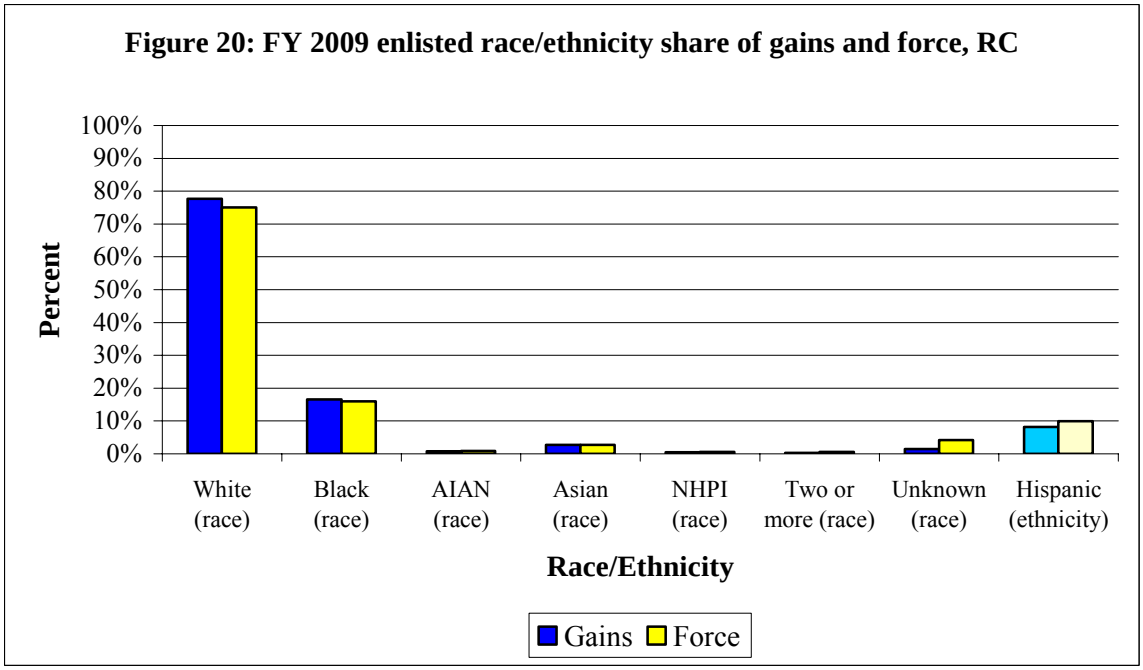


Figure 20 shows that whites accounted for roughly three-fourths of NPS enlisted RC gains and the RC force in FY 2009, followed by blacks at just under 20 percent of both gains and the force. None of the other racial categories accounted for more than 5 percent of either gains or the force. In terms of ethnicity, Hispanics made up 8.2 percent of gains and 9.8 percent of the force. Non-white RC gains in FY 2009 did not boost the non-white share of the RC force, nor did Hispanic RC gains boost the Hispanic share of the force.

Whites comprise slightly more of the RC than they do of the AC; the white share of the RC force is 75.0 percent, against 68.8 percent percent of the AC force. The six-point difference is offset by smaller RC shares for the two racial categories of AIAN and Two or More. A comparison of the RC and AC finds that Hispanics comprise a larger share of the AC (11.7 percent) than the RC (9.8 percent).

The Navy Reserve was the service element with the largest non-white share of its enlisted force—36.2 percent. The Air National Guard had the smallest non-white share—18.4 percent. The Navy Reserve also stood out in that it reported 6.7 percent of its gains and 4.0 percent of its force as being of multiple races; none of the other services reported more than 2.0 percent of gains or force as being in the multi-race category. The Navy is an outlier in terms of its multi-race reporting for the AC as well. The Navy may be more active than the other services in targeting potential recruits with multi-race backgrounds, or the explanation may simply be reporting differences. Non-white gains boosted the non-white share of the force for the Navy Reserve and the Air Force Reserve.

The Hispanic share of gains varied widely between the six service elements, from a high of 20.3 percent for the Navy Reserve to a low of 1.9 percent for the Air National Guard. There was less variation among the service elements' Hispanic force shares. Service-level

comparisons involving the Army are to be made with caution because the Army's enlisted RC reporting is missing the NHPI and Two or More fields for both gains and force.

