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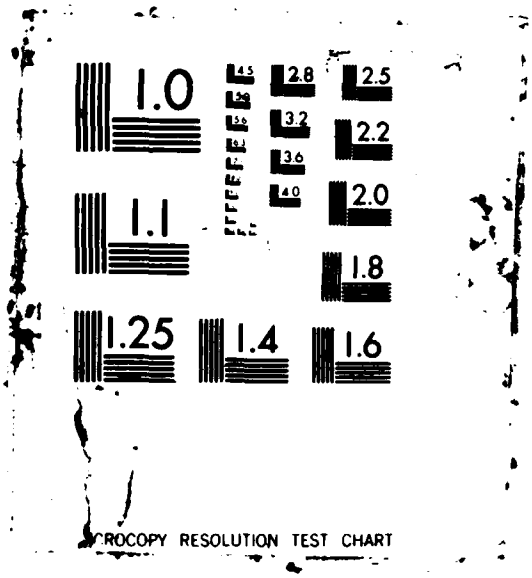
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Professional Paper 438 / February 1986

Supply Problems in the Naval Reserve

by

Jean W. Fletcher

A Division of CNA Hudson Institute

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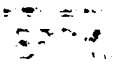

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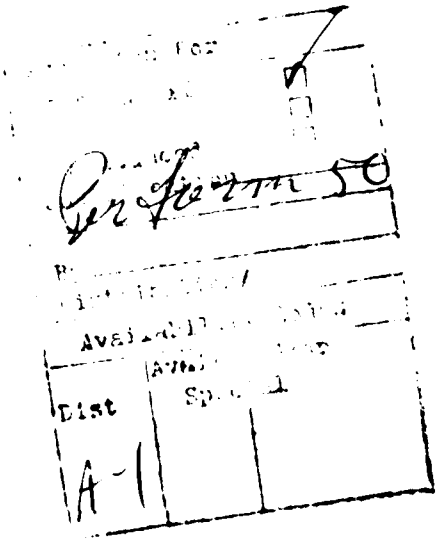

INTRODUCTION

I realized that I had mistitled my talk when I got a call from someone in the Navy Materiel Command, who said "I saw the agenda for the ICAF Conference, I'm really interested in wartime spares. What are you going to tell us?" I said, "I'm a labor economist. When I talk about supply, I mean personnel supply." This was a lesson to me not to be so insular and to think about what the world means by supply, not just what labor economists mean by supply.

I'm going to talk to you about the supply of reservists today, one of our most important manpower mobilization assets. In fact, they're the first line mobilization asset for all of the services. In particular I'm going to talk about the Selected Reserve and the work we've done trying to model Selected Reserve (SELRES) supply in the Navy.

We've talked about macroeconomic issues all yesterday and so far today. But I do see a few labor economists in the audience, so this one's for you.

The work that we've been doing with the Navy Selected Reserve has been essentially a two-year effort, and it is going to continue for another year. I want to tell you about the objectives we've tried to accomplish, and then at the end I'll tell you a little bit about what we're going to do with these results. Two of my colleagues, Dr. Deborah

Clay-Mendez and Dr. Aline Quester are in the audience; the work I am going to discuss is a cooperative effort. If there are any questions later that they can answer, they can feel free to do so. If I mess up, they can feel free not to tell me.

BACKGROUND

Previous work in the area of Selected Reserve personnel issues has been done primarily by RAND. There was a large study completed by Dave Grissmer, Zahava Doering, and others. Their main result was that for Army reservists, there was very little effect of pay on the reenlistment decision--that reservists did not seem particularly responsive to pay. We were, of course, very curious to find out if this result held for the Navy, and if it were true that pay was not going to be a very important incentive in growing a larger Navy reserve force.

Our objective was: How do you increase the reserves? The Navy Selected Reserve is slated to grow by 30 percent over the next five years. The Navy has programmed to meet SELRES requirements. The question the Navy asked us was: Are those numbers attainable? Well, being an economist, of course, I'd say, sure, the question is not, are they attainable, but at what price are they attainable? And that's what we set out to answer. What's the price of growing the Selected Reserve to meet mobilization requirements?

SELRES ENLISTMENT

We first looked at the various accession programs of the Selected Reserve. Now, let me tell you a little bit about the Navy reserves and how they're different from other service reserves. The Army is primarily a non-prior service reserve program--people are accessed off the street, trained and put into the Army reserves. The Air Force is less junior, and the Navy is much less so. The Navy Selected Reserve consists primarily of pre-trained veterans--people who were on active duty for at least three years. In fact, historically 87 percent of Navy SELRES accessions each year were pre-trained individuals. Our non-prior service programs have been fairly small. When we talk about growing the reserves much larger, much more rapidly, one big issue is--what is the appropriate mix of non-prior service and prior service accession programs?

