Background and Theory Behind the Compensation, Accessions, and Personnel Management (CAPM) Model

John Ausink, Jonathan Cave, Manuel Carrillo

Prepared for the
United States Air Force and
the Office of the Secretary of Defense

Approved for public release; distribution unlimited
The research reported here was sponsored by the United States Air Force and by the Office of the Secretary of Defense (OSD). The research was conducted in RAND’s Project AIR FORCE, a federally funded research and development center sponsored by the United States Air Force under Contract F49642-01-C-0003, and in RAND’s National Defense Research Institute, a federally funded research and development center supported by the OSD, the Joint Staff, the unified commands, and the defense agencies under Contract DASW01-01-C-0004.
Summary

Pay and other forms of compensation received for military service are important determinants of a person’s decision to join the military or to reenlist after an enlistment period is completed. Since the introduction of the All Volunteer Force in 1973, understanding the effects of economic issues on the supply, recruitment, and retention of military personnel has been especially important, and determining the effects of changes in pay, retirement compensation, selective reenlistment bonuses, or selective early retirement bonuses is essential for good decisionmaking in personnel policy matters. This report describes the Compensation, Accessions, and Personnel Management (CAPM) model, which was developed to be a relatively easy-to-use personal computer-based analytical tool that would enable decisionmakers to study the effects of changes in policy on retention behavior and future inventories of military personnel.

Econometric models of the effects of compensation changes (or other policy changes that can be expressed as equivalent changes in compensation) on retention behavior usually make the simple assumption that a rational individual decides whether or not to stay in the military by comparing the potential monetary value of staying with the potential monetary value of leaving, and choosing the most lucrative course of action. Calculations of changes in retention rates in CAPM are based on one such econometric model called the Annualized Cost of Leaving (ACOL) model and a modification called the ACOL 2 model. The mathematical derivations of both models and the advantages and disadvantages of each are described in Section 2 of this report. Additionally, the simplifying assumptions made to incorporate ACOL 2 parameters in CAPM are described (in Section 3). Examples in Appendix A outline some of the limitations of these assumptions by showing when CAPM may overestimate the effects of compensation changes when compared with a “true” ACOL 2 approach.

Jonathan Cave originally called CAPM an “architecture” because it is not simply a computer model; it is an Excel®-based analytic structure that includes databases, modules written in Visual Basic for Applications (VBA), a graphic user interface, and a variety of tools to analyze model output.¹ These features are described in order to show how ACOL values are calculated, how ACOL

¹Throughout this report, “CAPM,” “CAPM model,” and “CAPM system” will be used interchangeably to refer to the software package as a whole.
values are used to project inventories, and how CAPM can be used for policy analysis.²

This report concludes with a discussion of the dynamic retention model (DRM), an intuitively satisfying model of retention behavior that is computationally more difficult than the ACOL or ACOL 2 models (see Section 4). When CAPM was originally developed, the DRM was considered too difficult to implement as a desktop tool. However, recent RAND research is exploring new approaches to the DRM that may make the incorporation of a DRM-based module practicable in future versions of CAPM.

²More detailed examples of how CAPM can be used can be found in the CAPM tutorial and exercises, MR-1669-AF/OSD.