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A RAND NOTE

Unintended Effects of the New Military Retirement System

Yilmaz Argüden

May 1987

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→ In June 1986, the Military Retirement Reform Act was signed into law with the intention of saving \$2.9 billion in the 1986 accrual funding of the military retirement budget. This Note analyzes the potential effects of the new policy on personnel retention. Previous analyses conducted by the government to assess the effects of this new retirement policy have been based on the annualized cost of leaving (ACOL) model. Here, a new methodology, the dynamic retention model, is used to demonstrate that the ACOL methodology suffers considerable biases and that the potential effects of the new policy on retention are likely to be much greater than the ACOL model predicts. For instance, personnel losses may be larger than expected and the retention of higher quality personnel is likely to be reduced more than the retention of other personnel. The negative retention effects will probably be observed sooner than the intended cost savings.

**A RAND NOTE**

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**Unintended Effects of the New Military Retirement System**

**Yilmaz Argüden**

**May 1987**

**Prepared for  
The United States Air Force**

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## PREFACE

In June 1986, the Military Retirement Reform Act was signed into law with the intention of saving \$2.9 billion in the 1986 accrual funding of the military retirement budget. This Note provides an analysis of the potential effects of the new policy on personnel retention. It concludes that the unintended effects of the new policy on personnel retention are likely to be large. Policies that can moderate these effects would dilute the intended future cost savings.

Most of the analyses that were conducted by the government in formulating the new retirement policy and in analyzing the personnel retention effects of the new policy were based on the Annualized Cost of Leaving (ACOL) model. This Note uses a different methodology, the Dynamic Retention Model (DRM), to show that the ACOL methodology suffers considerable biases and that the potential retention effects of the new policy are likely to be much larger than ACOL models predict.

The Note should be of interest to personnel planners in all the uniformed services and to policy analysts in the Department of Defense and the Congress because it provides estimates of the effects of the new retirement policy on personnel retention.

This research was conducted under the Enlisted Force Management Project (EFMP), a joint RAND/Air Force project to develop a new, integrated, computer-based decision support system for the management of enlisted personnel. RAND's work on the EFMP falls within the Resource Management Program of Project AIR FORCE. The EFMP is part of a larger body of work in that program that is concerned with effective utilization of human resources in the Air Force.



## SUMMARY

In June 1986, the Military Retirement Reform Act was signed into law with the intention of saving \$2.9 billion in the 1986 accrual funding of the military retirement budget. Most of the analyses of alternative retirement policies leading to the new retirement policy were primarily based on the most commonly used methodology to predict retention, which is called Annualized Cost of Leaving (ACOL). However, ACOL predictions are biased. Therefore, decisionmakers may have been provided with biased estimates of the personnel retention effects of changing the retirement system.

**Losses of personnel due to the new retirement system are likely to be much larger than expected.** The number of years of productive service expected per accession is likely to decrease by more than 10 percent, a much higher percentage than the savings in military manpower budget. The retention of higher quality personnel is likely to be reduced more than the retention of other personnel.

The effect of the new retirement system will vary by year of service (YOS) group:

- It will have very little effect on new accessions and the retention of personnel at the end of first term.
- It will significantly increase losses of personnel having between 8 and 20 years of service.
- The number of airmen staying for more than 24 years of service will actually increase.

The timing of the intended cost savings and the unintended side effects will be different. The negative retention effects of the new retirement system are likely to be observed sooner than the intended reduction in outlays.

Policies to moderate these effects are likely to dilute the intended cost savings:

- Increasing accessions to maintain the current force size would increase recruitment and training costs and might make maintaining the quality mix difficult.
- Increasing current benefits across the board to improve retention would require about a 3 percent increase in current pay levels and still would not be sufficient to correct the differential effects in separate YOS groups.
- Selective increases of current benefits would raise pay equity issues and could reduce the effectiveness of bonuses in channeling personnel into desired occupational streams.

Fortunately, the unintended effects on force composition will not happen for several years. Therefore, there is **time to develop policies to moderate the deleterious effects of the new retirement system.**

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## I. BACKGROUND

In July 1985, the Congress passed legislation directing a \$2.9 billion reduction in the FY 1986 Department of Defense (DoD) accrual funding of the military retirement system. In June 1986, the Military Retirement Reform Act intended to save that amount was signed into law. This Note analyzes the effects of the new policy on personnel retention in the military.

The old retirement system provides an immediate lifetime annuity to personnel who retire after 20 or more years of service. The annuity is equal to 2.5 percentage points of final basic pay<sup>1</sup> multiplied by the number of years of service, and it is adjusted for inflation.<sup>2</sup> Basic pay is about 70 percent of total military compensation, so an individual who retires after 20 years of service receives about 35 percent of his final annual total military compensation as annual retirement pay. A chief master sergeant who serves the maximum 30 years in the military gets 75 percent of his basic pay (about 55 percent of his final pay) as retirement pay. An average retiree is a master sergeant with 23 years of service. Under the 1987 military pay schedule, his annual retirement pay would be \$12,000. Typically, he receives retirement pay for an average of 35 years starting in his early forties.

