



## MLDC Research Areas

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# Reserve Component Officer Continuation Rates by Gender and Race/Ethnicity

## Abstract

The Military Leadership Diversity Commission (MLDC) was tasked by Congress with measuring the ability of current programs to increase the continuation rates of women and minorities in the armed forces. To help identify possible continuation issues in the Reserve Component (RC), this issue paper (IP) examines continuation rates in the Reserve and National Guard. The main findings in this IP are that continuation rates for female officers are lower than those of men and that continuation rates for minorities are higher than those for white officers. However, while in general these results are robust across the Services, there is wide variation across officer careers.

Congress asked the MLDC to “Measure the ability of current activities to increase continuation rates for ethnic- and gender-specific members of the Armed Forces.” With this in mind, the primary purpose of this issue paper (IP) is to assess whether there are differences in continuation rates for female and minority officers in the Reserve Component (RC).

To do this in a consistent manner, we use data for all seven Reserve and National Guard components including

- Army National Guard (ARNG)
- Air National Guard (ANG)
- U.S. Army Reserve (USAR)
- U.S. Navy Reserve (USNR)
- U.S. Marine Corps Reserve (USMCR)
- U.S. Air Force Reserve (USAFR)
- U.S. Coast Guard Reserve (USCGR).

We find that there are indeed differences by gender and race/ethnicity. Our results

show that, on average, women tend to have lower continuation rates than men and that minorities tend to have higher continuation rates than whites. However, there are some nuances to these results, and we discuss this below.

We also note that the continuation rates we report here are descriptive rather than explanatory and that there are methodological limitations to using raw continuation rates to inform policy decisions. While our metrics inform us about whether differences in continuation rates exist, they say nothing about the cause of these differences.<sup>1</sup>

## Data

We base our calculations on data from the Reserve Components Common Personnel Data System (RCCPDS) provided by the Defense Manpower Data Center (DMDC). We note that as in other IPs for the National Guard and Reserve Subcommittee, our focus is on data on Selected Reserve (SelRes) officers not in active duty.<sup>2</sup>

For race/ethnicity, the data are reported in the following categories:

- Non-Hispanic Asians and Pacific Islanders (API)
- Non-Hispanic blacks (black)
- Hispanics
- non-Hispanic others (other), which includes American Indians, Alaska natives, “more than one race,” and “unknown”
- Non-Hispanic whites (white)

To maintain consistency within our data, we deviate slightly from the MLDC race/ethnicity categories presented in Military Leadership Diversity Commission (2009). In our data, Pacific Islanders are grouped with “Asian” instead of with the “other” category, and the “unknown” category<sup>3</sup> is included with other rather than as its own separate category.

### Conditional Continuation Rates

We use conditional continuation rates as a measure of retention. In general, conditional continuation rates measure the percentage of individuals that, having been observed in our data on a given year, still remain in the data the following year. In particular, because our interest is on retention over the career of officers, we use Years of Service (YOS) rather than calendar or fiscal years (FY) to assess retention in this IP.

Our data cover FY 2004 through FY 2909, which allows us to average our continuation rates over these years to obtain a more robust estimate of our continuation rates. This way we can average out any year-to-year random variations in the data that may confound our results.

We note that our conditional continuation rates contain information that goes beyond retention. Many factors may affect continuation rates beyond a servicemember's decision to stay in the RC. Servicemembers may leave the RC for a number of external reasons that range from lack of promotion opportunities, health or behavioral issues, or failure to pass training requirements. These are all included in the continuation rate numbers—if a servicemember leaves for any reason, he or she is counted as not continuing so these rates also include a measure of overall career progression that accounts for all the factors mentioned above.

Whenever possible, we point out those times in an officer's career when we think that the continuation rates that we observe are the result of retention decisions or influenced by external institutional factors. However, our data do not allow us to identify other personal factors that may also influence an officer's decision to stay in the RC.

