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THESIS

US ARMY'S DELAY ENTRY PROGRAM:
A SURVIVAL STUDY

by

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13. ABSTRACT *(maximum 200 words)*

This thesis studies the phenomena of Delayed Entry Program (DEP) survival. Specifically, this study attempts to provide a method for estimating the number of DEP accessions from a pool of recruits in DEP contracts. When providing recruiter goals, the Army must consider the number of individuals it has in DEP inventory. Due to DEP losses (Attrition) the number of recruit goals must be adjusted up or down depending on the number of individuals anticipated surviving the DEP contract. To accomplish this end a logistic model is fit to provide accession estimates. The model is fit to the largest recruit category - the male, high-school graduate with an Armed Forces Qualification Test (AFQT) score in the top 50 percentile. By exploring how those in DEP survive (access) the contract, Army analyst can estimate future expected number of accessions based on the current inventory of recruits in DEP.

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US Army's Delay Entry Program:
A Survival Study

by

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ABSTRACT

The Delayed Entry Program (DEP) has served a variety of roles in the recruiting process. In general, it acts as an inventory system of recruits which can be used to smooth out seasonal fluctuations in demand for basic and advanced individual training. It also serves to address the routine seasonal fluctuations in the recruiting process itself. DEP losses, or those individuals that renege on the agreement made with the Army to attend basic training, are a costly aspect of the program. Several studies have examined a number of aspects associated with DEP losses. When setting recruiting goals, Army analyst must consider the pool of individuals who are already in DEP. This thesis attempts to provide a method to estimate how many of those in DEP will survive to the end of the contract and enter basic training. Specifically, this thesis estimates survival probabilities as a function of time spent in DEP, contract length and other pertinent variables.

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Background:

The US Army along with other military services, government organizations and private enterprises need qualified "entry level" individuals to meet present and future manning levels. The Army must actively recruit these individuals to meet target levels. The Delayed Entry Program (DEP) has served a variety of roles in the recruiting process. In general, it acts as an inventory system of recruits which can be used to smooth out seasonal fluctuations in demand for basic and advanced individual training. It also serves to deal with the routine seasonal fluctuations in the recruiting process itself. DEP losses, or those individuals that renege on the agreement made with the Army to attend basic training, are a costly aspect of recruiting. Because of DEP losses, the Army must be careful when setting goals for its recruiters.

Purpose:

When setting recruiting goals, Army analysts must consider the pool of individuals who are already in DEP. Therefore, the question is posed: How many of those in the DEP pool will survive to the end of the DEP and enter basic training? We look for a methodology for estimating how many individuals in the DEP inventory pool will survive the program and access into the Army. An accurate estimate of DEP survivors (accessions) would assist analyst in setting recruiter goals.

Framework:

In pervious research, demographic characteristics believed to be related to DEP survival (or DEP loss) have bε studied. This thesis takes into account some of these demographic characteristics in addressing DEP survival as a function of time already spent in DEP. The logit model applied in this thesis was derived from the statistical literature on analyses of ordinal categorical data.

Approach:

Demographic characteristics, DEP contract length and time in DEP when lost were obtained from the United States Recruiting Command (USAREC) Mini-master file. The modeling effort was restricted to male high-school graduates who score on the top 50 percentile of the Armed Forces Qualification Test (AFQT). USAREC considers this individual a GMA candidate, the most populous recruit category.

Because DEP losses do not occur uniformly over the length of a contract, obtaining the general structure of losses was imperative. A loglinear regression model assisted in determining a method for combining months with few losses. This greatly reduced the number of parameters needed to estimate survival probabilities and provided the basis for fitting the continuation-ratio model (which employs a cumulative logit) used to estimate the survival probabilities directly.

Conclusion:

The fitted values from the continuation-ratio model can be used to estimate the probabilities necessary to find the expected number of accessions for a given inventory of candidates. These values provide USAREC analysts with a method to determine accession probabilities as a function of the time survived in DEP and other demographic factors. The probabilities obtained can be used to provide USAREC planners a quantitative basis for recruit accession projections needed for recruiter goal setting. While the model was applied to a specific recruit population, the modeling effort can be extended to other groups as well.

I. INTRODUCTION

The United States Army Recruiting Command (USAREC) is responsible for recruiting candidates for the Army's regular and reserve enlistment programs. This thesis pertains to the recruiting process of the former. In particular, it focuses on a widely used tool in military recruiting called the Delayed Entry Program (DEP). Below we give a brief description of the program.

A. DELAYED ENTRY PROGRAM

After an individual decides to join the Army and signs a contract at a Military Entrance Processing (MEP) Station, he/she does not proceed directly to basic training. The time period between the signing of the contract and the beginning of basic training is referred to as the Delayed Entry Program or DEP. DEP generally lasts from one to twelve months. The minimum of one month allows USAREC to perform the necessary administrative processing, background check and Drug and Alcohol Testing (DAT). In general, DEP acts like an inventory of recruits which can be used to smooth out the seasonal fluctuations in recruiting as well as seasonal demand in basic and advanced individual training. Moreover, DEP also allows USAREC to expand its "recruiting market" to include seniors who are still waiting to graduate from high school. After signing enlistment contracts, these seniors are automatically placed in DEP until after graduation. While in DEP, recruits play a role in attracting candidates for enlistment programs. Recruits in DEP provide additional leads for new candidates and influence others among their peer groups to join the Army.

DEP allows recruits more career choices. While at MEP stations, recruits must meet an Army career councilor who provides them with their assignment options. By varying the length of DEP, desirable assignments may become available at some future dates. Once the desirable assignment is obtained, the counselor then reserves and, thereby, guarantees the assignment for the recruits.

However, DEP comes at a cost to USAREC. Historically, 15 percent of the recruits in DEP renege on their contract and do not access into the Army. Based on the resources spent on recruiting an individual to sign an enlistment contract, the processing cost at the MEP and the administrative cost of DEP, USAREC estimates it spends approximately $5,000 per recruit who does not access into the Army, or a DEP loss [Ref. 1]. This amounts to an annual cost of $67 million that USAREC has to spend on DEP losses.

B. PROBLEM STATEMENT

In an effort to reduce the cost of DEP losses, USAREC has commissioned many studies [Ref. 2-5] to analyze the factors that affect DEP losses. More recently Burris [Ref. 1] studies DEP losses as a function of recruits contracted to be in DEP. To utilize this information in planning, he develops an optimization model to assist USAREC analyst in setting the monthly recruiting goals. In this research, we continue to work towards providing USAREC with a tool to assist in setting monthly recruiting goals.

Prior to the beginning of each quarter, USAREC analyst must set the recruiting goals for each of the next three months. These goals simply tell the recruiting brigades, battalions and stations how many individuals they need to recruit to sign enlistment contracts each month (Individuals who sign enlistment contract are simply referred to as "contracts"). When setting these recruiting goals, the analyst must consider the pool of individuals who are already in DEP. These individuals have been in DEP for various lengths of time and they are also scheduled to be sent to basic training (thereby, accessing into the Army) at different future dates. The problem that faces the analyst at this point is to determine how many individuals in the current DEP pool will eventually enter basic training and access into the Army. We can refer to these individuals as those who survive the DEP. If the expected number of survivors is small, the recruiting goals must be set higher to offset the expected losses. On the other hand, if they are higher, the goals can be adjusted downward. In the current budget environment, there is an acute need for an accurate estimate of DEP survivors. Thus, it is the goal of this thesis to provide a methodology to estimate the number of DEP survivors. The estimate will be based on the length of time the individual has already spent in DEP, the length of time contracted to be in DEP and other pertinent demographic factors. The main focus of the thesis will be to estimate the probability of DEP survival for the largest recruiting category. This category composes of male high-school graduates with Armed Forces Qualification Test (AFQT) scores in the upper 50 percentile. However, the same methodology can be applied to other recruiting categories as well.

C. THESIS ORGANIZATION

Chapter II gives an overview of the data set used for the research, a description of the variables used in modelling and an exploratory analysis conducted to develop the final model. In addition, contained within chapter II is a discussion of generalized linear models used for our model development. Chapter III concerns the development of the continuation-ratio model used to estimate the desired probabilities. Chapter IV gives the results of the model fit and uses of these results. Finally, Chapter V provides recommendations.

II. PRELIMINARY ANALYSIS

Before attempting to model DEP survival estimates a preliminary study of the data is in order. Understanding which variables influence DEP survival and the general structure of how DEP losses occur helps develop a strategy for model development. This Chapter includes a description of the data base, justification for considering male high school graduates with AFQT scores in the upper 50th percentile apart from other recruits, and motivation for including various explanatory variables in the model. Also contained is the justification for pooling the number of losses in the middle months of contracts with a DEP of 5 or more months.

A. DATA BASE

USAREC keeps extensive records on all candidates that have signed contracts. These records are contained in the Mini-master file and include a variety of information ranging from age and social security number to number of dependents and years of education. A labeling system encoding a candidates gender, AFQT score and education level is also included in the records. USAREC classifies recruits into 22 possible categories or mission boxes. Figure 1 provides the percentages of the predominantly recruited groups or mission boxes for FY 1988 through 1992. Of the mission boxes shown in

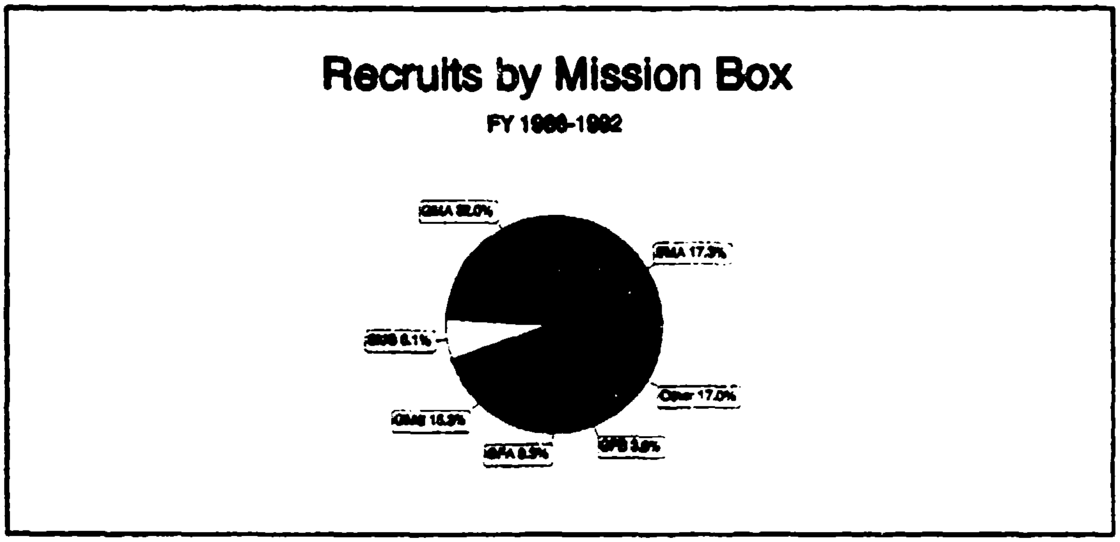

Figure 1 RECRUITS BY MISSION BOX

Figure 1, four are male and two female groups. For the male recruits, these are GMA, graduates with mental category A (upper 50th percentile on the AFQT), SMA, high school seniors with mental category A, GMB, graduates and with mental category B (between the 32 and 50 percentile on the AFQT) and SMB, seniors with mental category B. Female mission boxes or categories are high school graduates and are classified as GFA and GFB which corresponds to graduate female mental category A and B. Burris provides a complete listing of all 22 USAREC mission boxes [Ref 1].

USAREC supplied a subset of the Mini-master database records from FY 1988 though FY 1993. Although records for FY 1993 were available, they were not used due to a significant number of open records. Recruits with open records are still in DEP and therefore the outcome of the contract not known (loss or accessed). This is particularly true of records for recruits contracted for longer DEP periods.

To confine the scope of our model to typical DEP cases, only those records where the actual time in DEP (based on the accession or loss date) less than or equal to contracted DEP length were considered. For example, an individual with a DEP contract of 5 month with an accession or loss date in month 12 represented an unusual observation and is not considered. Records that indicate contracts of more than twelve months are not used because contracting for this length of time is not Army policy. Without this criteria for data selection the number of possible combinations becomes unmanageable. Records not used in the study comprise those that reflect unusual DEP observations or have errors in one or more of the fields. Because our study concentrates on the GMA mission box the number of records removed from the data set are summarized in Table I.

Table I DATA SUMMARY

YR	TOTAL RECORDS	TOTAL GMA RECORDS	GMA REC NOT USED	USED GMA RECORDS
88	131,724	34,251	775	33,476
89	136,184	34,538	1,099	33,439
90	96,941	35,331	1,055	34,276
91	86,048	37,045	821	36,244
92	59,825	22,649	570	22,079

B. EXPLANATORY VARIABLES

DEP length, the outcome of the contract (loss or accession) and if a loss, when it occurred are needed for the model. In addition, a set of demographic variables is included to add depth to the modelling effort. These variables are listed below in Table II and were selected with the assistance of USAREC analysts[1].

Table II SELECTION OF VARIABLES

1. RACE
2. MISSION BOX
3. CHILDREN
4. MARITAL STATUS
5. RECRUITING BRIGADE

Mission box contains 22 different categories and therefore as many levels for our model. Rather than including mission

[1]Based on phone conversations with USAREC analysts in November 1993.

boxes an exploratory variable, our approach was to fit a single model to the GMA mission box. If all 22 levels are included in the model, the resulting model would require many estimated parameters and could prove difficult to fit. Our study therefore concentrates on GMA's.

When analyzing the data we note that GMA recruits can not be combined with other mission boxes because of the significant differences in the proportion of DEP losses between them. For instance, from Figure 2, it is clear that the proportion of DEP losses for the GFA mission box is consistently higher than for the GMA.

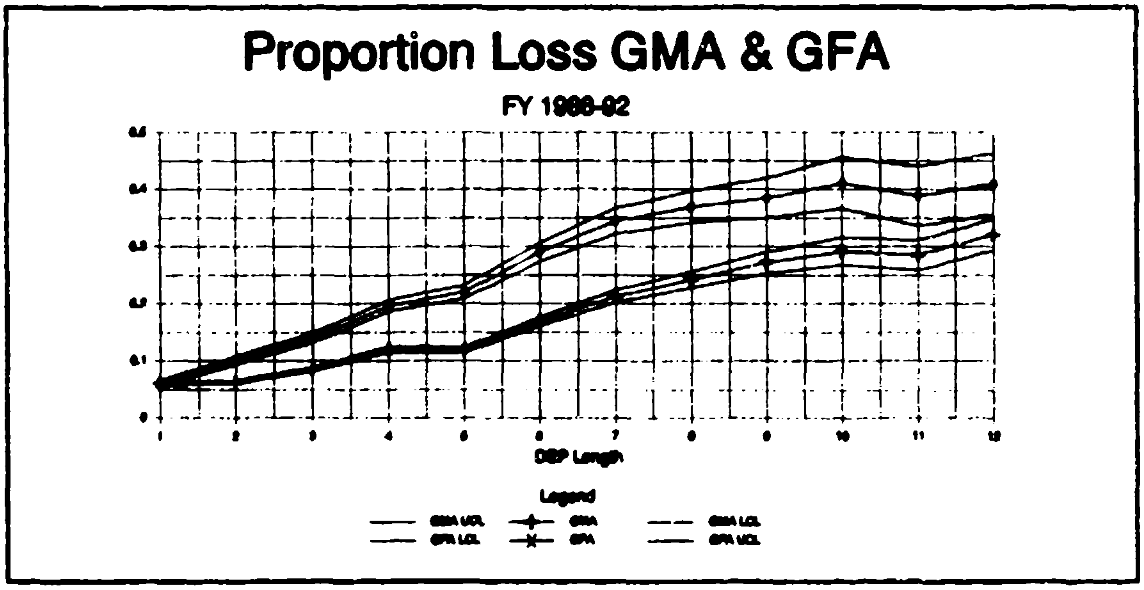

Figure 2 PROP LOSSES GMA & GFA WITH 95% CONF INTERVAL

Figures 3 and 4 graph the proportion of losses as a function of DEP length for the six recruited mission boxes.