Currently, there are about 1.4 million beneficiaries of the military retirement system.<sup>3</sup> In 1984, outlays for military retirement were \$16.5 billion.<sup>4</sup> According to CBO estimates, by the end of the

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<sup>1</sup>All retirees whose date of entrance into military service is after September 7, 1980, will have their retirement benefits calculated on the basis of the average of their highest three years' pay, rather than final basic pay (P.L. 96-342, 94 Stat. 1100, September 8, 1980).

<sup>2</sup>The Congress placed a three-year limitation on Consumer Price Index (CPI) adjustments for FY 83-FY 85 for retirees under age 62 (P.L. 97-253, 96 Stat. 790, September 8, 1982).

<sup>3</sup>About 7 million persons are directly or indirectly affected by the military retirement system (1.4 million retirees and 2.1 million active service members and their families).

<sup>4</sup>Congressional Budget Office (CBO), 1984.

century, retirement costs were projected to increase to \$19.4 billion (in constant 1984 dollars). The size of the annual outlays and the projected increase in future outlays generated Congressional concern, which led to the new retirement policy.

With the enactment of the new military retirement policy, there are now three different military retirement systems. One is for members who entered the service before September 8, 1980, a second is for those who entered between September 8, 1980 and July 31, 1986, and a third is for members who entered the service on or after August 1, 1986. Because the personnel who entered the service prior to August 1, 1986, are grandfathered, the intended reductions in outlays will be achieved only over time. However, because the Department of Defense retirement costs are now budgeted on an accrual basis, the savings in the retirement fund contributions will show up in the DoD budget sooner than the savings in actual outlays.

Under the new law, the benefits will be based on the highest three years of basic pay (just as for those who entered the service after September 7, 1980). In addition, the cost-of-living adjustment (COLA) will be held to one percentage point under the inflation rate. At age 62, there will be a one time restoration of the COLA to bring the benefits to the level they would have achieved if full COLAs had been received all along. After this recomputation, the COLA will again be one percentage point behind inflation. Therefore, the decline in real purchasing power of the annuity will be a function of the prevailing inflation rate.

Under the new law, until age 62 the annuity will be 40 percent of the average of the highest three years of basic pay for those who retire at 20 YOS. It will increase by 3.5 percentage points per year for those who stay longer in the military. Therefore, the multiplier for those who retire at 30 YOS will be 75 percent, the same maximum as the old retirement system. At age 62, the annuity will be increased to reflect the multipliers available to pre-August 1986 enlistees. Table 1 shows the percentage of basic pay that will be paid to a service member depending on the YOS completed at retirement. Figures 1 and 2 show lifetime annuities, in constant dollars, for typical 20-YOS retirees and 30-YOS retirees, respectively.

Table 1  
 MULTIPLIERS UNDER EXISTING RETIREMENT POLICIES<sup>a</sup>  
 (Percentage of basic pay)

Date Entered Service	YOS Completed at Retirement										
	20	21	22	23	24	25	26	27	28	29	30
Before											
9/08/80	50.0	52.5	55.0	57.5	60.0	62.5	65.0	67.5	70.0	72.5	75.0
9/08/80 - 7/31/86	50.0	52.5	55.0	57.5	60.0	62.5	65.0	67.5	70.0	72.5	75.0
After 7/31/86											
Until											
Age 62	40.0	43.5	47.0	51.5	54.0	57.5	61.0	64.5	68.0	71.5	75.0
After											
Age 62	50.0	52.5	55.0	57.5	60.0	62.5	65.0	67.5	70.0	72.5	75.0

<sup>a</sup>The multiplier is applied to the final basic pay for those who entered service prior to 9/08/80. It is applied to the average of the highest three years of basic pay for those who entered service after 9/08/80.

Any change to the retirement system has a direct effect on costs through changes in the amount paid to each retiree, but it also has an indirect effect on total system costs because it changes the incentives of military personnel to stay with the military. Total personnel costs consist of recruitment cost, training cost, support cost, direct compensation, reenlistment bonuses, and retirement benefits. Evaluation of cost changes for any retirement policy requires the distribution of the force by years of service (YOS), because most of these cost components depend primarily upon the experience level of personnel.

More important, changes in the availability of military manpower influence military readiness. Managers assessing the future readiness of the force would also profit from having information on the potential effects of the new retirement system on occupational composition, quality,<sup>5</sup> and experience of available personnel. Therefore, retention

<sup>5</sup>See Ward and Tan (1984) for an operationalization of the concept of quality.



