



**NAVAL
POSTGRADUATE
SCHOOL**

MONTEREY, CALIFORNIA

THESIS

**ESTIMATING THE ROI OF RECRUITMENT
MARKETING AND ADVERTISING EXPENDITURE FOR
THE AUSTRALIAN DEFENCE FORCE**

by

Christopher D. Kitchin

March 2012

Thesis Advisor:
Second Reader:

Stephen Mehay
Carol Stoker

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE			<i>Form Approved OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE March 2012	3. REPORT TYPE AND DATES COVERED Master's Thesis	
4. TITLE AND SUBTITLE Estimating the ROI for Recruitment Marketing and Advertising Expenditure for the Australian Defence Force		5. FUNDING NUMBERS	
6. AUTHOR(S) Christopher D. Kitchin		8. PERFORMING ORGANIZATION REPORT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number _____N/A_____.	
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited		12b. DISTRIBUTION CODE	
13. ABSTRACT (maximum 200 words) This thesis analyzes the influence of advertising expenditure for ADF recruitment using data covering the period from June 2008 to December 2011. Econometric analysis was used to analyze the effect of media advertising on ADF enquiries, applications and enlistments. These models were developed to predict the impact of changing advertising expenditure on the generation of enquiries, applications and enlistments. The econometric recruiting models included independent variables for total monthly ADF media expenditure, monthly enlistments targets, national monthly youth unemployment rates and quarterly propensity to enlist in the ADF. Advertising expenditure was found to be positively related to various measures of recruitment. Increasing advertising expenditure was found to generate enquires and applications. For example, a 10% increase in monthly advertising expenditure was found to increase enquiries by 1.6%. Similarly, a 10% increase in monthly advertising expenditure would increase applications by 1.3%. Youth national unemployment and enlistment targets were positively related to enlistments, while advertising expenditure was found to have no effect on enlistments.			
14. SUBJECT TERMS Marketing and Advertising Expenditure, Recruitment			15. NUMBER OF PAGES 97
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT UU

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited

**ESTIMATING THE ROI OF RECRUITMENT MARKETING AND
ADVERTISING EXPENDITURE FOR THE AUSTRALIAN DEFENCE FORCE**

Christopher D. Kitchin
Major, Australian Army
B.S., University of New South Wales, 1999
B.A. (HONS), University of New South Wales, 2001

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

**NAVAL POSTGRADUATE SCHOOL
March 2012**

Author: Christopher D. Kitchin

Approved by: Stephen Mehay
Thesis Advisor

Carol Stoker
Second Reader

William R. Gates
Dean, Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis analyzes the influence of advertising expenditure for ADF recruitment using data covering the period from June 2008 to December 2011. Econometric analysis was used to analyze the effect of media advertising on ADF enquiries, applications and enlistments. These models were developed to predict the impact of changing advertising expenditure on the generation of enquiries, applications and enlistments.

The econometric recruiting models included independent variables for total monthly ADF media expenditure, monthly enlistments targets, national monthly youth unemployment rates and quarterly propensity to enlist in the ADF. Advertising expenditure was found to be positively related to various measures of recruitment. Increasing advertising expenditure was found to generate enquires and applications. For example, a 10% increase in monthly advertising expenditure was found to increase enquiries by 1.6%. Similarly, a 10% increase in monthly advertising expenditure would increase applications by 1.3%. Youth national unemployment and enlistment targets were positively related to enlistments, while advertising expenditure was found to have no effect on enlistments.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I.	INTRODUCTION.....	1
	A. BACKGROUND	1
	B. PURPOSE.....	3
	C. RESEARCH QUESTIONS.....	4
	D. ADVERTISING EFFECTIVENESS	4
II.	LITERATURE REVIEW	7
	A. OVERVIEW.....	7
	B. PROPENSITY TO ENLIST IN THE MILITARY.....	8
	C. ECONOMETRIC ENLISTMENT SUPPLY MODELS.....	13
	D. MARKETING STUDIES.....	18
	E. MEASUREMENT ISSUES.....	27
	F. SUMMARY	28
III.	DEFENCE FORCE RECRUITING	29
	A. ORGANIZATION	29
	B. DFR MARKETING STRATEGY.....	30
	C. ADF BRAND AWARENESS.....	35
	D. ADF ENLISTMENT SUPPLY	37
	E. MODEL DEVELOPED.....	38
	F. DFR ADVERTISING MEASUREMENT INITIATIVES.....	39
	1. Internal Metrics	39
	2. External Metrics.....	42
IV.	ESTIMATING ADF ADVERTISING EFFECTIVENESS	43
	A. INTRODUCTION.....	43
	B. METHODOLOGY	43
	C. DATA	44
	1. Limitations.....	44
	2. Data Sources.....	44
	D. ANALYSIS VARIABLES.....	45
	1. Dependent Variable	45
	<i>a. Enquiries</i>	<i>45</i>
	<i>b. Applications.....</i>	<i>45</i>
	<i>c. Enlistments</i>	<i>46</i>
	2. Explanatory Variables.....	46
	<i>a. Unemployment Rate.....</i>	<i>46</i>
	<i>b. Propensity.....</i>	<i>46</i>
	<i>c. Enlistment Targets</i>	<i>47</i>
	<i>d. Advertising Media Expenditure.....</i>	<i>48</i>
	E. DESCRIPTIVE STATISTICS.....	48
	1. Summary Statistics	48
	2. Correlation Analysis	51

F.	RESULTS	57
1.	ADF-Level Recruitment and Advertising Spending Regression	
Results		57
2.	Individual Services.....	62
G.	SUMMARY	66
V.	CONCLUSIONS AND RECOMMENDATIONS.....	71
A.	CONCLUSION	71
B.	RECOMMENDATIONS.....	72
C.	RECOMMENDATIONS FOR FUTURE RESEARCH.....	73
	LIST OF REFERENCES	75
	INITIAL DISTRIBUTION LIST	79

LIST OF FIGURES

Figure 1.	Annual Full-Time Entry and Percentage of Enlistment targets Achieved. (From Australian Department of Defence, 2010)	1
Figure 2.	Australian Defence Force Annual Separation Rate. (From Australian Department of Defence, 2010).....	2
Figure 3.	ADF Annual Advertising Budget (DFR, 2011a)	3
Figure 4.	Model of Military Recruitment (Sackett & Mavor, 2003).....	11
Figure 5.	Effects over Six months of One-time Levels in Marketing Spending, Structural Estimates (From Dertouzos & Garber, 2003)	20
Figure 6.	Effects over Six months of One-time Levels in Marketing Spending, Reduced-Form Estimates (From Dertouzos & Garber, 2003)	21
Figure 7.	Advertising Effective Expenditure Range (From Optimization Group, 2010)	25
Figure 8.	ADF Workforce Growth FY2009/10 to FY 2018/19. (From Australian Department of Defence, 2010b).....	33
Figure 9.	Two Monthly Enquiries and Media Spend	52
Figure 10.	ADF Monthly Applications and Total Media Spend.....	52
Figure 11.	ADF Monthly Enlistments and Total Media Spend	53
Figure 12.	Navy Two Monthly Enquiries and Navy Media Spend.....	54
Figure 13.	Army Two Monthly Enquiries and Army Media Spend	55
Figure 14.	Air Force Two Monthly Enquiries and Air Force Media Spend	55

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1.	Marginal Costs of an Enlistment (in dollars) (From Dertouzos, 1989)	16
Table 2.	Recruitment – Leads. ROI by channel (From Gallup Inc, 2010).....	24
Table 3.	Cost per Contract (Optimization Group, 2010)	26
Table 4.	ADF Permanent Force Ab Initio Entry, 2008-09 and 2009-10 (From ADF Annual Report 09-10, 2010)	34
Table 5.	Models of Recruitment Success, General Entry Non-Technical (From Thurecht, Miranti, Cassells & Duncan, 2011)	38
Table 6.	Descriptive Statistics.....	49
Table 7.	Mean Recruitment Values for the ADF and Individual Services	50
Table 8.	Conversion Ratios	51
Table 9.	Correlation Coefficients.....	54
Table 10.	Correlation Coefficients using Individual Service Data	56
Table 11.	OLS Regression Model – ADF Enquiries	59
Table 12.	OLS Regression Model – ADF Applications	61
Table 13.	OLS Regression Model of ADF Enlistments including Enlistment Targets ...	62
Table 14.	OLS Regression Model – Army Enquiries and Army Advertising Expenditure	63
Table 15.	OLS Regression Model – Navy Enquiries and Navy Advertising Expenditure	65
Table 16.	OLS Regression Model – Air Force Enquiries and Air Force Advertising Expenditure	66

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

ABS	Australian Bureau of Statistics
ADF	Australian Defence Force
AVF	All Volunteer Force
DoD	Department of Defense
DFR	Defence Force Recruiting
FY	Financial Year
GALLUP	Gallup Social and Economic Analysis Group
GMAX	The Optimization Group
JAMRS	Joint Advertising Marketing Research & Studies
NATSEM	National Centre for Social and Economic Modelling
NRC	Navy Recruiting Command
U.S.	United States
WCAR	Wharton Center for Applied Research
YATS	Youth Attitude Tracking Survey

THIS PAGE INTENTIONALLY LEFT BLANK

ACKNOWLEDGMENTS

I would like to thank Professor Stephen Mehay and Mrs Carol Stoker for their insightful contributions, guidance and knowledge. I would also like to thank Mrs Patricia Duffy from DFR for her support.

Finally, to my NPS professors and classmates, thank you for your energy and support.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. BACKGROUND

The Australian Defence Force (ADF) has faced a challenging recruiting environment in the first part of the 21st century. A strong civilian labour market offering attractive wages to youth with skills required by the ADF has resulted in the ADF being unable to meet recruitment targets since 2000. The number of enlistments and percentage of enlistment targets achieved is depicted in Figure 1. The horizontal line indicates the ADF only met between 80-100% of recruitment targets in the period 2000 to 2010. This poor recruitment performance occurred even with falling and historically low separation rates, as shown in Figure 2.

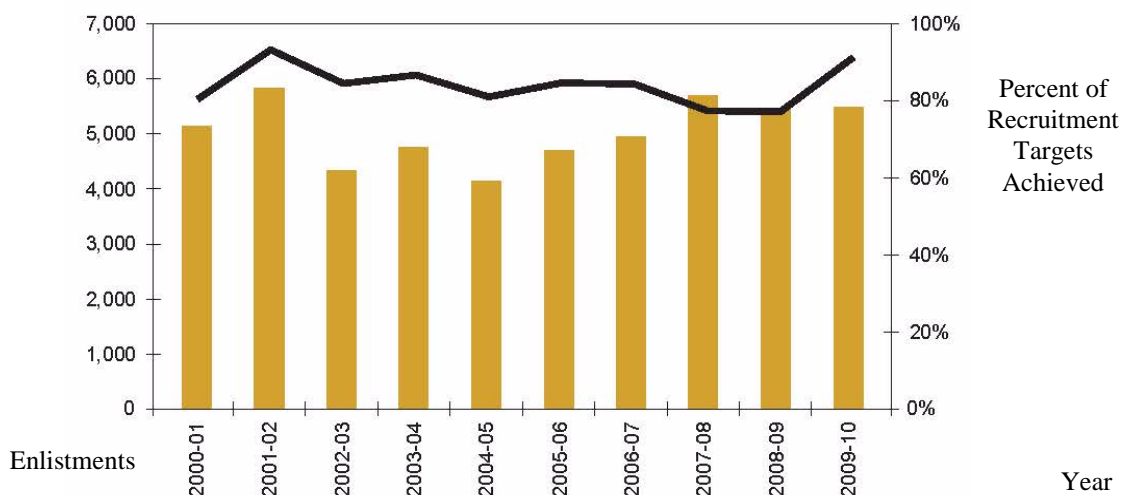


Figure 1. Annual Full-Time Entry and Percentage of Enlistment targets Achieved. (From Australian Department of Defence, 2010)

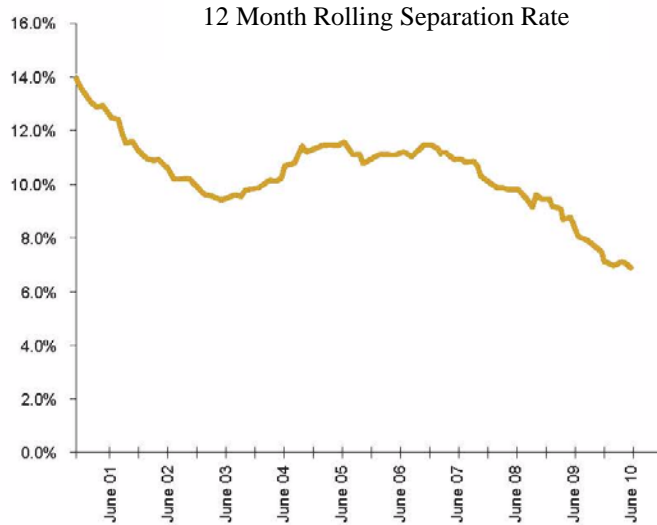


Figure 2. Australian Defence Force Annual Separation Rate. (From Australian Department of Defence, 2010)

While targets are not being met, of particular importance to the ADF is the number of critical trades and specialty employment categories which are at critical manning levels. Specialties such as Medical and Dental Officers and a number of trades, remain critically undermanned. This is especially prominent in the Navy submarine workforce (DFR, 2011).

Marketing and advertising (M&A) continues to play a very important role in achieving recruitment targets for the ADF. Historically, M&A has been in the form of newspaper advertisements, posters and television commercials. With advances in technology, and changing consumer tastes, print advertisement is rapidly giving way to digital content with television advertisement and internet marketing now providing the bulk of ADF marketing and advertising mediums.

This change in advertising strategy has also been stimulated by reductions in the ADF advertising budget. Spending by the ADF on M&A has decreased considerably in the last five years. Expenditure has decreased from \$51.5 million in 2008/09 to a forecasted budget of \$36 million for 2011/12. The pattern of ADF advertising expenditures over the last six years is illustrated graphically in Figure 3.

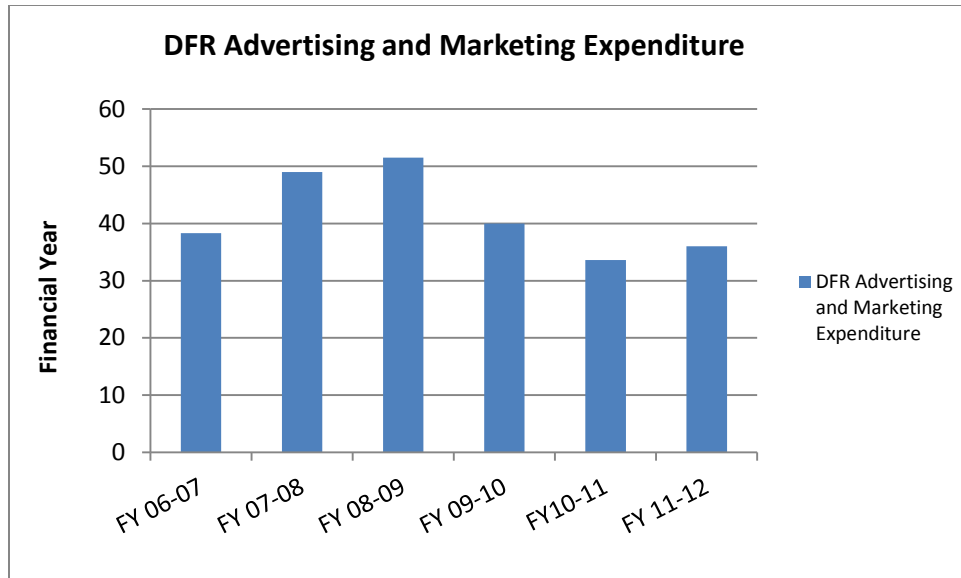


Figure 3. ADF Annual Advertising Budget (DFR, 2011a)

While enlistment targets are being consistently missed, research on the factors that influence a person's decision to enlist in the ADF has not been extensive; moreover, the impact of advertising on increasing awareness or its impact on enquiries or enlistments has not been extensively researched. This dearth of research has led Defence Force Recruiting (DFR), tasked with recruiting for the ADF, to expand its econometric analysis of the effectiveness of various marketing and advertising channels and their effect on recruitment success. Additionally, an ADF sponsored study is currently underway (early 2012) to investigate an enlistment supply model for the ADF.

