Prior-Service Reserve Affiliation and Continuation Behavior
Volume 1– Affiliation

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Photo credit line: Marines with 1st Battalion, 25th Marines Regiment verify the battle sight zeroes on their rifles at Camp Leatherneck, Helmand province, Sep 5 2011. The battalion is a reserve infantry unit based out of New England and is conducting in–theater exercises. (9/5/2011 By PO2 Jonathan Chandler)

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Contents

Executive summary

In this paper, we examine the Selected Reserve (SelRes) affiliation behavior of prior-service (PS) Marines. We use Marine Corps Total Force Structure (MCTFS) data on enlisted Marines and Marine officers who left active duty and transitioned to the Individual Ready Reserve (IRR) between October 2001 and September 2011. We estimate the effect of Marine characteristics and service history (active duty and reserve) on the SelRes affiliation decisions. Table 1 presents an overview of our findings for PS enlisted Marines and PS officers.

Table 1. Summary of SelRes affiliation trends

Variables	PS enlisted Marines	PS officers
Number of months in the IRR	The likelihood of SelRes affiliation decreases the longer a Marine is in the IRR. Cohorts transitioning since FY06 have been spending less time in the IRR before affiliating than earlier cohorts.	The likelihood of SelRes affiliation decreases the longer a Marine is in the IRR. Cohorts transitioning since FY05 have been spending less time in the IRR before affiliating than earlier cohorts.
Demographic characteristics	Women, racial minorities, Hispanics, divorcees, and Marines with three or more dependents are more likely to affiliate.	Officers who are a minority race other than black and those with three or more dependents are more likely to affiliate.
State unemployment rate	An increase in the unemployment rate in the six months before transitioning decreases the likelihood of affiliation.	We find no significant effects on SelRes affiliation.
Quality measures	Marines with high school diplomas are less likely to affiliate with the SelRes compared with other Tier I and Tier II/III Marines. Gold-standard Marines are more likely to affiliate than non-gold-standard Marines.	Officers with a graduate/professional degree are more likely than officers with a bachelor's degree to affiliate with the SelRes.
Paygrade	The likelihood of SelRes affiliation increases with rank.	The likelihood of SelRes affiliation increases with rank.
AC[a] deployment history	More AC deployment experience (in terms of months) decreases the likelihood of affiliating with the SelRes.	We find no significant effects on SelRes affiliation.
RC[a] activation and deployment history	Marines directly activated from the IRR are less likely to affiliate than those who are not. Higher SelRes activation rates decrease the likelihood of SelRes affiliation.	The likelihood of affiliating with the SelRes is lowest for officers who are activated and deployed directly from the IRR.

a. AC and RC abbreviate active component and reserve component.

SelRes affiliation behavior depends on the amount of time a Marine spends in the IRR after transition. We find that time spent in the IRR diminishes the likelihood of a PS Marine affiliating with the SelRes. We observe that most SelRes affiliation occurs within one year of a Marine leaving active duty, and the rate of SelRes affiliation falls as Marines spend more months in the IRR. These findings reinforce the importance of Reserve Affairs' current focus on educating Marines on reserve opportunities while they are on active duty and of unit leadership, career planners, and monitors engaging with and encouraging qualified PS Marines to affiliate with reserve units at the time they transition from active duty.

We find that minorities, Marines with lower education credentials, and those with many dependents are more likely to affiliate with the SelRes. In addition, we find that higher ranking Marines and Marines of higher quality are more likely to affiliate with and remain in the SelRes. These groups may be attracted to the added benefits of SelRes affiliation, such as health care, the Post-9/11 GI Bill education benefit, and a means to earn enough points each year to achieve the requisite number of "good" years for retirement pay.

Our models show that PS enlisted Marines with more AC deployment experience (in terms of number of months deployed) are less likely than those with less experience to affiliate with the SelRes. Also, PS Marines who are activated from the IRR are less likely to affiliate with the SelRes. In addition, we find evidence that when PS activations from the SelRes are high, enlisted Marines are slightly less likely to affiliate. These findings suggest that PS recruiting may be more difficult during or right after periods of high operational tempo.

Lastly, our analysis shows marked differences in SelRes affiliation between Marines who entered the Marine Corps before and after September 11, 2001 (hereafter expressed as 9/11). Because the PS SelRes population is indirectly shaped by AC recruiting, it is also important for the Marine Corps to understand how changes in both its active-duty members and the U.S. population may affect PS SelRes recruiting. Given the foreseeable changes in the U.S. population and economy, Marine Corps AC endstrength, and the U.S. military drawdown in Afghanistan, we recommend that the Marine Corps continue to monitor trends in SelRes affiliation and continuation rates.

Introduction

The continued reliance on reserve forces over the past decade has brought attention to the challenges in recruiting prior-service (PS) Marines to the Selected Reserve (SelRes) and retaining them.[1] Although the Marine Corps has information on basic trends in affiliation and continuation, it does not know what is influencing Marines' reserve affiliation and retention behavior. To develop an understanding of who affiliates with the SelRes, the Deputy Commandant, Manpower and Reserve Affairs (DC, M&RA) asked CNA to examine these issues for both Marine officers and enlisted Marines.[2]

We provide our study results in two reports. In this report, we analyze the affiliation trends of PS Marines. In a second report, we focus on PS Marines' SelRes continuation trends [1]. Combined, these reports present an analysis of Marines who transition from active to reserve status and their decisions to affiliate with and continue in the SelRes as a member of a Selected Marine Corps Reserve (SMCR) unit or as an individual mobilization augmentee (IMA).

Past research has focused separately on patterns in end-of-active-service (EAS) separation rates and reservists' unit affiliation behavior. From recent research, we know that, for the FY00–FY07 period, the EAS separation was relatively static; however, the separation rate was higher among Marines in combat occupations than among those in intelligence occupations [2]. Other research has shown that blacks and Hispanics tend to separate from the active component (AC) at

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1. The Marine Corps' SelRes includes Active Reserve (AR) Marines, reservists in Selected Marine Corps Reserve units, and Individual Mobilization Augmentees (IMAs) in active-duty units. We provide an overview of the USMC reserve organization in appendix A.

2. This study request was driven by discussions during the November 2010 Reserve General Officer offsite meeting in New Orleans.

lower rates than whites [3]. With regard to SelRes retention, prior research shows that, between FY00 and FY06, the increase in operational tempo had a negative effect on the likelihood of reservists maintaining their SelRes affiliation [4]. This study bridges these two branches of research.

Research issues

Our research focuses on the following questions:

1. Which Marines transitioning from the AC to the Individual Ready Reserve (IRR) are eligible for SelRes duty?

2. Which transitioning Marines decide to affiliate with SMCR units or as IMAs, and what factors may be influencing their reserve affiliation decisions?

3. Which Marines remain in the SelRes, for how long, and what factors may be influencing their retention decisions (see [1])?

This study aims at informing SMCR and IMA recruiting and retention policies by examining the relationship between various individual characteristics and military career events and the probability of both affiliating with and continuing in the SelRes.

More specifically, in this report, we focus on the affiliation behavior of PS Marines who left active duty between FY02 and FY11 [see questions 1 and 2 above]. The timeframe allows us to examine SelRes affiliation over a period of time in which the Marine Corps was faced with two wars, an increase in endstrength, and a decline in the U.S. economy. By identifying the traits of Marines who are most likely to affiliate with the SelRes, the Marine Corps can inform its reserve affiliation strategy, better target its recruiting resources, and refine its personnel management policies and practices.

Data

To conduct our analysis of PS SelRes affiliation behavior, we use individual-level data from the Marine Corps Total Force System (MCTFS) end-of-month snapshots, maintained by Headquarters Marine Corps,

Manpower and Reserve Affairs (HQMC M&RA). From MCTFS, we identify Marines separating from the AC between October 2001 and September 2011 and transitioning to the reserve component (RC). For each group, we merge data on demographic and service characteristics with waiver data from the Marine Corps Recruit Information Support System (MCRISS) as well as AC and RC activation and deployment data from the Global War on Terrorism (GWOT) files and the Contingency Tracking System (CTS). To determine the effect of economic factors on SelRes affiliation and continuation behavior, we incorporate state monthly unemployment rates, as reported by the Bureau of Labor Statistics (BLS).

Organization of this report

In the next section, we identify and examine the characteristics of transitioning enlisted Marines and officers who represent the recruitable SelRes PS population. Next, we analyze the SelRes affiliation behavior of the transitioning population. We examine trends in the PS affiliation rate, model the affiliation decision, and estimate the relationship between various Marine characteristics and the probability of affiliation. In the final section, we provide our conclusions, make recommendations, and discuss the implications of our findings.

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Identifying transitioning Marines and the recruitable PS population

We begin by distinguishing Marines who are eligible for recruitment into an SMCR unit or an IMA billet from Marines who left active duty between October 2001 and September 2011. Figure 1 describes how we isolated the eligible PS population from all active-duty losses.

Figure 1.   Identifying the transitioning PS population eligible for SelRes duty
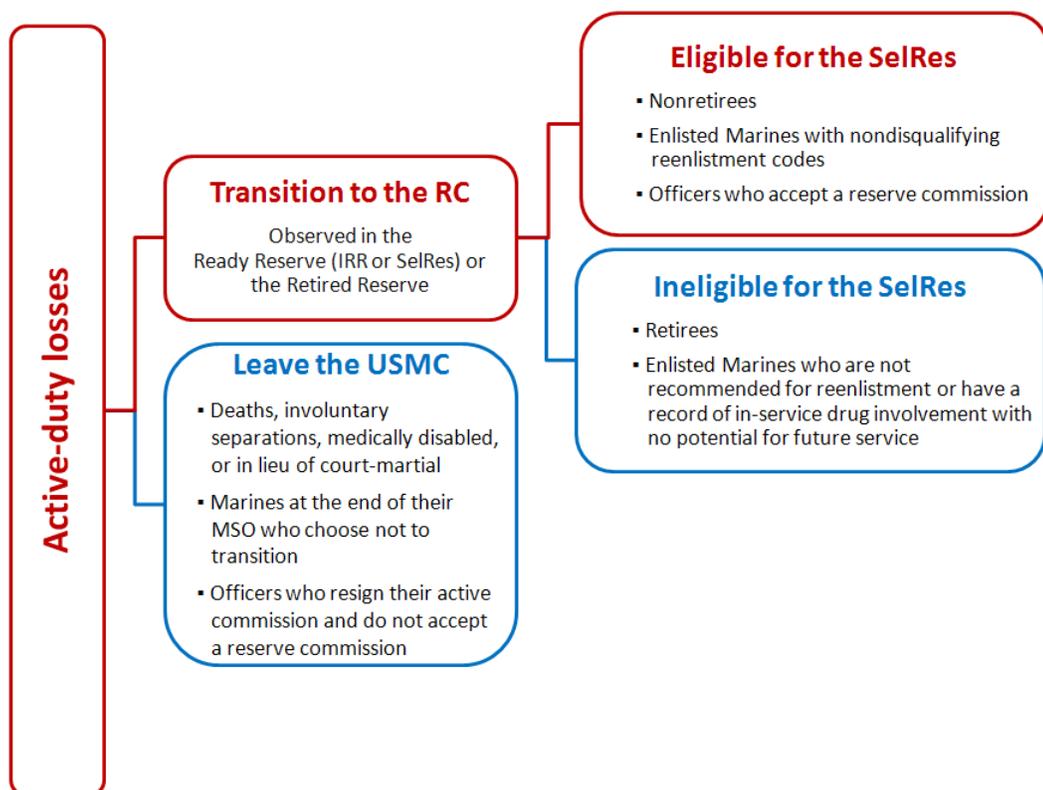
Enlisted Marines who separate from active duty with time remaining on the mandatory service obligation (MSO) automatically enter the IRR, while those who separate beyond their MSO may request to be placed in the IRR in anticipation of potentially affiliating with a unit. Officers enter the IRR after being scrolled by Headquarters Marine Corps (HQMC)—the official processes of resigning an active commission for a reserve commission. The recruitable PS population consists of Marines in the IRR minus any enlisted Marines with nondisqualifying reenlistment codes: not recommended for reenlistment or in-service drug use with no potential for further service.[3]

Transitioning enlisted Marines

Population trends

Figure 2 shows the monthly number of enlisted Marines who separated from active duty between October 2001 and September 2011. The blue line charts the total number of enlisted losses each month; the red line indicates those who were potentially eligible to affiliate with the SelRes.[4] Each fiscal year since FY02, roughly 25,000 enlisted Marines left active duty. As shown by the blue line, most separations occur between June and September. This follows from the fact that EAS dates are determined by when a Marine enters the Marine Corps, and most accessions occur between June and September.

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3. Marines with reenlistment codes other than recommended and eligible may require a waiver in order to affiliate. Reasons for a waiver include, but are not limited to, receipt of disability payments, single parenthood, and being the sole surviving son/daughter. However, recommended and eligible Marines also may need a waiver to enter the SelRes if there is a change in their service or civilian record—such as the existence of new tattoos or the use of illegal drugs—while in the IRR.

4. Of the enlisted Marines who left the AC and are not included in the eligible population, 22,504 entered the Retired Reserves, 2,096 were not recommended and eligible for reenlistment, and 833 had drug involvement with no potential for future service. Another 51,910 enlisted Marines left the AC and did not enter the RC because of involuntary discharges, medical disabilities, or in lieu of courts-martial.

Figure 2.   Number of transitioning enlisted Marines, Oct. 2001 to Sep. 2011[a]
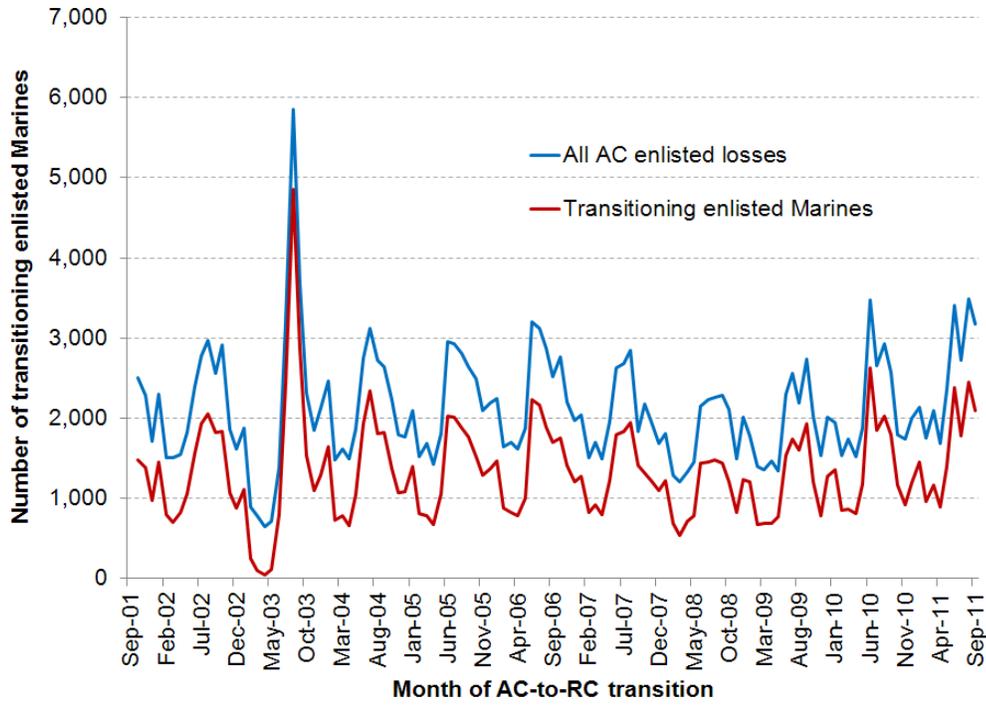
a. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

Enlisted monthly active-duty losses were lowest in April 2003 and highest in August 2003. These months coincide with the start and end of a forcewide stop-loss order during the initial months of Operation Iraqi Freedom (OIF) [5, 6, 7, and 8]. Otherwise, monthly enlisted active-duty losses range from 1,500 to 3,000. In FY08, the Marine Corps began to increase its total active-duty endstrength to 202,000, or 202K [9]. As a result, FY08 had fewer active-duty losses (21,800) than any other fiscal year. As the Marine Corps began to reach its new endstrength of 202K, it had less need to hold to Marines, and we see that active-duty losses began to increase in the two years.

During the observed period, the recruitable enlisted population consisted of 160,000 Marines, representing roughly 63 percent of all active-duty enlisted losses. Hereafter, we refer to this subset of Marines as the transitioning enlisted population.

Trends in the number of transitioning enlisted Marines follow those of all AC enlisted losses. The months at the start and end of stop-loss were the months with the fewest and most transitioning Marines: in April 2003 only 40 enlisted Marines transitioned, but in August 2003 over 4,800 transitioned. When the Marine Corps began increasing its active-duty endstrength to 202K, the number of transitioning Marines decreased: FY08 and FY09 had the fewest enlisted Marines transition to the RC—13,300 and 14,100, respectively. As the Marine Corps reached 202K and began to draw down its efforts in Iraq, the number of transitioning Marines began to increase. In FY11, we observe the greatest number of transitioning Marines since FY08—17,800—an increase of about 33 percent.

Characteristics

How the SelRes PS population looks in terms of demographics and service history is determined by the population of Marines leaving active-duty and by PS recruiting. The population leaving the AC will be affected by changes in both the Marine Corps and the civilian world. During the observed period, the United States was engaged in two wars and went through a major recession. These factors, along with other Marine Corps institutional changes, such as the 202K buildup followed by increased opportunities for Marines to leave the AC before their EAS date (i.e., Voluntary Enlisted Early Release Program (VEERP)), likely affect some populations (e.g., Marines in certain primary military occupational specialties (PMOSs), racial/ethnic groups or families of various sizes) more than others. We will discuss some of the changes in demographic and service characteristics of the transitioning enlisted population.[5]

Geographically, the enlisted population roughly follows trends in the overall U.S. population; most of the population is concentrated in the southern and western regions of the country and less in the northeast [10]. In terms of race and ethnic makeup, the transitioning population became less diverse between FY02 and FY11. Specifically, the breakdown of the transitioning enlisted population was as follows:

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5. We provide a table of mean characteristics for the FY02 and FY11 transitioning PS enlisted cohorts in appendix B.

