

## Chapter 8

# Combat Compensation and Continuation in the Active and Reserve Components

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## Executive Summary

### Background

The 11<sup>th</sup> Quadrennial Review of Military Compensation (QRMC) was chartered to examine four areas of the military compensation system, including “compensation for service performed in a combat zone, combat operation, or hostile fire area, or while exposed to a hostile fire event” [1]. As part of CNA’s support to the QRMC, we were asked to examine how active and reserve servicemembers’ retention is affected by the receipt of combat compensation. Our analysis is one part of the 11<sup>th</sup> QRMC’s overall analytical framework examining combat compensation.

The arduous nature of deployments is characterized by long hours, time away from family, and potentially harsh work conditions. When one deploys to a combat zone, there is the additional risk of harm to one’s self. Combat pay compensates servicemembers for these negative aspects of combat service and can potentially influence retention, unit turnover, and overall readiness. In this paper, we focus on two pays tied to combat service—hostile fire pay (HFP) and combat zone tax exclusion (CZTE)—and examine the correlation between receipt of these combat pays and active and reserve continuation.<sup>1</sup> We also compare Global War on Terror (GWOT) and non-GWOT deployment experiences for the active component, which may differ based on levels of risk and living conditions while deployed.

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1. When we reference hostile fire pay, we’re referring to both hostile fire pay and imminent danger pay [2].

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Our analysis provides a context in which to view differences in continuation rates by type of deployment experience.

### **Approach**

Our analytical approach is to first briefly review recent pays and policies relating to combat and deployments. Next, we review the literature on the effect of hostile deployments and combat compensation on continuation. Finally, we conduct an empirical analysis using deployment, personnel, and pay data provided by the Defense Manpower Data Center (DMDC).

In our empirical analysis, we use a two-pronged approach. First, for the active component (AC) we analyze differences in continuation across hostile deployments (as defined by the receipt of HFP or CZTE), non-hostile deployments, and no deployments. Second, we compare continuation across GWOT deployments, non-GWOT hostile deployments, non-hostile deployments, and no deployments. For the reserve component (RC), we first compare continuation across hostile deployments and non-hostile deployments. Second, we compare continuation by mobilizations with a GWOT deployment, only mobilizations without deployment, and no mobilizations.

Ideally, we would isolate the continuation effects of combat compensation from the continuation effects of deploying to a combat zone, but the way pays are structured and awarded prevents us from separating the compensation effect from the combat effect at the individual level. Thus, in interpreting our results, one cannot be certain whether the observed relationship is the result of receipt of combat pay or underlying differences from non-compensation factors (*viz.*, combat experience). Although we are unable in our empirical analysis to disentangle the effect of combat compensation from the effect of a hostile deployment, we do use aggregate-level casualty and CZTE data to put our empirical findings in context.

### **Findings**

#### **Active component**

For the AC, we arrive at two main conclusions—one for servicemembers with less than 6 years of service (YOS) and another for servicemembers with 6 or more YOS.

First, for servicemembers (both enlisted and officer) with less than 6 YOS, the continuation effect of a hostile deployment is negative for the Army and Marine Corps and positive for the Air Force. Moreover, the negative continuation effect of hostile deployments for the Army and Marine Corps is driven by GWOT deployments. To be specific, when we separate GWOT and non-GWOT hostile deployments for

servicemembers with less than 6 YOS in the Army and Marine Corps, we find a negative continuation effect of GWOT deployments and a positive continuation effect of non-GWOT hostile deployments. In contrast, for servicemembers with less than 6 YOS in the Air Force, we find a positive continuation effect of any deployments (GWOT, non-GWOT hostile, and non-hostile). This might be explained by service-specific differences in risk or conditions faced while deployed in support of GWOT. Indeed, analysis of GWOT casualty data shows that casualty rates for the Air Force are much lower than for the Army and Marine Corps, both overall and when the data are restricted to the lower paygrades (a proxy for low YOS). Also, survey data show that deployments are associated with higher work and personal stress and lower reenlistment intentions among first-term servicemembers in the Army and Marine Corps than among first-term servicemembers in the Air Force [3].

Second, for servicemembers (both enlisted and officer) with 6 or more YOS, the continuation effect of deploying is unambiguously positive. This is true for GWOT, non-GWOT hostile, and non-hostile deployments and suggests that, while hostile deployments might contribute to lower continuation among servicemembers with fewer YOS, they might have the opposite effect for servicemembers with more YOS. We posit three potential explanations for this. First, servicemembers with fewer YOS face greater risk in a hostile deployment than servicemembers with more YOS, as demonstrated by the GWOT casualty data. Second, since taxable incomes tend to rise with YOS, the value of CZTE (in terms of its reduction in a servicemember's tax liability) is increasing in YOS, as demonstrated by the CZTE data. Third, we might be observing a selection effect since servicemembers with a greater tolerance for hostile deployments might themselves be more likely to stay in the military. Taken together, this might explain why the effect of hostile deployments is positive for more experienced servicemembers and negative for less experienced servicemembers.

### Reserve component

For all RCs except the Marine Corps, we find that those who have received any HFP have higher continuation rates than those who have not received the pay. When we narrow our focus to completed mobilizations, we find that for most RCs those members who have mobilized with a deployment have higher continuation rates than those who have mobilized without a deployment. We offer as one possible explanation the fact that those who have deployed in support of GWOT earn combat pay, unlike their non-deploying counterparts. Other differences, such as a desire to support the mission, may also influence the decision to stay in the Selected Reserve (SELRES). This finding, however, does not hold across all components; the exceptions are Marine Corps enlisted SELRES and Army National Guard officers.

The differences in our findings by service may be associated with service-specific differences in risk, as shown by the GWOT casualty data.

### Introduction<sup>2</sup>

As part of CNA's support to the 11<sup>th</sup> QRMC, we were asked to examine how continuation differed by different deployment experiences, for example, by deployments that do or don't involve receipt of HFP.<sup>3</sup> Our analytical approach to address this issue was to first briefly review the pays and policies that have been used since September 11, 2001, to compensate for combat and deployments. We then provide a brief literature review on the continuation effects of hostile deployments and compensation. For our statistical analysis, we use deployment, personnel, and pay data provided by the DMDC. In our empirical analysis, we focus on HFP and CZTE, two compensation elements that are directly tied to combat service, and we look separately at the AC and RC.

For the AC, we use deployment history over the past 24 months to separate servicemembers into those who (a) experienced hostile deployments (defined by receipt of HFP or CZTE), (b) experienced only non-hostile deployments, and (c) did not deploy. Then, we compare continuation rates across these three groups. Next, we separate hostile deployments into GWOT and non-GWOT deployments.

For the RC, we focus on continuation within the SELRES, first comparing continuation rates by receipt of HFP. Then we use data on whether mobilizations that included deployments in support of GWOT are associated with continuation rates that are different from mobilizations that didn't include deployments in support of GWOT.

In this paper, we present differences in continuation rates by different deployment experiences in the past 24 months. Ideally, we could isolate the continuation effects of combat compensation (HFP and CZTE) from the continuation effects of deploying to a combat zone. Unfortunately, given how combat compensation is structured and awarded and because of data limitations, we are unable to separate the pay effect from the combat effect. In general, when estimating the effect of compensation on continuation, researchers might exploit variation in differences in bonus amounts or in who is eligible for the bonuses. During the time period we examine in this paper, however, there is no variation in the amount of HFP received per month by servicemembers in combat, apart from a change in the benefit level in October

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2. The authors thank David Gregory for data programming assistance and Michael Markowitz for mapping assistance. We also wish to thank Dinah Sunday and Michael Moskowitz for reviewing earlier drafts of the paper.

3. When we reference hostile fire pay, we're referring to both hostile fire pay and imminent danger pay [2].

2002. Therefore, everyone who is in a designated combat zone for the same number of months receives the same amount of HFP. CZTE does vary in amount since it is based on military income received while in combat, but we do not have individual-level data on the value of the CZTE or a servicemember's military income.<sup>4</sup>

Our findings rely instead on differences in continuation rates by type of deployment and HFP and CZTE eligibility. For example, we compare continuation rates among servicemembers who did not experience a hostile deployment in the past 24 months (and therefore are not eligible for HFP and CZTE) with continuation rates among those who did (and therefore are eligible for HFP and CZTE). The limitation of this analysis is that we are unable to separately model the effect of combat compensation and the effect of underlying differences from non-compensation factors—namely, combat experience.<sup>5</sup> Although we are unable in our empirical analysis to disentangle the effect of combat compensation from the effect of a hostile deployment, we do use aggregate-level casualty and CZTE data to put our empirical findings in context.

## Deployment policies and deployment-related pays

### Deployment policies

In a January 2007 memorandum, Secretary Gates addressed DoD-wide deployment policies for AC and RC servicemembers [4]. Among other issues, the memorandum focused on the length of deployments and dwell time. Here, we discuss the implications for deployments and dwell time for the AC and RC in turn.

#### Active component

According to the SECDEF's memorandum, the goal for the AC is to have a 1-year deployment followed by 2 years of dwell time. There are noticeable differences in the service-specific AC deployment and dwell policies, as we describe below.

#### Army

For the Army, GWOT has at times required soldiers to deploy for 15 months, followed by only 12 months of dwell time [5]. Since 2009, the Army has worked to bring extended deployments to an end and to increase dwell time. Indeed, in testimony

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4. We discuss HFP and CZTE in more detail later in this document.

5. We did explore using casualty data in our individual-level empirical analysis. DMDC provided us with casualty data by country within GWOT-designated locations. Unfortunately, to tease out the separate effect of combat pay from combat deployments at the individual level, we need casualty data for non-GWOT countries, and those data were not available at the time of publication. However, we were able to use these data aggregated by service and YOS to aid in the interpretation of our results.

before the House Armed Services Committee, General George Casey, former Army Chief of Staff, emphasized that the Army's short-term goal is 2 years of dwell time following deployments for AC soldiers and the long-term goal is 3 years [6].

### Marine Corps

For the Marine Corps, deployments are usually 6 or 7 months long. The deployment-to-dwell ratio is 1:2 for AC Marines [7]. The 1:2 deployment-to-dwell ratio is expected to remain an achievable goal for combat units in the current environment, but increases in OPTEMPO may result in shorter dwell times. Still, some Marines, such as those in infantry, intelligence, and linguistics occupations, currently have deployment-to-dwell ratios that exceed 1:2 because of operational demands [8].

### Navy

For the AC Navy, deployment and dwell policies are governed by three principles:

- ❖ The maximum deployment length is 7 months for a single deployment within a ship employment cycle or 6 months for multiple deployments within a ship employment cycle.<sup>6</sup>
- ❖ The maximum deployment-to-dwell ratio is 1:1.
- ❖ At least 50 percent of time within a ship employment cycle should be spent in homeport.

A violation of any of these principles requires a waiver from the Chief of Naval Operations (CNO).<sup>7</sup> These principles apply to all AC Navy commands and other units that operate or deploy from their homeport or home station as a unit or as a detachment. For some mission or operating cycles, however, units are unable to abide by these principles [9].

### Air Force

In an attempt to alleviate stress associated with high OPTEMPO, the Air Force developed the Expeditionary Aerospace Force, now called the Air and Space Expeditionary Force (AEF) [11]. Initially, the AEF prescribed 90-day deployments for combat air forces (CAF) and slightly longer deployments for mobility air forces and high-demand/ low-density (HD/LD) forces. In 2004, deployments increased

6. A ship's employment cycle begins at the end of a maintenance phase for that ship and ends at the end of that ship's next maintenance phase.

7. The Navy's 1:1 maximum deployment-to-dwell ratio applies to Individual Augmentees as well [9]. If there is no other choice but to exceed the maximum deployment-to-dwell ratio, the case is referred for waiver consideration [10].

to 120 days (or 180 days for HD/LD forces) and the deployment-to-dwell ratio was set at 1:4 [12].

In 2009, the Air Force began assigning different deployment lengths and deployment-to-dwell ratios by Tempo Bands, A through E. The first, Tempo Band A, is considered to be the baseline and is comprised predominantly of CAF forces. This band deploys for 120 days with a 1:4 deployment-to-dwell ratio. Tempo Bands B through E deploy for 180 days and have lower deployment-to-dwell ratios, 1:4, 1:3, 1:2, and 1:1, respectively [11]. In 2010, Air Force Chief of Staff General Norton Schwartz announced a change to the AEF deployment lengths from 120 to 179 days for most AC Airmen. As a result, Tempo Band A was combined with Tempo Band B, resulting in deployments of 180 days and a deployment-to-dwell ratio of 1:4 [13].

### Reserve component

In addition to deployment lengths and dwell times for the AC, the 2007 Gates memorandum also addressed mobilization policy for the RC. As the memorandum describes, reservists can be involuntarily mobilized for up to 1 year. This excludes time spent in predeployment training and postdeployment leave. Following 1 year of involuntary mobilization, the goal is for reservists to not be subject to involuntary mobilization for 5 years [4].

But, as is the case for the AC, increases in operational demands have resulted in shorter dwell time than the policy described in the 2007 Gates memorandum. For example, in 2009 the Marine Corps goal for the reserve component was to maintain a 1:4 mobilization-to-dwell ratio [14]. The Army Guard and Reserve goal is to maintain a minimum dwell time of 4 years starting October 1, 2011 [15]. For the Navy Reserve, the overall goal is 1 year of involuntary mobilization and not subject to involuntary mobilization for 5 years; however, the goal for mission critical skills is to maintain a minimum of 4 years without involuntary mobilization [16].

### Deployment-related pays

Servicemembers serving in combat are eligible for a number of pays, some of which are directly associated with combat service and some of which compensate for various types of deployments. Military pays, such as HFP, were designed to compensate servicemembers for the risk associated with serving in combat. In addition to military pays is CZTE, which was originally designed to keep the servicemembers who are fighting the war from also having to bear the tax burden of the war. In this subsection, we present some background on HFP and CZTE. We then briefly discuss other deployment related pays that may influence a servicemember's decision to stay in the military.



### HFP

A servicemember is eligible for HFP if he or she is exposed to, is close to, is in possible danger of being exposed to, or is wounded from hostile fire or a hostile mine explosion. A servicemember can also receive HFP if he or she is on official duty in a designated Imminent Danger Pay area, either in the designated geographical land locale or in designated airspace [2]. Not all HFP locations are associated directly with GWOT. For example, because of the overall terrorism threat level, servicemembers serving in Athens, Greece, receive HFP “and ride to and from work in armored cars” according to [17]. Figure 1 shows eligible areas designated as HFP locations in the Eastern Hemisphere. Figure 16, in appendix A, illustrates that official military duty in Colombia, Cuba, Guantanamo, or Haiti also meets the criteria for HFP eligibility.

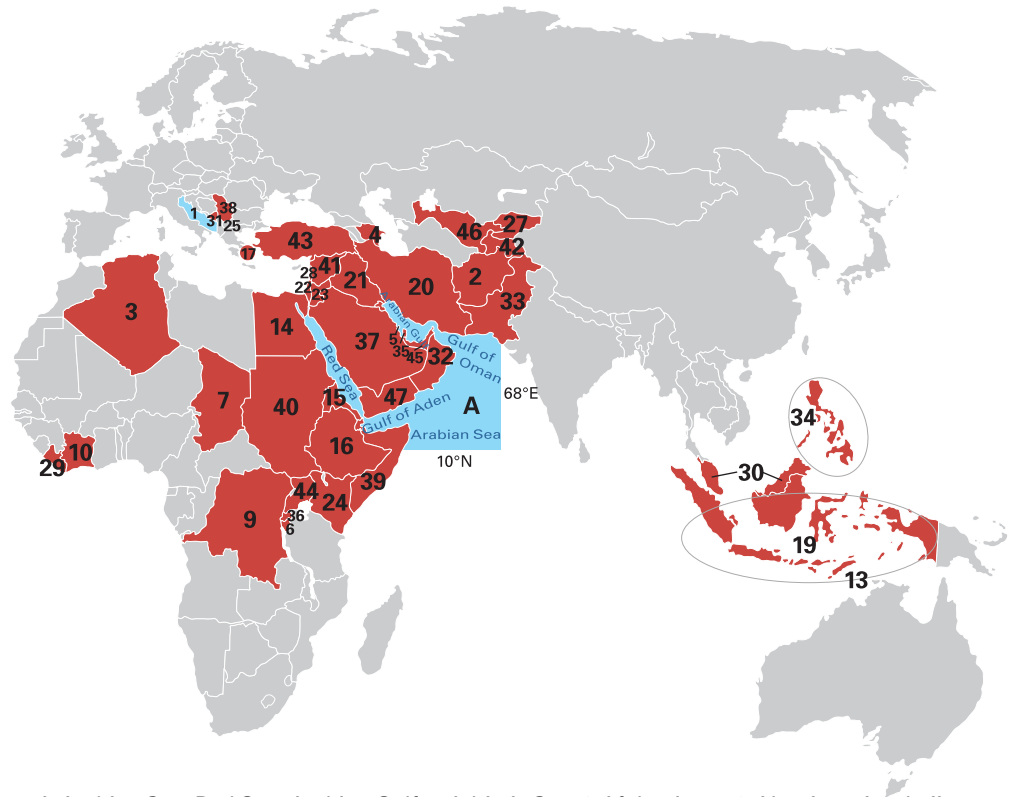
HFP is authorized under Title 37, Section 310, of the United States Code. It is paid monthly at the rate of \$225 per month, and the payment is not prorated for partial months. For the years we consider in this analysis, HFP increased only once, from \$150/month to \$225/month, in October 2002. HFP does not vary by combat intensity or risk of death or injury across different HFP designated areas. HFP also does not vary by differences in servicemembers’ military characteristics, such as rank, YOS, or service component. Since HFP does not vary by rank or YOS, the amount of HFP earned as a share (or percentage) of total military compensation does vary by enlisted/officer, rank, and YOS.

### CZTE

Servicemembers are eligible for CZTE when actively serving in a combat zone or providing direct support for personnel in those areas. Active service in a combat zone includes performing active duty assignment while under orders, hospitalization resulting from combat, and temporary leave from active duty in the combat zone [18]. Figure 2 identifies CZTE eligible areas in the Mideast. In appendix A, figure 17 shows which European countries are also included in CZTE through active service (namely, Albania, Montenegro, Serbia, and Kosovo).

In addition to active service in a combat zone, CZTE eligibility extends to servicemembers who are outside the combat zone but are on active duty providing direct support and receiving HFP. Figure 3 shows which countries are included in CZTE for providing direct support to the combat zone.