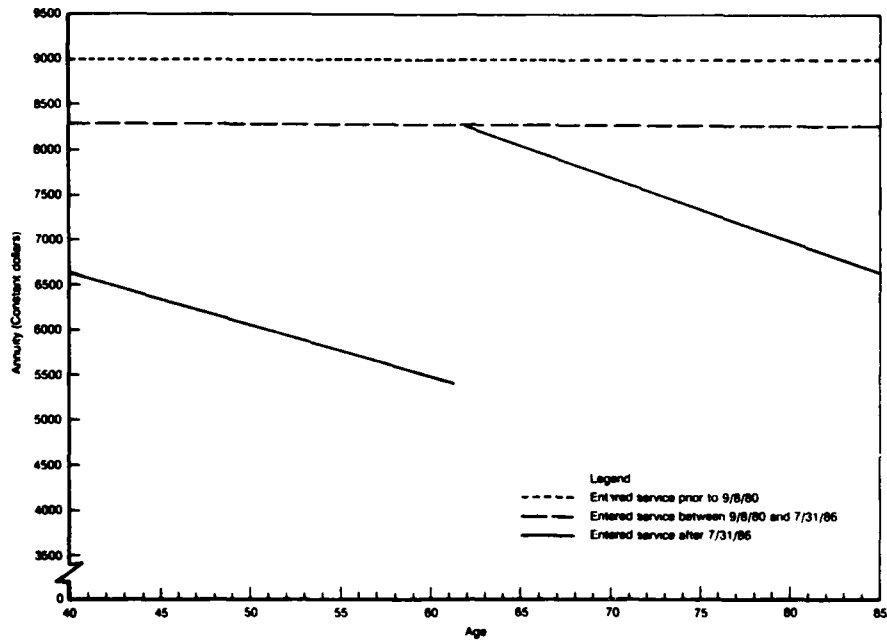


Fig. 1 -- Lifetime annuity for a 40-year-old retiree with 20 years of service

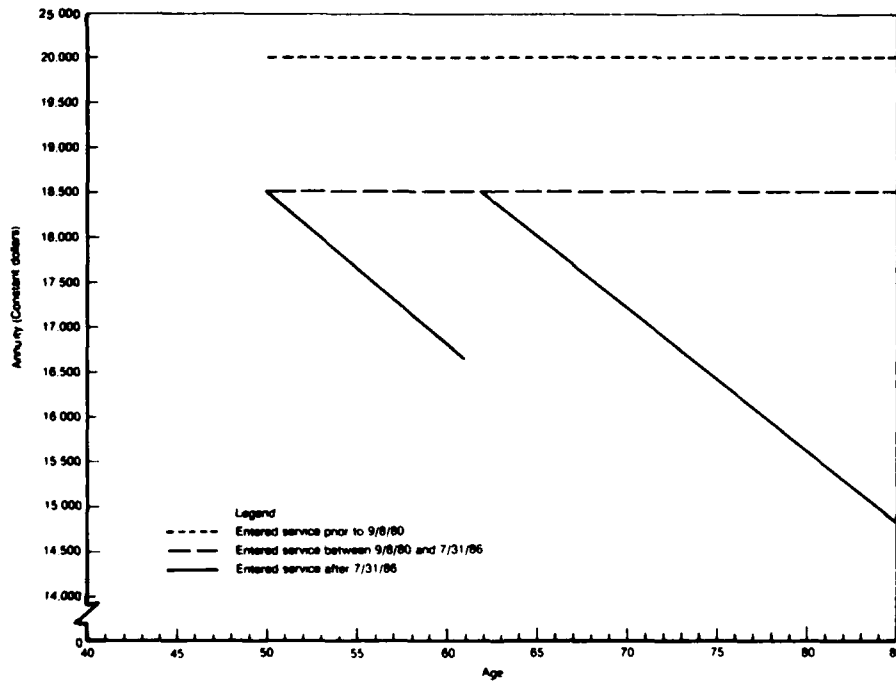


Fig. 2 -- Lifetime annuity for a 50-year-old retiree with 30 years of service

models that can predict the force profile consequences of retirement policy changes are central to the evaluation of retirement policies.

Most of the analyses of alternative policies leading to the new retirement policy were based on the most commonly used personnel retention model, the Annualized Cost of Leaving (ACOL) model. However, the ACOL methodology has some theoretical limitations that can lead to seriously biased estimates, especially when it is used to analyze retirement policies.

While the government was analyzing alternatives to the old retirement system using the ACOL model, a theoretically more rigorous and complete model, the Dynamic Retention Model (DRM), was calibrated at The RAND Corporation using retention rates of airmen<sup>6</sup> from 1971-1981. The DRM was used both to study alternative retirement policies and to evaluate the practical importance of the theoretical limitations of ACOL models.

This Note reports our predictions about the effects of the new retirement policy on personnel retention. We believe that the ACOL methodology, in the way it was used to analyze alternative retirement systems, produces biased results. The predictions obtained from our DRM simulations are better reflections of the probable effects of the new retirement system. The technically oriented reader is referred to Gotz and McCall (1984), Fernandez, Gotz, and Bell (1985), and Argüden (1987) for an explanation of the ACOL and DRM methodologies and a description of the theoretical limitations of the ACOL methodology.