Figure 21: FY09 officer race/ethnicity share of gains and force, reserve component

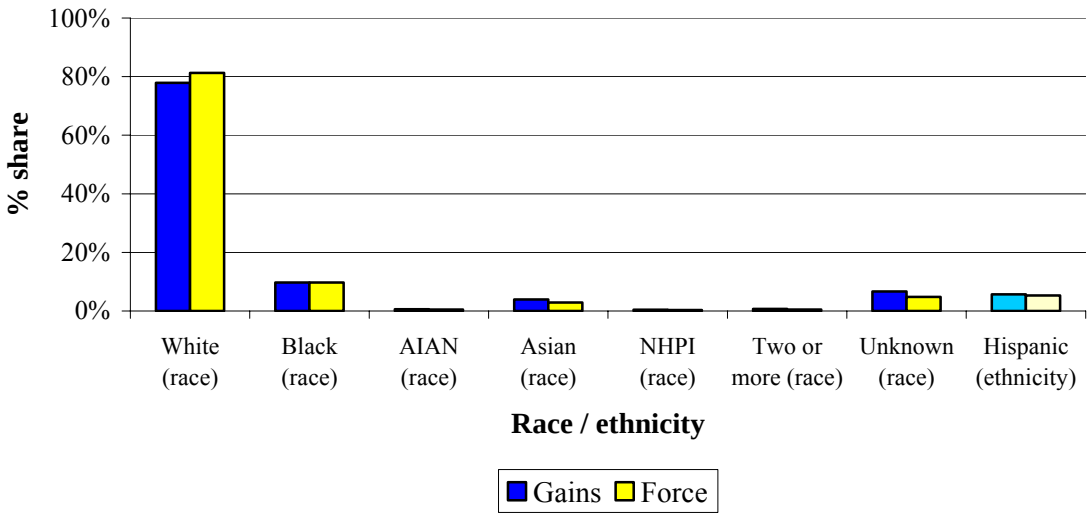


Figure 21 is the counterpart to figure 20 for the officer side of the RC. By race, non-white RC gains slightly boosted the non-white share of the RC force in FY 2009, with non-whites comprising 22.1 percent of gains against 18.7 percent of the force. By ethnicity, Hispanics comprised 5.7 percent of FY 2009 gains against 5.3 percent of the FY 2009 force, which boosted their share of their force as well.

When figure 21 for the RC officer force is compared with figure 15 for the AC officer force, the race/ethnic breakdowns of the two officer forces are found to be very similar. Whites comprise 78.9 percent of the AC officer force—a share that was within three percentage points of their share of the RC officer force. The 5.2 percent Hispanic share of the AC officer force was nearly identical to the Hispanic share of the RC officer force.

The non-white shares of the services' RC officer forces ranged from a high of 26.7 percent for the Army Reserve to a low of 11.7 percent for the Air National Guard. The Army reporting was again missing the fields of NHPI and Two or More, though. Inclusion of those fields in the Army reporting would enlarge the non-white shares of both the Army Reserve and the Army National Guard. That, in turn, would widen the range between the Army Reserve and the Air National Guard as the services with the largest and smallest non-white shares. Non-white gains boosted the non-white share of the force for all six service elements. The service with the smallest non-white share of the force, the Air National Guard, saw its non-white gains boost its non-white share of the

force by the most—16.6 percent of its FY 2009 gains were non-white, against 11.7 percent of its FY 2009 force.

Section IV: The U.S. Coast Guard

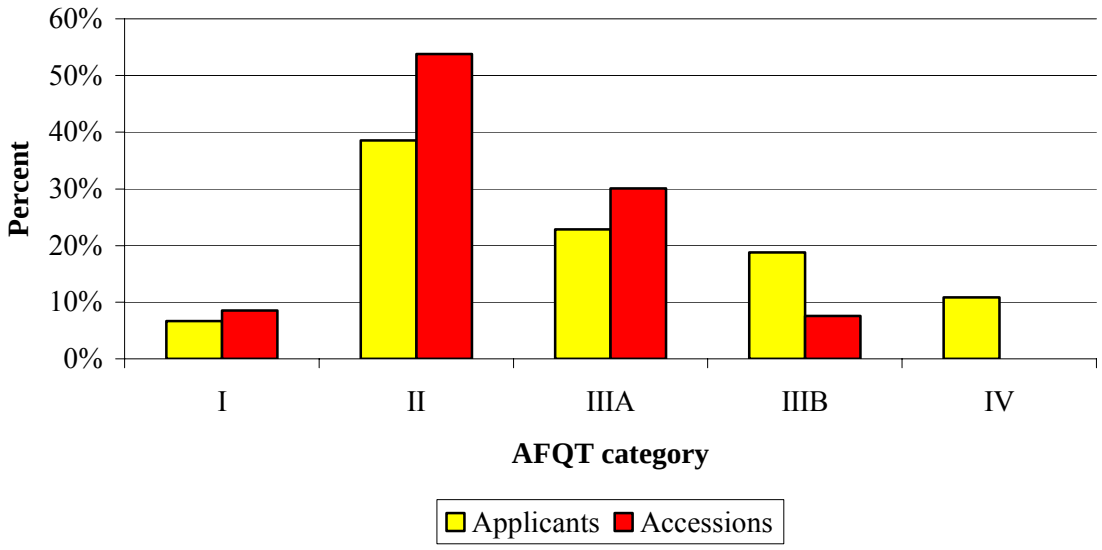
The smallest of the five military services, the U.S. Coast Guard is a special case in that the service operates under the Department of Homeland Security (DHS) in peacetime. In wartime, authority for the service may be transferred to DoD. Title 14 of the United States Code governs the transfer of authority over the service in wartime.[23]

