Retention in the Reserve and Guard Components
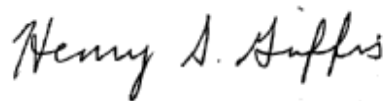
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Background

Policy-makers have proposed replacing the current system of reservist participation with a new model, termed a *Continuum of Service*. This new paradigm is intended to give reservists the ability to move seamlessly between full- and part-time status. Furthermore, the intent of this new system is to rely on reservist volunteerism, by providing more options for participation at different levels of service.

The services must provide adequate incentives to encourage reservists to volunteer. It is likely that changes to the current compensation system will be necessary to facilitate an increase in volunteerism. Before making any changes, however, it is important to understand existing manning problems, as well as those that could arise as a result of a Continuum of Service. If the services wish to rely on reservists with already-low retention, increases in compensation for these groups would be necessary to prevent retention from falling any further. In addition, the skill sets, demographics, civilian opportunities, and military experience of these groups will affect the types of pay and benefits that DoD should offer.

Data and methodology

This paper analyzes information from the Reserve Components Common Personnel Data System (RCCPDS) from FY00 to FY03 in order to identify existing, chronic, and potential manning challenges for each Reserve and Guard Component. These data contain detailed information on the demographics of the servicemembers, characteristics of their military service, and their retention decisions.

Although the RCCPDS provides us with a great deal of data, it also has significant limitations. Most significant is the inability to identify

reservists who are activated, mobilized, or deployed. Consequently, we can identify only the existence of retention problems and not their underlying causes.

In designing a compensation system to support a Continuum of Service, policy-makers need to understand the primary determinants of retention. Consequently, we isolate and present the effect of different reservist characteristics on continuation behavior, using standard logistic regression models. This approach allows us to identify the areas in which retention is already low and in which an increase in participation might create significant manning problems.

Findings and implications

Using these data, it is not possible to identify whether reservists are activated, mobilized, or deployed at any point during the time period we examine. However, most of the Reserve and Guard Components experienced *increases* in retention from FY00 to FY03. Furthermore, state-level data suggest a small, positive relationship between mobilizations and continuation rates. These trends are notable because mobilizations and deployments have all increased over this time period. Conventional wisdom would suggest that this would contribute to *more* separations from the Reserves.

Relatively large military pay raises, a sagging domestic economy, and a renewed sense of patriotism have all been credited with increases in retention in the Active Components. It is probable that these factors have also contributed to increases in retention in the Reserve and Guard Components. Even if these causes have overshadowed the negative effect of mobilizations, however, DoD should not *rely* on this relationship to continue. Rather, it seems prudent for the services to have the *flexibility* and discretion to provide incentives for voluntary participation if and when they become necessary.

While overall retention is high and on the rise in most Components, there are still certain groups with low retention. The most junior enlisted paygrades, which represent over 40 percent of all enlisted personnel, have continuation rates well below 80 percent. At the other end of the spectrum, there is strong evidence that retirement

benefits heavily influence retention decisions. Continuation rates are at their highest as servicemembers approach the point at which they become vested; once they become retirement-eligible, however, retention drops significantly. This suggests that changes in retirement benefits can significantly affect servicemember behavior and decisions to volunteer.

Retention also increases with level of education, until the point at which reservists obtain their degrees. It is probable that many people work toward their degrees while in the Reserves but choose to leave after finishing their education. If this is the case, changes in the level of educational benefits offered to reservists have the potential to influence volunteerism as well. However, the data also indicate that additional incentives may be necessary to retain servicemembers *after* they have obtained their degrees.

Finally, the data provide evidence that reservist retention varies with the strength of one's civilian earnings opportunities. Those with strong earnings potential in the labor market have some of the lowest continuation rates across the Reserve and Guard Components. At the other end of the spectrum, reservists with skills that typically command low salaries in the private sector have very high retention.

In establishing a Continuum of Service, then, it is likely that the pay/benefits necessary to encourage volunteerism will differ by occupational specialty. This differential will be exacerbated if skills with strong civilian opportunities are those on which the services hope to rely for enhanced volunteerism. These specialties already have relatively low retention; efforts to elicit higher levels of participation will require even higher compensation.

Introduction

Since the end of the Cold War, each of the services has used reservists more frequently, for longer periods, and in more varied roles. Using reservists in new ways has necessitated cumbersome workarounds to the traditional model of reservist participation. Policy-makers have proposed replacing the current system with a new paradigm, termed a *Continuum of Service*. This new model of participation is intended to give reservists the ability to move seamlessly between full- and part-time status, depending on their specialties, civilian job commitments, and even geographic location. Such a system would rely on enhanced volunteerism by providing more options for participation.

Because the Continuum of Service is, in many ways, a significant departure from the past, policy-makers are uncertain whether existing compensation is sufficient to facilitate an increase in volunteerism. Consequently, the Office of the Assistant Secretary of Defense for Reserve Affairs (Manpower and Personnel) has asked CNA to examine potential changes to the compensation system that would support a Continuum of Service.

Two economic principles should guide any attempt at compensation reform. First, reform should not be pursued for the sake of reform. Rather, changes to compensation should be in direct response to a specific problem faced by the services. For example, if the services are able to fully man reserve units, raising reservist pay is not a cost-effective response. If this is the case, while a pay increase might alleviate perceived inequities, it would not solve a tangible problem faced by the services.

Second, targeted pay is more efficient than across-the-board compensation. This principle is related to the first because targeted pay allows the services to address specific problem areas. In contrast, across-the-board compensation is paid to all servicemembers. Although across-the-board increases can alleviate specific manning problems, it also

raises compensation in areas in which there is no problem. This increases the overall cost of addressing the problem, whereas targeted pay could achieve the same result at substantially lower cost.