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<sup>6</sup>Although less than 30 percent of all active service members are in the Air Force, payments to Air Force retirees constitute 40 percent of total retirement costs because a higher proportion of an entering cohort reaches retirement eligibility in the Air Force than in other services. Therefore, the analysis in this Note, which is based on airmen data, has much relevance for the whole military retirement system.

## II. EFFECTS OF THE NEW RETIREMENT SYSTEM ON RETENTION

Most enlisted personnel leave military service after their initial term of enlistment, which is usually four years. Beyond the four-year point, the military retirement annuity heavily influences their decisions to stay with the military. Because military personnel receive almost no separation benefits if they leave before serving 20 years, the retention rate (the proportion of a YOS group choosing to stay with the military) steadily increases until YOS 20 (Table 2). Most personnel then retire within their first three years of retirement eligibility (Table 3).

Figure 3 shows a force experience profile of Air Force enlistees, using the average retention rates during the period 1971-81 and assuming new accessions to be 80,000. A majority of the airmen have fewer than five years of service. The expected years of service per accession is about 6.9 years. The retirement system ensures a stable supply of mid-length careerists between 10 and 20 years of service. Not only are the retention rates high between 10 and 20 YOS, but they are also less sensitive to exogenous economic conditions than they would be in the absence of the retirement system.<sup>1</sup> Mid-length careerists provide

Table 2

PERCENTAGE WHO WILL REACH RETIREMENT  
ELIGIBILITY BY YOS COMPLETED

YOS Completed	Enlisted	Officer
Entrants	11.5	17.0
4	30.5	32.0
8	59.4	50.1
12	82.4	69.3
16	92.9	84.1

SOURCE: Percentages are based on retention rates reported in QRMC V, App. I, 1984.

<sup>1</sup>Sensitivity to exogenous economic conditions increases right after retirement eligibility.

Table 3

PERCENTAGE OF RETIREMENT ELIGIBLES  
LEAVING BY YEARS AFTER ELIGIBILITY

Years After Eligibility	Enlisted	Officer
First	45	29
First 3	80	51
First 6	91	77

SOURCE: Percentages are based on retention rates reported in QRMC V, App. I, 1984.

training and leadership to the majority of the force (those with less than 5 YOS). In the military, high-level managers have been in the service for a long time and have gained extensive required experience. A stable supply of mid-careerists is clearly important to fill higher level positions adequately.

**AGGREGATE EFFECTS OF THE NEW RETIREMENT POLICY**

The new retirement system reduces military retirement income, making the military less desirable as a career. Therefore, without any compensatory measures, fewer airmen will remain in the Air Force. Figure 4 shows the *additional* losses from the force profile shown in Fig. 3 for Air Force enlisted personnel as predicted by ACOL and DRM.

Four observations are important. First, the new retirement system will have very little effect on the retention of personnel at the end of their first term (e.g., YOS 4). Second, the largest effect of the new retirement system will be observed between YOS 8 and 20. Third, the actual number of airmen staying for more than 24 YOS will increase, reflecting the higher opportunity cost of leaving before 30 YOS. Fourth, the ACOL model does not capture the full extent of the reduction in retention rates before retirement eligibility or the increased retention in the later years.

