FINAL REPORT
ONR Contract N00014-86-C-0398

MEASURING THE IMPACT OF NATIONAL ADVERTISING ON RECRUITING BY DATA ENVELOPMENT ANALYSIS METHODS

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(4)

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1.0 Introduction

Military human resource planners recognize the significance of the rapidly declining youth manpower pool through 1992. This declining segment of the population and the increased scrutiny of large recruiting resource budgets by Congress and others has prompted the services to search for methods to aid decision makers in planning and allocating resources in the best possible manner. The Center for Cybernetic Studies at The University of Texas at Austin has responded to this need with new and improved methods for use by the services in manpower planning. Data Envelopment Analysis (DEA) represents one such method which has been developed by the Center for Cybernetic Studies and greatly enhanced through research conducted jointly with the U.S. Army Recruiting Command (USAREC) since 1980. DEA represents an important development in its own right, and it can also be combined with other tools such as "goal programming" (as also developed by Center staff) for still further uses in manpower planning.

2.0 Data Envelopment Analysis

DEA is a relatively new approach developed by A. Charnes, W. W. Cooper and others associated with the Center for Cybernetic Studies, which can be used to evaluate the efficiency of not-for-profit entities engaged in operations which characteristically use multiple inputs to produce multiple outputs. Although these activities do not occur in markets where they can be "priced" or otherwise weighted, DEA does not require recourse to preassigned weights or the specification of functional relations between outputs and inputs. It requires only identification of those outputs and inputs which are important to the operations of the organization. It also requires identifying the organization entities which are to be regarded as being responsible for converting inputs into

outputs. For purposes of the present discussion, these terms may be defined and illustrated as follows:

Outputs: The desired outcomes of goods or services that an organization produces. Examples for USAREC are GSMA contracts and GSMA applicants as well as less tangible items such as changes in "propensities" to enlist.

Inputs: Resources utilized to produce the desired outputs. For USAREC these would be recruiters, local advertising funds, market size, unemployment and other pertinent demographic and economic characteristics.

Decision Making Unit (DMU): An organizational unit (in this case, a U.S. Army Recruiting battalion or brigade) which is charged with responsibility for converting inputs into outputs.

Further breakdowns and refinements are possible. For instance, inputs may also be classified as "discretionary" if they can be varied by management, (as in the case of recruiters and advertising expenditures) or inputs may be "non-discretionary" if they cannot be varied by management, (as is the case for unemployment rates). Note that the latter constitute important inputs which should enter into the evaluations of how well a DMU is performing in the outputs it produces. See [1]. As in all past research, the choice of DMUs, inputs and outputs, is best developed in a collaborative "team effort" by USAREC and staff from the Center for Cybernetic Studies.

The following figure can help to conceptualize what is involved:

Figure 2.1

To be noted is that the DMU operates as a "black box" in which inputs are converted into outputs, and explicit formulation of the connecting mathematical relations between inputs and outputs is not required. Actual managerial data for inputs and ouputs is utilized to obtain an efficiency evaluation for each DMU or battalion..

A simple graphical representation of what is involved in such an efficiency evaluation is provided by Figure 2.2.

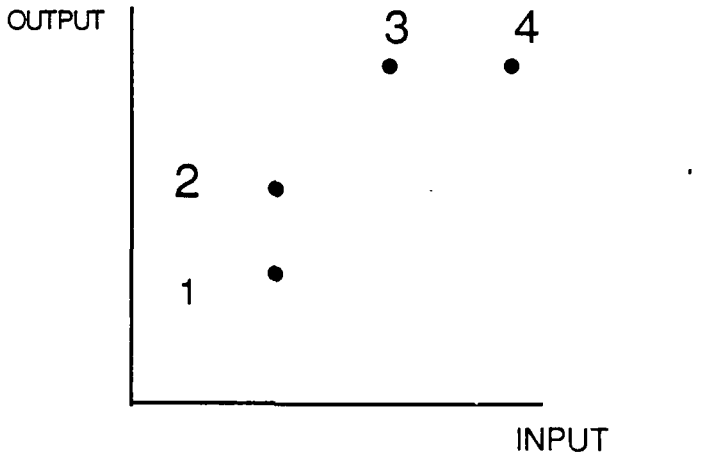

Figure 2.2

Only one output and one input are used in this simple example. As can be seen, DMU 2 is relatively more efficient than DMU I, because it has produced more output with the same amount of input as was utilized by DMU I. Similarly, DMU 3 is relatively more efficient than DMU 4 because it secured the same level of output with less input. Extensions to multiple output-multiple input situations are desired for such efficiency evaluations, of course, and this, too, is attended to by DEA in ways that extend beyond the pairwise comparisons used in Figure 2.2.

Efficiency as a science or engineering concept is usually defined in terms of an output to input ratio in which the output and the input are measured in the same units with, in general, output/input $\leq$ I. This is not immediately suitable for use when multiple outputs and multiple inputs need to be considered in possibly different units of measurement. Hence, DEA extends this ratio concept by defining a "virtual output" to "virtual input" ratio in which the outputs and the inputs are combined first into single virtual outputs and inputs. These virtual outputs and virtual inputs are evaluated in a way that maximizes the efficiency score of each DMU under consideration (e.g., a battalion) by reference to the evidence on the input to output attainments reported for all other DMUs (battalions). Efficiency then is defined for this application as below:

$$\frac{\textbf{COMBINED RCTNG OUTPUTS}}{\textbf{COMBINED RCTNG INPUTS}} = \textbf{EFFICIENCY}$$

As was true for the single output-to-single input case, the maximum attainable efficiency rating is unity (or I00%) and the theory underlying DEA guarantees that the resulting efficiency ratings for each DMU do not depend on the units of measurement employed.

The theory behind this development as well as its methods of implementation are documented in full detail in [1] and [2] and hence, need not be repeated here. Instead we shall focus on some of the further developments that have now occurred in response to the service needs in the collaborative efforts that have already been undertaken by CCS and USAREC.

3.0 Past Research - the Ad Mix Experiment

In one part of its efforts, the Center for Cybernetic Studies undertook a detailed review of the Ad Mix Experiment conducted for DOD by the Wharton Center for Applied Research (WCAR) [3]. The results of this analysis, as undertaken by A. Charnes, W. W. Cooper, B. Golany and P. L. Brockett as reported in [4] showed that (a) the statistical experimental design approach used in the WCAR study was not a suitable approach for addressing the questions of how best to budget for advertising in terms of service specific and joint advertising and (b) the models used and the statistical analyses employed by WCAR were seriously deficient.

Another part of the Center's research effort resulted in a further extension of DEA which would more accurately reflect what is involved in portraying and evaluating advertising effort. This extension involved a new type of DEA model to portray two stages of activity in which outputs at one stage become inputs to a succeeding stage.

Figure 3.1 pictorially portrays what is involved in this two stage approach in a very simple way. In Phase I, on the left of this Figure, inputs such as advertising dollars and recruiting efforts produce outputs such as "propensities" and "ASVAB Exams." These outputs are then treated as inputs to a succeeding stage where, combined with other inputs (such as recruiting and follow-up

efforts) they result in the contracts and other outputs that are realized as shown in Phase II of Figure 3.1.

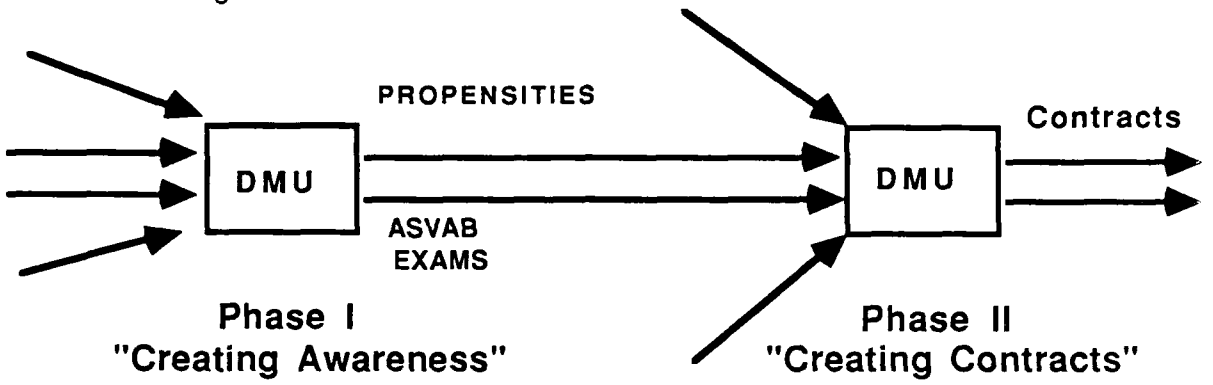

Figure 3.1 Two-Phased DEA

This two-phase approach differs from the over-simplified one-phase only approach used by WCAR in which direct casuality was assumed between advertising expenditures and the production of recruits without any intervening stages or processes and without important "marketing variables such as unemployment , other service competition potential market volume, etc. Furthermore, using DEA, a "production function" was developed utilizing FY 84 recruiting data for each of the Ad Mix test cells by aggregating the battalion level DEA results. In this analysis GSMA contracts per $1000 advertising was utilized as a measure of effectiveness. A simple interpretation of the results is in Figure 3.2:

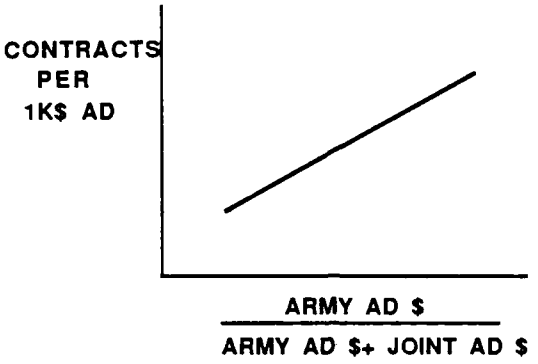

Figure 3.2 Development of a Production Function

The analysis showed that Army high quality contracts increased as the Army share of the total advertising budget increased.[5] Similar analyses for the Marines and Navy revealed the same result: Service ads are "better" than joint ads in "producing" high quality contracts. [6, 7] These results conflicted with the findings of the Department of Defense contractor (WCAR) that actually performed the Ad Mix experiment.

There are other important differences that should also be noted between the WCAR study and the DEA approach used by the Center for Cybernetic Studies. For example, the WCAR study used data collected by ADIs (Areas of Dominant Influence) whereas the DEA study used data collected directly from the battalions where recruitment activity occurs. Using the latter approach, it was possible to identify recruitment activities and possible aberrations (e.g., inefficient activity) with specifically identifiable individual battalions. This was not possible under the WCAR approach which could, at best, only artificially impute "average behavior" back to individual battalions. Trouble was also present in the WCAR data in attempts to identify battalion activities with the ADIs with which they were supposedly associated.

Further differences with the WCAR approach can be made clear by turning to Exhibit 3.I which shows a sample printout from a particular battalion that is readily obtainable from the DEA study. Here, only the Phase I inputs and outputs are included but a similar report can be provided for Phase II or, if desired, Phases I and II can be combined into a single report. To be noted is that multiple outputs as well as multiple inputs are included at each stage. This is in contrast with the WCAR study whose regressions had only one output at a time as the result of the inputs used.

SUMMARY TABLE

DEA RUN TITLE: ARMY Q385 PHASE II 54 BNS, LAGGED ADVERTISING, SINGLE OUTPUT
DEA MODEL: EXTENDED ADDITIVE

DECISION MAKING UNIT:	45	5M		
EFFICIENCY:	0.883			
REFERENCE UNITS:	12	54	38	49

	ACTUAL	POTENTIAL VALUE IF EFFICIENT	POTENTIAL IMPROVEMENT	POTENTIAL RATES OF CHANGE
OUTPUTS				
CONTRACTS	243 00	342 96	99 96	1.0000000000
INPUTS				
ARNAT.AD	148226 70	114975.16	33251.54	-0.0010000000
JT NAT.AD	35291 31	9694.68	25596.63	-0.0010000000
OS.NAT.AD	2 77	2 77	0.00	-143 7318815841
HSSRPOP	59147 00	56189 65	2957 35	0.0045420733
UNEMP85	9 32	8 21	1 11	-1 0000000000
PRODRCTR	107 00	107 00	0.00	-4 9134097931

Exhibit 3.1 Sample DEA Output

Starting at the top of the sample output under "Summary Table", the output provides a title for remarks to assist in identification. Next "DEA Model" specifies the theoretical version of the DEA model in use. Currently there are three versions of the DEA formulation, each possessing different characteristics. Choice of the model, as stated previously, does not change the earlier assertion that a priori formulations are not necessary. This choice relates to the methods

used to calculate the efficiency measures (i.e. the ratio of the recruiting outputs to the recruiting inputs). In this sample output the "Extended Additive" model was utilized. This model allows for extensions to distinguish between discretionary and non-discretionary inputs alluded to earlier.

Next the Decision Making Unit under investigation is specified. In this case, battalion number 45, coded "5M" is shown. This code refers to the Peoria, Illinois Recruiting Battalion.

The "efficiency score" is specified next on line four at the head of the above table. Remember that this score provides an estimate of the efficiency utilization of inputs in "producing" outputs. "Reference Unit," on line five, refers to the collection of DMUs that were utilized by the model in determining the efficiency score. As the DEA model uses a standard linear programming code to solve the optimization problem that results from the DEA formulation, these reference units correspond to the "basis" for this solution. These efficient DMUs are "most like" the DMU under investigation in their use of resources. Hence this portion of the output provides insights for comparisons or places to look for ways to gain improvements in efficiency for the DMU under investigation.

The remainder of the output shows the actual inputs and outputs used in the DEA analysis. "Actual" refers to the actual data values that were entered in the data base. This repeatback feature allows for a rapid check of the data for each DMU. "Potential Values If Efficient" shows the level of output (input) that would be produced (consumed) if the unit was operating efficiently. "Potential Improvement" is the difference between "Actual" and "Potential" . Here a wealth of useful information is provided for possible improvements in performance. For example, as shown on the line for contracts, approximately 100 more contracts could have been gained with $33,251 less national advertising, as shown on the line for ARNAT.AD. The specific amounts are not as important as the

indication of general managerial issues to investigate to improve efficiency.