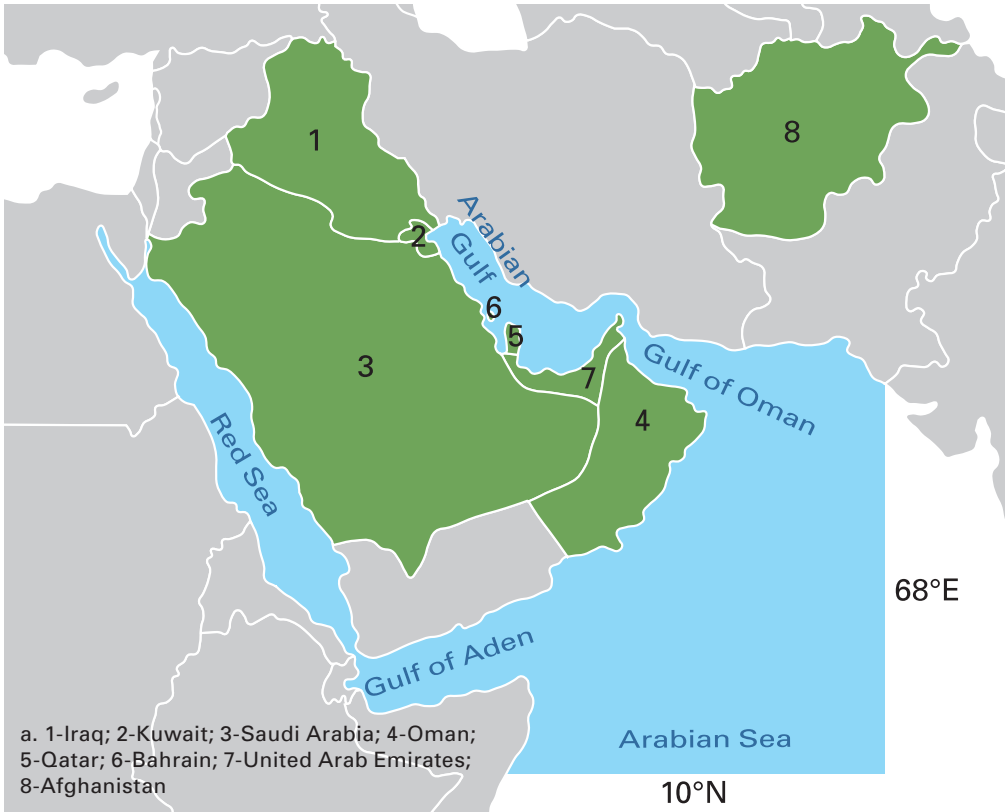




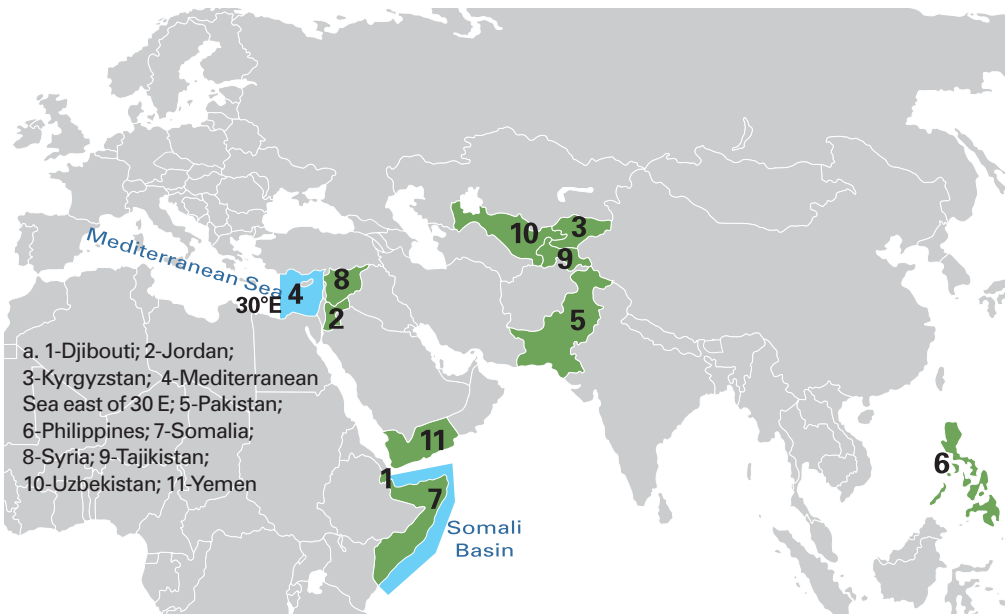
a. A-Arabian Sea, Red Sea, Arabian Gulf; 1-Adriatic Sea; 2-Afghanistan; 3-Algeria; 4-Azerbaijan; 5-Bahrain; 6-Burundi; 7-Chad; 8-Colombia (see HF West map); 9-Congo, Kinshasa; 10-Cote d'Ivoire; 11-Cuba (see HF West map); Guantanamo; 12-Djibouti; 13-East Timor; 14-Egypt; 15-Eritrea; 16-Ethiopia; 17-Greece (20 km Athens); 18-Haiti (see HF West map); 19-Indonesia; 20-Iran; 21-Iraq; 22-Israel; 23-Jordan; 24-Kenya; 25-Kosovo; 26-Kuwait; 27-Kyrgyzstan; 28-Lebanon; 29-Liberia; 30-Malaysia; 31-Montenegro; 32-Oman; 33-Pakistan; 34-Philippines; 35-Qatar; 36-Rwanda; 37-Saudi Arabia; 38-Serbia; 39-Somalia; 40-Sudan; 41-Syria; 42-Tajikistan; 43-Turkey; 44-Uganda; 45-United Arab Emirates; 46-Uzbekistan; 47-Yemen

**Figure 1. HFP locations, Eastern Hemisphere<sup>a</sup>**

Under CZTE, any pay and bonuses earned while eligible are exempt from federal income tax. Thus, the value of CZTE (in terms of its effect on a servicemember's tax liability) varies by paygrade and years of service, as well as whether a person is eligible for a bonus, such as the Selective Reenlistment Bonus (SRB), while in combat. Like HFP, CZTE is not directly linked to combat intensity or risk of death or injury across different CZTE designated areas.



**Figure 2. CZTE areas for personnel in direct support of a combat zone (Mideast)<sup>a</sup>**



**Figure 3. CZTE areas for active service in a combat zone<sup>a</sup>**

Summary of other deployment-related pays

Table 1 lists six deployment-related pays and incentives that directly or indirectly compensate for combat service.

Here, we provide a short description of each:

- ❖ **Hardship Duty Pay for Location** (HDP-L) is a quality-of-life pay that compensates for being at a location that does not have the same amenities as the continental United States (CONUS). HDP was designed to compensate for the arduous nature of deployments based on location (HDP-L), mission (HDP-M), or involuntary extension. So, for example, duty in Japan to assist in the recovery from the March 11, 2011, earthquake, tsunami, and nuclear reactor problems qualifies for HDP-L [25], as does duty in Iraq/Afghanistan. HDP-L is limited to land areas and is a

**Table 1. Deployment pays paid to all or some servicemembers serving in combat**

Deployment pay	Pay/benefit amount	Brief description of incentive	Source
Hardship Duty Pay for Location	Maximum of \$100/month when receiving HFP	Payable to servicemembers performing duty designated by the Secretary of Defense as hardship duty	[19]
Servicemembers Group Life Insurance Premiums	Maximum of \$400,000 life insurance premiums paid/reimbursed	During all servicemembers' deployments in support of OIF/OEF	[20]
Savings Deposit Program	10% annual interest on up to \$10,000 deposit	Provides servicemembers receiving HFP the opportunity to build their financial savings	[21]
Assignment Incentive Pay	Maximum of \$3,000/month	Payable to designated servicemembers on assignment in designated areas	[22]
Hazardous Duty Incentive Pay, other than aerial flights	Up to \$150/month except for high-altitude, low opening jump pay (\$225/month)	Incentive pay for servicemembers performing specific hazardous duties under orders	[23]
Family Separation Allowance	\$250/month	Payable to servicemembers who have dependents and are assigned away from their permanent duty station 30+ days without accompaniment by dependents	[24]

maximum of \$100 for those receiving HFP. The highest HDP for location in 2010 was \$150 per month [19].<sup>8</sup>

- ❖ **Servicemembers Group Life Insurance Premiums (SGLI)** for the maximum of \$400,000 of life insurance are reimbursed to servicemembers who are deployed in support of Operation Iraqi Freedom/Operation Enduring Freedom (OIF/OEF).
- ❖ The **Savings Deposit Program** (which is different from the Thrift Savings Plan) allows servicemembers to deposit up to \$10,000 while serving in a designated combat zone and get a 10-percent annual return on their savings. Members must be getting HFP and serving a minimum of 30 days in the area.
- ❖ **Assignment Incentive Pay (AIP)** was implemented as part of the 2003 Bob Stump National Defense Authorization Act as a special pay designed to fill hard-to-fill billets. AIP is flexible enough that it has been used differently by the services. For example, while the Navy uses it to compensate for hard-to-fill shore billets, the Air Force and Army have used it to get volunteers for duty in Korea (Korea Assignment Incentive Pay). For service in a combat zone, the Marine Corps has used AIP as an incentive for servicemembers to extend their expiration of active service in order to complete a deployment (2007 MARADMIN 108/ 07). In addition, the Army and Marine Corps have used AIP to provide a monthly incentive to qualified deployed members who have been involuntarily extended past 12 months in Iraq/Afghanistan [26].
- ❖ **Hazardous Duty Incentive Pay** is for performing specific hazardous duties while under orders. Though this is not earned by all servicemembers in combat, those who have hazardous duties may be participating in combat. Hazardous duty incentive pay is up to \$150/month except for high-altitude, low opening jump pay, which is \$225/month.
- ❖ The **Family Separation Allowance (FSA)** is paid to all servicemembers with dependents when they are away from home, so servicemembers with dependents in combat areas get this pay.

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8. By law, the maximum amount of all HDP may not exceed \$1,500 per month (Title 37, Chapter 5, Subchapter I §305). The maximum HDP-L and HDP-M combined is currently \$300/month.

## Literature review: deployments, combat pay, and continuation

### Active component

This paper fits into a broader literature that examines the link between deployment, combat pay, and continuation. A number of factors influence the continuation decision. The authors of [3] and [27] lay out the reenlistment decision within an expected utility framework, where utility is influenced by a number of different personal and military career factors. For example, it has been shown empirically that military retention is influenced by individual characteristics, such as dependent status [3] and race/ethnicity [28], military pay and reenlistment bonuses [29], and deployments.

Deployments can influence the reenlistment decision through actual experiences, expected future deployment experiences, and/or changes in compensation relating to the deployment. The effect of actual and expected deployments on retention is influenced by number, frequency, and type of deployments. For example, [30] and [31] find that servicemembers who have some deployment experience have higher retention than those with no deployment experience; however, lengthy deployments do negatively influence retention.

Retention behavior also differs by YOS. As servicemembers approach retirement eligibility, they are increasingly likely to remain in the military. Indeed, [32] finds different effects of hostile deployments on reenlistments across YOS zones among Explosive Ordnance Disposal Sailors. In particular, the authors estimate a negative correlation between hostile deployments and Zone A reenlistment, no effect on Zone B reenlistment, and a positive effect on Zone C reenlistment.<sup>9</sup>

In this case, it appears to some degree that the negative effect of hostile deployments wanes as YOS and the likelihood of reaching retirement grow.

In addition, the effect of deployments on retention has been found to differ by dependent status. Reference [33], focusing on enlisted Marines, analyzes how deployments influence reenlistment decisions of Marines who were recommended and eligible to reenlist from FY04 through FY07. The authors find that additional deployments to Iraq/Afghanistan have a negative effect on reenlistments among Zone A Marines. The authors also estimate that an additional 100 days deployed to a non-hostile region decreased reenlistment among Zone A Marines without

9. Zones A, B, and C include servicemembers with 17 months of service to 6 YOS, 6 to 10 YOS, and 10 to 14 YOS, respectively.

dependents but had a positive effect on Marines with dependents. This difference in reenlistment rates by dependent status may partially be correlated with receipt of FSA, as discussed earlier.

The authors of [3] used DMDC's Status of Forces survey data, which allowed them to analyze the retention effect of deployment characteristics not included in administrative data.<sup>10</sup> They find that servicemembers' reenlistment response to deployments is in part influenced by the number of longer than usual workdays associated with deployments. They also found that servicemembers are negatively influenced, in terms of stated reenlistment intentions, by deployments that differed in length from what was expected before the deployment. In addition to these deployment characteristics, the authors of [3] find that servicemembers who felt that they were well prepared for a deployment were more likely to indicate an intention to stay in the military.

Furthermore, [3] estimates the effect of hostile and non-hostile deployments on actual reenlistment decisions. The authors find differences over time and across services in how servicemembers respond to hostile and non-hostile deployments. They conclude that part of the reason for the differences across services, in addition to different deployment lengths, is how the services use bonuses to compensate for the arduous nature of deployments. The authors note that, since September 11, 2001, the use of reenlistment bonuses has mitigated negative effects of deployments. SRBs are targeted at the reenlistment decision point and can vary by military occupation, which can be correlated with different levels of deployment.<sup>11</sup>

In addition to reenlistment bonuses, in focus groups conducted by RAND (see [27]), servicemembers stated an awareness of the additional compensation associated with deployments. The focus group participants state that, in addition to increased military compensation, during deployments some of them have fewer opportunities to spend their money, leading to increased savings, reduction in debt or loans, and increased ability to purchase large ticket items. The authors of [27] note, however, that the financial benefits "are unlikely to completely eliminate the negative effects of deployment on personnel morale and attitudes" [27, p. 53].

As noted earlier, retention is influenced by a number of factors, not just deployment. An example of this is summarized in an analysis focusing on Army soldiers [36]. The authors examined why there was a significant decrease in the share of eligible Army soldiers signing up for reenlistment from FY03 through FY05. Controlling for a number

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10. For a summary of the main findings of [3], see [34].

11. For example, see [35], which presents the variation in the amount of time deployed to Iraq/Afghanistan by primary military occupation.

of factors, the authors find that neither deployment history nor expected deployment could *fully* account for this decline. Along with deployment experience and expected deployment, the authors include a measure of risk—fatality rates—in their model and estimate that this has a large negative effect on reenlistment.

### **Reserve component**

Irrespective of mobilization experience, across the services, researchers have found that reserve recruiting and retention increased with increases in military compensation [37, 38, 39, 40]. In addition to military compensation, YOS and family support have been found to have a positive effect on reserve retention [41].

The literature on the effect of mobilizing (versus not mobilizing) on reserve retention is mixed. In surveys, reservists are split between being more likely to stay, more likely to leave, and indifferent in response to their most recent activation or deployment. For example, [42] reported from the 2006 RAND Guard and Reserve Family Interviews that 38 percent of reservists say that their most recent activation or deployment had no influence on their interest in staying in the reserve, compared with 30 percent who say that it increased their interest in staying and 32 percent who say that it decreased their interest in staying. In addition, stated continuation intentions among reserve and guard members are sensitive to characteristics of the deployment. For example, perceptions of leaders' leadership skills have been associated with stated continuation intentions among Army National Guard soldiers recently returning from a mobilization [43].

In terms of changes in earnings while activated, page 118 of [44] states “that, on average, reservist earnings increase as a result of activation, and that those earnings grow as the number of days served increases.” This finding, however, is not consistent across rank or service. For example, more junior reserve members are more likely to have income gains from activation compared with their more senior counterparts. By service component, the Marine Corps had the largest income gains from activation, while the Air Force had the smallest.

Previous research on actual continuation behavior has consistently shown that SELRES members who have been mobilized but not deployed have higher loss rates than those who have been mobilized and deployed. This finding holds true for both enlisted members, in terms of loss rates [45] and reenlistment rates [40], and officers [46]. In addition to the type of mobilization, the authors of [47] found that among non-prior-service Marine Corps SELRES, the likelihood of leaving the SELRES increased with the length of mobilization.

Expectations of future deployments have also been found to influence reserve continuation decisions. The author of [48] developed a forward-looking model of



reserve participation and estimates that both “accessions and continuation rates are sensitive to the frequency and duration of [expected] active duty”[48, p. 100].

## Combat experience and continuation in the AC

In this section, we discuss our empirical analysis of the relationship between combat, combat pay, and continuation for the AC.

### Data

For the AC analysis, we use a combination of individual and aggregate level data. Here, we discuss both.

The individual level data used for the AC analysis consist of administrative deployment, personnel, and pay data provided by DMDC. To capture deployments, we use two data sets. The first comes from the FY01–FY10 PERSTEMPO files. The PERSTEMPO files were established to track all time away from home in one of five categories:

1. Operations
2. Exercises
3. Unit training
4. Home station training
5. Mission support temporary duty.

In our analysis, we limit our focus to the operations category.

The second deployment data source is the GWOT Contingency Tracking System (CTS) database. According to [49]:

a CTS “deployment” is for servicemembers who are and have been physically located within the OEF/OIF or specifically identified by his/her Service as “directly supporting” the OEF/OIF mission outside the designated combat zone.

For personnel data, we use SSN-level monthly snapshots that include information on military career (such as paygrade and occupation) and demographics (such as gender, race, ethnicity, marital status, and dependent status).

For pay data, we use data that DMDC receives from the Defense Finance and Accounting Service. These data include information on receipt of HFP and eligibility for CZTE. The pay files track all pay received by servicemembers, although there are gaps and irregularities in the pay data due to payment delays, overpayment, and so on.

To aid in the interpretation of our results, we also use data on GWOT casualties and the value of CZTE.<sup>12</sup> These data are being analyzed in detail for a separate analysis on the relationship between risk and combat compensation, also in support of the 11th QRMC [50].

The casualty data cover casualties (both killed in action and wounded) from 2005 through 2010 in GWOT-designated locations. These data are broken out separately for enlisted and officer, by service branch, and by paygrade. The casualty rates reported are total incidents over average members per day.

The data on the value of CZTE come from a comparison of servicemembers' actual tax liability with a counterfactual tax liability that adds back in income that was excluded from taxable income under CZTE. The difference in these tax liabilities represents the value of CZTE to the servicemember. These data are aggregated and provided for 2005 through 2010, broken out separately for enlisted and officer, by service branch, by paygrade bands, and by YOS.