In order to develop efficient strategies for enlarging the Navy Selected Reserve, we have modeled the enlistment and the continuation behavior of Selected Reservists. We feel that continuation, rather than reenlistment, is the appropriate concept to model because, since the advent of the All-Volunteer Force, being a reservist is pretty much a voluntary function. The result has been that less than 30 percent of the reservists actually fulfill the entire reserve contract. If one tries to model reenlistment at the end of an enlistment contract, only 30 percent of the population remains, and it's not clear that the

policy conclusions drawn from modeling reenlistment behavior are the same as those from modeling continuation behavior. Our problem then was to model the initial enlistment decision and the continuation behavior subsequent to that.

We first examined the pool of eligible Navy veterans (NAVETs) leaving the active Navy over a five-year period. Of those eligible to join SELRES in an open rating (a rating is equivalent to a military occupational specialty for Army and Air Force personnel), we found that between 6 and 20 percent affiliated. The percent varied depending upon the rating or the occupational specialty. We used Probit models to estimate the probability of joining SELRES as a function of economic and demographic factors. We found that these Navy veterans were very sensitive to economic factors. We calculated pay elasticities not unlike those that have been estimated over and over for initial enlistment in the active Navy, and we found that NAVETs were responsive to the unemployment rate. We looked at the unemployment rate for 20- to 24-year-old males in our study, and that rate averaged about 12 percent over the last 5 years.

SELRES CONTINUATION

In addition to finding that Navy enlistment into the Selected Reserve is responsive to pay and to the unemployment rate, we looked at continuation behavior. What keeps people in the reserves--or after

you've gotten them in the front door, how do you keep them? We had to know both how to get them in and how to keep them in order to determine how to budget efficiently for mobilization planning. It is important to have a Reserve force as ready as possible.

Again, to predict retention of these Navy veterans, or continuation year by year, we looked primarily at the first year, because, it turns out that of the Navy veterans who join SELRES, almost half are lost within their first year of drilling. That's an awfully high attrition rate when you consider the cost of affiliating people: signing them up, doing the paperwork, beginning to pay them, and affiliating them with a drill unit. We wanted to see what could be done to lower this really enormous first year loss rate.

We modeled the probability of surviving one year, using a Probit model with demographic and economic predictors. Our results mirror some of the results that people here and elsewhere have obtained in studies for active duty personnel. Many studies find having a high school diploma to be the most important factor in retaining people in the active Navy, Army and Air Force. We found the same thing to be true in the Reserves. High school diploma graduates are 29 percent more likely to survive a year than non-graduates.

We did not find pay and economic variables to be unimportant, just less so than demoraphic variables in the retention equation. This

result is consistent with some work that was done by Milton Boykin and Hardy Merritt using survey data. From their survey work of reservists they found that reservists initially affiliating were very responsive to pay, but subsequently became more responsive to other factors. We found, in fact, that we get continuation pay elasticities on the order of 1, which is, again, comparable to what you get for the active Navy and for the other services. However, it's unclear whether this is truly a pay effect or whether it's a pay grade effect i.e., whether it's people of higher rank who are more likely to stay for pay and other reasons combined. We do not really say we're sure about those pay elasticities.

Reserve retention in all services has gone up over the last few years and it has been due, in part, to the unemployment rate. In our retention analyses, we found that changes in the unemployment rate, rather than the level of unemployment, affect SELRES continuation.

COST-EFFECTIVE GROWTH STRATEGIES

Having modeled reserve enlistment and reserve continuation, we now have a powerful tool for analyzing alternative policy options in managing the reserves. In planning for a larger force, we can compare alternative programs; we can compare the affiliation rates, the continuation behavior and the recruitment and training costs of people from alternative programs.

We looked at the various programs that the Navy has; we looked at the cost of recruiting, training and bringing in people who had no prior military training as well as those who were trained on active duty. We found that, in general, it is cheaper to buy pre-trained personnel than to recruit and train new personnel. This is due mainly to the training cost and the attrition cost of the people that you're growing--not a surprising result.

The obstacle to strict prior service recruiting is that the supply may not match requirements. There are large SELRES requirements for low pay grade personnel. Somebody who has been on active duty for four years in the Navy is not likely to be a low pay grade person. If they are, it's not clear that the Navy wants them anyway--they've managed to survive four years without advancing. Thus, even though it's cheaper to recruit prior-service personnel, it's not clear that strategy provides the right billet/personnel match.

As additional sources of low pay grade personnel, we examined the Active Mariner and the Ready Mariner accession programs. The Ready Mariner has been replaced by the Sea and Air Mariner (SAM) program, which is a new non-prior service program. We compared the expected man years and the cost of recruiting and training people in the old Ready Mariner program and the Active Mariner program. The Active Mariner and the Ready Mariner program gave very similar results in terms of the cost

of providing personnel to the Selected Reserve, however the Active Mariners have more experience and a higher average pay grade.