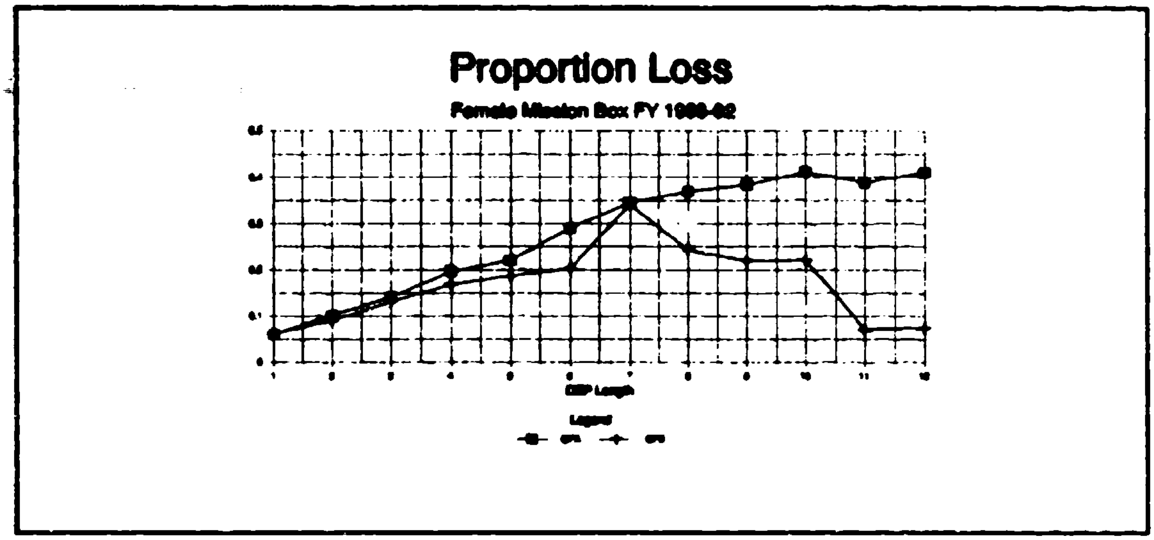

Figure 3 PROP LOSSES FOR SOME FEMALE MISSION BOXES

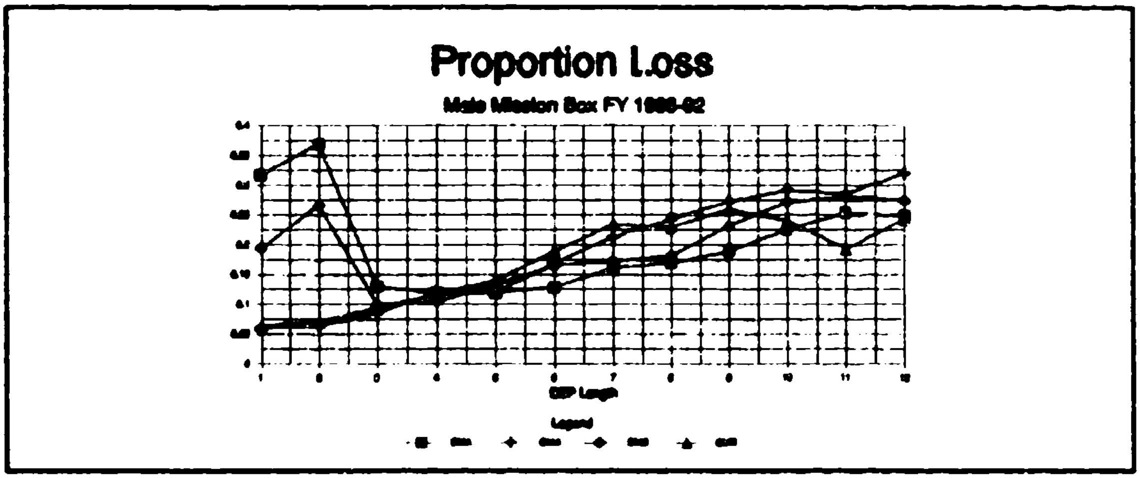

Figure 4 PROP LOSSES FOR SOME MALE MISSION BOXES

At present USAREC targets those individuals that are high school seniors or graduates and score above the 50th percentile on the AFQT. During FY 1992, nearly 37% of all candidates were GMA, the most of any recruit mission box. This is above historical percentages for all fiscal years except FY 1991 where 43 percent of recruits fell into this category. Figure 5 gives a historical summary of the percentages of

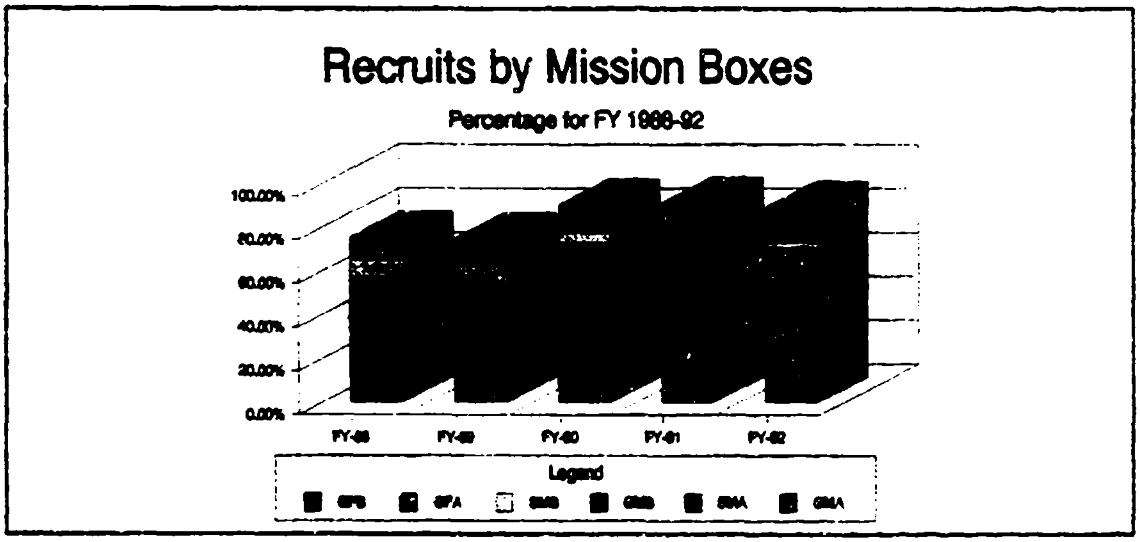

Figure 5 RECRUITS BY MISSION BOXES

recruits for 6 mission boxes for FY 1988-92 (These account for over 80% of all recruits).

C. INFLUENCE OF VARIABLES

Many of the studies centered on DEP loss examine individual and system characteristics believed to be associated with DEP loss [Ref. 2-5]. Cross-tabular analyses has been used to examine the relationship between many of these characteristics. The studies have reported statistically significant differences between loss rates associated with these characteristics. Our attempt is to view the influences of the variables to be used in the model from a practical and statistical point of view.

Preliminary analysis of the variables considered in our study was conducted by obtaining the proportion of accessions for GMA's by recruiting brigade[2], race and whether or not the candidate had one or more children. Formal hypothesis tests performed for differences in the proportion of accesses between groups result in significant differences. For example, from Appendix C we can obtain the necessary data to test for differences in the proportion of DEP accessions between blacks recruited from brigade I and III. This results in a test statistic of -3.03 and an associated significance level of 0.0012 . If we let P_1 and P_2 correspond respectively to the proportion of black recruits reported as accessions from brigade I and III, then the hypotheses tested are:

$$H_0: P_1 = P_2$$

$$H_a: P_1 \neq P_2,$$

with test statistic:

[2] Presently USAREC has four recruiting brigades down from six. Brigades II and V have been consolidated into the other four. Candidates recruited from these brigades II and V were considered part of the other four for this study. USAREC analyst appropriately accounted for this when providing the data set.

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}} , \quad (1)$$

where $\hat{p}_1$ and $\hat{p}_2$ are the estimated proportion of accessions and n_1 and n_2 are the sample sizes for the two brigades. In Table III we summarize the hypothesis tests for black recruits between recruiting brigades. All tests are significant at the 5% level of significance except for proportions between brigade I and IV.

The fact that the significance level is small is due in part to the large number of observations. Tests performed on data with very large sample sizes often result in statistical significance even when there is no practical difference between the magnitudes of the proportions. Figures 6-9 are

Table III HYPOTHESIS TEST FOR BLACK RECRUITS

BRIG POP.		PROPORTION		SAMPLE SIZE		TEST	
1	2	p_1	p_2	n_1	n_2	Z	p-value
I	III	.876	.892	6648	7725	-3.03	.00120
I	IV	.876	.874	6648	3842	0.283	.61141
I	VI	.876	.835	6648	1624	4.009	.00005
III	IV	.892	.874	7725	3842	2.820	.00240
III	VI	.892	.835	7725	1624	5.732	0
IV	VI	.874	.835	3842	1624	3.606	.00015

provided summarizing the results of the accession proportions. Each figure separates by brigade the accession proportions for all candidates and those with and without children. From these figures we can see there is a noticeable difference between the magnitude of the proportions. Thus, this motivates the inclusion of race, brigade, children in the model to estimate DEP accessions.

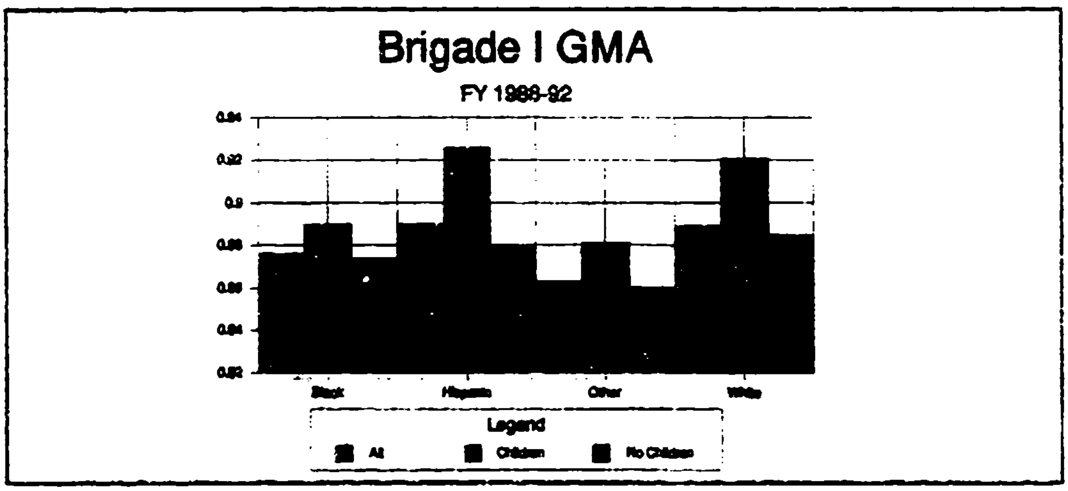

Figure 6 PROPORTION OF GMA ACCESSIONS FOR BRIGADE I

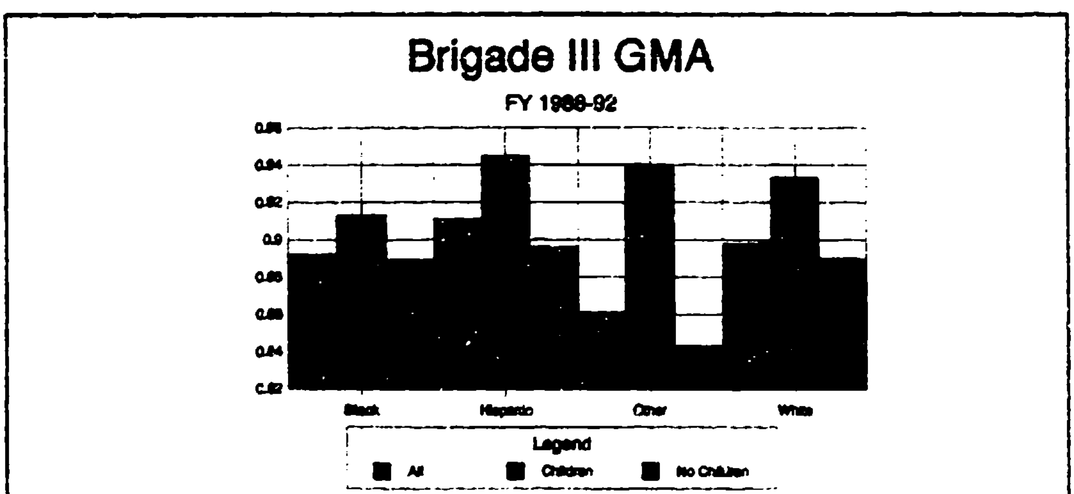

Figure 7 PROPORTION OF GMA ACCESSIONS FOR BRIGADE III

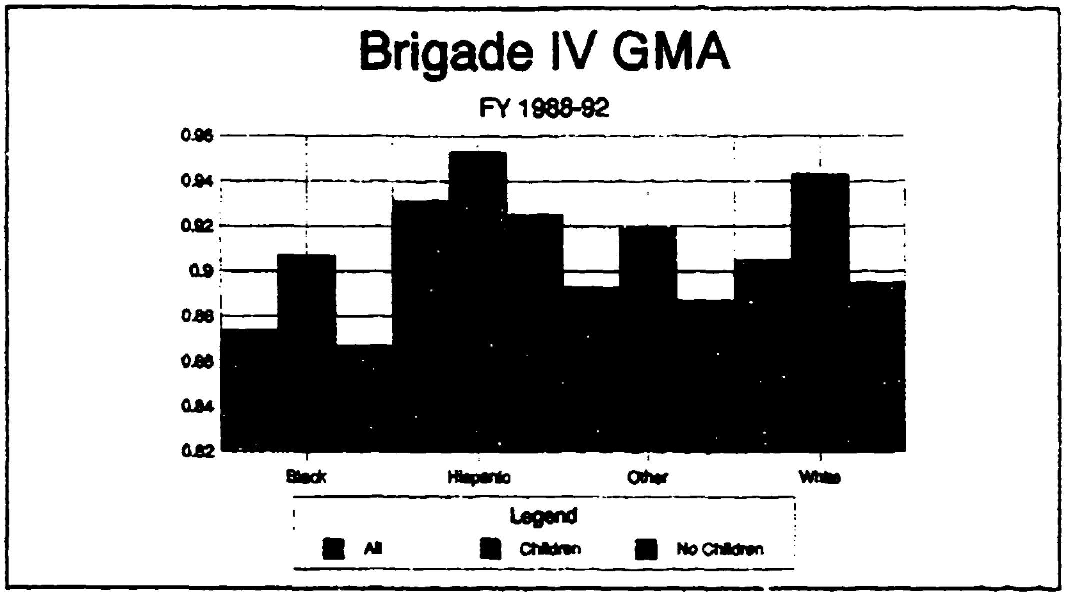

Figure 8 PROPORTION OF GMA ACCESSIONS FOR BRIGADE IV

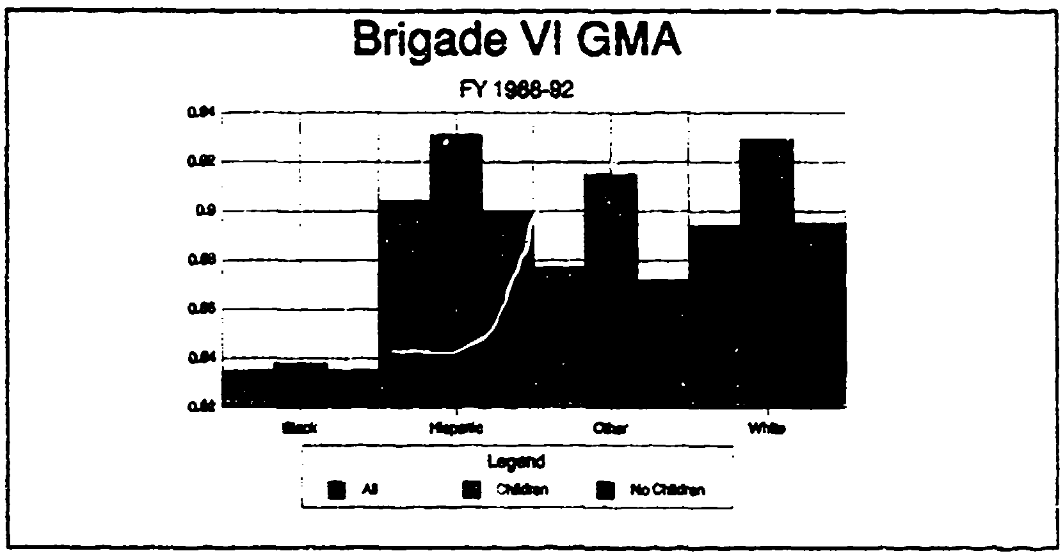

Figure 9 PROPORTION OF GMA ACCESSIONS FOR BRIGADE VI

D. EXPLANATORY ANALYSIS

When examining how losses occur a function of contract length and time in DEP, we note that most of the losses occur late in DEP. The last months of DEP exhibit most of the losses while all other months account for relatively few. This pattern of losses is true for FY 1988 through 1992 and may be indicative of either recruits in DEP waiting to renege their contract or recruiters not reporting an individual a loss until the last minute. Table IV shows how DEP losses for all mission boxes during FY 1992 are distributed over the contract lengths for a typical year. Similar loss patterns can be seen in Appendix A for other years. The numbers contained within the table correspond to the percentage of losses incurred per month of DEP. For a one month DEP contract all losses occur in month one. From the table we see for a two month DEP, 38% of losses occur in the first month while the remainder are realized in the last month.