- 73.0 percent white in FY02 and 82.9 percent in FY11
- 11.0 percent black in FY02 and only 6.8 percent in FY11
- 15.2 percent Hispanic in FY02 and 12.6 percent in FY11

In general, these patterns follow past research [3], which found that blacks and Hispanics are less likely to separate from the AC at EAS.

In terms of education level, the FY11 transitioning enlisted population had more non-high-school-diploma-graduates (non-HSDGs) than the FY02 cohort. The percentage of Tier I Marines (HSDGs) decreased from 93.4 to 91.8 percent, while the percentage of Marines with other Tier II credentials (adult education diplomas or one semester of college) increased from 2.4 to 3.8 percent, and the percentage of Tier II and Tier III (non-HSDGs) increased from 2.6 to 2.8 percent. The education benefits associated with affiliating with the SelRes (i.e., tuition assistance) may provide an incentive to Marines with lower education credentials to affiliate with a SelRes unit after transitioning from the AC.

Some Marines may leave the AC in order to spend more time with their families. More Marines with dependents transitioned in FY11 than in FY02. The percentage of transitioning enlisted Marines with dependents was 39.9 percent in FY02 and 42.3 percent in FY11. As more Marines were deployed over this period—96 percent had never deployed for combat reasons in FY02 compared with 26.5 percent in FY11—transitioning from the AC to RC may be a way for Marines to reduce the stress on their families. For these Marines, SelRes affiliation would provide access to health care benefits and an opportunity to transfer post-9/11 GI Bill benefits to their dependents.

Throughout this report, we use two measures of Marine "quality": high quality and gold standard (GS). High-quality enlisted Marines are those with a Tier I education credential and an Armed Forces Qualification Test (AFQT) score of 50 or higher. GS is a quality measure we adopted from [11], which looks at managing chronically short (CS) and high-demand/low-density (HD/LD) PMOSs. GS Marines are eligible for any CS and HD/LD specialties, and they are defined, in part, by their Armed Services Vocational Aptitude Battery (ASVAB) scores and by having at least a high school diploma, a class

1 Physical Fitness Test (PFT) score, no record of non-judicial punish-ments (NJPs) or courts-martial, and no drug, felony, or serious enlist-ment waivers [11].[6]

Overall, roughly two-thirds of all transitioning enlisted Marines were high-quality recruits, and the percentage of high-quality Marines transitioning to the RC was relatively constant between FY02 and FY11. The proportion of GS enlisted Marines, however, increased over the period. In FY02, 5.1 percent of the transitioning enlisted population were GS Marines, compared with 8.5 percent in FY11. Figure 3 tracks the proportion of transitioning Marines who are GS (by month) from October 2001 to September 2011.

Figure 3.   Percentage of transitioning enlisted Marines who were GS,[a] Oct. 2001 to Sep. 2011[b]
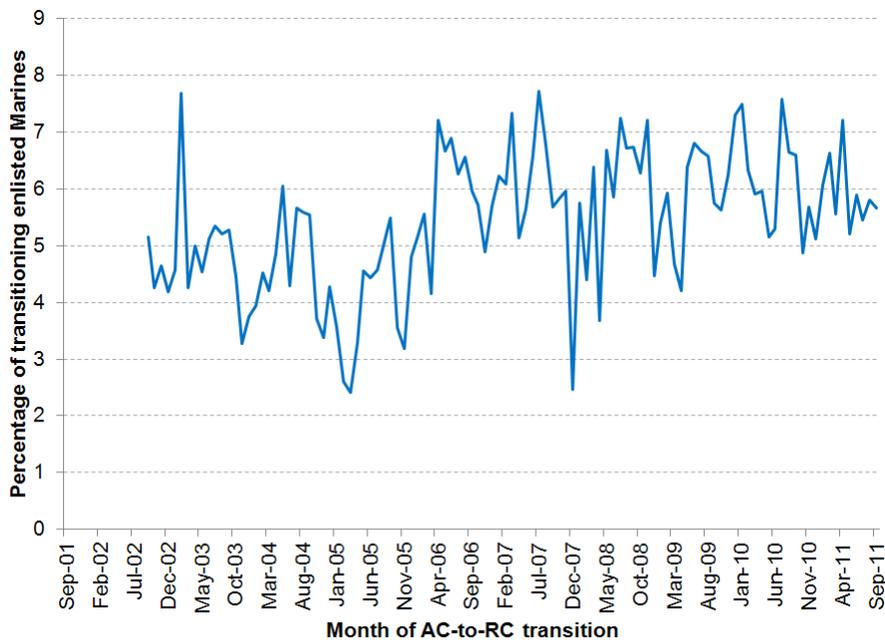
a. GS designation is not possible if PFT or ASVAB scores are unavailable. Between Oct. 2001 and May 2002, PFT scores are missing for all transitioning enlisted Marines.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011, merged with data from MCRISS.

6.   GS Marines have ASVAB scores that include a general technical score of 110 or better, a mechanical maintenance score of 105 or better, and an electronics score of 115 or better. The prevalence of waivers among enlisted Marines limits the number of GS Marines.

Marine Corps policies have also affected the transitioning enlisted population. Examination of separation codes reveals that the majority of the transitioning enlisted population had reached their EAS date. Over 99 percent of transitioning enlisted Marines in FY02 left the AC at their EAS date; however, this was the case for only 80 percent of the FY11 population. Although it appears that fewer Marines transitioned at EAS in FY11 than in FY02, that is not the case: the remaining 20 percent of the population transitioned from active duty early as part of the VEERP, which allows Marines to separate up to 90 days before their EAS dates [12, 13, 14].[7]

One effect of the VEERP program is that the FY11 transitioning enlisted population was of lower rank, on average, than the FY02 cohort. Between FY02 and FY11, the percentage of lance corporals increased from 13.5 to 20.6 percent, and the percentage of corporals increased from 52.8 to 63.6 percent. The percentage of sergeants in the transitioning enlisted population, however, decreased from 30.7 to 13.4 percent—a 56.4-percent decline—the largest change of any of the grades.

Lastly, in table 2, we show the five most-represented occupational fields (occfields) among transitioning enlisted Marines between FY02 and FY11.[8] Infantry Marines represent one-quarter of all transitioning Marines over the 10-year period. Furthermore, infantry Marines represent the greatest percentage of transitioning enlisted Marines each month between October 2001 and September 2011. This is not surprising, given that infantry is the largest occfield in the Marine Corps. The next largest occfield represented was motor transport (9.5 percent), followed by communications (7.9 percent), engineer, construction, facilities, and equipment (6.0 percent), and personnel and administration (4.9 percent). Together, these are also the most prevalent active-duty occfields.

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7.   The Voluntary Enlisted Early Release Program is a cost-saving initiative that supports force-shaping, sustaining the 202,000 endstrength within the constraints of the Marine Corps' yearly personnel budgets. Marines released under VEERP are not exempt from completing their MSOs per their service contracts [12, 13, 14].

8.   These trends are true for all fiscal years.

Table 2. Five most-represented occupational fields for transitioning enlisted Marines, Oct. 2001 to Sep. 2011[a]

Occfield	Percentage of transitioning Marines
03XX: Infantry	25.0
35XX: Motor Transport	9.5
06XX: Communications	7.9
13XX: Engineer, Construction, Facilities, and Equipment	6.0
01XX: Personnel and Administration	4.9

a. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

Transitioning officers

Population trends

Figure 4 shows the monthly number of officers who separated from active duty between October 2001 and September 2011. The blue line charts the total number of officer losses each month; the red line indicates those who were scrolled into the RC. Between FY02 and FY11, over 12,000 officers left active duty. About 5,300 of these officers transitioned to the RC and were eligible to affiliate with the SelRes.[9]

Officer loss patterns are similar to those for enlisted Marines: most officers transition between June and September, again corresponding to the months when recruiting numbers are highest. In addition, the number of officers leaving active duty and entering the RC was lowest in April 2003 at the start of the forcewide stop-loss order; only 5 of 26 losses entered the RC. After stop-loss ended, the number of transitioning PS officers increased. In September 2003, there were 190 total officer losses, of which 110 transitioned to the RC. We observe the greatest total number of transitioning officers in FY04. Notably, between FY04 and FY10, the annual number of recruitable PS officers

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9. From FY02 to FY11, 4,900 transitioning officers retired, another 1,900 left active-duty and did not transition to the RC, 170 died, 970 resigned their commissions, and 800 left for other reasons not in the data.

decreased by 30 percent (from 650 to 460). In FY11, the size of the recruitable PS officer population increased to 540.

Figure 4.   Number of officers who left active duty, by month, Oct. 2001 to Sep. 2011[a]
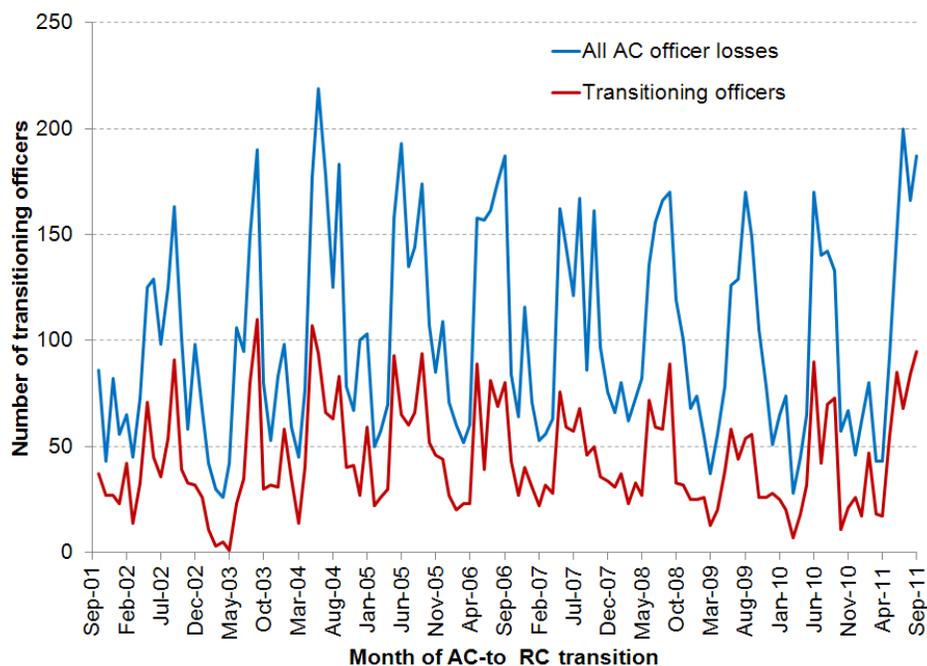
a. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

Characteristics

As was the case for the transitioning enlisted population, the characteristics of the transitioning officer population changed between FY02 and FY11.[10] In some ways, the officer population changed in similar ways to the enlisted population. For example, the average level of education fell in both populations. Specially among officers, the percentage with graduate or professional degrees fell from 8.4 percent in FY02 to 5.2 percent in FY11.

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10. We provide a table of mean characteristics for the FY02 and FY11 transitioning officer cohorts in appendix B.

Unlike the enlisted population, the FY11 transitioning officer population is no more or less white than the FY02 population; however, there was a shift in the racial minority mix from black to other minority races. In FY02 6.8 percent of transitioning officers were black and 1.6 percent were another minority race, but in FY11 the respective percentages were 6.9 and 5.5 percent. There was also a change in the family composition of transitioning officers over the period. The percentage of officers transitioning with dependents fell between FY02 and FY11. In FY02 almost 55 percent of transitioning officers had dependents, but in FY11 only 44 percent had dependents. This is the opposite of what happened among enlisted Marines.

In some cases the changes in the officer population were similar to those in the enlisted population. For example, both populations, the FY11 transitioning cohort had fewer years of service and lower rank on average than the FY02 population. For officers, the percentage of first lieutenants increased from 29.8 to 41.4 percent in FY11, while the proportion of captains decreased from 59.2 in FY02 to 52.6 percent in FY11. Variations in the proportion of officers who transition at the rank of first lieutenant and captain are influenced, in part, by the Marine Corps' career designation policy in a given year. Career designation is a force-shaping tool that allows the Marine Corps to manage the officer population by retaining the best qualified officers from each year group. Those selected for career designation are offered the opportunity to remain on active duty.[11]

Officers holding the grade of major experienced the largest change between FY02 and FY11 in percentage terms. The percentage of majors decreased from 10.6 percent in FY02 to 5.3 percent in FY11—a decrease of 50 percent.

Although the average rank of officers transitioning from the AC decreased, their combat experience increased over the period. In FY02, less than 2 percent of officers who transitioned had not been deployed for combat reasons; however, in FY11, over 90 percent of officers had been deployed.

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11. An officer's first career designation opportunity coincides with the first time the officer is in zone for the captain promotion board.

Turning to quality measures, we adapted the gold standard enlisted definition to the transitioning officer population. The main difference in definitions is that GS officers are restricted by their general classification test (GCT) scores: GS officers score 125 or better.[12] Overall, 19.2 percent of transitioning officers were GS officers. We show GS officers as a percentage of the transitioning officer population by month in figure 5.

Figure 5.   The percentage of transitioning officers who were GS,[a] Oct. 2001 to Sep. 2011[b]
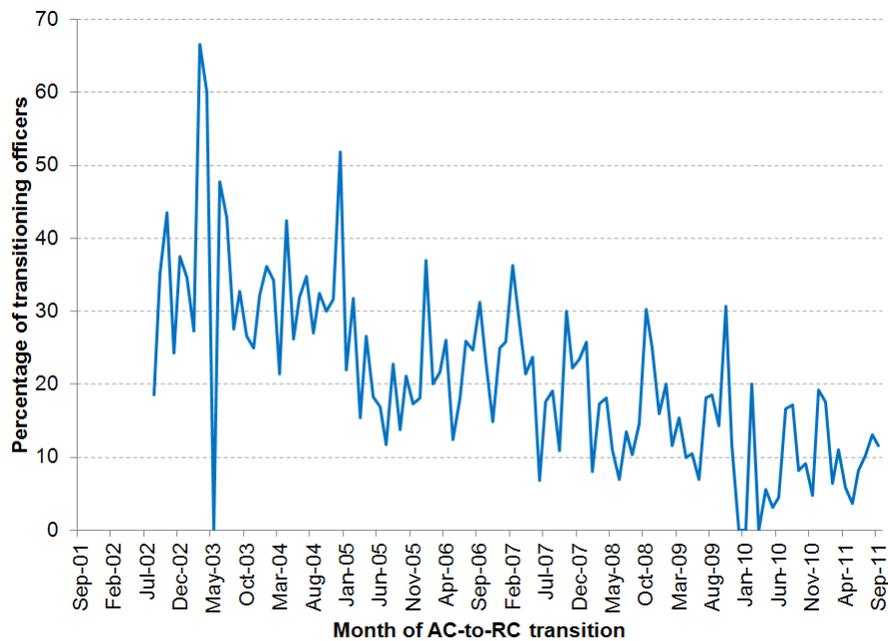
a. GS designation is not possible if PFT scores are unavailable. Between October 2001 and May 2002, PFT scores were missing for all transitioning officers.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011, merged with MCRISS data.

Between FY02 and FY11, the percentage of GS transitioning officers steadily fell from 38.6 to 14.7 percent. The component of the GS definition driving this trend is an increase in the number of officers with

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12. Gold standard, as defined in [11], applies to enlisted Marines only. We modified the test score qualification to be able to apply it to officers.

drug, felony, or serious waivers. The poor economy and the 202K buildup in the last few years of the observation period may have contributed to the decline in the number of GS officers transitioning from the AC.

Table 3 shows the five most-represented occfields among transitioning officers between FY02 and FY11. Together, these occfields make up roughly 60 percent of the transitioning officer population over the period. Infantry tops the list, with 17.7 percent of transitioning officers. The next largest occfields were pilots/naval flight officers (12.2 percent), logistics (11.7 percent), intelligence (10.3 percent), and communications (8.4 percent). These five occfields were the five most-represented in each fiscal year except FY07 and FY08, when field artillery replaced communications.[13]

Table 3.   Five most-represented occfields for transitioning officers, Oct. 2001 to Sep. 2011[a]

Occfield	Percentage of transitioning officers
03XX: Infantry	17.7
75XX: Pilots/naval flight officers	12.2
04XX: Logistics	11.7
02XX: Intelligence	10.3
06XX: Communications	8.4

a. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

Summary

Between October 2001 and September 2011, approximately 160,000 enlisted Marines and 5,300 Marine officers who left active duty were eligible for SelRes (SMCR or IMA) duty.

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13. Over the 10-year period, field artillery was the 6th largest occfield among transitioning officers.

Many of the characteristics of the transitioning enlisted population have changed over time. We find that transitioning enlisted Marines at the end of the FY02–FY11 period were less racially diverse and had more combat experience. Over the period, more lance corporals and corporals, and fewer enlisted Marines of the rank of sergeant and higher, transitioned to the RC. In terms of quality, we find that the FY11 enlisted experienced changes at both ends of the spectrum: the FY11 cohort had a higher percentage with lower education credentials compared with the FY02 cohort and a higher percentage of both high-quality recruits and GS Marines.

The transitioning officer population also changed between FY02 and FY11. We find that transitioning officers at the end of the period were less likely to be black or to have dependents than officers at the beginning of the period. In terms of their service characteristics, the number of GS officers transitioning from the AC fell over the period, and the FY11 transitioning officer population had a smaller proportion of captains—but more first lieutenants and majors—and more combat experience on average than the FY02 population.

In the next section, we continue to focus on the transitioning population and analyze the decision to affiliate with an SMCR unit or as an IMA.

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Trends in PS SelRes affiliation

In the previous section, we identified the transitioning population eligible to join an SMCR unit or fill an IMA billet. Here, we first examine the rate at which these transitioning Marines affiliated with the SelRes over time as well as the time a Marine spent in the IRR prior to affiliation. Then, we describe and estimate a model that relates a Marine's characteristics to his or her SelRes affiliation decision.