We also point out that a major difference between the Reserve and the Active Component (AC) is that a great majority of Reserve officers join the Reserve Component ranks after leaving active duty. The majority join at the O-3 and O-4 pay grades. This means that our continuation rates only account for these servicemembers after they have completed a year of service in the RC.

To facilitate the interpretation of the continuation rates presented below, we present them as deviations from a given baseline category. For gender, we use the male category as the baseline for comparisons. For the race/ethnicity comparisons, we use the white category. This means that for women, we present continuation rates as a percentage point difference from the male rates. For race/ethnicity, we present these comparisons as percentage point differences from the white category. To give a complete picture, we also report raw continuation rates in the appendix.

Lastly, as a point of reference for the continuation rates we present below, Table 1 shows the average YOS corresponding to each pay grade. We note that RC servicemembers may have had prior service time in the AC before joining the RC, and so they may come in already having achieved

certain career milestones. For this reason, we use YOS Pay Entry Base Date (PEBD) as a measure of total YOS and not just years of service in the Reserve Component. The YOS PEBD metric measures YOS from the time a servicemember first joins the armed forces, and thus puts all of our observations on the same time scale relative to accession to the armed forces. This facilitates identifying certain milestones in the data, such as reaching retirement eligibility. However, for prior service individuals, years of service as measured by YOS PEBD may include time in the enlisted ranks or in the active duty officer ranks.<sup>4</sup> Thus, YOS PEBD is not a perfect indicator of where in a career an RC officer may be at a particular YOS. To help the reader identify career milestones in the charts in this IP, Table 1 presents the average YOS at each pay grade for individuals in our sample. We note, however, that these are averages, and that there may be great variation across individuals.

### Officer Continuation Rates by Gender

We begin our examination of retention by looking at continuation rates by gender. As mentioned above, we use data from FY 2004 to FY 2009 to create composite cohorts that allow us to present average continuation rates across a number of years. We present continuation rates for women as percentage point deviations from male continuation rates.

As we show in Table 2 below, on average and for all Services, female continuation rates are lower than male continuation rates. These differences are statistically significant for all Services except for the Air National Guard. Moreover, as we show in Figures 1 and 2, these continuation rates show major differences across years of service but less so across Services. We explore general patterns and show two examples from the services below. For the reader interested in details related to the Services, we report

**Table 1. Average YOS, by Pay Grade**

| Pay Grade | Average |
|-----------|---------|
| O-1       | 7.28    |
| O-2       | 9.84    |
| O-3       | 12.68   |
| O-4       | 17.26   |
| O-5       | 21.69   |
| O-6       | 24.97   |
| O-7       | 27.90   |
| O-8       | 28.80   |

Source: DMDC RCCPDS FY 2004–FY 2009 (DMDC, 2008)

\*Some of the numbers in earlier years are based on a small number of observations.

continuation rate differentials and raw rates in the figures and tables in the appendix.

To illustrate these patterns we use gender continuation rate differentials for the Air National Guard and the Coast Guard Reserve. Data for the other Services are included in the appendix. While the Air National Guard is a perfect illustration of these patterns, the data we show from the Coast Guard Reserve is much noisier. The source of this noise is the small size of the Coast Guard Reserve officer corps. However, even with these noisy data the general pattern still stands.<sup>5</sup>

The general pattern is that female continuation rates are lower than male rates in the years between YOS 0 and YOS 10. During these early years, this difference in female continuation rates is likely due to differences in actual retention rather than a promotion effect. During this time in an officer's career, promotion is based only on obtaining full qualifications rather than on the competitive selection process used in higher ranks.<sup>6</sup>

In general, mid-career female continuation rates are higher than those of their male counterparts. Between YOS 10 and YOS 20, female rates rise to surpass the continuation rates of men for at least some of this time. We note that this is a point in officers' careers at which most of them are subject to competitive promotions.<sup>7</sup>

Later in their careers, the continuation rates for women tend to trend down and, in general, remain below their male counterparts. For most Services, there is a noticeable decrease in female rates at YOS 20, after which they remain below male rates. We note that at this time officers become eligible

for retirement benefits and that the Army Reserve and the Marine Corps Reserve are the only exceptions to this drop at YOS 20. However, in the case of the Marine Corps Reserve, the number of female officers is low enough to make their rates very noisy and, therefore, unreliable.