U.S. Coast Guard AC endstrength stood at 8,364 officers and 34,062 enlisted personnel in FY 2009. Reserve endstrength for the service in FY 2009 was 1,392 officers and 6,301 enlisted personnel. During the fiscal year, the AC added 758 officers and 3,861 enlisted personnel. The RC added 173 officers and 950 enlisted personnel that year.

Quality of enlisted applicants and accessions

Like the other military services, the Coast Guard administers the ASVAB to civilians who are considering joining its enlisted ranks. Like the other services, the Coast Guard is also selective in its acceptance of applicants. Strong preference is given to those whose ASVAB score translates into AFQT categories I, II, or IIIA. The strength of that preference is shown by figure 22, which provides a comparison of the AFQT score distributions in FY 2009 for Coast Guard applicants and enlisted accessions.

Figure 22: FY 2009 AFQT score distribution for enlisted U.S. Coast Guard applicants and accessions



[23] Section 3 of Title 14 provides that upon declaration of war and if Congress or the President so directs, the Coast Guard shall operate as a service in the Navy until the President transfers the service back to DHS.

Figure 22 reveals the Coast Guard to be the most selective of the services, in terms of recruits' AFQT scores. In FY 2009, 92.4 percent of Coast Guard recruits registered ASVAB scores that placed them in AFQT categories I through IIIA. The breakdown was 8.5 percent in category I, 53.8 percent in category II, and 30.1 percent in category IIIA. The comparable category I-IIIA share for the Air Force, the DoD service with the highest share, was 81.0 percent. The average for the four DoD services was 72.2 percent. The Coast Guard's applicant pool was nearly as qualified as the other services' accession pool, in that 70.4 percent of those who applied to the Coast Guard scored in categories I-IIIA.

Other measures of recruit quality are educational tiers and the fraction of high-quality recruits. A Tier I recruit is one who possesses a high-school diploma, and a high-quality recruit is one who falls into both Tier I and AFQT category I-IIIA. By those measures, FY 2009 accessions into the Coast Guard were 98.8 percent Tier I and 91.2 percent high-quality. For the Air Force, the most selective of the DoD services in FY 2009, the corresponding Tier I and high-quality shares were 98.1 percent and 79.3 percent. The averages for the four DoD services were 92.9 percent and 66.1 percent, respectively.

For all three measures of recruit quality, then, the Coast Guard, the smallest of the five services, was the most selective in FY 2009.

The representation of women and racial/ethnic groups

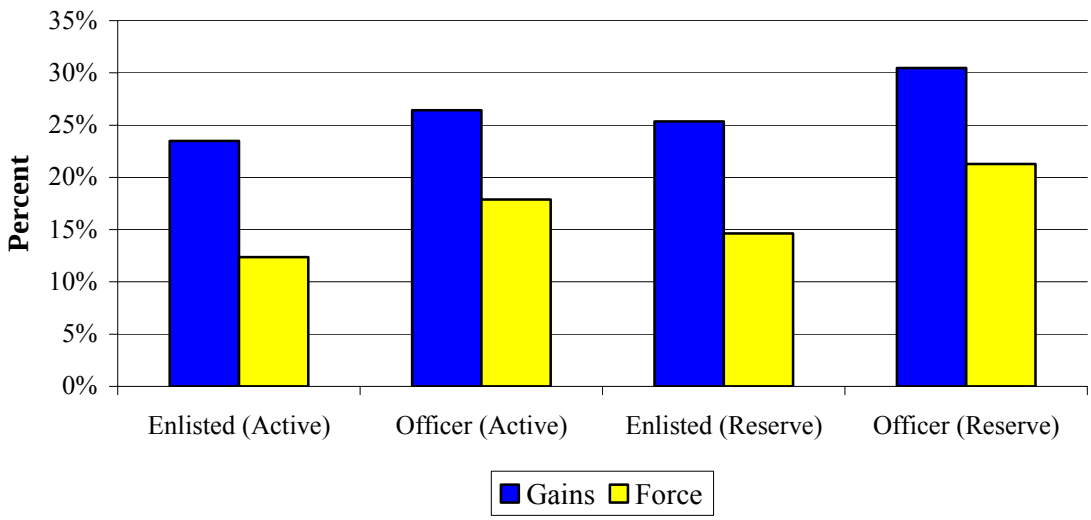
The Coast Guard, like the other services, is striving to build a more diverse force. Figures 23, 24, and 25 track the service's progress in FY 2009 on various diversity measures.[24]

