

CONCEPTUAL FRAMEWORK

Our research considered whether deployment affects the reenlistment of enlisted members and why. A fundamental underlying question was why past deployment should exert any influence on current reenlistment behavior. We suggest that a relationship exists because deployment enables members to learn about their preferences for deployment and about the frequency and duration of deployment.

We hypothesized that members enter military service with naive expectations about how much they will like deployment, the frequency and duration of deployment, and the variance of frequency and duration. These expectations are revised following an actual deployment experience. We described this learning mechanism as a *Bayesian updating process*. Although each deployment has its own characteristics, we hypothesized that learning occurs because deployments have common aspects—such as the separation from family and friends; the opportunity to apply training on missions, risks; the opportunity to demonstrate proficiency, resolve, and courage; as well as the possible sense of personal fulfillment. If deployment proves to be more satisfying than expected, the member revises upward his or her expected utility of remaining in service.

To demonstrate how deployment can influence reenlistment, we presented a model of the expected utility of another term in service. Higher expected utility should lead to higher reenlistment. The model depends on parameters the member can learn about from

past deployment: preferences for time deployed versus time at home station, for the variance in deployments and for the variance in deployment length. Using different parameter values, we showed how expected utility may be positively related to the expected number and variance of deployments over a reasonable range of parameter values, and positively or negatively related to the expected length and variance of a deployment. The expected utility model paved the way for our empirical work, which estimated the effect of past deployment on reenlistment.

STRUCTURE OF RESEARCH

We estimated two models of deployment and reenlistment. One model treats reenlistment as a function of deployment indicators. The other model has two equations: one for reenlistment and one for the time to E-5 promotion. In this model, deployment has a direct effect on reenlistment as in the first model, but it also has an indirect effect. The indirect effect operates through the effect of deployment on time to E-5, and the effect of expected time to E-5 on reenlistment. The model allows the error terms in the promotion and reenlistment equations to be correlated, which enables the detection of unobserved factors affecting both outcomes. We estimated the models by branch of service for first- and second-term reenlistment decisions.

In the deployment/reenlistment model, we estimated two specifications of the deployment variables: a main-effect specification and full-interaction specification. In the main-effect specification, the deployment variables indicate the number of nonhostile deployments and the number of hostile deployments (i.e., deployments involving hostile duty). In the full-interaction specification, the deployment variables indicate combinations of nonhostile and hostile deployments—e.g., one nonhostile deployment and one hostile deployment. In the two-equation model, we estimated only the main-effect specification.

The data cover members facing a reenlistment decision during FY1996–FY1999. We counted deployments over a three-year period ending three months prior to the date when the member made a decision to reenlist or to leave the military. Thus, the counting period extends back to the beginning of 1993. Also, the member

receives deployment pays and bears fixed and variable costs of deployment, and the deployment indicators reflect both the deployment experience and these pays and costs. Our results are conditional on the types of deployments and the deployment pays in the analysis period.

The deployment/reenlistment model treats reenlistment as a function of the member's deployment variables, education level, Armed Forces Qualification Test score category, occupational area, race/ethnicity, gender, dependency status, unemployment rate at entry, current unemployment rate, and fiscal year. The two-equation model retains the same variables in the reenlistment equation but also adds the expected time to E-5 promotion. The promotion equation includes the variables in the reenlistment equation, indicators of the member's promotion speed to E-4, and indicators of the calendar quarter when the member entered service.

FINDINGS FROM THE ONE-EQUATION MODEL OF REENLISTMENT

With few exceptions, we found that reenlistment among members who deployed was at least as high as reenlistment among members who did not deploy, and often considerably higher. When deployment had a negative effect on reenlistment, the effect was small.

For the first term, reenlistment typically rose with nonhostile deployments and did not change with respect to hostile deployments:

- In the Army, Air Force, and Marine Corps, reenlistment rose with the number of nonhostile deployments. This is consistent with expected utility increasing with the number of nonhostile deployments.
- For the Navy, reenlistment was higher among members with some deployment but did not rise with the number of nonhostile deployments. This is consistent with the idea that first-term sailors learn about nonhostile deployment from the first deployment but not from additional deployments.
- Hostile deployment typically had a small effect on reenlistment. In the main-effect specification, reenlistment changed little as

the number of hostile deployments increased. This was also true in the full-interaction model for the Army and Marine Corps. However, for the Navy and Air Force, going from zero to one or from one to two hostile deployments decreased reenlistment for members with one or more nonhostile deployments. Overall, the effect of hostile deployments was small compared with that for nonhostile deployments. The finding was consistent with the idea that hostile deployments have positive and negative aspects, and that learning about these aspects, along with the receipt of deployment-related pay, leaves expected utility little changed on net.

- The full-interaction specification revealed that members with the most deployment (three or more nonhostile deployments and three or more hostile deployments) had lower reenlistment than did members with two nonhostile or two hostile deployments. This suggested that total deployment among the most-deployed was greater than these members preferred.