The SelRes affiliation rate

Between October 2001 and September 2011, 8.5 percent of transitioning enlisted Marines and 43.4 percent of transitioning officers affiliated with SMCR units or IMA billets. In figure 6, we show the affiliation rate by fiscal year of transition for enlisted Marines and Marine officers eligible for SelRes duty between those dates.

Between FY02 and FY09, the enlisted SelRes affiliation rate was lowest in FY04 at 7.2 percent and highest in FY06 at 10.8 percent.[14] The difference between the FY04 and FY06 cohorts could be the effect of the events of 9/11. The FY06 transitioning cohort would have been the first cohort to enlist after 9/11. For the post-9/11 cohorts (FY06 through FY09), roughly 10 percent of each cohort of transitioning enlisted Marines affiliated with the SelRes.

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14. Although the figure shows a decreasing rate of affiliation for the FY10 and FY11 cohorts (7.7 and 3.1 percent, respectively), part of the decrease is driven by the fact that our observation period ends in September 2011, so our calculations do not take into account Marines who affiliated with the SelRes after September 2011. As we will show in our examination of the time it takes to affiliate, most affiliating Marines do not do so immediately upon transition. This implies that we are significantly less likely to observe a Marine affiliating with the SelRes the less time we observe him or her. This results in the underestimation of the affiliation rate for transitioning cohorts at the end of our sample period.

Figure 6.   SelRes PS affiliation rate,[a] enlisted Marines and officers, Oct. 2001 to Sep. 2011[b]
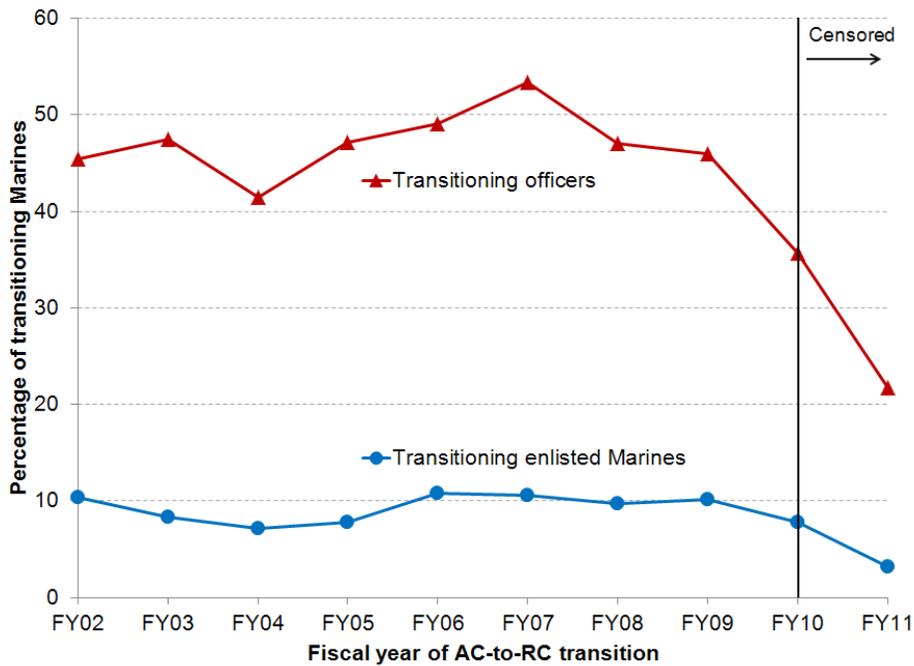
a. The affiliation rates for FY10 and FY11 underestimate the true enlisted and officer affiliation rates because we do not observe Marines who affiliated with the SelRes after Sep. 2011.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

The officer SelRes affiliation rate follows a similar trend to that of the enlisted affiliation rate between FY02 and FY09. The officer affiliation rate was lowest in FY04 at 41.5 percent.[15] The officer affiliation rate has a similar spike up between the pre- and post-9/11 cohorts: After FY04, the officer affiliation rate increased to 53.3 percent for the FY07 cohort. However, unlike the enlisted affiliation rate, which has been relatively stable since FY06, the officer affiliation decreased in the last few years of the period. Multiple factors could be contributing to the decline in the affiliation rate, including a shrinking transitioning officer population with the start of the 202,000 endstrength buildup and the poor economy.

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15. As we described for the enlisted population, the officer affiliation rates calculated for cohorts near the end of our sample period are underestimated as a result of our data being right-censored.

In figures 7, 8, and 9, we illustrate how the affiliation rate differs across education level, GS status, and occupation. Each figure shows the SelRes affiliation rate for a transitioning cohort of enlisted Marines or officers with the designated characteristic.

Figure 7. SelRes PS affiliation rates[a] by education level,[b] enlisted Marines and officers, Oct. 2001 to Sep. 2011[c]
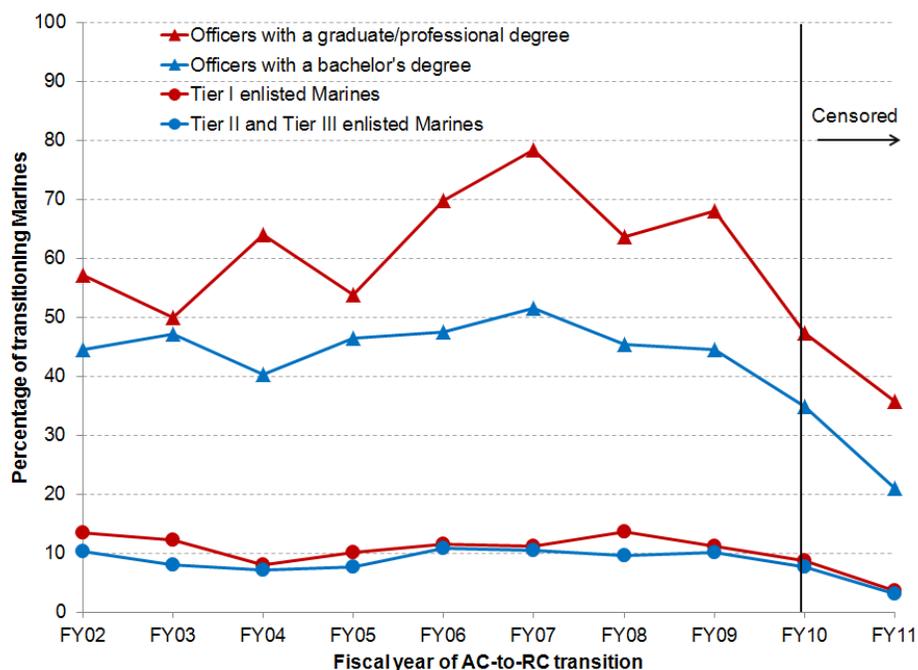
a. The affiliation rates for FY10 and FY11 underestimate the true enlisted and officer affiliation rates because we do not observe Marines who affiliated with the SelRes after Sep. 2011.
b. Tier I includes Marines with at least a high school diploma, with one semester of college, or with an adult education diploma. Tier II Marines are those with a correspondence diploma, GED, home study degree, or other non-traditional high-school-equivalent degree. Tier III Marines are those without a high school credential.
c. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

In figure 7, we see that, for both enlisted Marines and officers, the affiliation rate is higher among those with more education. Between October 2001 and September 2011, 9.8 percent of Tier I enlisted Marines affiliated with the SelRes, compared with 8.4 percent of Tier II and Tier III Marines. Among transitioning officers, 59.6 percent of those with a graduate or professional degree affiliated compared with 42.2 percent of officers with a bachelor's degree. These trends sug-

gest that Marines who are motivated to attain a higher level of education also are more likely to be motivated to continue their Marine Corps career as a reservist. These trends also indicate that there may be an opportunity for the Marine Corps to encourage PS Marines to affiliate in order to be eligible for education benefits.

In figure 8, we compare the affiliation rates of GS and non-GS transitioning Marines. The rate for GS Marines is higher in both the enlisted and the officer populations. Among transitioning enlisted Marines, overall, 9.9 percent of GS Marines affiliated with SMCR units or IMA billets, compared with 8.4 percent of non-GS Marines.[16] The difference between the GS and non-GS enlisted Marine affiliation rates ranged from 0.4 percentage point in FY09 to 4.0 percentage points in FY06.

Figure 8. SelRes PS affiliation rates[a] by gold standard (GS) status, enlisted Marines and officers, Oct. 2001 to Sep 2011[b]
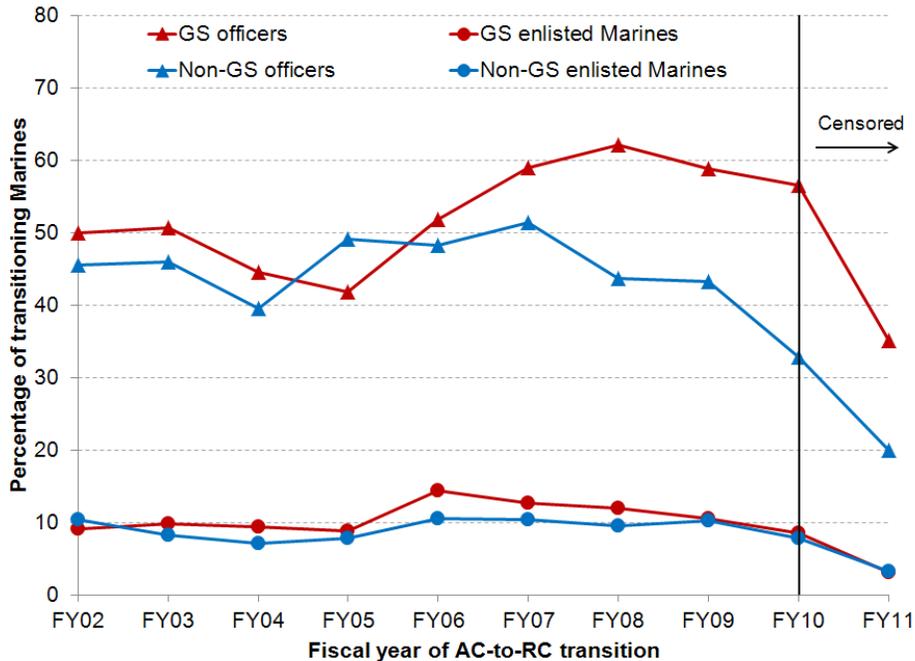
a. The affiliation rates for FY10 and FY11 underestimate the true enlisted and officer affiliation rates because we do not observe Marines who affiliated with the SelRes after Sep. 2011.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

16. These means are statistically different at the 1-percent level.

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Among transitioning officers, overall, 50.3 percent of GS officers affiliated with the SelRes compared with 41.4 percent of non-GS officers.[17] With the exception of the FY05 cohort, the affiliation rate of GS officers was greater than the affiliation rate of non-GS officers, with the gap between the GS and non-GS officer affiliation rate increasing over the period from 4.5 percentage points in FY02 to 15.5 percentage points in FY09. GS Marines may affiliate at higher rates than no-GS Marines for a number of reasons which may include being targeted for recruitment or being more motivated or committed to stay involved with the Marine Corps.

Lastly, in figure 9, we compare the affiliation rates of transitioning Marines by military occupation. We group Marines into three occupational categories: aviation, combat arms, and combat/service support.[18] Among transitioning enlisted Marines, the overall SelRes affiliation rate is highest among those in support roles (9.8 percent), followed by those in combat arms (7.7 percent), and finally, aviation (5.7 percent).

The pattern is different among transitioning officers: the affiliation rate is highest among those in aviation (51.6 percent), followed by combat support (43.8 percent), and finally, combat arms (36.6 percent). One should keep in mind, however, that, relative to combat arms and combat support, aviation officers make up 20 percent of the transitioning officer population each fiscal year, so large percentage point changes reflect small level changes.

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17. The large differences in the officer affiliation rates are partly due to small sample size. On average, only 500 officers transition from the AC each fiscal year.

18. Aviation includes occfields 60XX through 75XX; combat arms includes occfields 03XX, 08XX, and 18XX; and combat and service support includes all other occfields.

Figure 9.   Percentage of transitioning Marines who affiliated with the SelRes by occupation,[a] enlisted Marines and officers, Oct. 2001 to Sep. 2011[b]
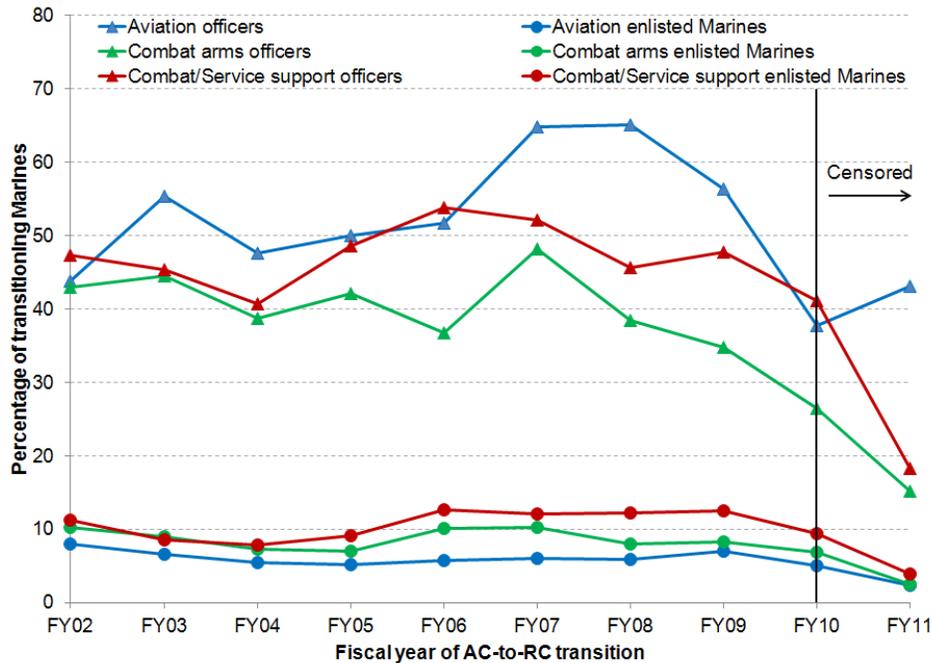
a. The affiliation rates for FY10 and FY11 underestimate the true enlisted and officer affiliation rates because we do not observe Marines who affiliated with the SelRes after Sep. 2011.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

Time to affiliation

In this subsection, we examine how long it takes a Marine to affiliate with the SelRes after transitioning from active duty. On separation from the AC, a Marine with time remaining on his or her MSO goes into the IRR and remains there until affiliating with the SelRes or until reaching the end of his or her service contract.[19]

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19. For example, assume that three Marines transitioned in June 2006. One Marine affiliated with the SelRes in December 2006, so he or she spent six months in the IRR. The second Marine affiliated within the same month, so he or she spent less than one month in the IRR. The third Marine never affiliated and left the sample in July 2006, so he or she spent one month in the IRR.

We begin by looking at how time-to-affiliation has changed over time. Figure 10 shows the percentages of PS enlisted Marines and officers who affiliated with an SMCR unit or IMA billet within one year of transitioning to the RC. The trends are similar for both—a decline in the percentage followed by a rise. For enlisted Marines, the cohort with the smallest percentage affiliating within one year is FY06 (37 percent). This cohort would have entered the Marine Corps roughly four years earlier in FY02—right after 9/11. For officers, the FY05 cohort has the smallest percentage (44 percent) who affiliate with the SelRes; this cohort entered in FY01, before 9/11. The change in affiliation behavior appears to be tied to the events of 9/11 and the start of OEF and OIF. The FY09 cohort has the highest percentage of PS Marines who affiliated with the SelRes within a year of transition: 65 percent of enlisted and 78 percent of officers.

Figure 10. Percentage of affiliating Marines who took one year or less to affiliate with the SelRes, transitioning enlisted Marines and Marine officer,[a] Oct. 2001 to Sep. 2011[b]
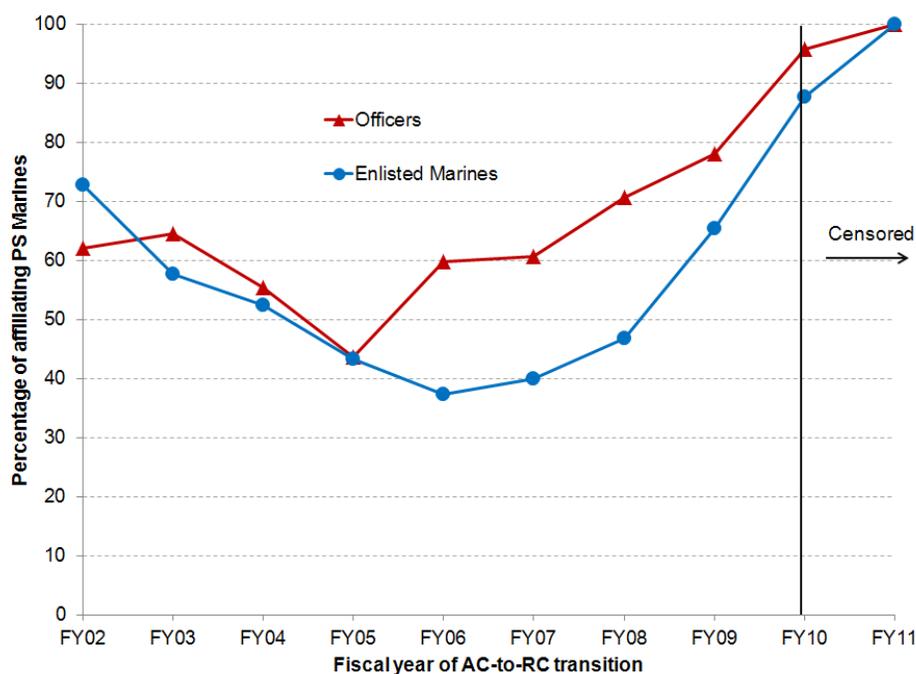
a. Because we observe Marines who transitioned in FY11 only through September 2011, all affiliating Marines from the FY11 cohort must have done so within one year.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

We examine time-to-affiliation by enlisted rank in figure 11. Overall, 57 percent of affiliating enlisted Marines did so within a year of transition and 21 percent took over two years. Average time-to-affiliation is longest for corporals and shortest for staff sergeants and gunnery sergeants. More specifically, the ranks differ in the percentages that affiliate after one month and two or more years from transition. For example, 20 percent of lance corporals affiliated within one month of transition, while 9 percent of corporals, 17 percent of sergeants, and 52 percent of staff sergeants and gunnery sergeants did so. These findings suggest that higher ranking Marines may think about SelRes affiliation sooner, perhaps while still in the AC, than lower ranking Marines—perhaps because they are more mature and tend to plan for the future more, considering such benefits as health insurance, education benefits, or earning "good years" for retirement eligibility.