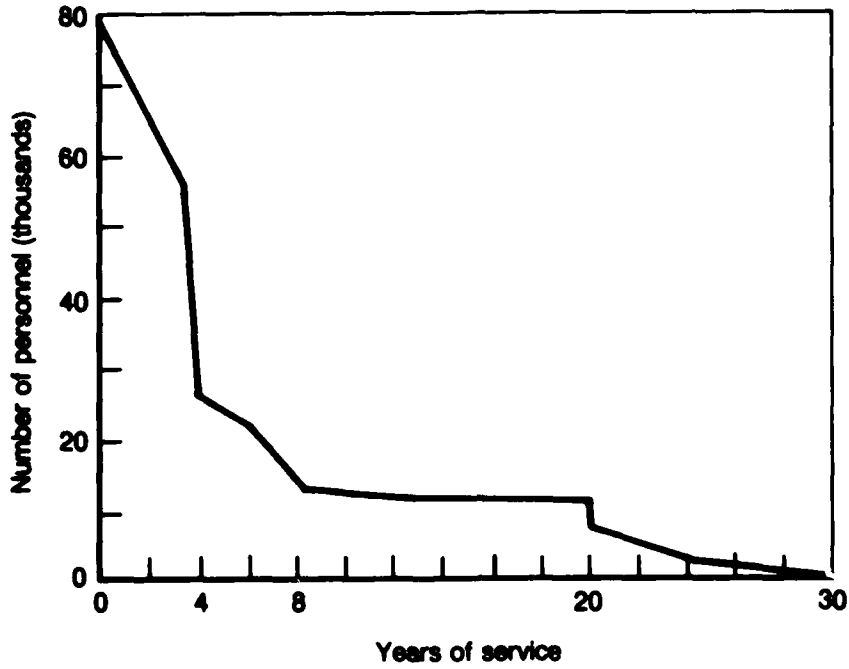


Fig. 3 -- USAF enlisted force experience profile

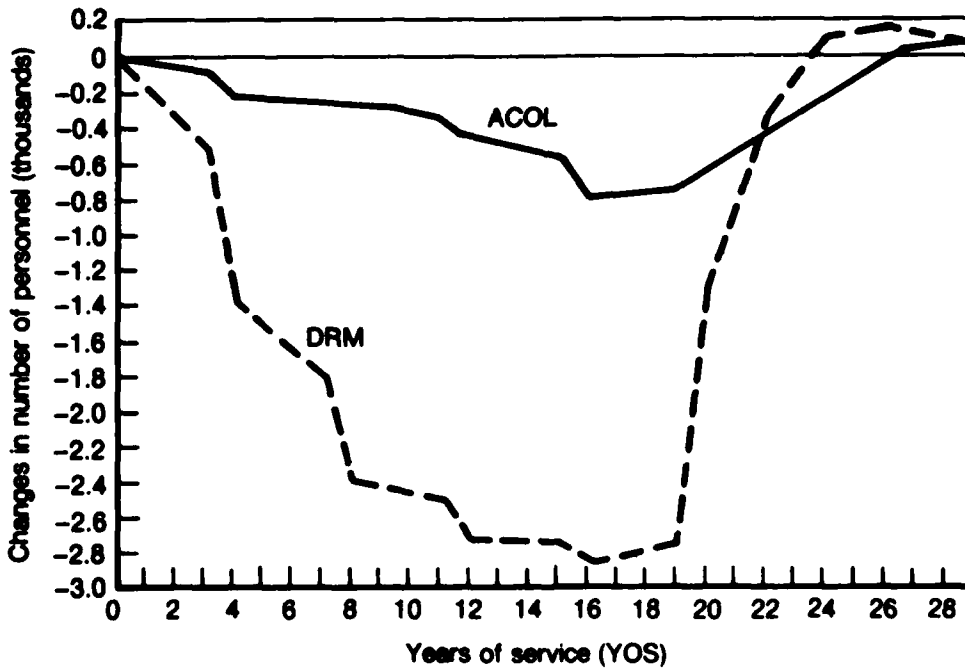


Fig. 4 -- DRM predicts greater losses than ACOL under the new retirement policy

Figure 5, based on the DRM, shows the additional airman losses as a percentage of the baseline population serving in various YOS groups under the old retirement system. The effect at the end of the first term is almost negligible (less than 0.5 percent) because of the discounting of benefits that will be obtained at least 16 years in the future. Also, the new retirement system is unlikely to have a significant influence on the initial decision to join the military, because at least 20 YOS are required before any benefits are received and less than 12 percent of enlistees serve this long (Table 2).

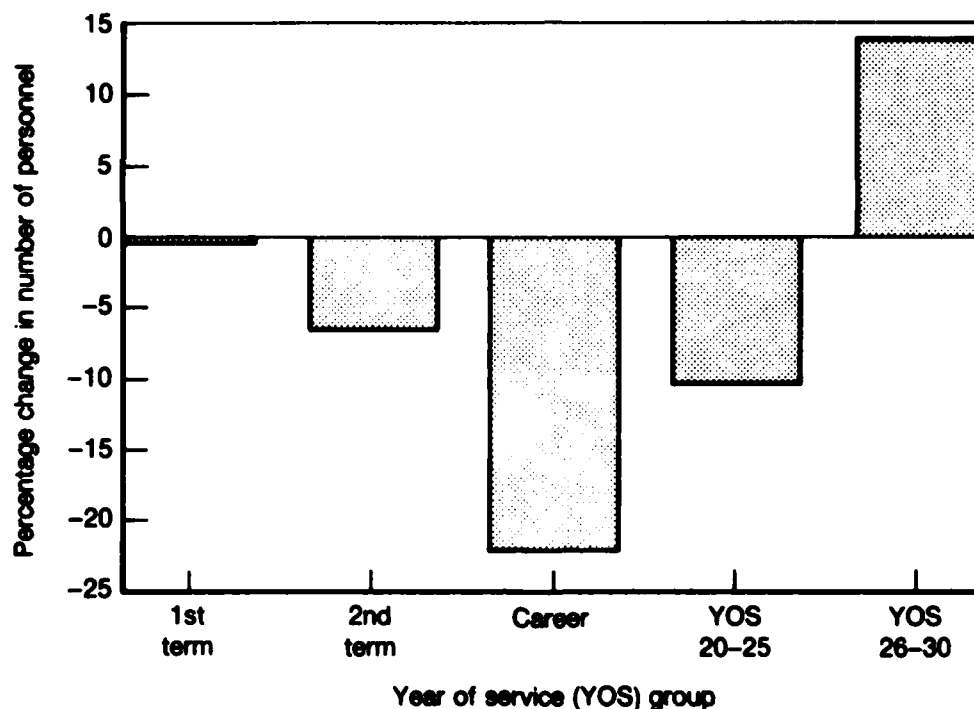


Fig. 5 -- Effects of the new retirement policy on airman retention as a percentage of baseline population