Figure 23 shows that Coast Guard female gains in FY 2009 boosted the female share of the force at all levels: enlisted and officer, AC and RC. The female share of gains was at least five percentage points higher than the female share of the force for each of the four personnel categories. Women accounted for 13.3 percent of the Coast Guard's active-component force of officers and enlisted personnel in FY 2009. For the Coast Guard's reserve component, the female share of the force in FY 2009—officers plus enlisted—was 15.7 percent.

In the Coast Guard AC, whites comprised slightly more than three-quarters of the enlisted gains and the enlisted force in FY 2009, as figure 24 indicates. The comparable shares of gains and the force for whites in the other military services were closer to 70 percent (see figure 5). The Coast Guard's AC enlisted force is slightly more white, in proportionate terms, than the AC enlisted force of the other services. Blacks comprised 5.7 percent of the force and 4.7 percent of gains. Those who identified with two or more racial categories comprised 10.3 percent of gains—twice their 5.0 percent of the force. The unknown category accounted for nearly 10 percent of the force. Hispanic gains were 14.6 percent against 11.9 percent of the force; the comparable Hispanic shares for the other military services were 15.8 percent and 11.7 percent.

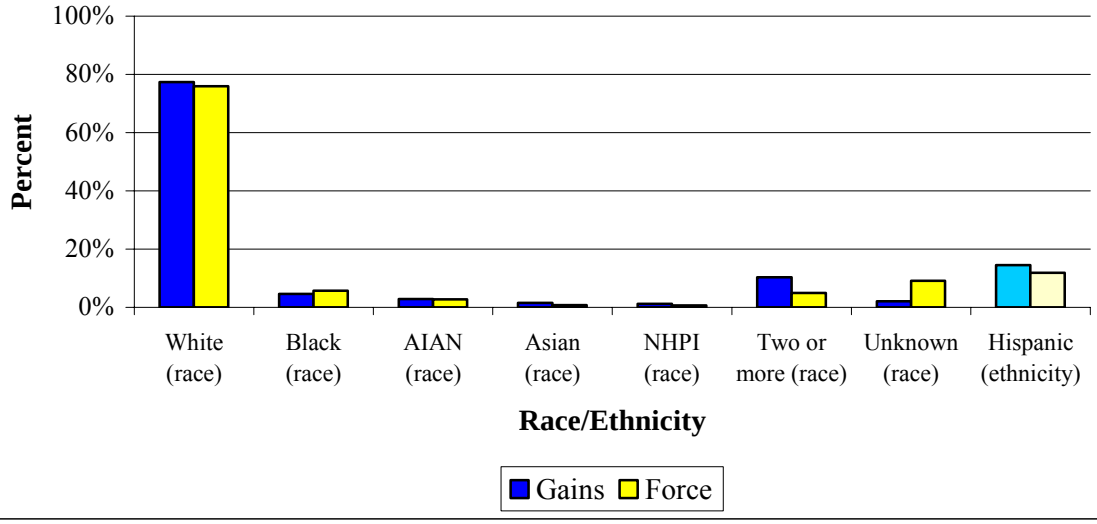
[24] To maintain consistency with the discussion in Sections II and III, Figures 23-25 do not include warrant officers and the enlisted accessions only reflect NPS accessions.

Figure 23: FY 2009 U.S. Coast Guard female share of gains and force, officer and enlisted, active and reserve