## Methodology

For our analysis of the AC, we use the individual level data just described to create a dataset of 12-month continuation decisions from June 2003 through June 2009. For each June snapshot, we looked out 12 months to see if a servicemember was still in the AC. So, for the June 2009 snapshot, for example, we looked to see whether the servicemember was still in the AC in June 2010. We restrict our analysis to servicemembers with at least 2 YOS since our measure of deployment experience covers the 24 months before the June snapshot.<sup>13</sup>

Along with presenting raw continuation rates by deployment categories, we report results from a logit regression model, in which the dependent variable is a binary 12-month continuation decision from one June to the next, and the independent variables of interest pertain to deployment experience during the 24 months before the continuation decision.<sup>14</sup> We use two different deployment specifications. The first is a comparison of hostile deployments, as defined by receipt of HFP or CZTE, versus non-hostile deployments and no deployments. The second

12. The authors thank Saul Pleeter of the Institute for Defense Analyses for graciously sharing the casualty and CZTE data, which were provided by DMDC and the Division of Tax Analysis at the Department of Treasury, respectively.

13. To continue our earlier example, for the June 2009 snapshot, we look back 24 months at deployment experiences from June 2007 through June 2009.

14. Appendix B contains figures that show, by the 2003–2009 June snapshots, the average number of hostile deployed days in the past 24 months for enlisted and officer servicemembers. Similarly, appendix C contains figures that show the share of enlisted and officer servicemembers receiving HFP or CZTE in the past 24 months.

specification separates hostile deployments by whether they were in support of GWOT. In our regression analysis, we control for a number of military service and demographic characteristics, including paygrade, 3-digit DoD occupation codes, gender, race, ethnicity, and marital and dependent status. As a proxy for civilian job opportunities, we control for state-level unemployment rates (from the Bureau of Labor Statistics) linked to the individual servicemember's mailing address.<sup>15</sup> We conducted the analysis separately by service, officer/enlisted, and YOS groupings because, as noted earlier, continuation rates vary widely across these dimensions. Furthermore, as noted earlier, combat compensation as a share of overall military compensation differs by a number of factors, including officer/enlisted status and paygrade category (which is correlated with YOS).<sup>16</sup>

## Results for enlisted servicemembers

### Differences across hostile, non-hostile, and no deployments

Figure 4 shows 12-month continuation rates by deployment category (any hostile, only non-hostile, or no deployments) for enlisted servicemembers across all services. We would expect continuation rates to vary by deployment experience for many reasons. On one hand, deploying might positively affect continuation rates if servicemembers have a strong desire to be “part of the mission” or if deploying increases the likelihood of promotion. On the other hand, the risk (especially for hostile deployments) or unpleasant conditions associated with deployments, including time away from family, might drive down continuation rates among servicemembers who deploy.

The data in figure 4 suggest that the relationship between deployments and continuation rates differs by YOS. For enlisted members with less than 6 YOS, continuation rates are highest among those who have only non-hostile deployments in the past 24 months. Those with hostile deployments in the past 24 months, in contrast, have the lowest continuation rates, while those with no deployments in the past 24 months have continuation rates in between the other two. For enlisted members with 6 or more YOS, however, the pattern is different. Those with only

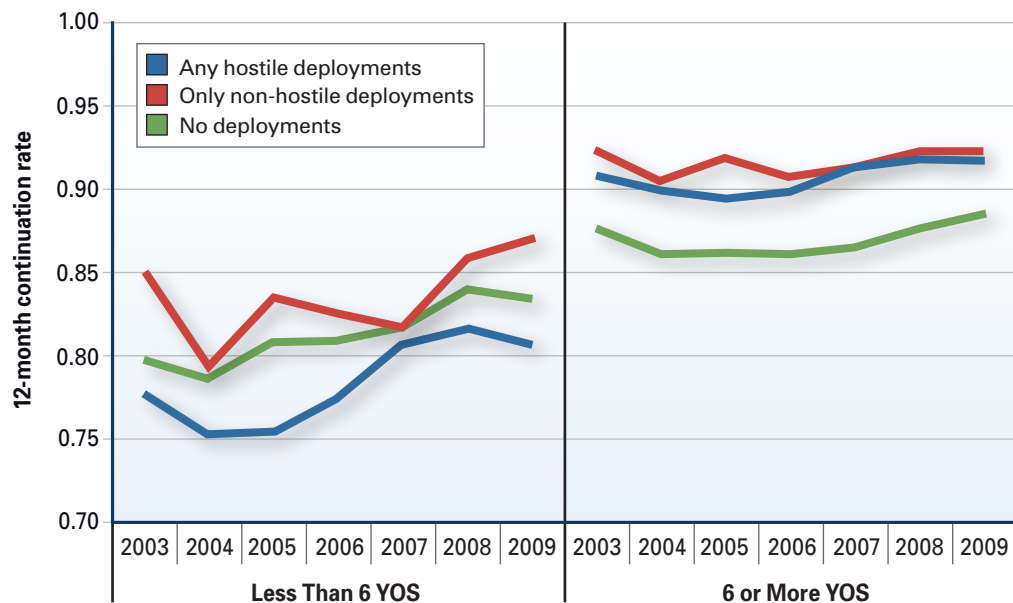
15. Because the majority of deployments are unit based (as opposed to individual based, such as individual augmentees), the likelihood of deployment is highly correlated among members of the same unit. Since likelihood of being sent on a deployment is correlated with units, there is the potential for correlation of our error term across observations. In our regression analysis, we account for this intra-unit dynamic by using Huber-White adjusted standard errors clustered on the Unit Identification Code.

16. Additional factors that influence combat compensation as a share of overall military compensation include dependent status (which we control for in our models) and length of deployment. Furthermore, the amount of CZTE benefit received has been shown to be influenced by how a deployment falls across calendar years [50].

non-hostile deployments in the past 24 months continue to have the highest continuation rates. But, for these more senior servicemembers, those with any hostile deployments in the past 24 months have continuation rates that are higher than those with no deployments (and they are almost as high as continuation rates for those with only non-hostile deployments). Therefore, figure 4 suggests that hostile deployments have a larger negative effect on continuation rates among enlisted servicemembers with fewer YOS than among servicemembers with more YOS.

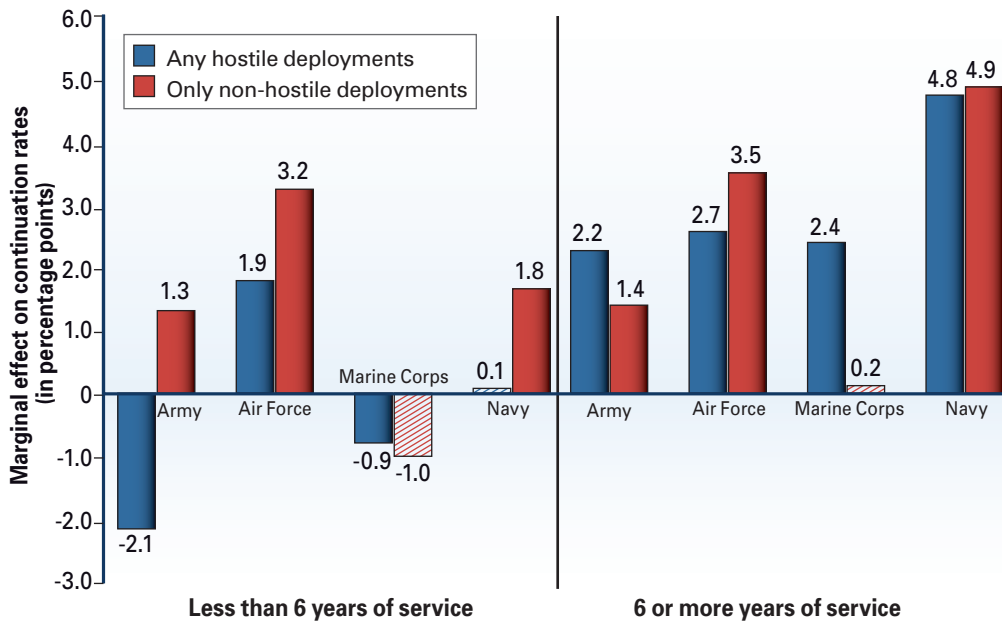
Figure 4 shows only a simple version of the story, however, because the data (a) are combined across all four services and (b) do not account for other factors, such as demographic characteristics, that are likely to affect both deployment history and continuation rates. Next we report our findings from service-specific regression analyses that also take these additional factors into consideration.

Figure 5 shows the marginal effect (measured in percentage points) of hostile and non-hostile deployments (relative to no deployments) on 12-month continuation rates, controlling for various military and demographic factors.<sup>17</sup> These estimates come from regression models estimated separately by service and by YOS group (less than 6 YOS and 6 or more YOS). All effects are statistically significant at the 5-percent or higher level with the exception of the striped bars.



**Figure 4. Enlisted, all services: 12-month continuation rates by deployment history in past 24 months**

17. Full regression results are available on request.



a. These estimates represent the marginal effects of any hostile and only non-hostile deployments on 12-month continuation rates, where the comparison group is no deployments. Each pair of any hostile and only non-hostile deployment marginal effects comes from a separate regression by service and by YOS group.

**Figure 5. Enlisted: Effect of hostile and non-hostile deployments on continuation rates<sup>a</sup>**

For servicemembers with less than 6 YOS, figure 5 shows that the effect of deploying on continuation rates is mixed. With respect to hostile deployments, servicemembers in the Army and Marine Corps who have any hostile deployments in the past 24 months are 2.1 and 0.9 percentage points less likely, respectively, to stay in the force in the next 12 months relative to those with no deployments in the past 24 months. In contrast, servicemembers with less than 6 YOS in the Air Force who have any hostile deployments in the past 24 months are 1.9 percentage points more likely to stay in the force in the next 12 months relative to servicemembers with no deployments in the past 24 months. The results for the Navy are statistically insignificant.

Turning to the effect of non-hostile deployments in the past 24 months (red bars), servicemembers with less than 6 YOS in the Army, Air Force, and Navy are 1.3, 3.2, and 1.8 percentage points, respectively, more likely to stay in the force in the next 12 months relative to servicemembers with no deployments in the past 24 months. The results for the Marine Corps are statistically insignificant.<sup>18</sup>

18. The magnitudes of the marginal effects for any hostile and only non-hostile deployments, relative to no deployments, for enlisted servicemembers with less than 6 YOS in the Marine Corps are similar (-0.9 and -1.0, respectively), but the latter is not statistically different from zero.

Among servicemembers with 6 or more YOS, the continuation rate effect of a hostile or non-hostile deployment in the past 24 months, relative to no deployments in the past 24 months, is unambiguously positive. Servicemembers in the Army, Air Force, Marine Corps, and Navy who have any hostile deployments in the past 24 months are 2.2, 2.7, 2.4, and 4.8 percentage points, respectively, more likely to stay in the force in the next 12 months relative to servicemembers with no deployments in the past 24 months.

Similarly, servicemembers in the Army, Air Force, and Navy who have only non-hostile deployments in the past 24 months are 1.4, 3.5, and 4.9 percentage points, respectively, more likely to stay in the force in the next 12 months relative to servicemembers with no deployments in the past 24 months. The non-hostile deployment results for the Marine Corps are statistically insignificant.

As a robustness check, we also ran the model restricting the sample to servicemembers estimated to be within 12 months of the end of their contracts. Although the measure is imperfect, being within 12 months of the end of a contract is nonetheless the most useful predictor in our data of which servicemembers are coming up on a stay/leave decision. When we restrict the sample to these servicemembers, we find that the magnitudes of the effects are generally larger, but the overall results are robust except for two cases.

First, under the restricted sample, Marines with less than 6 YOS who have any hostile deployments in the past 24 months are 1.4 percentage points *more* likely to stay in the force over the next 12 months relative to their counterparts with no deployments in the past 24 months. In contrast, as reported above, in the full sample, we found that these Marines were 0.9 percentage point *less* likely to continue relative to their counterparts with no deployments in the past 24 months.

Second, under the restricted sample, Navy Sailors with less than 6 YOS who have any hostile deployments in the past 24 months are 4.1 percentage points *more* likely to stay in the force over the next 12 months relative to their counterparts with no deployments in the past 24 months. In contrast, as reported earlier, in the full sample, we found *no significant* results for these Sailors.

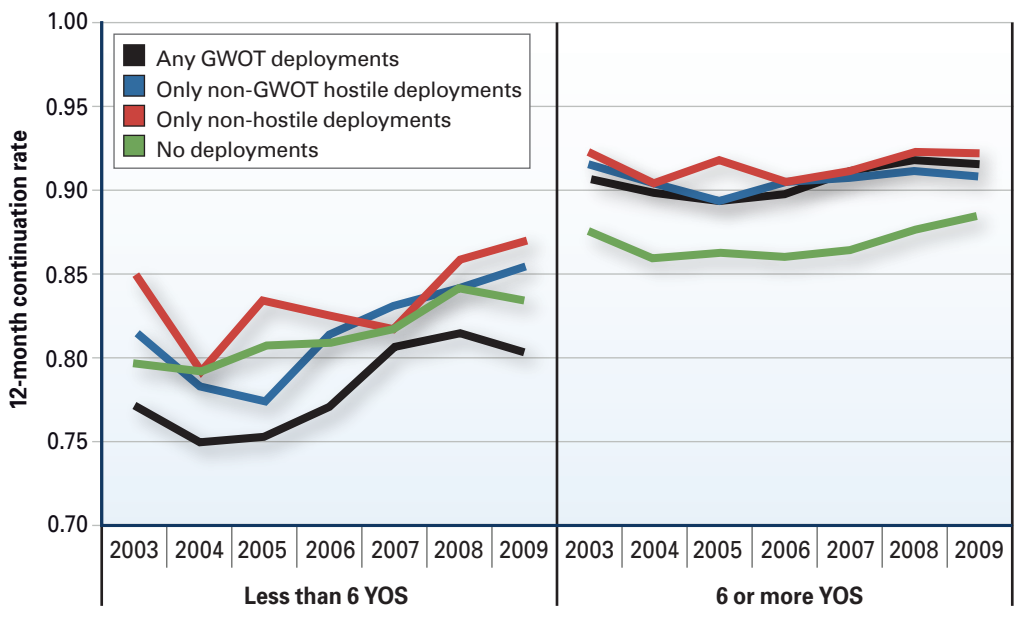
### Differences across GWOT and non-GWOT deployments

The estimates presented in the previous subsection represent the combined effect of a hostile deployment and combat compensation. Because anyone who goes on a hostile deployment receives combat compensation, it is difficult to separate the effect of the hostile deployment on continuation rates from the effect of

combat compensation. By separating hostile deployments into GWOT and non-GWOT, however, we can gain some insight into how the two effects operate. In particular, we can compare continuation rates among personnel in four deployment categories as shown in the legend of figure 6: any GWOT deployments, only non-GWOT hostile deployments, and only non-hostile deployments (the omitted category is no deployments).

Servicemembers falling in either of the first two categories (any GWOT and only non-GWOT hostile deployments) receive combat compensation. However, servicemembers in these two groups arguably face different amounts of risk and different living conditions while deployed, where presumably the risk is greater and the conditions less desirable in the GWOT deployments than in the non-GWOT hostile deployments.

Indeed, figure 6 shows raw 12-month continuation rates for servicemembers across all services in the four categories. For those with less than 6 YOS, continuation rates for those with any GWOT deployments are considerably lower than for those in any of the other three categories. For personnel with 6 or more YOS, there is very little difference in 12-month continuation rates between those who had any GWOT deployments and those who had only non-GWOT combat deployments (or those with only non-hostile deployments).



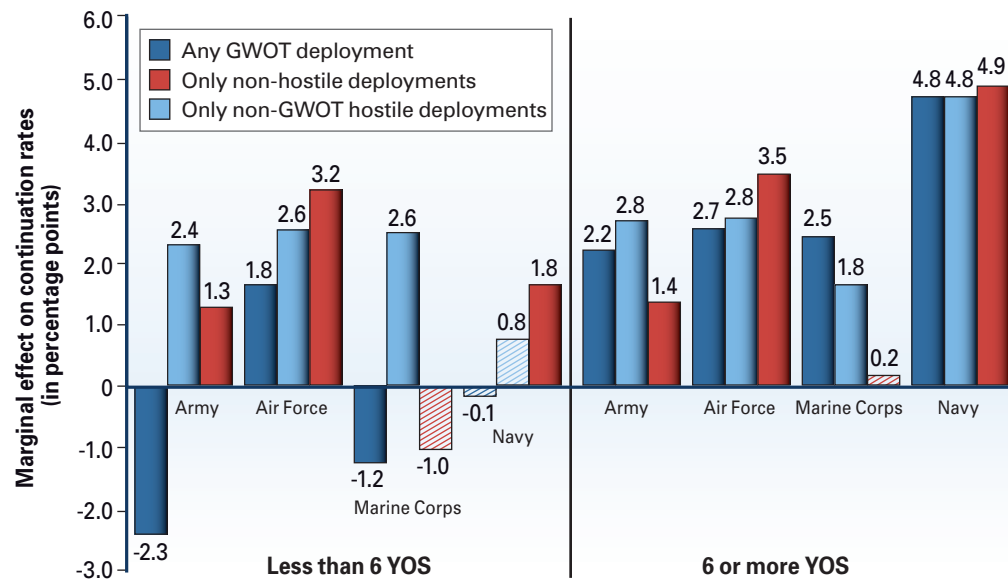
**Figure 6. Enlisted, all services: 12-month continuation rates by GWOT and non-GWOT locations within HFP-designated areas**



Figure 7 shows our findings from service-specific regression analyses that account for demographic and service-related characteristics in analyzing the effect of hostile deployments on continuation rates.

Figure 7 is similar to figure 5 except that the effect of any hostile deployments on continuation is estimated separately for GWOT and non-GWOT hostile deployments in figure 7.

For servicemembers with less than 6 YOS, we can see that the negative effect of any hostile deployments for the Army and the Marine Corps shown in figure 5 (-2.1 and -0.9 percentage points, respectively) is driven by GWOT deployments. Indeed, figure 7 shows that these servicemembers are 2.3 and 1.2 percentage points less likely, respectively, to stay in the force relative to their counterparts with no deployments. In contrast, only non-GWOT hostile deployments have a positive effect on continuation rates for servicemembers with less than 6 YOS in the Army and the Marine Corps (2.4 and 2.6 percentage points, respectively). For servicemembers with less than 6 YOS in the Air Force, both GWOT and non-GWOT hostile deployments have a positive effect on continuation, but the effect is larger for non-GWOT deployments (2.6 v. 1.6 percentage points). Finally, for the Navy, the results remain statistically insignificant for servicemembers with less than 6 YOS.



**Figure 7. Enlisted: Effect of GWOT, non-GWOT hostile, and non-hostile deployments on continuation rates<sup>a</sup>**

a. These estimates represent the marginal effects of any GWOT, any non-GWOT hostile, and only non-hostile deployments on 12-month continuation rates, where the comparison group is no deployments. Each trio of marginal effects comes from a separate regression by service and by YOS group.