Figure 4 (the DRM curve) indicates that there will be about 2500-3000 fewer airmen in each YOS group between YOS 8 and 20 under the new retirement system. This represents 22 percent of the number of airmen currently serving in these mid-career YOS groups (Fig. 5). However, these are "steady state" losses. Because the current personnel are grandfathered, the additional losses apply only to those who enter military service after July 31, 1986. The personnel retention effects shown in Fig. 4 will be observed only over time, starting with the effects shown for the lower YOS groups and proceeding to the effects for higher YOS groups.<sup>2</sup> Because the effects of the new retirement system are fairly small at lower YOS, very little effect will be noticeable on retention rates in the next few years. But the new retirement system may result in considerably greater losses of career personnel in about 6 to 10 years unless compensating measures are taken in the interim.

The new policy reduces the multiplier for early retirees (those closer to 20 YOS), but keeps it the same as in the old system for those who stay until 30 YOS. This induces people who retire to stay longer past 20 YOS, because each additional year served will increase the retirement benefits until age 62 by 3.5 percentage points rather than the 2.5 percentage points under the old system. Although fewer airmen will reach retirement eligibility, a higher proportion of those who do will stay longer, resulting in a larger number of very senior airmen than under the old system.

Figure 4 also shows the considerable bias of the ACOL methodology predictions used in designing the new retirement policy. These biases can be traced to theoretical limitations described in a companion publication (Argüden, 1987). Although there are different implementations of the ACOL model and the bias depends somewhat upon the implementation, the theoretical limitations of the ACOL methodology are the primary cause of its deficiencies.

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<sup>2</sup>For better visualization of this, cover Fig. 4 with a sheet of paper and slowly move the paper to right, one year at a time, to see the effects of the new retirement policy that will be observed in the future, everything else being the same.

The ACOL model reported in this Note is the version used by the Fifth Quadrennial Review of Military Compensation (QRMC V). Our analysis suggests that decisionmakers may have used biased estimates of personnel retention effects in evaluating changes in the retirement system. Personnel losses due to the new retirement system are likely to be much larger than expected.

### DISAGGREGATE EFFECTS OF THE NEW RETIREMENT POLICY

Disaggregation of the retention effects considering occupation, quality, and experience level is useful for several reasons. First, personnel in different occupations with different quality and experience levels are likely to have different productivity levels and thus contribute differentially to military readiness. Concentrating on only the aggregate retention effects of alternative policies may hide large gains in one group that are offset by large losses in another.

Second, the differential effects of a policy change on different groups of personnel are important in evaluating the equity aspects of the change. Equity is an important principle in military compensation, and disaggregation of the effects of policy changes is necessary in evaluating the conformity of different retirement policies to the concept of "equal pay for substantially equal work."

Third, the sensitivity of military personnel to compensation levels may also be a function of their occupation or quality level. That is, those in administrative occupations may behave differently from those in combat occupations under similar compensation schemes. Therefore, a disaggregate look at the force may provide more accurate predictions of retention rates.

This analysis differentiates three groups of airmen: those facing civilian income opportunities that are 10 percent higher than the average, those facing average civilian income opportunities, and those facing civilian income opportunities that are 10 percent lower than the average.<sup>3</sup> If skills may be transferred between military and civilian

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<sup>3</sup>Differences among airmen with different promotion probabilities and bonus opportunities were also analyzed. For the differential retention effects of retirement policies with respect to these dimensions, see Argüden (1986).



occupations and those with better skills would receive higher civilian income than others, then the differential effects of alternative retirement systems on personnel with different "quality" levels can be inferred by observing the changes in the retention rates of these three groups. (Argüden (1987) discusses the reasons why different groups will respond differently.)

Figure 6 shows that between YOS 8 and 20, the retention rates for high quality airmen (those with high civilian income opportunities) under the new retirement system will be reduced more than the retention rates for others. Therefore, not only would there be fewer airmen serving in the YOS 8 to 20 groups, but those who stay are likely to be the less productive ones.

