NPS-AS-91-014

NAVAL POSTGRADUATE SCHOOL

Monterey, California

AN ANALYSIS OF MIGRATION IN THE U.S. ARMY RESERVE

Stephen L. Mehay

July 1991

Approved for public release; distribution is unlimited.

Prepared for: U.S. Army Recruiting Command
Program Analysis and Evaluation Directorate
Research and Studies Division
Fort Sheridan, IL 60037-6090

NAVAL POSTGRADUATE SCHOOL
Monterey, California

RADM. R. W. West, Jr.
Superintendent

Harrison Shull
Provost

The report was prepared for U.S. Army Recruiting Command, Program Analysis and Evaluation Directorate, Research and Studies Division

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	July 1991	Final

4. TITLE AND SUBTITLE
An Analysis of Migration in the U.S. Army Reserve

5. FUNDING NUMBERS
MIPR 88-34

6. AUTHOR(S)
Stephen L. Mehay

7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES)
Department of Admistrative Sciences
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER
NPS-AS-91-014

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES)
HQ, U.S. Army Recruiting Command
Program Analysis and Evaluation Directorate
Research and Studies Division
Ft. Sheridan, IL 60037-6090

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
N/A

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The goal of this research was to examine the geographic migration patterns of Army Reservists and to compare migration of reservists with that of civilians. Army personnel data were used to track changes in status of individual Army reservists between 1981 and 1987. Statistical techniques were used to analyze the determinants of individual migration and transfer behavior. In addition place-to place migration patterns were analyzed. Finally, the report discusses the importance of migration and transfers for the analysis of USAR markets and recruiiting.

14. SUBJECT TERMS
U.S. Army Reserve, recruiting, migration, transfers

15. NUMBER OF PAGES
63

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	

NSN 7540-01-280-5500

Standard Form 298 (Rev 2-89)
Prescribed by ANSI Std 23908
298-102

EXECUTIVE SUMMARY

The goal of this research was to examine the nature, extent, and direction of geographic migration of Army Reservists, and to trace the link between civilian migration and USAR migration. The study used Army personnel (SIDPERS) records to create two separate data files: the first file consists of a cohort of new USAR enlistees in 1981; the second consists of a cohort of USAR members in 1981. Individual records were searched from 1981 to 1987 to obtain indicators of the migration and transfer activity of Army Reservists. Several statistical techniques were utilized to profile both individual migration and area migration patterns. A number of findings emerge from the statistical analyses:

(1) Approximately 20 percent of both cohorts migrated during the 1981–1987 period; of these, one-fourth (5 percent of the total) made long-distance moves between states.

(2) Overall migration rates for Reservists were somewhat lower than for comparably aged civilians during the period; interstate mobility was considerably lower for Reservists.

(3) Two-thirds of the 1981 gains cohort attrited before 1987; 17 percent of the attriters also moved.

(4) The direction of USAR place-to-place migration mirrors that of civilian migration during the period—mainly from Rust Belt regions and states to Sun Belt regions and states.

(5) Multivariate models indicate that personal characteristics such as age, AFQT, and education have important effects on Reservists' migration decisions; these effects tend to be similar to those for civilians and are consistent with the human capital investment model.

(6) Nonprior service Reservists and those in more technical MOSs are more likely to migrate.

(7) Among Reservists who move, those who are more likely to re-affiliate with the USAR tend to be better educated, older, in the top AFQT categories, and in the higher paygrades.

(8) Analyses using both micro-level data and aggregate data indicate that local economic conditions are important in explaining Reservists' migration patterns, and the origin and destination of Reservists.

The report concludes that decision models used by the Reserve Branch of USAREC-PAE should maintain historical civilian migration data and future projected migration rates for local areas. The purpose of maintaining migration projections is not to track the military available (MA) population of an area, but to identify areas of high potential unit turnover. Areas with high rates of projected out-migration will not provide a stable recruiting market for locating new units or increasing current authorizations. Areas of high projected in-migration (and transfers) may enjoy increased USAR affiliation rates without the need for increased recruiting resources; moreover, additional authorizations can be distributed to such areas at a relatively low cost. Both transfer and migration data will be of some value in establishing MOS-specific recruiting goals. Knowledge of who is migrating, what MOSs they represent, and where they are moving should aid in improving the precision of MOS-specific recruiting missions.

Migration is an important facet of the U.S. civilian workforce, which includes Army Reservists. Migration contributes to a number of manpower problems faced by the USAR: recruiting success, unit readiness, attrition, and unit MOS-qualification rates. This report finds that the contribution of migration of USAR members to those problems is significant enough to warrant an ongoing effort to identify and statistically measure the extent, nature, and direction of member migration and transfer patterns.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. INTRODUCTION

One of the abiding demographic features of the American landscape has been the geographic mobility of its people. Between 1980 and 1985, 41.7 percent of the population (one year old and over) moved at least once. The majority of these moves — 22.1 percent of the population — were local moves within the same county. Yet long-distance moves also were significant: 8.7 percent of the population moved between states, and 9.1 percent moved between counties in the same state.[1] Even during a single year mobility is high. Between 1985 and 1986, 6.7 percent of the population made nonlocal moves — between states or between counties within a state. This represents 15.6 million people making long-distance moves in just one year.[2] The civilian economy migration reallocates workers to geographic locations where their value (and wages) are the highest, thereby improving the utilization of scarce resources. But in the U.S. Army Reserve (USAR) system, extensive migration tends to have the opposite effect.

Civilian migration harms unit manning by stimulating personnel turnover. Army Reservists are, first and foremost, members of the civilian labor force, and only secondarily members of a military service. Therefore, they tend to share the demographic characteristics of other civilian workers, including mobility. If, for example, a perfect correlation existed between behavior as a Reservist and as a civilian, Army Reservists would evince annual migration rates (local and nonlocal moves) as high as 18 percent, which is the annual civilian migration rate. However, not all of this migration would damage unit manning levels. Because the majority of migration is local in nature, Reservists making such moves probably would maintain affiliation with the same unit. Even some long-distance moves do not alter total USAR strength levels if the Reservist affiliates with a different unit in the new location. Nonetheless, the potential implications for turnover in the USAR

---

[1]U.S. Bureau of the Census, Current Population Reports, *Geographical Mobility: 1985*, Population Characteristics, Series P-20, No. 420. Washington, D.C.: U.S. Government Printing Office, 1987.

[2]U.S. Bureau of the Census, Current Population Reports, *Geographical Mobility: March 1985 to March 1986*, Population Characteristics, Series P-20, No. 425. Washington, D.C.: U.S. Government Printing Office, 1988.

are significant. Furthermore, migration may be an important factor contributing to an annual attrition rate of over 30 percent in the USAR.

One question this study seeks to answer is the following: How close is the link between migration of the civilian labor force and mobility of Reservists? There is some evidence that the connection is a close one. Table 1, for example, displays migration propensities by age for the 1980–1985 period, and reveals that these propensities are relatively high in the 18–24 age range and reach a peak in the 25–29 age range. Thus, civilian migration propensities tend to be highest for precisely those sub-groups of the population that are most heavily represented in the USAR.

Table 1. Propensities to migrate by age, 1980–1985

	Percentage of the Population	
Age	Moving Between States	Moving Between Counties in Same State
18-24	11.1	13.5
25-29	16.0	16.6
30-34	11.9	12.7
35-44	9.0	8.5
45-64	5.7	5.2
65+	3.3	3.6

SOURCE: U.S. Bureau of the Census, Current Population Reports, *Geographical Mobility: 1985 Population Characteristcs*, Series P-20, No. 420, Table 17. Washington, D.C.: U.S. Government Printing Office, 1987.

A second aspect of population mobility with disturbing implications for the USAR is its direction. In the two decades between 1970 and 1990, an unprecedented shift occurred in the regional distribution of the U.S. population from the Northeast and Midwest to the South and West. In the period from 1980 to 1989, the South and West gained 7.3 million net in-migrants while

the Northeast and Midwest lost 2.5 million net out-migrants.[3] These population movements are significant to the USAR because Reserve units tend to be disproportionately located in the regions that have experienced the heaviest net out-migration. Table 2, which compares the distribution of the population of Reservists in 1981 with the U.S. population, indicates that the greatest imbalance is between New England, where the USAR is overrepresented, and the Pacific region, where it is underrepresented. This imbalance may be greater than depicted in table 2 since most migration is by younger persons, which alters the regional age distribution.

On the face of it, these facts constitute substantial circumstantial evidence that civilian population migration in the United States may significantly affect USAR unit turnover and attrition rates, recruiting requirements, and overall personnel readiness. But by themselves, they do not conclusively establish a link between civilian mobility and USAR turnover. The purpose of this report is to document the extent and nature of the actual relationship between external migration forces, internal movement of USAR members, and USAR personnel turbulence. In addition, the report attempts to identify the magnitude and geographic pattern of the internal transactions that occur in the USAR.

Civilian migration from an area may create two types of turnover problems in the area's Reserve units. The first problem is created by Reservists who move, attrite, and do not reaffiliate with a unit in the new location. The second problem arises when Reservists transfer between units. Migrants who attrite from the USAR may do so because they cannot find a nearby unit in their new location, or an available military occupational specialty (MOS) or billet. Some individuals, especially younger members with no prior service, may make no attempt to find a unit in their new location. Whatever the reason for not reaffiliating, individuals who attrite with a military service obligation (MSO) are assigned to the Individual Ready Reserve (IRR).[4]

---

[3]U.S. Bureau of the Census, *Statistical Abstract of the United States, 1989*. Net in-migration to the South and West exceeds net out-migration from the Northeast and Midwest due to foreign immigration.

[4]The nature of this personnel data problem is reviewed in U.S. General Accounting Office, *Reserve Components: Opportunities to Improve National Guard and Reserve Policies and Programs*, Washington, D.C., November 1988.

Table 2. Distribution of Reservists and U.S. population

Region/Division	Distribution of Enlisted Reservists		Distribution of Population	
	Total	Percent	Total	Percent
Northeast	**43,857**	**24.6**	**49,135**	**21.6**
New England	10,542		12,348	
Middle Atlantic	33,315		36,789	
Midwest	**44,864**	**25.2**	**58,866**	**25.9**
East North Central	30,103		41,682	
West North Central	14,761		17,183	
South	**64,686**	**36.3**	**75,372**	**33.3**
South Atlantic	33,616		36,959	
East South Central	15,396		14,666	
West South Central	15,676		23,747	
West	**24,456**	**13.7**	**43,172**	**19.1**
Mountain	6,979		11,373	
Pacific	17,477		31,800	
Total U.S.	**177,865**		**226,546**	

SOURCE: USAR data from SIDPERS data file; population data from U.S. Bureau of the Census, *Statistical Abstract of the United States, 1989.*

Other Reservists, especially more senior personnel, have stronger incentives to find a unit in their new location (i.e., to transfer units). The reason is that those who transfer between Troop Program Units (TPUs) retain their seniority, paygrade, and promotion standing. In the Army personnel data base that we used (SIDPERS), two different codes are assigned to those who transfer between units: (1) J1 if the transfer is between units in different Continental Armies (CONUSAs), and (2) L1 if the transfer is between units within the same CONUSA.

Regardless of whether a migrant attrites or transfers, in both cases a loss is imposed on the old (losing) unit. Strength levels obviously are reduced by migration-induced attrition. Strength levels are also affected by transfers, but at different levels: at the Battalion/Brigade/unit levels for both L1 and J1 transfers, and at the Major U.S. Army Command (MUSARC) and CONUSA levels for J1 transfers.

Despite the obvious turbulence created by transfers, the U.S. Army Forces Command (FORSCOM) definition of losses does not include either J1 or L1 types of losses. This is because transfers within the system do not affect the total (Army-wide) strength posture. Nonetheless, such transfers constitute a significant source of turmoil for subordinate commands and units. For example, an analysis of SIDPERS data for 1981 revealed 1,968 transfers between CONUSAs (J1) and 18,744 transfers within CONUSAs (L1). Since all J1 transactions and some L1 transactions involve interstate moves, it can be seen that internal mobility may account for upwards of 10 percent of the overall annual turnover for any given TPU.

Since the U.S. Army Recruiting Command (USAREC) uses the FORSCOM definition of gains and losses, these transfers also are not recognized in USAREC management and decision models. Nonetheless, USAREC "micro"-level missioning models are affected because the actual mission target necessary to maintain unit strength will be greater or less than the calculated mission, which is based on unit and Reserve Center losses (using the FORSCOM definition). Consequently, in areas where many vacancies are filled by "unprogrammed" gains, unit fill rates may be high and recruiters may have trouble attaining mission. In other areas, due to "unprogrammed" losses and transfers, unit fill rates will be low despite recruiters' efforts, and additional resources will be necessary to make mission.