In addition to these possible improvements, the column headed "Potential Rates of Change" are the rates of change a DMU would experience even after efficiency is achieved with incremental changes in that input or output. This rate of change will be discussed in more detail later.

This kind of printout is provided simultaneously for all the DMU specified in the analysis. A simple input program reads all necessary data at the beginning of the analysis. The managerial implications of the battalion level resolution are demonstrated: decision support is provided from the DEA as to where to focus resource allocation to effect changes in desired outputs.

Still other extensions and uses of DEA are available which can be explained from the report in Exhibit 3.1. As shown in this report, it is also possible to estimate possible improvements that might occur in the outputs produced and the inputs utilized by this battalion if the inefficiencies were eliminated. Note that these inefficiencies are identified and estimated for each input and each output. No such identifications could be effected by WCAR from which average estimates only could be formed with whatever inefficiencies or confounding observations might be present in the data. It should also be noted that the DEA kind of battalion information can be aggregated up to ADIs or other "higher echelon" units (e g., brigades) as desired. Moreover, such aggregations from these DEA results can be effected with efficiency adjustments, if desired, from the battalions with which they are identified. This can be done with reference to different phases or the two phases can be combined without losing the ability to track possible inefficiencies back to their sources in the individual battalions.

4.0 Continued Research :

DEA - A Decision Support System for Measuring the Impact of Advertising

Research and past experience have shown that decisions and operations in the Recruiting Command require quantitative methods that are sensitive enough to detect even the slightest variations in input/output intensity. Large scale experiments such as the one attempted by WCAR cannot adequately reflect the effects of the attenuation of the inputs and outputs, particularly advertising.

4.1 Purpose of Research

The purpose of this particular phase of the research was to further explore the uses of DEA in determining the impact of advertising in "producing" high quality contracts for the U.S. Army Recruiting Command (USAREC). Instrumental in this effort has been the "team concept" in which members of the Center for Cybernetics Studies and key decision makers and project officers have worked together in all phases of the modeling effort and analysis. Continuation of this concept is critical to future successful research.

4.2 Data

The data utilized in this current developmental stage comes from the Defense Manpower Data Center (DMDC). DMDC serves the Defense Department as the repository of all service manpower data reported by the services. DMDC provided the data collection and management from the original Ad Mix Experiment discussed above. The Office of the Secretary of Defense and the services agreed that continued advertising data collection would foster future research. This secondary data provides a useful source of

valid and increasingly reliable data. The Center supports the continued development of this data as the "industry standard" for military manpower planning research. It should be noted that DMDC personnel have been extremely cooperative and helpful in resolving questions and problems with the data that have arisen during the course of this research.

Table 4.1 lists the major variables provided by DMDC (through USAREC) in July and August 1987.

ARMY NATIONAL ADVERTISING	ARMY GSMA CONTRACTS
AIR FORCE NATIONAL ADVERTISING	AIR FORCE GSMA CONTRACTS
MARINE NATIONAL ADVERTISING	MARINE GSMA CONTRACTS
NAVY NATIONAL ADVERTISING	NAVY GSMA CONTRACTS
JOINT NATIONAL ADVERTISING	ARMY MISSION
ARMY LOCAL ADVERTISING	AIR FORCE MISSION
NAVY LOCAL ADVERTISING	MARINE MISSION
AIR FORCE LOCAL ADVERTISING	NAVY MISSION
MARINE LOCAL ADVERTISING	ARMY RECRUITERS
ARMY APPLICANTS	AIR FORCE RECRUITERS
AIR FORCE APPLICANTS	MARINE RECRUITERS
MARINE APPLICANTS	NAVY RECRUITERS
NAVY APPLICANTS	UNEMPLOYMENT
POPULATION	

Table 4.1: FY 85 Data

The data were provided at the county level with battalions (and other service equivalent recruiting organization) designators provided. DMDC used a standard algorithm approved by each service to determine the county to battalion aggregation.

FY 84 data were also supplied by DMDC, but as already stated in [4], many variables were only reported for a portion of the country. For any temporal analysis from FY84 to FY85, the data were augmented with official USAREC data as necessary.

Data reduction and preparation for analysis were performed on the University of Texas at Austin IBM 3081D.

Based upon guidance from USAREC, the original data were aggregated by Army recruiting battalion (=DMU) by quarter. Quarterly observations were chosen, as most recruiting policies are "managed" by quarter. All variables were summed from month to quarter except recruiters and unemployment, which were averaged by quarter. Again, the team concept aforementioned was used in determining inputs, outputs, and DMU's and in any decisions regarding necessary data manipulation.

This DMDC data allows for inclusion of competitive effects in the analyses as all service data is provided. Since each "management unit designator" for each service is provided on each county level record, aggregation of other service data to Army organization was possible. This service, provided by DMDC, as stated before, is vital to future recruiting research.

Numerous difficulties were uncovered in the process of "reducing" the data for preliminary analysis. Specifically, the High School Senior population had identical data for all of the approximately 3500 counties of the U.S. Additionally, the Army recruiter data was in error, showing less than half the proper number as verified by USAREC. DMDC responded to the Center for Cybernetic Studies' requests for clarification and provided accurate data. Summary statistics were provided to USAREC in August 1987 for verification prior to preliminary analysis. It should be noted that these data were well documented (in most cases) and that DMDC was responsive to any requests for clarification. The importance of this resource to all services for future manpower research is again highlighted.

An initial subset of the data was chosen for preliminary analysis. This subset (Table 4.2) was selected again based upon discussion with USAREC.

ARMY NATIONAL ADVERTISING	ARMY GSMA CONTRACTS
AIR FORCE NATIONAL ADVERTISING	AIR FORCE GSMA CONTRACTS
MARINE NATIONAL ADVERTISING	MARINE GSMA CONTRACTS
NAVY NATIONAL ADVERTISING	NAVY GSMA CONTRACTS
JOINT NATIONAL ADVERTISING	UNEMPLOYMENT
MARINE RECRUITERS	POPULATION
NAVY RECRUITERS	SERVICE DIRECT RESPONSE LEADS
ARMY RECRUITERS	SERVICE APPLICANTS
AIR FORCE RECRUITERS	

Table 4.2: Subset of Data for Analysis

4.3 Analysis

As a precursor to a DEA analysis, a typical regression approach was utilized to gain insights into possible misinterpretations of the data. Numerous combinations of independent variables from the subset in Table 5.2 were utilized in attempting to "explain" Army quality contracts and Army quality ASVAB examination applicants.

The most revealing of these are the simple regression lines for the FY85 data set depicted in the following two figures:

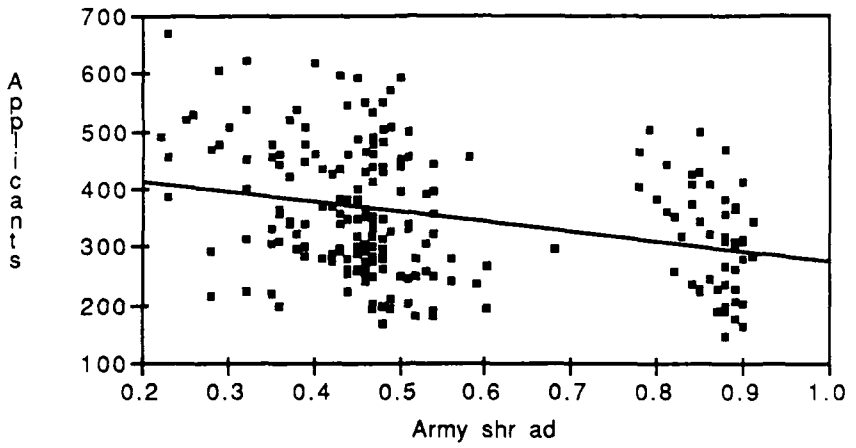

Figure 4.1: Regression of Army Applicants vs Share of Advertising

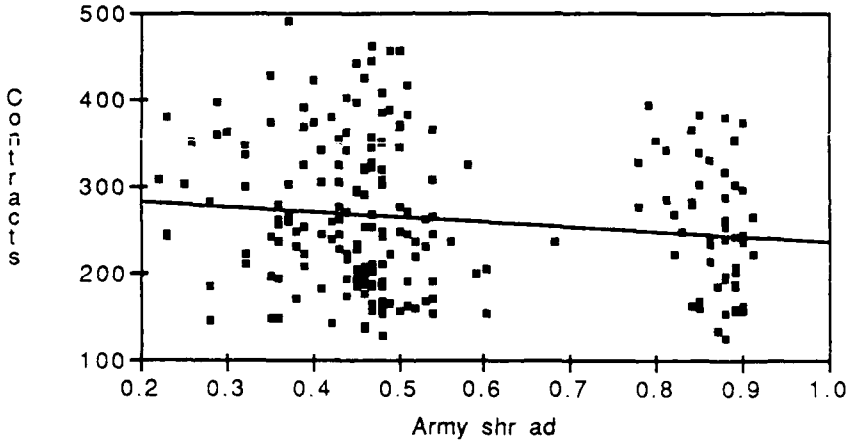

Figure 4.2: Regression of Army GSMA Contracts vs Share of Advertising

To be noted is that both supplies are negative so that in causal analysis associated with these regressions it appears that advertising repels recruits!

These strange results are further illustrated in part by the following histogram of Army "share" of advertising versus Army "share" of applicants.

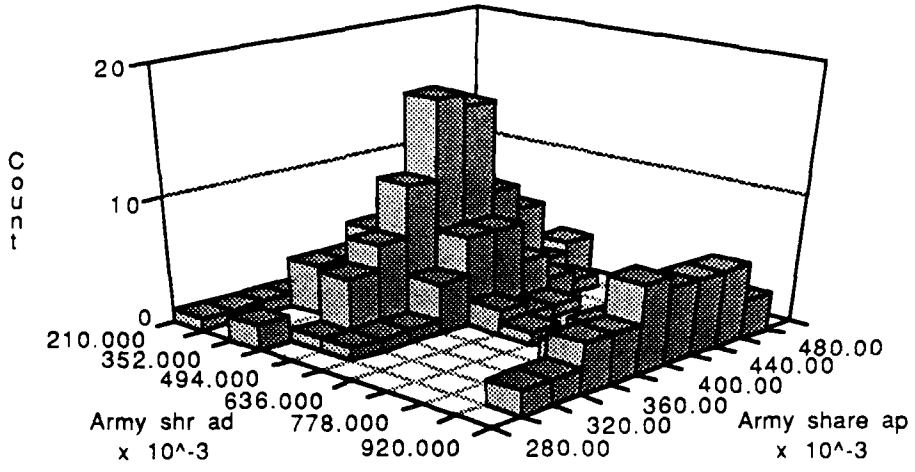

Figure 4.3 Histogram of Share of Advertising, Contracts and Applicants

The bimodal distribution depicted in Figure 4.3 raises severe questions about the use of linear (or even loglinear) regression models, like those used by WCAR.

Regression models like those used by WCAR are the wrong tools for this analysis. The result is a mis-specified model so that results from this modeling approach are best regarded as invalid. Similar analyses of FY 1984 revealed like results. In addition it appears from the previously mentioned critique of the WCAR efforts that the DOD study utilized these same techniques and reached similar conclusions. DEA, in contrast, does not require the kind of *a priori* model specification that these regression techniques require, so the pitfalls associated with assumption of linearity in the relations to the models can be avoided.

Previous uses of DEA in the analysis of Army recruiting have shown the power of the methodology as a management tool, allowing micro-level decisions at the battalion (=DMU) level [5]. Earlier work on the development of

the production function demonstrated how a macro-level analysis capability for resource allocation could be developed [5]. Finally the concept of a micro level DEA for each service utilizing DMDC data "feeding" a macro level goal programming model has been conceptualized in [8].

A new development in providing decision support in the impact of advertising is now presented. Although the general concept was presented in [6], optimal dual variables can be exploited to obtain still more from standard DEA informatics output. In particular the rate of change values shown for a particular DMU as in Exhibit 3.1 can be used to plan resource allocations and reallocations to obtain optimum recruitment plans and strategies across all DMUs.

Figure 4.4 shows a typical output from a DEA analysis of the subset of DMDC data described earlier. Particular attention is now called to the values in the column headed "Potential Rate of Change" where the optimal dual variables are recorded .

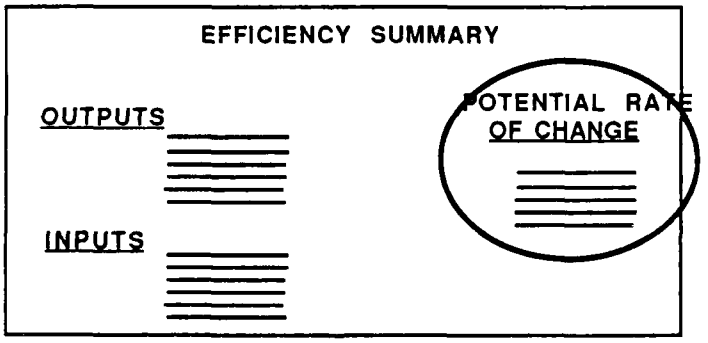

Figure 4.4 DEA Output

As shown in [1], the negative of the ratio of this "potential rate of change" or optimal dual variable for input x_i to the optimal dual for output y_r is equal to the rate of change of output y_r with respect to input x_i. This ratio, then, provides the

Army with an empirical means to determine, for example, the change in quality contracts (output) with respect to advertising (input). Resource trade-offs and sensitivity analysis can then be performed at the battalion level or higher. Used in this manner DEA provides marginal rates of substitution for the decision maker [5] for each input under observation by moving efficiently across the frontier of possible solutions. In technical economics terminology, these represent marginal rates of substitutions between inputs (or between outputs) and marginal rates of transformations from inputs to outputs at the efficiencies frontier.