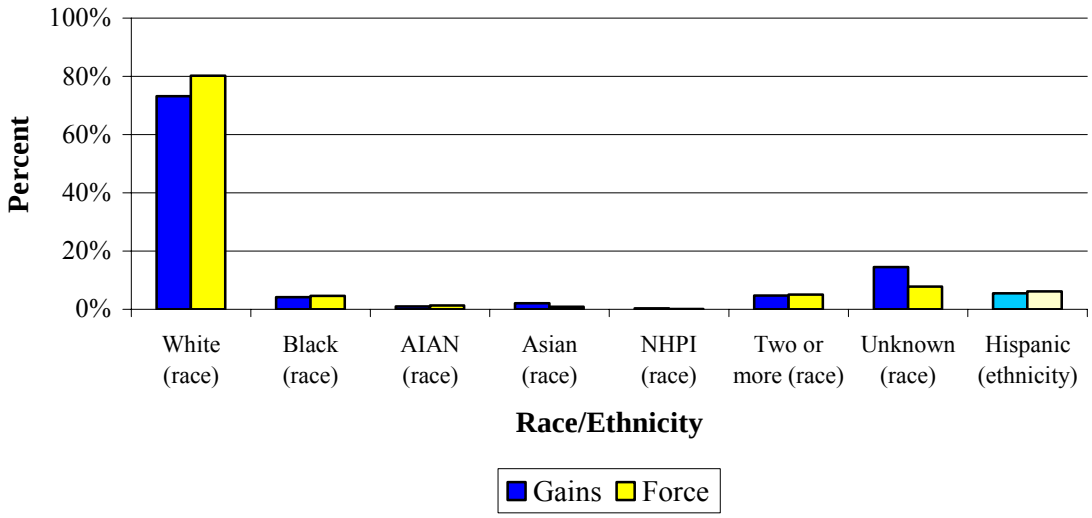
On balance, the story of the Coast Guard enlisted force was similar to that of the enlisted force of the other services in FY 2009. Each saw a leveling off of advances in terms of racial (non-white) diversity but not in terms of ethnic (Hispanic) diversity.

Figure 24: FY 2009 U.S. Coast Guard enlisted race/ethnicity share of gains and force, active component



The Coast Guard AC enlisted force was slightly more white than the other military services; the Coast Guard AC officer force was not, as figure 25 reveals. Whites accounted for 80.2 percent of the force and 73.2 percent of gains in FY 2009. The comparable shares for whites in the other military services were 75.8 percent and 78.9 percent, respectively (see figure 15). The second-largest race category for Coast Guard AC officers was the unknown race category. Its share was 14.5 percent of gains and 7.9 percent of the force. After that, it was the Two or More category with 5.0 percent of the force and blacks with 4.6 percent of the force. Hispanics were 6.1 percent of the force, against an average of 5.2 percent for the other military services.

Figure 25: FY 2009 U.S. Coast Guard officer race/ethnicity share of gains and force, AC

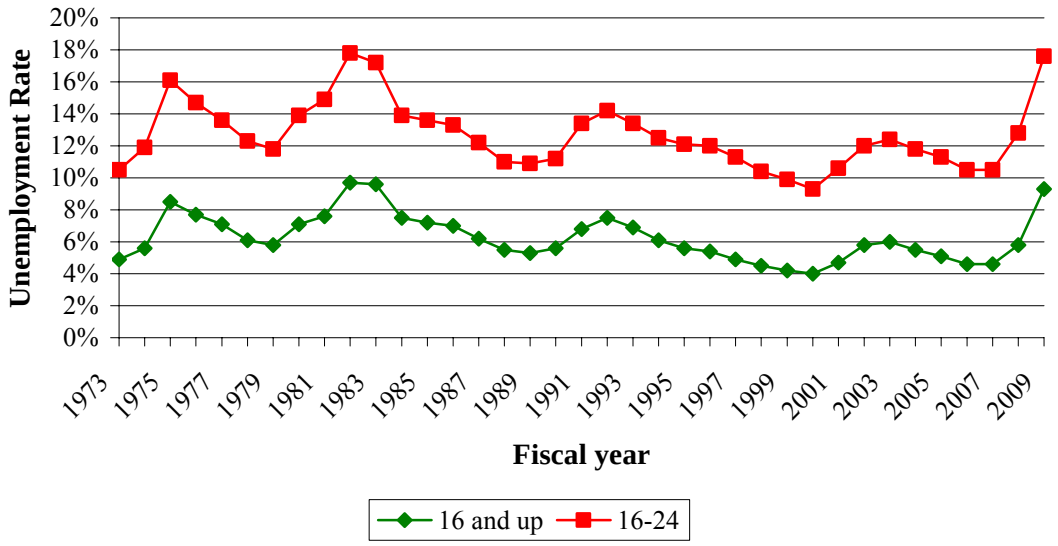


The data show that in FY 2009 the Coast Guard officer force advanced in racial (non-white) diversity—but with the caveat that those advances were almost entirely in the unknown race category. To the extent that some of those newly commissioned officers of unknown race were white, the extent of the nonwhite gains would be mitigated. Improved fidelity of the data reporting may reduce that unknown race share of Coast Guard officer gains (and the officer force). There was also a slowing of advances in ethnic (Hispanic) diversity for the Coast Guard officer force—the 5.5 percent Hispanic share of FY 2009 officer gains was smaller than the 6.1 percent Hispanic share of the FY 2009 officer force.