Other USAREC models are also affected by both transfers and civilian migration. Market supportability studies (MSS), for example, determine the current and future recruiting potential of a given geographic area. High rates of civilian out-migration for an area indicate long-term structural problems with the local economy. While current unemployment rates also reflect local economic conditions, unemployment rates respond more to short-term and cyclical fluctuations in an area's business conditions; civilian migration rates are superior for gauging a community's long-term economic health. There is evidence that high current unemployment increases Reserve enlistments;[5] but if unemployment persists, it will stimulate out-migration in the long run, which may simply convert the new accessions to losses. Migration rates, current and projected, will provide valuable information to the MSS on the

---

[5]Stephen L. Mehay, *An Enlistment Supply and Forecasting Model for the U.S. Army Reserve*, USAREC Study Report-89-2. Fort Sheridan, IL: U.S. Army Recruiting Command, 1989.

long-term economic health of a geographic market and the feasibility of activating or deactivating units.

The overall goal of this research is to quantify the nature, extent, and direction of migration of Army Reservists. While "migration" is defined as any geographic movement of Reservists, it can be broken down into two components: (1) movement of attriters and (2) movement of transferees (stayers). Both types of movement will be tracked since the causes and consequences of each are likely to differ. The characteristics of each type of migrant may also differ, with important implications for unit training requirements and personnel readiness. For example, the loss (via transfer or migration) of a senior enlisted member who is fully trained and MOS-qualified will be more damaging to personnel readiness than the loss of a recent enlistee with little training.

Thus, the first objective of this report is to analyze the magnitude of the amount of migration (including transfers) of USAR personnel. A second objective is to assess the direction of migration; that is, to identify in-migration and out-migration patterns for specific geographic areas and commands (CONUSAs). Intrastate, interstate, intra-CONUSA, and inter-CONUSA net migration flows are calculated. A related goal is to identify local economic conditions that are correlated with place-to-place flows, such as between states. These results will be compared to empirical studies in the civilian migration literature to determine how place-to-place flows for USAR members compare to those for civilian workers.

The third major goal of the research is to identify the characteristics of migrants and how they differ from other groups of USAR personnel. For example, in what ways do USAR migrants differ from nonmigrants? From attriters? From civilian migrants? In particular, are these groups distinguished by any important personal attributes, such as age, race, gender, education, paygrade, and prior service? If so, what is the relationship between each attribute and the individual's migration probability? Do Reservists behave like other civilians in their migration decision, or does being a Reservist cause them to behave differently? If they behave differently, does being a Reservist hinder or facilitate migration?

This paper is divided into the following sections: Following this introduction (Section I), Section II details the creation of a data file that is used to analyze USAR migration. The data file is used to profile the magnitude of

USAR migration, the direction of migration, and the characteristics of individual migrants; in addition, it is used to assess the magnitude of transfers in the USAR. Section III presents multivariate models of individual migration behavior of Army Reservists. Section IV analyzes the effect of regional employment and economic conditions on the decision to migrate. In addition, the place-to-place migration flows of Reservists are analyzed to determine how local economic conditions influence the direction of migration.

Section V presents a summary and the conclusions; it also develops the implications of the empirical analysis for USAREC recruiting, stationing, and missioning models. In particular, how important is it for USAREC to maintain accurate migration information in the MSS and mission models? If migration is found to be quantitatively important, a secondary issue arises: How accurate is the available data for profiling migration? Both the USAR (SIDPERS) data and civilian migration data are examined for accuracy, availability, and usefulness. Section V also surveys future trends in migration. Such projections may be important for future USAR stationing and recruiting policy. The annual National Market Analysis (NMA), for example, may be able to use such forecasts in aligning units with markets; forecasts may also be useful in setting long-term missioning goals.

II. ANALYSIS OF MIGRATION PATTERNS

All subsequent data discussions and analyses are based on three files made available by USAREC — the SIDPERS annual membership files, the annual GAIN files, and the annual LOSS files. Files for the years 1981 through 1987 were made available. The original data set contained records for 182,579 USAR enlisted members in 1981, of which 59,674 were gained in the same year. After deleting records with missing or incorrect information — especially invalid addresses — the final data set consisted of 177,865 USAR enlisted members in 1981. The objective of the research was to create a cohort of 1981 Reservists and to track changes of status and migration of this cohort over a six-year period.

In a few instances, data analysis is based on the entire 1981 membership file; however, in most cases, a much smaller file is used to avoid the problems created when trying to make inferences from such a heterogeneous group. In particular, a second file was created of just those USAR members who were gained (enlisted) in 1981. This file is further disaggregated into prior service (PS) and nonprior service (NPS) enlistees. Each person gained in 1981 is then tracked over six years, a period which encompasses the minimum service obligation (MSO) period for this group. From this longitudinal file changes in address (migration) and status (transfers) can be calculated to profile the migration experience of the cohort.

A "migrant" is identified by taking each person's record in the 1981 SIDPERS ("gains" or "members" file) and searching the LOSS files for each year from 1981 to 1987. If the person's home zip code or state code changed at any time during this interval, the record is flagged as a "mover" and the originating and destination codes are maintained. If the person made more than one move during the period, only the first and last geographic codes are maintained.

This definition captures most, but not all, USAR migrants. In particular, this procedure omits individuals who move and attrite from a TPU when no follow-up information is available in the SIDPERS files. Administratively, these persons are assigned to the IRR. Although IRR members are required to keep the Army informed of their address, in reality many do not meet this requirement.

The data files are first used to profile the pattern of transfers of USAR members. Table 3 displays the number of within-CONUSA (L1) and between-CONUSA (J1) transfers made by the original stock of members (1981) over the six-year period. The table highlights several features about the data. First, as expected, between-CONUSA transactions normally are much smaller than intra-CONUSA transfers. This is true for every year except 1984 and 1985, when between-CONUSA transactions jumped nearly tenfold from normal levels. This large increase in transactions in 1984 and 1985 may have been due to a reorganization of CONUSAs that occurred during this period. If these two unusual years are omitted, the pattern of transfers over time is consistently downward, a trend which would be expected as the 1981 membership cohort shrinks from attrition and normal separations. Nonetheless, the data indicate that over 147,000 transactions involving transfers were recorded over the six-year period for the beginning stock of Reservists, about 80 percent of which were within-CONUSA transfers. Many of these transfers involve movement between units in the same Reserve Center and do not represent true geographic migration. However, in many instances, individual TPU manning levels and recruiting requirements are affected.

Table 3. USAR transfers by year (1981 members cohort)

	Transfers	
Year	Within–CONUSA	Between–CONUSA
1981	18,744	1,968
1982	13,054	1,938
1983	28,484	1,084
1984	9,228	17,644
1985	17,982	21,838
1986	7,550	625
1987	6,278	614
Total	101,320	45,709

SOURCE: SIDPERS data.

Table 4 presents data on the types of transfers by year for the 1981 gains (new enlistee) cohort. The pattern mirrors that in table 3, including the inexplicable increase of between-CONUSA transfers in 1984 and 1985. The large increase in 1984 and 1985 is proportional to the surge observed in table 3.

Table 4. USAR transfers by year (1981 gains cohort)

	Transfers	
Year	Within–CONUSA	Between–CONUSA
1981	3,483	289
1982	4,959	884
1983	6,989	554
1984	2,273	4,313
1985	3,926	5,747
1986	1,519	273
1987	1,157	201
Total	24,306	12,261

SOURCE: SIDPERS data.

Table 5 is an appraisal of the number of "movers" in the USAR using the gains cohort. The table indicates the number of persons who enlisted in 1981 and then changed their home zip code during the 1981–1987 interval. The 1981 gains cohort recorded 11,944 total moves over the period, which represented 20 percent of those who enlisted in 1981. That is, one in five new enlistees in 1981 changed addresses during the six-year period of their original MSO. Of these moves, 8,738, or 73 percent, were intrastate, while 3,206, or 27 percent, were interstate. It is interesting to note that NPS and PS enlistees are about equally likely to move. While NPS enlistees are migration-prone due to their youth, many PS enlistees may be equally mobile because they have been recently discharged from active duty and have not yet settled on a job or location.

Table 5. Number of 1981–1987 USAR migrants by type

	Type of Migrant				
	Within State	Between States	Movers	Non-Movers	Total (Movers and Non-Movers)
PS	4,723	1,656	6,379	24,458	30,837
NPS	4,015	1,550	5,565	23,272	28,837
Total	8,738	3,206	11,944	47,730	59,674
Percent of Members	14.6	5.4	20.0	80.0	100

SOURCE: SIDPERS data on 1981 gains cohort.

Table 6 displays similar information on movers based on the 1981 membership cohort. The 36,363 moves of all types in table 6 represent 20.4 percent of the 1981 membership cohort. It appears that mobility is nearly identical for those who were already members in 1981 and those who enlisted in the Selected Reserve for the first time in 1981. The only notable difference is that the gains cohort (in table 5) displays a slightly stronger tendency toward interstate moves: 5.4 percent of the gains cohort made long-distance moves versus only 4.1 percent of the membership cohort.

Table 6. USAR migrants by type, 1981–1987

	Number	Percent of Total
Within-State Mover	29,030	16.3
Between-State Mover	7,333	4.1
Total Movers	36,363	20.4
Nonmovers	141,311	79.5
Total Members	177,674	99.9

SOURCE: SIDPERS data on 1981 members cohort.

It is noteworthy that migration rates are lower for Reservists than for civilians. While 20.4 percent of all Reservists migrated, table 1 indicates that 24.6 percent of civilians ages 18–24 and 32.6 percent of civilians ages 25–29 moved. The biggest disparity occurs in interstate moves: only 4.1 percent of Reservists moved between states, whereas the comparable civilian percentages are 11.1 percent for those 18–24 and 16.0 percent of those 25–29.[6]

The SIDPERS data indicate that about two-thirds of the 1981 gains cohort attrited before the end of their six-year MSO. Figure 1 shows the pattern of attrition over the same six-year period, with the largest losses occurring in 1982, the second year. Of the 37,575 attriters, 6,387, or 17 percent, also changed addresses during this period. Because many persons who attrited and moved dropped out of the SIDPERS record-keeping system, this number represents a lower-bound estimate of the proportion of attrition that is induced by migration. Although the exact contribution of migration to unprogrammed losses cannot be accurately calculated, it is clear that the role of migration in TPU turnover is significant. Our best guess is that migration-induced attrition represents about one-fourth of all attrition.

Table 7 displays the direction of migration by Reservists between the nine U.S. Census regions. The flow data are derived from the 7,333 interstate moves for the 1981 members cohort.[7] The state-to-state flow data are presented in Table C of the Appendix. This table indicates major in-flows of Reservists to the Sun Belt states of Texas (643), California (559), and Florida (373). Other states receiving significant in-flows were Maryland (325), New York (279), Illinois (276), and Virginia (270). Four of these states — California, Illinois, Texas, and New York — also generated a large volume of out-migrants. However, several Rust Belt states were heavy net losers — Indiana, Kentucky, Michigan, Missouri, Ohio, and Pennsylvania.

The patterns in the region-to-region matrix in table 7 follow those in the state-to-state matrix. The largest flows are toward the Sun Belt regions and

---

[6]It bears repeating, however, that the number of USAR migrants is understated due to a lack of follow-up data in the SIDPERS files on many attriter-movers. Also, migration is measured over slightly different time periods for Reservists and civilians.

[7]Flow data for the 1981 gains cohort are not presented because individual cell sizes are very small, and often zero in the state-to-state matrix.

Table 7. Regional moves, 1981–1987

TO:	New England	Mid-Atlantic	E. N. Central	W. N. Central	S. Atlantic	E. S. Central	W. S. Central	Mountain	Pacific
FROM:									
New England	—	47	24	12	57	11	28	19	41
Mid-Atlantic	60	—	98	28	282	32	89	36	86
E. N. Central	20	63	—	133	198	123	203	82	144
W. N. Central	14	22	139	—	91	27	131	98	80
S. Atlantic	42	153	106	41	—	92	121	35	101
E. S. Central	9	21	133	27	168	—	91	26	39
W. S. Central	10	38	67	45	66	41	—	61	66
Mountain	16	18	39	48	38	10	76	—	135
Pacific	16	60	66	46	94	29	108	133	—

SOURCE: SIDPERS data on 1981 members cohort.

away from the Rust Belt. In terms of individual flows, some of the largest are from the mid-Atlantic to the South Atlantic, and from the East North Central to the South Atlantic and the West South Central regions.

The regional flows for the nine Census regions are further aggregated to the four major Census areas — Northeast, Midwest, South, and West — in table 8. The upper panel of table 8 displays the flows for Army Reservists over the 1981–1987 period (based on the 1981 members cohort). For purposes of comparison, the civilian flows (in thousands) between the four major regions for 1980–1985 are presented in the lower panel of table 8. The last column for each panel computes the ratio of the number of in-migrants per 100 out-migrants for each region. The similarity in this ratio by region for USAR members and civilians is striking. Clearly, the origination and destination regions for both Reservists and civilians are virtually identical, as are the relative magnitudes of the flows.