B. PURPOSE

The purpose of this thesis is to provide an analytical evaluation of the recruitment effects of changes in expenditure for ADF national advertising during the period from FY 2008 to FY 2011. Given the changes in the budget, this study seeks to determine if there is any evidence that increases or decreases in advertising expenditure have caused a change in national awareness, as measured by number of enquiries generated and propensity to enlist in the ADF.

C. RESEARCH QUESTIONS

The following specific questions are addressed in this research:

1. Have changes in the ADF advertising budget impacted national advertising awareness as measured by the number of enquiries generated?
2. What is the relationship between changes in the ADF advertising budget and changes in the number of enquiries generated?
3. Is there evidence that ADF advertising increases market awareness?
4. Is there evidence that the increase in the ADF advertising budget affects attitudes of potential applicants?
5. Does the evidence suggest some media channels are more effective than others in terms of the number of inquiries they produce?
6. How cost-effective is advertising expenditure?

D. ADVERTISING EFFECTIVENESS

The issue of establishing the optimal advertising budget has been a problem confounding civilian companies and government departments for a long time. While advertising is almost universally regarded as a very important factor in increasing sales, firms and government have no conclusive method of establishing what the most appropriate level of advertising expenditure should be. In many cases, advertising expenditure is based on some past measure of sales, or previous advertising expenditure, on rule of thumb, or on prior experience and/or gut instinct.

Advertising expenditure for government departments is especially difficult to justify. This is due in part to the difficulty in measuring the return on investment of these advertising expenditures. DFR is faced with periodically having to justify advertising budgets and how much public money should be spent to meet recruitment goals. Faced with being asked to do more with less, accurately being able to measure advertising efficiency becomes a very important question. While DFR continues to expound the

benefits of M&A, and its effect on meeting both required enquiry levels and recruitment targets, it continues to search for methods which demonstrate a causal relationship between expenditures and outcomes.

DFR advertising uses a tiered approach to advertising which includes maintaining brand awareness and converting this awareness to propensity to join the ADF. DFR measures this propensity through regular surveying of target markets to measure whether the advertising expenditure has created or maintained awareness of the ADF product. While DFR M&A budgets have diminished in both real and nominal terms in recent years, enlistment rates have remained at fairly historically low levels. This then begs the question, does reducing the advertising and marketing budget lead to lower achievement of recruitment targets or simply lower propensity or enquiry rates. Furthermore, DFR remains unable to accurately determine whether increasing the advertising and marketing budgets, and by how much, would result in recruitment targets being completely met. Additionally, there does not appear to be evidence to suggest that increasing the M&A budget would be a more effective way of meeting recruitment targets than other policy instruments such as providing sign-on bonuses or amending recruiter numbers or recruitment locations. Additionally, DFR has difficulty quantifying the importance of external influences such as the level of economic activity and unemployment rates on the decision of a person to enlist.

So how should DFR determine the most appropriate level of advertising? It appears past budgets may not play much of a role. A quick scan of recent marketing and advertising budgets indicate very little correlation between yearly budget levels. In some instances it appears the marketing budget level is directed for DFR by the government. The budget for FY 10-11 was reduced \$2.4 million in forced savings and recruitment targets were not met for that year; however, it is impossible to say whether they would have been met had the advertising budgets included this additional \$2.4 million. The budget guidance for FY 11-12 provides \$36 million for advertising. Universal McCann, the agency contracted to provide advertising support for DFR, has indicated that this advertising expenditure level cannot be optimized further. That is, it is at the minimum

level necessary to support DFR objectives (DFR, 2011a). While this may be the case, there does not appear to be consensus on which level of expenditure is correct. In order to make a strong case for future M&A budgets, DFR must be able to accurately calculate the level of expenditure, and type of media channel employed, which maximizes the overall return on investment and makes the most efficient use of advertising expenditures.

II. LITERATURE REVIEW

A. OVERVIEW

The impact of advertising on contracts, impressions or enquiries for the U.S. DoD has been extensively investigated. In many early studies, the impact of advertising was generally measured as part of an enlistment supply model. The outcomes were measured in elasticities implying the percentage change in contracts achieved for a given percentage change in the advertising budget. With the increased focus on efficiency and the continual trimming of budgets, including advertising budgets, recent advertising studies have focused on the efficiency of the advertising budget. They have attempted to investigate the return from expenditures on different media channels and how to optimize the allocation amongst these channels.

The literature reviewed on marketing and advertising effectiveness approaches the problem in a number of ways. Some researchers have attempted to analyze the effects of advertising expenditures on contracts through direct or inferential means, while others have attempted to measure the benefits of M&A expenditures through comparison with expenditures on other recruiting policy instruments to determine their return on investment (ROI).

A broad analysis of the studies reviewed indicates data deficiencies to be one of the main problems in estimating the ROI of M&A expenditures. There are a number of reasons for this. One of the main reasons is the measurement of effectiveness of advertising can be defined in different ways. That is, either a change in propensity, enquiries, applications, or enlistments can be used, and for the most part, direct comparisons cannot be made with the effect of other policy instruments. Another issue is the different geographical impacts of M&A expenditure and the associated outcomes data. While much of the advertising expenditure is targeted towards local markets, propensity surveys and enquiry data is usually captured at an aggregate or national level making direct causal relationships difficult to quantify for different types of media.

While there are numerous studies measuring the effectiveness of advertising for the U.S. DoD, there appears to be very few studies estimating the effectiveness of advertising for the ADF. The ADF has recently contracted the Canberra University National Centre for Social and Economic Modelling (NATSEM) to analyze the Australian Defence recruitment market and develop an enlistment supply model for the ADF. Like a number of studies conducted using U.S. data, the NATSEM study appears to be battling a number of data deficiencies. The NATSEM study is discussed further in chapter III. The advertising agency Universal McCann, responsible for DFR advertising, is also currently undertaking econometric analysis of ADF data, which is also discussed in chapter III. The following section reviews literature on relevant aspects of measuring M&A effectiveness.

B. PROPENSITY TO ENLIST IN THE MILITARY

A person's propensity to enlist in the military will greatly increase or decrease the likelihood of that person enlisting in the military. Indeed, propensity of youth to enlist in the military and enlistment has a very strong demonstrated relationship. Using data from the Youth Attitude Tracking Surveys (YATS), for the period 1988 to 1998, Warner Simon & Payne (2002) find youth who state an intention to definitely join the military are approximately 9% more likely to access than applicants who are definitely not interested in joining. The authors also find youth who state they will probably join the military are approximately 4% more likely to access. Similar findings are found by Ford Griepentrog Helland & Marsh (2009). The authors conducted a study linking youth attitude tracking surveys and youth polls with accession records to evaluate the extent that propensity to enlist can predict actual enlistments. The results from 1996 to 2008 indicate that propensity of youth to enlist and actual enlistment is positively correlated. Of those surveyed who indicated that they planned to join the military, 23.6% enlisted, while only 3.7% enlisted of those who had negative propensity to enlist. This means those who indicated they plan to join the military are over six times more likely to enlist than those who are not. When both the open ended question and closed question were measured

together, those with the highest propensity were 15 times more likely to enlist than those with the lowest propensity. The authors conclude that propensity measures are valid predictor of enlistment behavior. Consideration needs to be taken with these results as the youth samples are based on representative samples of the youth population; they cannot be used to forecast enlistments by region. Notwithstanding this, the two studies identify a very strong relationship between a respondents propensity to consider a career in the military and actual enlistment.

There is also evidence indicating a relationship between advertising awareness and propensity. The more recruitment advertisements are seen, the more likely viewers of these advertisements will consider a career in the military. This relationship is routinely surveyed by the U.S. Department of Defence (DoD) and used as a measure of advertising effectiveness. In a 2001 study conducted by Warner, Simon & Payne, inconclusive results were found linking advertising awareness to propensity. The authors use YATS data from 1985 to 1998 and initially find youth who are aware of advertising are 2 to 3 percentage points more propensed than youth who are not. They also find propensity is more strongly related to active-duty advertising than reserve or guard advertising. The authors also estimate the relationship between advertising and propensity using data from the period 1989 to 1997. They find that for a 10% increase in advertising expenditures there is a significant increase in propensity for white males, white females, and non-white females, but only for specific media channels. The authors conclude that there is very little evidence of a relationship between advertising and propensity and that youth propensity does not respond to or reflect intensity of service recruiting efforts. Warner Simon & Payne (2002) develop a more accurate model that directly estimates the impact of advertising spending on youth propensity. The authors find that youth aware of any form of military advertising are 7.2% more likely to be positively propensed than youth who are not aware. They find each dollar increase in advertising per youth is estimated to increase propensity by between 1.2 - 2%. These results suggest that advertising expenditure does have a positive relationship to propensity. Increases in advertising expenditure increases awareness of the military which leads to higher propensity to consider a career in the military. As propensity to consider a career in the military is also

positively related to actual enlistment, it can reasonably be interpreted that advertising expenditure has a positive relationship to enlistment.

There is evidence that one-off external factors also affect propensity to enlist in the military, at least in the short term. The terrorist attacks in 2001 are one such example. Surveys conducted after 2001 find a strong immediate positive effect on propensity to enlist in the military. A JAMRS study conducted in 2009 finds that a dramatic event, such as 9/11, causes a rallying of national pride and group cohesion against a common enemy. This rallying also leads to greater support for the military and an increased desire to enlist. When respondents were asked how likely it would be that they would be serving in the military in the next few years, the change in propensity increased from 15% immediately pre-9/11 to 23% immediately post-9/11. Dramatic decreases in propensity have also been identified in the period immediately post the execution of Saddam Hussein. Propensity to enlist fell dramatically from 21% to 12%. The authors believe this fall in propensity was due to the elimination of the identifiable target, and the general malaise with the protracted campaign in the Middle East. Despite these short-term fluctuations, propensity to enlist appears to have returned to long-term levels. It appears the military conflict, while having short term implications, has no long-lasting positive or negative impact on attitudes towards the military or decisions to enlist (Joint Advertising Marketing Research & Studies, 2009).

The recent military action in Libya also caused a change in propensity to enlist in the military. In a 2011 study conducted by JAMRS, over one quarter of respondents (27%) indicated that the situation in Libya would make them less likely to join the military. However, of positively propensed youth, the situation in Libya would make 23% more likely to join the military and only 15% less likely. While in the negatively propensed group, the situation in Libya would only make 2% more likely to join the military, yet 29% less likely. These surveys indicate that external events appear to play an important role in influencing short-term propensity to enlist in the military. Military action can cause an immediate increase in perceived duty to country and patriotism, which can lead to an increase in propensity to enlist. Similarly, military action can also

change perceptions of why not to join the military and can cause short term decreases in propensity to enlist. While there are short-term changes in propensity, it appears these changes are short-lived with propensity reverting to long-term averages (Joint Advertising Marketing Research & Studies, 2011a). Internal and external socio-economic factors have been shown to influence the propensity to enlist into the U.S. military. While external military events have been shown to have a short-term influence on propensity, studies have found that these effects are relatively short lived with propensity returning to long-term averages. The problem for U.S. military recruitment is that the long-term average for propensity to join the military is declining. In order to continue to meet recruitment targets, and not compromise standards, methods need to be found to arrest this trend.

Marketing and advertising has a role to play in arresting the decline in propensity to enlist in the U.S. military. Sackett & Mavor (2003) believe the primary role of advertising in military recruiting is to support recruiters by positively influencing youth attitudes about military service. Along with influencers, advertising is one of the most important voices conveying information about careers and life in the military to youth. Indeed, as shown in Figure 4, the authors believe, along with environmental factors, advertising support is a key determinant influencing the propensity to enlist.

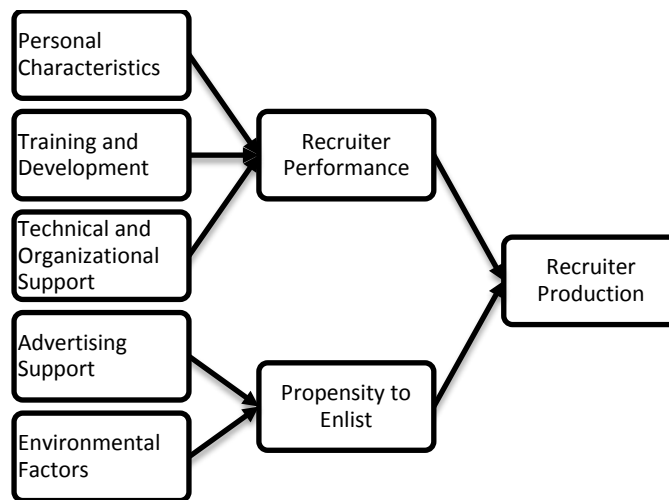


Figure 4. Model of Military Recruitment (Sackett & Mavor, 2003)

The authors differentiate propensity to enlist into two categories; propensity to enlist in the military in general and propensity to enlist in an individual service. The authors believe “propensity can be seen, in advertising terms, as a measure of the primary demand for military service when applied to the youth population’s overall interest in military service, and selective demand when specifically applied to youth interests in the specific services” (Sackett & Mavor, 2003, p. 226) and marketing and advertising can be focused on either primary demand or selective demand. If sustained advertising is not effectively conducted, propensity will fall and so will corresponding enlistments. The authors believe inadequate advertising is a cause of the declining propensity to enlist in the U.S. military.

Intuitively, the more a person hears positive messages about the military, the more likely they will consider a career in the military. The U.S. DoD, and other All Volunteer Force (AVF) nations, use advertising as an economical way to deliver information on a widespread basis. The advertising is used to inform and increase interest among target audiences and positively influence consumer sentiment. Sustained levels of advertising are required to ensure constant referral to the product so that it is not forgotten. Studies examined in this paper indicate that there are several target audiences that are important to U.S. military recruiting. Youth populations, both school age and recent school leavers, are two populations that require advertising support. These populations require sustained levels of advertising to advise and influence them of the benefits and rewards of military service. Advertising is also required to maintain positive feelings towards enlisting in the military when irregular external events, such as a war, occur. This advertising can contribute to maintaining a level of propensity to enlist in the military and as a result, enlistments. The U.S. DoD also needs to direct advertising towards influencers of youth. This is required as youth are inclined to listen to career advice provided by these influential persons.

These results offer some interesting conclusions. Firstly, external one-off influences can have an immediate impact on propensity to enlist. For marketing and advertising this has important implications. This suggests there is difficulty in accurately

measuring the effectiveness of marketing and advertising as external factors will continue to impact youth decisions to enlist. It also suggests that propensity to enlist in the military can be influenced by such things as effectively targeted marketing and advertising. A goal of military advertising outcomes should be focused upon maintaining a minimum level of positive youth propensity to enlist in the military.

C. ECONOMETRIC ENLISTMENT SUPPLY MODELS

Goldberg (1980) was one of the first to estimate econometrically the effect advertising has on enlistments. Using Navy data for the period 1971 to 1977, Goldberg employs a model that adjusts for the effects of changes in demand by recruiters and employs an advertising variable which he considers as a form of capital investment. He treats advertising as intangible “awareness capital” which depreciates over time. Goldberg estimates the effect of advertising by estimating the effect of the awareness capital on contracts of High School Graduates (HSG). He finds the effect of awareness capital is statistically significant; however, the coefficient is measured imprecisely. Notwithstanding this issue, Goldberg finds that the effects of advertising are mostly felt during future periods with the benefits of advertising taking up to four years to accrue. He finds advertising is more influential than recruiters on the lower mental groups of HSG contracts. The author also calculates the marginal productivities for advertising and military recruiters and finds that in the long-run generating HSG contracts is approximately the same for both policy instruments.