From all of the analyses I have discussed today, we now have information that we can use to try to evaluate alternative policies for the Navy. We are building a SELRES supply projection model; I'll tell you a little bit more later about some of our preliminary results from that model. We now have parameters that will allow us to say how the endstrength, how the supply of reservists, will change as the pay, economic conditions in general, and mix of accession programs change. It is very important to consider all of these factors. We want to have enough people at mobilization, but we also want to have the right people.

How does the Navy make sure it has the right people? The right people can mean several things. It can mean people in the right military occupational specialty. It can also mean people who can do the job best in each military occupational specialty. With reserves one of the things that always comes up is: can they do the job when the time comes?

SKILL EVALUATION

Among Selected Reservists, we wanted to look at the question of whether or not the skills in occupational specialties eroded over time.

Economists call this human capital depreciation. We attempted to develop profiles of skill retention that would allow us to make policy recommendations about training expenditures necessary to provide a trained force for mobilization.

The problem, of course, is measuring the quality of personnel skills. Since no one has yet succeeded in solving this problem on the active side, it was very difficult to look at it on the Reserve side. There are no widely accepted measures of personnel productivity. It is an area in which a lot of people are working now, and it is a very important research issue.

We tried to look at any measures which would index skills of individual Reservists. The one readily available measure was advancement examination scores. In order to advance in a pay grade, one must take an exam which tests skills in the rating. Our objective was to detemrine whether, everything else equal, Reserve advancement examination scores declined as years since active duty service increased. Reservists can study for advancement exams. So, in a sense one can upgrade skills every time an exam is taken. It is not known how studying will affect either reservists results or reserve/active comparisons.

We found, in general, that reservists on average scored lower than active duty personnel taking the same tests. We found that the disparity increases as pay grade rises. What we did not find, though,

is any consistent, significant decline in Reserve scores over time when controlling for personal characteristics of the individuals and the training they had received. The latter result is based on a Logit model of the effect on test scores of time since leaving active duty, training, and personal characteristics.

A very important factor related to higher scores was attendance at active duty for training (ACDUTRA). ACDUTRA is the 12-14 days of annual active duty for training that all selected reservists can attend. Another important factor was having a civilian occupation related to military job. These aren't terribly surprising results; one would assume that individuals having a civilian occupation very similar to military job would experience less skill erosion.

After controlling for these two things, however, the decay in knowledge over time since active duty was very small. For some ratings it was significant, but still was a relatively small effect. One would have to be out 8 years to have the equivalent skill decay of missing one year's active duty for training. At least for the ratings we considered, the ACDUTRA was very important.

SELRES PROJECTION MODEL

Finally, in order to use all the information that we have ammassed to access SELRES personnel supply, we are putting together a model. We

have pay elasticities, unemployment rate elasticities, and demographic differences for each rating for enlistment and retention of prior service veterans.

A policy-sensitive SELRES personnel model will be valuable in mobilization planning. SELRES traditionally has shortages in some ratings and overages in other ratings. Some skill categories are very hard to recruit. Given this, we can look at the pay elasticities we have calculated and figure out how to pay selective and variable bonuses across ratings in order to attract and retain personnel with the right mix of skills. In our projection model, we are feeding in all of our estimated parameters and trying to predict personnel supply under alternative compensation policies.

The preliminary results of our project model are not automatically calculated now on a rating by rating basis. We have looked primarily at the aggregate supply to try to answer the question: Can the reserves meet their personnel goals over the coming five years. Is personnel supply adequate to fill Navy Selected Reserve requirements?

Our preliminary answer, based on projected economic conditions, expected military pay, and the assumption of 10,000 SAM accessions per year is a tentative yes. Navy SELRES goals are attainable in the aggregate over the next five years if real military pay does not decline. However, even though aggregate supply seems adequate, there

are specific skill areas where special incentives or additional recruiting resources will be required to meet goals with appropriately qualified personnel. We are now expanding our projection model to examine attainability by rating under a variety of economic and policy scenarios.

It is important to match properly personnel qualification to billet requirements. Therefore, a judgement on SELRES growth feasibility must be reserved until rating-specific projections are completed. At any rate, it is important not to let military pay erode over the next five years. If economic conditions improve a lot, it becomes more difficult to meet our Navy reserve requirements. So, while I don't say, as a policy prescription we should all go out and make sure the economy doesn't improve, I do say we need to consider these factors in planning. We must be aware, watch what is happening demographically, monitor the economic forecast, and try to program expenditures for reserve mobilization personnel such that SELRES growth is accomplished efficiently.

Thank you.

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2. Listings for Professional Papers issued prior to PP 407 can be found in *Index of Selected Publications (through December 1983)*, March 1984.

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