Table 8. Civilian and USAR regional migration flows

TO:	Northwest	Midwest	South	West	Total Out	In-Migrants Per 100 Out-Migrants
FROM:			USAR: 1981–1987			
Northeast	—	150	498	182	830	60
Midwest	119	—	773	404	1,296	59
South	273	419	—	328	1,020	159
West	104	199	355	—	659	139
Total in	496	768	1,626	914	—	—
			CIVILIAN: 1980–1985 (000s)			
Northeast	—	110	292	153	555	66
Midwest	122	—	350	228	700	53
South	181	156	—	204	541	160
West	66	105	222	—	393	149
Total in	369	371	864	585	—	—

SOURCES: SIDPERS data based on 1981 memberS cohort, and M. J. Greenwood, "Report on Migration: Theory, Models, Data, and Empirical Studies," report to USAREC, February 1989.

Of additional interest is the flow of Reservists across subordinate Army commands, which is presented in table 9. The regional pattern here is not quite as clear as in table 8, since CONUSA boundaries do not conform to Census regions. Nonetheless, the two CONUSAs located primarily in the Rust Belt are the First and Fourth Armies and, as the last column indicates, these two Armies had the lowest ratios (both under 100) of in-migrants per 100 out-migrants. The Second, Fifth, and Sixth Armies all have portions or all of their command areas in Sun Belt states. As would be expected, they have the highest ratios (all over 100) of in-migrants per 100 out-migrants.

Data from table 7 and table C of the Appendix flows across the nine Census regions are rearranged to reveal the numbers of USAR in-migrants, out-migrants, and net migrants for each state and region. State data are presented in table 10 and region data in table 11. The states with the largest

Table 9. USAR migration flows across CONUSAS, 1981–1987

TO:	First	Second	Fourth	Fifth	Sixth	Total Out	In-Migrants per 100 Out-Migrants
FROM:							
First	—	675	233	302	303	1,513	66
Second	426	—	257	305	187	1,175	122
Fourth	259	437	—	613	390	1,699	64
Fifth	34	178	440	—	300	1,052	147
Sixth	86	146	168	327	—	827	143
Total in	1,005	1,436	1,098	1,547	1,180	—	—

SOURCE: SIDPERS data on 1981 members cohort.

Table 10. USAR net migration by state, 1981–1987 (based on 1981 gains and members cohorts) (continued on next page)

	1981 GAINS COHORT			1981 MEMBERS COHORT		
STATE	In-Migrants	Out-Migrants	Net Migrants	In-Migrants	Out-Migrants	Net Migrants
AK	11	4	7	17	9	8
AL	57	56	1	119	138	-19
AR	46	40	6	105	107	-2
AZ	59	41	18	141	77	64
CA	254	208	46	559	438	121
CO	78	70	8	179	116	63
CT	21	29	-8	70	66	4
DC	25	40	-15	72	132	-60
DE	8	10	-2	26	40	-14
FL	141	94	47	373	215	158
GA	95	52	43	231	143	88
HI	48	23	25	81	37	44
IA	32	62	-30	85	137	-52
ID	14	26	-12	35	56	-21
IL	133	150	-17	277	348	-71
IN	74	95	-21	165	231	-66
KS	58	66	-8	128	169	-41
KY	66	100	-34	151	225	-74
LA	45	46	-1	121	98	23

Table 10. USAR net migration by state (concluded)

STATE	1981 GAINS COHORT In-Migrants	1981 GAINS COHORT Out-Migrants	1981 GAINS COHORT Net Migrants	1981 MEMBERS COHORT In-Migrants	1981 MEMBERS COHORT Out-Migrants	1981 MEMBERS COHORT Net Migrants
MA	59	57	2	150	180	-30
MD	109	87	22	325	222	103
ME	9	15	-6	28	35	-7
MI	66	116	-50	132	256	-124
MN	44	64	-20	96	177	-81
MO	83	98	-15	203	208	-5
MS	20	26	-6	54	78	-24
MT	20	16	4	40	57	-17
NC	66	63	3	188	151	37
ND	16	8	8	28	34	-6
NE	17	40	-23	60	86	-26
NH	20	19	1	66	68	-2
NJ	51	61	-10	197	157	40
NM	32	21	11	64	50	14
NV	19	14	5	60	25	35
NY	116	146	-30	279	406	-127
OH	100	124	-24	236	241	-5
OK	95	36	59	193	114	79
OR	31	47	-16	85	109	-24
PA	77	139	-62	214	392	-178
PR	12	42	-30	37	100	-63
RI	12	11	1	29	35	-6
SC	46	28	18	82	99	-17
SD	9	8	-9	10	22	-12
TN	57	67	-10	120	149	-29
TX	276	27	149	643	286	357
UT	23	51	-28	49	93	-44
VA	103	79	24	270	215	55
VT	6	5	1	14	24	-10
WA	78	76	2	197	188	9
WI	54	73	-19	144	169	-25
WV	28	29	-1	64	97	-33
WY	8	1	7	31	2	19

SOURCE: SIDPERS data.

Table 11. USAR net migration by region, 1981–1987
(based on 1981 gains and members cohorts)
(continued on next page)

	1981 GAINS COHORT			1981 MEMBERS COHORT		
REGION	In-Migrants	Out-Migrants	Net Migrants	In-Migrants	Out-Migrants	Net Migrants
E. N. Central	311	442	-131	681	972	-291
E. S. Central	165	214	-49	368	514	-146
Middle Atlantic	184	286	-102	465	730	-265
Mountain	203	190	13	491	378	113
New England	87	96	-9	90	241	-51
Pacific	333	269	64	17	559	58
South Atlantic	434	295	39	1,011	694	317
W.N. Central	171	268	-97	381	604	-223
W.S. Central	393	180	213	855	398	457

SOURCE: SIDPERS data.

number of net out-migrants are Pennsylvania, New York, and Michigan. The heaviest net in-flows are to Texas, Florida, and California. Regions that are net losers of Reservists are New England, Middle Atlantic, East North Central, East South Central, and West North Central. Net gaining areas are the South Atlantic, West South Central, Pacific, and Mountain regions.

An overview of how USAR net migration compares to net migration for the civilian population is presented in table 12. Net migration by Reservists is presented in column 1 and by civilians (in thousands) in column 2; both columns are aggregated to the four major region levels. While the figures are not strictly comparable, the regional pattern is identical for both groups. Both the Northeast and Midwest are net losers, with the Midwest losing the largest number. Both the South and West are net gainers, with net gains in the South exceeding those in the West.

Table 12. Net migration by region

Region	Civilian Net Migrants 1980–1986 (000s)	USAR Net Migrants 1981–1987
Northeast	-1,272	-316
Midwest	-1,510	-514
South	+1,933	+628
West	+849	+271

SOURCE: SIDPERS data and U.S. Bureau of the Census, Current Population Reports, *Geographic Mobility: March 1985 to March 1986*, Population Characteristics, Series P-20, No. 425. Washington, D.C: U.S. Government Printing Office, 1988.

Two conclusions emerge from this section: (1) USAR migration appears to be significantly less than civilian migration, especially for interstate moves, and (2) the directions of civilian and USAR migrations are identical. Since migrants are undercounted in the SIDPERS data, the exact size of the difference in Reserve and civilian migration rates is unknown. However, it is unlikely that the missing USAR migrants would fully account for the difference. If Reservists are somewhat less mobile than their civilian counterparts, an intriguing question is whether this difference arises because Reservists do not share the same characteristics (education, race, etc.) as similar-age civilians, or simply because they are Reservists.[8] Section III attempts to shed light on this issue.

[8]An alternative possibility is that Reservists have some unobserved characteristic which motivates both Reserve affiliation *and* geographic stability.

III. AN ANALYSIS OF INDIVIDUAL MIGRATION BEHAVIOR

A. The Human Capital Model

This section seeks to identify the determinants of the migration decision of individual Reservists. Economists have treated an individual's decision to migrate as an "investment in human capital," comparable to decisions to invest in activities such as formal schooling.[9] The individual is assumed to compare the present value of the benefits (increased wages, lower unemployment, etc.) of migrating with the present value of the costs (direct and indirect) of moving; migration occurs when the present value of the difference between benefits and costs (net benefits) is positive. If the net benefits are positive for more than one destination, the individual is assumed to choose the destination with the greatest net benefits.

Numerous studies have confirmed the general predictions of human capital theory. For example, people tend to move from regions where economic opportunities are poor to areas where they are better, and mobility is much higher among the young (who have a longer period over which to recoup the investment costs) and more highly educated persons (who tend to receive higher benefits in the form of increased earnings). Finally, several studies have confirmed that, like investments in formal education, investments in migration yield a positive economic return, although the positive return is observed only after a period of some years. All in all, the human capital paradigm has provided a useful framework for explaining migration behavior.

In this paper we make the assumption that the human capital model can also be applied in specifying models of the migration decision of USAR members. The rationale for this assumption is that, at any given time, the vast majority of Reservists are employed full-time on civilian jobs. Therefore, changes in their civilian income or employment status are likely to be the primary motive for considering migration. Serving in the Reserves may, on the margin, affect the individual's final decision, but the direction of the effect is ambiguous. For example, being a Reservist may reduce the direct cost of

---

[9]See Chapter 9, "Investments in Human Capital," in R. Ehrenberg and R. Smith, *Modern Labor Economics*, 3d edition. Glenview, IL: Scott, Foresman, 1988.

migration if the individual can rely upon his Reserve earnings during the transition period to the new location. For this reason, Reservists may be more likely to migrate than otherwise similar individuals.

Alternatively, being a Reservist may increase the cost of mobility if the individual does not expect to reaffiliate in the new location. If the individual is highly motivated to remain in the Reserves, this factor may make migration less likely. The degree to which being a Reservist influences one's migration decision ultimately is an empirical question. The human capital paradigm is used below to specify models of the determinants of both place-to-place migration flows and individual migration choices.[10]

For single persons, migration decisions are influenced by the individual's personal attributes; for married persons, family characteristics also become important.[11] The personal characteristics that have been found to be important in the literature include employment status, earnings, education, accumulated skills and training, job tenure, age, sex, and race. In addition, life cycle considerations — marriage, divorce, graduation, birth of children, and retirement — are important. Unfortunately, information on all of these individual and family characteristics is not available in the Army personnel files used for this study.

One important factor in any human capital investment decision is an individual's age. The benefits of these investments decline with age because of the shorter period of time available to recoup the cost of the investment. In addition, investment costs — especially indirect, nonpecuniary costs — tend to rise with age due to family and community ties formed by older persons. A sizeable amount of empirical literature has affirmed the expected inverse relationship between age and civilian migration.

Table 13 indicates that a similar age-migration relationship applies to Reservists. The table shows the percentage of Reservists in each age group (from the 1981 gains cohort) who moved during the 1981–1987 period. As

---

[10]This report focuses on the migration choices of Reservists. A separate report concentrates on civilians.

[11]This survey of factors influencing individual migration decisions relies heavily on Greenwood, *op. cit.*

Table 13. Propensity to migrate, USAR 1981 gains cohort (1981–1987) by age

Age	Migration Propensity (%)
17–20	18.17
21–24	18.68
25–30	21.16
31–40	20.00
41–50	18.95
51+	12.63

SOURCE: SIDPERS data.

with civilians, Reserve migration propensity peaks in the 25 to 30 age group and declines thereafter. However, the decline in migration by age is not as pronounced for Reservists as for civilians (see table 1 for civilian migration by age).

The civilian propensity to migrate has also been observed to increase with education. The most highly educated groups — those with five years or more of college — have the highest migration propensities. Several factors underlie this relationship. First, persons with more education are more likely to work in occupations characterized by national, as opposed to strictly local, labor markets. These occupational differences also explain why persons with better educations are more likely to undertake long-distance moves. Second, job opportunities and employment information tend to be better for those with more education, who also may be better able to decipher complex information about alternative localities. For example, most professional and technical workers have a job in hand when they move, which lowers the expected cost of migration by reducing the job search period. Finally, education may lessen the ties of family and tradition that often bind poorly educated persons to an area.

The expected positive correlation between education and migration is also exhibited in the USAR data. High school diploma graduates (HSDGs) have a migration propensity of 20.4 percent, compared to only 16.6 percent for nongraduates. This difference is even more pronounced when AFQT test scores are used as a measure of educational background and skills. Persons in

the highest test score categories (TSCs I and II) have a migration propensity of 23.3 percent, compared to only 17.6 percent for those in the lowest categories (TSCs III and IV).