Figure 11. Months affiliating enlisted Marines[a] spent in the IRR prior to SelRes affiliation, by paygrade, Oct. 2001 to Sep. 2011[b]
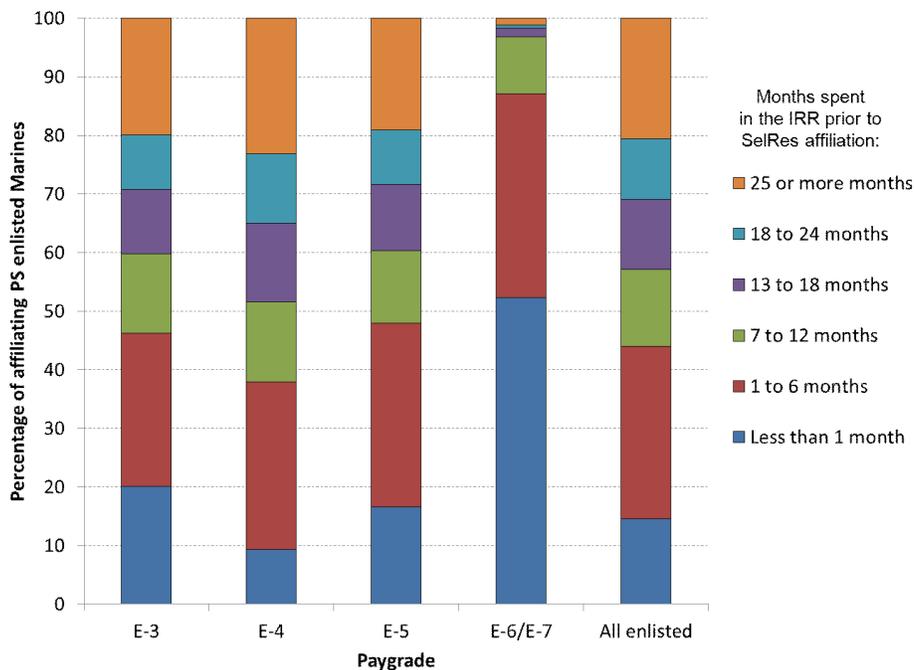
a. In our model, we include transitioning E-1s and E-2s, but we exclude them here because only 58 affiliated with the SelRes over the 10-year period.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.

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Looking at time-to-affiliation for officers, we find that over 65 percent spent less than one year in the IRR, and 17 percent took two or more years to affiliate with an SMCR unit or an IMA billet (see figure 12). In general, time-to-affiliation decreases continuously across officer ranks. Among majors and lieutenant colonels who affiliated with the SelRes, 39 percent affiliated in the same month of transition and 10 percent took over two years to affiliate. Among captains, 20 percent affiliated in the same month in which they transitioned, 34 percent affiliated within one to six months, and 13 percent affiliated between seven months and one year of transition. Overall, second and first lieutenants have similar time-to-affiliation patterns as captains, except that a smaller proportion of captains affiliated within one to six months (24 percent compared to 34 percent).

Figure 12. Months affiliating officers spent in the IRR prior to SelRes affiliation, by paygrade, Oct. 2001 to Sep. 2011[a]
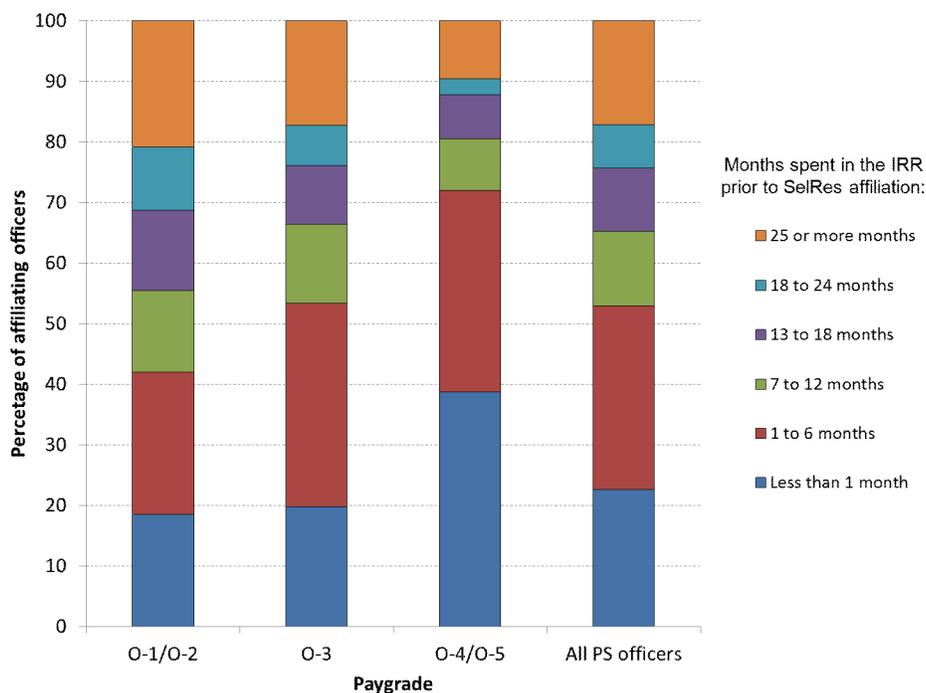
Lastly, we examine the relationship between time observed in the IRR and the likelihood of affiliating with an SMCR unit or IMA billet. Figure 13 plots the SelRes affiliation rate as a function of the number of months observed in the IRR. This "affiliation curve" shows that the more months a Marine spends in the IRR, the less likely he or she is to affiliate with the SelRes. For enlisted Marines, the likelihood of affiliation is highest within the first 3 months after transition. Then it steadily falls until about 12 months after transition and increases around 16 months, before steadily declining to almost zero likelihood of SelRes affiliation by 44 months. We observe a similar pattern among officers: the likelihood of officer affiliation is greatest during the first 6 months after transition, dips after a year, increases at 16 months, and steadily falls after 18 months in the IRR. It is possible that PS Marines' propensity to affiliate increases at 18 months in the IRR; alternatively, the spike could be driven by PS recruiters if they tend to target PS Marines around this time.

Figure 13. The percentage of transitioning Marines who affiliated with the SelRes as a function of time in the IRR, enlisted Marines and officers, Oct. 2001 to Sep. 2011[a]
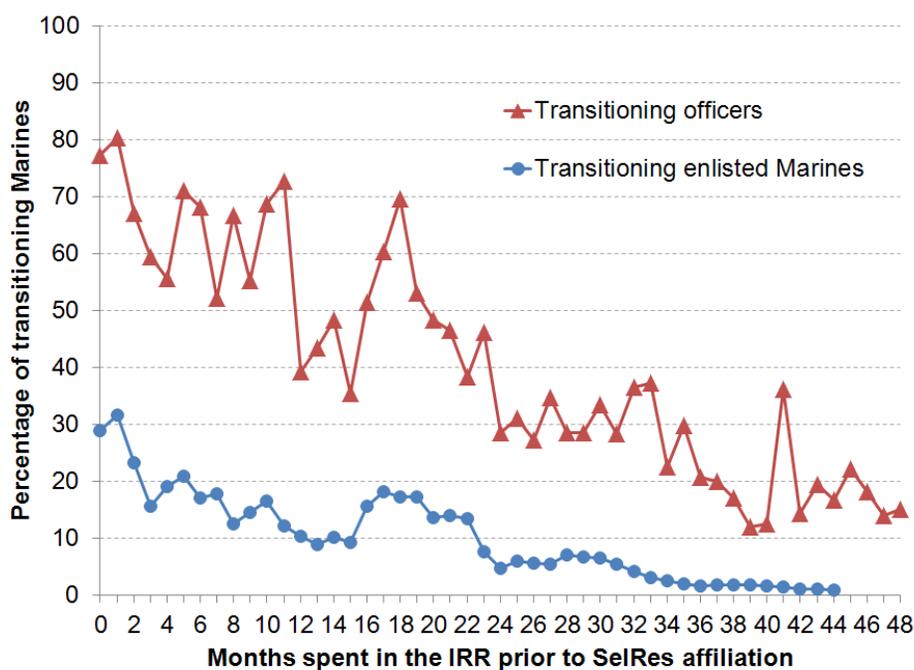
Summary

In this section we looked at trends in the SelRes affiliation rate between FY02 and FY11. During this period, 8.5 percent of enlisted Marines and 43.4 percent of officers who transitioned from active-duty affiliated with an SMCR unit or as an IMA. Affiliation rates are higher among more educated and gold standard Marines. Also, we find that affiliation rates are highest in the first 12 months after a Marine transitioned. Since FY05, the percentage of PS enlisted Marines and PS officers who affiliated within one year of transition has been increasing.

Our next step is to model the SelRes affiliation decision to see if the overall trends that we observe in affiliation rates exist after controlling for other Marine and environmental characteristics. We describe our modeling techniques in the next section.

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Modeling the SelRes affiliation decision

To be able to effectively and efficiently recruit prior-service Marines to SMCR units and IMA billets, it is important for the Marine Corps to understand the factors that influence Marines' affiliation decisions. These factors include the impact of individual Marine traits, including demographic characteristics (e.g., gender, race, and education), service characteristics (e.g., rank and quality), and activation/deployment history.

Up to this point, our analysis of SelRes affiliation behavior has included simple comparisons of the average affiliation rate for Marines with different characteristics. Although this type of analysis provides insight into the relationship between SelRes affiliation and a Marine's characteristics, it does not account for other factors that may influence *both* affiliation behavior *and* the Marine's characteristics. To isolate the effect of a specific characteristic (e.g., education or rank) on the decision to affiliate, we need to use a statistical model that allows us to control for other factors that also may affect the decision to affiliate. Since the likelihood of SelRes affiliation is a function of *both* observed characteristics *and* time spent in the IRR after transition (as previously shown in figure 13), we use survival analysis techniques to estimate the relative effect of Marines' characteristics on the SelRes affiliation decision.[20]

In the context of our study, survival analysis techniques allow us to model the likelihood that a particular Marine will affiliate with an SMCR unit or an IMA billet, given that other Marines *at the same point* in their reserve careers have not affiliated.[21] Our models estimate the effects of the following on the likelihood of affiliating with the SelRes:

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20. We provide background and a description of survival analysis methods in appendix C.

21. We describe the SelRes affiliation model and variables in appendix D.

- Marines' demographic and service characteristics, such as race, ethnicity, education credential, number of dependents, and rank

- Marines' service histories, such as months deployed for combat reasons while in the AC and months activated while in the IRR

- Environmental factors, such as the state unemployment rate

All of our models also include trimester indicators to control for when a Marine transitioned from the AC. These trimester fixed effects control for factors that are common to all Marines in a transition-cohort (i.e., the 202K buildup and the start of OEF and OIF). The trimester effects will estimate how the relative likelihood of affiliation has changed from cohort to cohort over the course of the period.

The next two sections discuss the results from estimating our affiliation models with the transitioning PS enlisted and PS officer populations, respectively.

The relative likelihood of affiliation among PS enlisted Marines

We begin by looking at the results from estimating our affiliation model using the transitioning enlisted population. In figure 14, we provide a subset of estimated hazard ratios for selected characteristics for transitioning Marines, civilian state unemployment rates, and the SelRes PS activation rate.[22] For the categorical variables, the hazard ratio for the comparison group is set to 1.0 and is represented with a black bar. A hazard ratio statistically greater than 1 (p-value of 0.10 or less) implies a higher relative likelihood to affiliate, while a hazard ratio statistically smaller than 1 implies a lower relative likelihood to affiliate. The hazard ratio associated with continuous variables (i.e., state unemployment rate and SelRes PS activation rate) represents the relative difference in the likelihood of SelRes affiliation for a one-unit change in the variable (e.g., a 1-percentage-point increase in the unemployment rate).

In the remainder of this section, we discuss our findings and provide recommendations on how the Marine Corps may use this information. We divide our discussion of our results into three subsections, looking at the effects of the following:

1. Demographic and service characteristics

2. Operational tempo

3. Changing environmental factors

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22. Full estimation results are available in appendix E.

Figure 14. The relative likelihood of SelRes affiliation[a] for PS enlisted Marines,[b] Oct. 2001 to Sep. 2011[c]
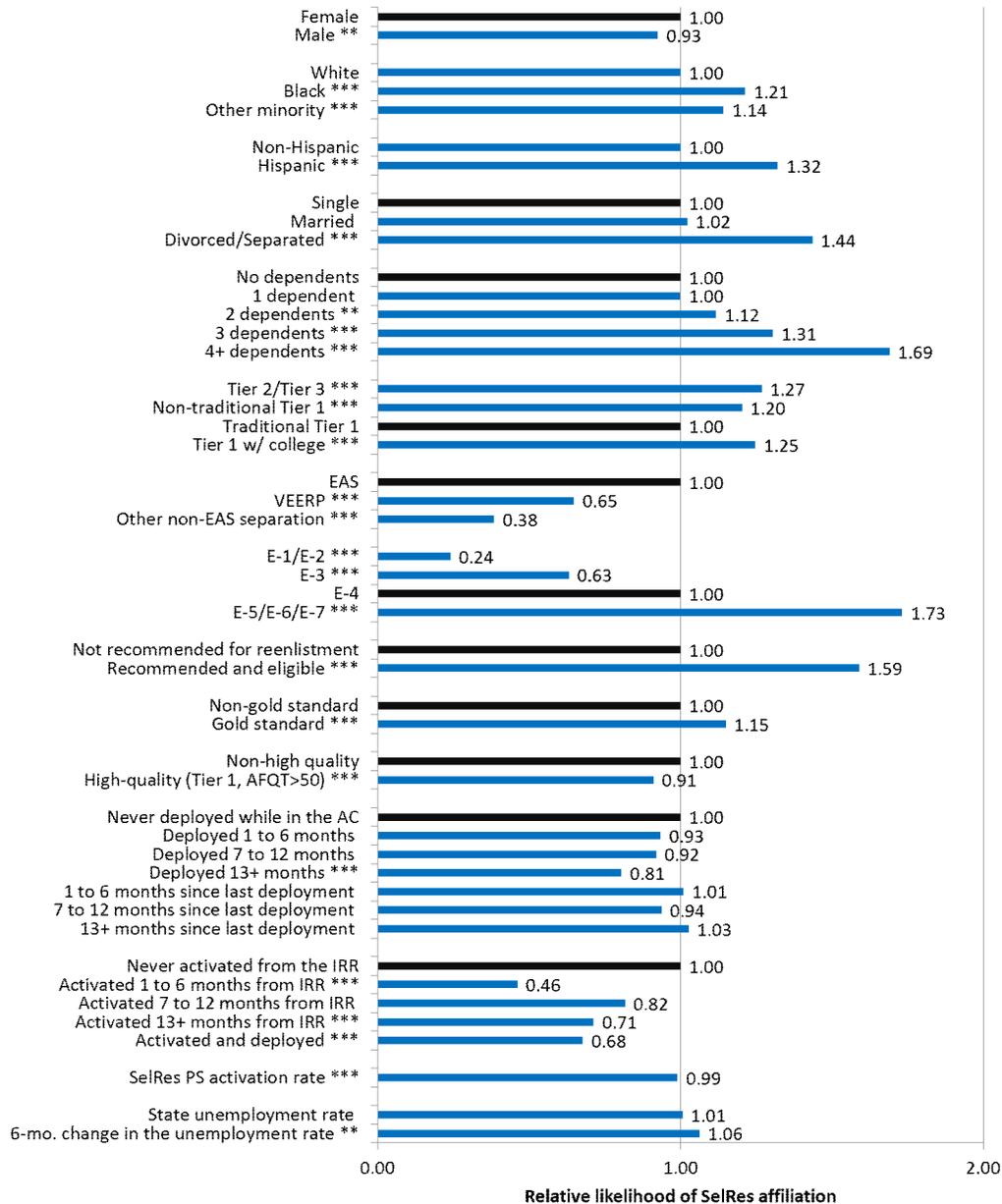
a. Significance levels are denoted as follows: * p-value < 0.1, ** p-value < 0.5, and *** p-value < 0.01.
b. For all categorical variables, the hazard ratio for the comparison group has been set to 1 and is represented with a black bar. The SelRes activation rate and unemployment rate variables are continuous variables, and the hazard ratio represents the percentage change in the likelihood of affiliation for a 1-percentage-point change in the respective variable. See appendix D for full descriptions of the variables included in the model.
c. Source: MCTFS end-of-month snapshots, Oct. 2001 to Sep. 2011, merged with data from MCRISS, the GWOT deployment file, RC CTS, and unemployment data from the BLS.

Effects of demographic and service-related characteristics on affiliation behavior

Our estimates for PS enlisted Marines show that some demographic groups are more likely to affiliate with the SelRes than others. The following is a list of some of the trends in the likelihood of affiliation among PS enlisted Marines:

- Women are more likely to affiliate than men.

- Racial/ethnic minorities are more likely than whites to affiliate.

- Divorcees and Marines with large families are more likely to affiliate than single Marines.

- Marines with other education credentials are more likely to affiliate than traditional high school diploma graduates (HSDGs).

- Higher ranking Marines are more likely to affiliate than lower-ranked Marines.

- GS Marines are more likely to affiliate than non-GS Marines.

In addition to providing more details about the degree to which these groups are more likely to affiliate, we also examine the trends in the likelihood of SelRes affiliation across geographical areas and occfields in the discussion that follows.

Women and minorities more likely to affiliate

Our estimates show that male enlisted Marines are 7 percent less likely than their female counterparts to affiliate with an SMCR unit or IMA billet. Past research has shown that women are more likely than men to separate from the AC at EAS [3]. Combined with our findings, this suggests that perhaps female enlisted Marines prefer to serve on a part-time rather than a full-time basis. For example, female enlisted Marines may wish to serve part-time if they are planning to go back to school or perhaps start families.