Section V: Impact of labor market conditions on accession quality

The civilian economy from which recruits enter the military experienced a dramatic worsening in FY 2009. The economy had already slid into recession,[25] but the unemployment rate rose steeply during the year. At the start of the fiscal year, in October 2008, the nationwide unemployment rate for those in the labor force aged 16 and over stood at 6.6 percent. By the end of the fiscal year, in September 2009, the rate had surged to 9.8 percent, which was the highest it had been in over 25 years. One month later, it would top 10 percent. (It would remain above 10 percent for another 2 months.) Figure 26 plots two measures of the U.S. unemployment rate: the rate for all in the labor force aged 16 and over, and the rate for members of the labor force aged 16-24. Both measures are tracked and reported by the U.S. Bureau of Labor Statistics (BLS).

Figure 26: Civilian US unemployment rates, FY 1973-2009



The civilian job market deteriorated sharply in FY 2009. As Figure 26 shows, the nationwide unemployment rate for the civilian labor force aged 16 and over (the most commonly cited measure of the unemployment rate) averaged 9.3 percent for the year. For the age 16-24 subset of the labor force—from which the military disproportionately draws its recruits—the rate stood at 17.3 percent. Both rates were up steeply from the year before and stood at their highest levels since the recession of the early 1980s. That recession, in turn, saw the highest unemployment rates since the Great Depression.[26]

[25] According to the National Bureau of Economic Research (NBER), the recession began in December 2007.

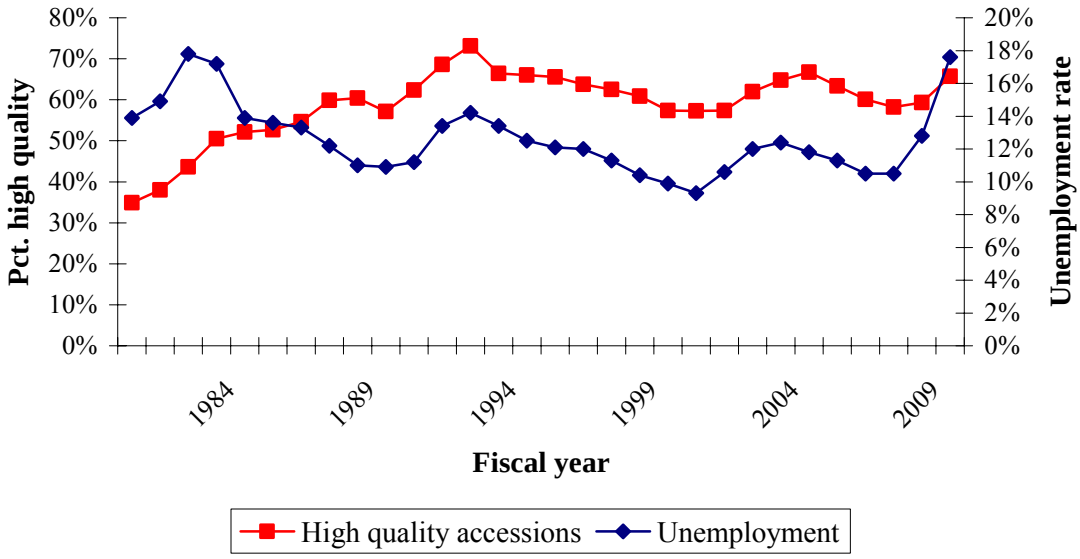
[26] During that recession, the nationwide unemployment rate peaked at 10.8 percent in November and December 1982.

In this section, we use data that are readily available in appendix D of this report to investigate the relationship between labor market conditions and the overall quality of accessions. We begin by considering accessions across all of DOD. We then discuss how the impact of labor market conditions on accession quality varies across the Services.

Variables of interest. Our measure for labor market conditions is the unemployment rate for 16- to 24-year-olds that is reported in table D-2 of this report. To measure accession quality, we use the share or percentage of all accessions who qualify as high quality. A high quality accession has an AFQT score in any of categories I, II, and IIIA—in the top 50 percent—and also has a high school diploma (Tier 1). The data on high quality accessions comes from table D-9 of this report.

Looking at the data. In figure 27, we present the time series for the two measures going back to 1980. Since 1980, the United States has suffered through four different recessionary periods. The first was in the early 1980s. The unemployment rate for 16- to 24-year-olds peaked at 17.8 percent in 1982. The second was in the early 1990s, when the unemployment rate peaked at 14.2 percent. The third came less than a decade ago when unemployment rose from 9.3 percent in 2000 to 12.4 percent in 2003. The latest is the recession that resulted from the recent financial crisis. This caused unemployment among 16- to 24-year-olds to rise to 17.6 percent in 2009.