The effect of race on migration is not as clear-cut as other demographic attributes. Part of the difficulty is that nonwhites tend to be concentrated in lower occupational strata in which job transfers are rare, unemployment is common, and local rather than national labor markets are the rule. Empirical research suggests that nonwhites are more responsive than whites to regional income differentials, while whites are more responsive to differential employment opportunities. Another factor is employment and housing discrimination. If employment discrimination is widespread, the benefits of migration and thus the propensity to migrate will tend to be lower for nonwhites. Similarly, housing market segregation may also reduce the potential rate of return in new locations if job access for nonwhites is poor.

The observed migration propensities in the USAR data are lower for nonwhites than for whites: 16.5 percent compared to 20.4 percent. Among identifiable ethnic groups, Hispanics have the lowest propensity — 13.7 percent. This may be explained in part by the lack of English language skills of Hispanics, and in part by the strength of traditional family ties in Hispanic communities.

Another attribute that is important in the civilian literature on migration is job tenure. Because job tenure is correlated with promotions, raises, and employment stability, the probability of migration tends to fall as job tenure grows. Unfortunately, the SIDPERS data do not contain any civilian employment information on Reservists. However, paygrade, which indicates job tenure in the USAR, may serve as a proxy for civilian job tenure.

Table 14 shows migration propensities based on an individual's paygrade in 1981. To make this tabulation, the 1981 members cohort was used in order to provide a sufficient range of paygrades. As table 14 shows, the migration rate rises until paygrade E5, then drops steadily thereafter. It should also be noted that paygrade and age are correlated; hence, the migration rates in tables 13 and 14 show a similar pattern.

Table 14. Migration propensity, USAR members cohort, by paygrade

Paygrade	Migration Propensity (%)
E1	18.18
E2	16.45
E3	21.77
E4	21.71
E5	23.46
E6	21.23
E7	18.47
E8	15.66
E9	10.64

SOURCE: SIDPERS data on 1981 members cohort.

Changes in life cycle and family circumstances are frequently associated with the decision to migrate. Life cycle changes include graduation, marriage, birth of children, divorce, and retirement. Family status is important because a husband-wife family must examine the joint net returns of migrating. The husband's earnings gain frequently is offset by the wife's earnings loss, causing individuals to stay put. In addition, the presence of children can affect the wife's labor force participation and the family's migration decision. Despite the importance of life cycle and family conditions, little information is available on these factors in the SIDPERS files.

Marital status is the only family characteristic available in the SIDPERS files. The human capital model implies that husband-wife families will have a lower migration propensity than single persons,[12] a hypothesis that has received some support in prior empirical studies.[13] However, migration differences between married and single Reservists are slight: the migration rate for married Reservists is 19.3 percent; for singles it is 21.5 percent. Migration differences between males and females, on the other hand, are pronounced and surprising — the female migration rate is 27.8 percent, but only 19 percent for males. Of course, female Reservists are probably not

[12]Jacob Mincer, "Family Migration Decisions," *Journal of Political Economy*, 1978, 86: 749–773.

[13]M. Greenwood, *op cit.*

representative of the U.S. population; female Reservists tend to be younger and less likely to be married then their civilian counterparts. Perhaps as evidence of this uniqueness, there is virtually no difference in migration rates between married and single USAR females. However, it should be stressed that a number of omitted factors — such as civilian labor participation of the female and number of children — may confound the simple relationships between marital status, gender, and migration.

B. Multivariate Analysis of the Determinants of Migration

Indeed, simple bivariate techniques are inadequate to analyze migration decisions because they cannot control other confounding influences. To account for the numerous determinants of migration, a multivariate analytical framework is needed. In specifying a multivariate model for empirical testing, it is assumed that Reservists' migration decisions are linked to their civilian employment status. Thus, the human capital investment model provides the theoretical underpinning for the multivariate analysis of migration, and all of the personal attributes discussed above are candidates for explanatory variables in the migration model.

The empirical approach is to estimate a multivariate model in which the decision to migrate is characterized as a binary variable that assumes the value of 1 for those who migrate and 0 for those who do not migrate. The model relates the migration decision of the i^{th} individual, M_i, to a vector of personal attributes, X_i:

$$M_i = P(X_i) \tag{1}$$

where

$$P(X_i) = P[M_i=1/X_i] = \frac{1}{1 + e^{-(\beta_0+\beta_1 X_{i1}+\ldots+\beta_k X_{ik})}}, \tag{2}$$

k is the number of attributes of i, and β_0, β_1, ..., β_k are the parameters to be estimated. Rearranging terms and taking logs of both sides yields:

$$\log \frac{P_i}{1-P_i} = \beta_j+\beta_1 X_{i1}+\ldots+\beta_k X_{ik} \tag{3}$$

This is the "logit" model, which is based on the cumulative logistic probability function.[14] Values for the β_k coefficients are obtained by using maximum likelihood estimation.

Table 15 provides descriptive statistics for the explanatory variables (X_i) used in the estimating model. Most of the explanatory variables in the estimating model also are binary variables, coded 1 or 0. The only exceptions are a variable for age, in years, and paygrade, which ranges from 1 to 9. The variables reflect the individual's characteristics — age, marital status, paygrade, and so forth — as of 1981. While many of these characteristics change during the period in which migration is allowed to occur (1981–1987), it is assumed that the beginning-period characteristics are the primary determinants of any migration decisions during the ensuing six-year period. This assumption is re-examined later using data on changes in personal and family status over time.

Table 15. Descriptive statistics for entire sample

Sample size	55,495
Average age	23.75
Average paygrade	2.53
Average state employment growth rate, 1980–1985 (%)	0.07
Average state per-capita income growth rate, 1980–1985 (%)	0.45
	Percent of Sample
Migrating	19.1
HSDGs	66.4
Single	70.9
Hispanics	0.4
Males	79.9
TSC I-II	25.7
TSC IIIA	20.0
TSC IIIB	34.8
Nonprior service	51.9
Nonwhite	31.7

SOURCE: SIDPERS data from the 1981 gains cohort, and the U.S. Census Bureau.

[14]Robert Pindyck and Daniel Rubinfeld, *Econometric Models and Economic Forecasts*. New York: McGraw-Hill, 1976.

The results of estimating the basic logit model are presented in table 16. For ease of understanding the effect of each explanatory variable, the estimated logit parameters have been transformed. First, the migration probability is calculated for a hypothetical "reference" individual with the following characteristics: married, white, non-Hispanic, female, non-HSDG, TSC IIIB, with prior service, and mean age (23.75) and paygrade. The values displayed in table 16 reflect the change in the migration probability when one of these characteristics is altered, holding all other factors constant. For example, the results in table 16 indicate that a high school graduate is 2.9 percent more likely to migrate than a nongraduate, everything else being equal. Column 1 of table 16 presents the results using the 1981 gains cohort (N=55,495) as the sample, while column 2 uses the 1981 membership cohort (N=176,937) as the sample.

Table 16. Effects of personal attributes on migration

Variable	Change in Migration Probability[a] 1981 Gains	1981 Members
High school graduate	.029**	.016**
Single	-.0004	.015**
Male	-.075**	-.089**
Hispanic	-.060**	-.027**
Age	-.010	-.183**
Paygrade	.034**	.090**
TSC I-II	.039**	.041**
TSC IIIA	.014**	.028**
TSC IIIB	-.001	-.002
Nonprior service	.028**	N.A.
Nonwhite	-.038**	-.018**
Sample size	55,495	176,937
Chi-square	687.7	2517.2

a. Migration probability = .21 for reference individual (for gains; .22 for members) with following characteristics: married, white, non-Hispanic female, non-HSDG, TSC IIIB, with prior service and mean age and paygrade.

**(*) Significant at .01 (.05) level.

The results are broadly supportive of the predictions of the human capital model: Reservists with at least a high school degree (HSDG) and those with higher AFQT scores (TSC I–II and IIIA) are more likely to migrate; older persons are less likely to migrate. The results for the two cohorts, although similar, reveal some noteworthy differences. The age effect is statistically significant only for the members cohort; furthermore, it is much stronger for that sample, indicating that one additional year of age reduces the migration probability by 18.3 percent. One reason the age variable performs poorly in the gains cohort is likely collinearity with the variable for prior service. The nonprior service variable, which is positive and significant, is probably capturing most of the effect of age differences, thus biasing downward the coefficient of age. A second problem is that the variation in age in the gains cohort is small. In the members cohort, unmarried persons are more likely, and males less likely, to migrate. While the magnitude of the marital effect is small, males are almost 9 percent less likely to migrate than females.

Hispanics and nonwhites have lower migration probabilities than non-Hispanics and whites, respectively. Hispanics are 6 percent less likely to migrate and nonwhites are 3.8 percent less likely. The AFQT score is broken into four groupings: I–II, IIIA, IIIB, and IV. TSC IV is the omitted category in the equation. The results indicate that, compared to TSC IV, both TSC I–II and IIIA have higher migration probabilities, while no differences are observed between TSC IIIB and IV.

That these empirical results reflect the empirical relationships observed previously in the civilian literature and support the implications of a theoretical model that is based on civilian migration is an important conclusion. Reserve participation is a secondary labor force activity, and members' basic life cycle decisions are prompted by changes in their civilian employment status — being a Reservist is the tail on a very large dog. However, it is still possible that the tail exerts some influence on the dog, a possibility that is investigated further below.

C. The Relationship Between MOS and Migration

It is important to stress that the more highly educated Reservists — HSDGs in the top AFQT groups (TSCs I–II and IIIA) — have the highest migration propensities. Since enlistees with these mental attributes are more likely to be assigned to technical occupational specialties, it appears that migration may be disproportionately high in the most technical MOSs. If so, migration would affect not only overall unit manning levels, but also the distribution of skills within units. To the extent that more technically trained personnel are more migration prone, the cost of migration to the USAR will be higher than if migration propensities were evenly distributed across MOSs.

To determine whether an individual's MOS influences the decision to migrate, an additional set of models was estimated. In 1981 there were more than 300 Army MOSs. In order to reduce the number of variables to a manageable number, the MOSs were matched with DOD occupational codes using the Defense Department's occupational classification system.[15] The one-digit DOD occupational areas are as follows:

CODE	OCCUPATIONAL AREA
0	Infantry, Gun Crews
1	Electronic Equipment Repairers
2	Communications and Intelligence Specialists
3	Medical/Dental Specialists
4	Other Technical and Allied Specialists
5	Functional Support and Administration
6	Electrical/Mechanical Equipment Repairers
7	Craftsmen
8	Service and Supply Handlers
9	Nonoccupational

These codes were included as explanatory variables and the logit model in table 16, column 1, was reestimated. The results are displayed in table 17. To conserve space, only the coefficients of the occupational codes are presented. The results in table 17 are in accord with expectations. The omitted category is occupation code 0, Infantry and Gun Crews, an occupation that requires little technical training. The positive coefficients indicate that,

---

[15]Office of the Assistant Secretary of Defense, *Occupational Conversion Manual*, January 1989.

compared to code 0, many of the other occupations have a significantly higher probability of moving, ranging from 1 percent for Service and Supply Handlers to 5 percent for Medical Specialists. A chi-square test also indicated that the MOS variables significantly improved the explanatory value of the model. The highest migration rates are for medical, communications/ intelligence, and support/administration specialties.

The impact of migration may go far beyond the recruiting requirements necessary to replace lost soldiers. The unit must also replace the training and skill level embodied in the migrant. Because certain military jobs require lengthy training periods, and Reservists train only on a part-time basis, migration may leave slots that eventually are filled with unqualified Reservists. When slots are not filled with MOS-qualified Reservists, unit readiness is degraded. A 1988 General Accounting Office study revealed that over 30 percent of USAR personnel were not fully qualified for their duty positions.[16]

In an effort to determine the degree to which member transfers contribute to this problem, an attempt was made to correlate member transfers and MOS matches. In particular, an individual's primary MOS in 1981 was compared with his or her duty MOS in 1987 to determine if the two MOSs matched. Of the 55,756 members gained in 1981, the beginning and ending MOSs were identical for 56.1 percent. Of individuals who transferred during this period, 56 percent were in a new MOS that did not match their initial MOS. Of those who did not transfer, only 37 percent of their MOSs failed to match. Stated differently, a much higher percentage of MOS matches were found for those who did not transfer than for those who did. While this calculation proves very little, it suggests that transfers and migration may have a strong effect on unit personnel readiness levels.

---

[16]U.S. General Accounting Office, *Reserve Components: Opportunities to Improve National Guard and Reserve Policies and Programs*, November 1988.