For servicemembers with 6 or more YOS, the effect of hostile deployments, regardless of whether they are GWOT or non-GWOT, continues to be unambiguously positive. Among servicemembers with 6 or more YOS, any GWOT deployments in the past 24 months is associated with increases in 12-month continuation rates in the Army, Air Force, Marine Corps, and Navy by 2.2, 2.7, 2.5, and 4.8 percentage points, respectively, relative to servicemembers with no deployments in the past 24 months. Similarly, only non-GWOT hostile deployments in the past 24 months are associated with increases in 12-month continuation rates in the Army, Air Force, Marine Corps, and Navy by 2.8, 2.8, 1.8, and 4.8 percentage points, respectively, relative to servicemembers with no deployments in the past 24 months.

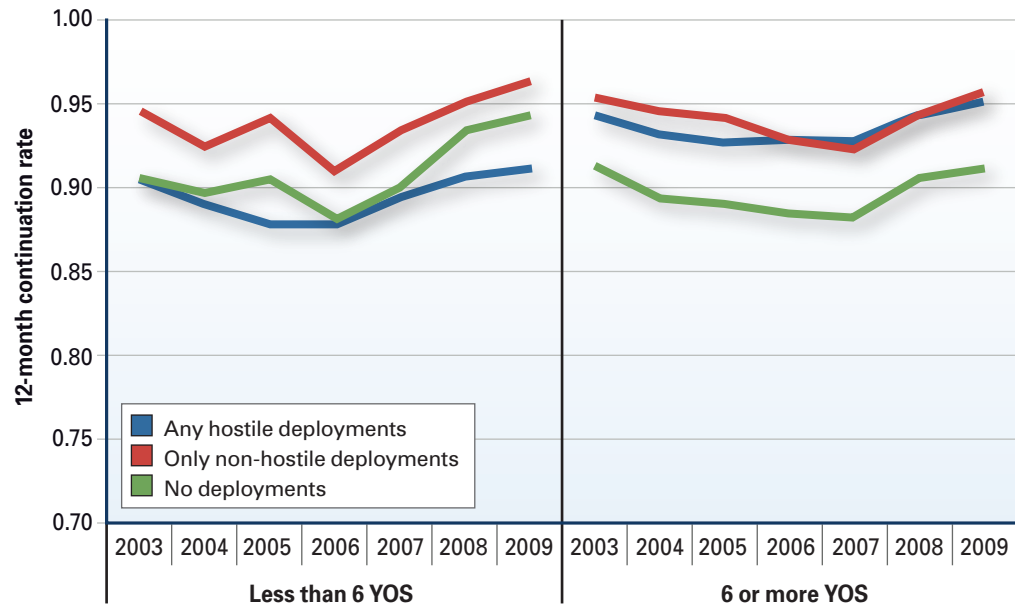
### **Results for officer servicemembers**

#### **Differences across hostile, non-hostile, and no deployments**

Turning now to officers, figure 8 shows 12-month raw continuation rates for officers across all services by deployment category. The figure is quite similar to the one for enlisted members. In particular, as was the case with the enlisted force, the figure suggests that the relationship between hostile deployments and continuation rates varies by YOS. For officers with less than 6 YOS, continuation rates are highest among those who have only non-hostile deployments in the past 24 months and lowest for those with any hostile deployments in the past 24 months; those with no deployments in the past 24 months have continuation rates in the middle.

For officers with 6 or more YOS, however, the last two groups are reversed, such that those with only non-hostile deployments in the past 24 months continue to have the highest continuation rates, those with no deployments in the past 24 months have the lowest continuation rates, and those with any hostile deployments in the past 24 months have continuation rates in the middle. As was the case with the enlisted force, continuation rates for officers with 6 or more YOS with any hostile deployments in the past 24 months are nearly as high as the rates for those with only non-hostile deployments in the past 24 months. Therefore, like the enlisted force, figure 8 suggests that hostile deployments have a larger negative effect on continuation rates among officers with fewer YOS than among officers with more YOS.

Figure 9 shows the marginal effect (in percentage points) of hostile and non-hostile deployments (relative to no deployments) on 12-month continuation rates, controlling for the various military and demographic factors. Again, all effects are statistically significant at the 5-percent or higher level except for the striped bars. Overall, the results for officers are very similar to the results for the enlisted force.

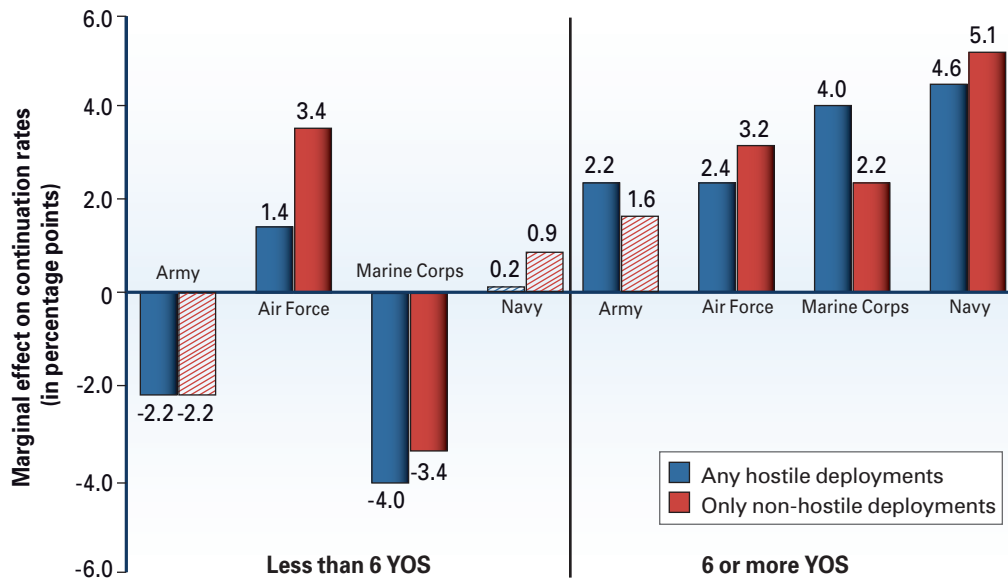


**Figure 8. Officer, all services: 12-month continuation rates by deployment history in past 24 months**

For officers with less than 6 YOS, the effect of deploying on continuation rates is mixed, as was the case for enlisted servicemembers with less than 6 YOS. The figure shows that the effect of a hostile deployment in the past 24 months on 12-month continuation rates (blue bars) is different across services. Those in the Army and Marine Corps who have any hostile deployments in the past 24 months are 2.2 percentage points and 4.0 percentage points less likely to stay in the force, respectively, in the next 12 months relative to officers with no deployments in the past 24 months. In contrast, servicemembers with less than 6 YOS in the Air Force who have any hostile deployments in the past 24 months are 1.4 percentage points more likely to stay in the force in the next 12 months relative to officers with no deployments in the past 24 months. The results for the Navy are statistically insignificant.

Turning to the effect of non-hostile deployments in the past 24 months (red bars), officers with less than 6 YOS in the Air Force are 3.4 percentage points more likely to stay in the force in the next 12 months relative to officers with no deployments in the past 24 months, whereas their Marine Corps counterparts are 3.4 percentage points less likely to stay in the force in the next 12 months. The results for the Army and Navy are statistically insignificant.<sup>19</sup>

19. Although the magnitudes of the marginal effects for any hostile and only non-hostile deployments, relative to no deployments, for officers with less than 6 YOS in the Army are similar (both approximately -2.2), the latter is not statistically different from zero.



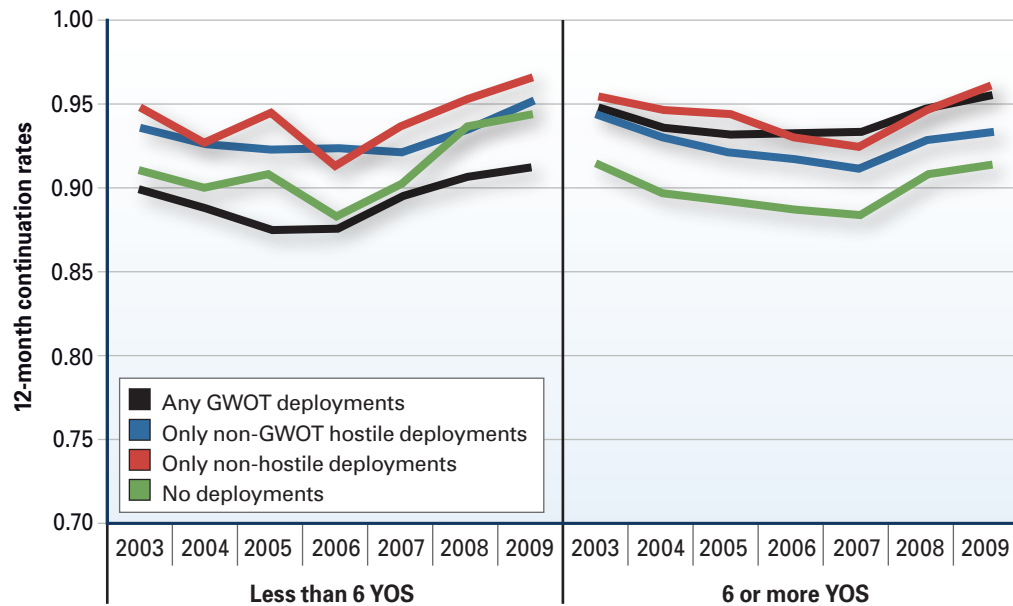
**Figure 9. Officer: Effect of hostile/non-hostile deployments on continuation rates<sup>a</sup>**

a. These estimates represent the marginal effects of any hostile and only non-hostile deployments on 12-month continuation rates, where the comparison group is no deployments. Each pair of any hostile and only non-hostile deployment marginal effects comes from a separate regression by service and by years of service group.

For officers with 6 or more YOS, the continuation rate effect of a hostile or non-hostile deployment in the past 24 months, relative to no deployments in the past 24 months, is unambiguously positive. Compared with officers with no deployments in the past 24 months, officers who have any hostile deployments in the past 24 months are more likely to stay in the force by 2.2 percentage points in the Army, 2.4 percentage points in the Air Force, 4.0 percentage points in the Marine Corps, and 4.6 percentage points in the Navy. Similarly, officers in the Air Force, Marine Corps, and Navy who have only non-hostile deployments in the past 24 months are, respectively, 3.2, 2.2, and 5.1 percentage points more likely to stay in the force in the next 12 months relative to officers with no deployments in the past 24 months. The non-hostile deployment results for the Army are statistically insignificant.

### Differences across GWOT and non-GWOT deployments

The estimates presented in the previous subsection represent the combined effect of a hostile deployment and combat compensation. We also can compare continuation rates among servicemembers in the four deployment categories (any GWOT, only non-GWOT hostile, only non-hostile, and no deployments) to gain insights into how the pay and combat effects operate.

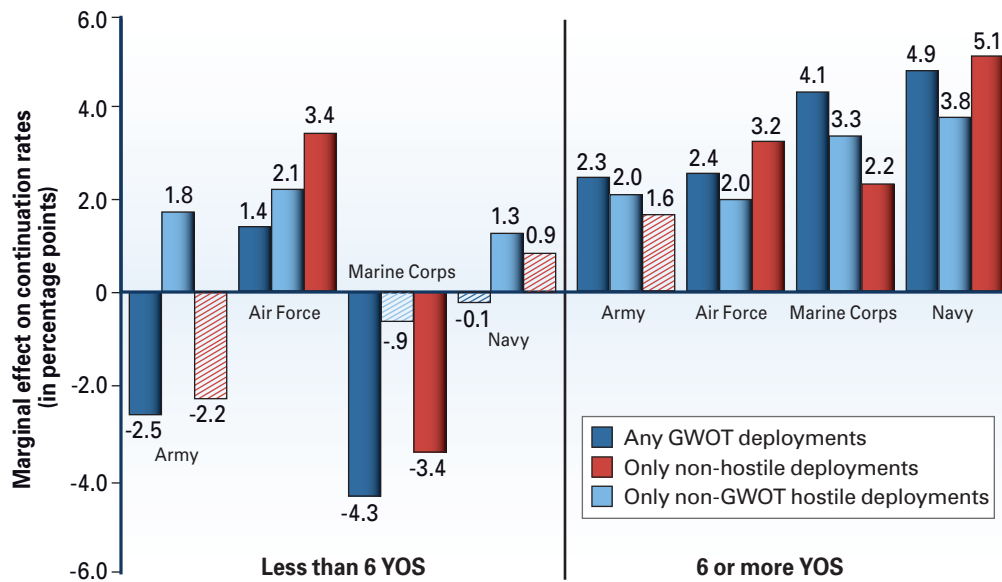


**Figure 10. Officer, all services: 12-month continuation rates by GWOT and non-GWOT locations within HFP-designated areas**

Figure 10 shows raw 12-month continuation rates in all deployment categories for officers in all services. As in the enlisted case, officers with less than 6 YOS and any GWOT deployments in the past 24 months exhibit lower continuation rates than their counterparts in the other categories. However, officers with 6 or more YOS and any GWOT deployments in the past 24 months have higher continuation rates than those with non-GWOT combat deployments in the past 24 months. This is in contrast to the result for enlisted with 6 or more YOS in which there appears to be little difference in continuation between those who had any GWOT deployments and those who had only non-GWOT combat deployments in the past 24 months.

In figure 11, we report our findings from service-specific regression analyses that control for differences in demographic and service-related characteristics. Again, figure 11 is similar to figure 9 except that the effect of any hostile deployments on continuation is estimated separately for GWOT and non-GWOT hostile deployments in figure 11.

The results for officers when we break the hostile deployments into GWOT and non-GWOT hostile deployments are similar to the results for enlisted. For officers with less than 6 YOS, the negative effect of any hostile deployments in the past 24 months for the Army and the Marine Corps (-2.2 and -4.0 percentage points, respectively, as shown in figure 9) is driven by GWOT deployments. Indeed, figure 11 shows that these officers are 2.5 and 4.3 percentage points less likely, respectively,



**Figure 11. Officer: Effect of GWOT, non-GWOT hostile, and non-hostile deployments on continuation rates<sup>a</sup>**

a. These estimates represent the marginal effects of any GWOT, any non-GWOT hostile, and only non-hostile deployments on 12-month continuation rates, where the comparison group is no deployments. Each trio of any GWOT, any non-GWOT hostile, and only non-hostile deployment marginal effects comes from a separate regression by service and by years of service group.

to stay in the force relative to their counterparts with no deployments in the past 24 months. In contrast, non-GWOT hostile deployments in the past 24 months have a positive effect on continuation rates for officers with less than 6 YOS in the Army (1.8 percentage points) and an insignificant effect for officers with less than 6 YOS in the Marine Corps. For officers with less than 6 YOS in the Air Force, both GWOT and non-GWOT hostile deployments in the past 24 months have a positive effect on continuation, and the effect is larger for non-GWOT deployments (2.1 v. 1.4 percentage points). Finally, for the Navy, the effect of GWOT deployments in the past 24 months is statistically insignificant, while the effect of non-GWOT hostile deployments in the past 24 months is positive (1.3 percentage points).

As was the case for enlisted servicemembers, for officers with 6 or more YOS, the effect of hostile deployments (GWOT and non-GWOT) in the past 24 months is unambiguously positive. Unlike the enlisted results, however, GWOT deployments in the past 24 months have a larger effect than non-GWOT hostile deployments in the past 24 months: 2.3 v. 2.0 percentage points for the Army, 2.5 v. 2.0 percentage points for the Air Force, 4.1 v. 3.3 percentage points for the Marine Corps, and 4.9 v. 3.8 percentage points for the Navy.

## Conclusions from the active component analysis

Across the enlisted and officer analyses, two interesting conclusions arise. After taking into consideration the data on casualty rates and the value of CZTE, we can begin to gain a deeper understanding of what is driving these conclusions.

First, for both enlisted and officers with less than 6 YOS, the effect of a hostile deployment is negative for the Army and Marine Corps and positive for the Air Force. In addition, the negative effect of hostile deployments for the Army and Marine Corps is driven by GWOT deployments. Indeed, when we analyze GWOT and non-GWOT hostile deployments separately, for servicemembers with less than 6 YOS in the Army and Marine Corps, we find that the effect of GWOT deployments is negative, while the effect of non-GWOT hostile deployments is positive. In contrast, for servicemembers with less than 6 YOS in the Air Force, we find that any deployments (GWOT, non-GWOT hostile, and non-hostile) have positive continuation effects. This difference could be driven by service-specific differences in risk faced while deployed in support of GWOT. Consistent with this explanation, GWOT casualty data from FY05 through FY10 produce casualty rates that are 10 and 15 times higher for the Army and Marine Corps, respectively, than for the Air Force. In addition, the differences in the service-specific casualty rates are similar when the data are limited to the lower paygrades, where E1–E4 and O1–O3 are a rough proxy for enlisted and officers with less than 6 YOS. Therefore, the remarkably higher Army and Marine Corps GWOT casualty rates relative to the Air Force might explain why GWOT deployments have a negative effect on continuation for the Army and Marine Corps but not for the Air Force. This difference also could be driven by service-specific differences in living condition while deployed. Indeed, [3] finds that deployments are associated with higher work and personal stress and lower reenlistment intentions among first-term servicemembers in the Army and Marine Corps than among first-term servicemembers in the Air Force.<sup>20</sup>

Second, for both enlisted and officers with 6 or more YOS, the continuation effect of deploying is unambiguously positive. This is the case regardless of whether the deployment is hostile (GWOT or non-GWOT) or non-hostile. Therefore, while hostile deployments might contribute to lower continuation among servicemembers

20. While our analysis compares continuation effects by deployment type, [3] examines the additional effect of deployment duration, concluding that longer hostile deployments have larger negative effects on reenlistment than shorter deployments. Since servicemembers in the Army and Marine Corps have deployed for longer spells on average than servicemembers in the Air Force, this is consistent with our findings. In addition, [3] notes that the negative impact of hostile deployments on reenlistment would have been larger in the Army and the Marine Corps had it not been for the aggressive expansion of SRB eligibility and amounts in an attempt to meet endstrength goals.



with fewer YOS, they might instead produce higher continuation among servicemembers with more YOS. Part of this could be because servicemembers with fewer YOS face greater risk in a hostile deployment than servicemembers with more YOS. For instance, if we use E1–E4 and O1–O3 paygrades as a rough proxy for less than 6 YOS, we see that GWOT casualty rates are 4 and 5 times higher for enlisted and officers, respectively, with few YOS relative to those with more YOS. An alternative explanation could be differences in the value of combat compensation, namely CZTE, across the YOS distribution. In fact, data on the value of CZTE show that the value of the tax exclusion (in terms of the reduction in a servicemember’s tax liability) is increasing in YOS since taxable incomes tend to rise with YOS. For example, the value of the tax exclusion for an E7 with 20 YOS is twice that of an E5 with 4 YOS. Yet another explanation might be a selection effect, that servicemembers with a greater tolerance for hostile deployments might themselves be more likely to stay in the military. These three pieces of evidence—the fact that casualty risk is decreasing in YOS, the fact that the value of CZTE is increasing in YOS, and the selection effect—might explain why the effect of hostile deployments is positive for more experienced servicemembers, while it is negative for less experienced servicemembers.