In 1981, the U.S. Secretary of Defense initiated a test of the newly authorized variable enlistment bonuses for certain occupational categories in order to evaluate their effects on recruiting. The study was conducted during 1982-1984 and used nationwide data for the U.S. Army. The study was initiated to determine if the increased enlistment bonuses would attract more high quality recruits into the Army, encourage more enlistments in hard-to-fill specialties, and influence recruits to sign contracts for longer terms of service. The evaluation of this test, conducted by Polich, Dertouzos & Press (1986), modeled high-quality enlistment contracts and employed a number of economy

variables and features of the recruiting system, including national and local advertising expenditures, which could also influence recruitment. National advertising data used was total monthly national expenditures by media channel and the total number of monthly impressions achieved by this advertising expenditure. Impressions were estimated from data obtained from sample surveys of the population. Local advertising consisted of media purchases made directly by individual Army recruiting battalions to supplement the national advertising program. The authors obtained total local advertising expenditures by month by Battalion. The authors find a national advertising elasticity of .0563 and a local advertising elasticity of .0127, both of which are statistically significant. This suggests that a 100% increase in national advertising expenditure will increase U.S. high-quality enlistment contracts by approximately 5.6%. While not directly evaluating the comparative marginal costs of different policy instruments, the authors note that while bonuses can have a market expansion effect by increasing the total number of high quality recruits, bonuses are more expensive than the use of national and local advertising. They note that additional data and analysis would need to be conducted to confirm this.

Similar findings were identified by Dertouzos & Polich (1989). The authors examined the effectiveness of U.S Army advertising for a 36-month period using data from 1981 to 1984. Their study found, in general, that advertising expenditures had a significant and immediate effect on high-quality enlistments in the short-run out to six months. They also found that advertising effectiveness compared favorably with alternative policy instruments such as bonuses, pay and recruiter numbers and incentives. The study also determined that, at the budget levels used, advertising spending was cost-effective; however, the optimal mix of advertising depended on the size of the budget. For instance, print media was more effective at low budget levels, while television was more effective at high budget levels. The authors were quick to point out that the estimates, although statistically significant, are only appropriate for a narrow range of values. For national television advertising, the authors found an advertising elasticity of .0231 implying that a 100 percent increase in television advertising can be expected to increase high-quality enlistments by 2.31 percent. The study also found that advertising

expenditure data can be used as a proxy for advertising impressions data. They found advertising expenditure data accurately reflects the penetration of advertising to the target audience and in many cases could almost be preferable since it is measured with more accuracy and is easier to gather.

Following a congressional budget study released in 1981 that recommended significant increases in joint recruiting and advertising and reductions in service-specific advertising, the U.S. DoD sponsored an “Advertising Mix Test” study in 1984. Wharton Center for Applied Research (WCAR) was commissioned to conduct the study which involved every recruiting organization for all services across the U.S. The test used an experimental design approach that was designed to vary the size of joint and service specific advertising budgets. Budgets would be high, current, or lower for both joint and service specific advertising based on the FY1982 budget. After analyzing the findings, WCAR concluded that joint advertising budgets should be increased as service specific budgets are scaled-back due to more efficiency of joint advertising than single-service advertising. They also concluded that DoD could reduce its total advertising spending without adversely effecting recruiting performance. Following significant criticism of this study, the RAND Corporation [Dertouzos (1989)] was hired by the U.S. DoD to determine the validity of the results.

Dertouzos (1989) used data from the “Advertising Mix Test” to analyze the effectiveness of U.S. Army advertising. He attempted to answer the questions of whether individual service advertising is expansionary by drawing from the private sector or whether increasing single service enlistments comes at the expense of other services. He also attempted to quantify the marginal cost of advertising and whether it compared favorably with the cost of other policy instruments. He was quick to note a limitation with the model estimated. He did not control for changing recruiter missions, a factor likely to change with changing economic conditions and one found to affect enlistments in other studies (see previous work by Dertouzos & Polich (1989)). Notwithstanding this limitation, he found a number of interesting results. Firstly, he found that all services appear to gain enlistments from additional joint or individual service advertising and the

gains of any individual service do not come at the expense of other services. He also found that joint advertising, in some cases, is equally as effective as single-service advertising. For example, both joint and single-service advertising are effective for the Army. For the U.S. Navy, joint advertising appears to be very important, while for the Marine Corps and Air Force single-service advertising appears to be more effective than joint advertising. His overall conclusion is both individual service and joint advertising appear to be successful in inducing enlistments and that single-service advertising by one branch actually confers benefits to other services as well. He also found U.S. Army advertising to be significantly correlated with short-run enlistment behavior, and that a one-time change in advertising can induce enlistments for as long as six months, but the effect of the advertising diminished by a factor of 40% every month.

Table 1 depicts the estimated advertising expenditure required to add an additional contract for each service (i.e. the marginal cost per contract), as shown, joint advertising is relatively cheap to add an additional Army or Navy contract, whereas individual service advertising is relatively cheap for the Air Force and Marine Corp (Dertouzos, 1989).

Advertising Expenditure	Army	Navy	Air Force	Marine Corps	All
Joint	\$6,414	\$5,014	\$23,983	\$13,454	\$2,122
Army	\$7,014	\$9,090	\$47,345	\$26,425	\$3,210
Service-specific	\$10,439	\$26,620	\$6,338	\$7,067	\$2,456
All	\$8,991	\$12,640	\$7,814	\$8,048	\$2,260

Table 1. Marginal Costs of an Enlistment (in dollars) (From Dertouzos, 1989)

A significant influence of M&A expenditure was also found by Berner & Daula (1993). The authors develop an enlistment supply model to test whether allocating recruiting goals is endogenous to the enlistment supply process. Using panel data from 1980 – 1990, Berner & Daula find a national advertising elasticity of 0.208 and conclude

that it is likely that national advertising has a more significant influence on recruiting than previous studies have indicated. They acknowledge that the precision of their estimates are low, but recommend further investigation of this influencing variable.

Another of the inherent difficulties of measuring advertising is how to measure the real outcome of advertising expenditure. While expenditures are often the easiest data to gather, this may not truly reflect how many viewers of the target audience were actually reached. This can occur for a number of reasons including the habits and media consumption of the target audience can change, and changes in the cost of advertising. Warner, Simon & Payne (2001) suggest advertising expenditures may not accurately measure the impact of an advertising campaign and believe advertising impressions are a more accurate reflection of the real outcome of advertising expenditures. The authors experiment with a number of models attempting to estimate the impact of advertising. This is achieved by using both advertising expenditures and advertising impressions as independent variables. Due to insufficient expenditure variation for many non-TV advertising channels, they compare TV advertising versus all other non-TV advertising.

When comparing impression results, the authors discover that non-TV advertising generates a much larger number of impressions per dollar than TV advertising, but note that cost effectiveness is a function of marginal productivity rather than average productivity. Additionally, impressions from different media may not necessarily be equally productive in generating interest in the military. For example, as found by Dertouzos & Garber (2003), less high-quality recruits were generated via TV advertising than via non-TV advertising. It is therefore possible that a non-TV impression is more likely to produce a recruit than a TV impression. Overall, the authors find advertising has a significant impact on high-quality Army and Navy enlistments. They find the estimates differed when advertising was measured in expenditures or in impressions. A 10% increase in Army advertising impressions would increase high-quality enlistments by 14%; a 10% increase in Navy advertising impressions would increase high-quality enlistments by 8%. They found no evidence that Marine Corps or Air Force advertising had positive effects on high-quality enlistments. They surmise that these differences

could be due to the size of the advertising budgets of each service with Army spending the most, followed by the Navy expenditure, and finally the remaining two services which have relatively small-scale advertising programs.

D. MARKETING STUDIES

Following diminishing advertising budgets, recruitment commands realized greater understanding of the cost-effectiveness of advertising, and the role played by different media channels, was required. In response to this, Dertouzos & Garber (2003) estimate the effectiveness of military advertising using data from the period 1981 to 1984. The study was a significant advancement on previous studies due to the additional complexity of the econometric models analyzed as well as the level of specificity of the data obtained. They used U.S. advertising data obtained from the Army's advertising agency during the period analyzed. The advertising expenditure data was more detailed than previous studies as it was disaggregated over time, geographic area, and channel. The models estimated allow for an advertising-specific functional form to account for threshold levels of expenditure. The functional forms allows for a minimum threshold level where advertising expenditure below this amount has virtually no impact, and a maximum saturation level where expenditure above this threshold has virtually no impact. The models also allow the impact of more dynamic patterns of advertising expenditure over time on recruitment. The model specification also allows different media to exhibit different patterns of effects on enlistments by time. The authors attempted to replicate these models using data for all services for fiscal years 1993 to 1997, but were restricted by data deficiencies and what they termed a more complex recruiting environment due to external demand-side factors.

A number of general results were identified. They found that the S-curve threshold and saturation effects are highly relevant and should be taken into account when planning advertising budgets. Also, the S-curve effects differ for alternative media channels and also need to be taken into account when deciding which media channel to use. The dynamic temporal patterns of effects for different media channels also differ

greatly. The authors found that a reallocation of advertising budgets across media can improve recruiting outcomes and increasing advertising budgets can produce increases in high quality enlistments. For example, they found a 5% increase in advertising budgets may have produced a 5-8% increase in high quality enlistments.

For the U.S. Army, the authors estimate the determinants of high quality enlistments and recruiter effort through two equations, a structural form and a reduced form. The structural form versions are measured by nonlinear instrumental variable methods, employing monthly dummy variables, one for each of the 36 sample months for which data are available, as instruments. The reduced model is estimated in annual difference form by nonlinear least squares regression, negating the requirement for instrumental variables.

For each of the models, advertising is broken into four advertising categories consisting of television, radio, magazine, and newspaper expenditure. For each of the categories, a coefficient is estimated for the current month expenditure, previous month expenditure, and all earlier months. This allows the authors to determine the saturation levels, or ceilings, on effects of advertising spending on any channel in any given month.

The authors find that of the 17 advertising variables estimated, 15 of the point estimates are positive for the structural form and 14 are positive for the reduced form. Additionally, none of the negative estimates are statistically significant. This accords with the prior hypothesis that increases in advertising expenditure will lead to increases in high quality enlistments. For both the structural and reduced form models, television advertising increases potential high quality enlistments during the month in which the advertisements air of between 12% to 16% at maximum threshold levels of spending. The structural equation also indicates advertising has a lingering effect on enlistments. Modeling a one month lag in maximum threshold advertising expenditure, the authors find that this would still increase high quality enlistments by 5%. For longer lag periods (two or more months), the two equations suggest different conclusions ranging from quite small effects to important ones. This leads the authors to suggest that television advertisements appeal to the emotions of would be enlistees who have already been

through the early stages of the recruiting process to make the enlistment commitment. The potential long-lived effects of advertising also suggest that it can initiate would-be recruits to start the enlistment process. The estimated effects of radio and magazine advertising on enlistment have similar time patterns to each other but differ from that of television. That is, there is no evidence of significant effects during the month that the advertising messages are transmitted for either radio or magazine, some indication of moderate size effects one month later, but consistent evidence of long-lived effects. The authors suggest that these two channels are very influential in inducing would-be recruits to begin the enlistment process, but relatively ineffectual in convincing youths to sign contracts.

Assuming a baseline level of 70 high-quality contracts per month, the authors use the results from these point estimates to plot predicted additional contracts over a six-month time horizon as a function of marketing spending per 1000 young males. This is shown in Figures 5 and 6.

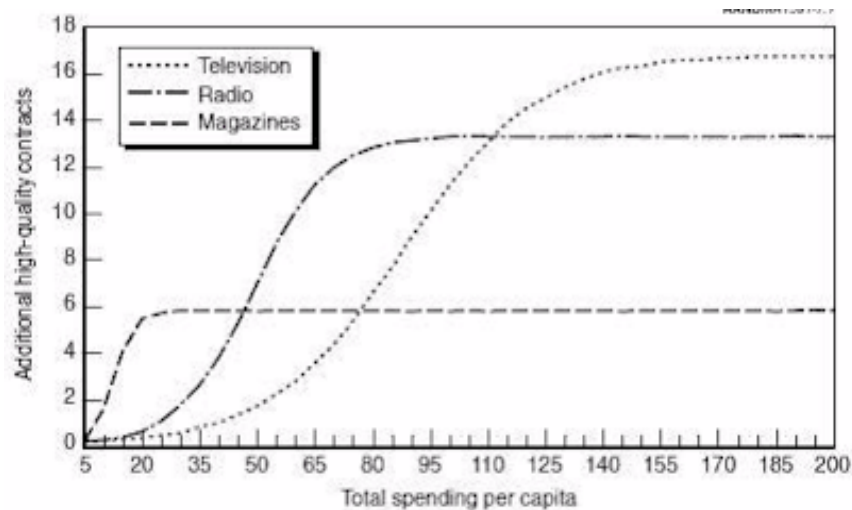


Figure 5. Effects over Six months of One-time Levels in Marketing Spending, Structural Estimates (From Dertouzos & Garber, 2003)

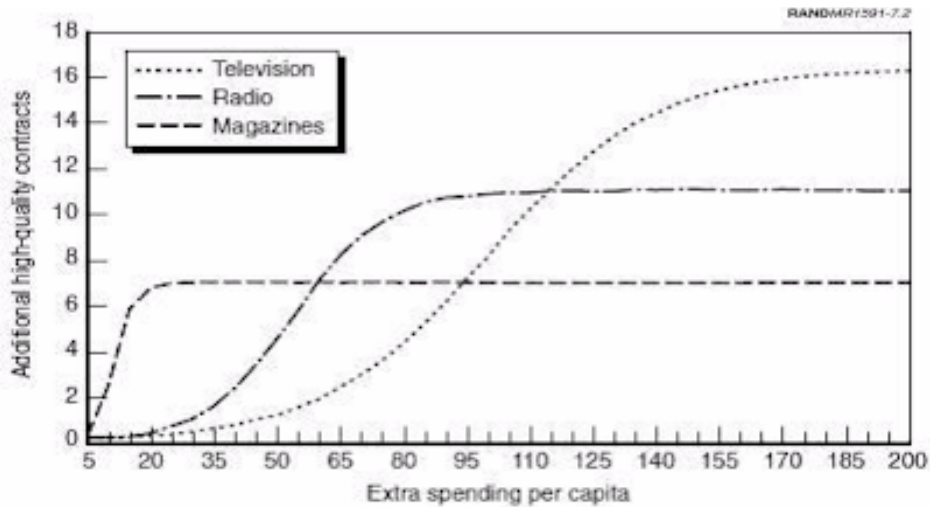


Figure 6. Effects over Six months of One-time Levels in Marketing Spending, Reduced-Form Estimates (From Dertouzos & Garber, 2003)

Figures 5 and 6 demonstrate a number of important implications. Firstly, the different shaped S-curves, for each media channel, suggest that saturation spending levels and the effects on contracts differ. They also suggest that as advertising budgets change, the type of media channel employed should change so as to increase the efficiency of overall advertising expenditure. Figures 5 and 6 also indicate that at very low budget levels, magazine advertising appears to be the best choice whereas at high budget levels, TV advertising appears to be more effective. These findings are an improvement on the previous econometric models developed.

In a recent study, conducted by Dertouzos (2009), the effectiveness of military advertising was evaluated using the U.S. DoD advertising expenditures from 2002 to 2004. The author developed an Army enlistment model that links monthly contracts at the recruiting station level with 46 other factors, including advertising. The model builds on the developments of previous studies and estimates separate S-curves for each advertising category, while also allowing for the lag effects of advertising expenditure. The model was an improvement on previous models as it also includes television spending by other

non-Army services. The results of this study were also more robust as the author analyzes the size and mix of the advertising budget and the inter-service effects of advertising expenditure.

While the specification of the model provided superior results to previous estimates, the study was plagued by data limitations. The study was unable to incorporate advertising expenditures by all services and the official budget expenditures for advertising provided by all four services did not match the expenditure according to OSD. The data accuracy varied between less than 50% to 85% completeness. The study was also unable to adequately control for service recruiter numbers, enlistment targets, and recruitment goals were only available at the aggregated level.

Consistent with previous research, the author finds advertising is a very effective recruiting policy and compares favorably with the marginal costs of adding recruiters or increasing bonuses. Using the advertising budget for 2002 and 2003, the marginal cost of a new contract attracted via advertising was approximately \$10,000. In contrast, the marginal cost of a new recruit from adding additional recruiters was \$15,000, and the marginal cost of a new recruit from increasing bonuses was over \$90,000. Similar to Dertouzos & Garber (2003), Dertouzos (2009) finds that magazine advertising is most effective at low levels of advertising spending followed by minority cable television. At low budget levels, the least effective media channel is general television, which requires a significantly large expenditure before it becomes effective.