Table IV DEP LOSS PERCENTAGES FY 1992 - ALL MISSION BOXES

		LOSS MONTH											
		1	2	3	4	5	6	7	8	9	10	11	12
	1	100											
C	2	38	62										
O	3	21	18	60									
N	4	17	4	21	58								
T	5	17	2	6	21	54							
R	6	16	1	2	6	21	54						
A	7	14	1	3	3	6	26	47					
C	8	8	1	2	2	2	7	25	53				
T	9	5	0	1	1	2	6	9	26	50			
	10	3	0	0	1	1	4	7	10	30	45		
	11	3	0	0	1	1	1	4	5	8	28	50	
	12	2	1	0	0	0	0	3	5	2	10	28	49

The fact that losses occur either at the very beginning or toward the end of DEP suggest that several months could be combined together. This should result in a more parsimonious model requiring fewer estimated parameters. This notion is explored in the next section. The loglinear model discussed in the next section is used to investigate the viability of a combining months together. A family of models called generalized linear models, of which the loglinear and logit models are members, is offered next along with a discussion of the loglinear model we use in our exploratory analysis.

E. GENERALIZED LINEAR MODELS

The classical linear model is of the form

$$E(Y) = \alpha + \beta^T x \quad , \qquad (2)$$

where Y is the response variable, α is the intercept parameter, β is a column vector of unknown coefficients and $x=(x_1,...,x_m)^T$ is a vector of m explanatory variables. The response variable is assumed to have a Normal distribution with constant variance. Although this approach is fairly robust with respect to the normality assumption, there are many instances where it is not appropriate. For example, if Y is a binary variable, equation (1) can lead to an expected value E(Y) that is not between 0 and 1. Also, the variance of binary responses is not constant, but changes with the expected value of the response.

Generalized linear models (GLM) effectively address these issues. They do this by reparametertizing the model so that the expected response is a linear function of the coefficients. These models contain three parts:

1. A random component, associated with the distribution of the response variable (e.g. Binomial, Poisson, Normal). This gives the basis for the variance function used to describe how the variance change with the mean.

2. The systematic component, $\beta^T x$ which gives the linear function of the explanatory variables used for prediction.

3. The link component g(E(Y)) which describes how the mean depends on the linear predictors (for Normally distributed responses the link function g(.) is the identity function).

The power of the GLM approach is that when the distribution of Y belongs to an exponential family and the link function g(.) is chosen appropriately (i.e. g(.) is the canonical link), the Maximum Likelihood Estimators (MLE) of the parameters can be approximated using an iterative least squares algorithm. For large samples, inference for parameters of GLM's is much the same as those in the usual linear model setting.

In logistic regression, the response variable Y is binary. Let $\pi(x)$ represent the conditional expectation of Y given a set of explanatory variables $x = (x_1, \ldots, x_j)$; the canonical link function in this setting is the logit function

$$\ln\left[\frac{\pi(x)}{1-\pi(x)}\right] = \alpha + \beta^T x \quad , \tag{3}$$

where $\beta^T = (\beta_1, \ldots, \beta_j)$ is the coefficient vector and α is the constant intercept. Equivalently,

$$\pi(x) = \frac{e^{\alpha+\beta^T x}}{1+e^{\alpha+\beta^T x}} \quad . \tag{4}$$

Equation (4) guarantees that the probability $\pi(x)$ will be between 0 and 1.

When the response variable is Poisson, such as the number of counts falling into a particular cell of contingency table, then the canonical link is

$$\ln E(Y) = \alpha + \beta^T x \quad , \tag{5}$$

giving us loglinear models.

1. **Loglinear model**

Preliminary analysis included fitting a loglinear model. We consider a candidates race (Black, Hispanic, Other, White), recruiting brigade (I,III,IV,VI) , Marital status (Single, Married), DEP length (1,...,12), DEP loss month (1,...,12) or accession in the model. The response variable for a loglinear model is the number of observations that fall into a particular cell of a contingency table defined by the variables considered.

By fitting such a model we are able to gain insight into advantageous ways to combine DEP length with DEP loss month. We defined one variable, DEP Outcome, with 90 levels and thereby consolidate two variables into one. For example, a three month DEP has a possible outcome of a loss in first, second or third month or accession (levels 6 - 9, Table V). One can see that this arrangement results in 90 possible outcomes - 78 for losses and 12 accessions.

Table V DEP OUTCOME MATRIX (90 LEVELS)

		MONTH OF DEP LOSS												
		1	2	3	4	5	6	7	8	9	10	11	12	A
	1	1												2
D	2	3	4											5
E	3	6	7	8										9
P	4	10	11	12	13									14
	5	15	15	16	17	18								19
L	6	21	22	23	24	25	26							27
E	7	28	29	30	31	32	33	34						35
N	8	36	37	38	39	40	41	42	43					44
G	9	45	46	47	48	49	50	51	52	53				54
T	10	55	56	57	58	59	60	61	62	63	64			65
H	11	66	67	68	69	70	71	72	73	74	75	76		77
	12	78	79	80	81	82	83	84	85	86	87	88	89	90

NOTE: A-Accession.

The model initially fit using all 90 levels proved to be numerically unstable. This can be attributed to the sparse nature of the contingency table with relatively few counts in the "middle" months of DEP.

Several combining strategies were attempted to reduce the number of levels in DEP Outcome by joining together adjacent

Table VI COMBINED DEP OUTCOME MATRIX (37 LEVELS)

		MONTH OF DEP LOSS												
		1	2	3	4	5	6	7	8	9	10	11	12	A
	1	1												2
D	2	3	4											5
E	3	6	7	8										9
P	4	10	11	12	13									14
	5	15	15	16	17	18								19
L	6	21	22	23	24	25	26							27
E	7	28	29	30	31	32	33	34						35
N	8	36	37	38	39	40	41	42	43					44
G	9	45	46	47	48	49	50	51	52	53				54
T	10	55	56	57	58	59	60	61	62	63	64			65
H	11	66	67	68	69	70	71	72	73	74	75	76		77
	12	78	79	80	81	82	83	84	85	86	87	88	89	90

NOTE: L-loss; A-Accession.

cells (months) to form a composite level. Table VI indicates composite successful combining strategy. The table outlines each composite level by dashed lines. By combining the levels representing losses in the middle DEP months (that had few counts), we reduce the number of estimated parameters, bring more stability to the model and do not sacrifice model fit. In doing so we reduce the number of levels from 90 to 37. The hypothesis test between the null model with all 90 levels and the alternative model combining levels as indicated in table VI produced a χ^2 statistic of 4420 with 4770 degrees of freedom. The associated p-value of .9998 indicates no practical difference between the fit of the model using no combining and the model combined as in Table VI. Attempts to further combine levels give models which do not fit the data as well.

A first look at the data shows which explanatory variables can not be ignored when estimating the probabilities of DEP loss. An important step to finding estimates of the DEP survival (accession) is to find the most parsimonious model for estimating these probabilities. Without it the number of parameters in any reasonably well fitting model becomes unmanageable. We do this in two ways. We restrict attention to the most heavily recruited group (GMA) and by using a loglinear model, we justify combined levels of a variable that takes into account DEP length and number of months served in DEP. This provides the basis for developing the final model used for estimating the conditional probabilities in the next Chapter.

III. ESTIMATING CONDITIONAL PROBABILITIES

In this chapter, we estimate the conditional probability of accession given an individual has survived DEP for a certain period of time. The loglinear regression approach of the previous section gives estimates of the expected number of individuals which fall into each cell of a contingency table defined by the explanatory variables. From the loglinear model, all conditional probabilities for a set of explanatory variables could be estimated. The difficulty with using this model is that it gives the joint probability mass function of all the variables. Because we seek the conditional probabilities, the loglinear approach forces us into estimating too many parameters.

An alternative approach is to use a GLM to estimate the conditional probabilities directly. If the response variable is strictly binary, where an individual is an accession or loss, then a standard logistic regression model would apply. However, in this case the response variable Y has several levels that indicate when the individual is lost or survives DEP and becomes an accession. In addition, this variable has a sequential order to it and is therefore ordinal in nature. When the levels of an ordinal response variable are stages or time frames through which an individual, item or process may progress, such as a fixed series of attempts seeking a success, a technique called continuation-ratio modeling is used [Ref. 8].

A. CONTINUATION-RATIO MODEL

In analyzing DEP survival, we use the case of a four month contract to illustrate the continuation-ratio model. We begin with a fixed number of individuals. Some of these individuals will drop out during the first, second, third or fourth month while others will access. For each individual, the response variable Y falls into one of five levels where Y = 1,...,4 represents a loss in month 1, month 2, month 3 and month 4 respectively. We use Y = 5 to represent an accession. The continuation-ratio model uses "cumulative" or "accumulated" logits [Ref. 9] that take into account category order. Because we are ultimately interested in the probability of a recruit accessing given he survives in DEP for a number of months, we can use

$$L_j = Logit[Pr(Y>j \mid Y\geq j)] \qquad for\ j = 1,\ldots,4 \ . \qquad (6)$$

For instance, in the context of our example, L_2 this the logit of probability of surviving past the second month given survival of two or more months. An alternative expression for L_j is

$$L_j = -\ln\left[\frac{Pr(Y>j)}{1-Pr(Y\leq j)}\right] \ . \qquad (7)$$

The continuation-ratio model is similar to Cox's proportional hazard model and approaches it as the number of stages increases [Ref. 8].

In the continuation-ratio model explanatory variables are incorporated by letting

$$L_j = \alpha + \beta^T X \quad , \qquad (8)$$

where α is the intercept, β^T is the vector of unknown coefficients and X is a vector of explanatory variables. Using the continuation-ratio model we estimate the conditional probability $P(Y>j|Y\geq j)$ for $j = 1,\ldots,4$. We can now estimate the probability of accession given the recruit survives for a number of months in DEP (i.e. $P(Y>4|Y\geq j)$ for $j= 1,\ldots,4$).

B. THE MODEL CONSTRUCTION PROCESS

S-PLUS version 3.1, by Statistical Science, Incorporated was used on a Hewlett Packard 730 work station to fit the model. The exploratory variables are the same as those previously used for the loglinear model discussed in Chapter II. In addition, we establish an ordinal variable, Zone, that takes into account the strategy for combining months successfully exploited for the loglinear model. Table VII itemizes these and their associated levels.

Table VII LIST OF CONTINUATION-RATIO MODEL VARIABLES

EXPLANATORY VARIABLE	SYMBOL	LEVELS	TYPE
DEP CONTRACT	D	1,2,...,12	ORDINAL
ZONE	Z	1,...,5	ORDINAL
MARITAL STATUS	M	MARRIED, SINGLE (1,2)	CATEGORICAL
RACE	R	BLACK,HISPANIC, OTHER, WHITE (1,...,4)	CATEGORICAL
CHILDREN	C	YES,NO (1,2)	CATEGORICAL
BRIGADE	B	I, III, IV, VI (1,...,4)	CATEGORICAL

Zone represents the stages through which a recruit must survive to become an accession. The number of zones vary with the length of contract. For all DEP lengths, reaching zone 5 represents an accession while zone 1 represents the first month of contract. A one month DEP has two levels; zone 1 for a loss and zone 5 for an accession (Figure 10). Three levels exist for a two month contract where losses can occur in either the first or second month represented by zone 1 and 2. Similarly, an accession is labeled as zone 5. A three month contract accordingly calls for 4 levels with losses possible in zones 1 through 3. Finally, for DEP lengths of 4 or more months 5 levels are needed. Zone 2 for DEP lengths greater than 4 months is a composite of all "middle" months. The extent to which these "middle" months are combined into zone 2 will vary according to the length of DEP. Zone 2 will consist of all months but the first, last and next to last for

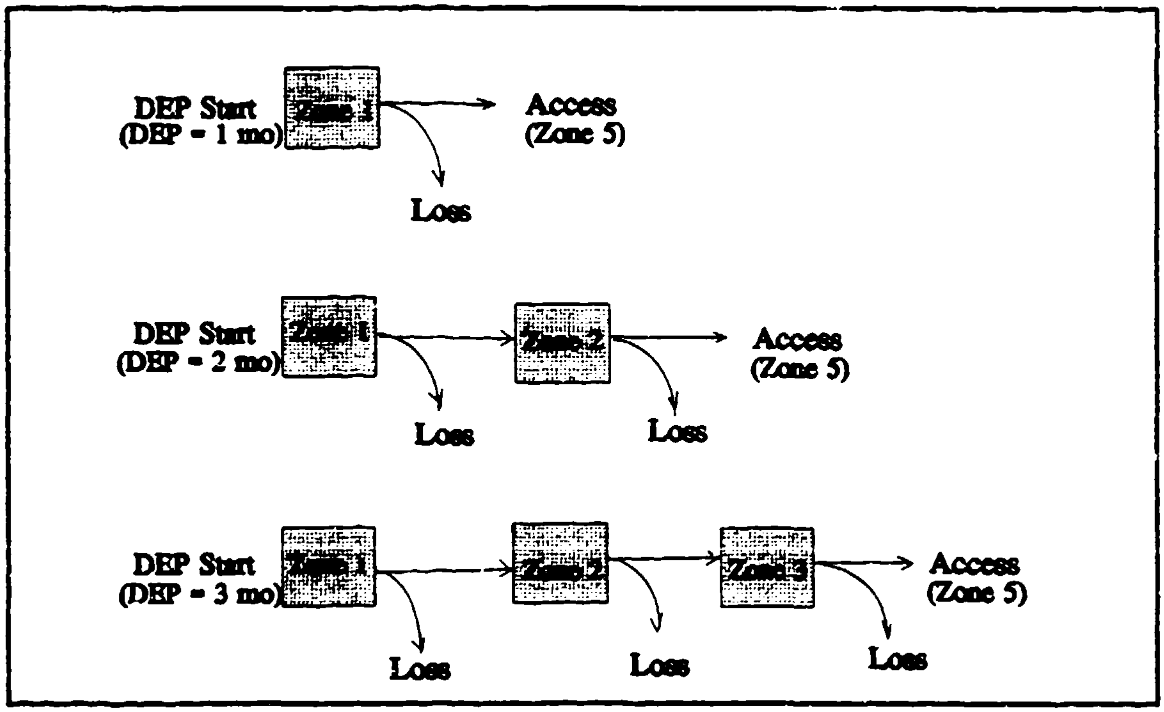

Figure 10 ZONE PROFILE FOR 1, 2 AND 3 MONTH DEP

contracts of 4 or more months. Figure 11 summarizes the zones for contracts greater than 3 months.

Combining months into zones as motivated by our loglinear model reduces the number of cells in the contingency table defined by the variables to 2688. Accordingly, the estimated parameters for the model are reduced.

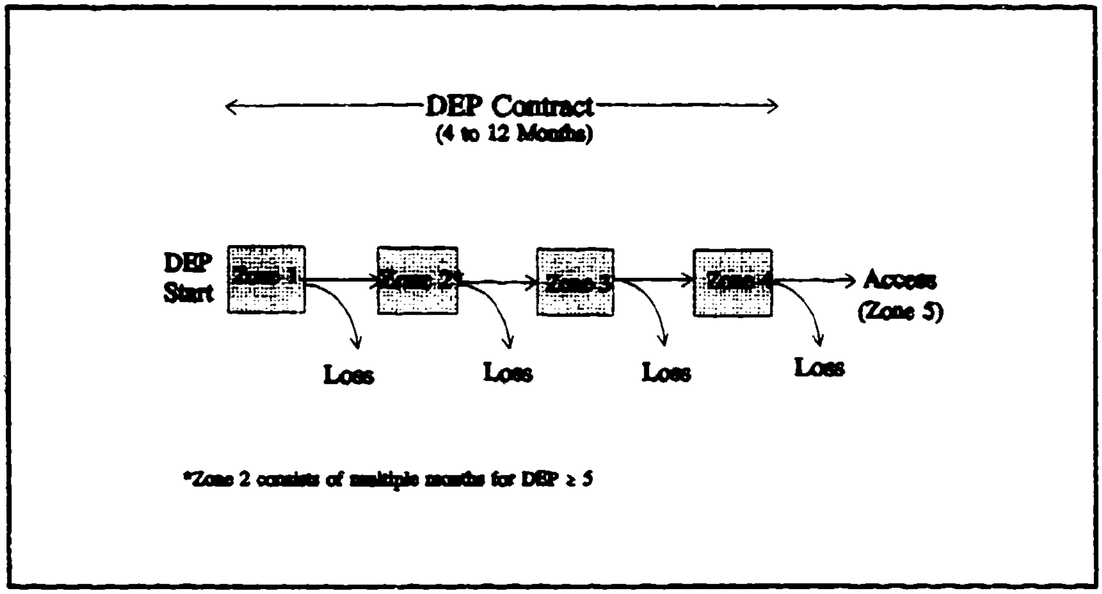

Figure 11 ZONE PROFILE FOR DEP ≥ 4 MONTHS

C. FITTING

S-PLUS glm function with a binomial link component was used to run the model. Recall, for GLM models, the link component (p.19) describes how the mean of the response variable depends on the linear predictors. Since we are using a logit model the binomial link is appropriate.

Our assessment of model adequacy was centered on the deviance explained by the model. Based on the outcome of the goodness-of-fit test terms were added or removed while keeping with the discipline of hierarchical models. Our model was kept hierarchical, where all lower-order terms are included if they involve those in higher-order. Because our model consists of no more than two-way interactions between exploratory variables, keeping a model hierarchical requires the main effects to be kept for any two way interactions in which they appear.

