



## CNA'S DYNAMIC DECISION MODEL FOR SERVICEMEMBER RETENTION

*CNA's retention models have helped the Department of Defense make personnel policy choices for more than half a century. This work has culminated in a retention model with the flexibility to evaluate the widest possible range of policy options: the **Dynamic Decision Model (DDM)**.*

CNA's DDM gives personnel leaders a decision-making edge through its four key attributes:

- **Comprehensive:** It quantifies retention impacts of monetary, non-monetary, and even unobservable factors.
- **Dynamic:** It considers how servicemembers react not only to the most immediate incentive package but also to the prospect of incentives at multiple points along a career path.
- **Structural:** It more successfully isolates the impact of a policy option than other, "predictive" models.
- **Reusable:** It can be used to evaluate new policy questions within hours or weeks, rather than the months required to develop a traditional, one-off policy analysis model.

***Policy decision-makers need a model that takes into account a wide variety of influences on servicemember retention across time. A dynamic decision model does that.***

The DDM focuses on policy levers, estimating the willingness of servicemembers to reenlist based on financial incentives, career expectations, economic conditions when they joined the service, and their inherent taste for military service. It helps answer three questions that are vital for meeting endstrength and manning requirements:

- What numbers will be retained under the status quo?
- Which policy changes will influence retention, and by how much?
- How will retention changes affect future manning and endstrength?

### THE CASE FOR DYNAMIC MODELING

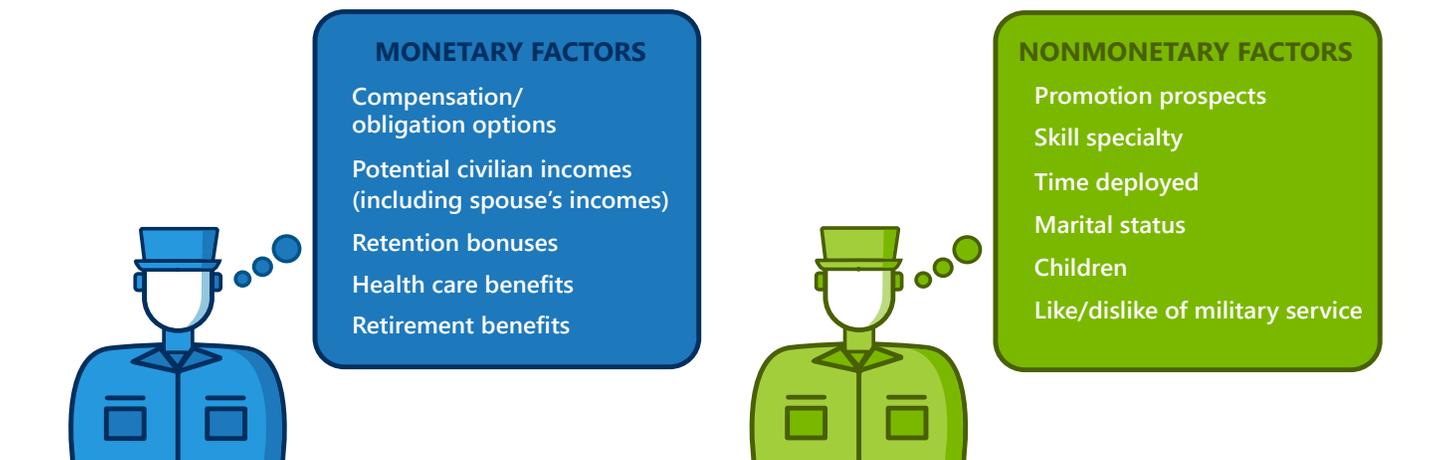
Servicemembers facing reenlistment decisions consider far more than the options in front of them at that moment. They look ahead to future bonuses that might entice them to stay. They consider economic conditions and civilian wages for their particular skill specialty. Some will take into account the impact their continued service will have on the earnings of their spouses.