While advertising compared favorably to other recruitment policy instruments, Dertouzos (2009) finds the effectiveness of advertising expenditure could have been improved. A more cost effective allocation of advertising expenditure could have been achieved by firstly increasing the total advertising budget, smoothing spending across the entire year and reallocating a portion of the budget across media, specifically to magazine advertising and away from other channels. The author also finds that the marginal effect of advertising for the U.S. Army was reduced due to competing services advertising programs. He analyzed whether advertising could have an expansionary effect, whether the individual service advertising would be predatory to recruitment or whether there

were positive spillover effects from individual service advertising. He finds that, overall; advertising creates a significant market expansion. However, when running an Army only model, the results indicate that competition from the other services draws enlistments away from the Army. At current budget levels the regression indicates the Army loses approximately 50% of its gains from advertising due to competition from other services; however, the regression suggests that high levels of advertising spending could retain approximately 70% of the expansionary nature of the enlistments.

In an attempt to further refine the estimation of the effects of advertising expenditures Navy Recruiting Command (NRC) contracted two organizations, Gallup Social and Economic Analysis Group (GALLUP) and The Optimization Group (GMAX) to analyze U.S. Navy M&A effectiveness and ROI. The two companies ran completely independent studies using the same 42 months of data capturing Navy advertising spending, market conditions and other external social data to understand which variables explain the variability of Navy leads and contracts.

The GALLUP study examined the effect on both leads and contracts for Active Duty General Enlisted (GE), Active Duty General Officer (GO) and several other specified groups. The report drew a number of interesting conclusions. The effects of specific media channels were found to vary significantly by each recruitment category. A mix of national broadcast, cable television and network and spot radio are effective in driving GE leads. Internet activities and direct mail are also effective in driving leads for this category. While for GO, the internet is a particularly effective channel to generate leads along with national and spot cable television. While unemployment is a significant driver of GE leads, unemployment plays little role in generating GO leads; rather advertising expenditure explains 95% of the variation in GO leads. They also find that for all leads, advertising expenditure, enlistment bonuses, and unemployment accounted for 87% of the total variance.

For all leads, a minimum of almost \$4 million monthly advertising spend (\$48 million annually) is necessary to generate leads. After monthly expenditures of \$9.6 million (\$115 million annually), the returns diminish. Television advertising remains the

most effective medium, but requires a minimum of \$1.4 million monthly spend. Additionally, every 0.1% increase in the unemployment rate above 6.7% generates 3,422 incremental total leads per month.

For all contracts, a minimum of almost \$4 million Navy advertising monthly expenditure is required to affect leads. For expenditure above \$4 million dollars, each incremental \$100,000 yields 19 additional leads up to \$7.4 million, after which the returns to additional expenditure diminish.

Table 2 summarizes the results GALLUP finds for the ROI of marketing expenditure by media channel. The returns utilize the S-curve relationship and depict the impact on leads of an additional \$100,000 advertising expenditure in the most effective range of the curve.

<input type="checkbox"/> Television Advertising: Minimum of \$1.4 million monthly necessary. Next \$500,000 generates 19,000 leads; each incremental \$100,000 generates 391 leads.
<input type="checkbox"/> Radio Advertising: \$147,000 generates 24,000 leads, steady decline in leads beyond that point.
<input type="checkbox"/> Print: Every \$100,000 yields 7,418 leads, up to \$900,000 when diminishing returns occur
<input type="checkbox"/> Internet: Every \$100,000 generates 2,739 leads. Diminishing returns occur at \$1.4 million
<input type="checkbox"/> Magazine BRC/Bingo: Above a min. threshold of \$261,000 every \$100,000 generates 6,367 leads.
<input type="checkbox"/> Media Event: Each incremental \$100,000 yields 4,642 leads.
<input type="checkbox"/> OOH: Up to a maximum at \$386,000, every \$100,000 generates 13,370 leads
<input type="checkbox"/> Local Newspaper (Enlisted): Every \$100,000 produces 1,691 leads.
<input type="checkbox"/> Other Local (Officers): A minimum threshold of \$726,000; above this, each incremental \$100,000 means 5,499 additional leads per \$100,000.



Table 2. Recruitment – Leads. ROI by channel (From Gallup Inc, 2010)

Based on leads data, the GMAX study finds that the effective range in total annual advertising expenditure for all combined media was between \$65 million and \$100 million. They also find that each additional \$100,000 in spending generates a larger effect in the range of \$1.4 million to \$1.9 million per month, depending on the media channel. Figure 7 demonstrates this relationship.

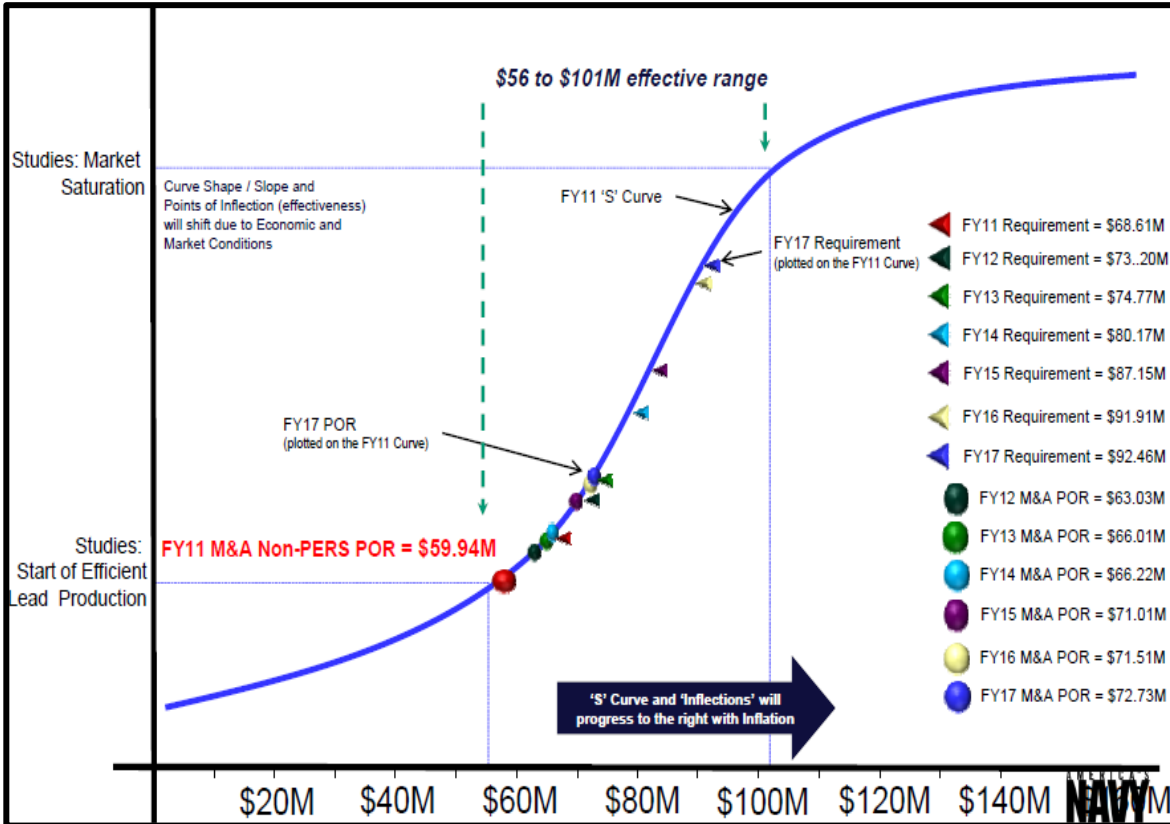


Figure 7. Advertising Effective Expenditure Range (From Optimization Group, 2010)

Like other studies, the GMAX study finds that some media channels have a larger effect on leads (e.g., the internet), whereas other media channels mainly affect the conversion of leads to contracts (e.g., television and radio advertising). Finally, they find media channels interact in generating leads and contracts. These spillover effects make it difficult to accurately identify an optimal media mix since the impact of spending on one

channel is affected by spending on related channels. Notwithstanding this issue, the GMAX study estimated a cost per contract by individual media channel. These costs are shown in Table 3.

The two independent studies provide greater fidelity surrounding the ROI of recruitment advertising expenditure. The GALLUP study was able to disaggregate the impact of advertising on recruitment for specific employment categories and the effect different media channels have on these employment categories. The GMAX study also provided greater fidelity by calculating specific dollar values, for each contract written, depending on which media channel generated the original lead.

WEIGHTED BY # CONTRACTS GENERATED BY EACH MEDIA (Sig @ 80% CL) MEDIA	General Enlisted	
	Base Level Cost per Contract	Marginal Cost per Contract
Emerging Mobile Wireless	\$ 84	\$ 985
Emerging Broadcast	\$ 110	\$ 830
Internet CPL	\$ 512	\$ 619
Internet Job Post	\$ 466	\$ 629
Internet Display	\$ 602	\$ 962
Internet Resume	\$ 2	\$ 23
Internet Search	\$ 171	\$ 220
Print	\$ 902	\$ 2,169
Radio		
National DM/EM		
Local DM/EM		
Media Event		
Out of Home	\$ 532	\$ 3,075
TV	\$ 2,813	\$ 9,038
NAVY OPERATIONS		
Fulfillment	\$ 75	\$ 81
National Call Center	\$ 6	na
Postage	\$ 97	\$ 71
EVENTS		
Accelerate Your Life		
NASCAR	\$ 164	na
Conventions	\$ 141	\$ 802
Suburban	\$ 45	\$ 205
Simulator		

Base Level Mix:

General Enlisted (NALTS)	Base Level of Importance
Postage	14%
Fulfillment	12%
Internet CPL	11%
Internet Search	11%
Internet Job Post	10%
Internet Display	10%
Print	7%
TV	6%
Suburban	4%
Out of Home	4%
Conventions	4%
Emerging Broadcast	3%
Internet Resume	2%
Emerging Mobile Wireless	2%

Table 3. Cost per Contract (Optimization Group, 2010)

E. MEASUREMENT ISSUES

While these studies have made significant improvements in estimating the impact of advertising expenditure on leads and contracts, there are a number of issues which make measurement of the effectiveness of advertising expenditure difficult. The increased use of new technologies has resulted in the conundrum of making it easier to target niche audiences, yet harder to target broad audiences. New technologies such as the ability to record cable channels, surf and skip commercials, and advertisements which direct viewers to the internet means that the metrics of advertising effectiveness can have a degree of error.

Other limitations in the measurement of advertising effectiveness have been noted by Dertouzos & Garber (2003). The authors believe measuring the ROI of recruitment advertising is difficult due to the benefits of advertising on different media accruing differently over the short-run and long-run. The authors find advertising in the short run can increase leads and contracts, but it can also lay the preconditions for increased leads and contracts in the long run by establishing positive images and perceptions of the military and military life. Additionally, marketing and advertising has been used to complement recruiter efforts in struggling recruiter districts where the advertising expenditure could have been used more efficiently in other districts where the marginal returns were higher. The M&A expenditure may also be used for non-direct recruitment and via increasing member retention. Increasing serving member morale and lowering attrition may be two goals of an advertising campaign which may not be able to be directly measured. Additionally, Dertouzos & Garber (2003) note that due to difficulties in measuring the long-lived effects of brand awareness, which other policy instruments are unable to achieve, they should be kept in mind when evaluating ROI of M&A strategies.

F. SUMMARY

The literature review examined some of the main findings from the extensive body of literature relating to military advertising effectiveness. The general consensus is that advertising is important to either maintain propensity to enlist, or increase enlistments. There are, however, fewer consensuses on how to measure this interaction and how cost effective it is. A number of earlier studies find advertising is as cost effective as recruiters, and more cost effective than bonuses, in increasing contracts. Latter studies analyze the ROI of advertising by channel and estimate the expenditure required to increase leads over a constrained budget. Different media channels are estimated to have different effective minimum and maximum expenditures and cost to increase contracts.

III. DEFENCE FORCE RECRUITING

A. ORGANIZATION

Defence Force Recruiting (DFR) is responsible for carrying out the Australian Defence Forces (ADF) recruiting effort. DFR comprises military members and civilians employed by Manpower Incorporated, a civilian company contracted by the ADF to provide recruitment services. The ADF has outsourced recruitment functions to civilian companies since 2002.

DFR plays an important role in recruiting people, as well as educating the broader market and environment, building and sustaining propensity for enlistment to the ADF and building support for the ADF for key demographic influencers such as teachers, parents and mentors. Advertising is centrally controlled by DFR; however, each of the three services, Army, Navy and Air Force, have input in determining the direction that individual service marketing will look like through the Defence People Committee.

The stated purpose of DFR is the following:

- a. Position the Service brands appropriately to the key target audience of 16-24 year olds and their influencers;
- b. Remove barriers to consideration by correcting common misperceptions about the three services;
- c. Build and maintain long-term propensity to consider a career in the service of the ADF;
- d. Create awareness of the diversity of jobs available;
- e. Attract candidates and get them to enquire and apply; and
- f. Steer candidates towards priority jobs. (DFR, 2010a)

The DFR M&A budget is approved through the government approvals process in six month intervals. For this to occur, a detailed cost-benefit analysis is completed by

DFR and processed through the Department of Finance Committee, the Secretary of Defence and the Minister for Defence Science and Personnel. This is completed after consultation with each individual service and at the tri-service level of the Defence People Committee. Within the six monthly intervals, individual weightings of advertisements can still be amended to reflect requirements for increased or decreased advertising for specific target shortfalls.

In total there are more than 330 different jobs that are recruited for the ADF. While not all of these jobs receive advertising support, there are at least 60 jobs receiving advertising support at any one time. (DFR, 2010b)

B. DFR MARKETING STRATEGY

DFR marketing activity is guided by the recruitment targets required for both reservists and full-time jobs for each individual service. These recruitment targets drive the number of enquiries required to meet those targets based on historical conversion rates of enquiries to enlistments. The number of enquiries is periodically tracked to determine if and when additional advertising support is required.

DFR's marketing strategy has undergone significant change in the last decade. Prior to 2006, DFR's strategy focused on promoting the individual methods of entry into the ADF. This strategy, known as 'Avenues of Entry', was focused on promoting entry into specific roles, such as, technical trades, pilots, officers, and ship drivers. Following brand research conducted by DFR in 2006, the marketing strategy of single service branding and advertising was introduced which proved to be a very successful method of attracting candidates into each service. Historical data from Navy enlistments immediately post 2006 indicate it was very successful in meeting recruitment targets (DFR, 2011a). While this strategy proved to be successful, single service advertising is relatively more expensive. This resulted in DFR modifying its strategies to make more efficient use of advertising dollars. Modifications included a move from 'bursts' of media

(high weights of advertising over a short duration) to ‘continuity’ (lower weights of advertising over a sustained duration) and the move away from individual service to joint service advertising.

DFR has proposed a refined marketing strategy to be implemented during FY 2011 and 2012. This strategy has three tiers of activity and builds upon findings found in test markets during previous FYs. The three-tier approach is as follows:

Tier 1: Foundation Media. This tier involves a low weight of joint advertising over a sustained duration, including inter-service rotation. It is expected that foundation media will consume 60% of the media budget for FY 2011 and 2012.

Tier 2: Media Activation. This tier involves service-specific advertising which allows the opportunity to penetrate target audiences by promoting specific jobs and delivering relevant communications. This tier also allows individual services to deliver key communication objectives. It is expected that media activation will consume 30% of the media budget for FY 2011 and 2012.

Tier 3: Brand Development. This tier involves media advertisements to position the ADF as an employer of choice by highlighting specific opportunities such as ongoing training and development, and travel. It is expected that brand development will consume 10% of the media budget for FY 2011 and 2012 (DFR, 2011a).

DFR partitions the market audience into three distinct segments. The primary market for DFR is 16 -24 year old males and females who meet eligibility requirements. This primary audience includes those still at school, those who may have been working but are now looking for a change in occupation, and those who have completed school and are looking for a career amongst competing alternatives. It also includes those currently undertaking further study at university or other further education institutions.

The Secondary audience is 25 -35 year old males and females who meet eligibility requirements. People in this target audience can include those who are considering an entirely new career, those who have just completed University and those

who are currently established in an occupation relevant to the ADF and are attracted by the unique work environment and benefits of the ADF.