### Statistical Significance by Gender

While the continuation patterns for female Reserve officers described above seem robust across both YOS and across components, we tested for statistical significance of these results to ensure that these patterns were robust by scientific standards.

We used regression analysis to determine whether gender plays a significant role in explaining continuation rates. We report our results in Table 2.

As in the previous section, we use the male gender category as the baseline to report average gender differences in continuation rates by Service. Standard errors are shown in parentheses and significance levels are marked with asterisks.

The standard errors reported below give us a measure of the accuracy of our results given the sample of data used to construct the estimates (smaller standard errors are associated with more accurate estimates). Likewise, more stars point to a smaller probability that our results appear different from zero due to chance alone. For example, a single \* means that there is at most a 10 percent probability that our results are due to chance alone, \*\* shows that this probability is 5 percent, and for \*\*\* this probability is only 1 percent.

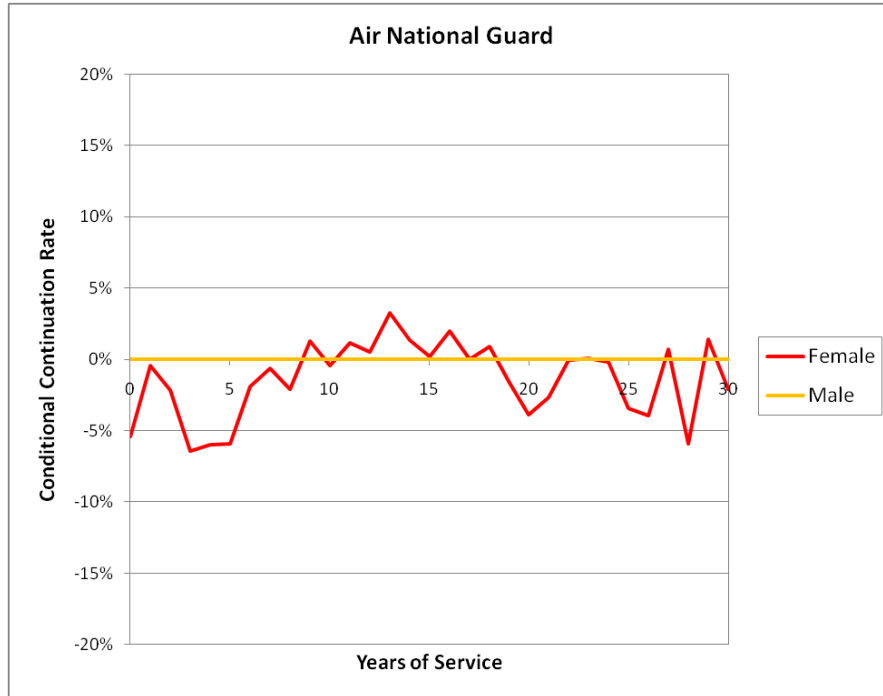
**Table 2. Average Effect of Gender on Conditional Continuation Rates, by Service**

|                 | Air Force Reserve     | Air National Guard   | Army National Guard  | Army Reserve          | Coast Guard Reserve   | Marine Corps Reserve | Navy Reserve          |
|-----------------|-----------------------|----------------------|----------------------|-----------------------|-----------------------|----------------------|-----------------------|
| Female          | -0.0212***<br>(0.002) | -0.0042<br>(0.003)   | -0.0047*<br>(0.002)  | -0.0124***<br>(0.002) | -0.0354***<br>(0.010) | -0.0221*<br>(0.013)  | -0.0181***<br>(0.003) |
| Baseline (Male) | 0.9032***<br>(0.001)  | 0.9237***<br>(0.001) | 0.8967***<br>(0.001) | 0.8889***<br>(0.001)  | 0.8995***<br>(0.004)  | 0.8048***<br>(0.003) | 0.8618***<br>(0.001)  |
| N               | 90349                 | 66246                | 151448               | 177461                | 6355                  | 16331                | 86424                 |
| F               | 86.5267               | 2.3847               | 3.7629               | 51.8464               | 13.4350               | 2.7271               | 33.5594               |
| d.f.            | 1                     | 1                    | 1                    | 1                     | 1                     | 1                    | 1                     |
| p-value         | 0.0000                | 0.1225               | 0.0524               | 0.0000                | 0.0002                | 0.0987               | 0.0000                |