Figure 27: The share of high quality accessions and the unemployment rate for 16- to 24-year-olds, FYs 1980 through 2009



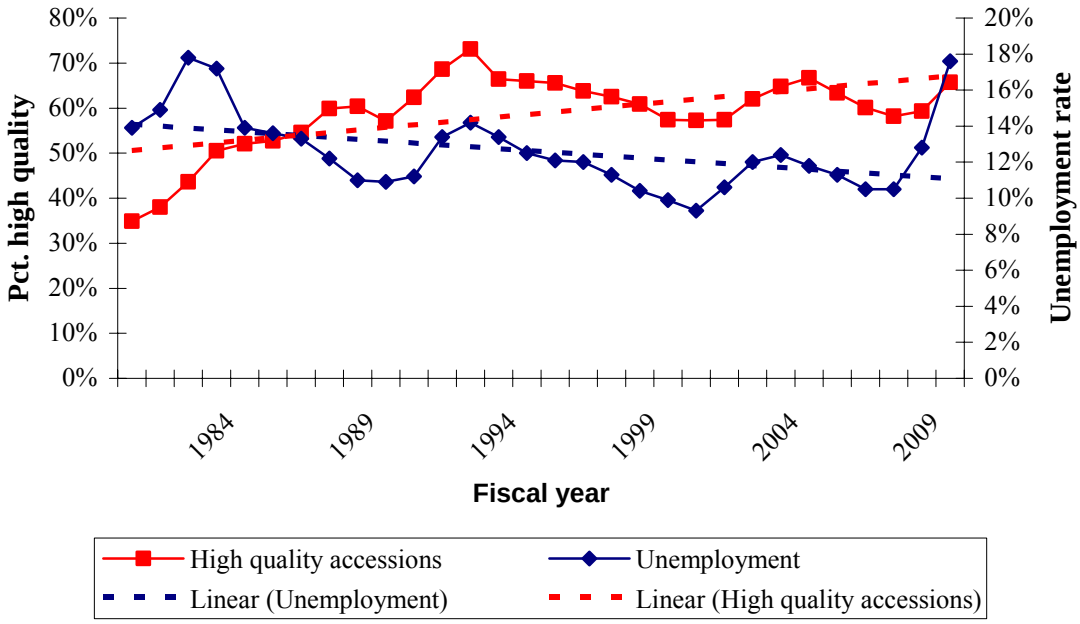
During each of these periods of increasing unemployment, the percentage of accessions categorized as high quality also increased. From 1980 to 1982, the share rose from 35 percent to nearly 44 percent. From 1990 to 1992, the share rose from 62 percent to 73

percent. From 2000 to 2003, the share rose from 57 percent to 65 percent. Finally during the latest recession, the share rose from 58 percent in FY 2007 to 66 percent in FY 2009.

Since the early 1990s, decreases in unemployment have been associated with decreases in the share of accessions that are high quality. For instance, between FYs 1992 and 2000 the share fell from 73 percent to 57 percent and between FYs 2003 and 2007 the share fell from 65 percent to 58 percent.

Statistical analysis. Estimating time series models can be a bit tricky. For instance, if one were to estimate a simple model on the levels of the variables' values, he or she would find a weak negative relationship between the unemployment rate and accession quality. This does not make much intuitive sense given what we have seen in figure 27. The reason one would find this non-intuitive result is that each of time series is trended. The share of all accessions who are high quality has followed a positive trend since the early 1980s, while the unemployment rate among 16- to 24-year-olds has followed a negative trend over this same time period (see figure 28). Estimating the model using levels can lead to spurious results if the time series are heavily trended.[27]

Figure 28: The share of high quality accessions and the unemployment rate for 16- to 24-year-olds, FYs 1980 through 2009, with trends



[27] The results of Dickey-Fuller tests indicate the presence of a unit root, or extreme autocorrelation, in each of the time series we are considering here. One way of dealing with unit root issues is to take first-differences of the data. The resulting time series test negative for the presence of a unit root and neither is heavily trended.

Instead of looking at levels, we consider the relationship between year-to-year fluctuations in unemployment and accession quality. To do this, we estimate the following model for all of DOD and for each of the Services.

$$\Delta\%\text{High Quality}_t = \alpha + \beta\ \Delta\%\text{Unemployment}_t + \varepsilon_t$$

Where $\Delta\%\text{High Quality}_t = \%\text{High Quality}_t - \%\text{High Quality}_{t-1}$ and $\Delta\%\text{Unemployment}_t = \%\text{Unemployment}_t - \%\text{Unemployment}_{t-1}$. The results of the regression models are presented in table 2.