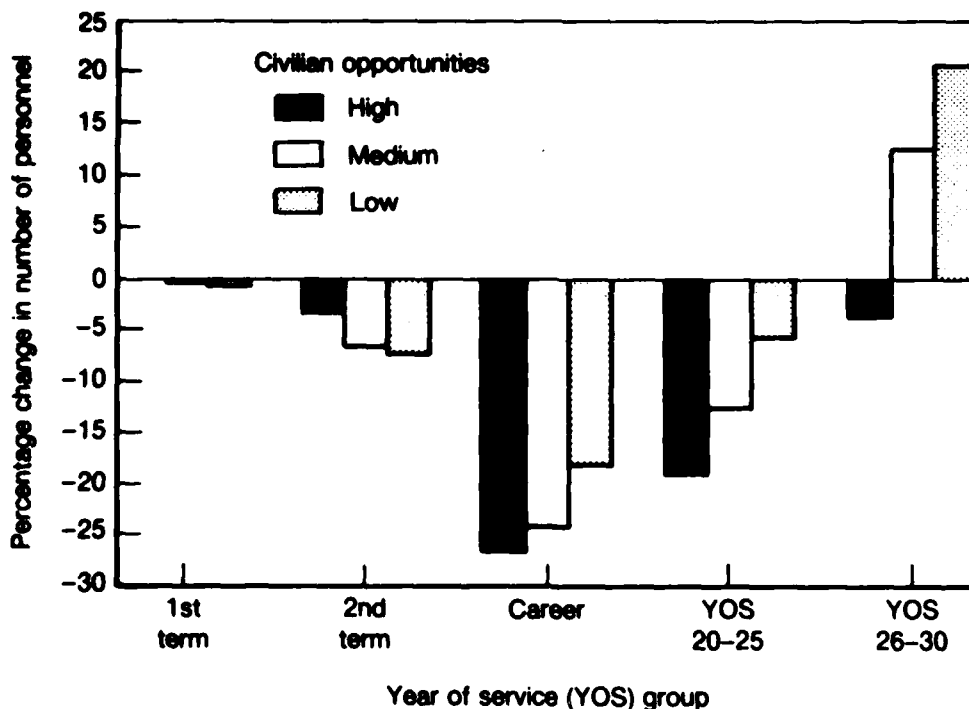


Fig. 6 -- Additional losses will be greater among personnel with higher civilian opportunities

### III. POLICY OPTIONS

The new retirement system is likely to produce a considerable reduction in the retention of personnel, and the retention of higher quality personnel is likely to suffer more than the average, particularly in the early mid-career years (YOS 8 to 12). The years of service expected per accession will be reduced by about 0.5 years to 6.4 years. If the full 6.9 years of service currently obtained from an average Air Force enlistee were productive, this would represent a 7.5 percent reduction in productive service per accession. However, many specialties require two to four years of training before an airman can be used productively; therefore the new retirement system could result in a 10.5 to 17.5 percent reduction in productive service per accession.<sup>1</sup>

The intended \$2.9 billion reduction in accrual funding of the military retirement budget will cause a large, unintended loss in productive service for each accession. Unless compensatory measures are taken, the cost savings will actually be larger than intended because fewer airmen will reach retirement eligibility,<sup>2</sup> and average enlisted compensation will decrease with average experience level.

#### INCREASED ACCESSIONS

Military personnel planners have three basic options to compensate for the increased losses of personnel: increased accessions, increased overall benefits, and selective increases in benefits. If end strength levels are not reduced, the significant reduction in the number of mid-career people could be balanced with higher non-prior-service

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<sup>1</sup>Based on an assumption of zero productivity while airmen are in training.

<sup>2</sup>In the current accrual budgeting, recent past retention rates are used as the basis of calculating the accrual charge, without considering the effects of the new retirement policy on retention decisions. Even though the actual accrual savings will be larger than those intended, the DoD budget will not reflect them until correct retention rates are used in calculating the annual accrual charge.

accessions. Figure 7 shows the resulting steady-state force profile for the Air Force if the current force size were to be maintained by increasing accessions: Accessions would have to increase by about 6500 per year (about 10 percent). Changes in accessions of this magnitude have been experienced in the past decade. However, a 22 percent reduction in the retention of mid-career personnel has never been experienced. The resulting change in the force profile may pose a difficult management problem. There would be fewer senior enlisted personnel to manage a larger number of junior personnel. Furthermore, a larger number of junior personnel implies that greater resources would have to be spent for training. Higher accessions from a declining youth