Before recommending changes to reserve compensation, then, it is important to identify existing manning problems, as well as potential problems that could arise as a result of a Continuum of Service. The degree to which different skill sets are likely to be used in a new model is potentially useful in forming personnel policies and programs that encourage different levels of participation. Also, the degree to which these skill sets differ in terms of their retention, demographics, civilian opportunities, and military experience will affect the types of pay and benefits that DoD should offer.

Therefore, this paper analyzes information from the Reserve Components Common Personnel Data System (RCCPDS) in order to understand existing, chronic, and potential manning challenges for all Reserve and Guard Components as they move toward a Continuum of Service. While recent and current conditions do not necessarily indicate that problems will persist, they do offer the services some insight into manning challenges that have the potential to be highlighted in a new model of reserve participation.

Data

The data we use in our analysis come from the Reserve Components Common Personnel Data System (RCCPDS). For each September from 1999 to 2003, the Defense Manpower Data Center (DMDC) provided data on all servicemembers in a Reserve or Guard Component.[1] These data allow us to construct continuation rates for FY00–03 and to disaggregate these continuation rates into both reenlistment rates (i.e., those who choose to remain in the Reserves past their current obligation) and attrition rates (i.e., those who leave the Reserves before their obligation is complete).

In addition, the RCCPDS provides us with detailed data on the demographic characteristics of the servicemember (such as gender, race/ethnicity, and age) and on characteristics of their military service (paygrade, length of service, military specialty, geographic location, etc.). These additional data allow us to assess the degree to which attrition problems are concentrated within particular demographic groups, military specialties, or even geographic locations.[2]

Although the RCCPDS contains a great deal of data on reservists and characteristics of their service, it also has significant limitations. Using these data, it is not possible to identify whether reservists are activated, mobilized, or deployed at any point during the fiscal year. Consequently, we are unable to assess the role that these events play in the decision of reservists to separate from the Reserve or Guard Component to which they belong. CNA is working with the Office of the Assistant Secretary of Defense for Reserve Affairs (Manpower and Personnel) to create a database to analyze the impact of activation, mobilization, and deployment on attrition. In this analysis, however, we can identify only the *existence* of manning problems and not their *underlying causes*.

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1. We thank Ms. Molly Wehrle at DMDC for her efforts with these data.

2. Reference [1] uses the RCCPDS in a similar fashion, examining quarterly Naval Reserve data from FY86 and FY87.

Retention in the Reserve and Guard Components

Continuation rates

Table 1 lists FY03 continuation rates, calculated separately for each Reserve and Guard Component. We define the *continuation rate* as the proportion of Selected Reserve (SelRes) members in a Reserve or Guard Component at the beginning of the fiscal year who are still members of the Selected Reserve at the end of the fiscal year.

Table 1.   FY03 continuation rates

Component	Continuation rate
Army National Guard	86.9%
Army Reserve	84.6%
Naval Reserve	82.5%
Air National Guard	89.5%
Air Force Reserve	86.3%
Marine Forces Reserve	82.4%
Coast Guard Reserve	80.7%

As shown above, continuation rates are highest in the Air National Guard and lowest in the Coast Guard. The difference between the largest and smallest level of continuation is not trivial. At one extreme, continuation rates in the Air National Guard are close to 90 percent; in contrast, the Coast Guard Reserve has continuation at about 80 percent.

These continuation rates reflect the number of people who remain in SelRes from one year to the next. Note, however, that not all who leave SelRes *necessarily* leave the Reserves. To illustrate, table 2 lists the Reserve affiliation of those who left SelRes in FY03. In all of the

Reserve Components, less than 50 percent of those who leave SelRes actually leave the Reserves. Most switch either to the Individual Ready Reserve or to the Retired Reserve. From DoD's perspective, these separations from SelRes do not represent separations from the military; if necessary, they can still be ordered to active duty. It does, however, represent a weaker affiliation with the military and decreases the size of the most accessible pool of labor at DoD's disposal.

Table 2. Reserve affiliation of those who left SelRes in FY03 (percentages)

Component	Leave Reserves	Individual Ready Reserve	Retired Reserve	SelRes training pipeline	Standby	Inactive National Guard
Army National Guard	73.8	13.8	3.9	5.8	0.0	2.8
Army Reserve	49.7	33.8	10.8	5.4	0.4	n/a
Naval Reserve	38.0	46.4	9.8	5.4	0.4	n/a
Air National Guard	43.1	14.7	37.1	4.2	0.8	0.0
Air Force Reserve	28.4	32.0	32.2	7.1	0.3	n/a
Marine Forces Reserve	47.1	44.7	3.5	4.5	0.1	n/a
Coast Guard Reserve	40.8	40.4	16.6	0.2	2.1	n/a

The continuation rates in table 1 are a weighted average of the retention decisions of enlisted personnel, commissioned officers, and warrant officers. In table 3, we calculate these rates separately for each of these three groups.

Table 3. FY03 continuation rates of enlisted personnel, commissioned officers, and warrant officers

Component	Continuation rate (percentage)		
	Enlisted	Officer	Warrant
Army National Guard	86.3	91.6	91.0
Army Reserve	83.4	89.3	91.2
Naval Reserve	80.9	88.2	82.9
Air National Guard	89.4	90.7	n/a
Air Force Reserve	86.2	86.8	n/a
Marine Forces Reserve	82.3	82.0	86.7
Coast Guard Reserve	80.6	80.4	86.1

With the exception of the Marine Forces and Coast Guard Reserve, continuation rates are higher for commissioned officers than for enlisted personnel; warrant officer retention is usually at or above that of commissioned officers.[3] Continuation rates are virtually the same in the Marine Corps and the Coast Guard—whether the service-member is enlisted or a commissioned officer.