D. The Effect of Prior Service and Gender on Migration

The results for the gains cohort (column 1 in table 16) indicate that NPS enlistees, all else being equal, have a significantly higher migration probability.[17] It is reasonable to expect that the effects of the other explanatory variables differ depending on whether the individual is a NPS or PS enlistee. NPS recruits are in the youngest age groups and are more likely than PS recruits to experience more life cycle changes during their first enlistment term. Leaving home, attending college, completing formal schooling, entering the labor force, marrying, and having children are among the life cycle changes that may color the decisions of NPS personnel.

Table 17. Effects of MOS on migration (1981 gains cohort)

	Variable	Change in Migration Probability
(1)	Electronic Repair	.021
(2)	Comm./Intell.	.030**
(3)	Medical/Dental	.046**
(4)	Other Technical	.015
(5)	Support/Admin.	.031**
(6)	Repair	.022**
(7)	Craftsmen	.007
(8)	Supply	.011*
(9)	Nonocc.	.036*
	Sample size	55,756
	Chi-square	718.1

**(*) Significant at .01 (.05) level.

To test whether the parameter estimates differ by prior service status, the 1981 gains sample is divided into two groups — NPS and PS. The basic logit model is then estimated separately for each group. The results are presented in table 18; column 1 displays parameter estimates for the NPS group,

[17]Note that in the bivariate analysis in table 5 no differences were observed in the effect of prior service on migration. But when other factors are controlled in table 16, a pronounced difference emerges.

and column 2 for the PS group. The results in table 18 also should be compared with column 1 in table 16.

Table 18. Differences in effects of personal attributes on migration — NPS versus PS enlistees (1981 gains cohort)

Variable	Change in Migration Probability[a]	
	Nonprior Service	Prior Service
High school graduate	.027**	.050**
Single	-.007	.001
Male	-.043**	-.117**
Hispanic	-.045**	-.074**
Age	-.020	-.001
Paygrade	.048**	.010*
TSC I-II	.063**	.015
TSC IIIA	.030**	-.012
TSC IIIB	.012	-.027**
Nonwhite	-.032**	-.046**
Sample size	28,837	26,658
Chi-square	367.8	400.9

a. Migration probability = .285 (PS), .207 (NPS). See table 17 for description of reference individual.

**(*) Significant at .01 (.05) level.

Some interesting differences emerge in table 18. The magnitudes of the partial effects of holding a high school diploma, being a male, and being Hispanic are somewhat larger for the PS group. Second, AFQT score does not have a significant effect in the PS sample, except that those in TSC IIIB have a much lower migration probability. Third, the positive effect of paygrade is somewhat larger for the NPS group. While these differences are noteworthy, they are relatively small in magnitude and involve only one sign change. They suggest that pooling NPS and PS recruits is an acceptable procedure.

It is also possible that the effects of various personal attributes, especially marital status, may differ between males and females. To test for such differences, the gains and members cohorts are divided by gender and the

basic logit models estimated for each group. The results are presented in tables A and B of the Appendix.

For most variables, differences by gender appear to be minor, especially for the gains cohort. The main difference is the effect of marital status. In the gains cohort, single females are more likely to migrate than married females; in the members cohort, however, no difference is observed by marital status of females. In the members cohort, single males are also more likely to migrate than married males.

E. Long-Distance Versus Local Migration

The length of the move is important when analyzing migration choices. The data differentiate those who changed zip code over the period, but not state, from those who changed both zip code and state. The first group relocated within their home state, and are defined as "local" movers; the second group made long-distance (interstate) moves.

A persistent finding in the migration literature is that the distance and migration rate between any two geographic areas (Metropolitan Statistical Areas (SMSAs) or states, for example) tend to be negatively related. A major reason for this relationship is that increased distance raises the costs of moving — both direct and indirect — thereby reducing the expected net return. In addition, the availability of employment and other information declines for more distant locales. Thus, for any given population — such as the USAR membership group — the frequency of local moves should be much higher. This expectation is confirmed for the membership cohort. Between 1981 and 1987, 36,303 moves were recorded, of which 80 percent were local (within-state) moves.

The human capital investment model also provides a guide to expected differences between the characteristics of "local" and "interstate" movers. More highly educated persons tend to have higher incomes and thus are better able to afford the cost of acquiring information about alternative destinations; they also are more adept at processing the information. Thus, those with more education are more likely than poorly educated persons to make long-distance moves. Less well-educated persons tend to be more dependent upon friends and relatives for information, and tend to move shorter distances. In our sample, this translates to an expectation that HSDG, TSC I-II

(and perhaps TSC IIIA) individuals would be more likely to make interstate moves. Those in TSC IV, as well as nonwhites and Hispanics, would be more likely to make local moves. The effect of paygrade on the distance moved is based on the connection with tenure: individuals in higher ranks have higher tenure in the USAR. If these persons also, as seems likely, have higher job tenure on their civilian jobs, they will be less likely to make long-distance moves.

To compare the effects of personal characteristics on the type of move made, a random sample of all movers is extracted from the members cohort file. The sample contained 36,303 movers, of whom 7,320 moved interstate and 28,983 moved within-state. The basic logit model in column 2 of table 16 is then reestimated for this sample; the dependent variable is binary and equals 1 for interstate movers. The results are displayed in table 19.

Table 19. Effects of personal attributes on interstate migration[a] (1981 members cohort)

Variable	Pooled Sample	Females	Males
High school graduate	.050**	.027	.113**
Single	-.002	.006	-.025**
Male	-.054**	—	—
Hispanic	-.016	.019*	.024
Age	-.001	-.001	-.001
Paygrade	-.016**	.011**	-.016**
TSC I-II	.061**	.051**	.051**
TSC IIIA	.037**	.025**	.053**
TSC IIIB	.012*	.013*	.019**
Nonwhite	-.023**	-.010*	-.043**
Sample size	36,303	28,363	7,940
Chi-square	681.9	248.6	53.4

a. Migration probability for reference individual = .18 for local movers, .038 for interstate movers. See table 16 for attributes of reference individual.

**(*) Significant at .01 (.05) level.

The results in table 19 support the theoretical predictions. High school graduates and individuals in test score categories I–II and IIIA have a significantly higher probability of moving interstate than do nongraduates and those in TSC IV. Individuals in TSC IIIB are somewhat more likely to move between states. Individuals in higher paygrades are less likely to make long-distance moves, which we argue is associated with the effects of civilian job tenure. Also in line with predictions, Hispanics and nonwhites are less likely to make long-distance moves.

One noteworthy result is that females have a higher probability of moving between states than males. This result is somewhat puzzling, since normally we would expect males to be more likely to undertake long-distance moves for human capital investment reasons. To identify gender differences in the effects of each explanatory variable on interstate moves, the sample was partitioned by sex and the model reestimated. The results are presented in columns 2 and 3 of table 19.

One important difference between males and females appears to explain the puzzling effect of gender in the pooled sample. Single females are less likely to make long-distance moves than married females. On the other hand, marital status has no effect on distance moved for males. It appears that married females make longer moves, perhaps because their moves are tied to those of their husbands.

F. Life Cycle Changes and Migration

One problem with the above analyses is that, while the decision to migrate — the dependent variable — may have been made anytime during the 1981–1987 interval, most of the individual's attributes are measured as of 1981. Some of these attributes will, of course, remain constant over the period — race, ethnic group, AFQT, sex, and prior service status, for example. Others, however, will change — e.g., education, paygrade, and marital status.

It is well known that life cycle changes play a key role in triggering migration. In an effort to better understand the role of life cycle forces, three new variables are created. The variables compare the individual's marital status, education, and paygrade in 1987 and 1981. If no change in these characteristics took place, the new dummy variables are coded 0; if a change took place, they are coded 1. The "paygrade change" and "education change"

variables are both coded 1 when the person's education or rank increased. The "marital status change" variable merely indicates a status change; it does not indicate whether the change involved a marriage or divorce. However, because of the young age of the Reservists, most of the changes probably involved a marriage.[18] For the gains cohort, 24 percent experienced a pay-grade change, 8 percent a change in education, and 8 percent a change in marital status.[19]

The new variables are incorporated into the basic logit model (presented above in table 16, column 1). The results of estimating the model with the status change variables are presented in table 20. The results in table 20 underscore the importance of life cycle changes to Reservists' decisions. All three of the status change variables are positive and statistically significant. They indicate that an increase in education, a promotion, and a change in marital status are positively associated with the migration decision. Moreover, the magnitudes of the coefficients are the largest of any of the explanatory variables in the model. A change in marital status increases the migration probability by 29 to 35 percent, a promotion by 8 to 10 percent, and an increase in education by 13 to 16 percent. Life cycle changes clearly have important implications for migration decisions.

G. Transfers versus Migration

A second group that affects unit turnover are those individuals who transfer between TPUs. The two major types of transfers are those between units in the same CONUSA (coded L1), and those between units in different CONUSAs (coded J1). The latter transfers normally always involve a change of address, and individuals who make this transfer would, therefore, also be classified as movers. Individuals in the former group are classified as movers

---

[18]Note, too, that we are assuming that these life cycle changes precede (and cause) migration while, in fact, some moves may precede these changes. No attempt was made to address this simultaneity problem.

[19]The low number of marital and education changes is explained by the high rate of attrition of Reservists over the period. A more complete analysis would require that these characteristics be matched *every year* from 1981 to 1987.

Table 20. The effect of life cycle changes on migration (1981 gains cohort)

Variable	Changes in Migration Probability[a] Model 1	Model 2
Hispanic	-.059**	-.042**
Age	.002**	-.001
TSC I-II	.054**	.032**
TSC IIIA	.016*	.011*
TSC IIIB	-.005	.002
Nonwhite	-.032**	-.022**
NPS	-.028**	.013*
Male	-.072**	-.043**
Single	—	-.006
HSDG	—	.040**
Paygrade	—	.010**
Paygrade change	.105**	.080**
Education change	.161**	.134**
Marital status change	.351**	.287**
Sample size	55,495	55,495
Chi-square	3,770.2	3,921.8

a. Migration probability for reference individual = .25 (Model 1), .148 (Model 2). See table 16 for description of reference individual.

**(*) Significant at .01 (.05) level.

only when their home zip code changes. From the gains cohort there were 20,012 transfers over the 1981–1987 period. Of this number, 6,284 (31 percent) also involved a change of address.

Since so many transferees are also movers, it would be redundant to analyze the entire group of transferees as was done for movers in table 16. Instead, transfers are divided into those who move and those who do not move. Similarly, movers are divided into those who transfer (i.e., move and reaffiliate with the USAR), and those who do not transfer (i.e., do not reaffiliate). The diagram below shows the alternative groups. Movers are divided into those who transfer (i.e., move and reaffiliate with the USAR), and those who do not transfer (i.e., do not reaffiliate). Similarly, transfers are divided into those who move and those who do not move.

1. Movers		2. Transfers	
a. affiliate	b. nonaffiliate	a. movers	b. nonmovers

A sample is then formed from the gains cohort which consists of groups 2a and 1b only. The sample contains 6,276 mover/transferees and 4,349 non-transfer movers. A basic logit model is then estimated with a binary dependent variable indicating a reaffiliation decision. This permits a comparison between the parameters of the basic model for those who move and reaffiliate with the USAR versus those who move but leave the USAR. This analysis seeks an answer to the question: What, if anything, appears to distinguish movers who stay from movers who leave the USAR?

Table 21 displays the partial effects of the standard set of explanatory variables on the reaffiliation decision. The results indicate that, of those who move, nonprior service high school graduates in the top AFQT categories are more likely to reaffiliate. This suggests that these individuals either are more adept at identifying available slots and Reserve units in their new locations, or they are more likely to be steered into available slots by unit commanders. Older individuals in higher paygrades are also more likely to reaffiliate. The obvious incentives of retirement pay may underlie this result. Hispanics are somewhat less likely to reaffiliate after a move, and males are substantially less likely to reaffiliate. It may be that females reaffiliate because the USAR provides part-time work that conveniently matches family and child-rearing activities. Perhaps the only surprising result is that NPS enlistees are more likely than PS enlistees to reaffiliate.

Of course, this analysis represents only a preliminary investigation of these relationships. The decision to reaffiliate in a new location is complicated by numerous factors, many outside the control of the Reservist. These factors include the following: whether a TPU is located within 50 miles of the new residence; whether the TPU is already filled and, if so, whether it has approval to exceed 100 percent of its authorized strength; and whether a slot is available in the Reservist's MOS and paygrade.

Table 21. Effects of personal attributes on reaffiliation (1981 gains cohort)

Variable	Change in Reaffiliation Probability[a]
High school graduate	.03**
Single	.005
Male	-.06**
Hispanic	-.04
Age	.005**
Paygrade	.01*
TSC I-II	.04**
TSC IIIA	.01
TSC IIIB	.001
Nonwhite	.005**
Non-prior service	.094**
Sample size	10,625
Chi-square	130.5

a. Migration probability for reference individual (see table 16 for definition) = .82.