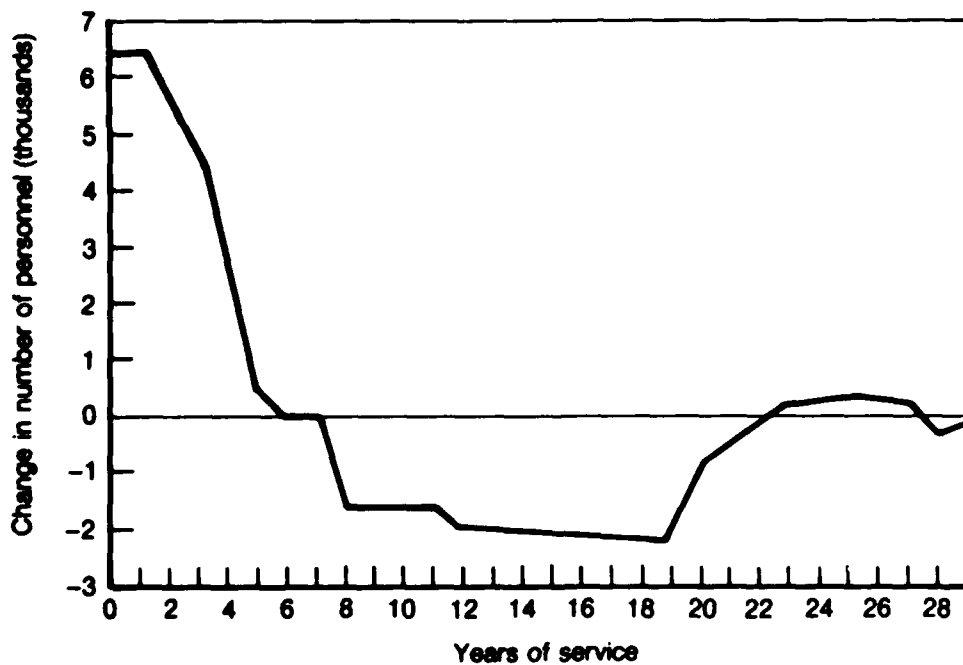


Fig. 7 -- Change in USAF enlisted force experience profile if accessions are increased

pool would make maintaining the quality mix of enlistees difficult. For example, during FY 81 (a low retention year),<sup>3</sup> accessions were about 12,000 more than in FY 85 (a better retention year). During FY 81, 12 percent of the accessions were not high school graduates, whereas during FY 85 only 1 percent of the accessions did not have a high school diploma. Similarly, 10 percent of FY 81 accessions scored very low in the tests given at enlistment, whereas only 1 percent of FY 85 accessions scored as low.

### INCREASED OVERALL BENEFITS

The reduction in retirement benefits could be offset by increasing current benefits (e.g., basic pay or housing allowances) to improve overall retention rates. However, this would require Congressional action and would dilute the cost savings intended to be produced by changing the retirement system. According to our estimates, a 3 percent increase in the general military pay level could bring the expected YOS per accession back to 6.9 years, but such an across-the-board measure would cost about \$2 billion per year and would not bring the shape of the force profile back to its old form.<sup>4</sup>

### SELECTIVE INCREASES IN BENEFITS

Benefits may be increased selectively (e.g., using bonuses) for personnel who are most likely to change their retention decisions. This option has the advantage of better maintaining the intended cost savings, but it has disadvantages as well. It raises issues of pay equity; it may be difficult to identify those who would change their decisions; and finally, a general increase in bonus levels is likely to dilute the effectiveness of bonuses in channeling personnel into desired occupational groups.

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<sup>3</sup>In FY 81 a majority of the losses were at the end of first term. Therefore, new accessions replaced junior airmen, resulting in easier substitutability and less productivity loss.

<sup>4</sup>There would still be fewer mid-career personnel and more very senior level personnel.

## TIMING OF EXTRA LOSSES AND COST SAVINGS

The timing of the intended cost savings and the unintended side effects will be different. Because the current personnel are grandfathered, the savings from changing the retirement system can be achieved only over time. The DoD budget is now based on accrual accounting. Therefore, the savings in the retirement fund will affect the annual budgets sooner than the savings in actual outlays. Even under the accrual accounting system, the full savings will not be reflected in the budgets until all grandfathered personnel retire.

However, the side effects from changing the retirement system, such as the reduction in average experience and quality levels, and the increased accessions and training costs are likely to occur sooner (within the next 4 to 10 years).<sup>5</sup>

The military personnel system provides for practically no lateral entry; therefore, once airmen who are reaching their mid-career years are lost it will be very difficult to modify the force profile. Thus, the effects will be long-lasting. Also, because the military retirement system has not changed greatly in the recent past, even the estimates we have produced with better models have a considerable degree of uncertainty. It is important to closely monitor the retention effects of the new retirement system over the next 4 to 10 years and to develop plans for moderating the retention effects and be ready to implement them when the need arises.

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<sup>5</sup>As a part of the Enlisted Force Management Project, personnel costing models are being developed. When these models are completed, we will be able to analyze the total system costs of various compensation policies, including changing the retirement system.

#### IV. CONCLUSIONS

The probable retention effects of the new retirement system will be much larger than have been predicted using ACOL models. Also, the retention of higher quality personnel is likely to be reduced more than that of other personnel. These unintended side effects are likely to occur sooner than the intended cost savings of the new retirement system. Furthermore, policies to moderate these effects will probably dilute the intended cost savings.

Fortunately, the effects on force composition will not happen for several years. Therefore, there is time to develop policies to moderate the deleterious effects of the new retirement system.

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