### Combat experience and continuation in the RC

In this section, we discuss the data used and our statistical analysis of the relationship between receipt of HFP, GWOT mobilizations, and 12-month continuation rates for the reserve component.

#### Data

As with the AC analysis, the data we use for the RC analysis are a combination of administrative personnel, pay, deployment and casualty data provided by DMDC. For the personnel data, we use SSN-level monthly snapshots from DMDC (Reserve Components Common Personnel Data System). For the pay data, we use data that DMDC receives from the Defense Finance and Accounting Service. These data include information on receipt of HFP. To capture deployments, we again use the GWOT CTS database. The CTS data for SELRES differs from the active component in how it captures GWOT mobilizations and GWOT deployments during a mobilization. All the deployments captured on the CTS are GWOT deployments.

In addition, we use aggregate-level casualty data that cover casualties (both killed in action and wounded) from 2005 through 2010 in GWOT-designated locations.

The RC casualty data are broken out by service branch. The rates reported are total incidents over average members per day.<sup>21</sup>

## Methodology

For our analysis of SELRES, we use DMDC data described earlier to create a 12-month continuation data set from June 2003 to June 2009. We analyzed enlisted and officers separately and, when noted, separately for the services. We restrict our analysis to SELRES members with at least 2 years of service, measured by pay entry base date. In this section, we focus on (1) hostile deployments using the pay data and then (2) GWOT mobilizations, with and without GWOT deployments. Our methodology for the SELRES focuses on the descriptive statistics by these different deployment experiences.<sup>22</sup>

## Continuation rates for enlisted SELRES

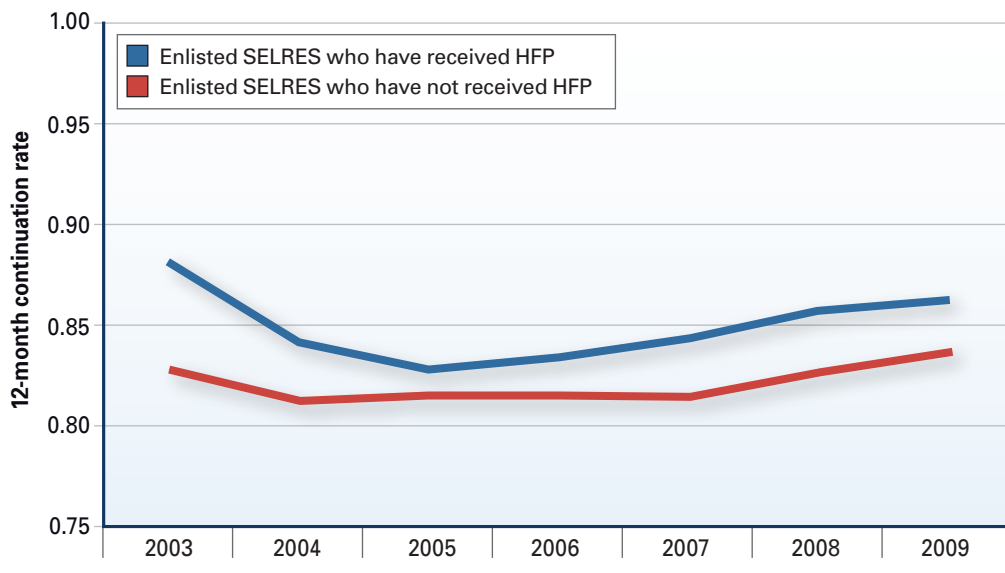
### Differences across hostile and no hostile deployments

Figure 12 shows the 12-month continuation rates, by June snapshots, for enlisted SELRES broken out by receipt of HFP. Those who received HFP for at least 1 month in the past 24 months have continuation rates that are 2.6 percentage points higher than those who did not receive HFP. This difference is statistically significant. Because there are potential differences across reserve components, we include this breakout by reserve component in appendix D (see figures 22 through 24). Those figures show that a similar pattern is consistent across most reserve components. Except for the Marine Corps, receipt of HFP in the past 24 months is associated with higher continuation rates.

We call attention to two caveats. First, those who have not received HFP in the past 24 months include SELRES members who are not mobilized along with those who are mobilized to a non-hostile area. For this reason, we next present continuation rates using CTS data on mobilizations that did or did not involve a GWOT deployment. Second, part of the reason for the higher continuation rates among HFP recipients could be that some of the SELRES members are currently receiving HFP and thus are still deployed and less likely to leave. For that reason, in the next subsection, we present continuation rates based on only those mobilizations that have been completed.

21. Unfortunately, the CZTE data are not aggregated in a way that is useful for interpreting the RC analysis.

22. Because of time limitations, we focused the RC analysis on descriptive statistics instead of presenting a regression model (as we did for the active component). For a discussion of the complexities involved in modeling reserve retention, see [45] and [46].



**Figure 12. Enlisted SELRES, all services: 12-month continuation rates by receipt of HFP in past 24 months**

#### Differences across mobilizations with and without GWOT deployments

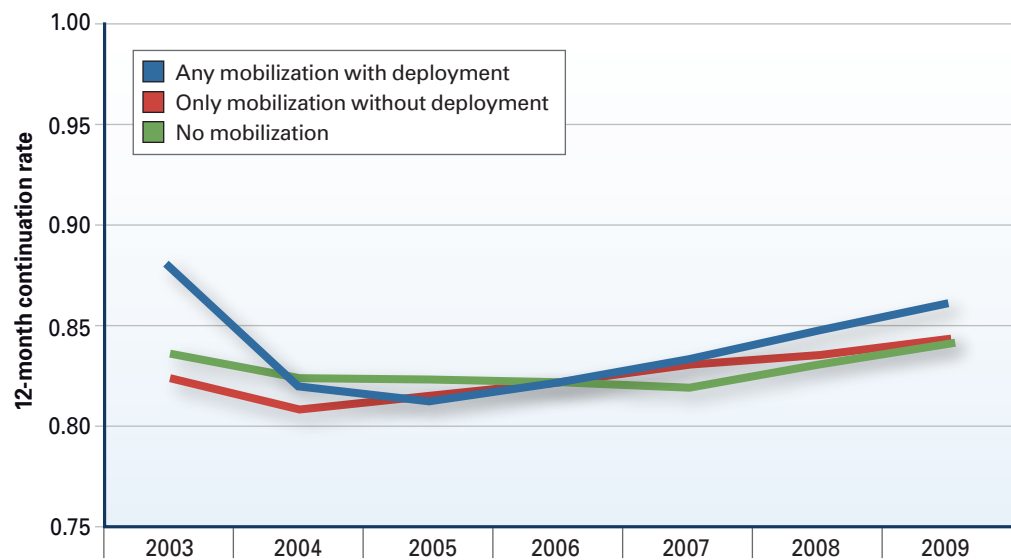
To examine whether there is a difference by mobilization in addition to a difference by receipt of HFP, as discussed in the last section, we separate out all mobilizations by those with deployments in support of GWOT—as defined on the CTS—and those without deployments. An example of a mobilization without a deployment would be to fill CONUS support positions. A SELRES member falls in the “only mobilization without deployment” category if not one of the member’s mobilization periods that ended in the past 24 months included a deployment. If, however, a SELRES member had any mobilizations that ended in the past 24 months that included a GWOT deployment, they belong to the “any mobilization with deployment” category. Our mutually exclusive third category is “no mobilization in the past 24 months.” Because we focus our analysis on completed mobilizations, those without a completed mobilization who are currently mobilized would be in our “no mobilization” category.

The continuation rate among those with a GWOT deployment isn’t consistently higher than the other two categories across all years (see figure 13). The continuation rate among those with any mobilizations with a deployment is higher than the

continuation rate of those who mobilized but didn't have a deployment in 2003, 2004, 2008, and 2009. That difference is statistically significant in those years. For the other years, there is no statistically significant difference in the continuation rates between mobilized reserve members by deployment experience.

Since the different reserve components mobilize with different frequencies, in appendix D (figures 25 through 27), we provide these estimates by reserve component. For all reserve components other than the Marine Corp Reserve, the continuation rate among those who have mobilized and deployed in support of GWOT is higher than for those who have mobilized but not deployed. This finding is consistent with previous findings (e.g., see [45]). Note that those who have deployed in support of GWOT earn combat pay; however, compensation may not be the only factor contributing to this difference.

While we don't find higher continuation rates among Marines who did deploy across all years, SELRES Marines in focus groups, documented in [51], did state that, if activated, they would prefer to deploy because they didn't want to mobilize outside CONUS and do nothing.



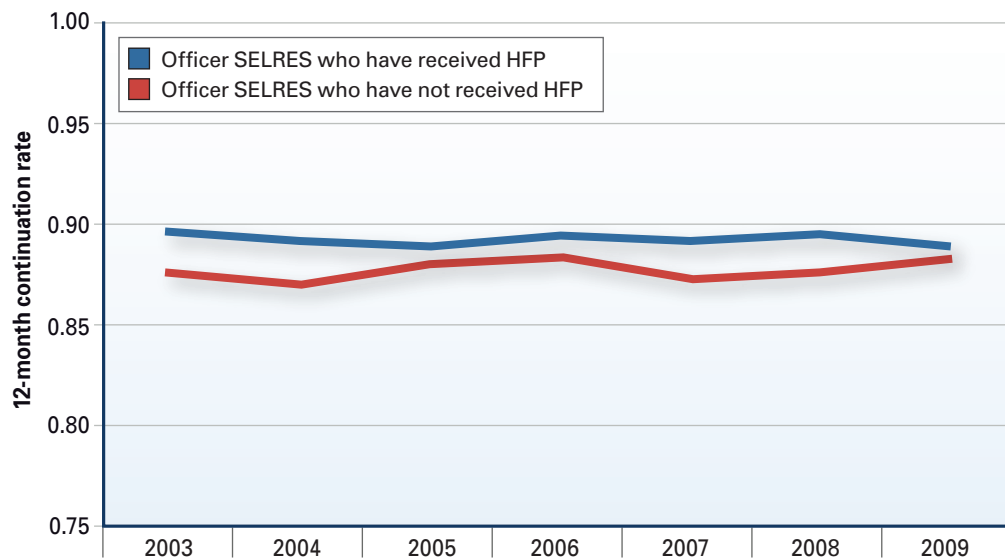
**Figure 13. Enlisted SELRES, all services: 12-month continuation rates by mobilizations in past 24 months**

## Results for officer SELRES

### Differences across hostile and no hostile deployments

Figure 14 shows the 12-month continuation rates by June snapshots for SELRES officers broken out by receipt of HFP in the previous 24 months.

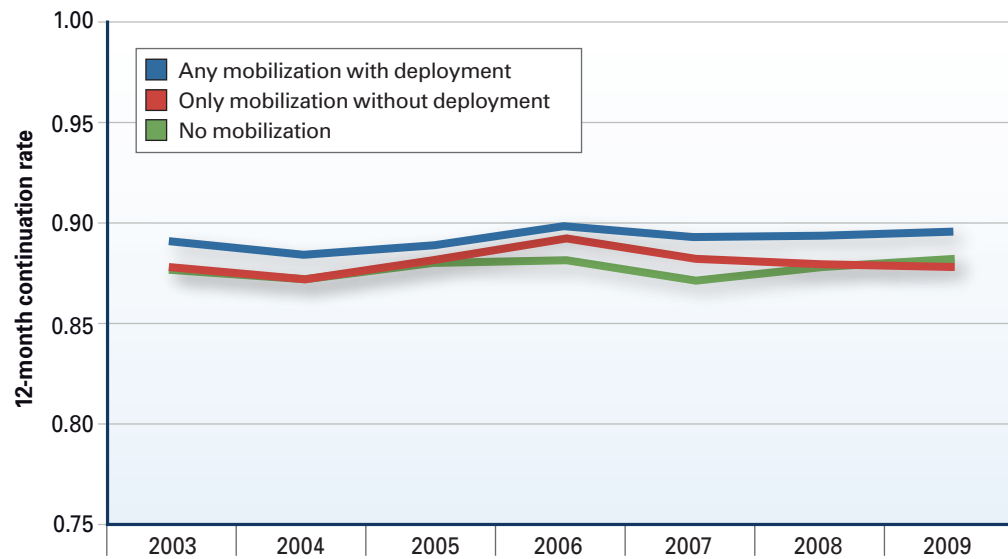
Those who received HFP for at least 1 month in the past 24 months have, over this time period, a statistically significantly higher continuation rate by 1.5 percentage points. Because there are potential differences across reserve components, we include this breakout by reserve component in appendix E (see figures 28 through 30). In summary, for most reserve components, the continuation rate among officers who have received any HFP within the past 24 months is higher than the continuation rate among officers who have not received any HFP within the past 24 months. As was the case with enlisted SELRES, the Marine Corps is the only reserve component in which 12-month continuation rates of officers who received any HFP in the past 24 months are *not* consistently associated with higher continuation rates.



**Figure 14. Officer SELRES, all services: 12-month continuation rates by receipt of HFP in past 24 months**

### Differences across mobilizations with and without GWOT deployments

To examine whether there is a difference by mobilization, we separate out all completed mobilizations in the past 24 months by those with deployments in support of GWOT and compare those with mobilizations without GWOT deployments and no mobilizations. Across all June snapshots, we see in figure 15 that the highest



**Figure 15. Officer SELRES, all services: 12-month continuation rates by mobilizations in past 24 months**

continuation rate is among those who have had any completed mobilization in the past 24 months that involved a GWOT deployment. There isn't a clear ordering of continuation rates among those with only mobilizations without deployments versus those with no mobilizations. Indeed, the difference in continuation rates among those with only mobilizations without a deployment and among those with no mobilizations is statistically significant only in 2006 and 2007 where only mobilization without deployment is higher than no mobilization. We also include this breakout by RC in appendix E (see figures 31 through 33).

When we look at officers who have completed mobilizations within the past 24 months, we get less of a clear pattern across all the services by mobilization versus no mobilization. A better comparison, however, is among those who have deployed in support of GWOT with those who have mobilized but not deployed. Across the June 2003–2009 snapshots and across all reserve components, the continuation rate among officers who have mobilized and deployed in support of GWOT is generally equal to or higher than that for officers who have mobilized but not deployed. This pattern exists for all reserve components except the Army National Guard. The difference in continuation rates by deployment experience is consistent with previous findings [46]. Those who have deployed in support of GWOT earn combat pay, unlike their non-deploying counterparts, but there are other differences, such as a desire to support the mission, that may also influence the decision to stay in the SELRES.

### **Conclusions from the RC analysis**

For most reserve components, we find that those who have received any HFP have higher continuation rates than those who have not received the pay. This finding holds across enlisted and officers and across all service components, with the exception of the Marine Corps SELRES.

When we narrow our focus to completed mobilizations, we find that for most reserve components those members who have mobilized with a deployment have higher continuation rates than those who have mobilized without a deployment. Exceptions are the Marine Corps enlisted SELRES and Army National Guard officers.

We offer two potential explanations for why continuation rates are higher among those who have mobilized and deployed versus those who have mobilized without a deployment. The first is the fact that those who have deployed in support of GWOT earn combat pay, unlike their non-deploying counterparts. Other differences, however, such as a desire to support the mission, may also influence the decision to stay in the SELRES.

The differences in our findings by service (specifically, the Marine Corps enlisted SELRES and Army National Guard officers) may be associated with service-specific differences in the types of deployment and in particular differences in levels of risk. GWOT FY05–FY10 casualty rates are higher among the Army and Marine Corps reserve and guard components than the other reserve/guard components.<sup>23</sup> In FY08 and FY09, the casualty rate was highest for the Army reserve/guard. In FY05, FY06, FY07, and FY10, the casualty rate was highest for the Marine Corps among all the reserve/guard components. In FY10, for example, the casualty rate for the Marine Corps reserve was 23 times higher than for the Navy reserve.

### **Summary and conclusions**

Our analysis of the relationship between combat deployments and continuation produced some interesting and varied insights across the active and reserve components, the enlisted and officer corps, and the services.

#### **AC analysis**

For the AC, we come to two main conclusions pertaining to differences in continuation effects across services and across YOS.

First, for both enlisted and officers with less than 6 YOS, the effect of a hostile deployment is negative for the Army and Marine Corps and positive for the Air

23. DMDC casualty data were reported jointly for both the Army reserve and guard components.



Force. In addition, the negative effect of hostile deployments for the Army and Marine Corps is driven by GWOT deployments. More specifically, when we separate GWOT and non-GWOT hostile deployments for servicemembers with less than 6 YOS in the Army and Marine Corps, we find a negative continuation effect of GWOT deployments and a positive effect of non-GWOT hostile deployments. In contrast, for servicemembers with less than 6 YOS in the Air Force, we find a positive continuation effect of any deployments (GWOT, non-GWOT hostile, and non-hostile). This difference might be attributed to service-specific differences in risk or conditions faced while deployed in support of GWOT. Indeed, aggregate GWOT casualty data show that casualty rates are considerably higher for the Army and Marine Corps than for the Air Force, both overall and when the data are restricted to the lower paygrades (a proxy for low YOS). In addition, survey data show that deployments are associated with higher work and personal stress and lower reenlistment intentions among first-term servicemembers in the Army and Marine Corps than among first-term servicemembers in the Air Force.

Second, for both enlisted and officers with 6 or more YOS, the continuation effect of deploying is unambiguously positive. This is true for hostile (GWOT or non-GWOT) and non-hostile deployments. So, while hostile deployments might contribute to lower continuation among servicemembers with fewer YOS, they might produce higher continuation among servicemembers with more YOS. We offer three potential explanations: (1) servicemembers with fewer YOS face greater risk in a hostile deployment than servicemembers with more YOS, as demonstrated by the GWOT casualty data; (2) the value of CZTE (in terms of the reduction in a servicemember's tax liability) is increasing in YOS, since taxable incomes tend to rise with YOS, as demonstrated by the CZTE data; and (3) this might be the result of a selection effect since servicemembers with a greater tolerance for hostile deployments might themselves be more likely to stay in the military. These three pieces of evidence might explain why the effect of hostile deployments is positive for more experienced servicemembers, while it is negative for less experienced servicemembers.