**(*) Significant at .01 (.05) level.

H. A Multiple Choice Model of Transferring, Migrating, and Staying

In order to shed additional light on the reaffiliation decision, a more complex three-way choice model is constructed. The set of alternatives is expanded to include moving and reaffiliating, moving and attriting, and neither moving nor attriting. This choice model has a dependent variable that is trichotomous. Under certain reasonable assumptions concerning the stochastic components of the theoretical model, the choice model can be estimated using the multinomial logit (MNL) technique.[20] The choice equations estimated by the MNL technique take the following general forms:

$$\ln (P_r/P_s) = f(X) \quad (4)$$

$$\ln (P_a/P_s) = f(X) \quad (5)$$

[20]See G. S. Maddala, *Limited Dependent and Qualitative Variables in Econometrics*. New York: Cambridge University Press, 1983.

where P_r, P_a, and P_s refer, respectively, to the probability of moving and reaffiliating, moving and attriting, and staying. The vector X includes the explanatory variables used in the previous logit models.

Table 22 presents the parameter estimates of the MNL model. The estimates indicate that the relative probability of staying (not moving and not attriting) is higher for males, those in TSC IIIA and IIIB, and nonwhites. Nonprior service personnel are more likely to move or transfer than they are to stay put. Those who are more likely to affiliate upon moving tend to be older, high school grads, in TSC I–II, and in higher paygrades. Hispanics are less likely to transfer than to stay. The other relationships in the table are not statistically significant.

Table 22. Parameter estimates of MNL model of transfer/move/stay decision[a]

Variable	$\ln(P_r/P_s)$	$\ln(P_a/P_s)$
High school graduate	.089	-.034
	(1.68)	(.61)
Single	.013	-.016
	(.28)	(.33)
Hispanic	-.240	-.691
	(2.15)	(.60)
Male	-.745	-.508
	(13.21)	(8.30)
Age	.023	.0001
	(5.22)	(.20)
Non-prior service	2.155	1.743
	(28.69)	(21.55)
TSC I-II	.144	-.031
	(2.35)	(.47)
TSC IIIA	-.113	-.766
	(1.75)	(1.12)
TSC IIIB	-.178	-.183
	(3.03)	(2.93)
Paygrade	.091	.036
	(4.10)	(1.50)
Nonwhite	-.219	-.198
	(4.90)	(4.15)
Intercept	-.931	-.425
Log likelihood	-16,958	
Chi-squared	2,976.6	

SOURCE: SIDPERS data.

a. t-values in parentheses.

IV. AN ANALYSIS OF REGIONAL MIGRATION FLOWS

Another objective of this study is to determine whether and how the demographic and economic characteristics of local geographical areas affect USAR member migration. Previous studies have found that regional income and employment opportunities are closely linked to an area's migration pattern. However, such opportunities offer a better explanation of in-migration than of out-migration. Moreover, the effects of local economic conditions are not always unambiguous. For example, areas with higher unemployment rates would generally be expected to have both more out-migration and less in-migration, all else being equal. Yet numerous prior studies have failed to verify this relationship. The interrelationship between local employment and economic conditions and migration does not always involve a simple one-way causal pattern.

Two alternative approaches are adopted here to explore the impact of local area characteristics on USAR migration. The first involves simply modifying the micro-data sample used above in Section III to estimate the logit models. The second approach involves developing a new aggregate data file consisting of place-to-place flows of USAR migrants. Each approach is discussed in turn, along with the associated empirical findings.

The first approach involves merging data on state economic conditions with the 1981 gains cohort file. The employment and economic conditions for the state in which each individual resided in 1981 are merged with the individual's record. Several variables are constructed to reflect regional characteristics. The growth rate (in percent) of total nonagricultural employment over the 1980 to 1985 period is used to reflect growth in state employment conditions during the Reservist's enlistment period. Previous studies have found a negative correlation between out-migration rates and employment growth.[21]

The second variable is the percentage growth rate of per capita income in the state, 1980–1985. This variable should reflect the state's overall, long-term economic growth pattern. While it might be expected that this variable

---

[21]See, for example, R. Nakosteen and M. Zimmer, "Migration and Income," *Southern Economic Journal*, 1980, 46:840–851.

also would be negatively correlated with out-migration, some prior studies have observed a positive correlation.

A third state-level characteristic is the growth rate of manufacturing wages, 1980–1985. A region characterized by labor shortages should experience faster wage growth and be more attractive to potential in-migrants. The population growth rate of the state is also included to capture demographic changes that may affect migrants' decisions — such as congestion, crowding and other amenities — independent of economic factors. Finally, the state's unemployment rate relative to the national average (in 1980) is included.

The result of estimating several versions of this basic model are presented in table 23. The alternative versions are estimated to explore the effects of multicollinearity among the state-level characteristics.

Table 23 indicates a mixed pattern of relationships. The per-capita income growth variable represents the overall, long-term economic growth of the state and is included in all three specifications. The sign of the income growth variable is consistently negative, as expected, and significant. The probability of out-migration tends to be lower for Reservists who live in states with more rapid economic growth. Similarly, states with more rapid wage growth also tend to have lower out-migration probabilities. These two variables provide the only consistent results, in terms of being aligned with expectations.

By way of contrast, the employment growth variable is positive in Models 2 and 3, but significant only in Model 2. Similarly, the population growth rate is positive in Model 1, indicating higher out-migration propensities in states with rapid population growth.[22] However, in Model 3 the coefficient of population growth is insignificant. Finally, the relative state unemployment rate has an unexpected negative sign in Model 3. This is perhaps the least surprising result since prior studies have not observed a consistent effect of unemployment.

---

[22]These results are not particularly surprising. Studies have found that areas with faster rates of employment and population growth have more in-migration, but they also tend to have more out-migration. Several hypotheses have been offered for this (see Greenwood, *op. cit*

Table 23. The effect of local economic conditions on migration behavior[a] (1981 gains cohort)

Variable	Model 1	Model 2	Model 3
High School graduate	.203**	.201**	.204**
Single	.004	.004	.004
Male	−.399	−.401**	−.400**
Hispanic	.085	.105	.094
Age	−.001	−.001	−.001
Paygrade	.066**	.064**	.065**
TSC I-II	.251**	.253**	.251**
TSC IIIA	.078*	.082*	.082*
TSC IIIB	.002	.001	.006
Nonprior service	.214**	.211**	.213**
Nonwhite	−.211**	−.223**	−.204**
Employment growth	—	.761**	.677
Per capita income growth	−1.226**	−2.094**	−1.722**
Wage growth	−1.554**	—	−1.512**
Population growth	1.178**	—	.095
Relative unemployment, 1981	—	—	−.002**
Sample size	53,593	53,593	53,593
Chi-square	822.38	792.67	831.33

a. The values represent the estimated logit coefficients.

**(*) Significant at .01 (.05) level.

Two problems underlie these inconsistent results. The first is the high degree of collinearity among the state conditions variables. The second stems from using data to reflect economic and employment conditions that could only be measured at the state level. Individual migration behavior may be more responsive to local labor market conditions, and data at the SMSA level may be needed to adequately measure the effect of local conditions.

Despite these qualifications, it is clear that regional economic conditions cannot be entirely ignored when trying to explain migration. Both per-capita income growth and wage growth are negatively, and significantly, related to out-migration decisions. Linking economic conditions more closely in time to

the individual's actual migration decision is one change that probably would provide a more precise estimate of the impact of local conditions on migration.

We now turn to an analysis of aggregate migration flows between geographic areas. The matrix of state-to-state migration flows in table C of the Appendix is used to construct the basic data file. Each cell in that table corresponds to a flow between an origin and destination state. State-level place-to-place migration rates are then computed as the number of individual Reservists who moved from each state i to each state j, as a percentage of the total population of Reservists in the original state i in 1981.

Let M_i denote the computed migration rate between i and j, computed as the number of migrations divided by the base population. Human capital considerations imply that the migration rate between i and j will be a function of the economic attractiveness of each location, denoted as E_i and E_j, and the cost of moving from i to j, C_{ij}. Thus, the basic state-to-state migration model to be empirically tested can be expressed as:

$$M_{ij} = f(\overset{-}{E_i}, \overset{+}{E_j}, \overset{-}{C_{ij}}) \qquad (6)$$

The signs above the variables indicate the hypothesized direction of the relationships. The greater the economic attractiveness of i, and the higher the moving cost, the *lower* the migration from i to j; the *greater* the attractiveness of j, the greater the migration from i to j.

A debate that has surfaced in the literature is whether origin and destination conditions have symmetrical effects on migration. In particular, it is questioned whether individuals possess sufficient information about employment conditions in both the origin locale and in all potential destination regions. Thus, it is questionable whether the "push" effect of unfavorable employment opportunities in the origin state is equal to the "pull" effect of more attractive conditions in the potential destination. Since individuals are likely to be better informed about labor market conditions in the home area, it is often claimed that origin conditions should exert a stronger (push) effect on migration than the pull effect destination conditions. The prior literature

has substantiated this asymmetry: destination economic conditions consistently outperform origin conditions. The empirical analysis in this section attempts to test for asymmetric effects.

The variables used to specify the factors incorporated in E_i and E_j are those used in table 23 — growth rates (1980–1985) of total employment, per-capita income, manufacturing wages, and population. Unfortunately, data were not available to specify the cost of moving between each pair of states. The data are taken from a 50 x 50 contingency table, less the main diagonal, of directional migration for pairs of origin and destination states. This yields a maximum potential sample size of 2,450. However, many cells contained zeroes and therefore were dropped from the sample. Missing data for the explanatory variables reduced the usable sample even further, and the final sample contained 1,063 observations. The results of ordinary least squares (OLS) estimation of equation 4 are presented in table 24. Asymmetric effects are tested by simply entering the origin and destination variables separately.

The results in table 24 are somewhat mixed. On the positive side, several of the estimated coefficients support the basic hypothesis that place-to-place migration is explained by the human capital model. A second general finding is the presence of asymmetry between origin and destination conditions. However, the pattern is not systematic. For some variables the coefficient on the origin variable is larger (in absolute magnitude) than the coefficient on the corresponding destination; for other variables (and models), the reverse is true. Examining just Model 3, the "pull" effect of destination conditions dominates for all variables except wage growth. Thus, the asymmetry for Reservists appears to be the opposite of that discovered for civilians. This is an interesting finding and raises the question of why destination pull is stronger for Reservists. While it is purely speculative, it may be that Reservists have better information networks in distant locations than civilians. A carefully constructed survey would provide more definitive answers to this issue.

For some of the explanatory variables, the results are consistent in all models: destinations with higher growth rates of personal income, population, and manufacturing wages attract migrants at a higher rate than states where income and wage growth are low. Correspondingly, origins with rapid income and wage growth generate fewer out-migrants. However, origins with higher

Table 24. OLS estimates of state-to-state migration flows, 1981–1987[a,b]

Explanatory Variables	Model 1	Model 2	Model 3
Employment growth — origin	.684*** (4.35)	.731*** (4.93)	.513*** (3.09)
Employment growth — destination	-.364** (2.28)	-.385** (2.56)	-.896*** (5.43)
Personal income growth — origin	-.504*** (4.89)	-.268*** (2.69)	-.250** (2.57)
Personal income growth — destination	.299*** (2.87)	.347*** (3.48)	.364*** (3.74)
Wage growth — origin	—	−1.072*** (11.29)	−.986*** (10.15)
Wage growth — destination	—	−.014 (.15)	.163* (1.72)
Population growth — origin	—	—	.322** (2.32)
Population growth — destination	—	—	.857*** (6.73)
Constant	.183*** (3.01)	.368*** (5.93)	.263*** (4.19)
R^2 =	.03	.14	.19
F-statistic =	8.30***	7.51***	8.20***

a. Flows based on migration between 1981 and 1987 by members cohort. Sample size = 1,063.

b. T-statistics in parentheses.

***, **, * Significant at .01, .05, .10 level.

population growth appear to attract migrants. Finally, the signs of the employment growth variable are reversed from expectations. High employment growth in origins increases out-migration, whereas higher employment growth appears to discourage in-migration.

While the F-statistics indicate that the overall model is significant in explaining place-to-place migration, the R^2 indicates that the proportion of variance explained is low. These statistics indicate that, while area-wide

economic conditions are important in explaining state-to-state migration flows of USAR migrants, other factors are also at work. Finally, the results reinforce the principal conclusion of the earlier analysis using micro-level data: local conditions are as important to Reservists as to civilians in making migration decisions.