Trends in continuation rates

The FY00–03 data provide limited information on recent trends in continuation behavior. Most of the Components have experienced notable increases in retention over these past few years. For example, continuation rates in the Army Reserve rose from 80 percent in FY00 to over 84 percent in FY03; this increase was the result of increases for both officers and enlisted personnel. Furthermore, each Component experienced an increase in retention from FY02 to FY03, with the exception of the Air National Guard and Air Force Reserve.[4]

These trends are interesting because activations, mobilizations, and deployments have all increased over this time period.[5] Conventional wisdom would suggest that these events would contribute to *more* separations from the Reserves. The overall trends, however, are not consistent with this intuition.

Other factors influence continuation and have changed over this time period as well. Relatively large military pay raises, a sagging domestic economy, and a renewed sense of patriotism have all been credited with increases in retention in the Active Components [2, 3]. It is probable that these factors have also contributed to increases in retention in the Reserve and Guard Components.

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3. The Air Force does not use the warrant officer paygrades.

4. In these two Components, about half of the decrease in continuation can be explained by an increase in the number of individuals entering the Retired Reserve.

5. While DoD did issue "stop-loss" orders that prevented some reservists from leaving, these orders were not widespread enough to explain the increase in retention.

An alternate explanation for the continuation rate is that people are affiliated with the Reserves because they wish to serve their country, and that deployments are the *reason* they remain in the Guard and Reserves. Reference [4] advances a similar explanation of the relationship between active duty deployments and reenlistment, suggesting that deployments provide servicemembers with an opportunity to update previously held "naive expectations." If these explanations are correct, one would expect that recent deployments have increased retention of reservists.[6]

Even if this is the case, the services should not *rely* on a positive relationship between frequency/duration of involuntary deployment and subsequent reenlistment behavior. Rather, it seems prudent for the services to have the *flexibility* to address manning problems with compensation tools that are specifically tailored to address these problems. This gives the services the discretion to provide incentives for voluntary participation if and when they are necessary.

Reenlistment and attrition of enlisted personnel

For enlisted personnel, those who remain affiliated with the Selected Reserve can be decomposed into two groups on which policy-makers often focus: those who renew their contracts at the expiration of their service agreements, and those who leave SelRes before the expiration of their obligations. The proportion of those who renew their agreements is the *reenlistment rate;* the proportion of those under obligation who leave their Reserve or Guard Component is the *attrition rate.* The continuation rate is a weighted average of the reenlistment and attrition rates—the weights being the proportion of enlisted personnel who are eligible to reenlist within the fiscal year.[7]

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6. Reference [5] hypothesizes a similar explanation, noting that Navy attrition rose following the end of conflict in Desert Shield/Desert Storm.

7. Specifically, $C = E*R + (1 - E)*(1 - A)$, where C is the continuation rate, E is the proportion eligible to reenlist, R is the reenlistment rate, and A is the attrition rate. Since we do not have eligibility data for all enlisted personnel, the reenlistment and attrition rates in table 4 imply slightly different continuation rates than are shown in table 3.

It is important to note that this definition of attrition differs from that used by DoD. To measure attrition in the Reserve Components, DoD divides total losses in a given time frame by average strength over that same time period. A more comparable metric to the DoD measure of attrition is 100 minus the continuation rates presented in table 1.

Table 4, then, displays reenlistment and attrition rates of enlisted personnel in FY03, calculated separately for each Reserve and Guard Component. The Air National Guard has the highest reenlistment and one of the lowest attrition rates of all the Components; both metrics combine to generate the high continuation rates in table 3. Similarly, the Marine Forces Reserve has the lowest reenlistment rate and relatively high attrition.

Table 4.   FY03 reenlistment and attrition rates of enlisted personnel (percentages)

Component	Reenlistment	Attrition
Army National Guard	65.1	9.0
Army Reserve	63.4	14.7
Naval Reserves	75.5	18.0
Air National Guard	86.0	10.1
Air Force Reserve	82.3	13.1
Marine Forces Reserve	60.3	16.1
Coast Guard Reserve	76.1	18.9

High (low) reenlistment is not always accompanied by low (high) attrition, however. For example, both the Naval and Coast Guard Reserve have higher reenlistment *and* higher attrition than the Army National Guard. The combination of simultaneously high attrition and reenlistment has a unique interpretation. High attrition means that servicemembers are leaving SelRes before the expiration of their obligated service; yet many of those who honor their commitments choose to remain in the Selected Reserve. In contrast, low attrition coupled with low reenlistment means that most people remain throughout their obligated service but choose to leave at the end of their commitments.

In general, trends in reenlistment rates of enlisted personnel follow the trend in continuation rates. Except for the Air Force and the Coast Guard, however, attrition rates have steadily decreased in *every* Reserve and Guard Component from FY00 to FY03. For example, Naval Reserve attrition in FY00 was 23 percent; by FY01, it had declined to 20.5 percent and fell to about 18 percent in FY02–03.

A multivariate analysis of continuation behavior

Continuation rates vary over many dimensions, not just by Reserve and Guard Component or by enlisted, commissioned, or warrant officer. In designing a compensation system to support a Continuum of Service, policy-makers need to understand the primary determinants of retention. On one hand, if certain skill sets have already-low retention because of strong civilian opportunities, expectations of an increase in participation from these servicemembers are probably not realistic. In fact, one could argue that higher compensation for these groups is needed *now* to alleviate manning shortages. More frequent participation under a Continuum of Service would require a larger pay increase for these skill sets than those with already-high retention.