4.4 Findings

The original subset of FY 85 data was aggregated to the Army battalion level for all services. The "competitive" effects of "other service" (Navy, Air Force, and Marine Corps) advertising was modeled by the following:

$$\frac{1}{\text{NAVY AD\$ + MARINES AD\$ + AIR FORCE AD\$}}$$

This reciprocal says that there is an inverse relationship between "other service" advertising and Army contracts. (This relationship was developed in [5] and has generally been agreed upon by advertising experts and Army leadership). The "lagged effect" of advertising was modeled by using an average of the previous quarter and the current quarter advertising expenditure data. Joint advertising was considered as an input to provide a "best case" estimate of its impact on Army recruiting.

To allow comparison to FY 84, during the period of the Joint Ad Mix Experiment in which ad levels were changed in certain parts of the country, the FY 84 data used in [5] were also considered. Admittedly, these data were provided in part by USAREC and in part by DMDC, and so the resulting direct comparisons may be biased. However, the DEA can control for this in the use of a "window analysis" in which a four-quarter "moving window" of the same DMUs are compared to other windows in different time periods across the eight quarters , FY84 to FY85. This window analysis, seen below in Exhibit 4.1, allows for analysis of temporal effects in the rate of change discussed before. Complete window analyses for the different types of advertising (Army, joint, other service and total service) are in Appendices A, B, C, D, respectively.

	100 * RATIO OF ARMY DUALS								SUMMARY MEASURES			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	MEAN	VAR RANGE	COLUMNTOTAL RANGE	
1A	0.136	0.023	0.393	0.020								
		0.006	0.086	0.032	0.100				0.115	0.308	0.371	0.465
			0.042	0.032	0.032	0.053						
				0.311	0.049	0.109	0.471					
					0.100	0.100	0.100	0.100				
MEDIAN	0.136	0.014	0.086	0.032	0.074	0.100	0.285	0.100				
1B	0.015	0.003	0.008	0.002								
		0.000	0.006	0.002	0.004				0.013	0.003	0.043	0.045
			0.014	0.005	0.007	0.014						
				0.004	0.047	0.015	0.015					
					0.047	0.013	0.007	0.011				
MEDIAN	0.015	0.002	0.008	0.003	0.027	0.014	0.011	0.011				
1C	0.153	0.045	0.100	0.014								
		0.100	0.100	0.014	0.086				0.092	0.133	0.265	0.311
			0.100	0.023	0.282	0.325						
				0.064	0.017	0.100	0.125					
					0.020	0.100	0.031	0.040				
MEDIAN	0.153	0.072	0.100	0.018	0.053	0.100	0.078	0.040				
1D	0.152	0.399	0.483	0.940								
		0.056	0.260	0.013	0.812				0.316	2.626	1.540	1.540
			0.100	0.013	0.808	0.235						
				1.553	0.119	0.367	0.305					
					0.100	0.230	0.100	0.176				
MEDIAN	0.152	0.727	0.260	0.026	0.464	0.235	0.202	0.176				

Exhibit 4.1 Window Analysis

Note that the analysis is provided at the battalion (=DMU) level with the same DMU being compared in different four-quarter "windows." As statistical observations, these DMUs can be regarded as "different" in each window, hence increasing the total sample of units "observed" since the data sets are developed by dropping one quarter and adding another quarter of data in moving the window from left to right.

Summary measures to the right of the page allow for rapid discovery of "exceptions behavior", where a large variance in measures may indicate outlier behavior. Management can then utilize this information to direct attention to any such DMU and investigate to determine causes for this behavior, including misreporting or the reporting of erroneous data. Additionally, median values are provided which allow for robust aggregation of the individual DMU measures to national level for macro analysis. It should be noted that for this temporal analysis, all variables provided in FY 85 were not available in FY 84, so only certain input/output combinations could be analyzed.

The input-output combination utilized, then, focusing on a single output Phase II ("creating contracts") DEA was as follows:

INPUTS	OUTPUTS
Army National Advertising	GSMA Contracts
Joint National Advertising	
Other Service National Advertising	
HSSR population	
Production Recruiters	
Total Unemployment	

Phase II analysis and the single output combination were selected to attempt to isolate the effects of advertising on contracts. New software has been developed by the Center for Cybernetic Studies to provide the ratios of dual variables for Army Advertising, Joint Advertising, Other Service Advertising, and Total Service Advertising. Each battalion "rate of change" in contracts with respect to each type national advertising was summarized by use of the median rate of change for each quarter in the analysis. These median rates of change were then weighted by the battalion population. This weighting allowed aggregation to the national command level by summing. Finally this command rate was "averaged" by dividing each quarterly command rate by the total population.

Using the previously described window analyses, comparisons of the median rates of change in contracts for each type advertising can be made for the eight quarters of data, FY 84 - FY 85. Results of the analysis are depicted below in Figure 4.5:

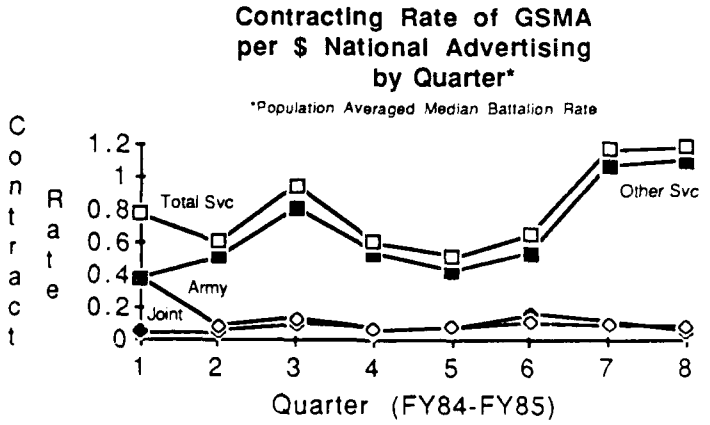

Figure 4.5

It is readily apparent that the rate of change in Army quality contracts in every case is greater than Joint for either Army advertising, Other Service

advertising, or Total Service advertising. Note in the chart that the Army rate declined drastically from the 1st Quarter FY 84 to 2nd Quarter FY 84. This was the beginning of the Joint Advertising Mix Test, in which Service advertising was either reduced or held constant, while Joint Advertising was raised. The Other Service contract rate shows a decline in Quarters 3 through 6, perhaps reflecting the effects of the changes induced by the experiment. Note particularly the "recovery effect" on total services advertising with the termination of the Joint Advertising Mix Test contracting after Quarter 6 and a seeming return to "normal". The Army rate then remains relatively flat, perhaps because of the difficulty in recovering from the initial loss of advertising awareness. The Other Services also show similar behavior.

These findings agree with earlier work performed by the Center in response to issues raised during the Joint Ad Mix Experiment: Service advertising appears to be more effective in "producing" contracts than Joint advertising [5,6,7,8].

5.0. Conclusions from DEA analyses

This research is only in the early stages of development. DEA analyses need to be performed with various other service outputs and inputs to complete these developments. However, the already developed DEA applications provide an empirical, battalion-level basis for management decisions regarding the Service-Joint advertising issue and other resource trade-offs. The rate of change measure is easily incorporated into previously developed informatics utilized for DEA. True decision support can then be provided to the recruiting command through DEA on the impact of advertising of different types, and on the allocation of other resources. Thus DEA can provide the basis of a Decision Support System which will systematically provide insights from the data while

maintaining the managerial level resolution needed to implement those insights into decisions.

6.0. Future applications

As stated, more detailed DEA can be performed, utilizing local advertising, other service recruiters, different media types of national advertising, direct response leads and others to develop a Decision Support System useful at battalion and national headquarters level. Insights can be gained on rates of change in other outputs, such as changes in awareness with respect to advertising inputs (Phase I analysis). In addition the "efficiency" measure at the battalion level can be utilized to assess changes in missioning or sales quotas. Finally, the micro level analysis can be aggregated to national level for each service and "optimal" resource levels can be be explored using goal program extensions to DEA [8].

DEA provides decision support at the national level producing a quantitative justification for future executive-level discussions on the allocation of expensive recruiting resources-the national advertising budget. The support provided, upon development, can provide real-time management information in highly relevant "digestible" forms of reports for use in the management process. Future development will hopefully allow a successful integration of all the hardware and software into the battalion (and above) commander's decision-making environment so that efficienct resource allocation across brigades and/or battalions can be effected along with monitoring and correcting inefficiencies in the performance of each DMU in the system.

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100 * RATIO OF ARMY D[illegible] S

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1A	0.136	0.023	0.393	0.020								
		0.006	0.036	0.032	0.100							
			0.042	0.032	0.032	0.033			0.115	0.308	0.371	0.465
				0.311	0.049	0.199	0.471					
					0.100	0.100	0.100	0.100				
MEDIAN	0.136	0.014	0.086	0.032	0.074	0.100	0.235	0.100				
1B	0.015	0.003	0.003	0.002								
		0.000	0.006	0.002	0.004							
			0.014	0.005	0.007	0.014			0.013	0.003	0.043	0.045
				0.004	0.047	0.015	0.015					
					0.047	0.013	0.007	0.011				
MEDIAN	0.015	0.002	0.008	0.003	0.027	0.014	0.011	0.011				
1C	0.153	0.045	0.100	0.014								
		0.100	0.100	0.014	0.086							
			0.100	0.023	0.262	0.325			0.092	0.133	0.265	0.311
				0.064	0.017	0.100	0.125					
					0.020	0.100	0.031	0.040				
MEDIAN	0.153	0.072	0.100	0.018	0.053	0.100	0.078	0.040				
1D	0.152	0.399	0.483	0.040								
		0.056	0.260	0.013	0.812							
			0.100	0.013	0.803	0.235			0.316	2.626	1.540	1.540
				1.553	0.119	0.367	0.305					
					0.100	0.230	0.100	0.176				
MEDIAN	0.152	0.227	0.260	0.026	0.464	0.235	0.202	0.176				
1E	0.061	0.082	0.100	0.061								
		0.100	0.150	0.100	0.100							
			0.100	0.025	0.021	0.042			0.077	0.052	0.123	0.222
				0.051	0.048	0.041	0.115					
					0.046	0.041	0.238	0.016				
MEDIAN	0.061	0.091	0.100	0.056	0.043	0.041	0.176	0.016				
1F	0.100	0.100	0.172	0.100								
		0.100	0.250	0.100	0.100							
			0.646	0.100	0.100	5.363			0.415	26.105	5.263	5.263
				0.364	0.100	0.100	0.100					
					0.100	0.114	0.100	0.100				
MEDIAN	0.100	0.100	0.250	0.100	0.100	0.114	0.100	0.100				

Introduction to Technical Appendices

Appendices A through D represent the window analyses described in pages 18-19 of this report. Results and conclusions in the report are based in part on an aggregation of the median summary statistics for each battalion. The entire window summaries are provided for fututer reference concerning managerial issues at the battalion level. Appendix A represents the marginal rates of change in GSMA contracts for a change in Army advertising. Likewise, Appendices B through D provide rates of change in GSMA contracts for small changes in Joint advertising, Other Service advertising and Total Service advertising, respectively.

100 * RATIO OF ARMY DIA...

	q1	q2	q3	q4	q5	q6	q7	q8	MEAN	VAR RANGE	COLUMN RANGE	TOTAL
									SUMMARY MEASURES			
3A	0.012	0.019	0.045	0.045								
		0.056	0.100	0.100	0.005							
			0.095	0.097	0.014	0.035			0.039	0.023	0.055	0.095
				0.065	0.015	0.011	0.041					
					0.021	0.012	0.018	0.007				
MEDIAN	0.012	0.037	0.095	0.081	0.014	0.011	0.030	0.007				
3B	0.015	0.019	0.374	0.003								
		0.039	0.105	0.013	0.004							
			0.110	0.013	0.012	0.125			0.131	0.386	0.536	0.540
				0.544	0.100	0.210	0.214					
					0.120	0.165	0.187	0.283				
MEDIAN	0.015	0.014	0.110	0.013	0.056	0.165	0.200	0.283				
3C	0.000	0.006	0.100	0.000								
		0.015	0.049	0.023	0.053							
			0.055	0.024	0.100	0.100			0.067	0.026	0.051	0.094
				0.045	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.000	0.010	0.055	0.023	0.100	0.100	0.100	0.100				
3D	0.006	0.054	0.100	0.045								
		0.039	0.056	0.055	0.100							
			0.095	0.100	0.100	0.100			0.085	0.014	0.055	0.094
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.006	0.071	0.095	0.073	0.100	0.100	0.100	0.100				
3E	0.001	0.018	0.019	0.006								
		0.003	0.036	0.010	0.041							
			0.019	0.006	0.011	0.035			0.022	0.005	0.039	0.049
				0.016	0.037	0.050	0.018					
					0.035	0.031	0.045	0.005				
MEDIAN	0.001	0.010	0.019	0.008	0.036	0.035	0.031	0.005				
3F	0.022	0.017	0.294	0.061								
		0.100	0.135	0.100	0.100							
			0.104	0.100	0.100	0.099			0.106	0.067	0.190	0.277
				0.100	0.100	0.100	0.047					
					0.100	0.100	0.110	0.176				
MEDIAN	0.022	0.056	0.135	0.100	0.100	0.100	0.078	0.176				