The tertiary market audience for DFR is those aged 35 years and older who either meet eligibility requirements or are an influencer. This audience can include those established in occupations relevant to the ADF and attracted by the unique benefits of the ADF, and those who have persuasive power over the primary and secondary audiences.

The DFR recruitment process is largely straightforward and has been streamlined in recent years. The recruitment process begins with an enquiry by a potential recruit. DFR differentiates enquiries as either passive or active. A passive enquirer is an enquiry that has not proceeded to an application. An active enquirer¹ is a person who has completed an application and his details have been recorded. An active enquirer becomes an applicant once he has booked an appointment to attend a Your Opportunities Unlimited (YOU) session. The YOU session includes an aptitude test, a medical interview and an interview with a careers counselor. An applicant who is successful in all assessments will then be issued with a letter of offer. Successful applicants are now determined to be a 'candidate in the pipeline' which is the first physical step in the process. DFR uses enquiries, applications and enlistments to measure the effectiveness of current advertising (DFR, 2010b).

The planned growth in the ADF workforce is shown in Figure 8. Aside from a small decrease in FY 2011/12, Average Funded Strength (AFS) is set to increase out to FY 2015/16. While AFS is increasing, DFR has been able to reduce its recruitment targets as a result of lower attrition and higher retention. While the recruiting market has been favorable, there are still problems in filling certain high-demand occupations particularly those skills for which the military must compete with the transportation, mining, engineering, construction and health sectors (DFR, 2010b).

¹ Approximately 20% of enquirers who enter the system as passive convert to active. This is usually as a result of outbound marketing initiatives (DFR, 2010b)

ADF – Workforce Growth FY2009/10 to FY2018/19

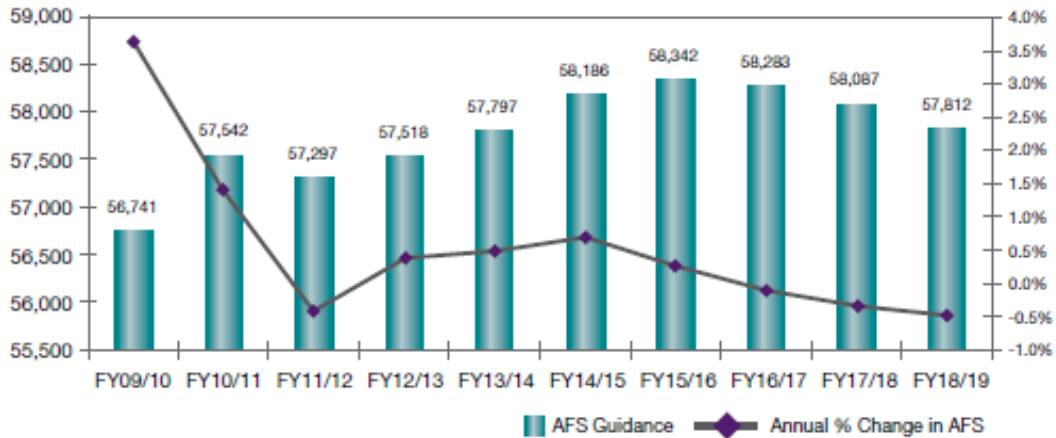


Figure 8. ADF Workforce Growth FY2009/10 to FY 2018/19. (From Australian Department of Defence, 2010b)

Recruitment targets, enquiries, and pipeline data are monitored, reported on monthly, and used by DFR marketing to plan tactical advertising expenditure. The permanent force recruitment target for the ADF for FY 11-12 is 6,550. Based on historical conversion ratios, this number of enlistments requires approximately 62,000 enquiries. Table 4 illustrates recruitment statistics for 2008-09 and 2009-10. The first thing apparent from this table is that the ADF was unable to meet enlistment targets for both years. The percentage of enlistments achieved in 2008 was 76% and 91% in 2009. While this appears to be an improvement in performance, it is important to note that enquiries actually fell by more than 10,000 and target enlistments were almost 18% lower.

2008-09	Navy	Army	Air Force	ADF
Total Enquiries	13,391	38,315	21,250	72,956
Formal Applications	3,651	8,229	3,868	15,748
Ab initio enlisted	1,294	3,128	1,027	5,449
Target Enlistments	1,802	4,143	1,194	7,139
Enlistments achieved (%)	72	76	86	76
2009-10				
Total Enquiries	11,489	33,720	15,918	61,127
Formal Applications	4,613	9,904	3,645	18,162
Ab initio enlisted	1,520	2,993	977	5,490
Target Enlistments	1,675	3,326	1,062	6,063
Enlistments achieved (%)	91	90	92	91

Table 4. ADF Permanent Force Ab Initio Entry, 2008-09 and 2009-10
(From ADF Annual Report 09-10, 2010)

Including all ADF recruitment, 8,971 personnel were enlisted through DFR in FY 2009-10. Based on FY 2009-10 campaign advertising expenditures of \$26,974,773, the cost of advertising per recruit was \$3,007. This is a more representative cost per head than using total advertising and marketing budgets of \$40 million. This equates to a cost per recruit of \$4,459 (DFR, 2010).

As a result of changing consumer tastes, traditional marketing channels are becoming less popular among the ADF primary recruitment target population. Traditional advertising streams of radio and print media are losing importance to the internet, SMS messaging and increased television viewing. The ADF has begun to tailor its M&A expenditure in light of these changes. DFR also understands the increasing importance of the Defence jobs website which has a number of interactive games, the ability to twitter and instant messaging. These recent developments are relatively cheaper than traditional forms of advertising and have broad appeal to the primary target population. It is also possible to measure, real time, certain aspects of the successfulness of these mediums through internet click rates and follow-on web searching.

DFR has also identified other areas where opportunities exist. It has identified that females make up 26% of all enquiries, but they are only 16% of enlistments. Similarly,

while 26-35 year olds account for 70% of inquiries, they account for only 11% of enlistments (DFR, 2011a). DFR also believes there is potential to reduce advertising expenditure through better targeting of passive enquirers and conversion of passive enquiries to applications.

DFR also sees opportunities to improve recruitment through improving marketing messages as well as the mix of media channels used. It also sees opportunities to improve the conversion rate from inquiry to application by targeting passive inquirers and improved efficiency in media expenditure through increased use of lower-cost digital channels.

C. ADF BRAND AWARENESS

In 2006, DFR commissioned two studies to better understand how the ADF brand was perceived and understood in the marketplace. The first study was a quantitative study to identify and understand the attributes which were associated with each service and was used to establish a benchmark for propensity to consider a career in each of the services. The second study, a qualitative study, was used to understand existing attitudes and perceptions about the service brands. The results of this study were used as the basis for M&A strategies for each service brand (DFR, 2011a).

The results from these two surveys demonstrated that there were numerous misperceptions and inconsistencies with each individual service brand by the wider public. The Royal Australian Air Force is plagued by the misconception that only wannabe pilots should attempt to join. The misconception is that if you do not want to be a pilot there are no jobs for you in the Air Force. It also suffers from the misconception that the service is elitist and out of reach of the common young Australian. To combat this, Air Force advertising has focused on explaining the wide range of roles offered in the Air Force and that enlistees will be trained in these occupations (DFR, 2010a).

The Australian Army faced the stereotype that it is an organization of combat roles that requires brawn not brains. It also faces the challenge of combating the

stereotype that Army recruits are treated not as a person, but a number. To combat this, DFR leveraged on the proud traditions of the Australian Army, but attempted to make it relevant to today's youth.

The Royal Australian Navy faced the added challenge that very few people of the wider public, unless they had an existing Navy connection, were aware of what the Navy did or what its role was. The common perception was a lonely, dull, repetitive and boring lifestyle. To target this, advertising was focused on Navy people working in teams achieving great results and a lifestyle that was significantly different from the Air Force or Army.

Following these studies, DFR directed two additional studies be undertaken to measure brand awareness. The studies found the brand campaigns have been successful in correcting general misperceptions and have also begun to develop an association of the desired attributes with each brand (DFR, 2011a).

In the past, ADF brand awareness advertising campaigns have been conducted at the individual service level and at the joint tri-service level. Due to reduced budgets, the ADF has recently moved to a continuity approach to M&A. The strategy is one of the three services running with lower weights of advertising, for each individual service, which allows them to run for longer. The belief is that it creates a “Halo” effect and increases enquiries for all three services. It also allows DFR to manage a reduced budget for longer periods on air and allows targeting of certain musterings and categories at critical periods, for example Australian Defence Force Academy (ADFA) M&A early in the final year of secondary schooling.

The primary target audience for DFR has a number of unique unifying characteristics which is important to marketing. These characteristics include increased familiarity with communications, culturally liberal, marketing savvy and more likely to have multiple careers. They also place importance on “what can I get out of it” and “what's in it for me”. To respond to these characteristics, DFR's current advertising campaign presents an accurate picture of ADF life by getting current serving members to

share their own service stories. It responds to the question of what's in it for me by providing specifics of training and jobs available and providing these messages in an open and transparent manner.

D. ADF ENLISTMENT SUPPLY

In 2010, the ADF commissioned the University of Canberra, National Centre for Social and Economic Modelling (NATSEM), to undertake a study of ADF recruiting to quantify the internal and external factors that affect recruiting. The goal of the project was to develop an enlistment supply model to predict recruiting success over a five year period. Phase two of the expected three phases was completed in late 2011. The study identified an absence of Australian literature available on ADF recruitment success or effectiveness, and significant data deficiencies. Moreover, the statistical model developed in phase 2 was unable to include advertising expenditure as a predictive variable due to the general lack of data and the highly aggregated nature of the data that was available.

The project team attempted to assemble the data on a monthly basis; however, during collection they identified a number of variables that were available only on a quarterly basis, others only semiannually or annually, and some variables that were not available at all. This resulted in a limited number of variables with which to estimate the relationship between the dependent variable, the number of enlistments and the predictor variables. Of relevance to this study, the project team attempted to collect data for propensity, recruiter workforce, marketing and advertising expenditure and recruitment success. They had mixed success. Data measuring the public perceptions of the ADF are available from the Australian Survey of Social Attitudes. This survey was only conducted in 2003 and 2005, had very few data points, and was outside the time period for which the most detailed enlistment target data was available. Public perception of the ADF is captured through internal propensity to enlist data, which measures the subjective likelihood of considering a career in the ADF. These data are gathered through telephone surveys and seek to measure brand health of the three services and the likelihood that survey respondents would consider a career in the ADF. Size of the recruiter workforce

data, by recruiting region and type of recruiter (civilian or military), was not available for this project. Marketing and advertising expenditure data was only available at an aggregate (national) level by financial year for the period 1998-99 to 2008-09. As the data was outside the time period for which the most detailed target data was available, this data was not included in the study. Data for number of applicants, recruits in the pipeline, recruitment targets, and enlistments were available for the study.

E. MODEL DEVELOPED

At the request of the ADF, the project team used the ratio of enlistments to targets as the dependent variable, which captures the rate of success in meeting recruitment goals. The authors note that other enlistments measures should be estimated in future models. It should also be noted that no previous enlistment supply study in the literature reviewed measured ‘supply’ this way. Results from the enlistment supply model estimated for General Entry, non-technical trades, is shown below in Table 5:

Independent Variable	Air Force			Army			Navy		
	Coeff	t	p	Coeff	t	p	Coeff	t	p
GDP Growth	0.05	0.23	0.82	-0.06	-0.78	0.46	0.05	1.23	0.26
Unemployment	0.18	1.94	0.09	0.02	0.41	0.69	0.07	2.58	0.04
Year 10 Attainment	-3.65	-3.66	0.01	0.12	0.30	0.77	-0.78	-1.51	0.18
Industry Ratio	13.96	1.06	0.33	-3.56	-1.32	0.23	7.45	1.80	0.11
Mortality	-0.81	-1.45	0.19	-0.07	-0.27	0.79	-0.34	-2.61	0.04
Applications	0.27	1.12	0.30	0.31	3.70	0.01	0.20	2.23	0.06
Salary Ratio	23.37	2.98	0.02	0.70	0.46	0.66	2.56	1.19	0.27
Separations	0.15	1.01	0.35	-0.09	-2.89	0.02	-0.07	-4.15	0.00
Propensity ADF Career	2.24	1.75	0.12	-0.66	-1.00	0.35	0.26	0.59	0.57
Conversion	-0.38	-5.09	0.00	-0.11	-1.78	0.12	-0.16	-3.36	0.01
GAS Score	0.41	2.41	0.05	-0.02	-0.23	0.83	0.06	1.02	0.34
Constant	-19.9	-2.87	0.02	2.01	2.39	0.05	-0.72	-0.44	0.67
Number of Observations	47			112			111		
R-squared	0.79			0.35			0.33		

Table 5. Models of Recruitment Success, General Entry Non-Technical
(From Thurecht, Miranti, Cassells & Duncan, 2011)

The R-squared differs significantly across the separate models for the three services. The R-squared of 0.79 for the Air Force indicates high explanatory power of the model, whereas the R-squared of 0.35 and 0.33, for the Army and Navy, respectively, indicate much lower explanatory power. It is possible the high R squared value for the Air Force could be due to the removal of outliers from the Air Force data set. The Air Force and Navy models found four of the explanatory variables are significant at the 5% level, while the Army model only has two significant explanatory variables. The only variables statistically significant at the 5% level in the Navy model are unemployment, mortality, separation rates and conversion rates. The statistically significant variables for the Army model are applications and separation rates. The Air Force model has four statistically significant explanatory variables which include year 10 school attainment, salary ratios, Letter of Offer (LOO) conversion and General Ability Score (GAS) score. The authors believe that the models are acceptable given the vagaries of the input data and the complex nature of the underlying processes being modeled.

F. DFR ADVERTISING MEASUREMENT INITIATIVES

DFR measures the effectiveness of its marketing and advertising by analyzing internal and external metrics. DFR also uses a number of external agencies to gather information and econometrically test the impact and cost effectiveness of its advertising campaigns. These metrics are outlined below.

1. Internal Metrics

A key metric employed by DFR is measuring the number of enquiries generated from an advertising campaign. This metric reflects changes in awareness generated from advertising. Conversion rates are also tracked and examined, by job type, and compared to historical conversion data. This data is then used to determine if additional advertising support is required to achieve recruitment targets. The conversion rates tracked by DFR are the ratio of enquires to applications and the conversion rate of applications to enlistments (DRF, 2011a).

DFR also uses advertising cost per enlistment as a broad measure of the effectiveness of advertising expenditure. As stated earlier, the advertising cost per enlistment for the ADF in FY 2009-2010 was \$3,007. DFR tracks this figure to analyze changes in advertising cost effectiveness over time (DRF, 2011a).

DFR also exploits the increased use of the internet in the target market as the first point of call for a potential enlistee. DFR's advertising agency, Universal McCann, tracks several metrics that reflect effectiveness of its digital advertising. These metrics include the number of impressions, clicks and passive enquiries, the cost per click and the cost per passive enquiry. Data is tracked for every digital advertisement, from banners to advertisements on catch-up television. Analysis of these metrics helps inform decisions regarding cost, site placement, timing, and comparative analysis of different DFR advertisements (Stoker & Mehay, 2011).

Another external company, Google Analytics, informs DFR about how visitors find and are directed to the Defence jobs website. This analysis helps DFR understand which online referring tool (such as search engines, display advertising, pay-per-click networks, or direct emails) are most effective in steering visitors to the website, thus increasing the website traffic rate. The digital advertising tracking analysis also helps DFR make cost decisions and improvements regarding the website (Stoker & Mehay, 2011).

DFR also conducts analysis of SMS response to advertisements on mobile channels. DFR advertisements display SMS codes so interested viewers can connect directly to a specific Defence website promoting priority jobs. Tracking of SMS responses to advertisements helps DFR measure the impact of the advertisements, as well as characteristics of responders (Stoker & Mehay, 2011).

DFR also uses results from the ADF research project the Longitudinal ADF Study Evaluation Research, known as Project LASER. This project surveys members of the ADF at four career points: at enlistment, during initial training, at the completion of their Initial Minimum Period of Service, and finally at separation from the ADF. Members are

asked questions which include which advertising medium was most effective in influencing their decision to enlist. DFR uses these results to modify their media mix allocation (DFR, 2011a).