On the other hand, groups with below-average attrition are those from which DoD could expect a higher level of participation with relatively little additional pay. While more frequent activations, mobilizations, or deployments would be expected to raise attrition in these skill sets, retention is already high and a reduction would not create as severe a manning challenge as in those skill sets with strong civilian opportunities.

To better understand these primary determinants of retention, we use a standard logistic regression model[8] to isolate the effect of different reservist characteristics on continuation behavior.[9] Logistic regression is a common statistical technique to use when the behavior being studied is dichotomous (binary choice). In our model, the two outcomes are to "stay in" or to "leave" SelRes within a fiscal year. The logistic regression estimates the probability of remaining in the

8.   For a detailed explanation of the logistic model, see [6].

9.   For an example of this approach, see [7].

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Selected Reserve (equivalently, the proportion of those who remain in SelRes), holding constant a number of observable characteristics.

Table 5 presents descriptive statistics of the data we have on reservists from RCCPDS. These are the variables that we use in our models of continuation behavior. Unless otherwise indicated, the data reflect the proportion of reservists in our data with a given characteristic.

In the following subsections, we present the relationships between several characteristics of a servicemember, his or her military service, and continuation behavior. Note, however, that we estimate a model that *simultaneously* controls for all these factors. This allows us to measure the independent effect of each characteristic on continuation.

For the bulk of our analysis, we focus on models that include members from all Reserve and Guard Components. When there are notable differences from one Component to the next, however, we will highlight those differences. In all other cases, the relationship between a given characteristic and continuation behavior is similar across all Components.

Paygrade

As table 3 showed, continuation rates are generally higher for commissioned and warrant officers than for enlisted personnel. For the enlisted paygrades, however, our multivariate analysis reveals that retention varies significantly by paygrade. Figure 1 displays predicted continuation rates by enlisted paygrade, holding all other characteristics constant. In general, continuation rates rise steadily by enlisted rank. Continuation rates for E-1s are around 63 percent, but they increase by paygrade until E-8, with continuation rates around 93 percent. Retention of E-9s is only slightly lower, at 92 percent.

In contrast, continuation rates for commissioned officers, shown in figure 2, have little variation by paygrade. Continuation rates vary between 84 and 91 percent, depending on paygrade. While retention of O-3s, O-4s, and O-5s is slightly higher than that of officers in other paygrades, there is no pronounced pattern by paygrade. The difference in retention by paygrade is even smaller for warrant officers (not shown).

Table 5.   Descriptive statistics

Variable	Proportion	Variable	Proportion	Variable	Proportion
Component		**Geographic location**		**Gender**	
Army Guard	0.401	Northeast	0.059	Male	0.842
Army Reserves	0.232	Mid-Atlantic	0.200	Female	0.158
Navy Reserves	0.106	Midwest	0.198	**Race/ethnicity**	
Air Force Guard	0.132	South	0.300	Hispanic	0.075
Air Force Reserves	0.075	Central	0.061	White (non-Hispanic)	0.706
Marine Corps Reserves	0.044	West	0.151	Black (non-Hispanic)	0.168
Coast Guard Reserves	0.010	Other	0.030	Other	0.051
Type of personnel		**Enlisted occupations**[a]		**Marital status**	
Enlisted	0.851	Infantry, gun crews and	0.187	Married	0.560
Commissioned officer	0.135	seamanship specialists		Not married	0.440
Warrant officer	0.014	Electronic eqpt. repair	0.050	**Educational attainment**	
Paygrade[b]		Comm./intel. specialists	0.051	No high school degree	0.046
E-1	0.015	Health care specialists	0.071	High school degree	0.588
E-2	0.028	Other tech/allied spec.	0.031	Some college	0.161
E-3	0.096	Functional supt./admin.	0.200	College degree	0.137
E-4	0.301	Electrical/mechanical	0.175	Postgraduate degree	0.047
E-5	0.236	equipment repairers		**Other characteristics**[c]	
E-6	0.174	Craftsworkers	0.062	Number of children	0.855
E-7	0.105	Service and supply	0.118	Age	35.58
E-8	0.035	handlers		Years of military service	12.51
E-9	0.011	Non-occupational	0.056	State unemployment	6.21
O-1	0.052	**Officer occupations**[d]		rate	
O-2	0.115	General officers	0.008	**Fiscal year**	
O-3	0.266	Tactical ops. officers	0.359	FY00	0.254
O-4	0.313	Intelligence officers	0.045	FY01	0.247
O-5	0.191	Engrg./maint. officers	0.109	FY02	0.248
O-6	0.061	Scientists/professionals	0.054	FY03	0.252
O-7 +	0.004	Health care officers	0.195		
W-1	0.088	Administration	0.081		
W-2	0.318	Supply, procurement	0.105		
W-3	0.237	and allied officers			
W-4	0.315	Non-occupational	0.022		
W-5	0.042	Other	0.023		

a. Proportion of all enlisted personnel.
b. Proportion in each enlisted, commissioned, and warrant officer paygrade of the total enlisted, commissioned, and
warrant officer populations, respectively.
c. Sample average is presented.
d. Proportion of all officers.