100 - RATIO OF ARMY DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1G	0.100	0.042	0.100	0.061								
		0.012	0.280	0.100	1.106				0.275	3.676	1.271	1.359
			0.100	0.100	0.100	0.100						
				0.061	0.100	1.371	0.100					
					0.100	1.371	0.100	0.100				
MEDIAN	0.100	0.027	0.100	0.081	0.100	1.371	0.100	0.100				
1H	0.112	0.100	0.100	0.100								
		0.100	0.172	0.100	0.272				0.120	0.032	0.172	0.172
			0.108	0.100	0.100	0.137						
				0.100	0.100	0.137	0.131					
					0.100	0.137	0.100	0.100				
MEDIAN	0.112	0.100	0.108	0.100	0.100	0.137	0.115	0.100				
1I	15.807	0.100	0.104	0.100								
		0.100	0.100	0.100	0.374				0.994	******	1.364	15.708
			1.464	0.099	0.100	0.119						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	15.807	0.100	0.104	0.100	0.100	0.100	0.100	0.100				
1K	0.023	0.054	0.100	0.045								
		0.100	0.100	0.100	0.100				0.091	0.009	0.055	0.077
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.023	0.077	0.100	0.100	0.100	0.100	0.100	0.100				
1L	0.100	0.067	0.085	0.054								
		0.100	0.258	0.100	0.014				0.051	0.068	0.237	0.257
			0.021	0.001	0.021	0.002						
				0.001	0.044	0.002	0.050					
					0.043	0.010	0.031	0.011				
MEDIAN	0.100	0.083	0.085	0.027	0.032	0.002	0.040	0.011				
1N	0.015	0.054	0.043	0.025								
		0.100	0.086	0.035	0.015				0.054	0.057	0.046	0.192
			0.064	0.010	0.012	0.022						
				0.026	0.027	0.049	0.194					
					0.029	0.049	0.202	0.018				
MEDIAN	0.015	0.077	0.064	0.025	0.021	0.049	0.198	0.018				

100 * RATIO OF ARMY DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
4C	0.090	0.799	1.966	0.045					0.447	16.087	3.020	3.812
		0.216	3.840	0.100	0.100							
			0.520	0.069	0.100	0.100						
				0.100	0.100	0.087	0.100					
					0.100	0.087	0.100	0.028				
MEDIAN	0.090	0.507	1.966	0.085	0.100	0.087	0.100	0.028				
4D	0.032	0.036	0.045	0.033					0.051	0.013	0.065	0.082
		0.036	0.043	0.025	0.063							
			0.043	0.022	0.035	0.080						
				0.077	0.100	0.080	0.046					
					0.100	0.080	0.028	0.018				
MEDIAN	0.032	0.036	0.043	0.029	0.081	0.080	0.037	0.018				
4E	0.273	0.100	0.100	0.045					0.103	0.036	0.055	0.229
		0.100	0.100	0.100	0.100							
			0.099	0.095	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.044				
MEDIAN	0.273	0.100	0.100	0.098	0.100	0.100	0.100	0.044				
4F	0.173	0.173	0.173	0.173					0.133	0.032	0.073	0.103
		0.164	0.121	0.100	0.100							
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.195					
					0.100	0.100	0.195	0.203				
MEDIAN	0.173	0.168	0.121	0.100	0.100	0.100	0.195	0.203				
4G	0.170	0.045	0.056	0.019					0.074	0.025	0.104	0.151
		0.104	0.069	0.100	0.100							
			0.068	0.035	0.069	0.047						
				0.123	0.100	0.053	0.072					
					0.100	0.053	0.065	0.026				
MEDIAN	0.170	0.076	0.068	0.067	0.100	0.053	0.068	0.026				
4H	0.100	0.173	0.100	0.100					0.118	0.023	0.073	0.095
		0.100	0.115	0.100	0.100							
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.195					
					0.100	0.100	0.175	0.195				
MEDIAN	0.100	0.137	0.100	0.100	0.100	0.100	0.185	0.195				

100 * RATIO OF ARMY DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3G	0.100	0.100	0.100	0.045								
		0.100	0.082	0.056	0.014				0.086	0.046	0.161	0.229
			0.243	0.029	0.100	0.100						
				0.100	0.100	0.034	0.065					
					0.100	0.128	0.100	0.027				
MEDIAN	0.100	0.100	0.100	0.050	0.100	0.100	0.082	0.027				
3H	0.012	0.019	0.173	0.015								
		0.100	0.100	0.087	0.100				0.069	0.033	0.081	0.161
			0.100	0.020	0.029	0.099						
				0.072	0.061	0.100	0.025					
					0.072	0.100	0.050	0.050				
MEDIAN	0.012	0.060	0.100	0.046	0.067	0.100	0.037	0.050				
3I	0.100	0.148	0.100	0.017								
		0.100	0.115	0.089	0.100				0.092	0.020	0.072	0.131
			0.100	0.029	0.100	0.089						
				0.023	0.100	0.100	0.100					
					0.100	0.100	0.100	0.125				
MEDIAN	0.100	0.124	0.100	0.026	0.100	0.100	0.100	0.125				
3J	0.100	0.374	0.266	0.112								
		0.100	0.192	0.056	0.100				0.135	0.117	0.274	0.318
			0.231	0.067	0.100	0.100						
				0.196	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.237	0.231	0.089	0.100	0.100	0.100	0.100				
3K	0.010	0.041	0.107	0.010								
		0.036	0.045	0.013	0.100				0.053	0.020	0.072	0.097
			0.035	0.018	0.035	0.053						
				0.041	0.100	0.058	0.071					
					0.100	0.058	0.100	0.030				
MEDIAN	0.010	0.038	0.045	0.015	0.100	0.058	0.086	0.030				
4A	0.100	0.294	0.100	0.100								
		0.121	0.115	0.089	0.100				0.116	0.040	0.175	0.205
			0.100	0.095	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.125	0.175				
MEDIAN	0.100	0.207	0.100	0.098	0.100	0.100	0.113	0.175				

100 * RATIO OF ARMY DATA

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
SD	0.017	0.017	0.173	0.082								
		0.103	0.150	0.115	0.100				0.114	0.077	0.143	0.237
			0.100	0.100	0.099	0.042						
				0.225	0.100	0.075	0.189					
					0.100	0.065	0.176	0.254				
MEDIAN	0.017	0.058	0.150	0.108	0.100	0.069	0.183	0.254				
SE	0.059	0.054	0.357	0.040								
		0.059	2.674	0.040	0.155				0.264	6.268	2.462	2.648
			0.212	0.026	0.075	0.089						
				0.185	0.168	0.093	0.192					
					0.201	0.072	0.284	0.230				
MEDIAN	0.059	0.056	0.357	0.040	0.161	0.089	0.238	0.230				
SF	0.157	0.063	0.085	0.067								
		0.063	0.293	0.087	0.100				0.101	0.114	0.231	0.268
			0.062	0.037	0.025	0.100						
				0.050	0.110	0.227	0.044					
					0.110	0.267	0.037	0.032				
MEDIAN	0.157	0.063	0.085	0.058	0.105	0.227	0.040	0.032				
SH	0.072	0.082	0.032	0.054								
		0.100	0.150	0.155	0.155				0.115	0.060	0.158	0.248
			0.006	0.109	0.100	0.100						
				0.212	0.100	0.100	0.185					
					0.100	0.100	0.254	0.088				
MEDIAN	0.072	0.091	0.032	0.127	0.100	0.100	0.220	0.088				
SI	0.008	0.011	0.067	0.016								
		0.011	0.100	0.087	0.100				0.040	0.022	0.079	0.102
			0.032	0.015	0.021	0.017						
				0.014	0.044	0.018	0.110					
					0.037	0.027	0.048	0.017				
MEDIAN	0.008	0.011	0.067	0.015	0.040	0.018	0.079	0.017				
SJ	0.042	0.061	0.045	0.045								
		0.150	0.191	0.108	0.108				0.076	0.040	0.146	0.178
			0.100	0.038	0.100	0.017						
				0.100	0.100	0.014	0.069					
					0.100	0.013	0.065	0.061				
MEDIAN	0.042	0.105	0.100	0.072	0.100	0.014	0.067	0.061				

100 * RATIO OF ARMY BOMBS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
41	0.173	0.173	0.294	0.100								
		0.115	0.115	0.100	0.100				0.122	0.045	0.194	0.194
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.178				
MEDIAN	0.173	0.144	0.115	0.100	0.100	0.100	0.100	0.178				
4J	0.100	0.100	0.083	0.100								
		0.100	0.155	0.056	0.100				0.107	0.017	0.083	0.127
			0.100	0.095	0.100	0.100						
				0.100	0.100	0.100	0.183					
					0.100	0.100	0.100	0.176				
MEDIAN	0.100	0.100	0.100	0.098	0.100	0.100	0.141	0.176				
4K	0.100	0.164	0.153	0.100								
		0.213	0.100	0.056	0.100				0.108	0.019	0.049	0.157
			0.095	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.188	0.100	0.100	0.100	0.100	0.100	0.100				
5A	0.030	0.061	0.051	0.054								
		0.100	0.230	0.100	0.100				0.109	0.086	0.229	0.281
			0.100	0.100	0.100	0.100						
				0.093	0.100	0.100	0.100					
					0.100	0.100	0.100	0.511				
MEDIAN	0.030	0.081	0.100	0.099	0.100	0.100	0.100	0.511				
5B	0.032	0.017	0.173	0.076								
		0.100	0.216	0.105	0.100				0.126	0.062	0.116	0.237
			0.100	0.064	0.100	0.100						
				0.165	0.126	0.100	0.189					
					0.175	0.100	0.176	0.254				
MEDIAN	0.082	0.058	0.173	0.090	0.113	0.100	0.183	0.254				
5C	0.007	0.007	0.061	0.076								
		0.007	0.061	0.155	0.100				0.036	0.027	0.137	0.148
			0.033	0.013	0.014	0.021						
				0.025	0.015	0.020	0.034					
					0.012	0.020	0.019	0.009				
MEDIAN	0.007	0.007	0.061	0.050	0.014	0.020	0.027	0.009				

[illegible] ARMY DUAL

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
6G	0.068	0.018 0.020	0.104 0.051 0.015	0.039 0.005 0.026 0.046	0.021 0.025 0.066 0.100	0.055 0.058 0.058	0.073 0.100	0.027	0.049	0.017	0.088	0.099
MEDIAN	0.068	0.019	0.051	0.032	0.045	0.053	0.086	0.027				
6H	0.300	0.068 0.318	0.076 0.150 0.100	0.017 0.050 0.080 0.077	0.012 0.029 0.082 0.100	0.054 0.009 0.008	0.122 0.050	0.041	0.087	0.137	0.250	0.310
MEDIAN	0.300	0.193	0.100	0.067	0.056	0.009	0.086	0.041				
6I	0.051	0.061 0.100	0.054 0.103 0.100	0.054 0.100 0.100 0.100	0.100 0.040 0.093 0.098	0.042 0.041 0.041	0.100 0.100	0.024	0.076	0.016	0.060	0.084
MEDIAN	0.051	0.081	0.100	0.100	0.098	0.041	0.100	0.024				
6J	0.100	0.061 0.100	0.100 0.100 0.095	0.100 0.089 0.095 0.100	0.100 0.100 0.100 0.100	0.089 0.100 0.100	0.073 0.100	0.412	0.111	0.098	0.039	0.351
MEDIAN	0.100	0.081	0.100	0.098	0.100	0.100	0.086	0.412				
6K	0.100	0.045 0.100	0.045 0.172 0.100	0.045 0.100 0.036 0.100	0.100 0.100 0.100 0.100	0.054 0.054 0.054	0.100 0.100	0.014	0.081	0.025	0.127	0.158
MEDIAN	0.100	0.072	0.100	0.072	0.100	0.054	0.100	0.014				
6L	0.375	0.032 0.100	0.085 1.095 0.013	0.054 0.100 0.033 0.098	0.100 0.040 0.070 0.055	0.034 0.051 0.041	0.032 0.049	0.029	0.130	1.092	1.085	1.085
MEDIAN	0.375	0.091	0.085	0.076	0.067	0.051	0.040	0.029				

100 = RATIO OF ARMY GOALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
5K	0.064	0.059 0.155	0.059 0.172 0.209	0.027 0.041 0.011 0.033	0.172 0.041 0.077 0.202	0.055 0.033 0.033	0.066 0.056	0.014	0.079	0.080	0.161	0.198
MEDIAN	0.064	0.107	0.172	0.030	0.134	0.033	0.061	0.014				
5L	0.059	0.059 0.103	0.031 0.050 0.054	0.059 0.028 0.020 0.046	0.043 0.022 0.131 0.100	0.047 0.053 0.053	0.072 0.065	0.068	0.057	0.015	0.109	0.111
MEDIAN	0.059	0.083	0.050	0.033	0.072	0.053	0.068	0.068				
5M	0.061	0.100 0.100	0.173 0.150 0.100	0.061 0.100 0.100 0.100	0.150 0.100 0.098 0.093	0.100 0.100 0.100	0.100 0.238	0.282	0.120	0.056	0.138	0.221
MEDIAN	0.061	0.100	0.150	0.100	0.099	0.100	0.169	0.282				
5N	0.080	0.082 0.100	0.076 0.155 0.100	0.054 0.100 0.100 0.100	0.108 0.043 0.100 0.100	0.042 0.080 0.128	0.217 0.245	0.034	0.102	0.053	0.086	0.211
MEDIAN	0.080	0.091	0.100	0.100	0.100	0.080	0.231	0.034				
6A	0.066	0.054 0.100	0.100 0.100 0.100	0.100 0.100 0.099 0.100	0.027 0.100 0.100 0.100	0.117 0.055 0.039	0.100 0.100	0.100	0.088	0.013	0.082	0.090
MEDIAN	0.066	0.077	0.100	0.100	0.100	0.039	0.100	0.100				
6F	0.004	0.042 0.100	0.042 0.100 0.100	0.051 0.100 0.021 0.044	0.042 0.043 0.100 0.100	0.036 0.057 0.061	0.017 0.024	0.009	0.055	0.022	0.079	0.096
MEDIAN	0.004	0.071	0.100	0.047	0.072	0.057	0.021	0.009				