Table 3: Regression results (standard errors in parentheses)

	DOD-wide	Army	Navy	USMC	Air Force
Constant	0.987	0.854	1.066	1.162*	1.125
	(0.581)	(0.882)	(0.734)	(0.553)	(0.744)
Δ%Unemployment	1.168**	1.720**	0.968*	0.766*	0.387
	(0.379)	(0.576)	(0.479)	(0.361)	(0.485)
R-square	0.253	0.242	0.127	0.139	0.022

** Significant at the 0.01 level.
* Significant at the 0.05 level.

The results indicate that across DOD short-term increases in unemployment are associated with short-term increases in accession quality. To get a sense of the magnitude of the relationship, a 1-percentage point increase in the unemployment rate for 16-to 24-year-olds is associated with a 1.17-percentage point increase in the share of accessions that are high quality. The result implies an elasticity of roughly 0.25 which is in line with the results of previous studies. The positive relationship between the two variables varies considerably across the four Services. It is strongest for the Army and non-existent for the Air Force.

The results are fairly robust to small changes in the specification of the model. For instance, when we lagged the unemployment rate by 1 period (year), we still found a strong statistically significant relationship between accession quality and unemployment. We also considered a model where accessions were related to the 2-year moving average for unemployment. The results of this model were again consistent with the results of the previous 2 models.

Conclusions and caveats. Our results indicate that there is a strong relationship between labor market conditions and accession quality. The reader should keep in mind that we have not controlled for other factors that may also affect accession quality. These factors include such variables as college tuition rates, civilian wages, and the labor force participation rate. Information on these variables is not included in the PopRep, thus their omission from our analysis.

List of acronyms

AC	Active Component
AFQT	Armed Forces Qualification Test
AIAN	American Indian / Alaskan Native
ANG	Air National Guard
ARNG	Army National Guard
ASVAB	Armed Services Vocational Aptitude Battery
AVF	All-Volunteer Force
BCT	Brigade Combat Team
BLS	Bureau of Labor Statistics
CNA	Center for Naval Analyses
CRS	Congressional Research Service
DMDC	Defense Manpower Data Center
DoD	Department of Defense
DHS	Department of Homeland Security
FY	Fiscal Year
GED	General Educational Development certificate
NBER	National Bureau of Economic Research
NHPI	Native Hawaiian / Pacific Islander
NPS	Non-Prior Service
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
PopRep	Population Representation Report
PS	Prior Service
RC	Reserve Component
SELRES	Selected Reserve
USAFR	U.S. Air Force Reserve
USAR	U.S. Army Reserve
USMCR	U.S. Marine Corps Reserve
USNR	U.S. Navy Reserve

Source data for tables and figures

Table 1	Tables B-1, B-12, B-15, B-30, B-34, C-1, C-8, C-11, C-16, C-17, C-28, E-5, E-10, E-12, E-18, E-19, E-20, E-22, E-24, E-28, E-29
Figure 1	Tables D-1 and D-11
Table 2	Tables A-4, A-5, B-4, and B-5
Figure 2	Tables D-7, D-8, and D-9
Figure 3	Tables B-4, B-6, and B-8
Figure 4	Tables B-1 and B-15
Figure 5	Tables B-3 and B-17
Figure 6	Table D-10
Figure 7	Table B-46
Figure 8	Table B-46
Figure 9	Table B-16
Figure 10	Table B-16
Figure 11	Table D-12
Figure 12	Tables D-15 and D-17
Figure 13	Table B-23
Figure 14	Tables B-15 and B-22
Figure 15	Table B-25
Figure 16	Table D-18
Figure 17	Tables D-20 and D-21
Figure 18	Tables D-20 and D-21
Figure 19	Tables C-1, C-11, and C-18
Figure 20	Tables C-3 and C-13
Figure 21	Table C-20
Figure 22	Tables E-3 and E-7
Figure 23	Tables E-5, E-12, E-18, E-20, E-24, and E-27
Figure 24	Tables E-6 and E-13
Figure 25	Table E-16
Figure 26	Table D-2
Figure 27	Tables D-2 and D-9
Figure 28	Tables D-2 and D-9
Table 3	Authors' calculations using data from Tables D-2 and D-9

References

[1] Amy Belasco, *Troop Levels in the Afghan and Iraq Wars, FY2001-FY2010: Cost and Other Potential Issues*, U.S. Congressional Research Service report R40682, 2009.

[2] Laura Junor and James Jondrow, *A Measure of the Quality of Our Forces*, CNA annotated briefing 4797003100, 1997.