### **RC analysis**

For most reserve components, we find that those who have received any HFP have higher continuation rates than those who have not received the pay. This finding holds across enlisted and officers and across all service components, with the exception of the Marine Corps SELRES. When we narrow our focus to completed mobilizations, we find that for most RCs those members who have mobilized with a deployment have higher continuation rates than those who have mobilized without a deployment. We offer one possible explanation of this finding—the fact that those who have deployed in support of GWOT earn combat pay, unlike their non-deploying

counterparts. Other differences, such as a desire to support the mission, may also influence the decision to stay in the SELRES. This finding, however, does not hold across all components; the exceptions are the Marine Corps enlisted SELRES and Army National Guard officers. The differences in our findings by service may be associated with service-specific differences in the types of deployment and differences in levels of risk. GWOT FY05–FY10 casualty rates are higher among the Army reserve and guard and the Marine Corps than the other reserve and guard components.

## Appendix A. Maps of additional HFP and CZTE areas

### Additional HFP locations

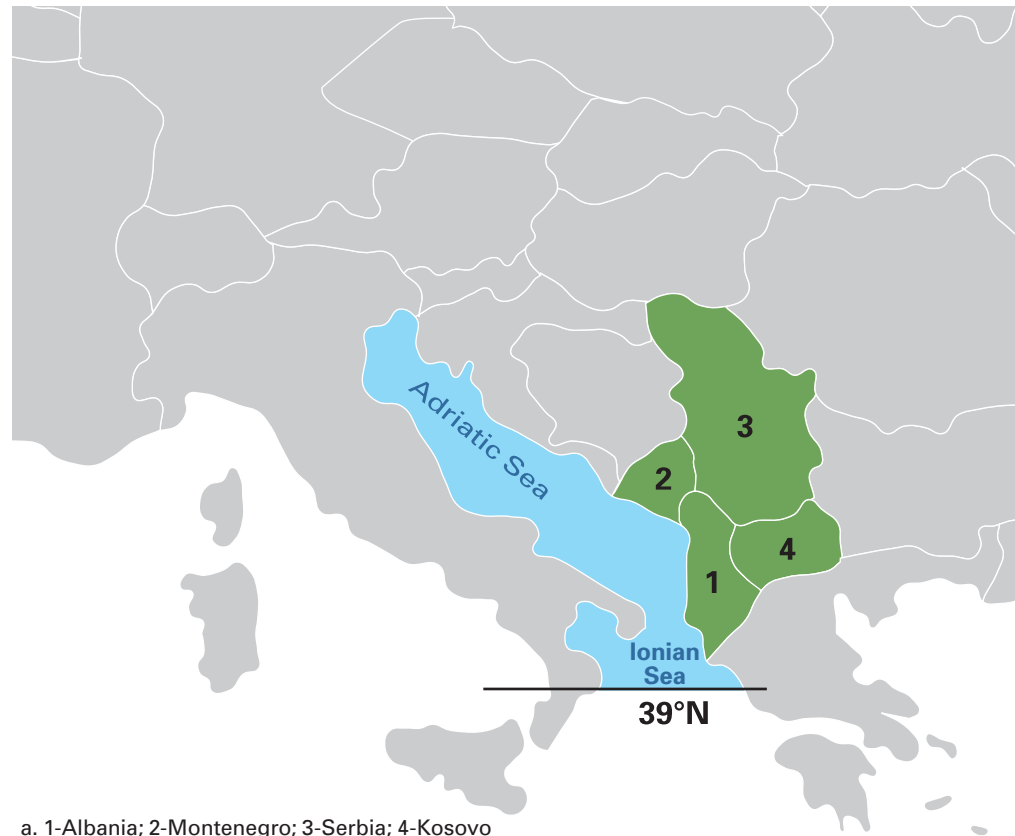
In addition to the locations listed in the main text, figure 16 shows that official military duty in Colombia, Cuba, Guantanamo, or Haiti also meets the criteria for HFP eligibility.



Figure 16. Additional HFP locations<sup>a</sup>

### Additional CZTE locations

In addition to the locations listed in the main text, figure 17 indicates which European countries are also CZTE designated.



**Figure 17. Additional CZTE areas for active service in a combat zone<sup>a</sup>**

## Appendix B. Average hostile deployed days

Figures 18 and 19 show by June snapshot the average number of hostile deployed days in the past 24 months for enlisted and officer in the active component.

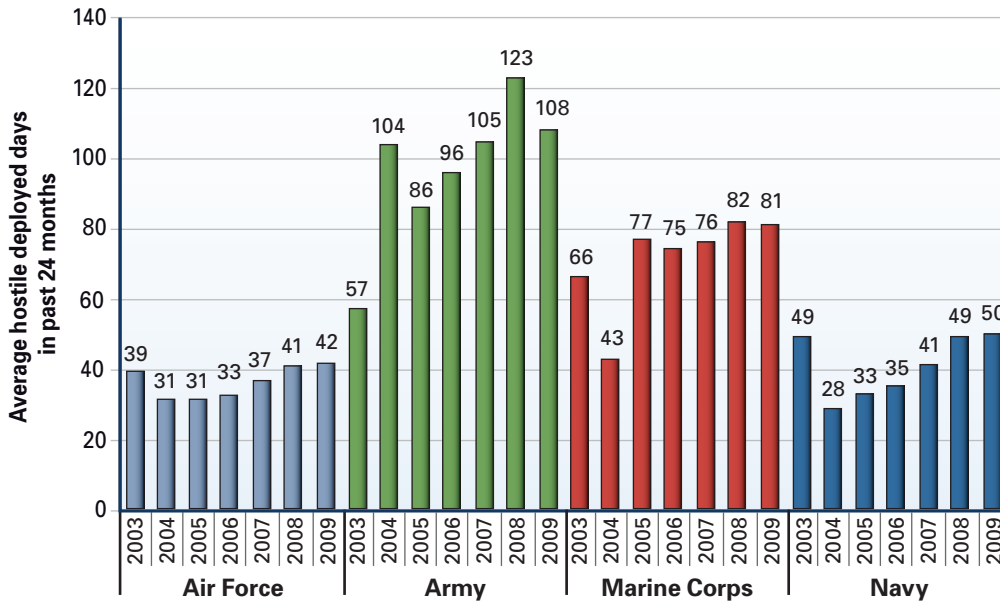


Figure 18. Average hostile deployed days, enlisted servicemembers, by service

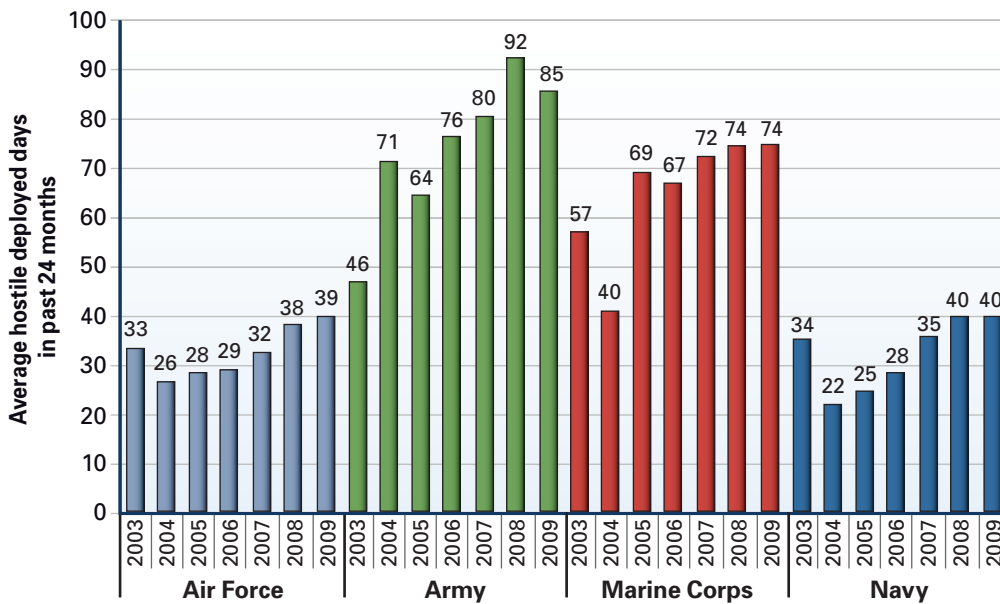


Figure 19. Average hostile deployed days, officer servicemembers, by service

## Appendix C. Percentage receiving HFP or CZTE

Figures 20 and 21 show by June snapshot the share of enlisted and officer in the active component receiving HFP or CZTE in the past 24 months.

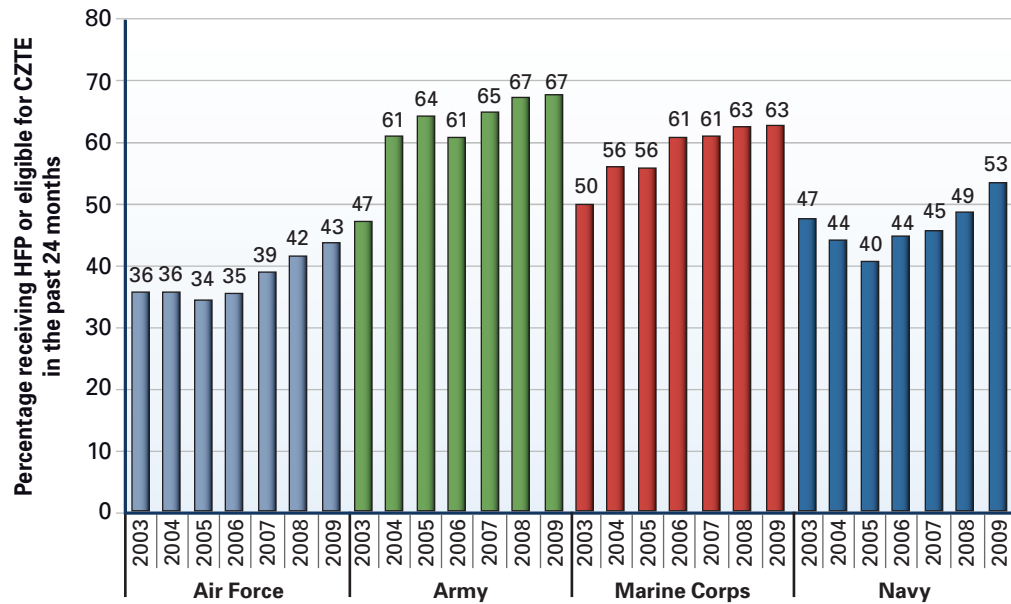


Figure 20. Percentage receiving HFP or CZTE, enlisted servicemembers, by service

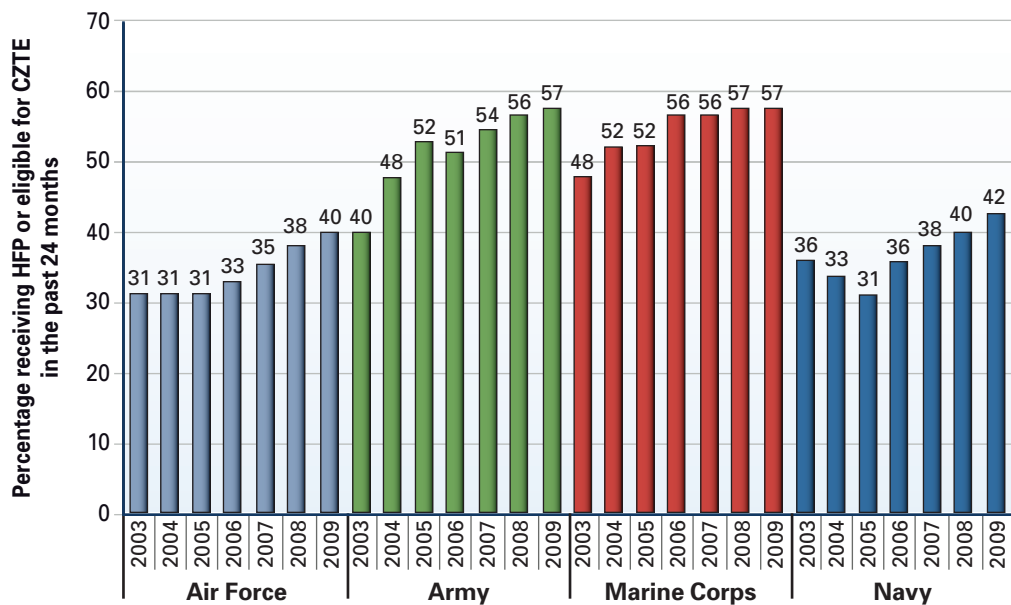
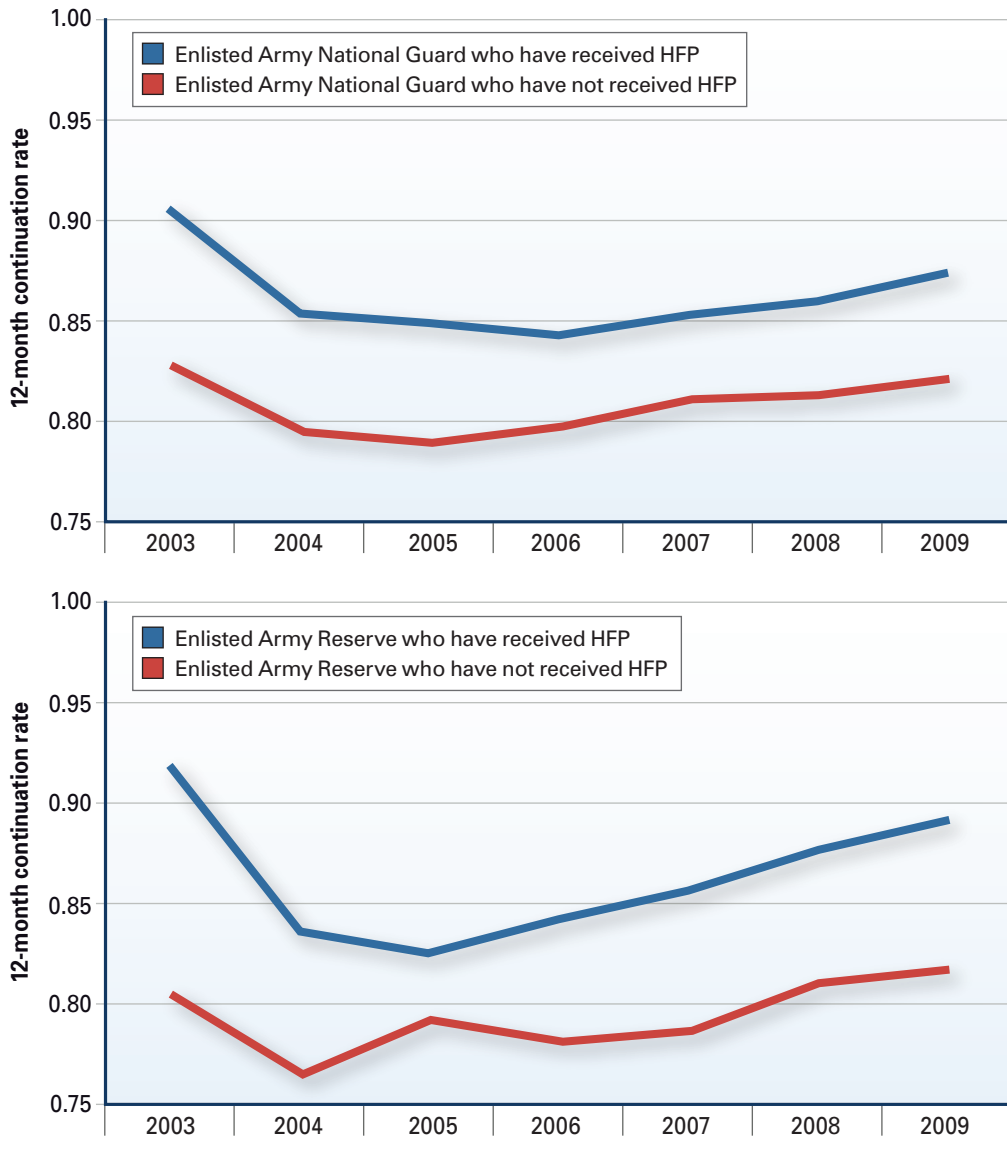


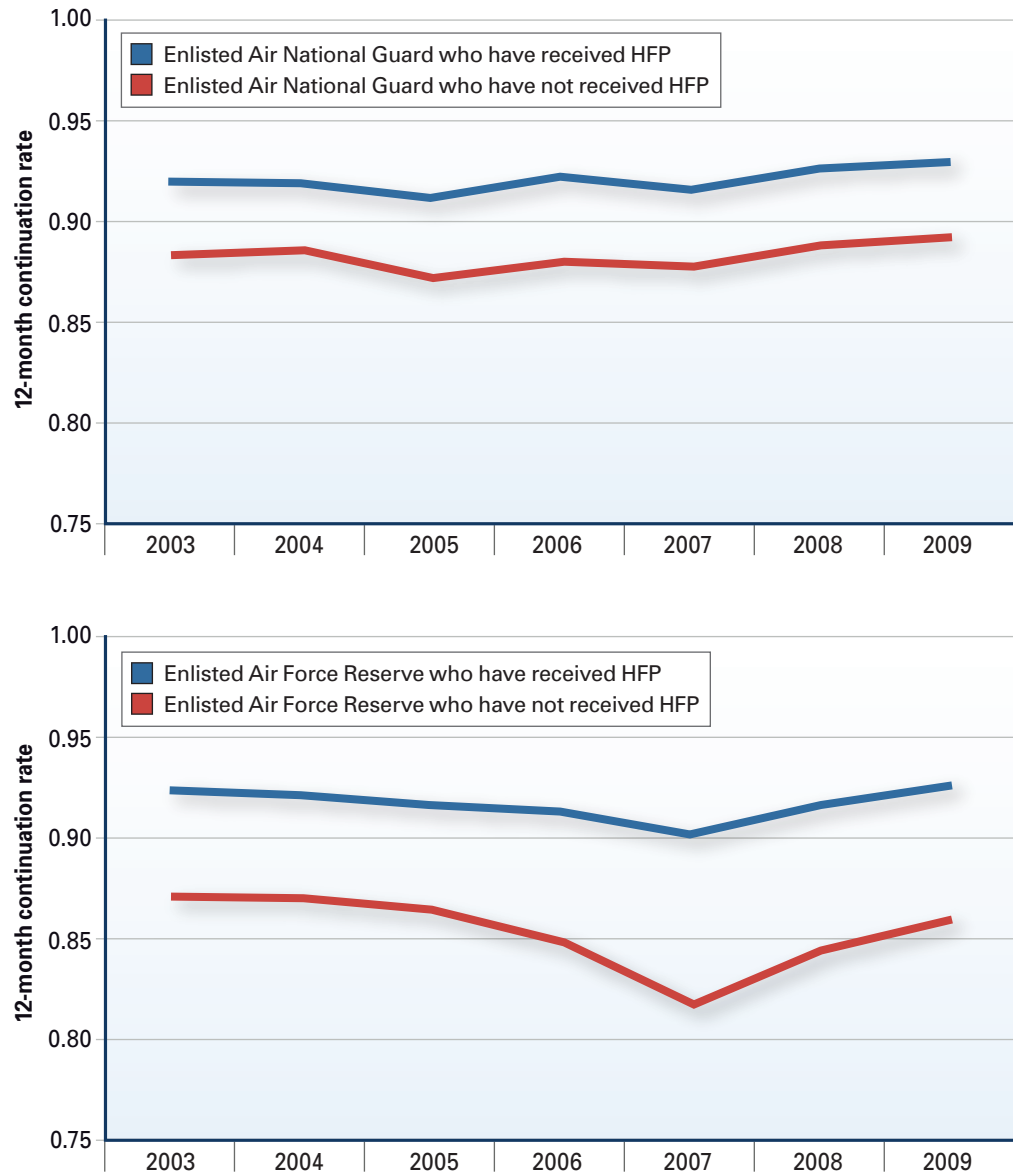
Figure 21. Percentage receiving HFP or CZTE, officer servicemembers, by service

## Appendix D. Enlisted SELRES 12-month continuation rates by service component

Figures 22 through 24 are 2003–2009 June snapshots of enlisted SELRES 12-month continuation rates by receipt of HFP, broken out by service components.