Compared with white enlisted Marines, minorities are more likely to affiliate: blacks and other minority Marines are 21 and 14 percent,

respectively, more likely to affiliate than whites. Hispanic Marines are 32 percent more likely than non-Hispanics to affiliate with the SelRes. Because blacks and minorities also have been shown to be more likely to reenlist in the AC [3], our results suggest that minorities prefer to maintain their connection with the Marine Corps even if they chose to leave active duty. Marine Corps leaders, career planners, and prior-service recruiters should be mindful of these behavioral patterns as they educate and counsel active-duty Marines about reserve career options should they decide not to reenlist in the AC.

Divorcees and Marines with large families more likely to affiliate

In terms of family composition, Marines who are divorced or separated are the most likely to affiliate, all else equal. Divorced or separated Marines are 44 percent more likely than single Marines to affiliate. PS enlisted Marines who are divorced may be more likely to join the SelRes because it allows them to regain a sense of camaraderie that they enjoyed while on active duty.

Past research has found that enlisted Marines with dependents are more likely to reenlist than those without dependents [15]. We find a similar pattern for SelRes affiliation. Our estimates show that the probability of affiliating with the SelRes increases with the number of dependents that Marines have. PS enlisted Marines with one dependent at the time of transition are no more likely to affiliate than those without dependents, whereas Marines with two dependents are 12 percent more likely, those with three dependents are 31 percent more likely, and those with four or more dependents are 69 percent more likely to affiliate with the SelRes. Although transitioning Marines have chosen to pursue civilian lives and careers, those with dependents may seek SelRes service for some of the same reasons that those in the AC may seek reenlistment: financial responsibility for their families in terms of income and health benefits as well as the transferability feature of the education benefits of the Post-9/11 GI Bill [16].

Marines with education credentials other than high school diplomas more likely to affiliate

Turning to education, we find that enlisted Marines who are HSDGs are the least likely to affiliate; those with lower education credentials and those with college degrees are more likely to affiliate with the SelRes. We find that nontraditional Tier I Marines are 20 percent more likely than traditional Tier I Marines to affiliate, while Tier II/Tier III Marines are 27 percent more likely than HSDGs. There are a number of reasons why these Marines may be more likely to affiliate. For example, these Marines may still want to serve but may also want to go back to school. As reservists they can do both. Furthermore, reservists can take advantage of Post-9/11 GI Bill education benefits.

We also find that enlisted Marines with college degrees are more likely to affiliate than those with traditional high school diplomas. According to our estimates, college graduates are 25 percent more likely to affiliate than HSDGs. This finding suggests that Marines who are more motivated to earn higher education degrees also may be more motivated to continue to serve in the Marine Corps.

Higher ranking Marines, GS Marines, and those who separated at EAS more likely to affiliate

Our estimates show that the likelihood of affiliating with an SMCR unit or IMA billet increases with a Marine's rank. Relative to corporals, privates and privates first class are 76 percent less likely to affiliate; lance corporals are 37 percent less likely. Sergeants and above are 73 percent more likely than corporals to affiliate with the SelRes. There are three possible reasons why corporals and above are more likely to affiliate. First is the fact that most PS SelRes billet vacancies require these corporals, sergeants, or staff sergeants. Second, under the Post-9/11 GI Bill, Marines who have served at least 10 years may transfer their education benefits to their dependents [16], so higher ranking Marines may affiliate to obtain this benefit. (Reference [16] estimates that this bill's transferability feature could double the SelRes affiliation rate for sergeants and those with more than 6 years of service.) Third, Marines of higher rank who did not retire from

active duty may be attracted to the possibility of earning the reserve retirement benefit.

In terms of quality, Marines who are recommended and eligible for reenlistment are 59 percent more likely to affiliate with the SelRes than Marines with other reenlistment codes. We also find that, relative to non-GS transitioning enlisted Marines, GS Marines are 15 percent more likely to affiliate. However, high-quality Marines—those with a Tier I education credential and an AFQT score of at least 50—are 9 percent less likely to affiliate relative to non-high-quality Marines, holding all else (including GS status) constant.[23] These findings suggest that high-quality enlisted Marines who have the potential to excel in the AC but choose to explore civilian options are more likely to affiliate. The Marine Corps wants its high-quality transitioning Marines to affiliate with reserve units. To have high quality in the SelRes, it is important that the Marine Corps proactively reach out to its high-quality transitioning Marines to provide them with information about reserve opportunities and associated benefits.

Our estimates show that Marines who separate at EAS are the most likely to affiliate. Marines who separated under the VEERP or other separation codes (e.g., pregnancy or financial hardship) are 35 and 62 percent less likely to affiliate relative to those separating at EAS, respectively. Given that VEERP Marines are voluntarily separating early from active duty, it may not be surprising that they are less inclined to join an SMCR unit or an IMA billet, particularly if VEERP Marines tend to be those who are nondeployable or who have committed some type of career-jeopardizing act during their enlistment. As the Marine Corps proceeds with its drawdown efforts in the coming years, reserve manpower planners should be mindful that VEERP Marines may or may not be optimal candidates for reserve affiliation.[24]

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23. All GS Marines are high-quality Marines, but not all high-quality Marines are GS Marines.

24. VEERP is only one of the voluntary force-shaping tools the Marine Corps is planning on using to reduce the AC to 182,100 by FY16 [17].

Effects of operational tempo on affiliation behavior

During times of war, operational tempo increases. That is, more Marines are deployed or activated. We measure operational tempo in three ways: months deployed for combat while in the AC, months activated from the IRR, and the PS SelRes activation rate. More months deployed while on active duty equals higher operational tempo. Likewise, the higher the PS SelRes activation rate—the percentage of PS SelRes enlisted Marines activated in a particular month—the higher the rate of operational tempo. From prior research, we know that active-duty enlisted Marines are less likely to reenlist the more they deployed [15]. If these Marines are leaving because they or their families are tired of the stresses that come along with multiple deployments or activations, we may expect these Marines to be less likely to affiliate with the SelRes, particularly if they believe they may be activated and deployed as a reservist.

AC combat deployments of 13 or more months decrease likelihood of affiliation

Our estimates show that PS enlisted Marines who had been combat deployed for 13 or more months are 19 percent less likely to affiliate with an SMCR unit or IMA billet than Marines who were not deployed. We do not find any significant difference between those who had never been combat deployed and those who deployed for 12 or fewer months, nor do we find an effect of the time between a Marine's last deployment and when he or she transitions on the likelihood to affiliate with the SelRes. Assuming that the Marine Corps would like to see more combat-experienced PS Marines affiliating with SelRes units, unit commanders, career planners, monitors, and PS recruiters will need to emphasize to these Marines that Marine Corps policy provides an activation deferment to PS SMCR Marines for up to 24 months from their date of transition from active duty if they completed a combat tour in the 12 months immediately preceding their EAS date [18].

IRR activations and deployments decrease likelihood of affiliation

Turning to the impact of IRR activations on SelRes affiliation, we find a negative relationship.[25] The negative relationship is strongest for those activated 1 to 6 months; these Marines are 54 percent less likely to affiliate than those who were never activated, whereas those who were activated for 13 or more months are 29 percent less likely to affiliate.[26] Marines whose IRR activations included a deployment are 32 percent less likely to affiliate than those who were never activated. Although we do not know whether the activations we observe in our data were voluntary, we propose several possible reasons why IRR Marines activated from the IRR are less likely to affiliate. On one hand, activations and deployments may cause stress in a Marine's life, particularly if the event was involuntary and interrupts his or her transition to civilian life. On the other hand, it may also be the case that the IRR Marine volunteers for activation, preferring to find opportunities that work best for him or her versus affiliating with a SelRes unit.

High rates of SelRes activations decrease likelihood of affiliation

Finally, we look at the relationship between the PS enlisted SelRes activation rate when a Marine transitioned from the AC and affiliation. If one of the reasons a Marine is leaving the AC is to take a break from deploying, we might expect a Marine to be less inclined to seek SelRes service if he or she observes the Marine Corps activating Marines from the SelRes in relatively high numbers. Our estimates show that when the PS enlisted SelRes activation rate increases by 1 percentage point, the likelihood of affiliation falls by 1 percent on average.[27] This estimate suggests that activation is not why Marines seek SelRes affiliation. Indeed, in [1], we find that PS Marines who are affiliated with their unit for at least 12 months before activation

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25. As previously noted, we cannot determine whether an activation was voluntary or involuntary.

26. Although the estimate for those activated 7 to 12 months is less than 1, it is not statistically significant.

27. One percent translates to about 13 Marines per fiscal year.

are more likely to stay in the SelRes once deactivated. These findings suggest that other factors, such as unit cohesion, are important considerations as well.

Effects of environmental factors on SelRes affiliation behavior

Our estimates of the effect of state unemployment rates and the trimester in which PS enlisted Marines transitioned from the AC provide some insight into how SelRes affiliation behavior changes with the U.S. economy and war. Overall, we find that the unemployment rate negatively affects affiliation and that the likelihood of affiliation was higher for cohorts that transitioned at the end of the period than for those at the beginning. These results are discussed in more detail on the next two pages.

Increasing unemployment rates decrease likelihood of affiliation

Although, we find that the unemployment rate at the time of transition has no statistical impact on the likelihood of SelRes affiliation for enlisted Marines, we do find that a *change* in the unemployment rate in the six months before AC-to-RC transition has an effect on affiliation behavior. According to our estimates, a 1-percentage-point increase in the unemployment rate in the six months before transitioning increases the likelihood of SelRes affiliation by 6 percent. Our estimates suggest that the trend in the unemployment rate carries more weight than the current unemployment rate in a Marine's decision to affiliate. This implies (a) that enlisted Marines are thinking about SelRes affiliation before separating from the AC and (b) that PS recruiting for the SelRes should begin prior to a Marine's EAS date. These findings support continuing the outreach activities that Reserve Affairs has implemented in the past few years, which provide Marines with information about reserve opportunities during career-counseling activities, such as Manpower Management Enlisted Assignments (MMEA) and Manpower Management Officer Assignments (MMOA) road shows.

Post-9/11 enlisted cohorts are more likely to affiliate than pre-9/11 cohorts

To illustrate how affiliation behavior has changed over time, we present the estimated relative likelihood of affiliation for each of our trimester cohorts in figure 15. The figure shows how the likelihood of affiliation has changed after controlling for all of the observable characteristics we have previously discussed. Each cohort is compared to the first cohort in our data: Marines who transitioned in October, November, December, and January (ONDJ) FY02. For simplicity, estimates that are statistically insignificant are shown as being equal to 1 in the figure. Recall that PS enlisted Marines transition with an average of 4 years of service.

Figure 15. Relative likelihood of SelRes affiliation[a] by transition cohort,[b] enlisted Marines, Oct. 2001 to Sep. 2011[c]
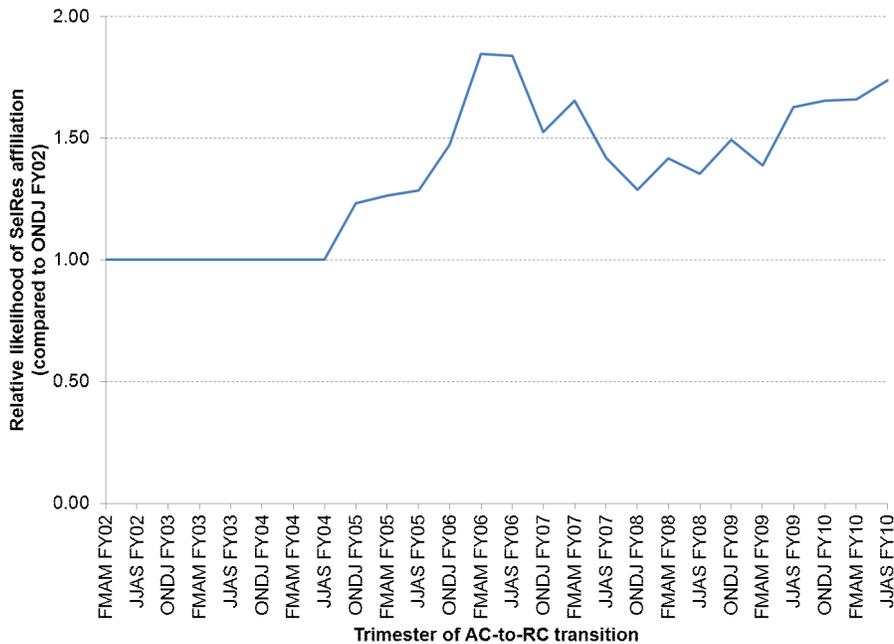
a. Full estimation results are available in appendix E. For simplicity, insignificant estimates are shown as being equal to 1.
b. Transition cohorts are made up of Marines who left active duty
c. Source: MCTFS end-of-month snapshots, Oct. 2001 to Sep. 2011, merged with data from MCRISS, the GWOT deployment file, RC CTS, and unemployment data from the BLS.

In figure 15, we see three patterns:

- First, the relative likelihood of affiliation increased for cohorts that transitioned from the AC between FY05 and FY06. The relative likelihood of affiliation is highest for the cohort that transitioned in June, July, August, and September (JJAS) FY06; this cohort was almost 85 percent more likely to affiliate than the ONDJ FY02 cohort. On average, these cohorts would have entered the Marine Corps just before or right after the terrorist attacks of 9/11. These estimates suggest a change in the expectation of those who enlisted and that it became more popular to become a reservist after leaving active duty than it had been in previous years.

- Second, the relative likelihood of affiliation fell and was lowest for the cohorts that transitioned in FY08 and F09. The decrease in the likelihood of affiliation may reflect the effects of the start of OEF and OIF. The 202K buildup is likely a reason for why the relative likelihood continued to be low for the cohorts that transitioned during FY08 and FY09; fewer Marines were being asked to leave, and those who did choose to leave likely did so for reasons that would have kept them from wanting to affiliate.

- Third, the relative likelihood of affiliation increased through FY10. Two factors that may have contributed to this increase include the Marine Corps reaching 202K endstrength in the AC as well as the end of OIF.

These trends are important because they showcase to the Marine Corps not only how its own policy but how world events may affect PS affiliation with the SelRes. The Marine Corps will want to continue to monitor PS SelRes affiliation with the coming drawdown in active-duty endstrength and the end of the war in Afghanistan.

Summary

Our survival analysis of SelRes affiliation behavior among PS enlisted Marines finds that women, racial and ethnic minorities, divorcees, and those with large families are most likely to affiliate with the SelRes. In terms of education, our estimates show that both Marines with

less than a traditional high school diploma and those with a college degree are most likely to affiliate. By providing Marines with more information about SelRes opportunities and associated benefits earlier in a Marine's career, the Marine Corps may be able to increase the likelihood of affiliation, particularly among these groups.

Also, our estimates indicate that high operational tempo decreases the likelihood of PS enlisted Marines affiliating with the SelRes. These findings suggest that PS enlisted Marines do not view the SelRes simply as a short-term means to being activated and deployed. Another factor that influences PS enlisted Marine's is the state unemployment rate. We find that Marines are more likely to affiliate if the unemployment rate increases during the six months prior to transition. These findings underpin the importance of educating Marines about SelRes career options while they are still on active duty.

Lastly, our analysis shows a distinct change in the likelihood of affiliation between enlisted cohorts that entered the Marine Corps before and after the events of 9/11: Marines who entered after 9/11 tend to be more likely to affiliate than those who entered before 9/11. In the future, as the war in Afghanistan draws to a close, the Marine Corps may want to monitor its PS enlisted affiliation rates to see if enlisted Marines entering the Corps in that postwar period behave differently.

The relative likelihood of SelRes affiliation among PS officers

In this section, we focus on the factors that influence SelRes affiliation among transitioning officers. Figure 16 provides a graphical summary of the hazard ratios associated with selected officer characteristics. Once again, for categorical variables, the hazard ratio for the comparison group is set to 1.0 and is depicted with a black bar. The hazard ratios associated with the continuous unemployment and PS SelRes activation rate variables represent the difference in the likelihood of SelRes affiliation for a 1-percentage-point change in the variable.[28]

Overall, our results indicate that fewer of our observable variables affect PS officer affiliation behavior. For example, unlike PS enlisted Marines, AC combat deployment experience does not statistically affect the likelihood that a PS officer affiliates with the SelRes. Also, we find that state unemployment rates and the SelRes activation rate among PS officers do not influence officer affiliation decisions. However, some of the factors that affect PS enlisted Marines' affiliation decisions affect PS officers. These factors include race, family size, education credentials, rank, and IRR activations and deployments. We discuss these effects in the subsections that follow.

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28. Full estimation results are presented in appendix E.

Figure 16. The relative likelihood of SelRes affiliation[a] associated with demographic and service-related characteristics,[b] transitioning officers, Oct. 2001 to Sep. 2011[c]

Effects of demographic and service-related characteristics on affiliation behavior

Our estimates show that SelRes affiliation is highest among officers who are a racial minority other than black, have more than two dependents, have a graduate or professional degree, or are majors or lieutenant colonels when they transitioned. We describe the effects in more detail below.

First, we find that officers of a minority race other than black are 28 percent more likely than their white counterparts to affiliate with an SMCR unit or IMA billet. The relative effect of race on the likelihood of affiliation is similar to what we found among enlisted Marines; however, the effect is larger for officers.

Second, similar to what we found for the transitioning enlisted population, there also is a positive relationship between the number of dependents and the probability of affiliating with the SelRes among officers. Relative to transitioning officers with no dependents, officers with three and those with four or more dependents are 28 and 68 percent more likely, respectively, to affiliate with the SelRes.

Third, we find that officers with graduate or professional degrees are more likely to affiliate than their counterparts with only a bachelor's degree. Our estimates show that graduate or professional degree holders are 35 percent more likely to affiliate with the SelRes than Marines with bachelor's degrees. This is a similar trend to what we found among college-educated PS enlisted Marines. More highly educated Marines may be more likely to affiliate with the SelRes because they are highly motivated and welcome the challenge of a second career in the Marine Corps Reserve.