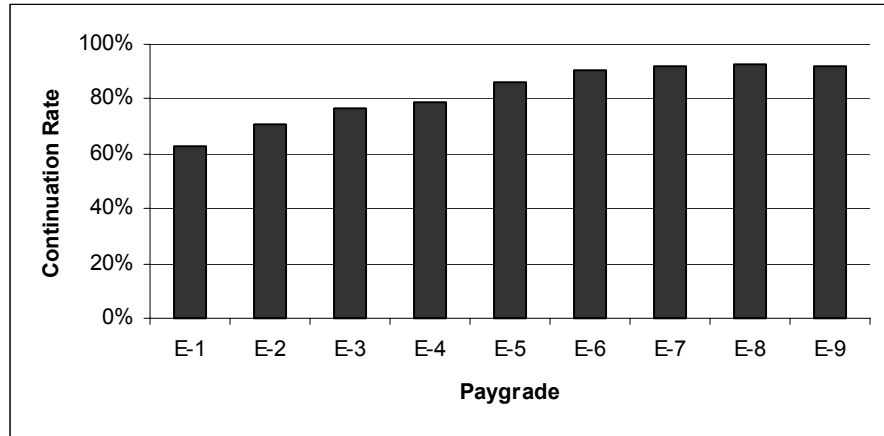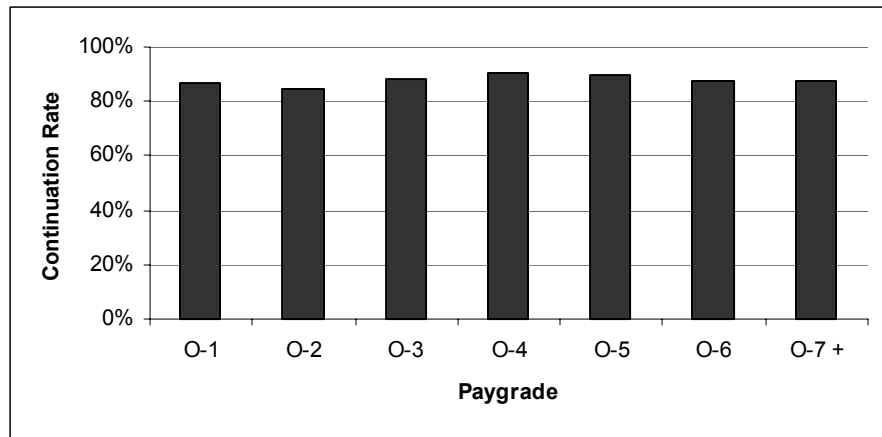Figure 1. Estimated continuation rates by enlisted paygrade

Figure 2. Estimated continuation rates by commissioned officer paygrade

It is only the most junior enlisted paygrades (E-1 to E-4), then, that appear to have significantly low retention, with continuation rates below 80 percent. These junior personnel in the Reserve and Guard Components represent over 40 percent of all enlisted personnel. If the services wish to rely on these servicemembers in a Continuum of Service, significant changes in compensation will probably be necessary to encourage them to remain in the Selected Reserve.

At the other end of the spectrum, more than 75 percent of all commissioned officers are in the O-3 to O-5 paygrades and have high levels of retention. Consequently, the services need to be less concerned about the retention impacts of the Continuum of Service on the seniority mix of officers. In other words, it is not likely that a new model of reservist participation will create a disproportionate manning challenge in the commissioned or warrant officer ranks.

Length of military service

Another dimension over which continuation rates vary significantly is the length of an individual's affiliation with the military.[10] To illustrate this point, figure 3 displays enlisted continuation rates by length of military service.[11] Continuation rates average between 83 and 90 percent until about 20 years of service, after which they drop significantly. This is not unexpected because people with 20 years of service qualify for retirement benefits. Consequently, there is a reduced incentive to remain a reservist after the 20-year point. In fact, it is notable that, of those with at least 25 years of service, over 70 percent choose to *remain* in the Selected Reserves.

Figure 3.   Estimated enlisted continuation rates by length of military service

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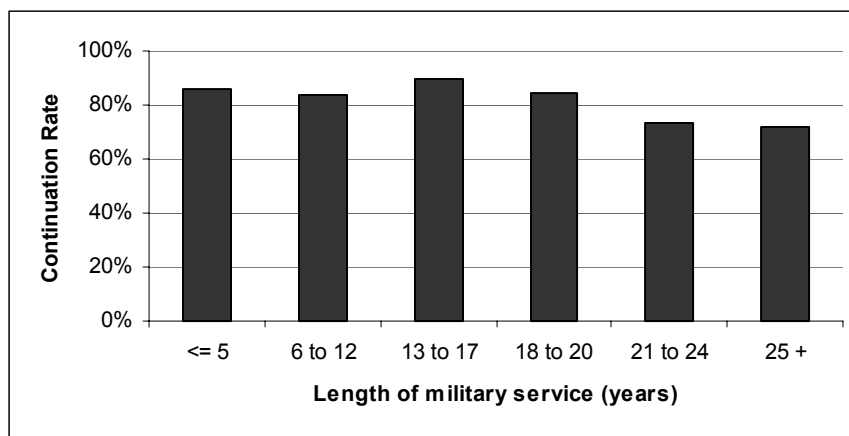
10. Unfortunately, we do not have data on the length of service in the Reserve or Guard Component with which an individual is affiliated.

11. Data for commissioned and warrant officers display similar patterns.

Furthermore, working conditions in the Reserve and Guard Components do not overshadow the draw of the military retirement system. As figure 3 shows, continuation rates at 13 to 17 years of service are higher than those of less experienced personnel. These are the servicemembers close to the point at which they become eligible for a military pension. While activations, mobilizations, and deployments may be affecting retention, it does not appear that the effect is so strong that many forgo a chance at receiving retirement benefits.