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

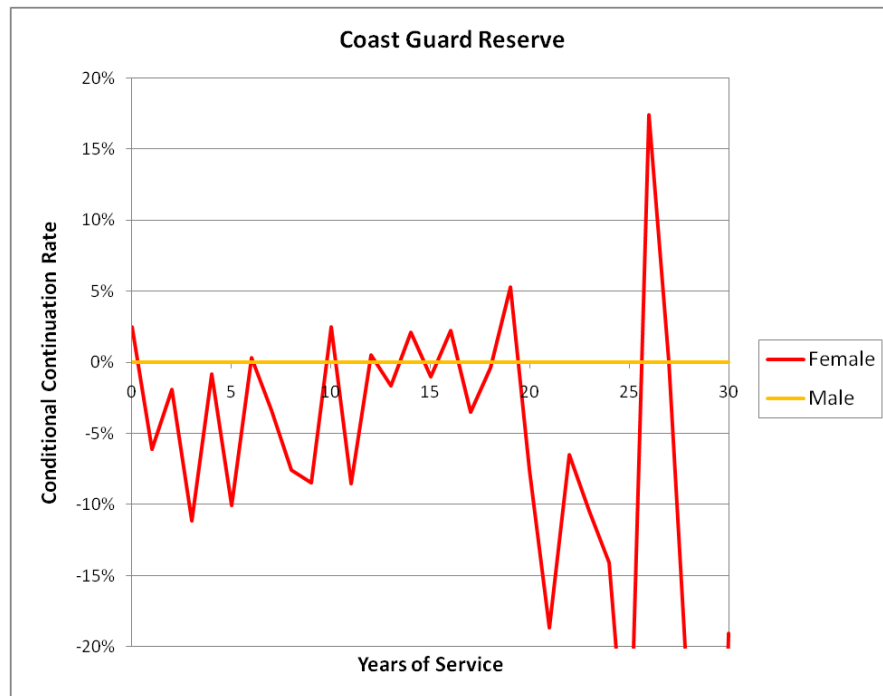
Estimates obtained using data from DMDC RCCPDS FY 2004–FY 2009 (DMDC, 2008)

**Figure 1. Air National Guard: Female Conditional Continuation Rates as Deviations from the Baseline (Percentage Points)**



Source: DMDC RCCPDS FY 2004–FY 2009 (DMDC, 2008)  
 The male category is used as the baseline for comparisons.

**Figure 2. Coast Guard Reserve: Female Conditional Continuation Rates as Deviations from the Baseline (Percentage Points)**



Source: DMDC RCCPDS FY 2004–FY 2009 (DMDC, 2008)  
 The male category is used as the baseline for comparisons.

The baseline row in Table 2 reports the average retention rate for men. The row marked Female reports the average deviation from the baseline rate. For example, in Table 2 the average continuation rate for male officers in the Air Force Reserve is 90 percent. The average continuation rate for women is 2 percentage points below that.

As we can see from this table, our results show that on average across all years of service, women have lower continuation rates than men for all Services and that this result is significant at least at the 10 percent level in all Services except for the Air National Guard.

### Officer Continuation Rates by Race/Ethnicity

We present conditional continuation rates by race/ethnicity as the difference between each category and whites. There are two points that need to be highlighted. First, the rates we calculate for racial/ethnic groups are noisier than those for the gender categories. Second, the continuation rates for minorities are on average higher than the rates for whites. The exceptions to this pattern are blacks in the Air Force Reserve, the Coast Guard Reserve, the Marine Corps Reserve, and the Navy Reserve; and the “other” category in the Air National Guard and the Air Force Reserve.