As is the case for PS enlisted Marines, our estimates for the PS officer population indicate that SelRes recruiting may benefit from providing Marines information about the SelRes while they are still on active duty. Early recruiting will provide Marines, particularly those who are most likely to affiliate, with more time and opportunity to find a position in the SelRes.

Last, like transitioning enlisted Marines, the likelihood of SelRes affiliation among officers increases with rank. Although officers with the rank of second lieutenant or first lieutenant have a similar probability of affiliating with the SelRes as captains, majors and lieutenant colonels are 88 percent more likely to affiliate than captains. As these officers get closer to retirement, they have a greater incentive to join an SMCR unit or IMA billet.[29]

Unlike GS PS enlisted Marines, we do not find GS PS officers are any more or less likely than non-GS officers to affiliate with the SelRes. Other variables (i.e., race and rank) in the model are significantly correlated with GS status, so these variables may be picking up some of the differences in the affiliation rate that we observed in figure 8.[30]

Effects of operational tempo on affiliation behavior

We find only one operational variable with a statistically significant relationship with SelRes affiliation. PS officers activated and deployed from the IRR are 42 percent less likely to affiliate. We found a similar estimate among PS enlisted Marines. Since we do not observe whether these activations were voluntary or involuntary, we cannot know whether our estimates reflect a preference to serve in the Marine Corps from the IRR or if Marines are reacting negatively to being called up to serve from the IRR.

Summary

Our analysis of PS officer SelRes affiliation behavior reveals few factors that affect their decisions to affiliate. We find that racial minorities other than blacks are more likely to affiliate than whites and that

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29. The O-4/O-5 category is predominantly made up of majors (refer back to table 4). For the FY02–FY11 period, only four transitioning lieutenant colonels affiliated with the SelRes.

30. Regressing gold standard status on gender, race, marital status, number of dependents, education credential, and rank shows that blacks are 18 percentage points less likely than whites to be GS officers while majors and lieutenant colonels are 17 percentage points more likely than captains to be GS officers.

likelihood of affiliation is highest among officers with large families. We find that officers with graduate/professional degrees and those who transitioned at the rank of major or lieutenant are most likely to affiliate with the SelRes. These officers may be more self-motivated to continue their careers in the Marine Corps because they have either put in enough years that they are now looking toward earning retirement pay or they are personally motivated to pursue careers in the Marine Corps Reserve in addition to their civilian careers.

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Conclusions and recommendations

Summary of findings

Between October 2001 and September 2011, 8.5 percent of transitioning enlisted Marines and 43.4 percent of transitioning officers affiliated with an SMCR unit or IMA billet. During this period, we observe that the longer a Marine is in the IRR, the less likely they are to affiliate with the SelRes. Roughly 44 percent of transitioning enlisted Marines and 53 percent of officers who affiliated with the SelRes did so within six months of transitioning to the RC. The percentage of Marines that affiliate within one year of transition was increasing in the latter half of the period.

We employed survival analysis techniques to estimate the likelihood of SelRes affiliation associated with various Marine characteristics and time spent in the IRR. Our estimates show that:

- Minorities and Marines with many dependents are the most likely to affiliate.

- Enlisted Marines with traditional high school diplomas are the least likely to affiliate, while officers with a graduate/professional degree are more likely to affiliate than officers with a bachelor's degree.

- Especially among transitioning enlisted Marines, higher operational tempo—in terms of length of deployment while in the AC, IRR activation, and the rate of SelRes activation—have a negative impact on probability of affiliating with the SelRes. The effects of operational tempo were not as strong among officers.

- Among PS enlisted Marines, an increasing (decreasing) unemployment rate prior to transition increases (decreases) the likelihood of affiliating with the SelRes.

- After accounting for Marine characteristics and environmental factors, we find that PS enlisted Marines who entered the Marines Corps after the events of 9/11 are more likely to affiliate with the SelRes than those who entered before 9/11. We do not find evidence of such a pattern among the transitioning officer population.

We summarize our findings in table 4. For each variable, we have indicated the direction of the effect—positive or negative—on the likelihood of a PS enlisted Marine or PS officer affiliating with the SelRes.

Table 4.   Summary of affiliation estimation results

Variable	Direction of effect[a]	
	Enlisted	Officers
Gender		
Male	−	NS
Race and ethnicity		
Black	+	NS
Other races	+	+
Hispanic	+	NS
Marital status		
Married	NS	NS
Divorced/separated	+	NS
Number of dependents		
One	NS	NS
Two	+	NS
Three	+	+
Four or more	+	+
Education credential		
Tier I, with a college degree	+	na
Other Tier I credential	+	na
Tier II/Tier III	+	na
Graduate or professional degree	na	+
State unemployment rate		
Unemployment rate in month of transition	NS	NS
Change in unemployment rate over past 6 months	+	NS
Separation reason		
VEERP	−	na
Other non-EAS reason	−	na

Table 4.   Summary of affiliation estimation results (continued)

	Direction of effect[a]	
Variable	Enlisted	Officers
Paygrade		
E-1 or E-2	–	na
E-3	–	na
E-5 or E-6 or E-7	+	na
O-1/O-2	na	NS
O-4/O-5	na	+
Quality measures		
Recommended and eligible for reenlistment	+	na
High-quality (Tier I & AFQT > 50)	–	na
Gold standard	+	NS
Months deployed while in the AC		
1 to 6	NS	NS
7 to 12	NS	NS
13 or more	–	NS
Activated from the IRR		
1 to 6 months	–	NS
7 to 12 months	NS	NS
13 or more months	–	NS
Activation included deployment	–	–
Expectation of SelRes activation		
Percentage of PS enlisted Marines activated in SelRes	–	NS

a. A plus (+) or minus (–) sign indicates that a one-unit change in value of the variable increases or decreases the like-lihood of affiliating with the SelRes. "NS" indicates that the estimate was not statistically significant, and "na" indi-cates that the variable was not included in the model.

Recommendations

Based on our findings, we make three recommendations:

1. The Marine Corps should focus PS Marine SelRes recruiting efforts on the months before and just after a Marine transitions from the AC. Our analysis provides evidence that Marines are planning their transition to the RC while they are still on active duty. These findings reinforce RA's transition strategy that focuses on educating Marines about reserve career options during MMEA and MMOA road shows, through career planners, monitors, and unit leadership. In addition, RA should

incorporate additional information about SelRes opportunities into the Marine Corps' new Transition Programs. Currently, the transition program includes a brief on reserve opportunities; however, RA should consider incorporating advising on reserve career options into each of the different transition tracks—university/college, vocational/technical training, employment, and entrepreneurial endeavors—that tailors information on how a Marine might balance being a reservist with each track. Providing Marines with information about the SelRes before they separate may increase interest and shorten the amount of time Marines spend in the IRR. To this end, the Marine Corps would need to maintain a current record of available billets and make that information readily available to Marines. Also, clear communication between AC career planner and PS recruiters will be necessary to ensure a Marine's smooth transition from active duty to the reserves.

2. When recruiting PS Marines to the SelRes, the Marine Corps should remind Marines of the additional benefits of affiliation, such as earning "good years" for retirement pay, health care, and the education benefits of the Post-9/11 GI Bill. These may be particularly useful in influencing Marines who have families or are thinking about starting families, want to go back to school themselves, or want to transfer their education benefits to a dependent. Depending on the grade, PMOS, and SelRes unit, Marines also may be eligible for affiliation bonuses or travel pay. These incentives may be particularly useful during times of high unemployment, when Marines may or may not be able to afford the cost of traveling long distances.

3. Lastly, we recommend that the Marine Corps continue to monitor SelRes affiliation rates for PS *and* NPS Marines. As the economy improves, active-duty endstrength draws down to 182,100, and the war in Afghanistan comes to an end, the Marine Corps will need to be attentive to changes in how its PS Marines feel and think about serving in the Marine Corps as reservists.

In our second report, [1], we will use many of the same techniques employed in this report to examine the factors that affect SelRes continuation behavior.

Appendix A: USMC reserve organization

Within the reserve component, the Marine Corps maintains the Ready Reserve, Standby Reserve, and Retired Reserve (see figure 17). The yellow portions of the figure represent reservists who count toward the endstrength of the Selected Reserve (SelRes).

Figure 17. Marine Corps Reserve[a]
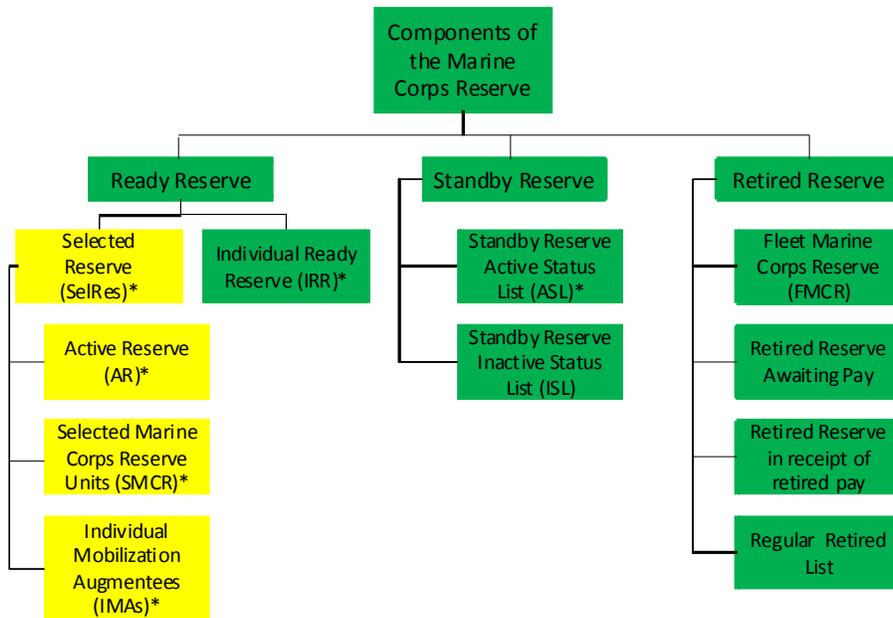
a. Source: [19], * denotes reserve categories that are considered Reserve Active Status.

The Ready Reserve is the Marine Corps' primary source of personnel to augment active forces for military contingency operations and war-time. It is made up of the SelRes and the Individual Ready Reserve (IRR).

The SelRes includes the Active Reserve (AR), reservists in Selected Marine Corps Reserve (SMCR) units, and Individual Mobilization Augmentees (IMAs). For the most part, SelRes members are part-time, drilling, paid reservists, although ARs serve in a full-time capacity. SMCR Marines are traditional reservists who, at a minimum, drill 1 weekend a month and perform 2-week annual training. IMAs augment active-duty units. They have drilling and annual training requirements similar to those of SMCR Marines, but they have the flexibility to arrange their annual training time. The IRR is composed of Marines who still have time left on their mandatory service obligations (MSOs) but are not associated with any other reserve category. They do not regularly train or receive pay; however, they muster once a year.

The Standby Reserve is made up of reservists who participate infrequently, do not receive pay, and would require significant training before deploying. The Standby Reserve-Active Status List includes reservists who would normally participate but temporarily cannot (because of family hardship, key civilian position, etc.). They are, however, eligible for promotion. The Standby Reserve-Inactive Status List includes Marines who are not eligible to participate or to receive pay or retirement credit, are not eligible for promotion consideration, and are not counted against reserve endstrength or controlled grades.

The Retired Reserve contains Marines in various stages of retirement, either awaiting or receiving retirement pay.

Appendix B: Characteristics of the transitioning enlisted and officer populations and geographic region definitions

In this appendix, we provide mean characteristics for the transitioning enlisted and service populations, as well as definitions of the geographic regions we use in our analysis.

Characteristics of the transitioning enlisted population

To have a sense of how the transitioning enlisted population changed between FY02 and FY11, we provide mean characteristics for these cohorts in table 5. The last column of the table indicates the direction of the change from FY02 to FY11.

Table 5.   Average characteristics of transitioning enlisted Marines in FY02 and FY11[a]

Characteristic (at time of transition)	FY02	FY11	Direction of change[b]
Demographic characteristics			
Male	93.6%	93.4%	NC
Average age	24.0	24.1	+
Race			
White	73.0%	82.9%	+
Black	11.0%	6.8%	–
Other races	3.2%	4.9%	+
Race unknown	15.2%	12.6%	–
Ethnicity			
Hispanic	15.2%	12.6%	–
Marital status			
Never married	57.4%	52.4%	–
Married	40.1%	44.4%	+
Divorced/separated	2.5%	3.1%	+
Status of dependents			
Dependents present	39.9%	42.3%	+
Number, if present	1.6	1.4	–
Education[c]			
Tier I, high school diploma	93.4%	91.8%	–
Tier I, with college	1.7%	1.9%	NC
Other Tier I credential	2.4%	3.6%	+
Tier II/Tier III	2.6%	2.8%	+
State of residence (division)[d]			
New England	3.9%	3.7%	NC
Middle Atlantic	10.7%	9.5%	–
East-North Central	13.7%	14.6%	+
West-North Central	5.7%	6.5%	+
South Atlantic	21.1%	20.8%	NC
East-South Central	4.6%	4.7%	NC
West-South Central	13.2%	12.9%	NC
Mountain	6.8%	7.7%	+
Pacific	19.9%	19.1%	NC
Outside U.S.	0.2%	0.5%	+
Service characteristics			
Average years of service	4.4	4.3	–
Type of active-duty loss			
End of active service	99.7%	80.0%	–
VEERP[e]	—	19.9%	+
Other non-EAS loss category	0.3%	0.1%	–

Table 5.   Average characteristics of transitioning enlisted Marines in FY02 and FY11[a] (contin-

Characteristic (at time of transition)	FY02	FY11	Direction of change[b]
Recommended and eligible for reenlistment	95.2%	92.3%	–
Grade at loss			
E-1	0.3%	0.3%	NC
E-2	1.5%	1.6%	NC
E-3	13.5%	20.6%	+
E-4	52.8%	63.6%	+
E-5	30.7%	13.4%	–
E-6	1.1%	0.5%	–
E-7	0.1%	0.1%	NC
"Quality" measures			
High-quality[f]	64.0%	65.0%	NC
Gold standard[g]	5.1%	8.5%	+
Months deployed while on active duty (cumulative)			
0 month	96.3%	23.5%	–
1 to 6 months	2.1%	7.8%	+
7 to 12 months	1.6%	33.9%	+
13 or more months	0.0%	34.8%	+
Average number of months since last deployment	3.6	13.5	+
Observations	16,046	17,859	

a. Source: MCTFS end-of-month snapshots, MCRISS, and the Marine Corps GWOT deployment data.

b. FY11 minus FY02 determines the direction of change. A plus sign (+) indicates that the FY11 average is statistically higher than the FY02 average with 95-percent confidence. A minus sign (–) indicates that the FY11 average is statistically lower than the FY02 average with 95-percent confidence. NC indicates that we observe no change between FY02 and FY11.

c. Education classifications are as follows: Tier I, high school diploma Marines are those who earned a traditional high school diploma; Tier I with college Marines are those with an associate, nursing, bachelor, graduate, or professional degree; Other Tier I includes Marines with one semester of college or an adult education diploma; Tier II Marines are those with a correspondence diploma, GED, home study degree, or other nontraditional high school-equivalent degree; Tier III Marines are those without a high school credential.

d. We define geographic regions using the Census Bureau's classification scheme (see appendix B).

e. The Voluntary Enlisted Early Release Program (VEERP) was in effect for FY10 and FY11 [12, 13, 14].

f. Marines who are Tier I and have an Armed Forces Qualification Test (AFQT) score of 50 or higher are considered high-quality Marines.

g. The definition of gold standard (GS) Marines comes from [11]. GS enlisted Marines have scored 110 or higher on the general technical portion of the Armed Services Vocational Aptitude Battery (ASVAB), 105 or higher on the mechanical maintenance portion, and 115 or higher on the electrical portion. GS Marines also have at least a traditional high school diploma; are recommended and eligible for reenlistment; have no felony, serious, or drug waivers; have a class 1 physical fitness test (PFT) score, and have no non-judicial punishments (NJPs) or courts-martial on their records.

Characteristics of the transitioning enlisted population

Table 6 provides the mean characteristics of the FY02 and FY11 transitioning officer populations. The last column of the table indicates the direction of the change from FY02 to FY11.

Table 6. Characteristics of transitioning officers, FY02 and FY11[a]

Characteristic (at time of active-duty loss)	FY02	FY11	Direction of change[b]
Demographic characteristics			
Male	90.0%	90.4%	NC
Average age	30.0	29.4	–
Race			
White	85.4%	86.0%	NC
Black	6.8%	3.9%	–
Other races	1.6%	5.5%	+
Race unknown	6.2%	4.6%	NC
Ethnicity			
Hispanic	5.8%	6.1%	NC
Marital status			
Never married	41.8%	50.0%	+
Married	53.2%	47.2%	NC
Divorced/separated	5.0%	2.8%	NC
Status of dependents			
Dependents present	54.7%	44.2%	–
Number, if present	1.9	1.8	NC
Education			
Bachelor's degree[c]	91.6%	94.8%	+
Graduate or professional degree	8.4%	5.2%	–
State of residence (division)[d]			
New England	3.2%	7.4%	+
Middle Atlantic	9.4%	12.3%	NC
East-North Central	12.6%	9.9%	NC
West-North Central	3.0%	5.1%	NC
South Atlantic	31.0%	29.4%	NC
East-South Central	3.6%	2.4%	NC
West-South Central	10.0%	11.0%	NC
Mountain	5.2%	5.0%	NC
Pacific	21.4%	16.9%	NC
Outside U.S.	0.6%	0.6%	NC

Table 6.   Characteristics of transitioning officers, FY02 and FY11[a] (continued)

Characteristic (at time of active-duty loss)	FY02	FY11	Direction of change[b]
Service characteristics			
Average years of service	6.6	5.8	–
Type of active-duty loss			
End of active service	56.4%	56.3%	NC
OVER Program[e]	—	1.7%	+
Other non-EAS loss category	43.6%	42.1%	NC
Grade at loss			
O-1	0.4%	0.7%	NC
O-2	29.8%	41.4%	+
O-3	59.2%	52.6%	–
O-4	10.6%	5.3%	+
O-5	0.0%	0.0%	NC
"Quality" measures			
General Classification Test (GCT) score	126.6	123.8	–
Gold standard	38.6%	14.7%	–
Months deployed while on active duty (cumulative)			
0 month	98.2%	10.7%	–
1 to 6 months	1.4%	7.0%	+
7 to 12 months	0.4%	38.6%	+
13 or more months	0.0%	43.8%	+
Average number of months since last deployment	4.1	18.3	+
Observations	500	544	

a. Source: MCTFS end-of-month snapshots, Oct. 2001 through Sep. 2011.
b. FY11 minus FY02 determines the direction of change. A plus sign (+) indicates that the FY11 average is statistically higher than the FY02 average with 95-percent confidence. A minus sign (–) indicates that the FY11 average is statistically lower than the FY02 average with 95-percent confidence. NC indicates that we observe no change between FY02 and FY11.
c. Also includes officers with an associate or nursing degree.
d. We define geographic regions using the Census Bureau's classification scheme (see appendix B).
e. Officers were eligible for the Officer Voluntary Early Release (OVER) Program if their EAS dates were between Apr. 1, 2011, and Sep. 30, 2012 [20].