Policy decision-makers need a model that takes into account all of those influences across time. An ordinary, "static" model will capture only a single decision by servicemembers at a single point in time.

But a dynamic model accounts for all of these influences. It captures hesitation to contractually obligate without some accompanying benefit. It uses estimates of how much servicemembers prefer working in the military to working in the civilian sector—or vice versa—to track the long-term consequences of retention bonuses. A dynamic model also estimates how servicemembers generally trade off money, obligation, and retention. Bonuses are not treated differently from other forms of compensation in the retention decision; instead, they are incorporated into the military-versus-civilian compensation comparison. This is important, because it allows the model to estimate the retention impact of bonuses at new career points or for obligation periods that have never been offered before.

### Elements of the Dynamic Decision Model

CNA's DDM models how individual servicemembers decide to stay in or leave the military given the following factors:



## Monetary Factors

The DDM comprehensively models the financial incentives that servicemembers are offered for each obligation length. We link military occupations to their civilian equivalents, using large civilian census and labor datasets and economic projections to estimate the civilian income that servicemembers—and their spouses—can expect if they leave the military. These are combined to approximate the **total household financial advantage** or disadvantage that remaining in the military presents over the next several years. The model has distinct advantages by incorporating factors beyond current military compensation and bonuses: It can independently estimate the retention impact of changes in other factors, such as health care and retirement benefits or future bonus opportunities.



## Nonmonetary Factors

The DDM also incorporates a wide variety of nonmonetary factors, using historical data to identify the likelihood that servicemembers will, for example, deploy, change their marital status, or have children. The DDM's probability-simulation approach allows the model to estimate the impact of new nonmonetary policies. For example, if a service wants to try a novel deployment schedule with no historical precedent, the event probabilities can be adjusted to represent the policy's expected "new reality."

One special, "unobservable" nonmonetary factor is **the degree to which a servicemember likes or dislikes military service**, which has a strong impact of the effectiveness of retention incentives. The DDM uses historical retention patterns to identify how much of each accession cohort is expected to fall into the "like" and "dislike" categories. For example, we can expect that a greater share will fall into the "dislike" category if they accessed during an economic recession, when alternatives were fewer. Incorporating this factor improves the DDM's ability to determine whether and when retention incentives are likely to be most effective. And it allows the DDM to estimate the extent to which early-career bonuses may result in the need for mid- and late-career bonuses.

### THE DDM'S ONGOING RETENTION ANALYSIS CAPABILITY

CNA has completed a Navy enlisted DDM, which already has been used for several quick-turn analyses of retention policies, as well as a DDM for Navy officer health care specialists. DDMs for Navy and Marine Corps aviators are nearing completion. To take full advantage of the DDM's reusability, CNA is developing a **dashboard that allows users to directly evaluate** the impact of different bonus policies without CNA analysts' input.

### Further Reading

*Estimating the Retention Effects of Continuation Pay.* Jared Huff, Mikhail Smirnov, Gregory Schell, and James Grefer. 2018.

*In or Out: What Drives Sailors' Reenlistment Decisions?* Jared Huff, Mikhail Smirnov, Jacklyn Kambic, Hayley Welsh, and Victor Wu. 2019.

## ABOUT CNA

CNA is a nonprofit research and analysis organization dedicated to the safety and security of the nation. It operates the Center for Naval Analyses—the only federally funded research and development center (FFRDC) serving the U.S. Department of the Navy—as well as the Institute for Public Research. CNA is dedicated to developing actionable solutions to complex problems of national importance. With nearly 700 scientists, analysts, and professional staff, CNA takes a real-world approach to gathering data. Its one-of-a-kind Field Program places analysts on carriers and military bases, in squad rooms and crisis centers, working side by side with operators and decision-makers around the world. CNA supports naval operations, fleet readiness and great power competition. Its non-defense research portfolio includes criminal justice, homeland security, and data management.

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