100 * RATIO OF JOINT SERVICES DUAL

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1A	0.002	0.036	0.037	0.020								
		0.036	0.068	0.032	0.100				0.068	0.056	0.086	0.184
			0.032	0.032	0.032	0.032						
				0.100	0.049	0.100	0.100					
					0.100	0.100	0.186	0.186				
MEDIAN	0.002	0.006	0.068	0.032	0.074	0.100	0.143	0.186				
1B	0.015	0.003	0.008	0.007								
		0.000	0.006	0.007	0.004				0.013	0.003	0.043	0.044
			0.014	0.005	0.007	0.014						
				0.004	0.047	0.015	0.015					
					0.047	0.013	0.012	0.011				
MEDIAN	0.015	0.002	0.008	0.006	0.027	0.014	0.013	0.011				
1C	0.014	0.045	0.100	0.014								
		0.100	0.100	0.014	0.009				0.059	0.035	0.091	0.120
			0.129	0.014	0.100	0.100						
				0.090	0.017	0.100	0.074					
					0.020	0.100	0.038	0.012				
MEDIAN	0.014	0.072	0.100	0.014	0.019	0.100	0.056	0.012				
1D	0.006	0.078	0.172	0.006								
		0.056	0.269	0.032	0.100				0.133	1.101	1.116	1.116
			0.105	0.032	0.100	0.011						
				1.122	0.022	0.069	0.066					
					0.100	0.100	0.100	0.100				
MEDIAN	0.006	0.077	0.172	0.032	0.100	0.069	0.083	0.100				
1E	0.061	0.045	0.100	0.061								
		0.100	0.100	0.100	0.100				0.062	0.018	0.079	0.087
			0.100	0.025	0.021	0.042						
				0.051	0.043	0.041	0.044					
					0.048	0.041	0.100	0.013				
MEDIAN	0.061	0.072	0.100	0.056	0.048	0.041	0.072	0.013				
1F	0.100	0.100	0.150	0.100								
		0.100	0.100	0.100	0.100				1.676	******	27.579	27.579
			0.313	0.100	0.100	27.679						
				0.250	0.100	3.655	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.150	0.100	0.100	3.655	0.100	0.100				

100 * RATIO OF ARMY DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
COL MEAN	0.333	0.093	0.137	0.080	0.100	0.131	0.109	0.099				

	[illegible] OF JOINT SERVICES DUALS								SUMMARY MEASURES			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3A	0.012	0.019 0.056	0.045 0.100 0.095	0.045 0.100 0.097 0.065	0.005 0.014 0.015 0.021	0.005 0.011 0.012	0.003 0.018	0.010	0.037	0.024	0.055	0.097
MEDIAN	0.012	0.037	0.075	0.081	0.014	0.011	0.010	0.010				
3B	0.015	0.002 0.005	0.100 0.090 0.099	0.006 0.012 0.012 0.087	0.004 0.012 0.100 0.102	0.100 0.100 0.100	0.006 0.120	0.003	0.057	0.052	0.158	0.160
MEDIAN	0.015	0.005	0.079	0.012	0.056	0.100	0.063	0.003				
3C	0.007	0.006 0.015	0.100 0.057 0.060	0.006 0.023 0.024 0.045	0.053 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.100	0.065	0.029	0.047	0.094
MEDIAN	0.007	0.010	0.060	0.023	0.100	0.100	0.100	0.100				
3D	0.006	0.054 0.089	0.100 0.056 0.095	0.045 0.056 0.100 0.100	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.100	0.085	0.014	0.055	0.094
MEDIAN	0.006	0.071	0.095	0.078	0.100	0.100	0.100	0.100				
3E	0.001	0.005 0.001	0.005 0.003 0.007	0.006 0.010 0.006 0.016	0.018 0.011 0.024 0.025	0.007 0.007 0.014	0.004 0.025	0.010	0.010	0.001	0.021	0.024
MEDIAN	0.001	0.003	0.005	0.008	0.021	0.007	0.014	0.010				
3F	0.001	0.017 0.100	0.100 0.100 0.100	0.061 0.100 0.100 0.100	0.100 0.100 0.100 0.100	0.099 0.100 0.100	0.047 0.100	0.100	0.086	0.017	0.083	0.099
MEDIAN	0.001	0.058	0.100	0.100	0.100	0.100	0.073	0.100				

100 * RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1G	0.100	0.042	0.100	0.061								
		0.012	0.100	0.100	0.100				0.187	1.784	0.980	1.068
			0.100	0.100	0.100	0.100						
				0.051	0.100	1.080	0.100					
					0.100	1.080	0.100	0.100				
MEDIAN	0.100	0.027	0.100	0.081	0.100	1.080	0.100	0.100				
1H	0.100	0.100	0.100	0.100								
		0.100	0.100	0.100	0.100				0.100	0.000	0.000	0.000
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100				
1I	0.100	0.100	0.100	0.100								
		0.100	3.111	0.100	0.100				0.302	9.324	3.011	3.012
			1.133	0.099	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	1.133	0.100	0.100	0.100	0.100	0.100				
1K	0.019	0.054	0.100	0.045								
		0.100	0.100	0.100	0.100				0.236	8.108	2.910	2.991
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	3.010	0.100				
MEDIAN	0.019	0.077	0.100	0.100	0.100	0.100	1.555	0.100				
1L	0.534	0.031	0.055	0.054								
		0.100	0.100	0.100	0.014				0.057	0.260	0.099	0.533
			0.021	0.001	0.021	0.002						
				0.001	0.044	0.002	0.007					
					0.043	0.010	0.016	0.011				
MEDIAN	0.534	0.065	0.055	0.027	0.032	0.002	0.011	0.011				
1N	0.004	0.054	0.007	0.007								
		0.100	0.035	0.014	0.015				0.035	0.019	0.057	0.096
			0.004	0.010	0.012	0.022						
				0.013	0.027	0.034	0.100					
					0.029	0.034	0.100	0.018				
MEDIAN	0.004	0.077	0.038	0.012	0.021	0.034	0.100	0.018				

100 · RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
4C	0.025	0.046	0.100	0.045								
		0.100	0.100	0.100	0.100				0.084	0.013	0.055	0.075
			0.100	0.069	0.100	0.100						
				0.100	0.100	0.087	0.100					
					0.100	0.087	0.100	0.028				
MEDIAN	0.025	0.073	0.100	0.085	0.100	0.087	0.100	0.028				
4D	0.009	0.003	0.017	0.015								
		0.001	0.020	0.017	0.063				0.030	0.018	0.065	0.099
			0.020	0.022	0.035	0.007						
				0.075	0.100	0.007	0.030					
					0.100	0.007	0.028	0.018				
MEDIAN	0.009	0.002	0.020	0.019	0.081	0.007	0.029	0.018				
4E	0.025	0.100	0.100	0.045								
		0.100	0.100	0.100	0.100				0.090	0.010	0.055	0.077
			0.099	0.095	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.044				
MEDIAN	0.023	0.100	0.100	0.098	0.100	0.100	0.100	0.044				
4F	0.100	0.100	0.100	0.100								
		0.100	0.100	0.100	0.100				0.100	0.000	0.000	0.000
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100				
4G	0.100	0.045	0.025	0.019								
		0.100	0.034	0.100	0.100				0.061	0.019	0.081	0.081
			0.024	0.035	0.069	0.047						
				0.100	0.100	0.053	0.039					
					0.100	0.053	0.065	0.020				
MEDIAN	0.100	0.072	0.025	0.067	0.100	0.053	0.052	0.020				
4H	0.100	0.100	0.100	0.100								
		0.100	0.100	0.100	0.100				0.100	0.000	0.000	0.000
			0.100	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100				

100 * RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3G	0.100	0.100	0.100	0.045								
		0.100	0.011	0.056	0.014							
			0.352	0.029	0.100	0.100			0.089	0.093	0.341	0.341
				0.100	0.100	0.080	0.065					
					0.100	0.100	0.100	0.027				
MEDIAN	0.100	0.100	0.100	0.050	0.100	0.100	0.082	0.027				
3H	0.012	0.017	0.100	0.015								
		0.100	0.100	0.087	0.100							
			0.100	0.020	0.029	0.099			0.065	0.024	0.081	0.088
				0.072	0.061	0.100	0.014					
					0.072	0.100	0.050	0.050				
MEDIAN	0.012	0.060	0.100	0.046	0.067	0.100	0.032	0.050				
3I	0.100	0.100	0.100	0.017								
		0.100	0.100	0.089	0.100							
			0.100	0.029	0.100	0.039			0.087	0.015	0.072	0.084
				0.023	0.100	0.101	0.100					
					0.100	0.101	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.026	0.100	0.101	0.100	0.100				
3J	0.100	0.100	0.016	0.100								
		0.100	0.100	0.056	0.100							
			0.100	0.067	0.100	0.100			0.092	0.009	0.084	0.084
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.083	0.100	0.100	0.100	0.100				
3K	0.010	0.007	0.092	0.010								
		0.005	0.045	0.013	0.100							
			0.055	0.018	0.035	0.053			0.049	0.023	0.065	0.095
				0.041	0.100	0.058	0.071					
					0.100	0.058	0.100	0.030				
MEDIAN	0.010	0.006	0.045	0.015	0.100	0.058	0.086	0.030				
4A	0.100	0.100	0.100	0.100								
		0.100	0.100	0.089	0.100							
			0.100	0.095	0.100	0.100			0.099	0.000	0.011	0.011
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.100				
MEDIAN	0.100	0.100	0.100	0.098	0.100	0.100	0.100	0.100				

100 * RATIO OF JOINT SERVICES GOALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
SD	0.017	0.017	0.100	0.045								
		0.100	0.100	0.100	0.100							
			0.100	0.100	0.099	0.042						
				0.100	0.100	0.075	0.100					
					0.100	0.065	0.100	0.100	0.083	0.016	0.083	0.083
MEDIAN	0.017	0.058	0.100	0.100	0.100	0.065	0.100	0.100				
SE	0.030	0.054	0.100	0.010								
		0.006	1.407	0.012	0.100							
			0.105	0.026	0.095	0.089						
				0.100	0.100	0.093	0.097					
					0.100	0.071	0.100	0.075	0.138	1.717	1.307	1.401
MEDIAN	0.030	0.030	0.105	0.019	0.100	0.089	0.099	0.075				
SF	0.013	0.019	0.035	0.031								
		0.019	0.100	0.087	0.100							
			0.011	0.012	0.025	0.100						
				0.007	0.046	0.100	0.044					
					0.049	0.100	0.037	0.032	0.048	0.024	0.089	0.093
MEDIAN	0.013	0.019	0.035	0.021	0.047	0.100	0.040	0.032				
SH	0.016	0.045	0.045	0.054								
		0.100	0.100	0.100	0.100							
			0.115	0.100	0.100	0.100						
				0.100	0.100	0.100	0.100					
					0.100	0.100	0.100	0.036	0.065	0.015	0.068	0.097
MEDIAN	0.016	0.072	0.100	0.100	0.100	0.100	0.100	0.036				
SI	0.003	0.007	0.031	0.009								
		0.011	0.100	0.087	0.100							
			0.023	0.015	0.021	0.017						
				0.014	0.044	0.018	0.046					
					0.037	0.027	0.038	0.010	0.033	0.017	0.079	0.093
MEDIAN	0.008	0.009	0.031	0.014	0.040	0.018	0.042	0.010				
SJ	0.042	0.061	0.045	0.045								
		0.100	0.100	0.100	0.100							
			0.100	0.038	0.100	0.017						
				0.100	0.100	0.014	0.033					
					0.100	0.013	0.034	0.024	0.065	0.024	0.062	0.087
MEDIAN	0.042	0.081	0.100	0.072	0.100	0.014	0.033	0.024				

100 · RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
4I	0.100	0.100 0.100	0.100 0.100 0.100	0.100 0.100 0.100 0.100	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.177	0.159	0.107	0.008	0.077	0.077
MEDIAN	0.100	0.100	0.100	0.100	0.100	0.100	0.138	0.159				
4J	0.100	0.100 0.100	0.040 0.100 0.100	0.100 0.056 0.095 0.100	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.100	0.095	0.005	0.060	0.060
MEDIAN	0.100	0.100	0.100	0.098	0.100	0.100	0.100	0.100				
4K	0.100	0.100 0.100	0.100 0.100 0.095	0.100 0.056 0.100 0.100	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.100	0.098	0.002	0.044	0.044
MEDIAN	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100				
5A	0.030	0.061 0.100	0.051 0.100 0.100	0.054 0.100 0.100 0.098	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.097	0.090	0.009	0.049	0.070
MEDIAN	0.030	0.081	0.100	0.099	0.100	0.100	0.100	0.097				
5B	0.045	0.017 0.100	0.100 0.100 0.110	0.051 0.090 0.064 0.021	0.100 0.100 0.100 0.100	0.100 0.100 0.100	0.100 0.100	0.100	0.084	0.017	0.083	0.093
MEDIAN	0.045	0.058	0.100	0.047	0.100	0.100	0.100	0.100				
5C	0.000	0.000 0.000	0.015 0.014 0.010	0.031 0.100 0.009 0.009	0.100 0.014 0.015 0.012	0.021 0.020 0.020	0.016 0.013	0.011	0.025	0.013	0.091	0.091
MEDIAN	0.000	0.000	0.014	0.020	0.014	0.020	0.014	0.011				

100 * RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
5K	0.027	0.030 0.100	0.050 0.100 0.100	0.003 0.018 0.011 0.016	0.100 0.041 0.045 0.100	0.010 0.015 0.016	0.023 0.027	0.014	0.042	0.025	0.070	0.092
MEDIAN	0.027	0.065	0.100	0.013	0.072	0.015	0.025	0.014				
5L	0.030	0.030 0.100	0.005 0.021 0.008	0.004 0.005 0.012 0.018	0.021 0.022 0.100 0.100	0.047 0.053 0.053	0.039 0.065	0.010	0.037	0.020	0.079	0.096
MEDIAN	0.030	0.065	0.008	0.008	0.061	0.055	0.052	0.010				
5M	0.061	0.100 0.100	0.100 0.100 0.100	0.061 0.100 0.100 0.100	0.100 0.100 0.098 0.098	0.100 0.100 0.100	0.100 0.100	0.100	0.096	0.003	0.039	0.039
MEDIAN	0.061	0.100	0.100	0.100	0.099	0.100	0.100	0.100				
5N	0.011	0.045 0.100	0.031 0.100 0.100	0.054 0.100 0.100 0.100	0.100 0.043 0.100 0.100	0.042 0.050 0.053	0.095 0.086	0.016	0.071	0.020	0.069	0.089
MEDIAN	0.011	0.072	0.100	0.100	0.100	0.050	0.090	0.016				
6A	0.083	0.054 0.100	0.100 0.100 0.100	0.100 0.100 0.099 0.100	0.022 0.100 0.100 0.100	0.097 0.098 0.093	0.100 1.375	0.100	0.156	1.571	1.275	1.353
MEDIAN	0.083	0.077	0.100	0.100	0.100	0.097	0.737	0.100				
6F	0.004	0.042 0.100	0.042 0.282 0.100	0.051 0.100 0.021 0.044	0.025 0.043 0.100 0.100	0.010 0.009 0.022	0.001 0.014	0.009	0.056	0.079	0.240	0.281
MEDIAN	0.004	0.071	0.100	0.047	0.072	0.010	0.007	0.009				