V. SUMMARY AND CONCLUSIONS

To derive testable hypotheses concerning migration choices of Reservists, this study adopted the human capital investment model, which has been used successfully to explain civilian migration. Empirical tests using data for USAR members repeatedly confirmed the predictions of the civilian model and provided substance to the view that Reservists, like civilians, base their migration choices on economic costs and benefits. As a consequence, the analysis found that those personal attributes that explain civilians' choices also explain Reservists' choices. In particular, Reservists who migrate tend to be younger with better educational backgrounds, higher AFQT scores, and no prior service; those who are less likely to migrate tend to be older, single, male, and nonwhite or Hispanic. The analysis discovered that Reservists serving in technical MOSs also have relatively high migration propensities.

These results pinpoint one potential dilemma for Army Reserve recruiting policy. Current recruiting efforts are targeted towards the very groups — high school graduates in the top AFQT categories — that display the highest migration propensities. Not only are these individuals more costly to recruit, they also create problems for TPUs in the form of personnel turnover, which degrades mission readiness. Of course, "high-quality" recruits often provide significant advantages to Reserve units: they are easier to train and tend to perform better in their specialties. However, these differential benefits must be weighed against the extra recruiting and retraining costs incurred due to migration, and the impact of migration-induced turnover on unit readiness. It is possible that, when all factors have been carefully evaluated, individuals who are less prone to move — those in TSC IIIB, for example — may present a more cost-effective alternative to high-quality recruits. In addition, increased emphasis on prior service recruits is a policy option that may warrant further study.

Other findings in this study support the hypothesis that the migration behavior of Reservists and civilians is similar. For example, place-to-place migration flows of Reservists tend to mimic those of civilians. Flows, for example, tend to be away from the Rust Belt and toward the Sun Belt. Multivariate models also established a relationship between the economic and employment conditions of an area and its migration experience. States with poor employment and wage opportunities tend to lose population to states

with better opportunities. This pattern is confirmed with both micro-data and aggregate-level data. Thus, the migration choices, behavior, and destinations of citizen-soldiers who serve in the USAR are similar in many respects to their neighbors who do not serve.

What is the importance of these findings for USAREC decision models? The results support the conclusion that, while it may not be necessary to maintain detailed civilian migration data in the various USAREC models, it would be unwise to ignore the potential market effects of civilian migration. The same conclusion applies to the need to maintain data on USAR transfers. Certain USAREC models will benefit from the introduction of migration and/or transfer data.

The MSS system examines the market supportability of specific locations for proposed activations, deactivations, or expansions of TPUs. The MSS is meant to profile market supportability over a five-year period. An improvement in the MSS model would be to include projected migration rates by geographic area. Five-year migration projections by state, for example, are available from the Census Bureau.[23] These projections could be acquired on an annual basis and maintained as a reference file or entered directly as part of the MSS system maintained at Litton. Note that the reason for maintaining these projections is not to track the projected recruitable (military available) population of the area, which is available from other sources. Instead, the goal is to identify areas of high potential unit turnover. Areas with high rates of projected out-migration will not provide a stable recruiting market for locating a new unit, or increasing current authorizations. Areas of high projected in-migration may enjoy increased USAR affiliation rates without the need for increased recruiting resources, and additional authorizations can be distributed to such areas at a relatively low cost.

Civilian migration projections also should be available as reference files for the annual NMAs, which attempts to identify specific geographic areas (states, MSAs, three-digit zip codes) where new TPUs could be located or where authorizations could be expanded. Again, the goal would be to identify

---

[23]U.S. Bureau of the Census, Current Population Reports, *Projections of the Population of States, by Age, Sex, and Race: 1988 to 2010,* Population Characteristics, Series P-25, No. 1017. Washington, D.C.: U.S. Government Printing Office, 1988.

areas where population movement is likely to affect unit stability and recruiting success over the long term.

The analysis in this report provides only a partial answer to the question of whether SIDPERS data on migration and transfers should be introduced into USAREC's mission model. The report highlights the considerable personnel turbulency buffeting TPUs. Roughly 10 percent of new enlistees transfer within the first year, and approximately 5 percent move each year. At the TPU level, all of these changes create potential personnel turbulence. USAREC can improve overall recruiter goaling by incorporating transfer losses and gains in the mission model. Of course, the decision to do this must be based on a comparison of the benefits in terms of maintaining unit strength and accurately resourcing recruiters versus the extra cost of collecting and maintaining the data. At a minimum, an experiment could be conducted by comparing the mission with and without transfers in the model, and then comparing these alternative mission goals with actual unit endstrength numbers.

The transfer and migration data will be of greatest value in establishing MOS-specific recruiting goals. Suppose, for example, an area experiences an influx of Reservists from other areas. Some of these Reservists will, for whatever reason, choose not to reaffiliate with a new unit. Nonetheless, these individuals are trained in specific MOSs, become part of the recruitable market population, and, depending on the extent of their training, may be similar to other prior service soldiers. Knowledge of who is migrating, what MOSs they represent, and where they are moving could aid in establishing MOS-specific recruiting goals.

A last question that remains to be answered concerns the accuracy and availability of migration data. On the civilian side, considerable data are available. County and state migration rates are computed annually and made available by the Census Bureau. Forecasts of migration at the state level are also available for up to 10 years in the future. What is *not* available are annual civilian data on the individual characteristics of migrants (age, race, education, and so on) at a local level. Such data are available only from the decennial census. The results of the 1990 census will become available within the next year or so and it is recommended that USAREC obtain the local area migration data.

On the USAR side, the SIDPERS data on transfers are available on an annual basis. However, their accuracy, as tables 3 and 4 indicate, is often questionable. Transfers may be recorded for persons other than individuals making geographic moves. If these problems can be identified and resolved, the transfer data will serve as an important source of information for USAREC analysts.

However, SIDPERS data on geographic migration are incomplete. Individuals who attrite from the USAR are currently assigned to the IRR, and tracking the geographic movement of these individuals is difficult. Follow-up data on individual IRR members are available from the Defense Manpower Data Center (DNDC), but addresses are not always accurate. When we attempted to match the social security numbers of Reservists who were assigned to the IRR during 1981–1987, we obtained matches for less than 3 percent of the file. Consequently, the magnitude of migration by Army Reservists tends to be understated, and the calculated flows between areas may not be accurate. The solution in this report was to assume that the available data constituted an accurate random sample of total migration. However, if accurate counts of the total numbers of migrants are needed, these data may be inadequate. Moreover, no easy solution to this problem is available, short of changing the personnel record-keeping system.

Migration is an important facet of the U.S. workforce, including Army Reservists. Migration contributes to a number of manpower problems faced by the USAR, including recruiting success, unit readiness, attrition, and MOS-qualification rates. The role of migration in these problems is significant enough to warrant an ongoing effort to identify and statistically measure the extent, nature, and direction of member migration and transfers.

APPENDIX

Table A. Logit coefficients of migration model — males versus females (gains cohort)

Variable	Males	Females
High school graduate	.187**	.239**
Single	−.028	.072**
Hispanic	−.401**	−.122
Age	.001	−.008
Paygrade	.061**	.073**
TSC I-II	.233**	.267**
TSC IIIA	.047	.193**
TSC IIIB	−.021	.047
Nonprior service	.273**	−.128
Nonwhite	−.213**	−.206**
Intercept	−1.929	−1.238
Sample size	44,349	11,146
Chi-square	337.9	148.9

**(*) Significant at the .01 (.05) level.

Table B. Logit coefficients of migration model — males versus females (members cohort)

Variable	Males	Females
High school graduate	.098**	.096**
Single	.100**	.007
Hispanic	−.151**	−.146
Age	−.029**	−.025**
Paygrade	.112**	.133**
TSC I-II	.229**	.315**
TSC IIIA	.165**	.181**
TSC IIIB	−.022	.034
Nonwhite	−.078**	−.175**
Intercept	−1.309	−.988
Sample size	148,450	28,487
Chi-square	1,091.9	417.8

**(*) Significant at the .01 (.05) level.

Table C. State-to-state migration flows (1981 members cohort) (continued on next page)

	DESTINATION										
	AK	AL	AQ	AR	AZ	CA	CO	CT	DC	DE	FL
AK	0	0	0	0	0	0	0	0	0	0	1
AL	0	0	0	0	2	7	0	2	0	0	14
AR	0	1	0	0	0	8	3	0	0	0	1
AZ	1	0	0	1	0	19	6	0	0	0	2
CA	2	5	0	7	34	0	11	1	3	1	16
CO	0	1	0	1	5	13	0	0	1	0	6
CT	0	0	0	0	0	6	1	0	1	0	3
DC	0	1	0	0	0	2	1	0	0	0	3
DE	0	0	0	0	0	2	0	0	1	0	2
FL	0	13	0	2	3	18	3	4	0	1	0
GA	0	15	0	0	2	7	2	2	0	0	18
HI	0	2	1	1	0	13	0	0	0	0	2
IA	1	0	0	2	1	3	4	0	0	0	3
ID	0	0	0	1	1	7	2	1	0	0	0
IL	1	8	0	9	5	42	5	0	1	0	19
IN	1	3	0	1	4	20	3	1	0	0	13
KS	0	3	0	2	2	11	10	0	0	1	3
KY	0	5	0	2	2	4	2	1	0	0	25
LA	0	4	0	9	0	7	1	0	0	0	5
MA	0	4	0	1	3	20	5	8	0	0	11
MD	0	2	0	0	1	15	1	3	35	7	6
ME	0	0	0	1	2	0	1	1	0	0	1
MI	0	4	0	3	11	26	7	2	0	0	17
MN	1	2	0	0	4	10	7	0	0	0	5
MO	0	2	0	6	2	16	3	1	1	0	10
MS	0	3	0	0	3	6	1	0	0	0	2
MT	2	0	0	0	3	4	4	0	0	0	1
NC	0	1	0	2	0	8	1	3	1	0	8
ND	1	0	0	1	2	1	3	0	0	0	5
NE	0	0	0	1	4	7	10	0	0	0	3
NH	0	1	0	0	0	1	1	1	0	0	5
NJ	0	1	0	1	0	10	2	2	0	2	9
NM	0	0	1	0	8	8	3	1	0	0	1
NV	0	0	0	0	0	6	2	0	0	1	0
NY	1	3	0	2	6	34	8	18	2	3	41
OH	1	3	0	1	5	13	7	1	0	0	17
OK	0	1	0	6	5	8	5	1	0	0	2
OR	1	0	0	2	2	21	1	0	0	0	1
PA	0	6	0	0	2	20	8	3	2	8	25
RI	0	0	0	0	0	2	1	1	0	0	3
SC	0	1	0	0	1	4	2	4	1	0	4
SD	0	0	0	0	0	0	0	0	0	0	2
TN	0	10	0	12	1	8	4	0	2	0	11
TX	1	4	0	23	2	22	15	2	1	0	9
UT	0	0	0	0	5	17	5	0	0	0	1
VA	0	4	0	2	1	8	0	2	19	1	6
VT	0	0	0	0	1	0	0	0	0	0	2
WA	3	3	1	0	2	42	6	0	1	1	5
WI	0	1	0	1	4	10	8	0	0	0	8
WV	0	0	0	0	0	3	1	0	0	0	6
WY	0	0	0	1	0	2	2	0	0	0	0
ALL	17	119	3	105	141	559	179	70	72	26	373

Table C. State-to-state migration flows (1981 members cohort) (continued on next page)

DESTINATION

	GA	GQ	HI	IA	ID	IL	IN	KS	KY	LA	MA
AK	0	0	0	0	0	0	0	1	1	0	0
AL	20	0	0	2	0	6	3	1	3	4	3
AR	2	0	0	1	1	5	0	1	0	5	1
AZ	1	1	2	0	0	4	0	0	2	0	2
CA	12	3	13	4	2	12	10	5	3	8	9
CO	2	1	0	1	1	3	3	5	0	4	0
CT	1	0	0	0	0	1	4	0	2	0	13
DC	1	0	0	1	0	0	0	0	0	2	0
DE	0	0	0	0	0	0	1	0	1	0	1
FL	26	0	0	2	0	10	3	0	4	2	3
GA	0	0	3	0	1	6	4	1	1	3	1
HI	0	0	0	0	1	0	1	0	0	0	0
IA	4	0	1	0	0	15	2	7	0	2	3
ID	1	0	1	0	0	0	1	0	0	0	1
IL	5	0	4	11	0	0	22	7	8	9	4
IN	7	0	4	2	0	23	0	4	31	5	0
KS	3	0	1	5	1	6	1	0	2	3	3
KY	2	0	3	1	0	4	22	2	0	4	1
LA	4	0	1	1	0	5	3	0	1	0	1
MA	2	0	4	1	0	0	3	1	2	4	0
MD	4	0	2	0	0	1	0	3	3	1	2
ME	1	0	1	0	0	0	0	0	1	0	5
MI	6	0	4	3	1	14	21	3	8	2	1
MN	3	0	1	13	1	8	2	3	1	0	1
MO	7	0	0	5	1	33	4	37	2	2	2
MS	4	0	0	0	0	7	1	1	0	9	1
MT	0	0	0	1	3	2	1	1	0	0	0
NC	12	0	5	1	1	6	1	1	3	2	4
ND	0	0	0	1	0	1	0	0	0	0	1
NE	1	0	1	11	0	4	3	5	0	2	2
NH	0	0	0	1	0	0	2	0	0	0	30
NJ	4	0	3	0	0	1	1	0	2	1	3
NM	0	0	2	0	0	2	0	3	0	1	1
NV	0	0	0	0	1	2	0	0	1	0	0
NY	8	0	3	2	0	8	6	4	4	6	14
OH	7	0	3	1	0	6	15	3	25	3	2
OK	3	0	0	1	0	3	1	6	0	4	0
OR	3	0	0	0	5	4	0	0	0	2	1
PA	16	0	3	1	1	7	9	0	7	2	8
RI	0	0	0	0	0	0	0	0	0	0	12
SC	15	0	0	0	1	3	0	2	1	0	0
SD	0	0	1	1	0	0	0	2	0	0	0
TN	15	0	2	0	0	6	3	4	10	2	0
TX	8	0	2	4	0	13	5	4	8	16	2
UT	0	0	1	1	6	0	0	2	1	3	0
VA	9	0	3	1	0	4	1	1	5	1	1
VT	0	0	0	0	0	0	1	1	0	0	4
WA	3	1	1	0	7	2	1	2	3	2	1
WI	7	0	0	5	0	31	3	3	2	2	1
WV	0	0	0	0	0	2	1	1	3	1	0
WY	0	0	1	0	0	0	0	0	0	1	0
ALL	231	6	81	85	35	277	165	128	151	121	150