In linear regression, summary measures of the distance between the observed and fitted values are a function of the residual defined as the difference between the fitted and observed value. In logistic regression, there are several possible measures of the fitted and observed values. The residual deviance D is one of these measures and is a most reliable and routinely used measure. The deviance is -2 times the difference of the log-likelihood of the fitted and saturated models. Under the null hypothesis that a model fits and when the sample size is large, D has an approximately χ^2 distribution with υ degrees of freedom equal to the number of observations N less the number of parameters p. Therefore, if the model fit is good, asymptotically the expected deviance is N-p.

In logistic models with many $\pi(x_i)$'s very close to zero or, as in our case, close to one, the distribution of the deviance is not close to being χ^2 with N-p degrees of freedom. Instead D tends to be much smaller than N-p. Thus, when using D our overall test of model fit results in very large p-values whether the models fit or not. The asymptotic distributions do hold for testing between two nested models. Specifically, the test statistic of H_0: model 1 versus H_a: model 2 is D_1-D_2 which is asymptotically χ^2 with $\upsilon_1-\upsilon_2$ degrees of freedom.

Here D_1 and D_2 are the total deviance of model 1 and 2 while υ_1 and υ_2 correspond to each of the model's residual degree of freedom.

In linear regression, a way to measure the contribution of an independent variable toward predicting a dependant variable is by calculating the coefficient of determination (R^2). This coefficient takes values between 0 and 1 with a high value suggesting a good fit. Because logit models have binary dependent variables, they have low R^2 values regardless of how well they fit [Ref. 10]. A method analogous to the coefficient of determination that avoids the problem with binary dependent variables is the likelihood ratio index [Ref 10]. This index provides a measure of the ratio of explained deviation in the model and is defined as:

$$\rho = 1 - \frac{\text{Explained Deviance}}{\text{Total Deviance}} \quad . \qquad (9)$$

Where the total deviance is the deviance from fitting the logit model with only a constant term (no explanatory variables).

D. FINAL MODEL

In the final model, the logit of the probability of surviving zone j given survival up to zone j can be parameterized as

$$L_j = \alpha + \beta^Z_j + \beta^D_i + \beta^M_k + \beta^R_l + \beta^B_m + \beta^{DZ}_{ij} \ . \qquad (10)$$

Here β^Z_j $j = 1,\ldots,4$ are the parameters corresponding to zones 1 through 4, β^D_i for $i = 1,\ldots,12$ are the parameters for DEP of 1 to 12 months, β^M_k $k = 1,2$ are the parameters corresponding to the marital status married and single respectively, β^R_l $l = 1,\ldots,4$ are the parameters corresponding to the respective races, black, hispanic, other and white and β^B_m $m = 1,\ldots,4$ are the parameters corresponding to the brigades I, III, IV, VI respectively. Finally, the two - way interaction parameters between zone and DEP length are β^{DZ}_{ij} for $i = 1,\ldots,12$; $j = 1,\ldots,4$. This model is simple and fits the data well by explaining 87% of the total deviance (Table VIII).

Table VIII REVIEW OF MODELS

MODEL	RESIDUAL DEVIANCES	RESIDUAL DF	Q
Null	16,616	2,687	0
Main Effects	3,148	2,114	.82
Final	2,053	2,088	.87
Main Effects with Two Way Interactions	1,654	1,953	.99

A model using all main effects and two-way interactions provides a nearly perfect fit. However, our aim was to obtain the best fit with the fewest possible parameters. To this end, the model was simplified to include only DEP length and zone as a two-way interaction term. The analysis of deviance given Table IX provides a summary of the deviances for the final fitted model. In it is summarized the contribution each or the terms makes toward the final model fit. The 87% of the total deviance explained and a χ^2 goodness-of-fit significance level of .6814 associated with 2088 total deviance and 2057 degrees of freedom provides an adequate fit to calculate the probabilities we need.

Table IX ANALYSIS OF DEVIANCE FOR FITTED MODEL

TERMS	DF	DEV	RESID DF	RESID DEV	ρ	SIGNIF
NULL			2687	16616	0	.000
DEP LENGTH	562	1844	2125	14771	.11	.000
ZONE	3	11114	2122	3658	.77	.000
MARRIED	1	360	2121	3298	.80	.000
RACE	3	124	2118	3174	.81	.000
BRIGADE	3	16	2115	3158	.82	.001
DEP LENGTH:ZONE	27	1101	2088	2057	.87	.000

Plots of residual deviance are often used in regression modelling to check a model's adequacy. We note that with the large number of cases where $\pi(x_i)$ is nearly one, plots of standardized residuals to investigate model adequacy are of small help. In fact, all these plots reveal, is for the given data the estimated proportions are near one. For this reason we do not use plots of standardized residuals here.

In this chapter we use the continuation-ratio model to estimate conditional probabilities directly. The fitted values allow us to directly calculate probabilities we ultimately desire. The final model is simple and explains most of the total deviance.

IV. MODEL RESULTS

The fitted continuation-ratio model for GMA's provide the values needed to estimate the expected probability of accessions given a certain survival has occurred. To illustrate, take the case of fitted values obtained by the model for MARRIED, BLACK and BRIGADE I (Table X). The fitted values indicate a single, black male recruited from brigade I has a 95% chance of surviving the first month and thereby

Table X P(x>zone i|x≥zone i) FITTED VALUES FOR BLACK, MARRIED, BRIGADE I

Conditional Probability of Surviving Past Zone (i)					
		ZONE			
		1	2	3	4
	1	.9502			
	2	.9782	.9607		
	3	.9826	.9903	.9456	
D	4	.9832	.9964	.9822	.9246
E	5	.9861	.9948	.9817	.9183
P	6	.9897	.9883	.9727	.8782
	7	.988	.9853	.9659	.8434
	8	.9923	.9719	.9593	.8289
	9	.9932	.9694	.9471	.8029
	10	.995	.9612	.9471	.7881
	11	.9946	.9689	.9528	.7756
	12	.9942	.9516	.9531	.8102

accessing into the Army under a one month DEP contract. A similar recruit with a DEP of 10 months has a 99.5% chance of surviving past the initial month of DEP, a 96.1% chance of surviving past months 2 through 8 (zone 2) and a 94.7% chance of making it past the next to last month of the contract. Meanwhile, there exist a 78.8% chance of making it past the last month and thereby accessing. A complete set of fitted probabilities is included in Appendix E.

A. CONDITIONAL PROBABILITIES

The probability an individual X survives past zone 4,

$$Pr(X > Zone\ 4) \qquad (11)$$

can be expressed as a function of conditional probabilities of surviving previous zones. In other words, the probability of surviving past zone 4 and becoming an accession is the probability of surviving past zone 4 given the individual survived past zone 3 multiplied by the probability of surviving past zone 3. Equation 11 is equivalent to

$$Pr(X > Zone\ 4 \mid X > Zone\ 3)\, Pr(X > Zone\ 3)\ . \qquad (12)$$

In general terms for i=2,...,4

$$P(X > zone\ i) = Pr(X > zone\ i \mid X > zone\ i-1)\, Pr(X > zone\ i-1) \qquad (13)$$

From Table XI we can obtain the probability of accession (surviving zone 4) given an individual has survived past some time. For example, the probability of an individual accessing given he has survived past zone 2 is:

$$Pr(X > zone\ 4 | X > zone\ 3)Pr(X > zone\ 3 | X > zone\ 2).$$

Thus from Table XI the estimated probability is 0.74641=(0.7881)(0.9471). Therefore, a married, black male, recruited from brigade I under a 10 month contract who has survived past zone 2 is expected to access 74.6% of the time. Table XI contains the estimated probability of surviving DEP conditioned on time survived. The value of .7468 calculated above is accordingly listed with a 10 month contract and under zone 3. Notice in Table XI all numbers increase from left to right. This should be the case since the more a recruit survives the more apt he is to access. A complete listing of all fitted values and their appropriate conditional probability is provided in Appendix E.

Table XI CONDITIONAL PROBABILITIES FOR TABLE XI

Prob. of Accession Given Survived Zone (i-1)					
		ZONE			
		1	2	3	4
	1	.9502			
	2	.93976	.9607		
	3	.92013	.93643	.9456	
D	4	.88967	.90487	.90814	.9246
E	5	.88434	.89681	.9015	.9183
P	6	.83554	.84423	.85423	.8782
	7	.79303	.80266	.81464	.8434
	8	.76687	.77282	.79516	.8289
	9	.73214	.73716	.76043	.8029
	10	.71386	.71745	.74641	.7881
	11	.71214	.71601	.73899	.7756
	12	.73057	.73483	.77220	.8102

B. USING PROBABILITIES TO ESTIMATE ACCESSIONS

USAREC planners may use the conditional probabilities to estimate accessions at some future date. By multiplying the appropriate conditional probability by the number of recruits in a given category a point estimate of the number of anticipated accessions is obtained. To illustrate, we borrow from table XI discussed in the previous section and use a simple example. If we have 100 single, black males recruited from brigade I. Of the 100 recruits, 50 have signed 6 month contracts and the rest are under 9 month DEP. Assume that of the 50 recruits in each contract group, 13 are in zone 1 and 13 are in zone 4. Of the remainder, 12 are in zone 2 and 12 in zone 3. To estimate the number accessing at some future date we multiply the number of individuals in DEP by their associated conditional probability. Table XII provides the results of our example. In similar fashion, if we desired to

Table XII ESTIMATING ACCESSIONS

Cont Length	Prob	Number in DEP	Product	Expected accessions
6	.8355	13	10.68	11 in 6 months
6	.8442	12	10.13	10 in 2 to 4 months
6	.8542	12	10.25	10 next month
6	.8782	13	11.41	11 this month
9	.7321	13	9.53	10 in 9 months
9	.7371	12	8.846	9 in 2 to 7 months
9	.7604	12	9.125	9 next month
9	.8029	13	10.4838	10 this month

estimate the number of accessions in one month, we would multiply the total number of recruits with a projected accession date for next month by the appropriate last zone conditional probability. Thus, next months estimates are obtained.

V. FINAL SUMMARY

The unique structure of DEP losses necessitates exploring avenues to address the modelling challenge associated with sparse contingency table. The use of the loglinear model to explore viable strategies for combining levels and thereby reducing the size of the contingency table (increasing the cell counts) is valuable toward this end. We note that the sparsity of the contingency table may be largely due to the inherent nature of the DEP loss reporting process or to a recruit's hesitation to renege on his contract early on. Recruiters are reluctant to report a candidate as a loss until no doubt exists of the individuals intention to renege on the contract. Recruits, on the other hand, may feel compelled to rescind only at the very end of the DEP. Despite this, a loss can only be realized when it is reported. Without major policy changes the actual loss date may never be available.

A. CONCLUSIONS AND RECOMMENDATIONS

The model building effort provides a methodology to estimate probabilities of accession based on time survived in DEP. The probabilities can provide USAREC planners a quantitative basis for accession projections for GMA recruits. By entering the model's fitted values into a commercial spreadsheet or database USAREC analysts can quickly estimate recruit accession numbers at some future date based on the present DEP inventory. By applying this modelling methodology to the other recruit categories (mission boxes) a complete analysis tool can be obtained. In doing so, a means to estimate recruit accessions may be realized which can ultimately assist in setting recruiter goals.

APPENDIX A: LOSS PERCENT AND PROPORTIONS (ALL MISSION BOXES)

		Loss Probability YR 1988												
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	acc
	mo1	0.059												0.941
	mo2	0.042	0.058											0.9
C	mo3	0.027	0.028	0.061										0.884
o	mo4	0.024	0.006	0.028	0.081									0.861
n	mo5	0.015	0.003	0.005	0.028	0.094								0.854
t	mo6	0.009	9E-04	0.002	0.008	0.035	0.123							0.823
r	mo7	0.008	0.001	0.002	0.003	0.008	0.039	0.123						0.816
a	mo8	0.01	5E-04	0.001	0.001	0.004	0.007	0.032	0.125					0.82
c	mo9	0.009	0.001	0.001	0.001	0.001	0.003	0.009	0.04	0.128				0.807
t	mo10	0.009	3E-04	5E-04	0.001	0.001	0.002	0.007	0.012	0.042	0.153			0.772
	mo11	0.009	0.002	2E-04	0	1E-03	7E-04	0.002	0.005	0.011	0.041	0.179		0.75
	mo12	0.01	9E-04	5E-04	3E-04	5E-04	5E-04	0.002	0.002	0.004	0.01	0.047	0.195	0.727

		Percent of Loss YR 1988											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1	100%											
	mo2	42%	58%										
C	mo3	23%	24%	53%									
o	mo4	17%	4%	20%	58%								
n	mo5	11%	2%	3%	19%	65%							
t	mo6	5%	1%	1%	5%	19%	69%						
r	mo7	4%	1%	1%	1%	5%	21%	67%					
a	mo8	6%	0%	1%	1%	2%	4%	18%	69%				
c	mo9	4%	1%	1%	1%	1%	1%	4%	21%	66%			
t	mo10	4%	0%	0%	0%	1%	1%	3%	5%	19%	67%		
	mo11	4%	1%	0%	0%	0%	0%	1%	2%	5%	16%	71%	
	mo12	4%	0%	0%	0%	0%	0%	1%	1%	1%	4%	17%	71%

		Prob(DEP Loss in month i | Survived to month i - 1) for YR 1988											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1												
	mo2	0.061											
C	mo3	0.091	0.064										
o	mo4	0.118	0.098	0.075									
n	mo5	0.132	0.13	0.125	0.099								
t	mo6	0.17	0.17	0.168	0.161	0.13							
r	mo7	0.177	0.177	0.175	0.173	0.166	0.131						
a	mo8	0.172	0.171	0.17	0.169	0.166	0.16	0.132					
c	mo9	0.186	0.184	0.183	0.183	0.182	0.179	0.172	0.137				
t	mo10	0.221	0.221	0.221	0.22	0.219	0.217	0.212	0.202	0.165			
	mo11	0.243	0.242	0.241	0.241	0.241	0.24	0.239	0.235	0.226	0.192		
	mo12	0.265	0.265	0.264	0.264	0.264	0.263	0.262	0.26	0.257	0.249	0.211	

APPENDIX A: LOSS PERCENT AND PROPORTIONS (ALL MISSION BOXES)

		Loss Probability YR 1989												
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	acc
	mo1	0.073												0.927
	mo2	0.029	0.036											0.935
C	mo3	0.021	0.007	0.059										0.913
o	mo4	0.018	0.003	0.014	0.088									0.878
n	mo5	0.016	0.001	0.005	[illegible]	0.102								0.853
t	mo6	0.011	[illegible]	0.003	0.012	0.036	0.116							0.821
r	mo7	0.014	[illegible]	8E-04	0.012	0.014	0.025	0.11						0.822
a	mo8	0.009	7E-04	0.001	0.025	0.033	0.019	0.026	0.087					0.8
c	mo9	[illegible]	2E-04	0.002	0.017	0.046	0.058	0.026	0.022	0.094				0.726
t	mo10	0.007	8E-04	4E-04	0.003	0.028	0.038	0.059	0.026	0.025	0.086			0.726
	mo11	0.007	2E-04	0	0.001	[illegible]	0.011	0.028	0.073	0.056	0.027	0.087		[illegible]
	mo12	0.005	0.001	0.001	0.001	0.002	0.002	0.007	0.02	0.063	0.094	0.031	0.087	[illegible]

		Percent of Loss YR 1989											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1	100%											
	mo2	45%	55%										
C	mo3	24%	8%	68%									
o	mo4	14%	2%	11%	72%								
n	mo5	11%	1%	3%	15%	69%							
t	mo6	6%	0%	2%	7%	20%	[illegible]						
r	mo7	8%	1%	0%	7%	8%	14%	62%					
a	mo8	4%	0%	1%	12%	17%	9%	13%	44%				
c	mo9	2%	0%	1%	6%	17%	21%	10%	8%	34%			
t	mo10	3%	0%	0%	1%	10%	14%	22%	10%	9%	32%		
	mo11	2%	0%	0%	0%	1%	4%	10%	25%	19%	9%	30%	
	mo12	2%	0%	0%	0%	1%	1%	2%	6%	20%	30%	10%	28%

		Prob(DEP Loss in month i | Survived to month i - 1) for YR 1989											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1												
	mo2	0.037											
C	mo3	0.068	0.061										
o	mo4	0.106	0.092	0.081									
n	mo5	0.132	0.131	0.127	0.106								
t	mo6	0.169	0.169	0.166	0.156	0.123							
r	mo7	0.166	0.165	0.165	0.154	0.141	0.118						
a	mo8	0.193	0.193	0.191	0.171	0.141	0.124	[illegible]					
c	mo9	0.269	0.269	0.267	0.254	0.218	0.165	0.138	0.115				
t	mo10	0.289	0.288	0.288	0.266	0.244	0.213	0.159	0.133	0.106			
	mo11	0.289	0.288	0.288	0.287	0.286	0.277	0.256	0.194	0.139	0.11		
	mo12	0.31	0.31	0.309	0.308	0.307	0.305	0.301	0.286	0.236	0.147	0.113	

APPENDIX A: LOSS PERCENT AND PROPORTIONS (ALL MISSION BOXES)