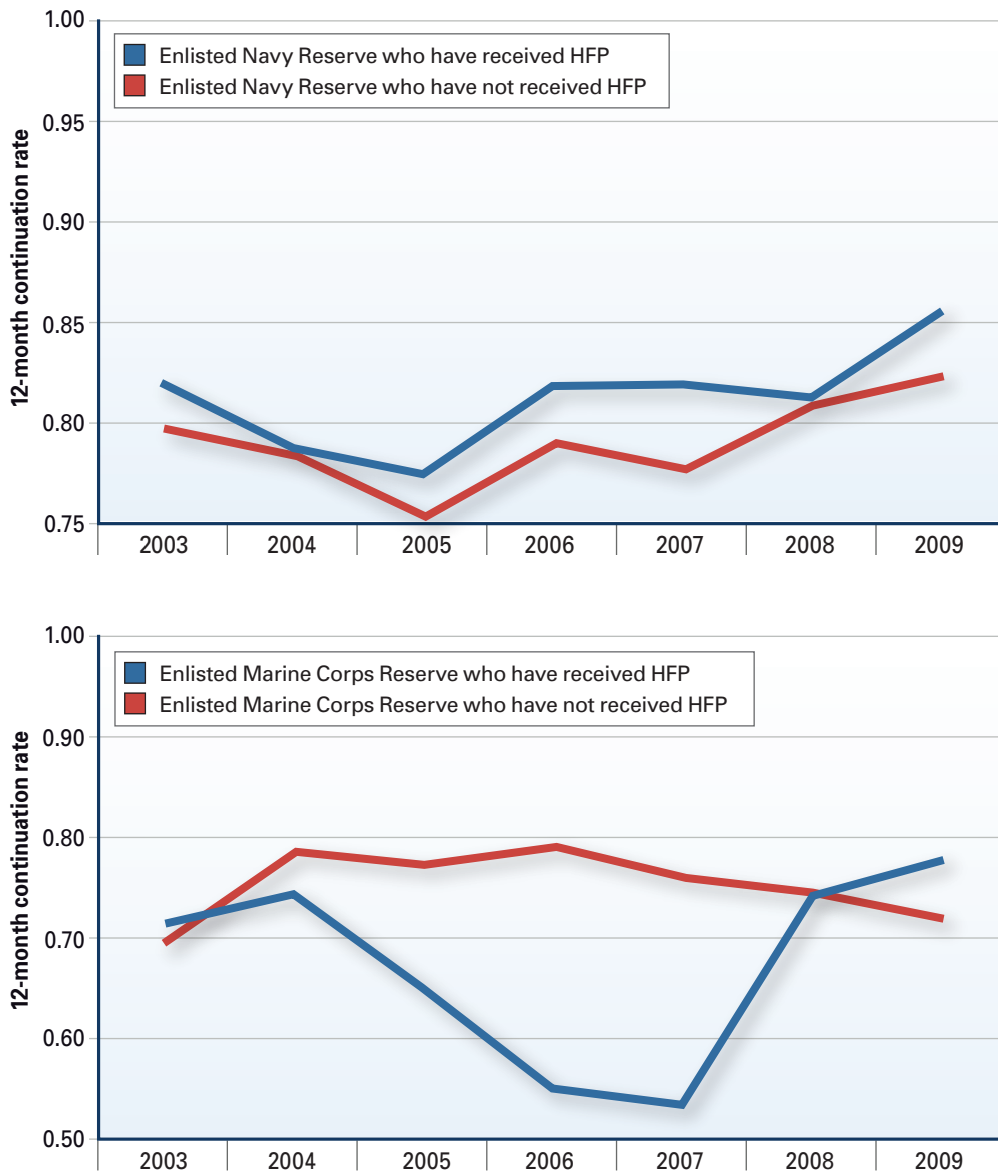


**Figure 22. Enlisted Army National Guard and Army Reserve: 12-month continuation rates by receipt of HFP in past 24 months**



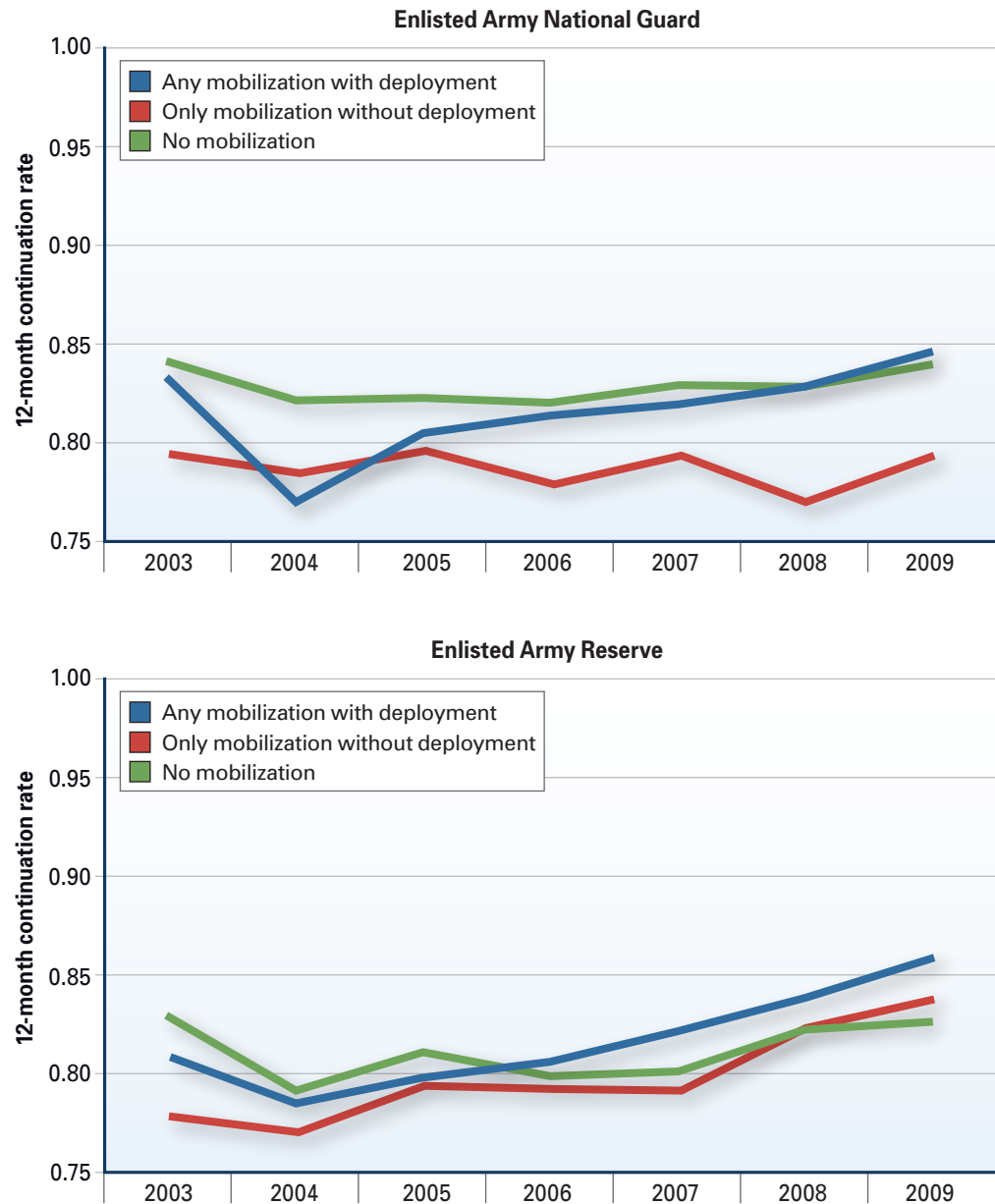
**Figure 23. Enlisted Air National Guard and Air Force Reserve: 12-month continuation rates by receipt of HFP in past 24 months**



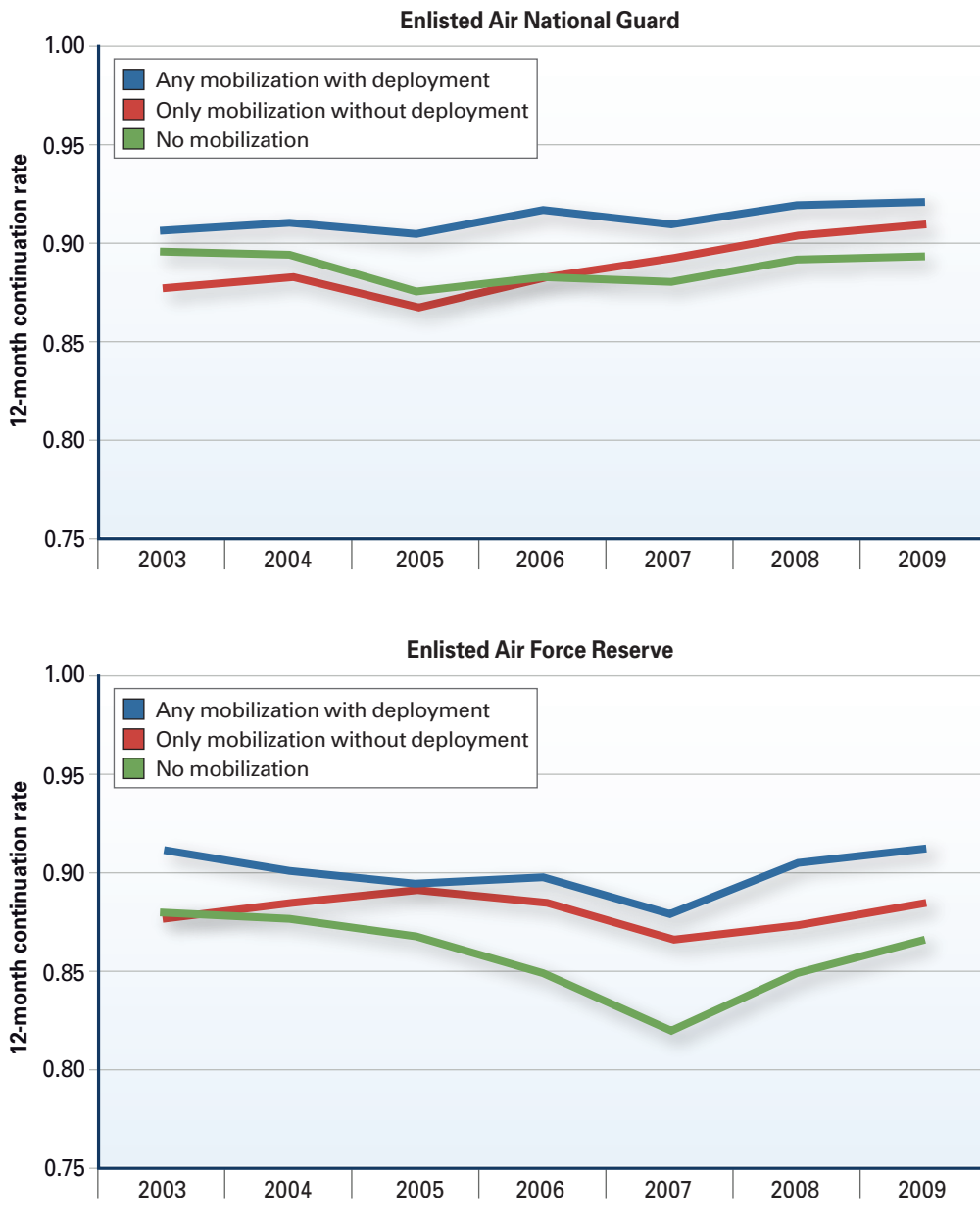


**Figure 24. Enlisted Navy and Marine Corps Reserve: 12-month continuation rates by receipt of HFP in past 24 months**

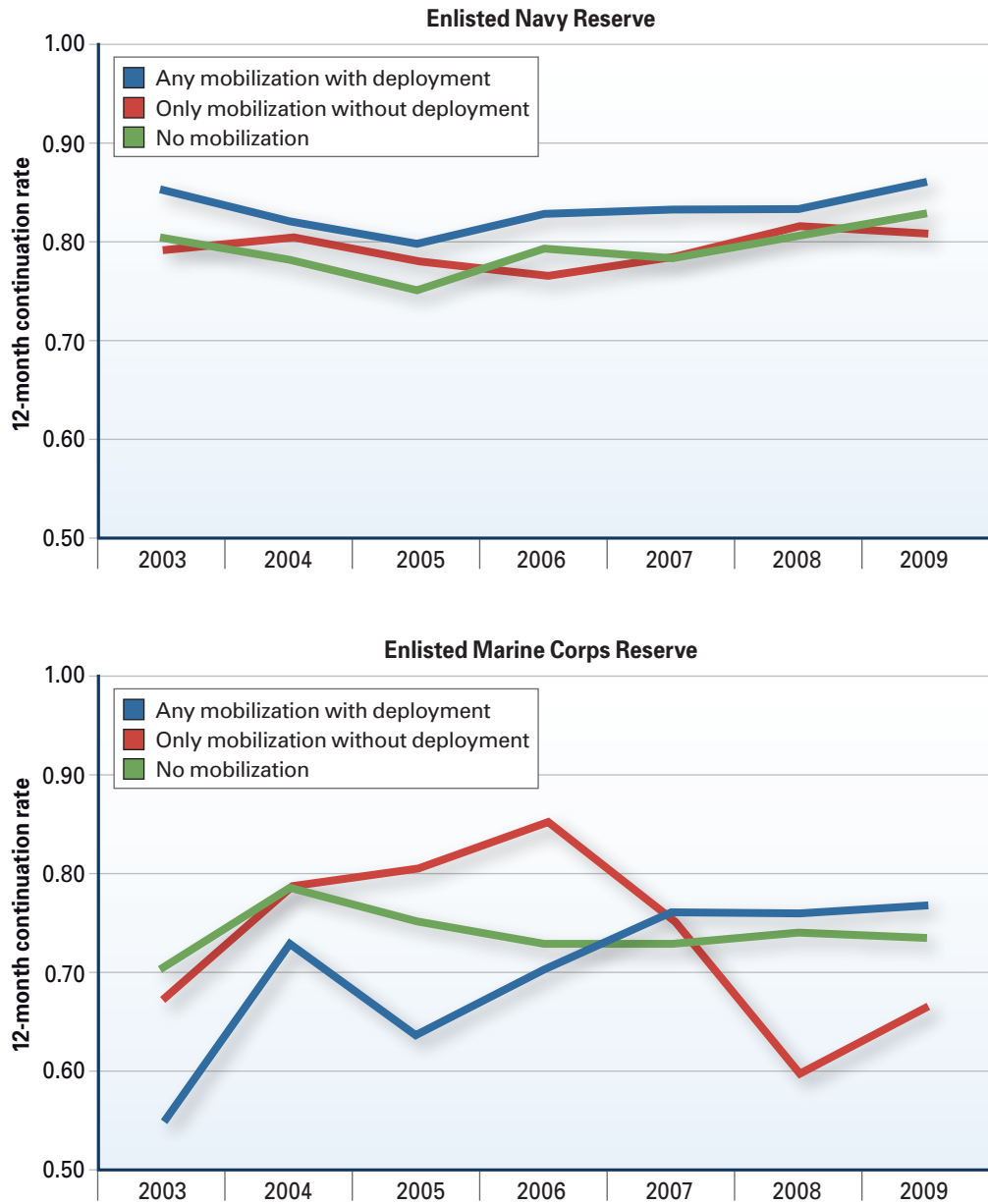
Figures 25 through 27 are June snapshots (2003 through 2009) of enlisted SELRES 12-month continuation rates by mobilization experience, broken out by service components.