Table C. State-to-state migration flows (1981 members cohort) (continued on next page)

DESTINATION

	MD	ME	MI	MN	MO	MS	MT	NC	ND	NE	NH
AK	0	0	0	0	0	0	0	0	0	0	0
AL	2	0	4	1	0	5	0	1	0	0	0
AR	1	0	4	0	5	1	0	1	0	1	2
AZ	2	0	0	2	3	1	0	2	2	1	0
CA	10	0	8	3	14	4	3	9	2	2	0
CO	3	2	2	0	8	1	1	3	1	2	1
CT	3	2	1	0	0	0	0	1	0	0	1
DC	99	0	0	0	1	0	0	1	0	0	0
DE	12	0	0	0	0	0	0	1	0	0	0
FL	7	0	8	3	4	1	1	20	0	0	1
GA	6	0	3	1	4	1	0	9	0	0	0
HI	1	0	0	2	2	0	0	1	0	1	0
IA	1	0	3	13	9	2	0	2	0	18	0
ID	0	0	0	0	1	0	3	0	0	2	0
IL	6	1	6	9	27	5	0	6	0	2	0
IN	4	1	20	3	5	2	0	5	0	1	0
KS	1	0	2	0	45	0	0	2	0	3	0
KY	4	0	3	1	5	0	2	13	0	2	0
LA	1	0	0	0	1	8	0	0	0	1	0
MA	2	5	1	0	3	0	0	2	0	0	35
MD	0	2	2	0	2	1	0	6	1	1	2
ME	0	0	0	0	1	0	0	2	0	0	5
MI	3	1	0	4	7	0	1	5	0	2	0
MN	4	0	9	0	4	0	3	2	15	2	0
MO	1	1	1	4	0	2	2	3	0	3	0
MS	1	0	0	2	2	0	0	3	0	0	0
MT	2	0	0	0	0	1	0	0	2	0	1
NC	4	0	3	0	0	4	0	0	0	1	0
ND	0	0	0	6	0	0	4	0	0	1	0
NE	3	0	2	1	1	0	0	1	0	0	0
NH	0	7	1	2	0	0	0	1	0	0	0
NJ	5	0	3	2	2		0	4	0	0	1
NM	0	0	1	0	0	0	1	0	0	0	0
NV	0	0	1	1	1	1	0	0	0	0	0
NY	17	1	2	2	5	0	0	14	0	3	2
OH	5	1	15	3	6	0	0	3	0	0	1
OK	0	0	1	2	4	1	0	0	0	1	0
OR	1	0	0	0	0	0	0	0	1	0	0
PA	39	0	5	3	4	1	3	6	0	0	1
RI	0	0	0	0	1	0	0	0	1	0	1
SC	6	0	1	1	1	0	0	19	0	0	0
SD	0	0	0	1	1	0	1	0	2	2	0
TN	2	0	4	0	2	3	0	7	0	0	0
TX	5	0	2	4	7	5	0	3	1	0	1
UT	0	0	1	2	4	0	4	1	0	1	0
VA	48	2	1	0	5	1	1	17	0	1	2
VT	0	0	0	0	0	0	0	0	0	0	6
WA	3	0	2	0	2	0	8	2	0	4	2
WI	1	1	10	18	3	2	0	2	0	1	1
WV	8	1	0	0	1	0	0	8	0	0	0
WY	0	0	0	0	0	0	2	0	0	1	0
ALL	325	28	132	96	203	54	40	188	28	60	66

Table C. State-to-state migration flows (1981 members cohort) (continued on next page)

DESTINATION

	NJ	NM	NV	NY	OH	OK	OR	PA	RI	RQ	SC
AK	0	0	0	0	0	0	1	1	0	0	1
AL	2	1	0	7	6	0	0	2	0	0	4
AR	1	1	2	2	1	15	1	0	0	0	0
AZ	0	1	1	0	5	1	1	1	0	0	0
CA	4	12	19	27	12	13	16	11	1	0	2
CO	1	2	0	2	1	4	2	3	0	1	0
CT	2	0	0	6	1	0	1	1	1	1	1
DC	0	0	0	0	1	0	0	2	0	0	0
DE	2	1	0	1	1	0	0	8	0	0	1
FL	3	0	2	10	7	4	1	2	1	2	6
GA	4	0	0	9	1	3	0	2	0	1	7
HI	0	0	1	1	0	0	0	1	1	0	0
IA	0	2	0	3	0	7	0	1	0	0	3
ID	1	0	2	1	0	0	5	0	0	0	0
IL	6	3	1	7	10	8	2	2	1	3	1
IN	2	0	2	4	12	1	1	1	0	0	4
KS	0	4	1	3	1	13	0	4	0	1	0
KY	0	1	1	5	53	2	2	1	0	0	1
LA	1	1	0	1	2	7	0	0	0	0	1
MA	4	1	0	13	0	4	0	3	18	0	1
MD	2	1	1	3	3	6	0	32	1	0	3
ME	1	0	1	3	3	0	0	0	0	0	1
MI	4	3	0	6	15	9	0	6	0	0	6
MN	0	0	1	2	1	5	2	3	0	0	0
MO	0	2	1	4	2	16	2	0	0	0	0
MS	1	0	2	0	2	1	0	0	0	0	1
MT	0	1	2	2	0	0	1	1	0	0	0
NC	8	0	1	10	2	3	0	5	0	0	18
ND	0	0	0	0	0	1	0	0	0	0	0
NE	0	0	1	0	1	4	2	1	0	0	2
NH	0	0	0	3	2	1	0	0	1	0	1
NJ	0	0	1	27	5	3	1	31	0	7	0
NM	0	0	0	0	1	1	0	0	0	0	0
NV	1	2	0	1	0	0	0	0	0	0	0
NY	60	0	1	0	10	6	2	28	3	11	3
OH	6	1	2	7	0	6	0	8	0	2	1
OK	0	2	2	4	4	0	3	1	0	0	0
OR	1	1	2	0	0	3	0	1	0	0	0
PA	50	1	0	29	33	4	1	0	1	1	4
RI	3	0	0	0	2	0	0	2	0	1	0
SC	4	0	0	5	1	1	0	1	0	0	0
SD	0	1	0	1	0	0	0	0	0	0	0
TN	1	0	1	1	2	4	0	1	0	0	1
TX	3	14	1	15	7	23	6	10	0	4	2
UT	1	3	3	3	2	2	3	0	0	0	0
VA	4	1	0	8	2	3	0	12	0	0	1
VT	1	0	0	3	1	0	0	2	0	0	1
WA	1	0	1	8	2	4	29	4	0	1	1
WI	1	0	3	3	1	4	0	0	0	1	1
WV	2	1	1	1	17	0	0	13	0	0	1
WY	0	0	0	0	0	1	0	0	0	0	0
ALL	197	64	60	279	236	193	85	214	29	37	82

Table C. State-to-state migration flows (1981 members cohort) (concluded)

DESTINATION

	SD	TN	TQ	TX	UT	VA	VT	WA	WI	WV	WY	TOT
AK	0	1	0	1	0	0	0	1	0	0	0	9
AL	1	9	0	15	1	5	0	3	1	1	0	138
AR	0	4	0	30	1	1	0	2	2	0	0	107
AZ	0	0	0	7	1	1	0	3	1	0	0	77
CA	0	6	0	43	8	9	0	31	7	0	1	438
CO	0	0	0	18	3	1	0	3	4	0	0	116
CT	0	0	0	3	0	3	3	2	0	0	1	66
DC	0	0	0	2	0	15	0	0	0	0	0	132
DE	0	0	0	3	0	2	0	0	0	0	0	40
FL	0	5	0	19	0	7	0	3	3	1	0	215
GA	0	8	0	16	0	0	0	2	0	0	0	143
HI	0	0	0	4	0	0	0	1	0	0	0	37
IA	3	1	0	7	0	1	0	6	3	1	3	137
ID	0	0	0	4	6	0	0	13	0	1	1	56
IL	0	5	0	31	1	6	0	4	34	0	1	348
IN	0	4	0	28	0	1	0	2	3	3	0	213
KS	0	1	0	14	2	4	0	3	5	0	3	169
KY	0	24	0	10	0	8	1	0	2	3	1	225
LA	0	0	0	30	0	2	0	0	0	0	0	98
MA	0	0	0	6	0	7	2	2	1	1	0	180
MD	0	2	0	9	0	41	0	6	0	9	0	222
ME	0	0	0	3	0	0	0	1	0	0	0	35
MI	0	5	0	25	2	2	0	4	10	3	0	256
MN	5	4	1	14	2	5	0	4	26	0	1	177
MO	0	4	0	17	2	1	0	3	3	0	0	208
MS	0	4	0	14	0	0	0	2	3	1	1	78
MT	0	0	0	3	1	1	0	9	2	0	6	57
NC	0	3	0	7	1	16	0	2	1	2	0	151
ND	0	0	0	4	0	0	0	0	0	0	2	34
NE	0	0	0	6	1	3	0	1	1	0	1	86
NH	0	0	0	2	1	0	4	0	0	0	0	68
NJ	0	3	0	7	0	7	1	1	1	2	0	157
NM	0	0	0	12	1	0	0	2	0	0	0	50
NV	0	0	0	3	0	0	0	0	0	1	0	25
NY	0	1	0	31	1	19	2	3	5	0	1	406
OH	0	3	0	35	0	8	0	2	2	11	0	241
OK	0	0	0	39	1	1	0	1	1	0	0	114
OR	0	0	0	7	0	1	0	47	1	0	0	109
PA	0	3	0	26	1	29	0	4	2	13	0	392
RI	0	1	0	2	0	0	1	1	0	0	0	35
SC	0	1	0	6	0	10	0	1	2	0	0	99
SD	0	1	0	2	0	0	0	1	0	0	3	22
TN	0	0	0	12	0	14	0	2	1	1	0	149
TX	0	3	0	0	4	10	0	4	8	3	0	286
UT	0	1	0	6	0	3	0	7	0	0	4	93
VA	0	6	0	16	0	0	0	6	4	5	0	215
VT	0	0	0	1	0	0	0	0	0	0	0	24
WA	1	1	0	11	5	3	0	0	4	1	1	188
WI	0	4	0	20	2	3	0	0	0	1	0	169
WV	0	1	0	5	1	18	0	0	0	0	0	97
WY	0	0	0	1	0	0	0	0	0	0	0	12
ALL	10	120	1	643	49	270	14	197	144	64	31	7333

SOURCE: SIDPERS data .

Distribution List

Agency	No. of copies
Defense Technical Information Center Cameron Station Alexandria, VA 22314	2
Dudley Knox Library, Code 0142 Naval Postgraduate School Monterey, CA 93943	2
Office of Research Administration Code 08 Naval Postgraduate School Monterey, CA 93943	1
Library, Center for Naval Analyses 4401 Ford Avenue Alexandria, VA 22302-0268	1
Department of Administrative Sciences Library Code AS Naval Postgraduate School Monterey, CA 93943	1
Department of Administrative Sciences Code AS/Mp Naval Postgraduate School Monterey, CA 93943	10
U.S. Army Recruiting Command Program Analysis and Evaluation Directorate Research and Studies Division Fort Sheridan, IL 60037-6090	1