							Loss Probability YR 1990							
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	acc
	mo1	0.049												0.951
	mo2	0.022	0.05											0.928
C	mo3	0.017	0.019	0.073										0.891
o	mo4	0.015	0.008	0.038	0.082									0.857
n	mo5	0.016	0.007	0.011	0.025	0.106								0.835
t	mo6	0.016	0.017	0.013	0.008	0.026	0.122							0.798
r	mo7	0.01	0.014	0.021	0.006	0.004	0.034	0.127						0.785
a	mo8	0.006	0.002	0.025	0.01	0.002	0.007	0.032	0.123					0.793
c	mo9	0.005	7E-04	0.004	0.004	0.002	0.009	0.016	0.057	0.134				0.768
t	mo10	0.003	8E-04	4E-04	4E-04	0.002	0.005	0.014	0.022	0.053	0.148			0.752
	mo11	0.004	4E-04	0	4E-04	0	0.001	0.009	0.011	0.021	0.064	0.156		0.733
	mo12	0.003	6E-04	6E-04	6E-04	2E-04	0	0.001	0.003	0.012	0.028	0.059	0.152	0.74
							Percent of Loss YR 1990							
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	
	mo1	100%												
	mo2	31%	69%											
C	mo3	16%	18%	67%										
o	mo4	10%	5%	27%	57%									
n	mo5	10%	5%	6%	15%	64%								
t	mo6	8%	8%	6%	4%	13%	61%							
r	mo7	4%	7%	10%	3%	2%	16%	59%						
a	mo8	3%	1%	12%	5%	1%	3%	15%	59%					
c	mo9	2%	0%	2%	2%	1%	4%	7%	24%	58%				
t	mo10	1%	0%	0%	0%	1%	2%	5%	9%	21%	60%			
	mo11	1%	0%	0%	0%	0%	1%	3%	4%	8%	24%	58%		
	mo12	1%	0%	0%	0%	0%	0%	0%	1%	5%	11%	23%	58%	
							Prob(DEP Loss in month i | Survived to month i - 1) for YR 1990							
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	
	mo1													
	mo2	0.051												
C	mo3	0.094	0.076											
o	mo4	0.13	0.107	0.076										
n	mo5	0.151	0.145	0.135	0.113									
t	mo6	0.189	0.175	0.163	0.157	0.133								
r	mo7	0.207	0.196	0.178	0.173	0.17	0.139							
a	mo8	0.203	0.201	0.18	0.171	0.169	0.163	0.134						
c	mo9	0.228	0.227	0.224	0.221	0.219	0.212	0.199	0.149					
t	mo10	0.248	0.245	0.245	0.245	0.243	0.24	0.229	0.211	0.165				
	mo11	0.264	0.264	0.264	0.264	0.264	0.263	0.256	0.248	0.231	0.175			
	mo12	0.259	0.258	0.258	0.257	0.257	0.257	0.256	0.254	0.244	0.222	0.17		

						Loss Probability YR 1991								
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	acc
	mo1	0.058												0.942
	mo2	0.049	0.041											0.91
C	mo3	0.023	0.04	0.07										0.867
o	mo4	0.014	0.006	0.04	0.09									0.85
n	mo5	0.012	0.001	0.006	0.041	0.071								0.869
t	mo6	0.009	0.001	0.003	0.01	0.065	0.071							0.841
r	mo7	0.015	0.001	0.001	0.009	0.018	0.084	0.121						0.752
a	mo8	0.011	3E-04	0	0.005	0.012	0.017	0.077	0.113					0.765
c	mo9	0.01	9E-04	0	0.004	0.007	0.006	0.018	0.08	0.098				0.777
t	mo10	0.02	0	0	0.003	0.008	0.008	0.015	0.018	0.103	0.145			0.68
	mo11	0.006	5E-04	8E-04	8E-04	5E-04	0.008	0.008	0.017	0.028	0.068	0.115		0.747
	mo12	0.005	6E-04	0.001	2E-04	0.001	0.001	0.003	0.006	0.018	0.033	0.059	0.095	0.776
						Percent of Loss YR 1991								
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	
	mo1	100%												
	mo2	54%	46%											
C	mo3	17%	30%	52%										
o	mo4	9%	4%	27%	60%									
n	mo5	9%	1%	5%	31%	54%								
t	mo6	6%	1%	2%	6%	41%	45%							
r	mo7	6%	1%	0%	4%	7%	34%	49%						
a	mo8	5%	0%	0%	2%	5%	7%	33%	48%					
c	mo9	4%	0%	0%	2%	3%	3%	8%	36%	44%				
t	mo10	6%	0%	0%	1%	2%	3%	5%	6%	32%	45%			
	mo11	2%	0%	0%	0%	0%	3%	3%	7%	11%	27%	46%		
	mo12	2%	0%	1%	0%	0%	1%	1%	3%	8%	15%	26%	43%	
						Prob(DEP Loss in month i | Survived to month i - 1) for YR 1991								
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	
	mo1													
	mo2	0.044												
C	mo3	0.112	0.074											
o	mo4	0.138	0.115	0.083										
n	mo5	0.121	0.119	0.114	0.075									
t	mo6	0.151	0.15	0.147	0.139	0.078								
r	mo7	0.237	0.236	0.235	0.229	0.214	0.138							
a	mo8	0.227	0.226	0.226	0.222	0.213	0.199	0.129						
c	mo9	0.215	0.214	0.214	0.212	0.206	0.201	0.186	0.112					
t	mo10	0.306	0.306	0.306	0.304	0.299	0.292	0.282	0.267	0.176				
	mo11	0.249	0.248	0.248	0.247	0.247	0.241	0.234	0.22	0.197	0.134			
	mo12	0.22	0.22	0.219	0.219	0.218	0.217	0.215	0.209	0.195	0.166	0.109		

APPENDIX A: LOSS PERCENT AND PROPORTIONS (ALL MISSION BOXES)

		Loss Probability YR 1992												
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12	acc
	mo1	0.066												0.934
	mo2	0.028	0.046											0.926
C	mo3	0.022	0.019	0.063										0.896
o	mo4	0.025	0.006	0.031	0.085									0.853
n	mo5	0.029	0.003	0.009	0.036	0.091								0.832
t	mo6	0.032	0.002	0.005	0.013	0.043	0.109							0.797
r	mo7	0.032	0.003	0.006	0.006	0.014	0.06	0.106						0.773
a	mo8	0.017	0.001	0.004	0.005	0.005	0.016	0.056	0.119					0.777
c	mo9	0.013	8E-04	0.002	0.002	0.005	0.015	0.022	0.062	0.121				0.758
t	mo10	0.006	3E-04	9E-04	0.001	0.002	0.009	0.016	0.023	0.069	0.104			0.768
	mo11	0.007	6E-04	0	0.002	0.001	0.003	0.01	0.012	0.019	0.07	0.124		0.751
	mo12	0.003	0.002	0	0	0	7E-04	0.005	0.01	0.004	0.018	0.052	0.093	0.811

		Percent of Loss YR 1992											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1	100%											
	mo2	38%	62%										
C	mo3	21%	18%	60%									
o	mo4	17%	4%	21%	58%								
n	mo5	17%	2%	6%	21%	54%							
t	mo6	16%	1%	2%	6%	21%	54%						
r	mo7	14%	1%	3%	3%	6%	26%	47%					
a	mo8	8%	1%	2%	2%	2%	7%	25%	53%				
c	mo9	5%	0%	1%	1%	2%	6%	9%	26%	50%			
t	mo10	3%	0%	0%	1%	1%	4%	7%	10%	30%	45%		
	mo11	3%	0%	0%	1%	1%	1%	4%	5%	8%	26%	50%	0%
	mo12	2%	1%	0%	0%	0%	0%	3%	5%	2%	10%	28%	49%

		Prob(DEP Loss in month i | Survived to month i - 1) for YR 1992											
		mo1	mo2	mo3	mo4	mo5	mo6	mo7	mo8	mo9	mo10	mo11	mo12
	mo1												
	mo2	0.047											
C	mo3	0.084	0.066										
o	mo4	0.125	0.104	0.078									
n	mo5	0.143	0.14	0.132	0.098								
t	mo6	0.177	0.176	0.172	0.16	0.12							
r	mo7	0.202	0.199	0.194	0.189	0.177	0.121						
a	mo8	0.21	0.209	0.205	0.201	0.197	0.184	0.133					
c	mo9	0.232	0.231	0.23	0.228	0.224	0.212	0.194	0.137				
t	mo10	0.227	0.227	0.226	0.225	0.223	0.216	0.203	0.184	0.12			
	mo11	0.243	0.243	0.243	0.241	0.24	0.238	0.23	0.221	0.205	0.142		
	mo12	0.186	0.184	0.184	0.184	0.184	0.184	0.18	0.171	0.168	0.152	0.103	

APPENDIX B: FY-1988-92 PROP LOSS FOR MAJOR MISSION BOXES

BOX I (SMA)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	105	110	[illegible]	80	10	[illegible]	14	0	0	12	0	0	70	6	[illegible]	271	126	0.3174	0.3641	0.2707
2	104	407	0.8772	162	21	[illegible]	71	6	[illegible]	48	6	0.1111	319	24	0.0702	788	483	[illegible]	[illegible]	0.3414
3	274	122	[illegible]	408	32	0.0727	227	21	0.0847	139	12	[illegible]	[illegible]	70	[illegible]	1788	257	0.129	0.144	[illegible]
4	444	50	0.1012	702	75	[illegible]	310	39	0.1117	481	85	0.1602	713	105	[illegible]	2850	354	0.1178	0.1298	0.1061
5	1381	146	[illegible]	1137	118	[illegible]	424	81	0.1604	1812	257	[illegible]	1852	224	0.1421	6106	838	0.1194	0.1272	0.1116
6	1351	162	0.1071	1264	162	[illegible]	1316	248	[illegible]	1220	157	0.114	789	148	[illegible]	5992	872	0.1282	0.1369	0.1201
7	1636	227	[illegible]	1794	282	[illegible]	2213	465	[illegible]	869	172	[illegible]	628	144	[illegible]	6867	1320	0.1612	0.1694	[illegible]
8	2822	451	[illegible]	2294	488	0.178	3802	711	0.1617	1404	302	0.177	972	181	0.157	10494	2183	0.1691	0.1757	[illegible]
9	2637	469	0.158	1059	591	[illegible]	1794	446	0.1991	906	160	0.142	372	110	[illegible]	7582	1766	[illegible]	0.1974	0.1812
10	1708	382	[illegible]	1800	601	[illegible]	1281	369	[illegible]	680	222	[illegible]	895	219	[illegible]	6154	1798	[illegible]	0.235	[illegible]
11	1804	607	[illegible]	1689	612	[illegible]	1457	519	[illegible]	2611	843	[illegible]	708	252	[illegible]	9049	2788	[illegible]	0.2619	0.2451
12	2880	1072	[illegible]	2274	892	0.2817	3071	1050	[illegible]	3894	940	[illegible]	905	200	0.181	12894	4164	0.248	0.2547	0.2414
	16919	4107	[illegible]	16946	[illegible]	[illegible]	16982	[illegible]	[illegible]	13308	3145	[illegible]	8845	1676	[illegible]	[illegible]	16769	85907	TOTAL	

BOX II (GMA)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	6012	371	[illegible]	[illegible]	524	[illegible]	[illegible]	390	[illegible]	[illegible]	229	[illegible]	3160	216	[illegible]	[illegible]	1684	[illegible]	[illegible]	[illegible]
2	7702	606	[illegible]	10204	619	0.0572	6102	400	0.0615	4761	278	[illegible]	5333	338	[illegible]	34122	2207	0.0691	[illegible]	[illegible]
3	4585	408	[illegible]	6667	682	[illegible]	4398	481	[illegible]	3544	301	[illegible]	5858	514	[illegible]	24817	2306	0.096	[illegible]	[illegible]
4	3948	578	0.1277	3243	358	[illegible]	3516	630	0.131	6978	857	[illegible]	2875	402	0.1227	19666	2725	0.1201	0.1245	[illegible]
5	3655	587	[illegible]	1205	244	[illegible]	2940	465	[illegible]	9906	968	[illegible]	1270	181	0.1247	18095	2425	0.1186	0.123	0.114
6	1498	349	[illegible]	888	208	[illegible]	2882	680	[illegible]	2602	395	0.1181	480	95	0.181	7678	1558	0.1695	0.1763	0.1607
7	770	230	[illegible]	622	167	[illegible]	2294	551	0.1657	488	160	[illegible]	493	117	[illegible]	4527	1225	0.218	0.2238	0.2022
8	583	171	[illegible]	393	139	[illegible]	912	310	[illegible]	589	171	0.2811	498	184	0.212	2901	825	0.2418	0.2558	[illegible]
9	394	135	[illegible]	253	117	0.3162	406	167	[illegible]	427	138	[illegible]	257	67	[illegible]	1677	625	0.2716	0.29	[illegible]
10	231	88	[illegible]	294	93	[illegible]	237	121	[illegible]	211	60	[illegible]	98	33	[illegible]	1009	416	0.2914	0.3155	[illegible]
11	177	99	0.3587	177	68	[illegible]	231	62	[illegible]	165	60	[illegible]	84	21	0.2	654	340	[illegible]	0.3109	[illegible]
12	164	182	[illegible]	167	83	[illegible]	164	78	[illegible]	211	78	[illegible]	77	12	[illegible]	808	378	0.3201	0.3472	[illegible]
	29507	[illegible]	[illegible]	30282	3177	[illegible]	[illegible]	4070	[illegible]	[illegible]	3597	[illegible]	19951	2128	[illegible]	142513	[illegible]	[illegible]		

APPENDIX B: FY-1988-92 PROP LOSS FOR MAJOR MISSION BOXES

BOX III (SMB)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	93	41	0.30[illegible]	38	2	0.05	2	0	0	4	0	0	71	7	0.0897	208	60	0.1[illegible]	0.248	0.1448
2	284	201	0.4144	138	9	0.0612	9	2	0.1818	11	2	0.1538	200	19	0.0[illegible]	642	233	0.2[illegible]	0.2962	0.2394
3	386	68	0.1478	317	20	0.0[illegible]	21	8	0.2758	98	10	0.0871	327	24	0.0684	1088	120	0.0980	0.1161	0.0818
4	713	57	0.074	408	53	0.1162	72	21	0.22[illegible]	300	50	0.1428	181	15	0.0765	1669	196	0.1051	0.1198	0.0908
5	621	68	0.1124	706	105	0.12[illegible]	213	65	0.2[illegible]	787	124	0.1361	243	16	0.0618	2469	376	0.1322	0.1448	0.1195
6	808	109	0.118[illegible]	778	116	0.12[illegible]	887	256	0.222	473	98	0.1716	77	14	0.1[illegible]	3038	598	0.1686	0.1768	0.1613
7	1001	129	0.1142	1086	208	0.1616	684	219	0.2426	387	98	0.2022	13	4	0.2[illegible]	3160	654	0.1719	0.1942	0.1697
8	1117	200	0.1618	1285	272	0.1747	950	280	0.2276	136	24	0.15	49	8	0.1404	3587	784	0.1814	0.1982	0.1697
9	1186	220	0.15[illegible]	980	449	0.3142	465	118	0.20[illegible]	12	5	0.2941	13	0	0	2625	792	0.2318	0.2462	0.2178
10	746	186	0.2061	980	450	0.3181	126	36	0.2222	6	6	0.5	68	20	0.2273	1906	708	0.2708	0.2882	0.2595
11	852	271	0.2413	880	408	0.3168	84	30	0.2[illegible]	3	5	0.625	24	8	0.25	1849	722	0.2815	0.2992	0.2697
12	1217	284	0.1892	1078	581	0.3513	11	5	0.3125	1	2	0.6667	11	2	0.1[illegible]	2818	874	0.2742	0.29	0.2594
	8982	1882	10[illegible]	8942	2374	11316	3534	1040	4[illegible]	2198	419	2612	1277	137	1414	24488	6102	30590		

BOX IV (OMB)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	6[illegible]	381	0.0547	4874	424	0.0[illegible]	3724	18[illegible]	0.04[illegible]	2025	153	0.0701	19[illegible]	155	0.074	1[illegible]	12[illegible]	0.0[illegible]	0.0874	0.080[illegible]
2	6134	479	0.0724	6[illegible]	491	0.0657	2774	230	0.078	1824	132	0.0676	2802	216	0.0716	20620	1558	0.0705	0.0739	0.067
3	2381	208	0.0812	3550	314	0.0813	2703	349	0.1128	1581	189	0.1067	2571	278	0.0927	12598	1295	0.0933	0.0[illegible]	0.0984
4	820	125	0.1323	1307	169	0.104[illegible]	2320	347	0.1301	2160	260	0.1076	998	117	0.1049	7595	1002	0.1166	0.12[illegible]	0.1098
5	523	99	0.1592	405	90	0.1818	1459	259	0.14[illegible]	2582	352	0.12	238	43	0.1558	6198	840	0.1332	0.1481	0.1309
6	298	83	0.218	220	92	0.2948	688	198	0.2285	729	89	0.10[illegible]	105	14	0.1176	2098	476	0.1899	0.205	0.1787
7	213	86	0.2[illegible]	141	65	0.3165	289	88	0.2274	122	31	0.2026	64	6	0.0857	839	256	0.2[illegible]	[illegible]	0.2082
8	107	27	0.2015	119	69	0.3[illegible]	195	48	0.1909	75	24	0.2426	50	6	0.1071	546	162	0.22[illegible]	[illegible]	0.1972
9	63	28	0.30[illegible]	95	42	0.30[illegible]	75	22	0.22[illegible]	71	17	0.1932	21	6	0.2222	315	110	0.2[illegible]	[illegible]	0.2168
10	42	28	0.3[illegible]	91	38	0.2946	72	16	0.1818	55	16	0.2148	31	0	0	291	92	0.2402	0.2[illegible]	[illegible].1966
11	36	16	0.3137	95	32	0.252	56	7	0.1111	64	7	0.1148	20	0	0	260	62	0.1925	0.2365	0.1496
12	20	21	0.5122	87	31	0.2627	42	8	0.16	49	9	0.1552	31	4	0.1143	229	73	0.2417	0.291	0.1925
	17163	1549	18712	17770	1831	19601	14401	1762	16163	11071	1248	12319	8[illegible]	840	9[illegible]	68970	7220	76590		