Geographic regions

In this report, we use the Census Bureau's definitions to refer to U.S. geographic regions. The Census Bureau broadly defines four regions of the United States: the Northeast, the Midwest, the South, and the West. The Census Bureau further stratifies each region into one of nine divisions. We provide the Census Bureau's region and division definitions in table 7.

Table 7.   Census regions and divisions

Region	Divisions		
Northeast	**New England** Connecticut Maine Massachusetts New Hampshire Rhode Island	**Middle Atlantic** New Jersey New York Pennsylvania	
Midwest	**East-North Central** Indiana Illinois Michigan Ohio Wisconsin	**West-North Central** Iowa Kansas Minnesota Missouri Nebraska North Dakota South Dakota	
South	**South Atlantic** Delaware District of Columbia Florida Georgia Maryland North Carolina South Carolina Virginia West Virginia	**East-South Central** Alabama Kentucky Mississippi Tennessee	**West-South Central** Arkansas Louisiana Oklahoma Texas
West	**Mountain** Arizona Colorado Idaho Montana Nevada New Mexico Utah Wyoming	**Pacific** Alaska California Hawaii Oregon Washington	

Appendix C: Survival analysis

Using typical linear regression methods to explain duration (i.e., time-to-affiliation) data presents a number of practical problems [4, 21, 22]. The key issue with duration data is that the event (SelRes affiliation) and the characteristics that explain the likelihood of that event (i.e., some Marine characteristics) may be changing over time (i.e., while a Marine is in the IRR).

Survival analysis is a statistical technique developed specifically to handle duration data. These models are used in a variety of professional fields [21]. Three examples follow:

- Industrial engineers use survival models to explain time-to-failure of equipment and machines.

- In medicine, survival models are employed to explain survival time after diagnosis or medical treatment.

- Economists have employed these models to explain the time people spend on unemployment.

In the context of our study, survival analysis techniques allow us to model the likelihood that a particular Marine will affiliate with an SMCR unit or IMA billet, given that other Marines at the same point in their reserve careers have not affiliated.

The proportional hazard model[31]

The basis of survival analysis is the *hazard function*. For our purpose, the hazard function models the likelihood of affiliation at time t for Marine j as a function of time and personal characteristics:

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31. The discussion summarizes the technical descriptions of survival analysis provided by [21] and [22].

$$h_j(t) = g(t, b_0 + b_1 x_{1j} + \ldots + b_k x_{kj}).$$

We use a semiparametric form of the hazard function—the Cox proportional hazard function—which allows the likelihood of affiliation due to a Marine's personal characteristics (X_j) to shift the baseline hazard rate, $h_0(t)$, which is a common to all Marines:

$$h_j(t|x_j) = h_0(t) \exp(X_j B_x)$$

The advantage of the Cox proportional hazard model is that it leaves the baseline hazard rate, $h_0(t)$, unspecified and unestimated. This implies that we do not have to know the exact functional form or constrain the shape of the baseline hazard function to be able to estimate the effect that observable characteristics (the x_j variables) have on the probability of affiliating with the SelRes. We determine how observable characteristics are associated with the likelihood of affiliation by choosing values for the coefficients (B_x) in the model that best fit the data. Specifically, we want coefficients that maximize the likelihood of observing the affiliations that actually occurred at each point in time in our data.

Hazard models are preferred to alternative statistical techniques when dealing with duration data because they are better able to address the various issues that arise when using duration data. Specifically,

- Hazard rate models explicitly represent the stochastic process underlying survival times. The assumptions behind ordinary least squares, probit, logit, and censored region models are not suitable for explaining time-to-affiliation. To be more precise, estimates from hazard rate models compare the likelihood of an event occurring for two otherwise identical individuals or groups (i.e., Marines who affiliated versus Marines who remained in the IRR) at the same point in time.

- Hazard models address data-censoring problems, which we have already noted exist in our data. Specifically, our data exhibit right-censoring—the sample period ends before some Marines have had the chance to affiliate with SMCR units or

IMA billets. Hazard models account for these observations and, therefore, avoid biased estimates.

- Hazard models may be used to deal with time-varying characteristics. Time-to-affiliation is likely to depend on a set of personal characteristics and events that may change over time. In hazard models, a Marine's characteristics are reevaluated at each point in time that a SelRes loss occurs.

Interpretation of results

Our hazard model estimates the likelihood of affiliating with the SelRes as a function of a set of demographic, service-related, and activation/deployment variables. Results of estimating the hazard model are expressed as *hazard ratios*—the ratio of two hazard rates. Hazard ratios compare the likelihood of affiliation for two Marines who are exactly the same except for a one-unit change in the variable of interest.

The hazard ratio is easiest to interpret for categorical variables. For instance, we include a gender variable in our model that is equal to 1 if the Marine is male and 0 is the Marine is female. For this gender variable, the hazard ratio is the male-to-female ratio of the likelihood to affiliate, holding all other variables at their sample averages. Specifically, for categorical variables:

- A hazard ratio equal to (or close to) 1 indicates that there is no considerable difference in the likelihood of affiliation for Marines with the characteristic relative to Marines without it. (That is, if being male has a hazard ratio of 1, this implies that male Marines are no more likely than female Marines to affiliate with the SelRes.)

- A hazard ratio less than 1 implies that Marines with the characteristic have a lower likelihood of affiliation relative to those without the characteristic. (That is, if being male has a hazard ratio of 0.7, this implies that male Marines are 30 percent less likely than female Marines to affiliate with the SelRes.)

- A hazard ratio greater than 1 implies that Marines with the characteristic are more likely to affiliate relative to those with-

out. (That is, if being male has a hazard ratio of 1.7, this implies that male Marines are 70 percent more likely than female Marines to affiliate with the SelRes.)

The hazard ratio for continuous variables expresses the difference in the relative magnitude of the likelihood of affiliating with an SMCR unit or IMA billet for a one-unit increase in the value of the continuous variable. For example, in the case of the state unemployment rate *(r),* the hazard ratio expresses the relative likelihood of SelRes affiliation when the state unemployment rate is $r + 1$ percent to the likelihood of affiliation when the unemployment rate is r.

When interpreting estimation results, it is also important to consider the *p-value* of the estimate. The p-value measures the smallest significance level at which we can reject that the estimated hazard ratio is equal to 1. It measures the degree to which we can say with certainty that the likelihoods of affiliation for Marines with and without a particular characteristic (holding all else constant) are different. Typically, researchers consider p-values of 0.10 or less to indicate statistical significance. Going back to our example of the relative likelihood of SelRes affiliation between male and female Marines, if the p-value associated with the hazard rate is equal to 0.05, we can claim with 95-percent accuracy that the likelihood of affiliation for male Marines is different from that for female Marines.

Appendix D: The SelRes affiliation model and the PS SelRes activation rate

We want to estimate the probability of affiliating with an SMCR unit or IMA billet for Marines transitioning from active duty to reserve status. To this end, we estimate separate hazard models for the population of transitioning enlisted Marines and transitioning officers. Because these populations are inherently different (e.g., high school versus college graduates), the populations face different incentives in and out of the Marine Corps and likely respond differently to changes in their environment.

Once in the RC, a Marine may flow in and out of the SelRes. As a result, an individual Marine may have multiple points of affiliation with SMCR units or IMA billets. For our analysis, we focus on Marines' first affiliations with either an SMCR unit or IMA billet.[32] Our hazard models will control for the number of months a Marine spent in the IRR before his or her first SelRes affiliation (time-to-affiliation). For Marines who never affiliate, time-to-affiliation defaults to the number of months in the IRR before leaving the sample or the end of the sample period.

Table 8 lists the variables we include in our affiliation models. In each model, we control for a Marine's demographic and service-related characteristics in the month that he or she transitioned to the RC. To control for the local economic environment, we include the state unemployment rate at the time a Marine left active duty as well as the change in the state unemployment rate in the 6 months before transition.

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32. A Marine might enter the IRR after transitioning, then affiliate with an SMCR unit, leave the unit, and go back into the IRR, only to decide later to go into an IMA billet. For this Marine, the month of SelRes affiliation coincides with the month that he or she affiliated with an SMCR unit.

Table 8.   Variable definition for SelRes affiliation models

Variable	Variable description
Dependent variable	
SelRes affiliation	1 if transitioning Marine affiliated with SMCR unit of IMA billet; 0 if the Marine remains in the IRR
Independent variables	
Male	1 if transitioning Marine is male; 0 if Marine is female
Race	Two 0/1 variables indicating if the transitioning Marine is black or other minority (white is the omitted category)
Ethnicity	1 if transitioning Marine is Hispanic, 0 if the Marine is non-Hispanic
Marital status	Two 0/1 variables indicating if the transitioning Marine is married or divorced/separated (single is the omitted category)
Number of dependents	Four 0/1 variables indicating if the transitioning Marine has 1, 2, 3, or 4 or more dependents (no dependents is the omitted category)
Enlisted education level	Three 0/1 variables indicating if the transitioning Marine is Tier 1 with a college degree, other Tier 1, or Tier 2/Tier 3 (Tier 1 with a traditional high school diploma is the omitted category)
Officer education level	1 if transitioning officer has a graduate or professional degree; 0 if officer has a bachelor's degree
Geographic region	Eight 0/1 variables that indicate the transitioning Marine's geographic area of residence based on his or her state of residence the first time he or she appeared in MCTFS after transitioning, defined using the Census Bureau's geographic divisions[a]
State unemployment rate	Continuous variable indicating the unemployment rate in the state the transitioning Marine lived the first time he or she appeared in MCTFS after transitioning
Change in state unemployment rate	The change in the unemployment rate of the transitioning Marine's state of residence in the six months prior to transition.
Enlisted AC separation reason	Two 0/1 variables indicating if the transitioning Marine separated as part of VEERP or for other non-EAS reasons (EAS is omitted category)
Paygrade	Set of 5 variables for enlisted Marines and a set of 3 variables for officers equal to 1 if the transitioning Marine is in the specified grade
Recommended and eligible	1 if transitioning enlisted Marine was recommended and eligible for reenlistment at separation; else 0
High-quality	1 if transitioning enlisted Marine is considered high-quality; else 0
Gold standard	1 if transitioning Marine is considered gold standard; else 0
Months deployed	Three 0/1 variables indicating if the transitioning Marine was deployed for 1–6, 7–12, or 13 or more months while in the AC (never combat deployed is the omitted category)
Months between last AC deployment and transition	Three 0/1 variables indicating if the number of months between last AC deployment and transition was 1–6, 7–12, or 13 or more months (never deployed is the omitted category)
Months activated from IRR	Three 0/1 variables indicating if the transitioning Marine was activated from the IRR for 1 to 6 months, 7 to 12 months, or 13 or more months (never activated is the omitted category)

Table 8.   Variable definition for SelRes affiliation models (continued)

Variable	Variable description
Activation included deployment	1 if IRR activation included a deployment; else 0
Military occfield	Set of 26 variables for enlisted Marines and a set of 16 variables for officers indicating the Marine's 2-digit occfield
Trimester/fiscal year of transition[b]	Thirty variables indicating the combined trimester (ONDJ, FMAM, JJAS) and FY a Marine separated from the AC (ONDJ FY02 is the omitted trimester)
SelRes PS activation rate	Of the transitioning population that affiliated with the SelRes prior to an individual Marine's transition date, the percentage that were activated

a. Geographic regions are defined in appendix B.
b. Trimesters are defined as follows: October, November, December, and January (ONDJ); February, March, April, and May (FMAM); and June, July, August, and September (JJAS).

To examine the relationship between AC and RC operational tempo and SelRes affiliation, we include a set of variables indicating the number of months a Marine was combat deployed while on active duty and the length of activation and deployment while in the IRR.[33] We control for IRR activation in our models since these Marines spend more time in the IRR; once activated, they are unable to affiliate with the SelRes.[34] We also control for the percentage of PS Marines activated from the SelRes as a measure of SelRes operational tempo. The next subsection describes the SelRes PS activation rate.

SelRes activations

A Marine's expectations of being activated from the SelRes may factor into his or her decision to affiliate. Because we cannot measure "perceived likelihood of SelRes activation" directly, we indirectly control

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33. About 3,700 transitioning enlisted Marines and 230 transitioning officers were activated while in the IRR. From our data, we cannot determine if these were voluntary or involuntary activations.

34. Because a Marine who has been activated while in the IRR cannot affiliate with an SMCR unit or IMA billet, we estimate a model using only Marines who were never activated from the IRR. Estimates for the overall population and the never-activated from the IRR population are similar; therefore, we focus on the model using the entire transitioning population. We present full estimation results in appendix D.

for it using the SelRes PS activation rate in the month a Marine transitioned—the percentage of transitioning Marines affiliated who affiliated with the SelRes and were activated. In using this measure, we assume that the expectation of activation will be high when the SelRes PS activation rate is high and low when the activation rate is low. Figure 18 tracks the PS SelRes activation rate for both enlisted Marines and officers between October 2001 to April 2011.[35]

Figure 18. PS enlisted Marine and PS officer SelRes activation rates,[a] by month, Oct. 2001 to Apr. 2011[b]
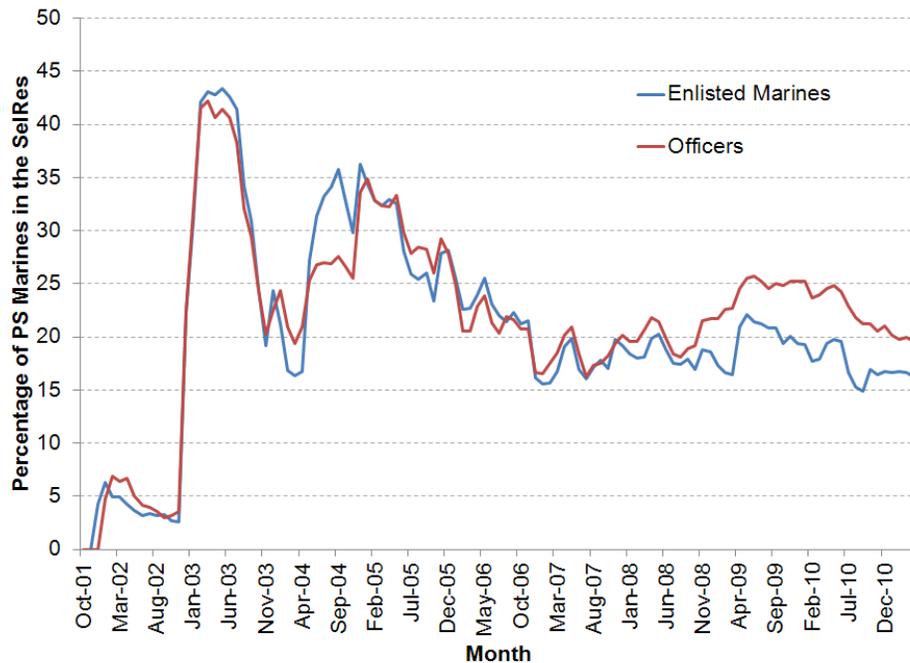
a. Of transitioning Marines who affiliated, the percentage that was activated each month.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Apr. 2011.

35. We limit our PS SelRes population to those who first affiliated between October 2001 and April 2011 because, when we turn to our analysis of SelRes continuation behavior, we define a loss from the SelRes as a Marine who reenters the IRR and remains in the IRR for at least the next five months. For our analysis of SelRes affiliation, the trimester fixed effects pick up the fact that the SelRes PS activation rate is missing after April 2011.

Overall, the PS enlisted and PS officer SelRes activation rates tend to move together. For both populations, less than 5 percent of PS SelRes Marines were activated before the fall of 2002. The activation rates increased to over 40 percent with the start of OIF. After the initial OIF surge, the SelRes activation rate fell to under 20 percent for both populations, and it increased to roughly 35 percent between the fall of 2004 and winter of 2005 during the Fallujah campaign. After Fallujah, the SelRes PS activation rate fell to under 20 percent again and remained there until the fall of 2008 when the PS enlisted and PS officer trends start to differ. Although both populations experienced an increase in activations in the late spring of 2009, the PS officer SelRes activation rate ranged from 20 to 25 percent, while the PS enlisted SelRes activation rate ranged from 16 to 22 percent.

To illustrate the correlation between SelRes affiliation and the expectation of SelRes activation, we show the scatter plots relating the current SelRes activation rate to the SelRes affiliation rate of a transitioning cohort (by month) in figure 19.

For transitioning enlisted Marines (see top panel of figure19), there appears to be a negative correlation between the SelRes activation rate and a cohort's affiliation rate—the higher the SelRes activation rate at the time of transition, the less likely a Marine is to transition. Specifically, the estimated slope of the trend line shows that a 1-percentage-point increase in the SelRes activation rate decreases the affiliation rate by 1.0 percent.[36]

The bottom panel of figure 19 shows that the officer SelRes activation rate and the officer SelRes affiliation rate appear to be positively related, but the slope of the trend line is not statistically significant. This implies a weak correlation between the officer SelRes activation rate and the officer affiliation rate. Adding the SelRes PS activation rate to our model will allow us to determine if the correlations we observe in figure 19 exist conditional on all other variables being held constant.