Following econometric modeling conducted in FY 09-10, DFR and Universal McCann are currently analyzing advertising campaigns. The goals of this project, which will be delivered in FY11-12, are the following:

- a. Identify and quantify the impact of key media drivers for enquiries and applications;
- b. Calculate ‘advertising decay’ per key media driver in order to apply cost efficiencies to the media plan;
- c. Identify the optimum media channel mix in driving enquiries and applications effectively and cost efficiently;
- d. Conduct pre- and post-campaign evaluations to evaluate the success of individual campaigns;
- e. Build and maintain a customized dashboard to track the performance of campaigns and media activity for enquiries, applications, traffic to the defense jobs website, search keyword impressions, etc.; and
- f. Measure media effectiveness nationally at a granular level - television program, radio session, print title, digital formats, search keyword terms, etc (DFR, 2011a).

DFR is also currently investigating a system that measures the preferences of prospective recruits in real-time using a web-based interface. The information gathered from individuals in the form of preference data can then be used to demonstrate acceptance probability and enlistment likelihood. The metrics can be customized to DFR’s requirements and can be used to measure effectiveness of advertising (DFR, 2011a).

2. External Metrics

DFR and Hall and Partners Open Mind have recently (2011) introduced the 'worm' to measure the extent which television commercials are able to build and sustain interest through the length of the commercial. Viewer demographics are captured as well as propensity and service preference. This advertising diagnostic combined with econometric modeling of the advertising decay rate will be used to measure television advertising cost-effectiveness and guide future development of advertising campaigns and advertising usage (DFR, 2011a).

Propensity studies are also used to track changing perceptions on the likelihood that individuals will consider a career in the military. DFR conducts these studies to determine changes in awareness and attitudes of personnel to enlist in the ADF. It also measures general propensity to enlist among its target markets and the effectiveness of branding efforts. These studies are also conducted to measure the brand positioning of the ADF and forecast ADF and individual service brand health.

IV. ESTIMATING ADF ADVERTISING EFFECTIVENESS

A. INTRODUCTION

This chapter begins by discussing some of the limitations of the available data. It discusses the sources of data used in the specification of the multivariate models and describes the dependent and independent variables used in the analysis. The multivariate regression models are then estimated via OLS regression techniques. The influence of advertising expenditure on ADF enquiries, applications and enlistments is analyzed followed by an analysis of the influence of service specific advertising on individual service enquiries.

B. METHODOLOGY

The multivariate regression analysis used in this study attempts to replicate earlier studies by employing different functional forms to test the lagged impact of advertising expenditure as well as the concept of threshold and saturation levels of expenditure and its influence on recruitment related outcomes. The first alternative estimated is a simple linear model followed by polynomial models that introduce a squared advertising expenditure variable. This variable is employed to estimate the diminishing returns of advertising spending and attempt to replicate models found in the prior recruitment supply literature. Finally, log-log models are estimated. Similar variables are tested as per previous studies, but with current ADF data. Due to data limitations, this study is unable to control for a number of external economic factors as per previous studies.

This approach was undertaken in order to test whether results from the U.S. military recruiting experience could be replicated with ADF recruitment data and to confirm the validity of previous ADF analysis. The estimation of several model specifications, and the corresponding results, would also lead to new insights for DFR M&A expenditure.

C. DATA

1. Limitations

The previous literature has identified a number of limitations of the data when modeling the effectiveness of recruiting. The most common data limitations include insufficient variability across observations, multicollinearity across time-series data, and insufficiently small sample sizes. Previous research for the U.S. DoD has attempted to control for these limitations by using pooled (cross-sectional times series) data. This increases the sample size and the variation in the variables, but introduces the problem of needing to control for differences between different cross-sectional units (such as states or territories) and across time. A further complication is disaggregating M&A expenditure across geographical regions and forms of advertising. The NATSEM Australian enlistment supply project also identified similar data deficiencies for the ADF. There were a number of limitations of the data set used for this study. The first limitation was that advertising expenditure was not disaggregated by advertising medium. The effect of this is that the cost effectiveness of different advertising media could not be estimated. Recruiter force numbers were also not available. The effect of this is that the influence of recruiters in converting enquiries to applications and then enlistments cannot be estimated or controlled for.

2. Data Sources

The internal data compiled for this data set was sourced exclusively from DFR. DFR provided this data set after a request was made for data used to compile the Defence Force Recruiting Marketing Plan, Financial year 2011-2012. The monthly data gathered was restricted to July 2008 to December 2011. This was due to consistency in terms of the definition of an enquiry from July 2008 onwards, and better availability of disaggregated advertising expenditure data. Australian unemployment data was sourced from the Australian Bureau of statistics (ABS) website (ABS, 2012).

D. ANALYSIS VARIABLES

The section describes the variables used to estimate the multivariate models in this chapter. The variables are categorized as dependent or independent (explanatory) variables.

1. Dependent Variable

a. Enquiries

This variable reports the total number of monthly passive and active enquiries completed by potential enlistees. Enquiries are separated by service and no-preference for service. For the time period examined, the Navy had a monthly mean of 1168 enquiries, the Army had a mean of 4568 monthly enquiries and the Air Force had 1706 mean monthly enquiries. There was a monthly average of 621 enquiries which had no-preference for service. Enquiries are used to measure the effect of advertising to generate interest and stimulate desire to join the military. Based on the literature review, it is hypothesized that a positive relationship exists between advertising expenditure and enquiries.

b. Applications

An active enquirer becomes an applicant once they have booked an appointment to attend a Your Opportunities Unlimited (YOU) session. A YOU session includes an aptitude test, a medical interview and an interview with a careers counselor. An applicant who is successful in all assessments will then be issued with an enlistment letter of offer. For the time frame examined, DFR received a mean of 1766 monthly applications for all services allocated between Navy (330), Army (1139) and Air Force (297). The number of Navy applications ranged from a monthly minimum of 123 to a maximum of 495. The Army had 583 minimum monthly applications and a maximum of 1641. The Air Force had a minimum of 97 monthly applications and a maximum of 487.

Based on the literature review, I expect a lagged positive correlation between advertising expenditure and the number of applications.

c. Enlistments

This variable reports the total number of officers and other ranks enlisted into the three services each month. There was significant variability and irregularity across months and service ranging from a minimum of zero monthly enlistments for the Air Force to a maximum of 704 Army monthly enlistments. This variability can possibly be explained by planning of the flow of new accessions into individual service training cycles. The mean monthly number of enlistments was 124 for the Navy, 415 for the Army and 88 for the Air Force. Based on the literature review, it is hypothesized that a lagged positive relationship exists between advertising expenditures and enlistments.

2. Explanatory Variables

a. Unemployment Rate

The ABS is the data source for the unemployment rate. The independent variable is the national unemployment rate by month for 15-24 year youth. This is a continuous variable. The mean unemployment rate for this entire period was 11.1% and the range was 8.9% - 12%. The unemployment rate is assumed to proxy the effect of civilian labor market conditions on recruitment. It is hypothesized that a positive relationship exists between unemployment and recruitment success.

b. Propensity

The propensity variable reflects survey responses from respondents to the question of how likely they will be to join the military. The survey question measuring propensity is:

“How likely are you to consider a job or career with the Navy, Army, or Air Force?”

Respondents are asked the question twice during the survey. They are initially asked at the beginning of the survey and once again at the end of the survey after viewing an advertisement. Propensity is generally higher once a respondent has viewed an advertisement. Propensity measures are divided into seven categories ranging from very likely to very unlikely to join the military.

The propensity measure used in this survey is an average of all respondents by quarter. As a result, there are a number of limitations. Firstly, there are less observation points (10 versus 40 for the other variables); this results in less variation across the data. Secondly, the measure is an aggregation of propensity across several population subsets which can have markedly different propensity. For example, propensity amongst male youth tends to be higher than propensity among female youth. Finally, the propensity score is an average of the responses to the question asked twice during the survey. These limitations are likely to give questionable results.

Like propensity in the U.S., propensity to join the military appears to be heavily skewed towards very unlikely to join the military. Less than 5% of respondents were extremely likely to join the military, while 25% responded that they were extremely unlikely to join the military. Overall, 64% of those surveyed responded that they were extremely unlikely, very unlikely or unlikely to join the military, whereas 30% were extremely likely, very likely or likely to join, and 6% were neutral. Based on the literature review, it is hypothesized that a positive relationship exists between high propensity to join the military and recruitment.

c. Enlistment Targets

This variable reports the total number of officers and other ranks required monthly by each service. There was significant variability and irregularity across months and service ranging from a zero monthly Air Force enlistment target to a 904 Army monthly enlistment target. The mean monthly enlistment targets were 124 for the Navy, 415 for the Army and 88 for the Air Force. This variable can be thought of as a demand

side factor in the recruitment process. It is expected that enlistments have a positive relationship with enlistment targets.

d. Advertising Media Expenditure

Advertising expenditure on media is the total monthly amount spent on all media channels including print, radio, television, and internet. This figure does not include other M&A costs including campaign advertising production, agency retainer fees, non-campaign media placement and agency travel. It is expected that media only expenditures is a more accurate figure to use for the impact of advertising on enlistments. Based on the literature review, it is hypothesized that a positive relationship exists between advertising expenditure and enquires, applications and enlistments.

E. DESCRIPTIVE STATISTICS

1. Summary Statistics

Table 6 provides descriptive statistics of the advertising expenditure dataset used to estimate the parameters of the ADF multivariate regression models. The mean monthly total media expenditure for the ADF was \$2,100,046 (rounding error). Total enquiries, including both passive and active was 8,064, total applications was approximately 1,766 and total monthly enlistments for all three services was approximately 628.

Variable (monthly)	Obs	Mean	Std. Dev.	Min	Max
Total Enquiries	42	8064.26	2009.94	4341	12361
Total Applications	42	1765.88	42.97	803	2546
Total Enlistments	42	627.76	253.88	96	1278
Total Expenditure (000s)\$	40	2100.46	1015.35	70	4117
Youth Unemployment Rate (%)	42	11.14	.87	8.9	12
Propensity Likely (%)	42	29.57	4.41	21	37

Table 6. Descriptive Statistics

Table 7 provides the mean monthly statistics by service and the cost per enlistment by individual service expenditure and ADF wide totals. Tables 7 illustrates that the Australian Army utilizes the bulk of the monthly recruiting media spend, accounting for 45% of the total ADF media expenditure. The Australian Army also enlists approximately 66% of the total ADF enlistments. Each enlistment costs the ADF approximately \$3,350 over the time period analyzed. This is similar to the figure reported by DFR in (DFR, 2011a). Among the services, a Navy enlistment is the most expensive costing approximately \$4,800 per enlistment, followed by the Air Force with each enlistment costing approximately \$3,960 in service-specific media spend and then the Army with each enlistment costing approximately \$2,300 in service-specific media spend.

	Navy	Army	Air Force	Other/ No Preference	ADF/Total
Enquiries – Passive	555	1929	850	591	3926
Enquiries - Active	613	2639	856	30	4138
Total Enquiries	1168	4568	1706	621	8063
Applicants	330	1139	297	-	1766
Enlistments	124	415	88	-	627
Targets	146	494	98	-	738
Media Spend	\$601,970	\$953,826	\$349,061	\$228,536	\$2,100,892
Cost Per Enlistment	\$4,854	\$2,298	\$3,966	-	\$3,350

Table 7. Mean Recruitment Values for the ADF and Individual Services

Table 8 provides the conversion ratios for the variables for both the ADF and the individual services. As seen in Table 8, the ADF requires approximately 15 enquiries to generate one enlistment. This can be further broken down to requiring approximately 4.7 enquiries to produce one application, and approximately 3.3 applications to generate one enlistment. The enquiry-to-enlistment conversion ratios also offer some interesting differences between the three services. Over the time period analyzed, the Army required an average of approximately 12 enquiries to achieve one enlistment, whereas the Navy required 38 enquiries and the Air Force required approximately 79 to produce one enlistment. The causes of these differences are outside the scope of this paper, but could be of interest to advertisers and recruiters.

	Navy	Army	Air Force	ADF
Average Monthly Enlistment	124	415	88	627
Active Enquiry/Applications	1.91	2.37	2.98	2.39
Total Enquiry/Applications	3.67	4.13	6.10	4.69
Application/Enlistments	7.06	3.13	12.92	3.28
Total Enquiries/Enlistments	38.32	12.4	79.29	14.83

Table 8. Conversion Ratios

2. Correlation Analysis

The correlations in the time pattern between monthly ADF enquiries, applications, enlistments and ADF media expenditure are illustrated in Figures 9-11. A clean positive relationship exists between fluctuations in monthly enquires and advertising expenditure. A positive relationship between ADF advertising expenditure and applications is also evident. There appears to be a weaker positive correlation between swings in ADF advertising expenditure and enlistments.