For all race/ethnicity categories, the data is relatively noisy in the first few years of service and after YOS 20. They are more stable for YOS 10 through YOS 20. During this time in an officer’s career, minority continuation rates are higher than the rates for whites, except for those for blacks in the Army Reserve, Marine Corps Reserve, and Navy Reserve. In these Services, black rates trend down and tend to stay below continuation rates for whites. While we provide some detail below, we invite the reader to refer to the tables and figures in the appendix for more detail.

In the early years of their careers, minorities in general have lower continuation rates than whites until about YOS 5, though this varies by racial/ethnic category. Hispanics and others have a noticeable dip in YOS 5 across the Services. Blacks and API, on the other hand, have a peak at YOS 5, except for the Coast Guard Reserve and the Navy Reserve, in which blacks have a dip instead.

Between YOS 5 and YOS 20, continuation rates for racial/ethnic minorities fluctuate around the rates for whites. For API and blacks, continuation rates are below those of whites in general, except for between YOS 5 and YOS 10. During this time, they peak above white rates, especially in the Army Reserve and the Navy Reserve. The opposite is true for the

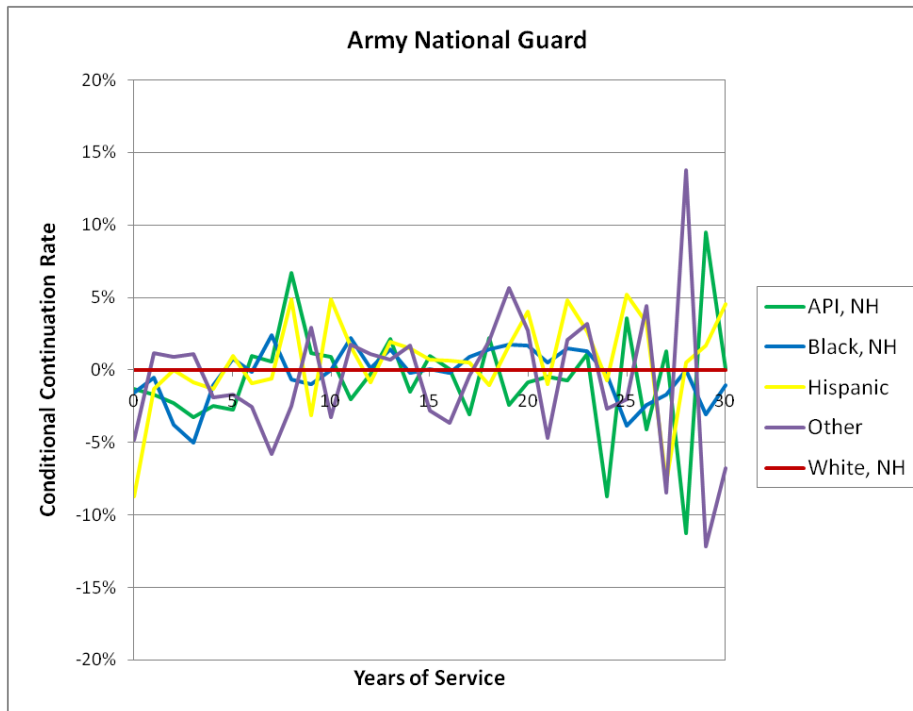
**Table 3. Average Effect of Race/Ethnicity on Conditional Continuation Rates, by Service**