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36. The slope coefficient of the linear trend line in figure 19 is -0.082. Dividing this by the enlisted SelRes affiliation rate (8.5), we calculate the estimated 1.0-percent change in the affiliation rate for a 1-percentage-point change in the SelRes activation rate.

Figure 19. The relationship between the SelRes PS activation and affiliation rates,[a] monthly
cohorts of transitioning Marines, enlisted and officer, Oct. 2001 to Apr. 2011[b]
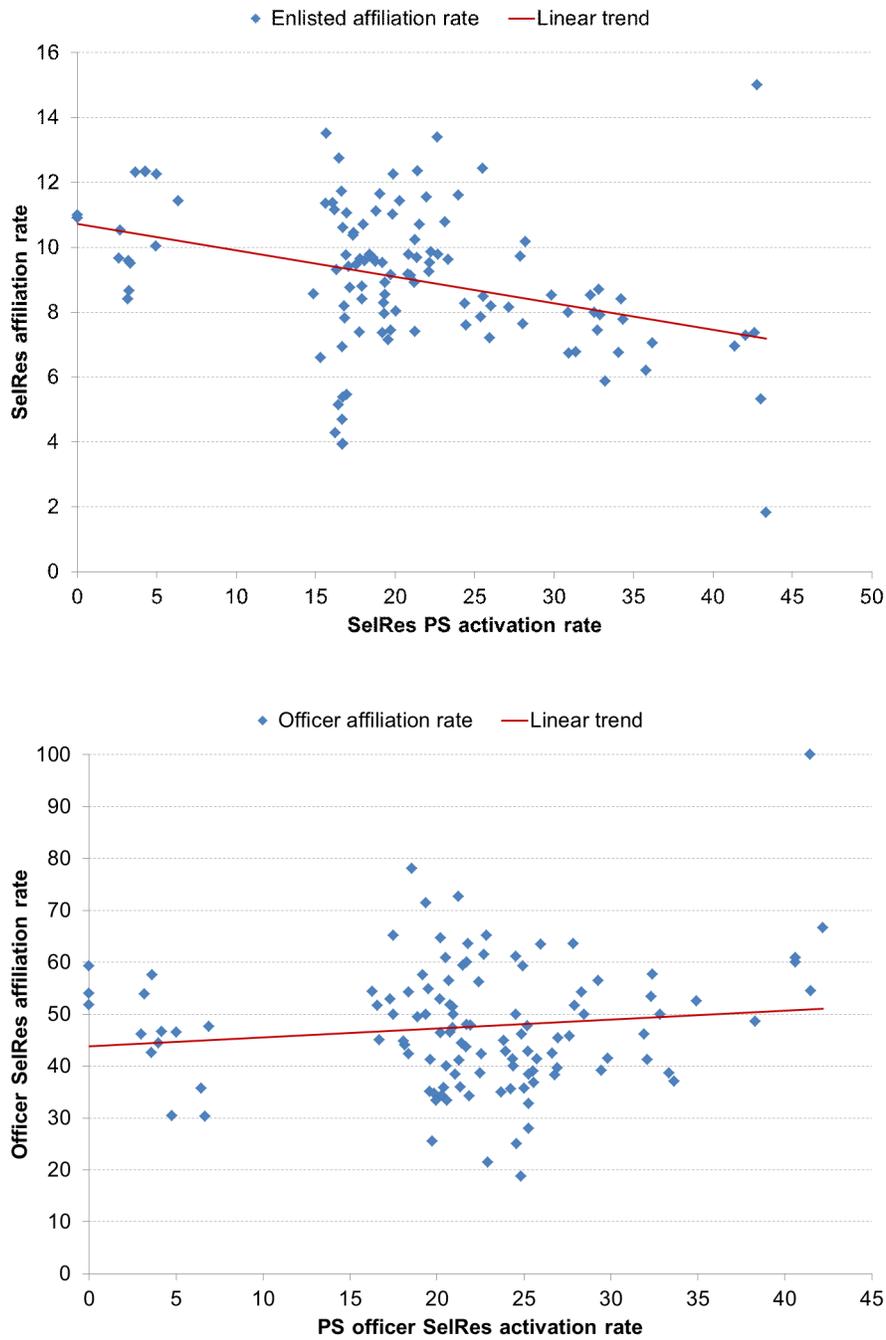
a. Of transitioning Marines who affiliated, the percentage that were activated each month.
b. Source: MCTFS end-of-month snapshots, Oct. 2001 through Apr. 2011.

Appendix E: Analysis of SelRes affiliation behavior

Tables 9 and 10 present the full results from estimating the SelRes affiliation model using the transitioning enlisted and officer populations, respectively. The "All" column in each table shows results from estimating our model using the entire transitioning population, while the next column's estimates are from models using the subset of the population that was *never* activated from the IRR. We estimated our model with never-activated populations in order to determine the degree to which the presence of activated Marines biases our estimates. Activated Marines inherently spend more time in the IRR than their never-activated counterparts because they cannot affiliate until they are no longer activated. Overall, we find that the estimates—and their respective significance levels—are similar across the two samples.

Table 9.   The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning enlisted Marines or never-activated enlisted Marines, Oct. 2001 to Sep. 2011[c]

Characteristic	All		Never activated	
Gender				
Female	**1.000**		**1.000**	
Male	0.925	**	0.934	*
Race				
White	**1.000**		**1.000**	
Black	1.213	***	1.232	***
Other races	1.142	***	1.153	***
Ethnicity				
Non-Hispanic	**1.000**		**1.000**	
Hispanic	1.320	***	1.331	***
Marital status				
Single	**1.000**		**1.000**	

Table 9.   The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning enlisted Marines or never-activated enlisted Marines, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
Married	1.023		1.020	
Divorced/separated	1.437	***	1.446	***
Number of dependents				
Zero	**1.000**		**1.000**	
One	0.999		1.004	
Two	1.118	**	1.117	***
Three	1.305	***	1.316	***
Four or more	1.691	***	1.749	***
Education credential				
Tier 1, with a high school diploma	**1.000**		**1.000**	
Tier 1, with a college degree	1.247	***	1.252	***
Other Tier 1 credential	1.203	***	1.169	**
Tier 2/Tier 3	1.268	***	1.256	***
Geographic area				
South Atlantic	**1.000**		**1.000**	
New England	1.294	***	1.304	***
Middle Atlantic	1.348	***	1.354	***
East-North Central	1.065	*	1.073	**
West-North Central	0.873	***	0.891	**
East-South Central	1.089	*	1.085	
West-South Central	1.146	***	1.157	***
Mountain	0.855	***	0.855	***
Pacific	0.855	***	8.849	***
State unemployment rate				
Unemployment rate in month of transition	1.007		1.007	
Change in unemployment rate over past 6 months	1.062	**	1.068	**
Separation reason				
EAS	**1.000**		**1.000**	
VEERP	0.648	**	0.648	***
Other non-EAS reason	0.384	***	0.389	***
Paygrade				
E-1 or E-2	0.240	***	0.237	***
E-3	0.631	***	0.635	***
E-4	**1.000**		**1.000**	
E-5 or E-6 or E-7	1.732	***	1.744	***
Quality Measures				
Recommended and eligible for reenlistment	1.590	***	1.600	***
Other reenlistment code	**1.000**		**1.000**	
Non-high-quality	**1.000**		**1.000**	

Table 9. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning enlisted Marines or never-activated enlisted Marines, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
High-quality (Tier 1 & AFQT>50)	0.911	***	0.915	***
Non-gold standard	**1.000**		**1.000**	
Gold standard	1.150	***	1.138	***
Gold standard status is missing	1.022		1.015	
Months deployed while in the AC				
Zero	**1.000**		**1.000**	
1 to 6	0.934		0.931	
7 to 12	0.920		0.920	
13 or more	0.805	***	0.798	***
Months between last deployment and transition				
Never deployed, zero months	**1.000**		**1.000**	
1 to 6	1.010		1.017	
7 to 12	0.937		0.942	
13 or more	1.028		1.036	
Activated from the IRR				
Never activated	**1.000**			
1 to 6 months	0.461	***		
7 to 12 months	0.816			
13 or more months	0.713	***		
Activation included deployment	0.677	***		
Expectation of SelRes activation				
Percentage of PS enlisted Marines activated in SelRes[d]	0.989	***	0.990	***
Occfield				
01XX: Personnel, administration, and retention	1.445	***	1.438	***
02XX: Intelligence	1.316	***	1.293	***
03XX: Infantry	**1.000**		**1.000**	
04XX: Logistics	1.108		1.112	*
05XX: MAGTF planning	1.341		1.305	
06XX: Command and control systems	0.953		0.946	
08XX: Field artillery	0.909		0.910	
11/13XX: Utilities/Engineer, construction, facilities, and equipment	0.929	*	0.932	*
18XX: Tank and assault amphibious vehicles	0.710	***	0.707	***
21XX: Ordnance	0.841	***	0.822	***
23XX: Ammunition/explosive ordnance disposal	1.553	***	1.527	***

Table 9. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning enlisted Marines or never-activated enlisted Marines, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
26XX: Signals intelligence	0.767	***	0.754	***
28XX: Ground electronics and maintenance	0.572	***	0.562	***
30XX: Supply administration and operations	1.260	***	1.269	***
31XX: Traffic management	0.899		0.892	
33XX: Food service	0.775	***	0.773	***
34XX: Financial management	0.799	*	0.786	*
35XX: Motor transport	1.238	***	1.231	***
43XX: Public affairs	1.142		1.155	
44XX: Legal services	1.200		1.179	
46XX: Combat camera	0.657	**	0.602	**
57XX: Nuclear, biological, and chemical defense	1.587	***	1.598	***
58XX:Military police/corrections	1.249	***	1.233	***
59XX: Electronics maintenance	0.446	***	0.440	***
Aviation occfields (60–73XX)[e]	0.591	***	0.582	***
Other occfields	0.637	***	0.650	***
Trimester of transition[f]				
ONDJ FY02	**1.000**		**1.000**	
FMAM FY02	1.033		1.015	
JJAS FY02	0.946		0.904	
ONDJ FY03	0.967		0.906	
FMAM FY03	0.757		0.742	
JJAS FY03	1.192		1.128	
ONDJ FY04	1.019		0.969	
FMAM FY04	1.030		0.979	
JJAS FY04	1.085		1.032	
ONDJ FY05	1.233	*	1.180	
FMAM FY05	1.264	*	1.191	
JJAS FY05	1.287	**	1.230	*
ONDJ FY06	1.472	*	1.426	***
FMAM FY06	1.848	***	1.803	***
JJAS FY06	1.839	***	1.757	***
ONDJ FY07	1.526	***	1.464	***
FMAM FY07	1.654	***	1.560	***
JJAS FY07	1.416	***	1.346	***
ONDJ FY08	1.289	***	1.214	***
FMAM FY08	1.418	**	1.345	***
JJAS FY08	1.355	**	1.268	***

Table 9. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning enlisted Marines or never-activated enlisted Marines, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
ONDJ FY09	1.434	***	1.312	***
FMAM FY09	1.389	**	1.291	***
JJAS FY09	1.629	***	1.514	***
ONDJ FY10	1.654	***	1.547	***
FMAM FY10	1.659	***	1.556	***
JJAS FY10	1.740	***	1.629	***
ONDJ FY11	1.220		1.144	
FMAM FY11	0.576	***	0.539	***
JJAS FY11	-		-	
Number of observations	153,969		150,338	

a. Statistical significance designated as follows: * p-value < 0.1; ** p-value < 0.05, and *** p-value < 0.01.
b. For categorical variables, the hazard ratio for the comparison group has been set to 1 and is bolded.
c. Source: MCTFS end-of-month snapshots, Oct. 2001 to Sep. 2011, merged with data from MCRISS, the GWOT deployment file, RC CTS, and unemployment data from the BLS.
d. Of the transitioning Marines who affiliated with the SelRes in cohorts prior to a Marine's transition, the percentage who were activated in that month.
e. We combined all aviation occfields (60XX through 73XX) in our statistical models. When entered separately, the estimated hazard ratio associated with the individual aviation occfields are similar in magnitude and significance to each other.
f. Trimesters of the fiscal year are October, November, December, and January (ONDJ); February, March, April, and May (FMAM); and June, July, August, and September (JJAS).

Table 10. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning officers or never-activated officers, Oct. 2001 to Sep. 2011[c]

Characteristic	All		Never activated	
Gender				
Female	**1.000**		**1.000**	
Male	1.118		1.104	
Race				
White	**1.000**		**1.000**	
Black	1.142		1.085	
Other races	1.283	***	1.268	**
Ethnicity				
Non-Hispanic	**1.000**		**1.000**	
Hispanic	1.013		1.0983	
Marital status				
Single	**1.000**		**1.000**	

Table 10. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning officers or never-activated officers, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
Married	0.966		0.992	
Divorced/separated	1.185		1.238	
Number of dependents				
Zero	**1.000**		**1.000**	
One	0.947		0.949	
Two	0.965		0.947	
Three	1.282	*	1.302	*
Four or more	1.682	***	1.701	***
Education credential				
Bachelor's degree	**1.000**		**1.000**	
Graduate or professional degree	1.347	***	1.356	***
Geographic area				
South Atlantic	**1.000**		**1.000**	
New England	1.031		1.017	
Middle Atlantic	0.985		0.988	
East-North Central	0.871		0.884	
West-North Central	0.839		0.788	
East-South Central	0.905		0.880	
West-South Central	1.097		1.122	
Mountain	0.988		0.963	
Pacific	0.956		0.963	
State unemployment rate				
Unemployment rate in month of transition	1.017		1.015	
Change in unemployment rate over past 6 months	1.063		1.067	
Paygrade				
O-1 or O-2	1.000		0.994	
O-3	**1.000**		**1.000**	
O-4 or O-5	1.884	***	1.873	***
Quality Measures				
Non-gold standard	**1.000**		**1.000**	
Gold standard	1.084		1.083	
Gold standard status is missing	1.018		1.011	
Months deployed while in the AC				
Zero	**1.000**		**1.000**	
1 to 6	1.027		1.000	
7 to 12	1.148		1.124	
13 or more	1.066		1.044	

Table 10. The relative likelihood of SelRes affiliation[a] associated with demographic and service characteristics[b] of all transitioning officers or never-activated officers, Oct. 2001 to Sep. 2011[c] (continued)

Characteristic	All		Never activated	
Months between last deployment and transition				
Never deployed, zero months	**1.000**		**1.000**	
1 to 6	0.912		0.952	
7 to 12	0.915		0.929	
13 or more	0.834		0.841	
Activated from the IRR				
Never activated	**1.000**			
1 to 6 months	0.861			
7 to 12 months	0.696			
13 or more months	0.935			
Activation included deployment	0.581	**		
Expectation of SelRes activation				
Percentage of PS officers activated in SelRes[d]	1.001		1.001	
Occfield				
01XX: Personnel, administration, and retention	1.118		1.099	
02XX: Intelligence	1.166		1.115	
03XX: Infantry	**1.000**		**1.000**	
04XX: Logistics	1.196	*	1.196	*
06XX: Command and control systems	1.151		1.182	
08XX: Field artillery	0.872		0.906	
13XX:Engineer, construction, facilities, and equipment	0.881		0.847	
18XX: Tank and assault amphibious vehicles	1.314		1.301	
30XX: Supply administration and operations	1.283	**	1.322	**
34XX: Financial management	1.118		1.125	
43XX: Public affairs	1.062		0.932	
44XX: Legal services	1.161		1.176	
58XX:Military police/corrections	0.907		0.894	
Aviation occfields (60XX–75XX)[e]	1.138		1.165	*
Other occfields	6.392	***	6.468	***
Trimester of transition[f]				
ONDJ FY02	**1.000**		**1.000**	
FMAM FY02	0.826		0.782	
JJAS FY02	0.934		0.993	
ONDJ FY03	1.065		1.064	
FMAM FY03	1.149		1.176	
JJAS FY03	0.958		0.964	

Table 10. The relative likelihood of SelRes affiliation[a] associated with demographic and service
characteristics[b] of all transitioning officers or never-activated officers, Oct. 2001 to
Sep. 2011[c] (continued)

Characteristic	All		Never activated	
ONDJ FY04	0.782		0.798	
FMAM FY04	0.879		0.852	
JJAS FY04	0.914		0.880	
ONDJ FY05	0.924		0.852	
FMAM FY05	1.082		1.032	
JJAS FY05	1.145		1.127	
ONDJ FY06	1.583		1.518	
FMAM FY06	0.976		0.949	
JJAS FY06	0.958		0.93	
ONDJ FY07	1.165		1.330	
FMAM FY07	1.645	*	1.671	*
JJAS FY07	1.161	*	1.516	
ONDJ FY08	1.294		1.211	
FMAM FY08	0.985		0.931	
JJAS FY08	0.991		0.945	
ONDJ FY09	1.376		1.294	
FMAM FY09	0.761		0.721	
JJAS FY09	1.085		1.034	
ONDJ FY10	1.029		0.932	
FMAM FY10	0.922		0.918	
JJAS FY10	1.212		1.165	
ONDJ FY11	1.335		1.282	
FMAM FY11	0.283	**	0.277	**
JJAS FY11	-		-	
Number of observations	4,105		3,921	

a. Statistical significance designated as follows: * p-value < 0.1; ** p-value < 0.05, and *** p-value < 0.01.
b. For categorical variables, the hazard ratio for the comparison group has been set to 1 and bolded.
c. Source: MCTFS end-of-month snapshots, Oct. 2001 to Sep. 2011 merged with data from MCRISS, the GWOT deployment file, RC CTS, and unemployment data from the BLS.
d. Of transitioning officers who affiliated with the SelRes in cohorts prior to a officer's transition, the percentage that activated in that month.
e. We combined all aviation occfields (60XX through 73XX) in our statistical models. When entered separately, the estimated hazard ratio associated with the individual aviation occfields are similar in magnitude and significance to each other.
f. Trimester of the fiscal year are: October, November, December, and January (ONDJ); February, March, April, and May (FMAM); and June, July, August, and September (JJAS).

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