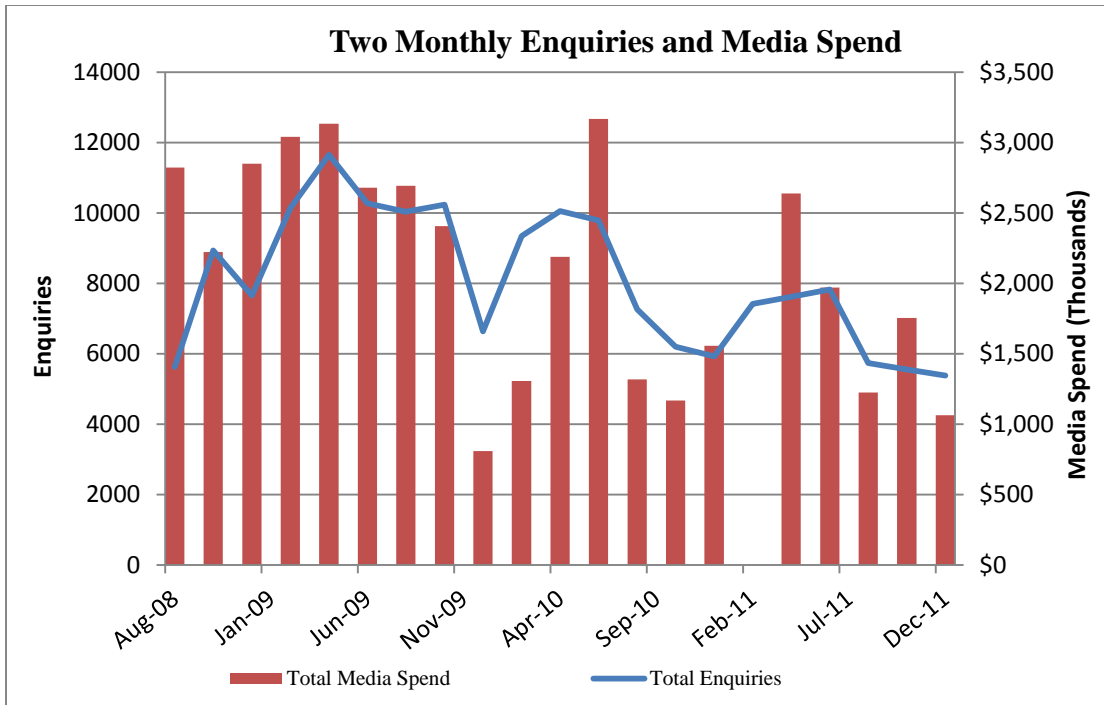


Figure 9. Two Monthly Enquiries and Media Spend

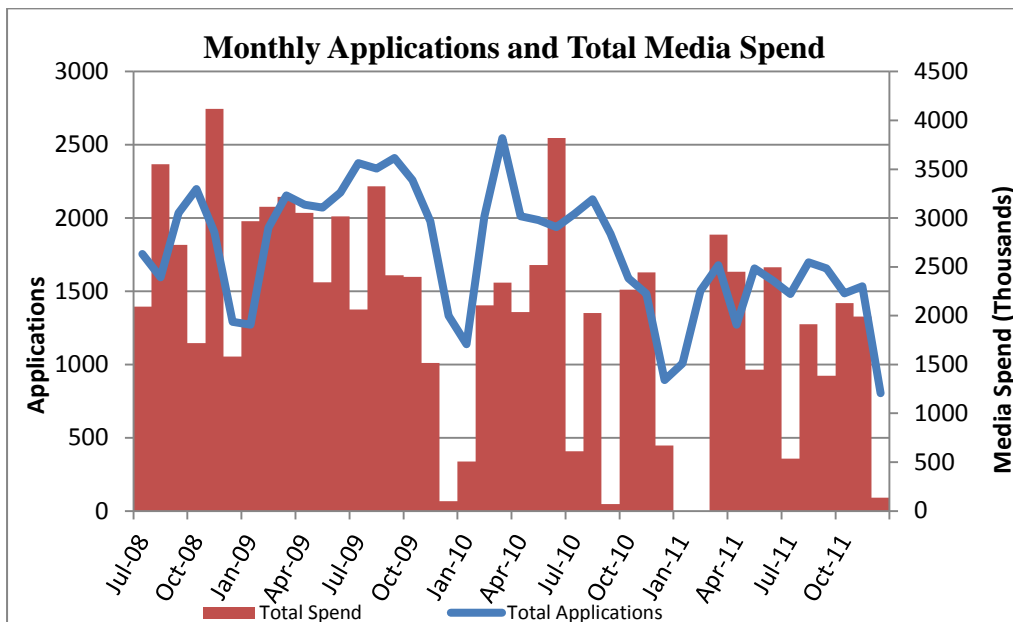


Figure 10. ADF Monthly Applications and Total Media Spend

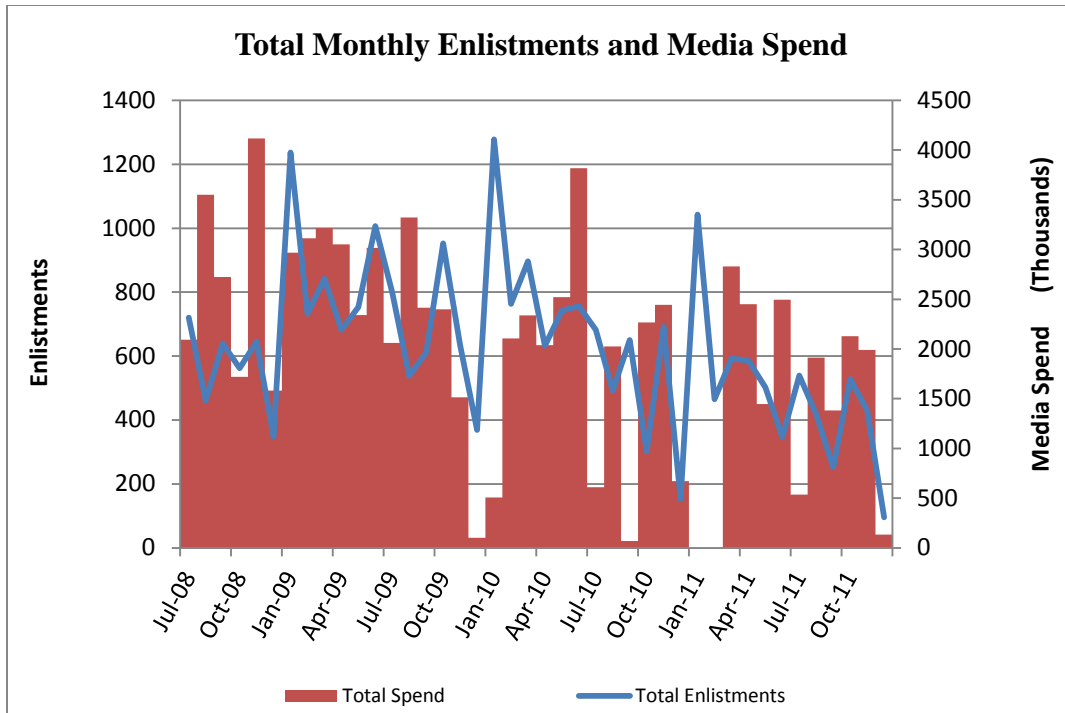


Figure 11. ADF Monthly Enlistments and Total Media Spend

Step one of the statistical analysis is to analyze the simple correlation coefficients between the main variables. The following correlation coefficients are provided in Tables 9-10:

1. Total enquiries versus aggregated ADF media expenditure.
2. Total applications versus aggregated ADF media expenditure.
3. Total enlistments versus aggregated ADF media expenditure.
4. Individual service enquiries versus individual service media expenditure.

The correlation coefficients illustrated in Table 9 indicate that a statistically significant positive relationship exists between ADF advertising expenditure and enquiries, application, and to a lesser extent, enlistments. The correlation between ADF advertising expenditure, enquiries, and applications are significant at the 0.01 level, while ADF advertising expenditure and enlistments is significant at the 0.10 level.

	Total Media Expenditure
Total Enquiries	0.55 *** (0.000)
Total Applications	0.44 *** (0.005)
Total Enlistments	0.31 * (0.055)

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 9. Correlation Coefficients

The correlation between individual service monthly enquiries and service-specific media expenditure is illustrated in Figures 12-14. A positive correlation appears to be evident for both the Army and Air Force, while there appears to be a weaker lagged correlation between Navy advertising expenditure and Navy enquiries.

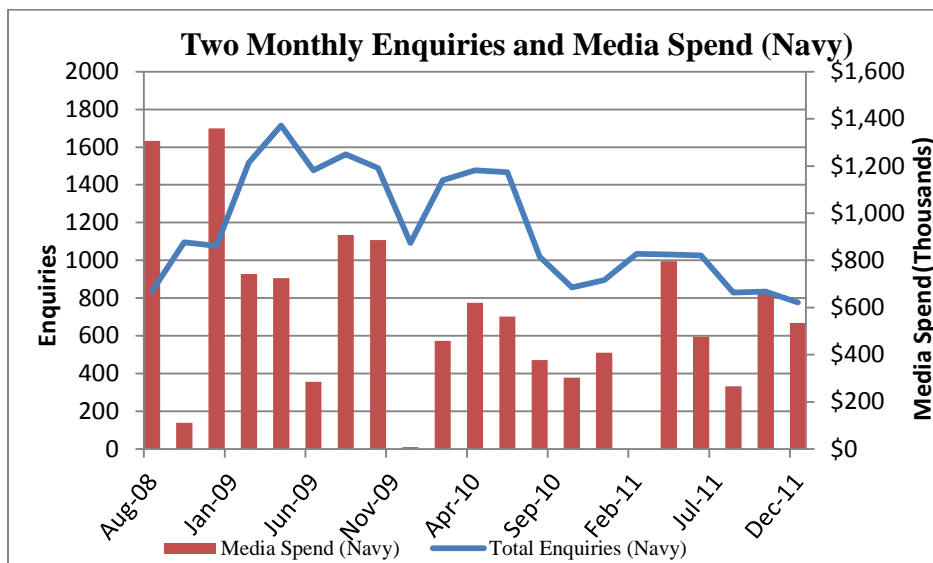


Figure 12. Navy Two Monthly Enquiries and Navy Media Spend

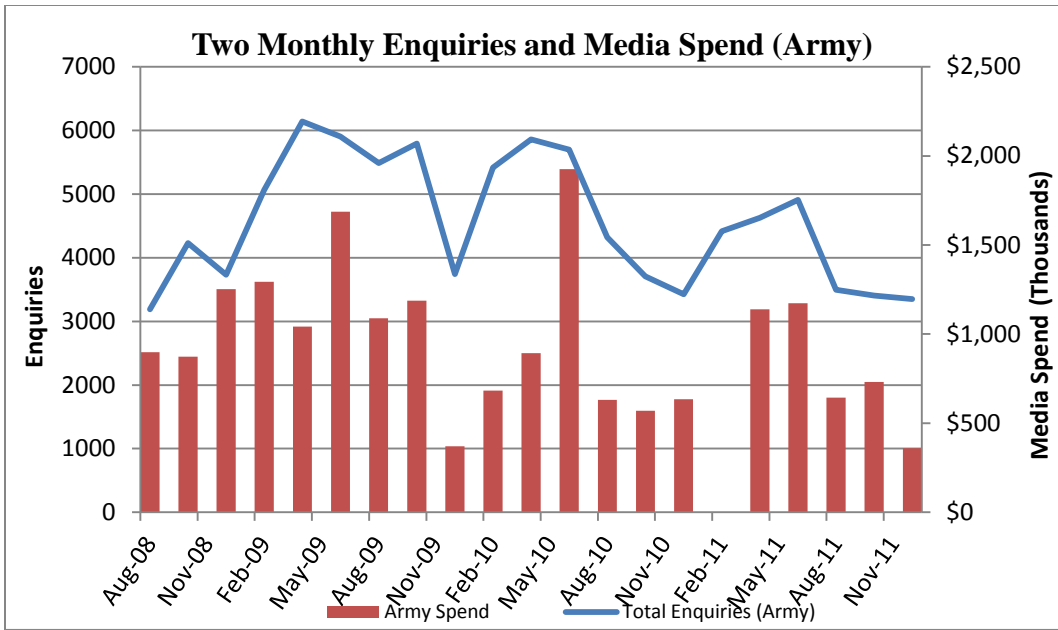


Figure 13. Army Two Monthly Enquiries and Army Media Spend

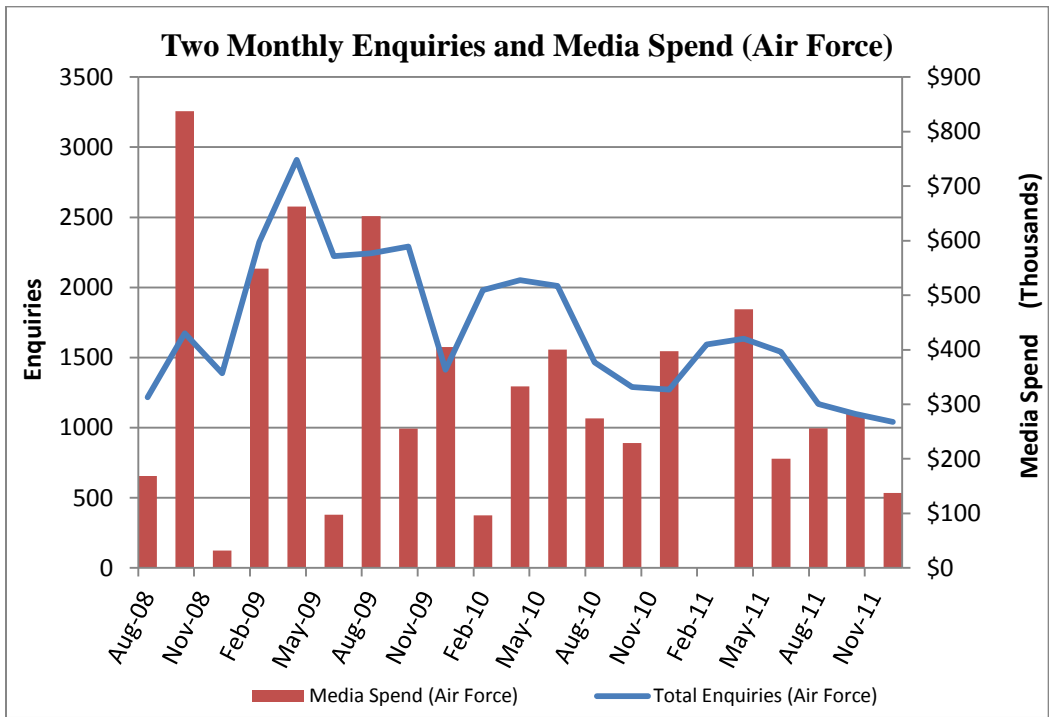


Figure 14. Air Force Two Monthly Enquiries and Air Force Media Spend

The correlation coefficients for individual service-level enquiries and media expenditure are displayed in Table 10. Army enquiries are positively correlated to Army-specific advertising and are significant at the 0.01 level. Likewise, Air Force enquiries are positively correlated to Air Force-specific advertising and significant at the 0.05 level. Navy enquiries are not significantly related to Navy advertising. Interestingly, the correlation between individual service enquiries and ADF expenditure are all statistically significant at the 0.01 level and the magnitudes of the correlations are similar in magnitude.

	Total Expenditure	Navy Expenditure	Army Expenditure	Air Force Expenditure
Navy Enquiries	0.48 *** (0.00)	0.10 (0.564)	0.32 ** (0.04)	0.25 (0.14)
Army Enquiries	0.50 *** (0.00)	0.01 (0.93)	0.44 *** (0.00)	0.21 (0.21)
Air Force Enquiries	0.48 *** (0.00)	0.07 (0.69)	0.28 * (0.08)	0.33 ** (0.04)

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 10. Correlation Coefficients using Individual Service Data

Because the correlation coefficients do not condition on other factors, the second step is to estimate multivariate models to analyze the impact of advertising expenditures on enquiries, applications and enlistments. The monthly data for the entire period from July 2008 to December 2011 is used. The models estimate the effect of ADF media expenditure on total ADF enquiries, applications and enlistments and estimate the effect of individual service advertising expenditure on enquiries. All models estimated are linear in parameter assuming constant returns. For the purposes of this study, the specification for the base regression model is as follows:

$$(\text{Enquiries}) = \beta_0 + \beta_1 (\text{Media Spend}) + \beta_2 (\text{Unemployment}) + \beta_3 (\text{Propensity}) + e \quad [1]$$

Based on the literature review, polynomial and Log-Log models are also investigated. The models are as follows:

$$(\text{Enquiries/applications/enlistments}) = \beta_0 + \beta_1 (\text{Media Spend}) + \beta_2 (\text{Media Spend})^2 + \beta_4 (\text{Unemployment}) + \beta_5 (\text{Propensity}) + \beta_6 (\text{Enlistment Targets}) + e$$

[2]

$$\text{Log}(\text{Enquiries/applications/enlistments}) = \beta_0 + \beta_1 \text{Log}(\text{Media Spend}) + \beta_2 \text{Log}(\text{Unemployment}) + \beta_3 \text{Log}(\text{Propensity}) + e \quad [3]$$

The polynomial models allows us to test for diminishing marginal returns to media spending, and the log-log model produces elasticities for each explanatory variable. Elasticities measure the percentage change in the dependent variable for a one percent change in the independent variable.

F. RESULTS

1. ADF-Level Recruitment and Advertising Spending Regression Results

The OLS regression results from estimating the various recruitment models for total ADF media spend are shown in Tables 11-13. Table 11 provides the complete results using total ADF enquiries as the dependent variable. The effect of media expenditure on enquiries is statistically significant across all model specifications. The effect ranges from 62 to 189 additional enquires per month for every \$100,000 increase in media expenditure. The best performing model is the linear model in column 2 based on an R-squared value of 0.49, and an F-value of 11.12 which is significant at the 0.01 level. Both explanatory variables of interest are significant at either the 0.01 or 0.05 level. In column 2, the unemployment rate coefficient performs as expected with an increase in the unemployment rate leading to an increase in enquiries. The unemployment rate

coefficient suggests every one percentage point increase in the national youth unemployment rate will lead to approximately 738 additional enquiries per month. The propensity coefficient in column 2 enters with an unexpected sign. When propensity is included in the model, the coefficient is negative suggesting that a one percent increase in propensity will lead to 138 fewer enquiries per month. This is counterintuitive and may indicate a problem with the propensity measures.

The models in columns 4-5 use a polynomial functional form to allow for diminishing marginal returns to advertising spending. They also offer interesting results. The polynomial model in column 5 has an R-squared of 0.48 and is significant overall ($F = 8.12$, $p = (0.000)$). The total media spend coefficient in column 5 suggests that an additional \$100,000 will generate 185 more enquiries per month. The unemployment and propensity coefficients are very similar to those obtained in the base model in column 2. The squared total media spend coefficient enters with a negative sign as expected. This suggests that the effect of advertising expenditure has diminishing marginal returns; however, the size of the coefficient is very small and is not statistically significant.

The model in column 7 estimates a log-log relationship between the dependent and independent variables. The model provides elasticities for each explanatory variable. The model has an F-value of 10.81 which is significant overall at the 0.01 level and performs well with an R-squared value of 0.47. The three explanatory variables total media spend, unemployment, and propensity are all statistically significant. The results indicate that a 10% increase in total media expenditure per month will generate a 1.6% increase in enquiries; a 10% increase in unemployment will generate an 8.8% increase in enquiries per month, and a 10% increase in propensity is associated with a 5.3% reduction in enquiries per month. Based on the elasticities, the results suggest that while advertising expenditure drives enquiries, the effect of unemployment is greater. Falling propensity also appears to have a strong association with the generation of enquiries, which noted above is a counterintuitive, and possibly implausible, result.