A comparison of continuation rates by age of servicemember leads to a similar conclusion. Enlisted continuation rates are generally high, between 80 and 90 percent, until the age of 55. In contrast, retention of those 55 years of age or older is only 76 percent.

These differences in retention by length of service have direct implications for a Continuum of Service. Given the demonstrable draw of the retirement system, the services can expect relatively high retention of those approaching the 20-year point, even at more frequent levels of participation. In addition, the "economic rent" of offering additional retirement benefits is probably high since many of these people would choose to stay in the Selected Reserve even without these benefits. If the premium to the services of additional experience is high enough, however, it might be cost-effective to consider compensation options that incentivize servicemembers to stay past the 20-year point.

Geographic location

A potentially important consideration in the decision to activate, mobilize, or deploy units is the geographic location in which that unit is based. On one hand, if certain regions of the country have persistent manning problems, mobilizing units from these states could exacerbate already low retention. Indeed, deployments from these regions over FY00–03 could be responsible for the low retention we observe in these areas. On the other hand, if there are more significant determinants of retention than geographic location, it is likely that a Continuum of Service could be supported with equal representation across the country.

To investigate this, we separate units into seven different geographic groups: units based in the Northeast, Mid-Atlantic, Midwestern, Southern, Central, and Western states, as well as those based outside the

United States (e.g., Puerto Rico). As shown in table 6, retention is remarkably stable across regions; each region of the United States has continuation rates between 84.5 and 86.5 percent. Units based outside the United States have slightly higher retention than those based within the 50 states.

Table 6.   Continuation rates by region

Region	Continuation rate (percentage)
Northeast	86.3
Mid-Atlantic	84.6
Midwest	85.0
South	84.6
Central	85.6
West	84.5
Non-U.S.	86.9

When adjusting for the skill mix and demographic characteristics of units, as well as the economic conditions in the states in which these units are based, the variation in retention by region is even smaller. However, each of the Reserve and Guard Components has different experiences in different regions of the country. In a given region, some Components will have relatively high retention, while others see low continuation rates.

To illustrate this point, table 7 displays, for each Reserve and Guard Component, the region in which the highest and lowest continuation rates are observed. These calculations are presented separately for enlisted personnel and for officers; in addition, we show the proportion of reservists in that Reserve or Guard Component whose units are based in that region. All of the differences in table 7 are "statistically significant," which means that we can state with confidence that these are true differences in retention, and not anomalies in a particular year.

Table 7. Regions with lowest/highest estimated continuation rate (percentage) for each Component

Component	Continuation rate	Proportion in region
Army National Guard Enlisted		
West	83.4	0.117
Non-U.S.	91.1	0.030
Army National Guard Officer		
Midwest	91.0	0.213
Non-U.S.	92.4	0.021
Army Reserve Enlisted		
Non-U.S.	79.9	0.037
Northeast	82.1	0.041
Army Reserve Officer		
Non-U.S.	85.2	0.032
Northeast	88.2	0.046
Naval Reserve Enlisted		
Central	78.9	0.031
South	80.7	0.315
Naval Reserve Officer		
Non-U.S.	84.3	0.053
Northeast	87.6	0.056
Air National Guard Enlisted		
South	91.2	0.236
Non-U.S.	92.5	0.015
Air National Guard Officer		
South	92.3	0.232
Non-U.S.	93.0	0.013
Air Force Reserve Enlisted		
Central	87.7	0.058
Non-U.S.	93.6	0.005
Air Force Reserve Officer		
Northeast	87.6	0.049
Midwest	90.5	0.159
Marine Forces Reserve Enlisted		
Central	77.5	0.035
Non-U.S.	80.4	0.036
Marine Forces Reserve Officer		
Northeast	75.4	0.037
West	82.6	0.252
Coast Guard Reserve Enlisted		
Midwest	81.9	0.094
Central	87.4	0.007
Coast Guard Reserve Officer		
Central	71.8	0.003
Midwest	85.7	0.107

The regions with high (low) retention are similar for both officers and enlisted personnel in only a few cases. The Army Reserve has low retention in units based outside the United States and high continuation rates in the Northeast. The Air National Guard has low retention in the South and high continuation rates in units based outside the United States. Units outside the United States have the most variation in continuation rates: in 6 of 14 cases, the highest level of retention for a Component is in this region, but in 3 cases it also produces the lowest continuation rates.

Of particular concern are regions with low retention and a large number of personnel in units based within these regions. For example, over 20 percent of the Air National Guard is based in the South, where retention is lowest for this Component. However, a large proportion of Naval Reserve enlisted personnel are based in the South, where retention is highest; Air Force and Coast Guard Reserve units have a similar situation with officers in the Midwest.

Widespread regional manning difficulties, then, exist in only a few cases. This does *not* mean, however, that the services should ignore differences in retention at a more localized level. In fact, it is probable that there are areas within every region (e.g., states, counties, cities) that have difficulty consistently manning units. Unit affiliation bonuses could help ease these manning challenges, particularly as the services move toward a Continuum of Service. Where retention problems exist throughout a region, however, it is likely that widespread use of these compensation tools would help improve the manning situations.

Activations, mobilizations and deployments

Using the RCCPDS data, it is not possible to identify whether individual reservists are activated, mobilized or deployed at any point during the fiscal year. However, we do have supplemental data from DoD that allow us to identify the number of Individual Mobilization Augmentees (IMAs), by Component and by state, from FY01 to FY03.[12] Using these data, we can assess the extent to which mobilizations and continuation rates vary by state, and can draw inferences about the effect of mobilization on individual retention behavior.