**Figure 25. Enlisted Army National Guard and Army Reserve: 12-month continuation rates by mobilizations in past 24 months**



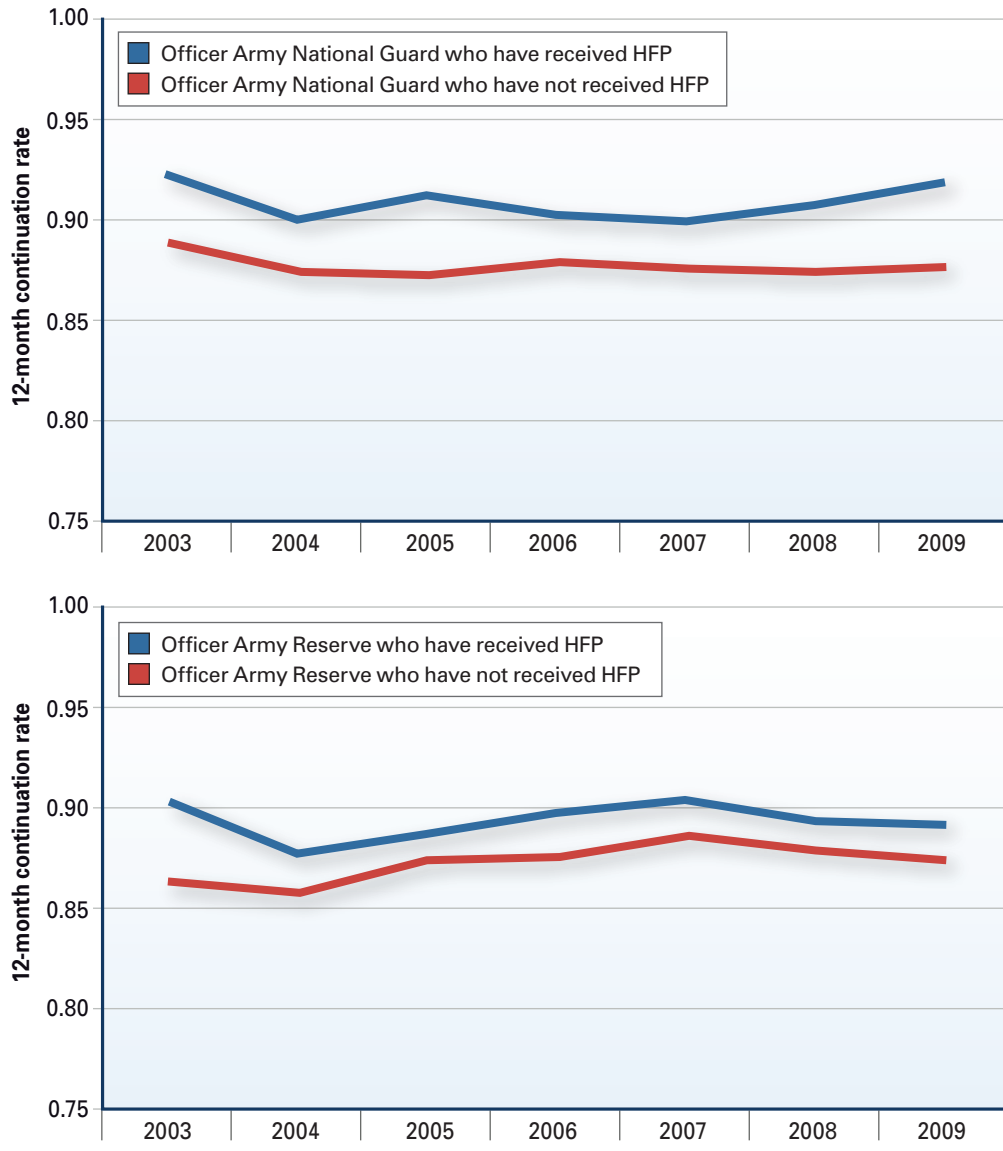
**Figure 26. Enlisted Air National Guard and Air Force Reserve: 12-month continuation rates by mobilizations in past 24 months**



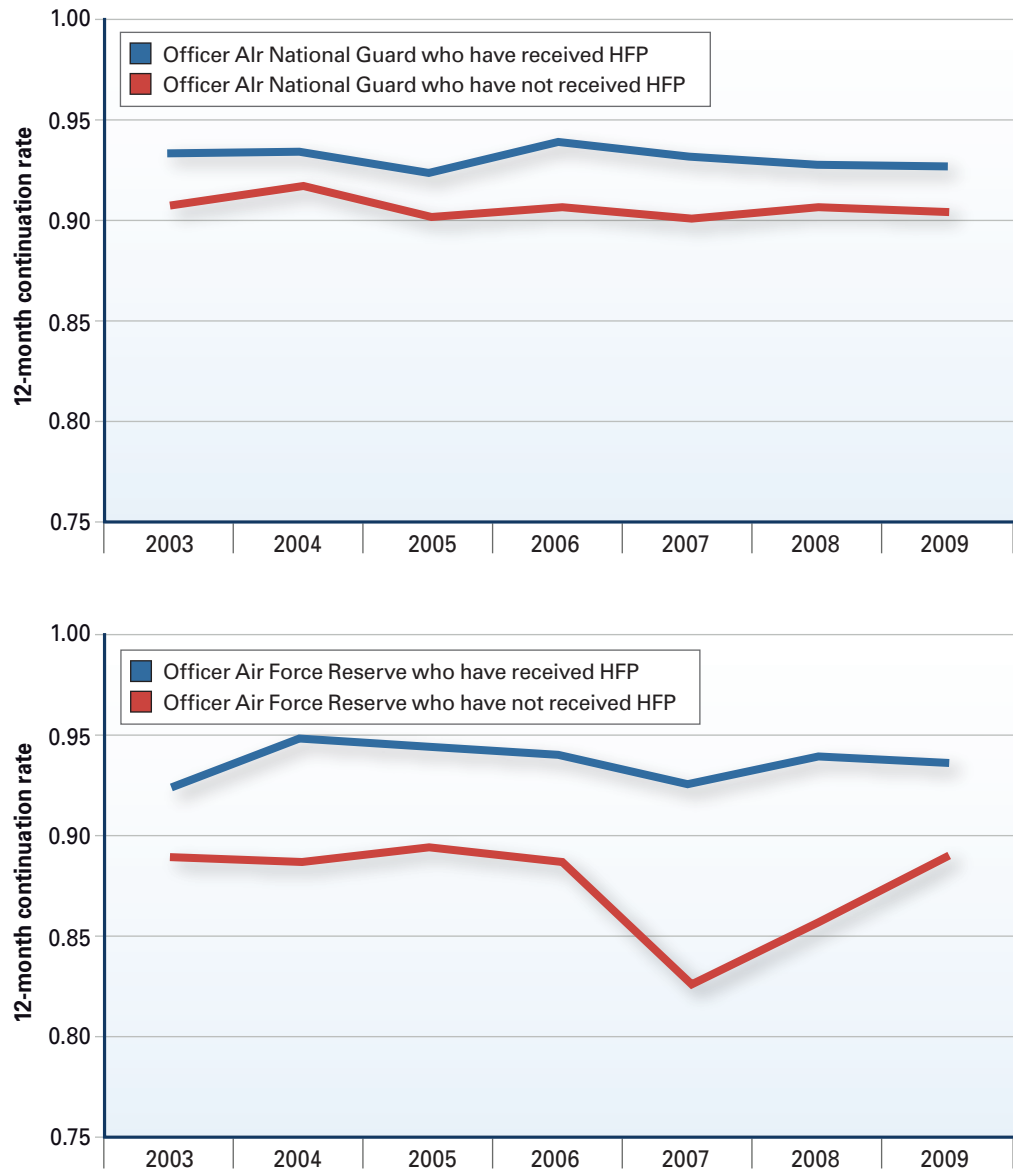
**Figure 27. Enlisted Navy and Marine Corps Reserve: 12-month continuation rates by mobilizations in past 24 months**

## Appendix E. Officer SELRES 12-month continuation rates by service component

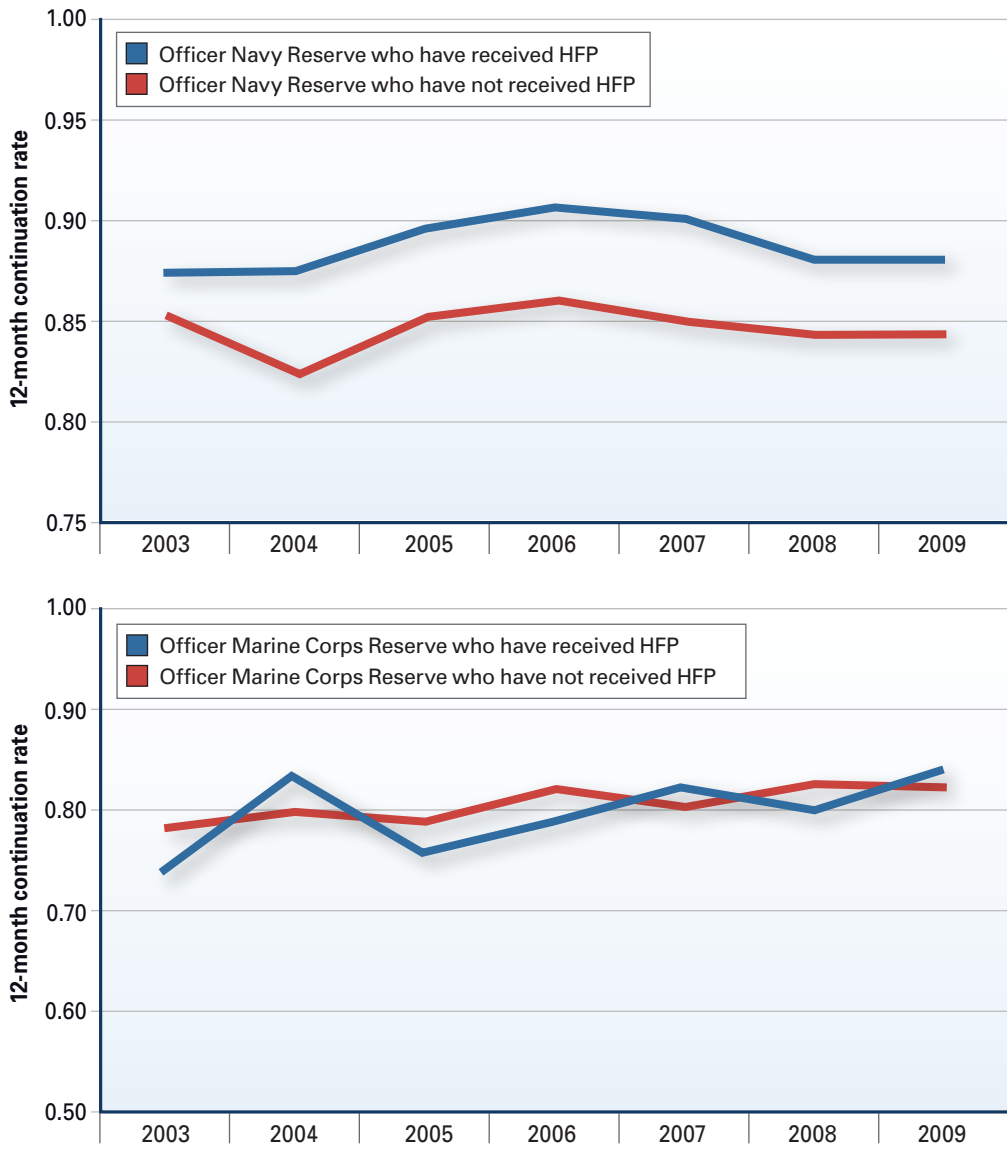
Figures 28 through 30 are June snapshots (2003 through 2009) of officer SELRES 12-month continuation rates by receipt of HFP, broken out by service components.



**Figure 28. Officer Army National Guard and Army Reserve: 12-month continuation rates by receipt of HFP in past 24 months**



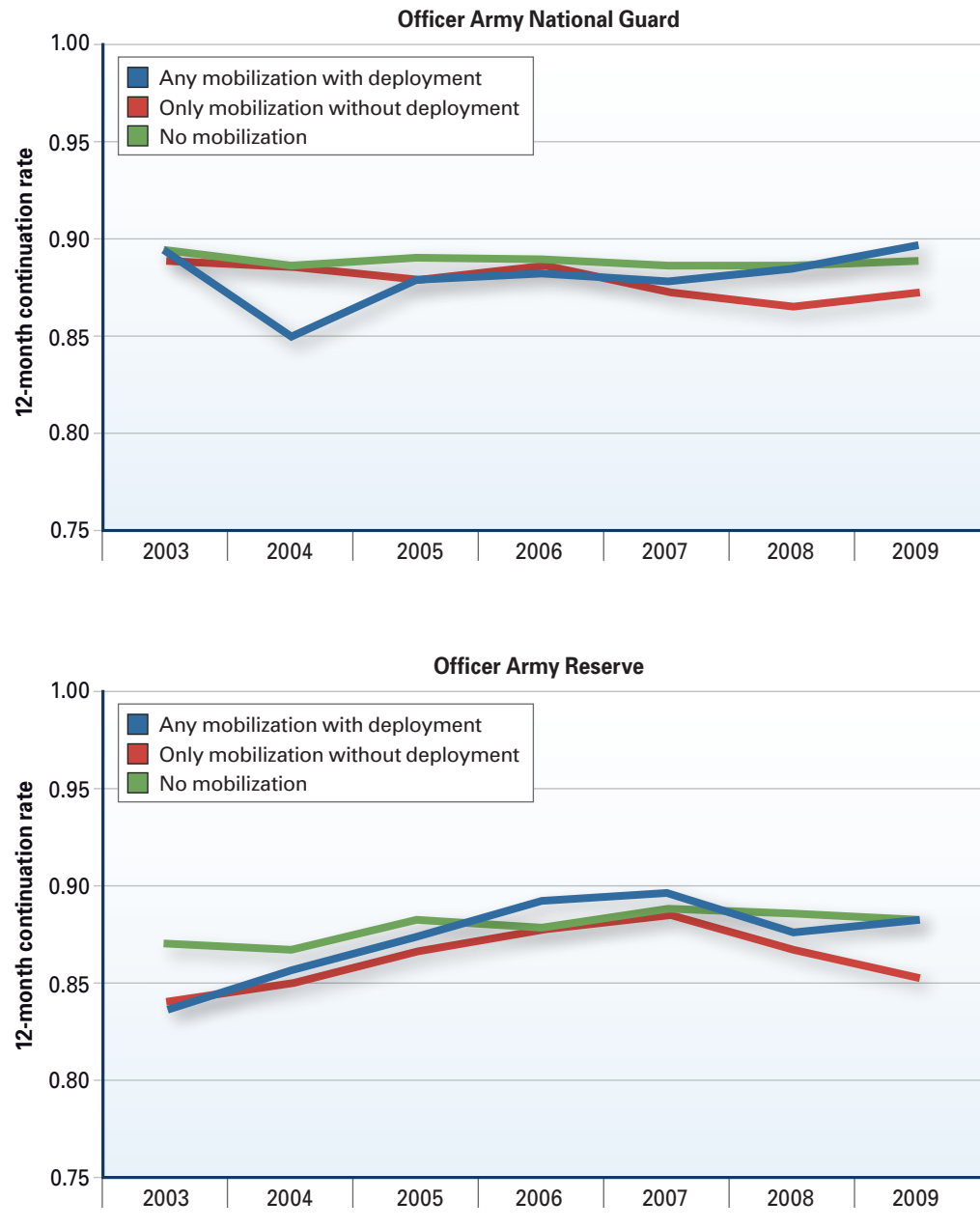
**Figure 29. Officer Air National Guard and Air Force Reserve: 12-month continuation rates by receipt of HFP in past 24 months**



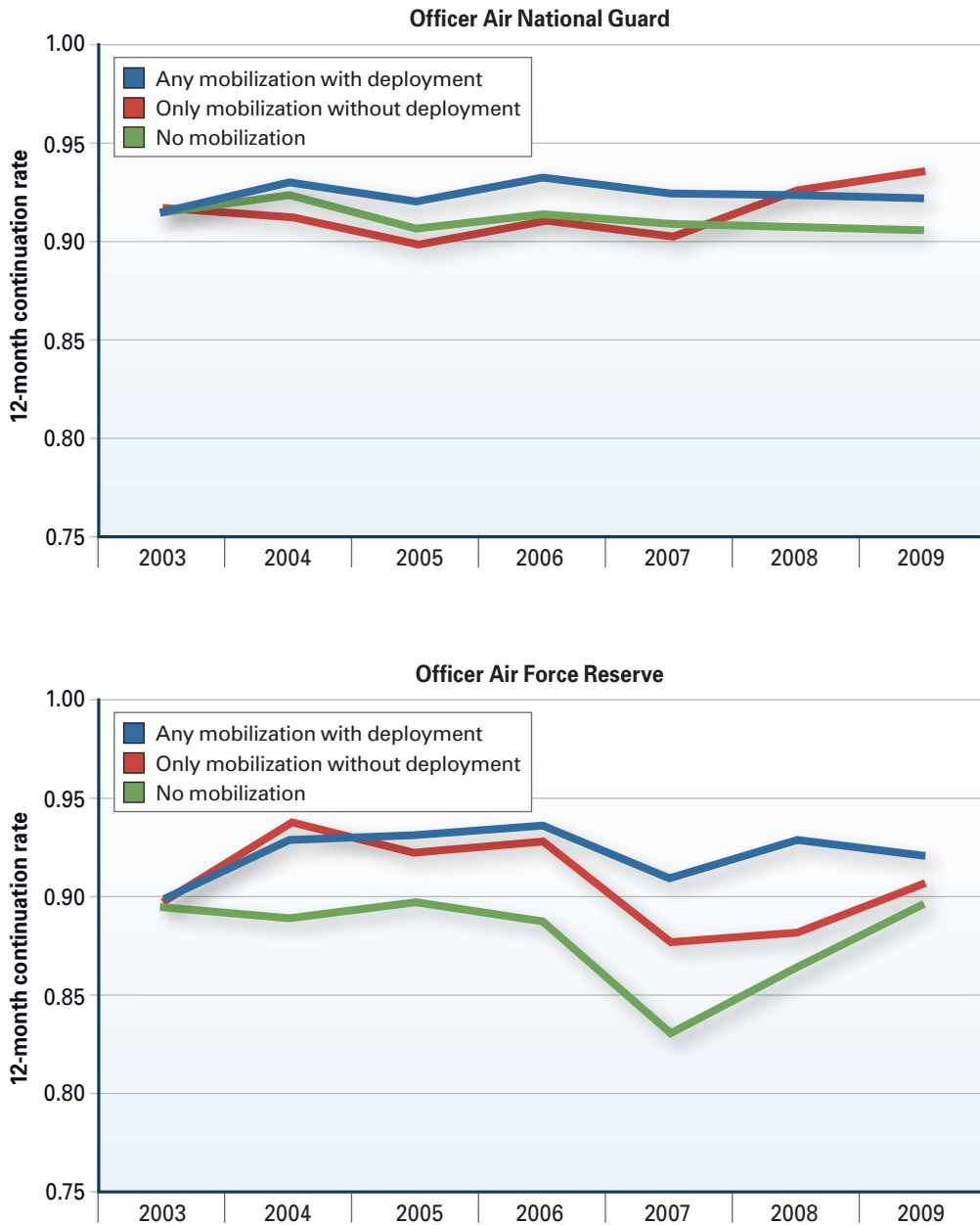
**Figure 30. Officer Navy and Marine Corps Reserve: 12-month continuation rates by receipt of HFP in past 24 months**



Figures 31 through 33 present June snapshots (2003 through 2009) of officer SELRES 12-month continuation rates by mobilization experience, broken out by service components.



**Figure 31. Officer Army National Guard and Army Reserve: 12-month continuation rates by mobilizations in past 24 months**



**Figure 32. Officer Air National Guard and Air Force Reserve: 12-month continuation rates by mobilizations in past 24 months**



**Figure 33. Officer Navy and Marine Corps Reserve: 12-month continuation rates by mobilizations in past 24 months**

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