APPENDIX B: FY-1988-92 PROP LOSS FOR MAJOR MISSION BOXES

BOX X (GFA)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	1828	109	0.0781	1450	87	[illegible]	1476	[illegible]	[illegible]	857	62	[illegible]	1016	[illegible]	[illegible]	5137	[illegible]	[illegible]	[illegible]	[illegible]
2	1807	225	0.1228	2108	188	0.0811	1288	180	0.1116	882	82	[illegible]	1188	130	0.109	7061	701	0.101	0.1078	[illegible]
3	1348	228	0.144	1809	286	0.124	1088	161	[illegible]	784	129	0.1413	1200	228	0.1887	8184	1000	[illegible]	0.1478	0.1314
4	851	180	[illegible]	1132	281	[illegible]	788	216	[illegible]	1848	411	[illegible]	788	208	[illegible]	6165	[illegible]	0.189	0.2088	[illegible]
5	881	204	[illegible]	422	138	[illegible]	740	282	[illegible]	1789	438	0.1977	381	118	[illegible]	4208	1188	0.2204	0.2317	[illegible]
6	402	167	[illegible]	184	119	0.3827	884	385	[illegible]	804	168	0.2188	187	85	[illegible]	2211	802	[illegible]	0.308	0.2782
7	213	108	[illegible]	164	78	0.3216	641	287	[illegible]	125	87	0.348	122	88	[illegible]	1165	608	0.3441	[illegible]	0.3216
8	94	88	[illegible]	118	92	[illegible]	259	125	[illegible]	188	116	0.4244	139	88	0.3118	788	[illegible]	[illegible]	[illegible]	[illegible]
9	88	45	0.4054	75	71	[illegible]	132	85	0.4185	131	71	0.3516	88	25	0.2212	482	[illegible]	[illegible]	[illegible]	[illegible]
10	31	35	[illegible]	62	58	[illegible]	87	58	[illegible]	72	38	[illegible]	30	16	[illegible]	282	197	0.4118	0.4562	[illegible]
11	27	28	[illegible]	62	46	0.4258	64	31	[illegible]	63	28	0.3201	22	9	0.2808	218	138	0.3876	[illegible]	[illegible]
12	25	29	0.537	49	46	0.5278	50	27	[illegible]	58	24	0.3117	27	9	0.25	188	137	0.409	0.4827	[illegible]
	[illegible]	1454	[illegible]	[illegible]	1405	[illegible]	[illegible]	1348	[illegible]	7114	1616	[illegible]	6140	980	6120	34082	7887	[illegible]		

BOX XII (GFB)

	1988			1989			1990			1991			1992			TOTAL			95% CI	
DEP	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Access	Loss	P(loss)	Upper	lower
1	1280	85	[illegible]	1422	88	0.0851	788	47	[illegible]	482	38	0.0841	588	30	[illegible]	4805	304	[illegible]	[illegible]	[illegible]
2	1320	137	0.094	1890	170	0.0861	948	38	[illegible]	388	38	[illegible]	724	64	0.0812	4890	464	0.09	0.0881	0.0819
3	746	98	0.1161	1288	168	[illegible]	804	71	[illegible]	300	65	[illegible]	687	110	0.1478	3270	467	0.1288	0.1408	0.1167
4	308	60	[illegible]	922	168	0.1802	188	54	[illegible]	316	70	0.1818	408	82	[illegible]	2117	428	0.1885	0.1888	0.1867
5	371	88	[illegible]	940	68	0.1414	111	34	[illegible]	348	98	0.2197	167	34	[illegible]	1367	305	0.1857	0.2048	[illegible]
6	165	42	0.2028	97	37	0.2761	68	9	[illegible]	202	64	[illegible]	88	6	[illegible]	880	147	0.2022	0.232	0.1724
7	49	28	[illegible]	57	28	[illegible]	28	18	[illegible]	27	9	0.25	82	20	[illegible]	198	100	0.3413	0.3867	[illegible]
8	20	11	[illegible]	32	10	0.2381	34	5	[illegible]	48	21	0.3281	84	16	[illegible]	190	62	0.2481	[illegible]	[illegible]
9	11	7	[illegible]	38	16	[illegible]	12	1	[illegible]	48	6	0.1164	18	5	0.2174	125	35	0.2188	0.2841	[illegible]
10	6	3	0.5	14	7	[illegible]	20	1	0.0476	20	4	0.1667	11	2	[illegible]	71	20	0.2188	0.3088	0.18
11	9	3	0.25	16	2	0.1111	11	0	0	28	1	0.0345	16	0	0	79	8	0.0708	0.1282	0.016
12	10	1	0.0909	32	2	[illegible]	21	0	0	29	4	0.1212	7	1	0.125	89	8	0.0746	0.1288	[illegible]
	4285	586	[illegible]	5038	760	[illegible]	1868	277	2176	2206	388	2601	2777	388	3146	17259	2867	[illegible]		

GMA BRIG - I SUMMARY

	ACCESSION				LOSS			
	BLACK	HISP	OTHER	WHITE	BLACK	HISP	OTHER	WHITE
Child	865	188	126	2965	107	15	17	256
No Child	5783	619	736	22134	837	85	120	2886
Total	6648	807	862	25099	944	100	137	3142
Overall	0.875859	0.889746	0.862863	0.888743				
w/Child	0.889918	0.926108	0.881119	0.920522				
w/o Child	0.873585	0.879261	0.859813	0.884652				

GMA BRIG - III SUMMARY

	ACCESSION				LOSS			
	BLACK	HISP	OTHER	WHITE	BLACK	HISP	OTHER	WHITE
Child	1072	412	94	6517	102	24	6	467
No Child	6653	840	376	28003	834	98	70	3450
Total	7725	1252	470	34520	936	122	76	3917
Overall	0.891929	0.911208	0.880808	0.888093				
w/Child	0.913118	0.944954	0.94	0.933133				
w/o Child	0.888607	0.895522	0.843049	0.890313				

GMA BRIG - IV SUMMARY

	ACCESSION				LOSS			
	BLACK	HISP	OTHER	WHITE	BLACK	HISP	OTHER	WHITE
Child	645	602	147	5981	66	30	13	362
No Child	3197	2008	650	23449	489	163	83	2741
Total	3842	2610	797	29430	555	193	96	3103
Overall	0.873778	0.931145	0.892497	0.90462				
w/Child	0.907173	0.952532	0.91875	0.942929				
w/o Child	0.867336	0.924919	0.886767	0.895342				

GMA BRIG - VI SUMMARY

	ACCESSION				LOSS			
	BLACK	HISP	OTHER	WHITE	BLACK	HISP	OTHER	WHITE
Child	212	363	257	3398	41	27	24	260
No Child	1412	2150	1813	18966	279	241	265	2391
Total	1624	2513	2070	22364	320	268	289	2651
Overall	0.835391	0.903632	0.87749	0.894024				
w/Child	0.837945	0.930769	0.914591	0.928922				
w/o Child	0.835009	0.899205	0.872474	0.888046				

APPENDIX D: COEFFICIENTS FOR FITTED MODEL

Term[1]	Coefficient	T-value
Intercept	2.9489	70.8386
DEP 2	0.8564	20.7224
DEP 3	1.0873	21.6483
DEP 4	1.1244	21.0712
DEP 5	1.3172	21.9937
DEP 6	1.6258	16.7283
DEP 7	1.4663	12.9993
DEP 8	1.9191	11.3314
DEP 9	2.0457	8.8271
DEP 10	2.3308	6.9678
DEP 11	2.2630	6.3743
DEP 12	2.4008	6.3331
ZONE 2	-2.3392	-5.8631
ZONE 3	-2.2915	-5.7102
ZONE 4	-4.1370	-10.7285
MARRIED	-0.4653	-17.3229
HISPANIC	0.3939	8.7309
OTHER	0.0611	1.2649
WHITE	0.2063	9.2504
BRIG III	0.0474	2.1839
BRIG IV	0.0737	3.1831
BRIG VI	-0.0093	-0.3860

NOTE: 1. First level of each term set to 0 by S-Plus.

APPENDIX D: COEFFICIENTS FOR FITTED MODEL

Term	Coefficient	T-Value
DEP 2:ZONE 2	1.7314	4.3146
DEP 3:ZONE 2	2.9350	7.2405
DEP 4:ZONE 2	3.9049	9.4196
DEP 5:ZONE 2	3.3384	8.0940
DEP 6:ZONE 2	2.2073	5.2636
DEP 7:ZONE 2	2.1321	5.0068
DEP 8:ZONE 2	1.0163	2.3004
DEP 9:ZONE 2	0.8031	1.6946
DEP 10:ZONE 2	0.2682	0.5015
DEP 11:ZONE 2	0.5655	1.0118
DEP 12:ZONE 2	0	NA[2]
DEP 3:ZONE 3	1.1121	2.7489
DEP 4:ZONE 3	2.2299	5.4832
DEP 5:ZONE 3	2.0110	4.9312
DEP 6:ZONE 3	1.2935	3.1066
DEP 7:ZONE 3	1.2213	2.8970
DEP 8:ZONE 3	0.5839	1.3224
DEP 9:ZONE 3	0.1823	0.3870
DEP 10:ZONE 3	-0.1064	-0.1994
DEP 11:ZONE 3	0.0817	0.1483
DEP 12:ZONE 3	0	NA[2]

NOTE: 2. The model is overdetermined and this coefficient had multiple least square solutions. The coefficient does not contribute to the model.

APPENDIX D: COEFFICIENTS FOR FITTED MODEL

Term	Coefficient	T-value
DEP 4:ZONE 4	2.5705	6.6027
DEP 5:ZONE 4	2.2905	5.8678
DEP 6:ZONE 4	1.5381	3.8617
DEP 7:ZONE 4	1.4057	3.4893
DEP 8:ZONE 4	0.8468	2.0022
DEP 9:ZONE 4	0.5469	1.2074
DEP 10:ZONE 4	0.1949	0.3786
DEP 11:ZONE 4	0.1891	0.3574
DEP 12:ZONE 4	0	NA[2]

NOTE: 2. The model is overdetermined and this coefficient had multiple least square solutions. The coefficient does not contribute to the model.

APPENDIX E: FITTED VALUES AND COND PROBABILITIES

CASE: MARRIED, BLACK, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9502			
	2	0.9782	0.9607		
	3	0.9826	0.9903	0.9456	
D	4	0.9832	0.9964	0.9822	0.9246
E	5	0.9861	0.9948	0.9817	0.9183
P	6	0.9897	0.9883	0.9727	0.8782
	7	0.986	0.9853	0.9659	0.8434
	8	0.9923	0.9719	0.9593	0.8289
	9	0.9932	0.9694	0.9471	0.3029
	10	0.995	0.9612	0.9471	0.7881
	11	0.9946	0.9689	0.9528	0.7756
	12	0.9942	0.9516	0.9531	0.8102

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9502			
2	0.9398	0.9607		
3	0.9201	0.9364	0.9456	
4	0.8897	0.9049	0.9081	0.9246
5	0.8843	0.8968	0.9015	0.9183
6	0.8355	0.8442	0.8542	0.8782
7	0.793	0.8027	0.8146	0.8434
8	0.7669	0.7728	0.7952	0.8289
9	0.7321	0.7372	0.7604	0.8029
10	0.7139	0.7174	0.7464	0.7881
11	0.7121	0.716	0.739	0.7756
12	0.7306	0.7348	0.7722	0.8102

CASE: SINGLE, BLACK, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9229			
	2	0.9657	0.9389		
D	3	0.9726	0.9847	0.9161	
E	4	0.9736	0.9943	0.9719	0.885
P	5	0.9761	0.9918	0.9712	0.8759
	6	0.9838	0.9816	0.9573	0.8191
	7	0.9811	0.9768	0.9468	0.7718
	8	0.9879	0.958	0.9367	0.7526
	9	0.9893	0.9522	0.9183	0.7189
	10	0.9919	0.9395	0.918	0.7052
	11	0.9913	0.9513	0.9266	0.6897
	12	0.9924	0.9272	0.9304	0.6787

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9229			
2	0.9067	0.9389		
3	0.8774	0.9021	0.9161	
4	0.8327	0.8552	0.8601	0.885
5	0.8252	0.8437	0.8507	0.8759
6	0.7572	0.7697	0.7841	0.8191
7	0.7003	0.7138	0.7307	0.7718
8	0.6658	0.6739	0.705	0.7526
9	0.6219	0.6286	0.6602	0.7189
10	0.6033	0.6082	0.6474	0.7052
11	0.6027	0.608	0.6391	0.6897
12	0.581	0.5855	0.6315	0.6787

CASE: MARRIED, HISPANIC, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9658			
	2	0.9852	0.9731		
	3	0.9882	0.9934	0.9627	
D	4	0.9886	0.9973	0.9879	0.9478
E	5	0.9906	0.9965	0.9876	0.9434
P	6	0.993	0.9921	0.9814	0.9145
	7	0.992	0.99	0.9768	0.8863
	8	0.9948	0.9809	0.9723	0.8752
	9	0.9955	0.9792	0.9638	0.855
	10	0.9966	0.9735	0.9637	0.8465
	11	0.9933	0.9788	0.9677	0.8367
	12	0.998	0.9868	0.9679	0.8632

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9658			
2	0.9587	0.9731		
3	0.9451	0.9563	0.9627	
4	0.9234	0.9341	0.9363	0.9478
5	0.9197	0.9284	0.9317	0.9434
6	0.8842	0.8904	0.8975	0.9145
7	0.8502	0.8571	0.8657	0.8863
8	0.8304	0.8347	0.851	0.8752
9	0.8033	0.8069	0.824	0.855
10	0.7915	0.7942	0.8158	0.8465
11	0.7896	0.7925	0.8097	0.8367
12	0.8045	0.8078	0.8355	0.8632

CASE: SINGLE, HISPANIC, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9467			
	2	0.9766	0.9579		
	3	0.9813	0.9896	0.9418	
D	4	0.982	0.9961	0.9809	0.9194
E	5	0.9851	0.9944	0.9804	0.9127
P	6	0.989	0.9875	0.9708	0.8704
	7	0.9873	0.9843	0.9636	0.8304
	8	0.9919	0.97	0.9566	0.8149
	9	0.9928	0.9873	0.9436	0.7874
	10	0.9945	0.9584	0.9432	0.7801
	11	0.9942	0.9667	0.9495	0.7629
	12	0.9937	0.9482	0.9498	0.7991

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9467			
2	0.9355	0.9579		
3	0.9146	0.932	0.9418	
4	0.8822	0.8983	0.9018	0.9194
5	0.8765	0.8898	0.8948	0.9127
6	0.8252	0.8344	0.845	0.8704
7	0.7776	0.7876	0.8002	0.8304
8	0.75	0.7561	0.7795	0.8149
9	0.7135	0.7187	0.743	0.7874
10	0.7013	0.7052	0.7358	0.7801
11	0.6962	0.7003	0.7244	0.7629
12	0.7151	0.7197	0.759	0.7991

CASE: MARRIED, OTHER, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.953			
	2	0.9799	0.9632		
	3	0.9837	0.9909	0.9487	
D	4	0.9842	0.9967	0.9833	0.9288
E	5	0.987	0.9952	0.9828	0.9228
P	6	0.9904	0.9891	0.9744	0.8846
	7	0.9889	0.9862	0.968	0.8483
	8	0.9929	0.9736	0.9619	0.8309
	9	0.9939	0.9714	0.9505	0.8051
	10	0.9953	0.9635	0.9501	0.7982
	11	0.9951	0.9708	0.9557	0.7821
	12	0.9946	0.9544	0.9558	0.8194

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.953			
2	0.9438	0.9632		
3	0.9248	0.9401	0.9487	
4	0.8958	0.9102	0.9132	0.9288
5	0.8908	0.9025	0.9069	0.9228
6	0.8443	0.8525	0.862	0.8846
7	0.8009	0.8099	0.8212	0.8483
8	0.7727	0.7782	0.7992	0.8309
9	0.7388	0.7433	0.7652	0.8051
10	0.7273	0.7307	0.7584	0.7982
11	0.7221	0.7257	0.7475	0.7821
12	0.7434	0.7475	0.7832	0.8194