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12. IMAs are reservists who train on a part-time basis in preparation for mobilization.

We find a small, positive relationship between the proportion of reservists in a state that are IMAs and the continuation rate in that state. Even after controlling for all the other observable characteristics of reservists that we have identified, there is no evidence that mobilizations lead to lower continuation rates. This statistical relationship is consistent with the trends in the aggregate data, where continuation rates have increased as the number of activations, mobilizations and deployments has risen. Again, we stress that the services should not rely on this positive relationship to proliferate; rather, it is recommended that the services have the flexibility to address emerging manning problems if and when they arise.

Local economic conditions

Given the nature of the data, we cannot separately identify the role of overall economic conditions vs. the general environment in the Reserves from one year to the next. However, we are able to examine the effect that local economic conditions have on retention. Using unemployment rates of the state in which a unit is based, we can assess the extent to which differences in the local economic environment affect continuation behavior.

In general, higher unemployment in a state is associated with higher retention. This finding is intuitive: in regions where civilian job opportunities are scarce, people are more likely to maintain their affiliation with the Selected Reserves. The magnitude of this relationship, however, is very small. A 1-percentage-point increase in unemployment (a sizable increase) increases continuation rates by only 0.2 percentage point. While local economic conditions do play a role in retention, then, they do not appear to be the primary drivers of the decision to remain in the Reserves.[13]

Occupational specialty

The degree to which different skill sets are used in a Continuum of Service is an important consideration in forming personnel policies

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13. The small but statistically significant effect of state-specific unemployment rates on continuation behavior is consistent with previous research [2].

that encourage different levels of participation. As table 8 shows, enlisted retention does vary substantively by occupational specialty: reservists without an occupational affiliation have continuation rates at about 78 percent, whereas electrical/mechanical equipment repairers have continuation rates just under 86 percent.

Table 8.   Estimated continuation rates (percentages) by enlisted occupational specialty

Occupation	Continuation rate
Non-occupational	78.4
Health care specialists	82.7
Infantry, gun crews and seamanship specialists	83.3
Communications and intelligence specialists	83.5
Electronic equipment repairers	83.9
Other technical and allied specialists	84.5
Service and supply handlers	85.3
Craftsworkers	85.3
Functional support and administration	85.3
Electrical/mechanical equipment repairers	85.7

In addition, table 8 provides some evidence that retention varies by the strength of one's civilian earnings opportunities. For example, health care specialists and electronic technicians generally have strong earnings potential in the labor market and have some of the lowest levels of retention. At the other end of the spectrum, reservists in service occupations and administrative positions, with relatively low earnings potential, have very high continuation rates. Despite some subtle differences by Component, these patterns are generally consistent for all reservists.

In establishing a Continuum of Service, then, it is likely that the pay/benefits necessary to encourage volunteerism will differ by occupational specialty. Reservists with strong civilian opportunities already have relatively low retention; efforts to elicit higher levels of participation will require relatively higher compensation. In contrast, those with less favorable civilian opportunities have high retention and will probably not require as much compensation.

Table 9 displays comparable results for commissioned and warrant officers. For officers, the relationship between civilian earnings opportunities and retention is less strong. Health care officers and scientists have the highest continuation rates of all occupational specialties, but tactical operations officers, which include pilots, have very low retention.

Table 9.   Estimated continuation rates by officer occupational specialty

Occupation	Continuation rate
Tactical operations officers	87.4
Non-occupational	87.5
Intelligence officers	88.5
Administration	89.2
Engineering and maintenance officers	89.4
Supply, procurement and allied officers	89.5
General officers	90.1
Health care officers	90.2
Scientists and professionals	90.2

Unfortunately, the RCCPDS data do not provide reliable information on the civilian occupation in which a reservist is employed. These data were not reported until after the beginning of FY00, so we do not have any civilian labor market data for the first year in our data. Data for FY01-03 are not substantively better; for over 90 percent of reservists, there is no civilian occupation recorded in the RCCPDS data. Consequently, we are unable to directly test whether reservists with high civilian earnings are more likely to leave the Selected Reserve.

Demographic characteristics

Finally, we examine the relationship between several individual characteristics and continuation behavior. The services are not likely to *intentionally* rely on particular demographic groups to support a Continuum of Service. However, it is important to understand the relationship between these characteristics and retention, since different demographic groups may participate at different levels in the Continuum of Service.

For example, if level of education is positively correlated with continuation behavior, offering educational benefits as an incentive to increase levels of participation can have a secondary benefit of increases in retention. Furthermore, if different demographic groups are disproportionately affected by activations, mobilizations, and deployments, any differences in retention can be exacerbated.

It is well known that demographic characteristics are some of the strongest determinants of civilian economic opportunities [8]. A possible interpretation of the effect of these characteristics is that they reflect a combination of two factors: relative economic opportunity, and relative preference for military service.[14] While it is not possible to separately identify these two effects, it is possible to see differences in continuation behavior by demographic group, even if there is no inherent difference in preference for the military. Similarly, it is possible to observe no demographic difference in retention, even if groups have substantially different economic opportunities.

Differences in continuation by gender, marital status, and race/ethnicity are consistent with this latter explanation, as they are very small in magnitude. For example, men are 0.4 percentage point more likely to stay in the Selected Reserve than women; married reservists are only 1.3 percentage points more likely to stay than those without spouses. Hispanics have continuation rates that are about 1.3 percentage points higher than those of blacks, whites, and all other racial/ethnic groups. Among these latter three groups, there are no significant differences in retention, despite well-known differences in civilian earnings opportunities.