100 × RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
6G	0.003	0.018	0.100	0.009								
		0.020	0.058	0.005	0.021				0.046	0.019	0.079	0.095
			0.071	0.016	0.025	0.055						
				0.030	0.066	0.058	0.072					
					0.100	0.058	0.100	0.027				
MEDIAN	0.003	0.019	0.071	0.012	0.045	0.058	0.086	0.027				
6H	0.008	0.002	0.031	0.017								
		0.004	0.100	0.056	0.012				0.040	0.026	0.088	0.098
			0.100	0.080	0.029	0.005						
				0.077	0.082	0.009	0.010					
					0.100	0.003	0.050	0.019				
MEDIAN	0.003	0.003	0.100	0.067	0.056	0.008	0.030	0.019				
6I	0.051	0.001	0.054	0.054								
		0.100	0.100	0.100	0.100				0.075	0.017	0.060	0.086
			0.100	0.100	0.040	0.042						
				0.100	0.098	0.041	0.100					
					0.098	0.041	0.100	0.014				
MEDIAN	0.051	0.081	0.100	0.100	0.098	0.041	0.100	0.014				
6J	0.100	0.061	0.100	0.100								
		0.100	0.100	0.089	0.100				0.094	0.002	0.039	0.040
			0.095	0.095	0.100	0.089						
				0.100	0.100	0.101	0.073					
					0.100	0.101	0.100	0.085				
MEDIAN	0.100	0.081	0.100	0.098	0.100	0.101	0.086	0.085				
6K	0.100	0.045	0.045	0.045								
		0.100	0.100	0.100	0.100				0.077	0.017	0.064	0.086
			0.100	0.036	0.100	0.054						
				0.100	0.100	0.054	0.100					
					0.100	0.054	0.100	0.014				
MEDIAN	0.100	0.072	0.100	0.072	0.100	0.054	0.100	0.014				
6L	0.032	0.045	0.035	0.054								
		0.100	0.531	0.100	0.100				0.077	0.239	0.496	0.526
			0.120	0.038	0.040	0.005						
				0.098	0.070	0.023	0.015					
					0.065	0.041	0.021	0.016				
MEDIAN	0.032	0.072	0.120	0.076	0.067	0.023	0.018	0.016				

100 * RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
COL MEAN	0.055	0.064	0.120	0.068	0.079	0.274	0.114	0.058

SUMMARY MEASURES

MEAN	VAR RANGE	COLUMN RANGE	TOTAL

APPENDIX C OTHER SERVICE WINDOW ANALYSIS

100 * RATIO OF OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1A	0.545	0.048 0.799	1.245 0.973 0.513	0.374 0.601 0.601 1.901	12.678 0.264 0.397 0.818	0.166 0.389 5.828	2.470 2.460	4.122	1.750	******	12.414	12.630
MEDIAN	0.545	0.424	0.973	0.601	0.607	0.389	2.465	4.122				
1B	0.046	0.020 0.000	0.022 0.003 0.024	0.004 0.004 0.009 0.009	0.107 0.005 0.062 0.062	0.004 0.004 0.004	0.063 0.022	0.053	0.031	0.029	0.162	0.164
MEDIAN	0.046	0.010	0.022	0.006	0.062	0.004	0.042	0.053				
1C	0.073	0.061 0.137	0.279 0.300 0.113	0.027 0.027 0.018 0.319	0.190 0.145 0.033 0.038	0.087 0.057 0.057	0.153 0.092	0.103	0.115	0.162	0.301	0.301
MEDIAN	0.073	0.099	0.279	0.027	0.091	0.057	0.123	0.103				
1D	0.896	2.021 1.191	1.406 1.406 1.406	0.025 0.188 0.188 5.306	5.851 1.332 0.295 2.771	0.396 0.274 0.426	2.159 3.628	5.242	1.720	53.534	5.556	5.826
MEDIAN	0.896	1.606	1.406	0.188	2.051	0.396	2.894	5.242				
1E	0.083	0.155 0.404	0.480 0.520 0.667	0.367 0.635 0.164 0.625	0.266 0.103 0.273 0.273	0.066 0.048 0.048	0.463 1.056	0.209	0.346	1.337	0.593	1.008
MEDIAN	0.083	0.279	0.520	0.496	0.269	0.048	0.759	0.209				
1F	0.121	0.243 4.014	0.435 0.704 2.774	0.511 0.515 0.515 1.415	5.487 0.737 0.389 0.382	26.008 6.951 1.943	1.211 1.509	2.948	5.840	******	84.065	85.887
MEDIAN	0.121	2.128	0.704	0.515	0.563	6.951	1.360	2.948				

100 · RATIO OF JOINT SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
COL MEAN	0.055	0.064	0.120	0.068	0.079	0.274	0.114	0.058				

160 - RATIO OF OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1G	0.123	0.107	0.429	0.106								
		0.243	1.296	1.750	2.907				0.576	8.954	2.747	2.803
			0.231	0.523	0.227	0.220						
				0.234	0.162	0.432	0.529					
					0.162	0.482	0.529	0.714				
MEDIAN	0.123	0.178	0.429	0.378	0.194	0.482	0.529	0.714				
1H	0.247	0.180	0.213	0.324								
		0.819	0.377	0.339	1.250				0.447	1.940	0.966	1.142
			0.341	0.495	0.399	0.108						
				0.550	0.284	0.108	0.675					
					0.284	0.108	0.802	1.044				
MEDIAN	0.247	0.499	0.341	0.417	0.341	0.108	0.738	1.044				
1I	13.723	0.253	0.310	0.467								
		6.443	64.278	1.310	8.656				5.723	******	63.968	64.120
			10.928	0.738	0.534	0.167						
				0.805	0.322	0.158	1.047					
					0.313	0.158	1.499	2.351				
MEDIAN	13.723	3.348	10.928	0.771	0.428	0.158	1.273	2.351				
1K	0.032	0.035	0.207	0.134								
		1.310	0.210	0.310	1.090				0.989	******	11.466	12.044
			0.309	0.455	0.573	0.093						
				0.640	0.265	0.084	0.610					
					0.265	0.084	12.076	1.154				
MEDIAN	0.032	0.697	0.210	0.382	0.319	0.084	6.343	1.154				
1L	0.050	0.058	0.140	0.158								
		2.039	0.703	0.292	0.403				0.223	4.013	1.981	2.038
			0.093	0.002	0.042	0.001						
				0.002	0.101	0.001	0.045					
					0.095	0.005	0.130	0.103				
MEDIAN	0.050	1.048	0.140	0.080	0.098	0.001	0.087	0.103				
1N	0.035	0.099	0.023	0.023								
		0.182	0.085	0.048	0.085				0.122	0.504	0.204	0.551
			0.227	0.043	0.028	0.022						
				0.055	0.077	0.029	0.573					
					0.083	0.029	0.569	0.121				
MEDIAN	0.035	0.140	0.085	0.045	0.080	0.029	0.571	0.121				

100 * RATIO ... * VALUES ...

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3A	0.034	0.128	0.213	0.309					0.271	1.792	0.638	0.940
		0.390	0.671	0.745	0.016							
			0.725	0.943	0.044	0.005						
				0.670	0.046	0.017	0.003					
					0.077	0.018	0.253	0.138				
MEDIAN	0.034	0.259	0.671	0.707	0.045	0.017	0.118	0.138				
3B	0.046	0.138	0.999	0.112					0.750	15.971	3.589	3.786
		0.047	0.903	0.163	0.654							
			1.485	0.176	0.085	0.793						
				2.019	1.523	0.519	0.243					
					0.650	0.440	3.832	0.176				
MEDIAN	0.046	0.092	0.999	0.172	0.652	0.519	2.037	0.176				
3C	0.036	0.046	0.566	0.050					1.470	79.811	8.462	8.908
		0.333	0.772	0.244	8.944							
			0.746	0.304	1.035	2.544						
				0.506	0.651	0.991	2.116					
					0.482	3.206	2.600	3.215				
MEDIAN	0.036	0.189	0.746	0.274	0.643	2.544	2.358	3.215				
3D	0.029	0.292	0.740	0.446					0.837	8.087	0.879	2.531
		0.521	0.451	0.605	1.116							
			1.062	1.327	0.651	0.277						
				1.109	0.732	0.264	1.841					
					0.542	0.264	1.910	2.560				
MEDIAN	0.029	0.406	0.740	0.857	0.691	0.264	1.875	2.560				
3E	0.000	0.027	0.014	0.043					0.052	0.075	0.256	0.274
		0.001	0.009	0.070	0.049							
			0.012	0.043	0.031	0.008						
				0.115	0.099	0.003	0.019					
					0.112	0.014	0.275	0.052				
MEDIAN	0.000	0.014	0.012	0.056	0.074	0.008	0.147	0.052				
3F	0.054	0.083	0.906	0.559					1.034	17.664	1.250	4.093
		0.584	1.883	0.973	0.598							
			1.336	1.372	0.657	0.401						
				1.641	0.861	0.267	1.210					
					0.449	0.267	2.460	4.147				
MEDIAN	0.054	0.333	1.336	1.172	0.627	0.267	1.835	4.147				

100 * RATIO OF OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3G	0.620	0.400	0.243	0.246								
		1.456	1.279	0.331	1.199							
			2.667	0.277	0.638	0.105						
				0.978	0.435	0.061	0.685					
					0.435	0.101	0.941	0.392	0.674	7.334	2.424	2.606
MEDIAN	0.620	0.928	1.279	0.304	0.536	0.101	0.313	0.392				
3H	0.030	0.125	0.697	0.151								
		0.692	0.767	0.865	0.457							
			1.078	0.319	0.235	0.259						
				0.714	0.509	0.223	0.237					
					0.280	0.223	0.841	1.266	0.498	2.280	0.714	1.236
MEDIAN	0.030	0.408	0.767	0.516	0.383	0.223	0.539	1.266				
3I	0.104	0.660	0.692	0.174								
		0.724	0.756	0.934	1.400							
			1.046	0.600	0.602	0.199						
				0.252	0.790	0.223	1.318					
					0.408	0.223	1.282	1.901	0.714	4.480	0.992	1.797
MEDIAN	0.104	0.692	0.756	0.426	0.696	0.223	1.300	1.901				
3J	0.137	0.552	0.256	1.225								
		1.974	0.938	0.728	23.178							
			1.105	0.883	1.520	0.485						
				1.325	1.011	0.367	5.540					
					0.600	0.367	3.564	5.344	2.458	******	22.578	23.041
MEDIAN	0.137	1.263	0.938	1.054	1.266	0.367	3.552	5.344				
3K	0.116	0.131	0.662	0.260								
		0.046	0.320	0.366	5.421							
			0.249	0.215	0.260	0.176						
				0.601	0.567	0.178	1.273					
					0.594	0.178	2.763	1.045	0.771	29.929	5.161	5.375
MEDIAN	0.116	0.088	0.320	0.313	0.580	0.178	2.020	1.045				
4A	0.331	2.200	0.764	4.020								
		2.352	0.364	3.924	1.513							
			1.187	4.283	1.365	0.446						
				4.476	1.537	0.303	1.962					
					1.482	0.303	1.875	3.047	1.938	35.453	0.552	4.173
MEDIAN	0.331	2.276	0.864	4.151	1.525	0.303	1.918	3.047				

SUMMARY MEASURES

[illegible] OF [illegible] SERVICES [illegible]

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
4C	0.119	0.438	3.522	0.337								
		0.445	6.455	0.790	0.279							
			4.304	0.566	0.366	0.109						
				0.824	0.454	0.084	0.674					
					0.354	0.084	0.525	0.270	1.075	57.553	2.933	6.371
MEDIAN	0.119	0.442	4.804	0.678	0.360	0.084	0.599	0.270				
4D	0.052	0.015	0.395	0.113								
		0.048	0.109	0.133	0.417							
			0.109	0.171	0.195	0.071						
				0.590	0.458	0.071	0.372					
					0.447	0.071	0.509	0.315	0.218	0.629	0.477	0.577
MEDIAN	0.052	0.030	0.109	0.152	0.432	0.071	0.440	0.315				
4E	0.103	0.190	0.259	0.202								
		0.380	0.707	0.480	0.866							
			0.398	0.669	0.554	0.128						
				0.762	0.394	0.128	1.279					
					0.394	0.128	0.948	0.520	0.500	2.076	0.690	1.171
MEDIAN	0.103	0.535	0.398	0.574	0.474	0.128	1.113	0.520				
4F	0.342	0.506	1.282	0.595								
		1.033	1.347	0.745	3.262							
			1.682	0.883	0.829	0.226						
				0.718	0.666	0.221	1.384					
					0.515	0.221	1.384	2.088	0.996	10.449	2.747	3.041
MEDIAN	0.342	0.769	1.347	0.731	0.747	0.221	1.384	2.088				
4G	0.342	0.136	0.162	0.226								
		0.317	0.252	1.225	0.458							
			0.169	0.433	0.323	0.072						
				1.274	0.503	0.063	0.207					
					0.577	0.063	0.417	0.267	0.374	2.118	1.043	1.211
MEDIAN	0.342	0.226	0.169	0.529	0.480	0.063	0.312	0.267				
4H	0.222	0.955	0.970	1.764								
		1.063	0.740	1.927	0.740							
			1.024	2.016	1.031	0.339						
				1.989	1.254	0.224	1.962					
					0.734	0.224	1.927	3.025	1.191	11.230	0.500	2.803
MEDIAN	0.222	1.009	0.740	1.958	0.885	0.224	1.944	3.025				