CASE: SINGLE, OTHER, BRIG I

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.929			
	2	0.9677	0.9423		
	3	0.9742	0.9856	0.9208	
D	4	0.9751	0.9947	0.9738	0.8912
E	5	0.9794	0.9923	0.9729	0.8824
P	6	0.9848	0.9827	0.9598	0.828
	7	0.9822	0.9782	0.9498	0.7824
	8	0.9886	0.9586	0.9403	0.7638
	9	0.9901	0.9551	0.9231	0.7264
	10	0.9926	0.9431	0.9228	0.7129
	11	0.992	0.9542	0.931	0.6977
	12	0.9914	0.9293	0.9314	0.7412

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.929			
2	0.9119	0.9423		
3	0.8841	0.9075	0.9208	
4	0.8416	0.863	0.8676	0.8912
5	0.8344	0.8519	0.8585	0.8824
6	0.7691	0.781	0.7947	0.828
7	0.714	0.727	0.7432	0.7824
8	0.6806	0.6884	0.7182	0.7638
9	0.6341	0.6405	0.6706	0.7264
10	0.6159	0.6205	0.6579	0.7129
11	0.6148	0.6198	0.6495	0.6977
12	0.636	0.6416	0.6904	0.7412

CASE: MARRIED, WHITE ,BRIG I

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9591				1	0.9591			
	2	0.9822	0.9678			2	0.9506	0.9678		
	3	0.9858	0.9921	0.9554		3	0.9344	0.9478	0.9554	
D	4	0.9863	0.9971	0.9855	0.9378	4	0.9089	0.9215	0.9242	0.9378
E	5	0.9887	0.9958	0.9851	0.9325	5	0.9045	0.9148	0.9186	0.9325
P	6	0.9917	0.9905	0.9778	0.8986	6	0.8631	0.8703	0.8787	0.8986
	7	0.9903	0.988	0.9721	0.8688	7	0.8263	0.8345	0.8446	0.8688
	8	0.9938	0.9771	0.9667	0.8562	8	0.8037	0.8087	0.8277	0.8582
	9	0.9945	0.975	0.9566	0.8335	9	0.7732	0.7774	0.7973	0.8335
	10	0.9959	0.9683	0.9566	0.8206	10	0.7569	C.76	0.7849	0.8206
	11	0.9956	0.9745	0.9612	0.8131	11	0.7583	0.7617	0.7816	0.8131
	12	0.9962	0.9615	0.9632	0.8052	12	0.7428	0.7457	0.7756	0.8052

CASE: SINGLE, WHITE, BRIG I

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9364				1	0.9364			
	2	0.972	0.9497			2	0.9231	0.9497		
	3	0.9776	0.9875	0.9307		3	0.8986	0.9191	0.9307	
D	4	0.9784	0.9954	0.9771	0.9045	4	0.8607	0.8797	0.8837	0.9045
E	5	0.9821	0.9933	0.9765	0.8967	5	0.8542	0.8698	0.8756	0.8967
P	6	0.9868	0.985	0.965	0.8477	6	0.7952	0.8058	0.8181	0.8477
	7	0.9846	0.9811	0.9563	0.8061	7	0.7447	0.7563	0.7709	0.8061
	8	0.9901	0.964	0.9479	0.789	8	0.7139	0.721	0.7479	0.789
	9	0.9913	0.9608	0.9326	0.7587	9	0.6739	0.6798	0.7075	0.7587
	10	0.9934	0.9503	0.9323	0.7463	10	0.6568	0.6611	0.6958	0.7463
	11	0.993	0.9601	0.9395	0.7321	11	0.6557	0.6603	0.6878	0.7321
	12	0.9939	0.94	0.9426	0.7219	12	0.6357	0.6397	0.6805	0.7219

CASE: MARRIED, BLACK, BRIG II

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9524				1	0.9524			
	2	0.9792	0.9625			2	0.9425	0.9625		
	3	0.9834	0.9908	0.9481		3	0.9238	0.9393	0.9481	
D	4	0.984	0.9966	0.983	0.9279	4	0.8945	0.909	0.9121	0.9279
E	5	0.9868	0.9951	0.9826	0.9201	5	0.8877	0.8996	0.904	0.9201
P	6	0.9903	0.9889	0.974	0.8832	6	0.8425	0.8507	0.8603	0.8832
	7	0.9888	0.9861	0.9676	0.8465	7	0.7986	0.8077	0.8191	0.8465
	8	0.9928	0.9733	0.9613	0.8322	8	0.7731	0.7786	0.8	0.8322
	9	0.9937	0.9709	0.9496	0.8066	9	0.739	0.7437	0.766	0.8066
	10	0.9952	0.963	0.9495	0.796	10	0.7243	0.7278	0.7558	0.796
	11	0.9948	0.9703	0.9548	0.7878	11	0.726	0.7298	0.7521	0.7878
	12	0.9945	0.9538	0.9552	0.8174	12	0.7406	0.7447	0.7808	0.8174

CASE: SINGLE, BLACK, BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP		ZONE 1	2	3	4
	1	0.9263			
	2	0.9673	0.9416		
	3	0.9739	0.9854	0.9198	
D	4	0.9748	0.9946	0.9732	0.8898
E	5	0.9791	0.9922	0.9726	0.881
P	6	0.98[illegible]	0.9824	0.9593	0.8261
	7	0.982	0.9779	0.9492	0.7801
	8	0.9885	0.958	0.9395	0.7613
	9	0.9898	0.9544	0.9218	0.7237
	10	0.9923	0.9422	0.9216	0.715
	11	0.9918	0.9535	0.9298	0.6948
	12	0.9928	0.9304	0.9334	0.6889

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9263			
2	0.9108	0.9416		
3	0.8827	0.9064	0.9198	
4	0.8397	0.8614	0.866	0.8898
5	0.8324	0.8501	0.8568	0.881
6	0.7065	0.7785	0.7924	0.8261
7	0.711	0.7241	0.7404	0.7801
8	0.6773	0.6852	0.7153	0.7613
9	0.6302	0.6367	0.6671	0.7237
10	0.6161	0.6208	0.6589	0.7[illegible]5
11	0.6109	0.616	0.646	0.6948
12	0.594	0.5982	0.643	0.6889

CASE: MARRIED, HISPANIC, BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP		ZONE 1	2	3	4
	1	0.9682			
	2	0.9862	0.9745		
	3	0.9888	0.9937	0.9641	
D	4	0.9892	0.9977	0.9885	0.949
E	5	0.9911	0.9967	0.988[illegible]	0.9459
P	6	0.9935	0.9925	0.9824	0.9163
	7	0.9924	0.9906	0.9779	0.891
	8	0.9952	0.9818	0.9736	0.8803
	9	0.9957	0.9802	0.9655	0.8608
	10	0.9968	0.9747	0.9654	0.8526
	11	0.9966	0.9798	0.9692	0.8431
	12	0.9963	0.96[illegible]4	0.9694	0.8687

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9682			
2	0.9611	0.9745		
3	0.9473	0.958	0.9641	
4	0.9258	0.936	0.9381	0.949
5	0.9233	0.9316	0.9347	0.9459
6	0.8877	0.8935	0.9002	0.9163
7	0.8566	0.8631	0.8714	0.891
8	0.8374	0.8415	0.857	0.8803
9	0.8112	0.8147	0.8311	0.8608
10	0.7997	0.8023	0.8231	0.8526
11	0.7979	0.8006	0.8171	0.8431
12	0.8124	0.8154	0.8421	0.8687

CASE: SINGLE, HISPANIC, BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP		ZONE 1	2	3	4
	1	0.9491			
	2	0.9777	0.959[illegible]		
	3	0.9822	0.9901	0.9444	
D	4	0.9829	0.9964	0.9818	0.9229
E	5	0.9858	0.9947	0.9813	0.9165
P	6	0.9897	0.9881	0.9723	0.873
	7	0.9878	0.985	0.9651	0.837
	8	0.9922	0.9713	0.9584	0.8255
	9	0.9932	0.9689	0.9461	0.7952
	10	0.9948	0.9603	0.9459	0.7[illegible]41
	11	0.9945	0.9682	0.9518	0.7714
	12	0.9941	0.9506	0.9521	0.8066

Prob of Accession Given Survived Zone (i-1)

	ZONE 1	2	3	4
1	0.9491			
2	0.9384	0.9598		
3	0.9185	0.9351	0.9444	
4	0.8874	0.9028	0.9061	0.9229
5	0.882	0.8946	0.8994	0.9165
6	0.8301	0.8387	0.8488	0.873
7	0.786	0.7957	0.8078	0.837
8	0.7624	0.7684	0.7911	0.8255
9	0.724	0.729	0.7524	0.7952
10	0.7086	0.7123	0.7417	0.7841
11	0.707	0.7109	0.7342	0.7714
12	0.7257	0.73	0.768	0.8066

APPENDIX E: FITTED VALUES AND COND PROBABILITIES

CASE: MARRIED. OTHER, .BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
	1	0.9551			
	2	0.9804	0.9648		
	3	0.9845	0.9913	0.9506	
D	4	0.9852	0.9968	0.9841	0.9303
E	5	0.9876	0.9954	0.9836	0.9261
P	6	0.991	0.9896	0.9756	0.887
	7	0.9894	0.9869	0.9695	0.8543
	8	0.9933	0.9748	0.9635	0.8406
	9	0.9942	0.9727	0.9527	0.8124
	10	0.9956	0.9652	0.9525	0.802
	11	0.9952	0.9721	0.9575	0.7939
	12	0.9939	0.9552	0.956	0.8631

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9551			
2	0.946	0.9648		
3	0.9276	0.9423	0.9506	
4	0.8991	0.9126	0.9155	0.9303
5	0.8954	0.9067	0.9109	0.9261
6	0.8487	0.8564	0.8654	0.887
7	0.8087	0.8173	0.8282	0.8543
8	0.7842	0.7895	0.8099	0.8406
9	0.7484	0.7528	0.774	0.8124
10	0.7341	0.7374	0.7639	0.802
11	0.7354	0.739	0.7602	0.7939
12	0.7833	0.7881	0.8251	0.8631

CASE: SINGLE. OTHER, .BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
	1	0.9304			
	2	0.9892	0.9448		
	3	0.9754	0.9863	0.9241	
D	4	0.9763	0.9949	0.9748	0.8957
E	5	0.9803	0.9927	0.9742	0.8848
P	6	0.9855	0.9835	0.9616	0.8347
	7	0.9833	0.9792	0.9522	0.7864
	8	0.9891	0.9604	0.9429	0.7723
	9	0.9906	0.9571	0.9264	0.7358
	10	0.9929	0.9456	0.9282	0.7226
	11	0.9924	0.9562	0.934	0.7076
	12	0.9918	0.9323	0.9344	0.7501

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9304			
2	0.9157	0.9448		
3	0.889	0.9115	0.9241	
4	0.8481	0.8687	0.8731	0.8957
5	0.8389	0.8557	0.862	0.8848
6	0.7779	0.7893	0.8026	0.8347
7	0.721	0.7333	0.7488	0.7864
8	0.6917	0.6993	0.7282	0.7723
9	0.6462	0.6524	0.6816	0.7358
10	0.6283	0.6328	0.6692	0.7226
11	0.6271	0.6319	0.6609	0.7076
12	0.6481	0.6535	0.7009	0.7501

CASE: MARRIED. WHITE. BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
	1	0.9609			
	2	0.983	0.9693		
	3	0.9865	0.9925	0.9573	
D	4	0.987	0.9972	0.9862	0.9405
E	5	0.9892	0.996	0.9858	0.9354
P	6	0.9921	0.991	0.9788	0.9029
	7	0.9907	0.9886	0.9734	0.8741
	8	0.9941	0.9781	0.9681	0.862
	9	0.9948	0.9762	0.9585	0.84
	10	0.9961	0.9696	0.9583	0.8308
	11	0.9959	0.9758	0.963	0.8167
	12	0.9955	0.9621	0.9633	0.846

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9609			
2	0.9528	0.9693		
3	0.9373	0.9502	0.9573	
4	0.9129	0.9249	0.9275	0.9405
5	0.9086	0.9185	0.9222	0.9354
6	0.8688	0.8757	0.8837	0.9029
7	0.8333	0.8411	0.8508	0.8741
8	0.8114	0.8162	0.8345	0.862
9	0.7818	0.788	0.8051	0.84
10	0.769	0.772	0.7962	0.8308
11	0.7643	0.7674	0.7865	0.8167
12	0.7805	0.784	0.8149	0.846

APPENDIX E: FITTED VALUES AND COND PROBABILITIES

CASE: SINGLE, WHITE, BRIG II

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9392			
2	0.9732	0.9519		
3	0.9786	0.9881	0.9337	
4	0.9794	0.9956	0.9781	0.9085
5	0.983	0.9937	0.9776	0.901
6	0.9874	0.9857	0.9886	0.8538
7	0.9853	0.982	0.9583	0.8134
8	0.9906	0.9656	0.9502	0.7968
9	0.9917	0.9626	0.9355	0.7673
10	0.9937	0.9525	0.9352	0.7551
11	0.9934	0.9619	0.9424	0.7367
12	0.9942	0.9426	0.9452	0.7313

Prob of Accession Z4 Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9392			
2	0.9265	0.9519		
3	0.9029	0.9226	0.9337	
4	0.8665	0.8847	0.8886	0.9085
5	0.8603	0.8752	0.8808	0.901
6	0.8032	0.8134	0.8252	0.8538
7	0.7541	0.7654	0.7795	0.8134
8	0.7242	0.7311	0.7571	0.7968
9	0.6852	0.6909	0.7178	0.7673
10	0.6685	0.6727	0.7062	0.7551
11	0.6634	0.6678	0.6942	0.7367
12	0.6477	0.6515	0.6912	0.7313

CASE: MARRIED, BLACK, BRIG III

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9536			
2	0.9798	0.9834		
3	0.9839	0.991	0.9493	
4	0.9844	0.9967	0.9835	0.9296
5	0.9871	0.9952	0.983	0.9237
6	0.9905	0.9892	0.9747	0.8859
7	0.9891	0.9864	0.9884	0.8499
8	0.9929	0.9739	0.9821	0.8359
9	0.9939	0.9717	0.9509	0.8107
10	0.9954	0.9839	0.9507	0.8002
11	0.995	0.9711	0.9561	0.7882
12	0.9956	0.9582	0.9582	0.8213

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9536			
2	0.9439	0.9834		
3	0.9256	0.9408	0.9493	
4	0.897	0.9112	0.9142	0.9296
5	0.892	0.9037	0.908	0.9237
6	0.8461	0.8542	0.8635	0.8859
7	0.803	0.8119	0.8231	0.8499
8	0.7777	0.7832	0.8042	0.8359
9	0.7444	0.749	0.7709	0.8107
10	0.7299	0.7333	0.7608	0.8002
11	0.7282	0.7318	0.7536	0.7882
12	0.7492	0.7525	0.7869	0.8213

CASE: SINGLE, BLACK, BRIG III

Conditional Prob (fitted) of Surviving Past Zone (i)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9281			
2	0.9681	0.943		
3	0.9745	0.9858	0.9217	
4	0.9754	0.9948	0.9739	0.8924
5	0.9797	0.9924	0.9732	0.8837
6	0.985	0.9829	0.9803	0.8298
7	0.9824	0.9785	0.9504	0.7846
8	0.9888	0.9591	0.941	0.7661
9	0.9902	0.9556	0.924	0.7289
10	0.9926	0.9437	0.9237	0.7155
11	0.992	0.9546	0.9315	0.7053
12	0.9915	0.9301	0.9322	0.7436

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	ZONE 2	ZONE 3	ZONE 4
1	0.9281			
2	0.913	0.943		
3	0.8855	0.9086	0.9217	
4	0.8433	0.8646	0.8691	0.8924
5	0.8362	0.8536	0.8601	0.8837
6	0.7715	0.7832	0.7969	0.8298
7	0.7168	0.7296	0.7457	0.7846
8	0.6836	0.6914	0.7209	0.7661
9	0.6374	0.6437	0.6735	0.7289
10	0.6192	0.6238	0.661	0.7155
11	0.6222	0.6272	0.657	0.7053
12	0.6393	0.6448	0.6932	0.7436

APPENDIX E: FITTED VALUES AND COND PROBABILITIES

CASE: MARRIED, HISPANIC,BRIG III

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9682				1	0.9682			
	2	0.9863	0.975			2	0.9616	0.975		
	3	0.9891	0.9939	0.9653		3	0.9489	0.9594	0.9653	
D	4	0.9895	0.9978	0.9888	0.9514	4	0.9288	0.9387	0.9407	0.9514
E	5	0.9913	0.9968	0.9885	0.9472	5	0.9252	0.9333	0.9363	0.9472
P	6	0.9937	0.9927	0.9629	0.9183	6	0.8903	0.896	0.9026	0.9183
	7	0.9926	0.9908	0.9785	0.8936	7	0.8599	0.8663	0.8743	0.8936
	8	0.9953	0.9823	0.9742	0.8831	8	0.8411	0.8451	0.8603	0.8831
	9	0.9958	0.9807	0.9663	0.8639	9	0.8154	0.8188	0.8349	0.8639
	10	0.9969	0.9754	0.9662	0.8559	10	0.8041	0.8086	0.827	0.8559
	11	0.9967	0.9803	0.9699	0.8466	11	0.8023	0.805	0.8211	0.8466
	12	0.9957	0.9683	0.9689	0.9003	12	0.841	0.8446	0.8723	0.9003