More significant differences in retention are found at different levels of education. Table 10 presents differences in retention by educational attainment. Individuals without high school degrees have continuation rates around 82 percent, while those with diplomas (and no further education) have continuation rates of slightly more than 84 percent.

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14. This assumption is consistent with many interpretations of regression results in previous studies. For example, reference [9] attributes a negative relationship between ability and reenlistment to the "stronger civilian opportunities" of high-ability individuals.

Table 10. Estimated continuation rates by
educational attainment

Level of education	Continuation rate (percentage)
No high school degree	82.2
High school degree	84.2
Some college	87.2
College degree	86.3
Postgraduate degree	86.1

Reservists with some college education have the highest level of reten-tion. Many may be pursuing their college degrees while affiliated with the Selected Reserves; unfortunately, our data do not allow us to test this assumption. In contrast, reservists with at least a college degree have slightly lower retention than those with some college education. This is consistent with the notion that people acquire their college degrees while in the Reserves but choose to leave after finishing their education. It is also consistent with the sizable wage premium paid to college graduates in the private sector [8].

Conclusions and implications

Before recommending changes to reserve compensation, it is important to identify existing manning problems, as well as potential manning problems that could arise as a result of a Continuum of Service. Since the end of the Cold War, and particularly since the terrorist attacks in September 2001, each of the services has used reservists more frequently, for longer periods of time, and in more varied roles. To a certain extent, then, recent data provide us with an opportunity to observe how activations, mobilizations, and deployments have affected retention in the Reserve and Guard Components.

Unfortunately, it is not possible with existing data to specifically identify people who have been directly affected by this increasing reliance on reservists. We hope that data will soon be available that will allow this next step. In the meantime, we are unable to *directly* assess the role that these events play in the decision to separate from the Reserve and Guard Components. However, these existing data offer some insight into manning challenges that have the potential to be highlighted or exacerbated in a new model of reserve participation.

With data from FY00 to FY03, we have limited information on recent trends in continuation behavior. Most of the Components have experienced notable *increases* in retention over these past few years; most Components have also seen a steady decrease in attrition over the same time period. These trends are interesting, given the prevalence of mobilizations over the past few years. It is probable that a combination of an unhealthy civilian economy, sizable increases in military compensation, and a surge in patriotism have all overshadowed any effects of higher mobilization rates.

If this is the case, the services should not *rely* on a continued, positive relationship between frequency/duration of involuntary deployment and subsequent reenlistment behavior. Rather, it is prudent for the

services to have the flexibility to address manning problems with compensation tools specifically tailored to address these problems.

While overall retention is high, there are still certain groups with notably lower retention. The most junior enlisted paygrades (E-1 to E-4) have significantly low retention, with continuation rates below 80 percent. While these are the most junior personnel in the Reserve and Guard Components, they do represent over 40 percent of all enlisted personnel. At the other end of the spectrum, reservists with more than 20 years of military service have low retention since there is reduced incentive to remain a reservist after the 20-year point.

There is surprisingly little variation in retention by demographic characteristics of the individual. One notable exception is differences by educational attainment. Retention increases with level of education until the point at which reservists obtain their college degrees. It is likely that many reservists work toward their degrees while in the Reserves, but choose to leave after finishing their education. It is also consistent with the services' inability to compete with the private sector for highly educated people.

Widespread regional retention differences exist in only a few cases. This does not mean, however, that the services should ignore differences in retention at a more localized level. In fact, it is probable that there are areas within every region that have difficulty consistently manning units. Having the flexibility to address these challenges at the unit level would help the services with retention.

Finally, our data provide some evidence that retention varies by the strength of one's civilian earnings opportunities. In establishing a Continuum of Service, then, it is likely that the compensation necessary to encourage volunteerism will differ by occupational specialty. Reservists with strong civilian opportunities have low retention and will require more compensation to elicit higher levels of participation than those with less favorable employment opportunities.

References

[1] Martha E. Shiells and David L. Reese. *Retention in the Naval Reserve Force,* Feb 1988 (CNA Research Memorandum 88-29)

[2] Michael L. Hansen, Henry S. Griffis, and Deena Ackerman. *Steady-State Accession Requirements,* Mar 2003 (CNA Research Memorandum D0007675)

[3] Michael L. Hansen and Jennie W. Wenger, with Albert B. Monroe IV and Henry S. Griffis. *Is Enlisted Retention Too High?* Oct 2003 (CNA Research Memorandum D0008594)

[4] James R. Hosek and Mark Totten. *Serving Away from Home: How Deployments Affect Reenlistment,* 2002 (RAND Report MR-1594-OSD)

[5] Heidi L. W. Golding and Henry S. Griffis. *Increased PERSTEMPO, Retention, and Navy Policy,* Jul 2003 (CNA Annotated Briefing D0008040)

[6] G. S. Maddala. *Limited-Dependent and Qualitative Variables in Econometrics.* Cambridge: Cambridge University Press, 1983

[7] Dan D. Goldhaber and Jeremy A. Arkes, with David L. Reese. *Return on Quality-of-Life Programs in DoD,* Jun 1999 (CNA Research Memorandum 98-102)

[8] Peter Gottschalk. "Inequality, Income Growth, and Mobility." *Journal of Economic Perspectives* 11, No. 2(1997): 21-40

[9] Martha E. Shiells and Joyce S. McMahon. *Effects of Sea Duty and Advancement on First-Term Retention,* Jun 1993 (CNA Research Memorandum 92-205)

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