For the second term, reenlistment rose with nonhostile deployments and with the first and the second hostile deployment, which encompassed most members who had hostile deployment:

- Reenlistment increased with the number of nonhostile deployments. This was true for the Army, Air Force, and Marine Corps, in the first term, as well as for the Navy. Members apparently continued to learn about nonhostile deployment in their second term; most members had only one deployment or no deployment in their first term. The positive effect for the Navy suggested that deployment was more satisfying in the second term than in the first term. Second-term sailors receive career sea pay and have been trained in a rating (occupational specialty), whereas many first-term sailors did not receive career sea pay (during our study period) and began without training, serving as “general detail.”
- Reenlistment increased with the number of hostile deployments up to two, which differed from the first-term results where it did not change. The increase in reenlistment may reflect the selectivity of second-term members relative to first-term members,

and possibly higher satisfaction from participating in hostile deployments at a higher rank.

- Reenlistment declined somewhat for Army and Marine Corps members with three or more hostile deployments but did not for Navy or Air Force members. Still, reenlistment remained higher than for members who had no hostile deployment. The decline in reenlistment with three or more hostile deployments was consistent with the idea that the member had more time deployed than was preferred.

We used the main-effect model to predict how a 25-percent increase in episodes, all hostile, would affect reenlistment. Spreading the episodes across members at random by a Poisson process, we found that first- and second-term reenlistment would be virtually unchanged, perhaps even rising slightly.

We conducted a number of empirical excursions to test the robustness of the findings. We ran models that added months deployed as an explanatory variable. Months deployed had a negative effect on reenlistment for the Air Force, Navy, and Marine Corps but a positive effect on reenlistment for the Army. Although the inclusion of months deployed sometimes affected the coefficients on the deployment indicator variables, on the whole the effect of deployment (through the indicator *and* months variables) remained much the same. We showed in the conceptual modeling that either effect, negative or positive, was consistent with the expected utility model. Also, we estimated models for members with a four-year term of service and found results similar to the results for members with four-year or longer terms, which are reported above.

FINDINGS FROM THE TWO-EQUATION MODEL OF PROMOTION AND REENLISTMENT

The joint model of promotion speed and reenlistment indicated that time to E-5 was shorter with a greater number of nonhostile deployments but was little affected by the number of hostile deployments. For example, a member with two nonhostile episodes was promoted faster than a member with one nonhostile and one hostile episode, and that member was promoted faster than a member with no episodes of any kind. These patterns were present in all branches

and were stronger in the Army and Air Force than they were in the Navy and Marine Corps.

Although deployment tended to reduce time to E-5, the reduction was small. Furthermore, we found that a shorter expected time to E-5 resulted in an only slightly higher reenlistment probability. Therefore, although deployment affected reenlistment via promotion speed, the pathway was minor. The presence of this indirect pathway did little to affect the direct relationship between deployment and reenlistment described above.

We found evidence of unobserved variables that affected both promotion speed and reenlistment. The evidence was in the form of a large negative correlation between the error terms in the promotion and reenlistment equations except in one case (first-term reenlistment in the Air Force). We computed the implications of this correlation: Controlling for their observed variables, members who reached E-5 faster were considerably more likely to reenlist. This relationship appeared to be strong enough to merit further research to identify the unobserved factors.

REENLISTMENT AND DEPENDENCY STATUS

We were interested in whether the relationship between deployment and reenlistment differed by a member's dependency status at the time of the reenlistment decision. For most members, having dependents meant being married and, perhaps, having some children. We focused on first-term personnel because most second-term personnel have dependents. We found that for any given number of nonhostile and hostile deployments, members with dependents typically had a *higher* reenlistment probability. Furthermore, for these members reenlistment tended to *increase* with the number of nonhostile or hostile deployments, whereas for members without dependents, it rose less rapidly for nonhostile deployments and was unchanged, or declined slightly, for hostile deployments. If we had found only a difference in reenlistment between members with and without dependents, we could attribute this to selection effects related to getting married. But we found that the difference in reenlistment varied with the *number of deployments*. We believe this reflected an unobserved factor that predisposed a member to discover that deployment was satisfying, which

correlated with getting married. Compared with other members, members who married while in service presumably found the military, and its deployments, to their liking.

As mentioned, we found that the effect of nonhostile and hostile deployments on second-term reenlistment was positive. The similarity of the second-term results to those of first-term members with dependents probably reflects the selectivity of first-term reenlistment. The higher first-term reenlistment rate for members with dependents, coupled with the positive effect of deployment on reenlistment for those members, implies an overall higher reenlistment rate for members with dependents who liked deployment.

DEPLOYMENT PAYS

Deployment pays compensate for separation, danger, arduous duty, and inhospitable conditions. In effect, these pays help to reimburse the member for deployment-related costs such as making arrangements to have bills paid, possessions looked after, and responsibilities attended to during an absence for deployment. For married members, some of these costs may be shifted to the spouse, who must handle child care and household chores, often in addition to holding a job. We could not study the effect of deployment pays or costs because there was little variation in deployment pays in our study period and no data on deployment costs in our database. We suspect that deployment pays play an important role as intended by policy, but we have no empirical evidence to offer on their effect on reenlistment.

CONCLUSIONS

We found that reenlistment was higher among members who deployed compared with those who did not deploy. Reenlistment tended to rise with the number of nonhostile deployments and changed little with the number of hostile deployments. For the vast majority of members with hostile deployments, reenlistment was no lower (and sometimes was higher) than for members who did not deploy. We found that a sizeable increase in deployments, all hostile, appeared unlikely to reduce reenlistment. Finally, the results were consistent with the notion that members used their deployment

experience to revise their expectations about whether they liked deployment, and this learning mechanism created a bridge between past deployment and current reenlistment decisions.