100 * RATIO OF OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
41	0.364	1.204	1.340	2.411					1.613	10.957	0.655	2.404
		1.267	1.915	2.581	0.930							
			1.930	2.632	1.296	0.636						
				2.611	1.547	0.886	1.998					
					0.894	0.686	1.954	2.788				
MEDIAN	0.364	1.236	1.918	2.596	1.116	0.666	1.976	2.738				
4J	0.196	0.445	0.126	0.751					0.932	7.636	1.185	2.295
		1.030	1.011	0.464	1.504							
			1.210	1.154	0.905	0.254						
				1.316	0.684	0.256	1.689					
					0.684	0.256	1.689	2.421				
MEDIAN	0.196	1.037	1.011	0.952	0.794	0.256	1.689	2.421				
4K	0.223	0.269	1.234	0.973					0.899	4.710	1.088	1.587
		1.357	1.332	0.583	1.068							
			1.281	1.271	0.551	0.246						
				1.136	0.654	0.228	1.253					
					0.637	0.228	1.527	1.815				
MEDIAN	0.228	0.813	1.281	1.054	0.652	0.223	1.390	1.815				
5A	0.046	0.103	0.119	0.130					0.390	3.565	1.413	1.476
		1.516	1.522	0.243	0.791							
			0.330	0.352	0.256	0.056						
				0.493	0.201	0.047	0.382					
					0.201	0.047	0.382	0.591				
MEDIAN	0.046	0.809	0.330	0.297	0.228	0.047	0.382	0.591				
5B	0.065	0.117	0.942	0.373					0.954	13.290	0.897	3.253
		0.792	1.639	1.134	0.534							
			1.255	0.824	0.756	0.426						
				0.269	1.026	0.232	2.162					
					0.534	0.232	2.144	3.318				
MEDIAN	0.065	0.454	1.255	0.598	0.645	0.282	2.153	3.318				
5C	0.000	0.001	0.108	0.224					0.112	0.477	0.661	0.723
		0.000	0.101	0.724	0.262							
			0.076	0.063	0.055	0.011						
				0.069	0.055	0.010	0.086					
					0.037	0.010	0.062	0.059				
MEDIAN	0.000	0.000	0.101	0.146	0.054	0.010	0.074	0.059				

100 * RATIO OF OTHER SERVICES DO...

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
SD	0.051	0.071	0.835	0.434								
		0.513	0.864	1.037	0.593							
			1.120	1.292	0.650	0.152						
				1.730	0.851	0.137	2.043					
					0.449	0.150	2.043	3.181	0.912	12.519	1.296	3.130
MEDIAN	0.051	0.294	0.864	1.164	0.624	0.150	2.043	3.181				
SE	0.049	0.144	0.357	0.114								
		0.710	17.096	0.132	1.112							
			1.295	0.296	0.581	0.403						
				1.129	0.802	0.278	1.355					
					0.837	0.202	1.953	2.574	1.586	******	16.539	17.047
MEDIAN	0.049	0.427	1.295	0.214	0.819	0.278	1.654	2.574				
SF	0.053	0.042	0.437	0.383								
		0.042	2.443	1.081	0.506							
			0.279	0.150	0.115	0.166						
				0.091	0.336	0.110	0.228					
					0.228	0.104	0.102	0.167	0.353	5.670	2.164	2.401
MEDIAN	0.053	0.042	0.437	0.266	0.282	0.110	0.165	0.167				
SH	0.068	0.213	0.315	0.378								
		0.549	0.729	0.718	0.320							
			0.045	0.919	0.422	0.237						
				1.271	0.667	0.206	1.475					
					0.669	0.206	1.432	0.366	0.591	3.608	0.893	1.437
MEDIAN	0.068	0.381	0.315	0.818	0.545	0.206	1.479	0.886				
SI	0.011	0.020	0.152	0.043								
		0.045	0.535	0.432	0.281							
			0.115	0.087	0.089	0.020						
				0.033	0.209	0.021	0.503					
					0.092	0.020	0.252	0.110	0.159	0.539	0.434	0.524
MEDIAN	0.011	0.032	0.152	0.085	0.150	0.020	0.377	0.110				
SJ	0.071	0.131	0.128	0.211								
		0.219	0.443	0.475	0.210							
			0.427	0.189	0.300	0.013						
				0.943	0.396	0.011	0.151					
					0.396	0.009	0.169	0.188	0.254	0.904	0.754	0.934
MEDIAN	0.071	0.175	0.427	0.543	0.348	0.011	0.160	0.188				

100 * RATIO OF OTHER SERVICES DIRECT

	J1	J2	J3	J4	J5	J6	J7	J8
SK	0.063	0.093	0.063	0.058				
		0.339	0.302	0.087	0.367			
			0.507	0.055	0.184	0.011		
				0.082	0.191	0.014	0.100	
					0.372	0.016	0.165	0.100
MEDIAN	0.063	0.213	0.302	0.068	0.275	0.014	0.132	0.100
SL	0.053	0.092	0.020	0.015				
		0.320	0.037	0.043	0.077			
			0.055	0.110	0.085	0.094		
				0.173	0.505	0.082	0.367	
					0.480	0.082	0.739	0.151
MEDIAN	0.053	0.206	0.055	0.076	0.232	0.082	0.553	0.151
SM	0.063	0.289	0.361	0.310				
		0.367	0.395	0.534	0.300			
			0.510	0.717	0.362	0.212		
				1.067	0.499	0.153	0.803	
					0.499	0.153	0.762	1.657
MEDIAN	0.063	0.328	0.396	0.625	0.430	0.153	0.782	1.657
SN	0.065	0.121	0.129	0.515				
		0.314	0.410	0.586	0.243			
			0.536	0.804	0.217	0.053		
				1.091	0.463	0.040	0.603	
					0.463	0.039	0.515	0.172
MEDIAN	0.065	0.217	0.416	0.695	0.353	0.040	0.558	0.172
6A	0.139	0.172	0.204	0.342				
		0.376	0.903	0.936	0.610			
			0.311	0.527	0.417	0.111		
				0.744	0.284	0.070	0.832	
					0.284	0.067	6.822	1.303
MEDIAN	0.139	0.284	0.311	0.635	0.350	0.070	3.827	1.303
6F	0.004	0.068	0.033	0.101				
		0.591	1.335	1.015	0.117			
			0.173	0.040	0.044	0.003		
				0.094	0.095	0.002	0.000	
					0.095	0.005	0.055	0.036
MEDIAN	0.004	0.340	0.173	0.097	0.095	0.003	0.027	0.036

SUMMARY MEASURES

MEAN	VAR RANGE	COLUMN RANGE	TOTAL
0.159	0.413	0.444	0.496
0.181	0.739	0.426	0.724
0.501	2.571	0.757	1.594
0.359	1.493	0.776	1.052
0.784	40.635	5.990	6.755
0.210	2.432	1.252	1.333

100 - RATIO OF OTHER SERVICES GOALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
6G	0.091	0.103	0.571	0.135								
		0.208	0.793	0.057	0.593							
			0.504	0.194	0.161	0.175						
				0.368	0.419	0.178	0.956		0.417	2.841	0.658	1.557
					0.720	0.178	1.614	0.730				
MEDIAN	0.091	0.155	0.571	0.164	0.406	0.178	1.285	0.730				
6H	0.001	0.028	0.540	0.358								
		0.067	1.731	1.243	0.099							
			1.731	1.854	0.476	0.054			0.701	8.660	1.496	1.843
				1.763	1.110	0.011	0.238					
					0.818	0.022	1.163	0.061				
MEDIAN	0.061	0.047	1.731	1.503	0.647	0.022	0.701	0.661				
6I	0.101	0.228	0.196	0.244								
		0.451	0.369	0.453	1.551							
			0.494	0.617	0.173	0.050			0.420	2.582	1.378	1.515
				0.975	0.370	0.036	0.729					
					0.370	0.036	0.729	0.228				
MEDIAN	0.101	0.339	0.369	0.537	0.370	0.036	0.729	0.228				
6J	0.296	0.329	0.586	1.232								
		0.792	1.604	1.258	1.310							
			0.835	1.374	1.161	0.251			1.007	8.507	1.018	2.872
				1.543	0.805	0.252	0.919					
					0.761	0.282	1.260	3.123				
MEDIAN	0.296	0.560	0.835	1.328	0.993	0.282	1.039	3.123				
6K	0.120	0.071	0.066	0.105								
		0.629	0.250	0.237	0.927							
			0.216	0.214	0.293	0.050			0.292	1.361	0.721	0.873
				0.457	0.208	0.056	0.345					
					0.203	0.056	0.653	0.164				
MEDIAN	0.120	0.350	0.216	0.225	0.250	0.056	0.749	0.164				
6L	0.206	0.197	0.109	0.226								
		0.520	2.145	0.424	1.461							
			0.027	0.166	0.163	0.029			0.382	5.479	2.118	2.126
				0.882	0.257	0.019	0.113					
					0.242	0.039	0.183	0.163				
MEDIAN	0.206	0.359	0.109	0.325	0.249	0.029	0.148	0.163				

100 * RATIO OF OTHER SERVICES DUAL)

	q1	q2	q3	q4	q5	q6	q7	q8
COL MEAN	0.465	0.557	1.307	0.680	0.642	0.806	1.226	1.380

SUMMARY MEASURES

MEAN	VAR RANGE	COLUMN RANGE	TOTAL

1D - SOF OF RATIO OF ARMY AND OTHER SERVICE GOALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1A	0.043	0.007 0.080	0.164 0.106 0.055	0.039 0.063 0.063 0.221	1.278 0.030 0.045 0.092	0.022 0.050 0.393	0.294 0.256	0.422	0.186	1.545	1.248	1.271
MEDIAN	0.043	0.043	0.106	0.063	0.063	0.050	0.275	0.422				
1B	0.005	0.002 0.000	0.003 0.001 0.004	0.001 0.001 0.001 0.001	0.017 0.001 0.011 0.011	0.002 0.002 0.002	0.008 0.003	0.006	0.004	0.000	0.016	0.016
MEDIAN	0.036	0.001	0.003	0.001	0.011	0.002	0.005	0.006				
1C	0.023	0.011 0.024	0.033 0.040 0.021	0.004 0.004 0.004 0.038	0.028 0.043 0.005 0.006	0.041 0.016 0.016	0.028 0.012	0.014	0.021	0.004	0.038	0.039
MEDIAN	0.023	0.017	0.038	0.004	0.017	0.016	0.020	0.014				
1D	0.105	0.242 0.125	0.187 0.167 0.151	0.006 0.020 0.020 0.486	0.666 0.214 0.041 0.287	0.063 0.064 0.066	0.246 0.373	0.542	0.204	0.658	0.625	0.660
MEDIAN	0.105	0.183	0.167	0.020	0.250	0.064	0.309	0.542				
1E	0.014	0.024 0.350	0.053 0.067 0.079	0.043 0.074 0.019 0.068	0.037 0.012 0.032 0.032	0.011 0.009 0.009	0.058 0.129	0.022	0.042	0.018	0.071	0.120
MEDIAN	0.014	0.037	0.067	0.056	0.032	0.009	0.093	0.022				
1F	0.022	0.034 0.411	0.060 0.095 0.342	0.061 0.062 0.062 0.178	0.359 0.084 0.049 0.043	9.137 0.705 0.206	0.131 0.161	0.305	0.626	76.817	8.931	9.115
MEDIAN	0.022	0.222	0.095	0.062	0.066	0.705	0.146	0.305				

1D 304 IF RATIO OF ARMY AND OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
1G	0.022	0.015	0.053	0.017					0.085	0.173	0.376	0.387
		0.026	0.158	0.135	0.402							
			0.036	0.062	0.033	0.022						
				0.030	0.026	0.135	0.063					
					0.026	0.135	0.063	0.081				
MEDIAN	0.022	0.021	0.053	0.046	0.030	0.135	0.063	0.081				
1H	0.036	0.023	0.031	0.042					0.057	0.022	0.114	0.127
		0.092	0.055	0.044	0.132							
			0.045	0.059	0.050	0.025						
				0.065	0.038	0.025	0.081					
					0.038	0.025	0.090	0.114				
MEDIAN	0.036	0.060	0.045	0.051	0.044	0.025	0.085	0.114				
1I	2.953	0.055	0.041	0.057					0.672	44.169	6.397	6.412
		0.654	6.458	0.141	0.955							
			1.239	0.084	0.063	0.029						
				0.090	0.042	0.026	0.115					
					0.041	0.026	0.160	0.245				
MEDIAN	2.953	0.344	1.239	0.087	0.053	0.028	0.137	0.245				
1K	0.006	0.014	0.031	0.018					0.108	1.325	1.147	1.212
		0.141	0.031	0.041	0.117							
			0.041	0.055	0.047	0.019						
				0.074	0.036	0.018	0.071					
					0.036	0.018	1.218	0.125				
MEDIAN	0.006	0.377	0.031	0.048	0.041	0.018	0.644	0.125				
1L	0.015	0.013	0.022	0.021					0.034	0.042	0.201	0.213
		0.214	0.096	0.039	0.042							
			0.011	0.000	0.005	0.000						
				0.000	0.015	0.000	0.009					
					0.014	0.001	0.016	0.011				
MEDIAN	0.015	0.113	0.022	0.010	0.014	0.000	0.012	0.011				
1N	0.005	0.015	0.007	0.005					0.017	0.009	0.022	0.073
		0.028	0.017	0.004	0.010							
			0.029	0.005	0.004	0.004						
				0.008	0.010	0.008	0.077					
					0.011	0.008	0.077	0.014				
MEDIAN	0.005	0.021	0.017	0.006	0.010	0.008	0.077	0.014				