|                      | Air Force Reserve     | Air National Guard   | Army National Guard  | Army Reserve         | Coast Guard Reserve  | Marine Corps Reserve | Navy Reserve          |
|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|
| API, NH              | 0.0056<br>(0.005)     | 0.0024<br>(0.006)    | 0.0031<br>(0.005)    | 0.0156***<br>(0.004) | -0.0255**<br>(0.013) | -0.0211<br>(0.020)   | 0.0115**<br>(0.006)   |
| Black, NH            | -0.0147***<br>(0.004) | 0.0007<br>(0.005)    | 0.0022<br>(0.003)    | 0.0039*<br>(0.002)   | -0.0201<br>(0.021)   | -0.0374**<br>(0.015) | -0.0151***<br>(0.006) |
| Hispanic             | 0.0046<br>(0.005)     | 0.0064<br>(0.005)    | 0.0092**<br>(0.004)  | 0.0087***<br>(0.003) | -0.0051<br>(0.018)   | -0.0157<br>(0.015)   | 0.0126**<br>(0.006)   |
| Other                | -0.0086<br>(0.006)    | -0.0032<br>(0.006)   | 0.0006<br>(0.006)    | 0.0212***<br>(0.005) | 0.0226<br>(0.020)    | 0.0240*<br>(0.014)   | 0.0111***<br>(0.004)  |
| Baseline (White, NH) | 0.8984***<br>(0.001)  | 0.9227***<br>(0.001) | 0.8954***<br>(0.001) | 0.8834***<br>(0.001) | 0.8951***<br>(0.004) | 0.8051***<br>(0.003) | 0.8570***<br>(0.001)  |
| N                    | 90349                 | 66246                | 151448               | 177461               | 6355                 | 16331                | 86424                 |
| F                    | 4.3107                | 0.4495               | 1.7697               | 9.8674               | 1.5579               | 2.9611               | 6.3388                |
| d.f.                 | 4                     | 4                    | 4                    | 4                    | 4                    | 4                    | 4                     |
| p-value              | 0.0017                | 0.7728               | 0.1318               | 0.0000               | 0.1826               | 0.0186               | 0.0000                |

\* p<0.10, \*\* p<0.05, \*\*\* p<0.01

Estimates obtained using data from DMDC RCCPDS FY 2004–FY 2009 (DMDC, 2008)

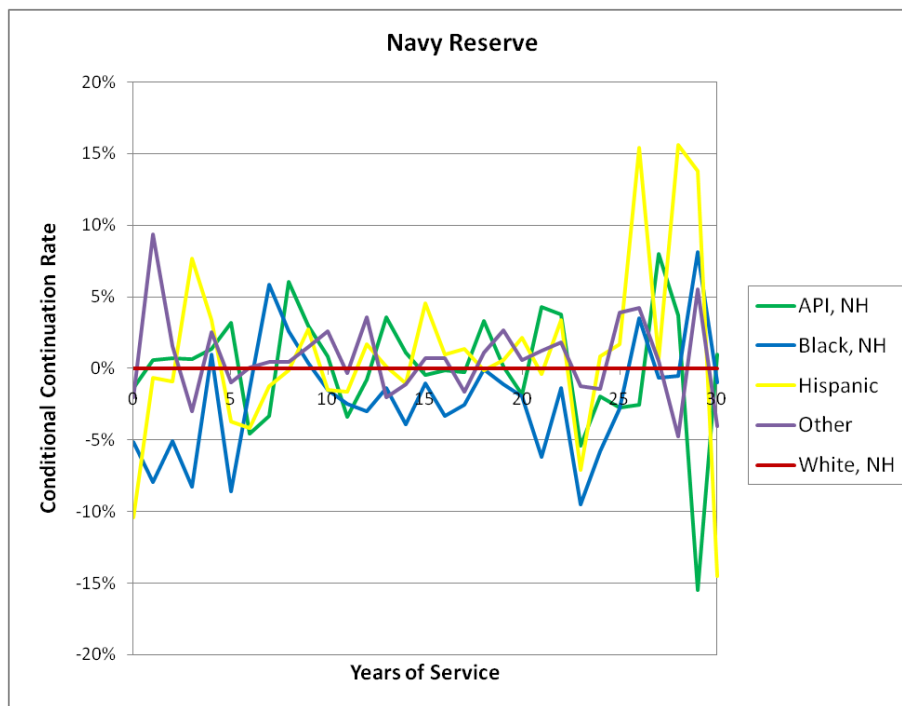
**Figure 3. Army National Guard: Race/Ethnicity Conditional Continuation Rates as Deviations from the Baseline (Percentage Points)**



Source: DMDC RCCPDS FY 2004-FY 2009 (DMDC, 2008)

The white, NH category is used as the baseline for comparison.