CASE: SINGLE, HISPANIC,BRIG III

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9503				1	0.9503			
	2	0.9783	0.9608			2	0.94	0.9608		
	3	0.9827	0.9904	0.9458		3	0.9205	0.9367	0.9458	
D	4	0.9833	0.9965	0.9823	0.9248	4	0.8901	0.9052	0.9084	0.9248
E	5	0.9862	0.9949	0.9818	0.9185	5	0.8848	0.8972	0.9018	0.9185
P	6	0.9898	0.9884	0.9729	0.8759	6	0.8337	0.8423	0.8522	0.8759
	7	0.9881	0.9854	0.966	0.8437	7	0.7936	0.8032	0.8151	0.8437
	8	0.9924	0.972	0.9594	0.8293	8	0.7674	0.7733	0.7956	0.8293
	9	0.9934	0.9696	0.9474	0.7995	9	0.7296	0.7345	0.7575	0.7995
	10	0.9949	0.9613	0.9471	0.7925	10	0.7178	0.7215	0.7506	0.7925
	11	0.9946	0.969	0.9528	0.7802	11	0.7163	0.7202	0.7433	0.7802
	12	0.9942	0.9518	0.9533	0.8107	12	0.7313	0.7355	0.7728	0.8107

CASE: MARRIED, OTHER, ,BRIG III

		Conditional Prob (fitted) of Surviving Past Zone (i)					Prob of Accession Given Survived Zone (i-1)			
		ZONE					ZONE			
		1	2	3	4		1	2	3	4
	1	0.9573				1	0.9573			
	2	0.9809	0.9655			2	0.9471	0.9655		
	3	0.9849	0.9915	0.9518		3	0.9294	0.9437	0.9518	
D	4	0.9856	0.9969	0.9845	0.932	4	0.9015	0.9147	0.9176	0.932
E	5	0.9879	0.9955	0.984	0.9279	5	0.8979	0.909	0.9131	0.9279
P	6	0.9912	0.9899	0.9762	0.8896	6	0.8521	0.8597	0.8685	0.8896
	7	0.9897	0.9872	0.9702	0.8575	7	0.8129	0.8214	0.832	0.8575
	8	0.9933	0.9754	0.9643	0.8472	8	0.7915	0.7968	0.8169	0.8472
	9	0.9942	0.9733	0.9537	0.8199	9	0.7566	0.761	0.7819	0.8199
	10	0.9957	0.9661	0.9537	0.8062	10	0.7396	0.7428	0.7688	0.8062
	11	0.9953	0.9728	0.9586	0.7982	11	0.7408	0.7443	0.7651	0.7982
	12	0.994	0.9563	0.9571	0.8662	12	0.788	0.7928	0.829	0.8662

CASE: SINGLE, OTHER, .BRIG III

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.932			
	2	0.97	0.9462		
	3	0.976	0.9886	0.926	
D	4	0.9769	0.9951	0.9754	0.8981
E	5	0.9808	0.9929	0.9748	0.8899
P	6	0.9859	0.9839	0.9625	0.8383
	7	0.9835	0.9787	0.9532	0.7947
	8	0.9894	0.9614	0.9443	0.7769
	9	0.9908	0.9582	0.9282	0.7408
	10	0.9931	0.9469	0.9279	0.7278
	11	0.9926	0.9573	0.9356	0.713
	12	0.992	0.934	0.936	0.7549

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.932			
2	0.9178	0.9462		
3	0.8917	0.9136	0.926	
4	0.8516	0.8717	0.876	0.8981
5	0.8447	0.8612	0.8674	0.8899
6	0.7827	0.7939	0.8069	0.8383
7	0.7299	0.7422	0.7575	0.7947
8	0.6978	0.7053	0.7336	0.7769
9	0.6528	0.6589	0.6876	0.7408
10	0.6351	0.6395	0.6754	0.7278
11	0.6339	0.6386	0.6671	0.713
12	0.6547	0.66	0.7086	0.7549

CASE: MARRIED, WHITE, BRIG III

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9619			
	2	0.9835	0.9701		
	3	0.9868	0.9927	0.9584	
D	4	0.9873	0.9973	0.9865	0.942
E	5	0.9895	0.9961	0.9882	0.937
P	6	0.9923	0.9912	0.9793	0.9052
	7	0.9909	0.9889	0.974	0.877
	8	0.9942	0.9787	0.989	0.8851
	9	0.9949	0.9788	0.9585	0.8435
	10	0.9962	0.9704	0.9595	0.8312
	11	0.996	0.9784	0.964	0.8206
	12	0.9956	0.963	0.9642	0.8493

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9619			
2	0.954	0.9701		
3	0.9389	0.9514	0.9584	
4	0.915	0.9268	0.9293	0.942
5	0.9108	0.9204	0.924	0.937
6	0.8718	0.8786	0.8864	0.9052
7	0.8371	0.8447	0.8542	0.877
8	0.8156	0.8203	0.8382	0.8651
9	0.7866	0.7906	0.8094	0.8435
10	0.771	0.7739	0.7976	0.8312
11	0.7692	0.7723	0.791	0.8206
12	0.7852	0.7887	0.8189	0.8493

CASE: SINGLE, WHITE, BRIG III

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9407			
	2	0.9739	0.9531		
	3	0.9792	0.9884	0.9353	
D	4	0.9799	0.9957	0.9787	0.9107
E	5	0.9834	0.9938	0.9781	0.9033
P	6	0.9877	0.986	0.9674	0.857
	7	0.9857	0.9824	0.9593	0.8174
	8	0.9908	0.9664	0.9514	0.801
	9	0.9919	0.9635	0.937	0.772
	10	0.9939	0.9536	0.9368	0.76
	11	0.9935	0.9628	0.9436	0.7463
	12	0.9943	0.944	0.9442	0.7805

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9407			
2	0.9283	0.9531		
3	0.9053	0.9245	0.9353	
4	0.8896	0.8874	0.8912	0.9107
5	0.8635	0.8781	0.8835	0.9033
6	0.8075	0.8175	0.8291	0.857
7	0.7583	0.7703	0.7841	0.8174
8	0.7298	0.7366	0.7621	0.801
9	0.6913	0.697	0.7234	0.772
10	0.6748	0.679	0.712	0.76
11	0.6736	0.678	0.7042	0.7463
12	0.6917	0.6957	0.7369	0.7805

CASE: MARRIED, BLACK, BRIG VI

DEP	Conditional Prob (fitted) of Surviving Past Zone (i) — ZONE 1	2	3	4	Prob of Accession Given Survived Zone (i-1) — ZONE 1	2	3	4
1	0.9498				0.9498			
2	0.976	0.9604			0.9393	0.9604		
3	0.9825	0.9902	0.9447		0.9191	0.9355	0.9447	
4	0.9831	0.9964	0.9821	0.924	0.8889	0.9041	0.9074	0.924
5	0.9863	0.9948	0.9817	0.9158	0.8821	0.8943	0.899	0.9158
6	0.9897	0.9883	0.9725	0.8772	0.8345	0.8432	0.8532	0.8772
7	0.9881	0.9853	0.9858	0.839	0.7889	0.7983	0.8103	0.839
8	0.9923	0.9717	0.959	0.8276	0.7652	0.7712	0.7938	0.8276
9	0.9933	0.9893	0.9469	0.7976	0.7272	0.732	0.7552	0.7976
10	0.995	0.9609	0.9467	0.7886	0.712	0.7156	0.7447	0.7886
11	0.9946	0.9887	0.9524	0.774	0.7103	0.7141	0.7372	0.774
12	0.9831	0.9496	0.9508	0.8486	0.761	0.7863	0.8068	0.8486

CASE: SINGLE, BLACK, BRIG VI

DEP	Conditional Prob (fitted) of Surviving Past Zone (i) — ZONE 1	2	3	4	Prob of Accession Given Survived Zone (i-1) — ZONE 1	2	3	4
1	0.9223				0.9223			
2	0.9855	0.9384			0.906	0.9384		
3	0.9724	0.9846	0.9155		0.8765	0.9014	0.9155	
4	0.9784	0.9943	0.9717	0.8841	0.8315	0.8543	0.8591	0.8841
5	0.9779	0.9918	0.971	0.8749	0.8239	0.8425	0.8495	0.8749
6	0.9837	0.9814	0.957	0.8178	0.7555	0.7681	0.7826	0.8178
7	0.9812	0.9767	0.9488	0.7659	0.6949	0.7081	0.725	0.7659
8	0.988	0.9558	0.9364	0.7464	0.66	0.668	0.699	0.7464
9	0.9882	0.9518	0.9177	0.7171	0.6196	0.6263	0.658	0.7171
10	0.992	0.9392	0.9177	0.6983	0.597	0.6019	0.6408	0.6983
11	0.9915	0.951	0.9263	0.6826	0.5962	0.6014	0.6323	0.6826
12	0.9924	0.9286	0.9298	0.6766	0.5785	0.5829	0.6291	0.6766

CASE: MARRIED, HISPANIC, BRIG VI

DEP	Conditional Prob (fitted) of Surviving Past Zone (i) — ZONE 1	2	3	4	Prob of Accession Given Survived Zone (i-1) — ZONE 1	2	3	4
1	0.9856				0.9856			
2	0.9851	0.9729			0.9584	0.9729		
3	0.9881	0.9934	0.9624		0.9447	0.956	0.9624	
4	0.9885	0.9976	0.9878	0.9474	0.9229	0.9338	0.9359	0.9474
5	0.9905	0.9965	0.9875	0.9429	0.9191	0.9279	0.9311	0.9429
6	0.993	0.9921	0.9813	0.9138	0.8834	0.8896	0.8967	0.9138
7	0.992	0.99	0.9767	0.8854	0.8492	0.8561	0.8647	0.8854
8	0.9949	0.9808	0.9721	0.8742	0.8292	0.8335	0.8498	0.8742
9	0.9954	0.979	0.9634	0.8568	0.8044	0.8062	0.8255	0.8568
10	0.9966	0.9733	0.9634	0.8453	0.79	0.7927	0.8144	0.8453
11	0.9964	0.9787	0.9674	0.8355	0.7881	0.791	0.8083	0.8355
12	0.9953	0.9856	0.9662	0.8926	0.6289	0.8328	0.8625	0.8926

CASE: SINGLE, HISPANIC, BRIG VI

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9463			
	2	0.9764	0.9576		
	3	0.9812	0.9896	0.9414	
D	4	0.9819	0.9962	0.9808	0.9188
E	5	0.985	0.9944	0.9803	0.9121
P	6	0.9889	0.9874	0.9706	0.8694
	7	0.9873	0.9842	0.9633	0.8291
	8	0.9919	0.9897	0.9562	0.8136
	9	0.9927	0.967	0.9429	0.7898
	10	0.9946	0.9581	0.943	0.7744
	11	0.9942	0.9664	0.9491	0.7613
	12	0.9937	0.3478	0.9494	0.7977

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9463			
2	0.935	0.9576		
3	0.914	0.9315	0.9414	
4	0.8814	0.8977	0.9011	0.9188
5	0.8757	0.8891	0.894	0.9121
6	0.8239	0.8331	0.8438	0.8694
7	0.7761	0.7861	0.7987	0.8291
8	0.7483	0.7544	0.778	0.8136
9	0.7149	0.7202	0.7448	0.7898
10	0.6959	0.6997	0.7302	0.7744
11	0.6942	0.6983	0.7225	0.7613
12	0.7133	0.7178	0.7574	0.7977

CASE: MARRIED, OTHER, .BRIG VI

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9526			
	2	0.9793	0.9627		
	3	0.9835	0.9908	0.9463	
D	4	0.9841	0.9966	0.9831	0.9282
E	5	0.9868	0.9951	0.9827	0.9221
P	6	0.9903	0.989	0.9741	0.8837
	7	0.9888	0.9861	0.9677	0.8471
	8	0.9928	0.9733	0.9613	0.8361
	9	0.9936	0.971	0.9497	0.811
	10	0.9953	0.9632	0.9497	0.7967
	11	0.9949	0.9705	0.9551	0.7845
	12	0.9945	0.954	0.9554	0.818

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9526			
2	0.9427	0.9627		
3	0.9241	0.9396	0.9463	
4	0.8949	0.9094	0.9125	0.9282
5	0.8898	0.9017	0.9061	0.9221
6	0.8431	0.8513	0.8608	0.8837
7	0.7993	0.8084	0.8198	0.8471
8	0.7767	0.7823	0.8038	0.8361
9	0.743	0.7478	0.7702	0.811
10	0.7253	0.7287	0.7588	0.7967
11	0.7235	0.7272	0.7493	0.7845
12	0.7415	0.7456	0.7816	0.818

CASE: SINGLE, OTHER, .BRIG VI

Conditional Prob (fitted) of Surviving Past Zone (i)

	DEP	ZONE 1	2	3	4
	1	0.9266			
	2	0.9675	0.9418		
	3	0.974	0.9855	0.9201	
D	4	0.9749	0.9947	0.9734	0.8903
E	5	0.9796	0.9923	0.9728	0.8789
P	6	0.9847	0.9825	0.9594	0.8267
	7	0.982	0.978	0.9494	0.7808
	8	0.9885	0.9582	0.9397	0.7578
	9	0.99	0.9547	0.9224	0.7246
	10	0.9925	0.9426	0.9222	0.711
	11	0.9918	0.9537	0.9301	0.7007
	12	0.9913	0.9287	0.9308	0.7394

Prob of Accession Given Survived Zone (i-1)

DEP	ZONE 1	2	3	4
1	0.9266			
2	0.9112	0.9418		
3	0.8831	0.9067	0.9201	
4	0.8403	0.8619	0.8665	0.8903
5	0.831	0.8484	0.855	0.8789
6	0.7673	0.7793	0.7932	0.8267
7	0.712	0.725	0.7413	0.7808
8	0.6745	0.6824	0.7121	0.7578
9	0.6317	0.6381	0.6684	0.7246
10	0.6134	0.618	0.6557	0.711
11	0.6165	0.6216	0.6517	0.7007
12	0.6336	0.6392	0.6883	0.7394

APPENDIX E: FITTED VALUES AND COND PROBABILITIES

CASE: MARRIED, WHITE, BRIG VI

Conditional Prob (fitted) of Surviving Past Zone (i)

		ZONE			
		1	2	3	4
	1	0.9588			
	2	0.9821	0.9675		
	3	0.9857	0.9921	0.955	
D	4	0.9862	0.9971	0.9854	0.9373
E	5	0.9886	0.9958	0.985	0.9319
P	6	0.9916	0.9904	0.9776	0.8978
	7	0.9902	0.9879	0.9719	0.8677
	8	0.9937	0.9768	0.9664	0.8551
	9	0.9946	0.9749	0.9563	0.8289
	10	0.9959	0.968	0.9562	0.8192
	11	0.9956	0.9744	0.961	0.8081
	12	0.9961	0.9611	0.9629	0.8037

Prob of Accession Given Survived Zone (i-1)

	ZONE			
	1	2	3	4
1	0.9588			
2	0.9502	0.9675		
3	0.9338	0.9474	0.955	
4	0.9082	0.9208	0.9235	0.9373
5	0.9036	0.914	0.9179	0.9319
6	0.862	0.8692	0.8776	0.8978
7	0.825	0.8331	0.8433	0.8677
8	0.8021	0.8072	0.8263	0.8551
9	0.7686	0.7728	0.7927	0.8289
10	0.7551	0.7582	0.7833	0.8192
11	0.7533	0.7566	0.7765	0.8081
12	0.7409	0.7438	0.7739	0.8037

CASE: SINGLE, WHITE, BRIG VI

Conditional Prob (fitted) of Surviving Past Zone (i)

		ZONE			
		1	2	3	4
	1	0.9359			
	2	0.9717	0.9493		
	3	0.9774	0.9874	0.9301	
D	4	0.9762	0.9954	0.9769	0.9037
E	5	0.982	0.9933	0.9763	0.8958
P	6	0.9867	0.9849	0.9647	0.8465
	7	0.9844	0.9809	0.9559	0.8047
	8	0.99	0.9636	0.9475	0.7875
	9	0.9912	0.9605	0.932	0.757
	10	0.9934	0.9498	0.9317	0.7445
	11	0.993	0.9598	0.9392	0.7255
	12	0.9938	0.9395	0.9421	0.72

Prob of Accession Given Survived Zone (i-1)

	ZONE			
	1	2	3	4
1	0.9359			
2	0.9224	0.9493		
3	0.8977	0.9184	0.9301	
4	0.8595	0.8787	0.8828	0.9037
5	0.853	0.8687	0.8745	0.8958
6	0.7936	0.8043	0.8167	0.8465
7	0.7428	0.7545	0.7692	0.8047
8	0.7118	0.719	0.7461	0.7875
9	0.6717	0.6776	0.7055	0.757
10	0.6545	0.6589	0.6937	0.7445
11	0.6495	0.6541	0.6814	0.7255
12	0.6334	0.6373	0.6783	0.72

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