									SUMMARY MEASURES			
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3A	0.005	0.015 0.045	0.026 0.077 0.062	0.053 0.035 0.104 0.073	0.002 0.006 0.005 0.010	0.001 0.003 0.003	0.004 0.025	0.014	0.031	0.022	0.069	0.103
MEDIAN	0.005	0.030	0.077	0.079	0.006	0.003	0.014	0.014				
3B	0.006	0.016 0.006	0.137 0.101 0.159	0.012 0.018 0.019 0.256	0.066 0.010 0.152 0.077	0.092 0.073 0.060	0.046 0.402	0.046	0.088	0.185	0.356	0.396
MEDIAN	0.006	0.011	0.137	0.019	0.072	0.073	0.224	0.046				
3C	0.004	0.005 0.035	0.069 0.082 0.080	0.006 0.027 0.033 0.055	0.900 0.113 0.075 0.058	0.264 0.109 0.331	0.222 0.270	0.331	0.153	0.808	0.842	0.896
MEDIAN	0.004	0.020	0.080	0.030	0.094	0.264	0.246	0.331				
3D	0.003	0.035 0.061	0.034 0.051 0.116	0.049 0.066 0.143 0.121	0.122 0.075 0.083 0.064	0.038 0.036 0.036	0.194 0.201	0.266	0.092	0.084	0.094	0.263
MEDIAN	0.003	0.048	0.034	0.093	0.079	0.036	0.197	0.266				
3E	0.000	0.005 0.000	0.003 0.005 0.003	0.005 0.008 0.005 0.013	0.009 0.004 0.014 0.015	0.004 0.035 0.004	0.004 0.032	0.006	0.008	0.001	0.028	0.029
MEDIAN	0.000	0.002	0.003	0.006	0.011	0.004	0.018	0.006				
3F	0.005	0.010 0.068	0.120 0.207 0.144	0.080 0.107 0.147 0.174	0.070 0.076 0.096 0.055	0.050 0.037 0.037	0.126 0.257	0.432	0.114	0.186	0.131	0.424
MEDIAN	0.005	0.039	0.144	0.127	0.073	0.037	0.192	0.432				

1b = SUM OF RATIO OF ARMY AND OTHER SERVICES DUALS

	q1	q2	q3	q4	q5	q6	q7	q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
3G	0.072	0.050	0.034	0.029					0.076	0.081	0.257	0.281
		0.156	0.136	0.039	0.121							
			0.291	0.031	0.074	0.021						
				0.108	0.053	0.010	0.075					
					0.053	0.023	0.104	0.042				
MEDIAN	0.072	0.103	0.136	0.035	0.063	0.021	0.089	0.042				
3H	0.004	0.014	0.087	0.017					0.057	0.025	0.078	0.128
		0.079	0.087	0.095	0.056							
			0.118	0.034	0.026	0.035						
				0.079	0.057	0.032	0.026					
					0.035	0.032	0.089	0.132				
MEDIAN	0.004	0.046	0.087	0.056	0.045	0.032	0.057	0.132				
3I	0.020	0.081	0.079	0.019					0.081	0.048	0.099	0.184
		0.032	0.087	0.102	0.150							
			0.115	0.063	0.070	0.029						
				0.023	0.089	0.032	0.142					
					0.051	0.032	0.133	0.203				
MEDIAN	0.020	0.081	0.087	0.046	0.079	0.032	0.140	0.203				
3J	0.024	0.093	0.052	0.134					0.259	4.832	2.258	2.304
		0.207	0.113	0.078	2.328							
			0.140	0.095	0.162	0.059						
				0.152	0.111	0.047	0.364					
					0.070	0.047	0.366	0.544				
MEDIAN	0.024	0.150	0.113	0.114	0.137	0.047	0.365	0.544				
3K	0.013	0.017	0.077	0.027					0.082	0.308	0.523	0.544
		0.003	0.036	0.038	0.532							
			0.029	0.023	0.029	0.023						
				0.064	0.067	0.024	0.135					
					0.069	0.024	0.286	0.108				
MEDIAN	0.013	0.012	0.036	0.032	0.068	0.024	0.211	0.108				
4A	0.043	0.249	0.088	0.412					0.205	0.357	0.057	0.418
		0.247	0.098	0.401	0.101							
			0.129	0.433	0.196	0.055						
				0.453	0.164	0.040	0.206					
					0.158	0.040	0.200	0.322				
MEDIAN	0.043	0.248	0.098	0.425	0.162	0.040	0.203	0.322				

									SUMMARY MEASURES			
	41	42	43	44	45	46	47	48	MEAN	VAR RANGE	COLUMN RANGE	TOTAL
SD	0.007	0.009 0.062	0.101 0.101 0.126	0.052 0.115 0.159 0.195	0.070 0.075 0.096 0.055	0.017 0.026 0.022	0.223 0.222	0.344	0.103	0.145	0.145	0.337
MEDIAN	0.007	0.035	0.101	0.127	0.072	0.022	0.222	0.344				
SE	0.011	0.020 0.077	0.091 1.977 0.151	0.015 0.017 0.032 0.131	0.127 0.078 0.097 0.104	0.049 0.037 0.027	0.155 0.224	0.280	0.135	3.480	1.886	1.966
MEDIAN	0.011	0.049	0.151	0.025	0.100	0.037	0.189	0.280				
SF	0.021	0.010 0.010	0.052 0.274 0.054	0.045 0.117 0.019 0.014	0.051 0.014 0.045 0.034	0.027 0.034 0.037	0.027 0.014	0.020	0.045	0.066	0.240	0.264
MEDIAN	0.021	0.010	0.052	0.032	0.039	0.034	0.020	0.020				
SH	0.014	0.029 0.065	0.040 0.033 0.005	0.043 0.087 0.102 0.148	0.048 0.052 0.077 0.077	0.039 0.031 0.031	0.166 0.174	0.097	0.071	0.044	0.105	0.169
MEDIAN	0.014	0.047	0.040	0.095	0.064	0.031	0.170	0.097				
SI	0.002	0.003 0.006	0.022 0.063 0.015	0.006 0.057 0.010 0.010	0.033 0.011 0.025 0.013	0.004 0.004 0.005	0.061 0.030	0.013	0.020	0.007	0.051	0.061
MEDIAN	0.002	0.004	0.022	0.010	0.019	0.004	0.045	0.013				
SJ	0.011	0.019 0.037	0.017 0.063 0.053	0.020 0.058 0.023 0.104	0.032 0.040 0.050 0.050	0.003 0.003 0.002	0.022 0.023	0.025	0.033	0.012	0.081	0.102
MEDIAN	0.011	0.028	0.053	0.042	0.045	0.003	0.022	0.025				

10 - SUM OF [illegible] ARMY AND OTHER [illegible]

	q1	q2	q3	q4	q5	q6	q7	q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
41	0.056	0.158	0.213	0.251								
		0.158	0.203	0.268	0.104				0.174	0.110	0.066	0.241
			0.204	0.273	0.140	0.079						
				0.271	0.105	0.079	0.210					
					0.099	0.079	0.205	0.297				
MEDIAN	0.056	0.158	0.204	0.270	0.122	0.079	0.207	0.297				
4J	0.030	0.055	0.021	0.035								
		0.173	0.117	0.052	0.100				0.104	0.081	0.118	0.239
			0.131	0.125	0.100	0.055						
				0.142	0.073	0.036	0.187					
					0.078	0.036	0.179	0.260				
MEDIAN	0.030	0.114	0.117	0.105	0.089	0.036	0.183	0.260				
4K	0.033	0.045	0.137	0.107								
		0.157	0.143	0.064	0.117				0.101	0.048	0.114	0.158
			0.136	0.137	0.075	0.035						
				0.124	0.075	0.033	0.135					
					0.074	0.033	0.163	0.191				
MEDIAN	0.033	0.100	0.138	0.115	0.075	0.035	0.149	0.191				
5A	0.003	0.016	0.017	0.018								
		0.162	0.180	0.034	0.089				0.050	0.043	0.163	0.172
			0.043	0.045	0.036	0.015						
				0.059	0.030	0.015	0.048					
					0.030	0.015	0.048	0.090				
MEDIAN	0.008	0.089	0.043	0.039	0.033	0.015	0.048	0.090				
5B	0.015	0.013	0.112	0.045								
		0.089	0.206	0.124	0.063				0.108	0.147	0.094	0.344
			0.135	0.089	0.036	0.053						
				0.043	0.115	0.033	0.235					
					0.071	0.038	0.232	0.357				
MEDIAN	0.015	0.051	0.135	0.067	0.078	0.036	0.234	0.357				
5C	0.001	0.001	0.017	0.030								
		0.001	0.016	0.008	0.036				0.014	0.007	0.080	0.087
			0.011	0.003	0.007	0.003						
				0.009	0.007	0.003	0.012					
					0.005	0.003	0.008	0.007				
MEDIAN	0.001	0.001	0.016	0.019	0.007	0.003	0.010	0.007				

[illegible] ARMY AND OTHER SERVICE DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
5K	0.013	0.016	0.012	0.007								
		0.049	0.053	0.013	0.054				0.024	0.008	0.060	0.067
			0.372	0.007	0.023	0.005						
				0.011	0.026	0.005	0.017					
					0.057	0.005	0.022	0.011				
MEDIAN	0.013	0.032	0.053	0.009	0.040	0.005	0.019	0.011				
5L	0.011	0.015	0.005	0.003								
		0.043	0.014	0.007	0.012				0.024	0.009	0.053	0.075
			0.009	0.013	0.011	0.014						
				0.022	0.064	0.014	0.044					
					0.053	0.014	0.080	0.022				
MEDIAN	0.011	0.029	0.009	0.010	0.035	0.014	0.062	0.022				
5M	0.012	0.039	0.053	0.037								
		0.047	0.055	0.063	0.043				0.062	0.031	0.080	0.182
			0.061	0.082	0.046	0.031						
				0.117	0.060	0.025	0.090					
					0.060	0.025	0.100	0.194				
MEDIAN	0.012	0.043	0.055	0.072	0.053	0.025	0.095	0.194				
5N	0.015	0.020	0.020	0.037								
		0.041	0.057	0.069	0.033				0.046	0.018	0.082	0.110
			0.064	0.090	0.026	0.009						
				0.119	0.056	0.012	0.082					
					0.056	0.017	0.076	0.021				
MEDIAN	0.015	0.030	0.057	0.079	0.043	0.012	0.079	0.021				
6A	0.023	0.025	0.030	0.044								
		0.043	0.101	0.104	0.034				0.087	0.408	0.599	0.682
			0.041	0.063	0.052	0.023						
				0.084	0.053	0.010	0.093					
					0.038	0.011	0.092	0.140				
MEDIAN	0.023	0.036	0.041	0.073	0.045	0.011	0.372	0.140				
6F	0.001	0.013	0.012	0.015								
		0.069	0.144	0.111	0.016				0.025	0.028	0.132	0.143
			0.026	0.006	0.009	0.004						
				0.014	0.019	0.006	0.002					
					0.019	0.007	0.008	0.005				
MEDIAN	0.001	0.041	0.028	0.014	0.017	0.006	0.005	0.005				

19 SUM OF RATIO OF ARMY AND OTHER SERVICES DUALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	SUMMARY MEASURES MEAN	VAR RANGE	COLUMN RANGE	TOTAL
6G	0.010	0.012	0.067	0.017								
		0.023	0.364	0.006	0.041							
			0.032	0.022	0.019	0.023						
				0.041	0.049	0.024	0.103		0.047	0.031	0.068	0.165
					0.032	0.024	0.171	0.076				
MEDIAN	0.010	0.017	0.067	0.019	0.045	0.024	0.137	0.076				
6H	0.030	0.010	0.062	0.030								
		0.038	0.138	0.130	0.011							
			0.183	0.193	0.050	0.011						
				0.134	0.119	0.002	0.036		0.079	0.087	0.155	0.191
					0.092	0.003	0.121	0.070				
MEDIAN	0.030	0.024	0.138	0.157	0.071	0.003	0.078	0.070				
6I	0.015	0.029	0.025	0.030								
		0.055	0.043	0.050	0.165							
			0.059	0.072	0.021	0.009						
				0.107	0.047	0.003	0.083		0.050	0.029	0.144	0.157
					0.047	0.003	0.083	0.025				
MEDIAN	0.015	0.042	0.048	0.064	0.047	0.003	0.083	0.025				
6J	0.040	0.039	0.067	0.133								
		0.039	0.170	0.135	0.141							
			0.075	0.147	0.123	0.034						
				0.164	0.090	0.033	0.099		0.112	0.100	0.101	0.319
					0.083	0.038	0.136	0.353				
MEDIAN	0.040	0.039	0.093	0.142	0.109	0.033	0.117	0.353				
6K	0.022	0.012	0.011	0.015								
		0.073	0.042	0.034	0.103							
			0.032	0.025	0.039	0.011						
				0.056	0.031	0.011	0.095		0.037	0.015	0.072	0.092
					0.031	0.011	0.075	0.018				
MEDIAN	0.022	0.042	0.032	0.030	0.035	0.011	0.085	0.018				
6L	0.064	0.026	0.019	0.023								
		0.062	0.324	0.052	0.136							
			0.004	0.020	0.020	0.011						
				0.095	0.033	0.007	0.014		0.051	0.104	0.320	0.320
					0.031	0.003	0.023	0.019				
MEDIAN	0.064	0.045	0.019	0.040	0.032	0.006	0.018	0.019				

10 .. OF RATIO OF ARMY AND OTHER ... SALS

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
COL MEAN	0.073	0.085	0.147	0.077	0.094	0.095	0.132	0.148

SUMMARY MEASURES

MEAN	VAR RANGE	COLUMN RANGE	TOTAL

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Recruiting
Resource Allocation
Joint Advertising Mix Experiment
Sensitivity Analysis
U.S. Army Recruiting Command
Service Advertising
Joint Advertising

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Empirical Pareto-Efficient Production Function means to assess the impact of advertising in U.S. Army Recruiting are developed utilizing Data Envelopment Analysis (DEA). Results show that service specific advertising is "more effective" in "producing" high quality army contracts. These results corroborate earlier findings by the authors based on DEA that address the joint vs. service specific advertising issue.

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