**Figure 4. Navy Reserve: Race/Ethnicity Conditional Continuation Rates as Deviations from the Baseline (Percentage Points)**



Source: DMDC RCCPDS FY 2004-FY 2009 (DMDC, 2008)

The white, NH category is used as the baseline for comparison.

Air Force Reserve and the Coast Guard Reserve, where these rates dip for API and blacks during this time. Hispanics also have a peak above white rates before YOS 20 that lasts for a few years, and in some cases, beyond YOS 20.

After YOS 20, minority continuation rates fluctuate around continuation rates for whites and are, in general, higher than white rates. However, the fluctuations are relatively wide in relation to the rest of the data. The reason for this is that the number of individuals in each category is relatively small when compared with whites, indicating that these data are noisier than during YOS 10 through YOS 20.

We show continuation rate differentials for minorities in Figures 14 and 18 in the appendix. We use the Army National Guard and the Navy Reserve as examples of the patterns described above. For more information about these and the other components, please refer to the appendix.

### Statistical Significance by Race/Ethnicity

As we did for gender, we use regression analysis to test for significant differences in average continuation rates by race/ethnicity. The row labeled Baseline on Table 3 indicates the average retention rates for whites for all the years of service included in our sample. The columns labeled with each of the race/ethnicity categories indicate deviations from that average.

On average, minorities tend to have higher continuation rates than whites. However, not all of these continuation rate differentials are statistically significant, and therefore, we cannot rule out with statistical certainty that some of these rates are no different from the continuation rates for whites. Note, however, that considering the magnitude of some of these results, they may merit further investigation.

### Conclusions

In this IP, we show continuation rates for the different gender and racial/ethnic categories in our sample. We report conditional continuation rates that count the percentage of individuals present in a given YOS, given that they were in the Selected Reserve in their previous YOS. We use data from FY 2004 through FY 2009 to construct average continuation rates that smooth year-to-year anomalies. To facilitate interpretation of differences, we present these rates as the difference between each category and a baseline. We use men and whites for the gender and race/ethnicity baselines, respectively.

Our results lead us to two conclusions. First, female continuation rates are in general lower than the rates for men. Female continuation rates tend to be relatively lower early and late in their careers, and somewhat higher between YOS 10 and YOS 20. This pattern is robust across Services.

Second, minorities, except for blacks and others in some of the Services, have, on average, higher continuation rates than their white counterparts. However, there is much variation by Service and race/ethnicity categories in these rates.

### Notes

<sup>1</sup>Please see Military Leadership Diversity Commission (2010a) for a review of these methodological limitations for policymaking.

<sup>2</sup>IP #53 (Military Leadership Diversity Commission, 2010b) presents a description of RC manpower including a definition of the SelRes and its importance to the Reserve Component and the armed forces in general.

<sup>3</sup>This category includes individuals that cannot be identified in the data as belonging to any of the other categories.

<sup>4</sup>Some officers join the RC at pay grades above O-1 after having served in active duty, and some officers may have had time in the enlisted ranks before being commissioned.

<sup>5</sup>Small sample size is also a problem in the Marine Corps Reserve data. Moreover, the problem of a small officer corps is compounded by the fact that the male/female ratio in the Marine Corps Reserve is much lower than in the other Services. The Marine Corps Reserve has the lowest share of female officers of all the components. Please see Military Leadership Diversity Commission (2010b) and (2010c) for more details.

<sup>6</sup>Competitive promotions start at the O-4 pay grade.

<sup>7</sup>While we don't have data that allow us to make comparisons in the RC, active duty female officers in the Navy, the Army, and the Coast Guard also have lower-than-average promotion rates to these grades (Military Leadership Diversity Commission, 2010d).

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