Total Enquiries	Linear	Linear	Lagged (t-1)	Polynomial	Polynomial	Log	Log
Total Media Spend	1.25 *** (0.000)	1.15 *** (0.000)	0.62 * (0.075)	1.89 ** (0.032)	1.85 ** (0.025)	0.169 *** (0.000)	0.162 *** (0.000)
Unemployment	712.46 ** (0.024)	737.98 ** (0.014)	200.44 (0.589)	690 ** (0.030)	713.66 ** (0.017)	0.83 ** (0.049)	0.88 ** (0.027)
Propensity		-138.12 ** (0.018)			-139.92 ** (0.017)		-0.53 ** (0.014)
Total Media Spend ^2				-0.0002 (0.431)	-.0001 (0.355)		
R2	0.39	0.49	0.08	0.40	0.48	0.38	0.47
F	11.98 (0.0001)	11.12 (0.0000)	1.70 (0.194)	8.12 (0.0003)	8.53 (0.0001)	11.19 (0.0002)	10.81 (0.0000)
No of Obs	40	40	39	40	40	40	40

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 11. OLS Regression Model – ADF Enquiries

Table 12 provides the complete results using ADF Applications as the dependent variable. The effect of media expenditure on the generation of applications is statistically significant across all model specifications. The effect ranges from 15 (in column 3) to 43 (in column 5) additional applications per month for every \$100,000 increase in media expenditure. The polynomial specification in column 5 performs the best based on an R-squared value of 0.35, of and is significant overall (F-value = 4.79, P-value = 0.004). Two of the explanatory variables, total media spend and propensity, are significant at the 0.01 level. Total media spend continues to have a positive effect on applications. In column 5, the expenditure coefficient suggests that a \$100,000 increase in total media spend will generate an additional 43 enquiries per month. This is twice the effect measured in the model without the squared coefficient in column one and over three

times the effect estimated by the log-log model in column seven. The propensity coefficient, when included in the model, again enters with an unexpected negative sign. The coefficient suggests that a one percent increase in propensity will lead to 27 fewer applications. The squared total media spend coefficient enters with a negative sign as expected, which suggests that the effect of advertising expenditure has diminishing marginal returns; however, the size of the coefficient is very small and not significant. The unemployment rate coefficient suggests that every one percentage point increase in the monthly national youth unemployment rate will lead to approximately 89 additional applications per month. This is in the middle of the range of the effect of unemployment estimated by the models in columns one through five; however, none of the coefficients are statistically significant. The log-log model in column 7 is statistically significant overall. Total advertising expenditure is the only statistically significant variable and suggests that a 10% increase in advertising expenditure will lead to a 1.3% increase in applications per month. These results suggest that advertising expenditure drives applications; however, the effect is weaker than on enquiries. Unemployment does not appear to demonstrate a relationship with applications.

Total Applications	Linear	Linear	Lagged [t-1]	Polynomial	Polynomial	Log	Log
Total Media Spend	0.196 *** (0.002)	0.178 *** (0.004)	0.15 ** (0.042)	0.44 ** (0.027)	0.43 ** (0.022)	0.14 *** (0.002)	0.13 *** (0.002)
Unemployment	93.06 (0.181)	97.99 (0.144)	70.23 (0.372)	84.69 (0.22)	89.30 (0.177)	0.43 (0.338)	0.47 (0.275)
Propensity		-26.62 ** (0.046)			-27.26 ** (0.039)		-0.47 (0.051)
Total Media Spend ^2				-0.00006 (0.189)	-0.0000 (0.149)		
R2	0.23	0.31	0.11	0.27	0.35	0.24	0.32
F	5.60 (0.007)	5.48 (0.003)	2.35 (0.12)	4.41 (0.009)	4.79 (0.004)	5.91 (0.006)	5.62 (0.003)
No of Obs	40	40	39	40	40	40	40

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 12. OLS Regression Model – ADF Applications

Table 13 provides the complete OLS regression results for ADF Enlistments as the dependent variable. The specifications include enlistment targets to control for the demand for new recruits. The effect of media expenditure on the generation of enlistments is insignificant across all models, except for the lagged model in column 3 which has a very small negative effect. For all the specifications estimated, unemployment and enlistment targets are significant at the 0.01 level. Unemployment appears to be a significant driver of enlistments. Across all the models estimated, a 1% point increase in the youth unemployment rate leads to between 40-51 additional monthly enlistments. Enlistment targets are similarly influential. Across all the models, an increase in enlistment targets causes a corresponding increase in enlistments. The log-log model in columns 6-7 indicate that a 10% increase in enlistment targets results in a corresponding 10.6% -10.7% increase in enlistments. This suggests that the recruiting force is effective in meeting enlistment targets. Propensity appears to have no effect on

enlistments. The high R-squared of the specifications in columns 6-7 also indicates high explanatory power of the variables tested (R-squared = 0.95, F-value = 182, P-value = 0.00).

Total Enlistments	Linear	Linear	Lagged [t-1]	Polynomial	Polynomial	Log	Log
Total Media Spend	0.001 (0.865)	0.00 (0.89)	-0.02 * (0.06)	-0.34 (0.238)	-0.033 (0.254)	0.27 (0.18)	0.28 (0.18)
Unemployment	50.19 *** (0.00)	50.32 *** (0.00)	39.96 *** (0.00)	51.51 *** (0.00)	51.58 *** (0.00)	0.81 *** (0.00)	0.81 *** (0.00)
Propensity		-2.02 (0.361)			-1.86 (0.397)		-0.06 (0.63)
Enlistment Targets	0.87 *** (0.00)	0.86 *** (0.00)	0.91 *** (0.00)	0.88 *** (0.00)	0.86 *** (0.00)	1.07 *** (0.00)	1.06 *** (0.00)
Total Media Spend ^2				0 (0.238)	0 (0.211)		
R2	0.95	0.95	0.97	0.95	0.95	0.95	0.95
F	243.38 (0.00)	182.01 (0.000)	335.83 (0.00)	186.88 (0.00)	148.53 (0.000)	249 (.000)	182 (0.000)
No of Obs	40	40	39	40	40	40	40

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 13. OLS Regression Model of ADF Enlistments including Enlistment Targets

2. Individual Services

The results from estimating OLS regression models for individual service advertising expenditure and enquiries are shown in Tables 14–16. Table 14 provides the complete results using Army enquiries as the dependent variable. The effect of Army advertising expenditure on the generation of Army enquiries is statistically significant across all models estimated, with the exception of the lagged model in column 3. The

effect ranges from 60-120 additional enquires per month for every \$100,000 increase in Army advertising expenditure. The best performing model is the log-log model in column 7 based on an R-squared value of 0.51, and an F-value of 12.32 which is significant at the 0.01 level. The three explanatory variables of interest are significant at either the 0.05 or 0.10 level. As expected, Army advertising expenditure has a positive effect on the generation of Army enquiries. The coefficient suggests that a 10% increase in expenditure will result in a 1.1% increase in enquiries per month. The unemployment coefficient indicates a 10% increase in the unemployment rate will generate 11% more enquiries per month, and a 10% increase in propensity is associated with a 5.6% decrease in enquiries per month.

Army Enquiries	Linear	Linear	Lagged [t-1]	Polynomial	Polynomial	Log	Log
Army Media Spend	0.64 *** (0.003)	.060 *** (0.003)	.178 (0.450)	1.10 * (0.092)	1.21 ** (0.048)	0.102 *** (0.000)	0.11 *** (0.000)
Unemployment	440.00 *** (0.010)	468.84 *** (0.004)	320.01 (0.097)	449.75 *** (0.010)	484.93 *** (0.003)	1.03 *** (0.008)	1.10 *** (.002)
Propensity		-78.15 ** (0.014)			-81.42 ** (0.011)		-0.56 *** (.005)
Total Media Spend ^2				-0.0002 (0.451)	-0.000 (0.285)		
R2	0.33	0.43	0.09	0.34	0.45	0.38	0.51
F	9.02 (0.000)	9 (0.000)	1.80 (0.18)	6.14 (0.002)	7.18 (0.000)	11.40 (0.000)	12.32 (.000)
No of Obs	40	40	39	40	40	40	40

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 14. OLS Regression Model – Army Enquiries and Army Advertising Expenditure

Table 15 provides the complete results using Navy enquiries as the dependent variable. The effect of Navy advertising expenditure on the generation of Navy enquiries is only statistically significant in the log-log model in column 7. This relationship is very small suggesting a 10% increase in expenditure leads to a 0.6% increase in enquiries. In the other model specifications, advertising expenditure is statistically insignificant and the magnitudes of the coefficients are also small. Unemployment and propensity are statistically significant across all the models except in the lagged model in column 3. The log-log model in column 7 is the best performing model with an R-squared value of 0.38 and is significant overall at the 0.01 level (F-value = 7.28, P-value = 0.00). A 10% increase in the unemployment rate is estimated to generate 12.6% additional Navy enquiries per month. A 10% decrease in propensity is associated with an 8.9% fall in enquiries per month.

Navy Enquiries	Linear	Linear	Lagged [t-1]	Polynomial	Polynomial	Log	Log
Navy Media Spend	0.154 (0.158)	0.12 (0.22)	0.02 (0.861)	0.21 (0.50)	0.41 (0.137)	0.05 (0.11)	0.061 ** (0.021)
Unemployment	148.47 ** (0.029)	143.47 ** (0.018)	49.60 (0.48)	147 ** (0.034)	135.28 ** (0.026)	1.17 ** (0.04)	1.26 ** (0.013)
Propensity		-32.45 *** (0.002)			-35.62 *** (0.001)		-0.89 *** (0.001)
Total Media Spend ^2				-0.0000 (0.852)	-0.0000 (0.256)		
R2	0.13	0.34	0.015	0.13	0.36	0.135	0.38
F	2.78 (0.08)	5.99 (0.002)	0.26 (0.77)	1.82 (0.16)	4.87 (0.003)	2.81 (0.07)	7.28 (0.000)
No of Obs	39	39	38	39	39	39	39

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 15. OLS Regression Model – Navy Enquiries and Navy Advertising Expenditure

Table 16 provides the complete results using Air Force enquiries as the dependent variable. The effect of Air Force advertising expenditure on the generation of Air Force enquiries is only statistically significant in the models estimated in columns 1-2. The coefficients suggest a \$100,000 increase in Air Force advertising expenditure will generate 49 or 55 additional enquiries per month. The linear model in column 2 performs the best based on an R-squared value of 0.30, and is significant overall (F-value = 4.93, P-value = 0.06). All three of the explanatory variables are statistically significant. Air Force advertising expenditure has a positive effect on enquiries. The coefficient suggests that a \$100,000 increase in media expenditure will generate an additional 49 enquiries per

month. A 1% point increase in the unemployment rate will generate 197 additional enquiries per month and a 1% increase in propensity will lead to 40 fewer Air Force enquiries per month.

Air Force Enquiries	Linear	Linear	Lagged [t-1]	Polynomial	Polynomial	Log	Log
Air Force Media Spend	0.55 ** (0.017)	0.49 ** (0.025)	0.18 (0.45)	-0.38 (0.55)	-0.43 (0.52)	0.02 (0.51)	0.019 (0.515)
Unemployment	194.32 * (0.078)	196.78 * (0.058)	34.95 (0.767)	250 ** (0.024)	254 (0.128)	0.80 (0.24)	0.85 (0.185)
Propensity		-40.40 ** (0.024)		-38.34 ** (0.029)			-0.76 ** (0.015)
Total Media Spend ^2				0.000 (0.154)	0.000 (0.128)		
R2	0.19	0.30	0.017	0.35	0.24	0.05	0.20
F	4.05 (0.03)	4.93 (0.006)	0.30 (0.74)	4.35 (0.006)	3.62 (0.022)	0.82 (0.45)	2.83 (0.05)
No of Obs	38	38	37	38	38	38	38

(P-value in parentheses)

*** statistically significant at the 0.01 level

** statistically significant at the 0.05 level

* statistically significant at the 0.10 level

Table 16. OLS Regression Model – Air Force Enquiries and Air Force Advertising Expenditure

G. SUMMARY

This study utilized several different model specifications to estimate the relationship between advertising expenditure and recruitment related outcomes. The first alternative was a simple linear model followed by polynomial models that attempt to replicate models found in the prior recruitment supply literature. Finally, log-log models were estimated. The models in Tables 11-13 estimate Total ADF enquiries, applications and enlistments and ADF advertising expenditure. The models in Tables 14-16 estimated individual service advertising expenditure and enquiries.

The estimates in Tables 11-13 indicate significant relationships between total ADF enquiries, applications, and total ADF advertising expenditure. No relationship was found between ADF advertising expenditure and enlistments. Unemployment was also found to be a significant predictor of enquiries and enlistments. These relationships are similar to the results found in studies of the U.S. Navy. The Gallup and GMAX studies found that both advertising expenditure and unemployment were significant generators of leads (enquiries). However, unlike the two U.S. Navy studies, an analysis of the specific effect of certain media channels, and the associated threshold levels of expenditure, could not be analyzed. This remains an interesting and valuable area for future study.

The magnitude of the effect of advertising expenditure on enquiries varied little between models with different functional form. The effect of an increase of \$100,000 media expenditure generated between 62 to 185 additional enquiries per month depending on the functional form employed. The log-log regression suggests a 10% increase in expenditure generates a 1.6% increase in enquiries.

For individual service models, the impact of individual service advertising expenditure on service enquiries is mixed. Army advertising appears to have the greatest influence on enquiries. The results for the Army are similar to those estimated for the ADF. This is not surprising considering the Army takes the lion share of the ADF monthly advertising budget (45%) and receives the bulk of all monthly enquiries (66%). Navy advertising does not appear to have an influence on the generation of enquiries as only 1 of the 7 models found a statistically significant, but very small, relationship. Air Force advertising was also found to have a very small influence. Only 2 of the 7 Air Force models identified statistically significant relationships and the magnitudes were relatively small.

These findings suggest that ADF advertising, not individual service advertising, is more effective at generating enquiries. These results also suggest that there may be positive spillover effects of individual service advertising to other services, particularly Army advertising on other services.

A strong relationship also exists between total ADF advertising expenditure and total ADF applications. An increase of \$100,000 media expenditure generated between 43 to 178 additional applications, depending on the functional form employed. This was also expected due to the strong correlation between enquiries and applications. Unemployment and propensity do not appear to be significant drivers of applications via any of the models.

The results for ADF enlistments, when controlling for enlistment targets, appear to offer the most robust results. In the models tested, unemployment and enlistment targets are significant influencers on enlistments. A 10% increase in enlistment targets was found to lead to approximately a 10% increase in enlistments. This is in-line with earlier expectations that increases in the demand for enlistments will result in additional enlistments. Unemployment was also statistically significant across all models estimated. A 1% point increase in the youth unemployment rate was found to be associated with 40 to 51 additional enlistments.

These findings indicate that ADF advertising expenditure has an immediate effect on awareness and is a key driver of enquiries and applications. The models suggest that advertising expenditure is not related to enlistments but rather that unemployment and enlistment targets are significant predictors of enlistments.

Falling propensity was found to drive enquiries. This negative relationship is counterintuitive as it is expected that increased propensity to join the military would result in increased enquiries, applications and enlistments. The limitations to the propensity measures, identified earlier in this study, are likely causes for this questionable finding. This remains a potential area for future study.

Unemployment was found to have a significant effect on enquiries and enlistments. A 10% increase in the youth unemployment rate was found to increase total enquiries and enlistments by approximately 8%. Similarly, unemployment was found to have a very strong relationship for the individual services. The effect was greatest for the Army with a 10% increase in youth unemployment related to an 11% increase in Army enquiries.

The results found in this study are similar to the results identified in the NATSEM study which are presented in Table 5. Unemployment was statistically significant in two of the three NATSEM individual service models and was also positive indicating that an increase in the unemployment rate is related to recruitment success. Additionally, like the ADF enlistment model estimated in this study, propensity to join the military and recruitment success were not statistically significant.

THIS PAGE INTENTIONALLY LEFT BLANK

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSION

The focus of this study was to examine the cost effectiveness of advertising expenditure on measures of ADF recruitment using data provided by DFR. Data were available only for the time period 2008 – 2011 due to changes in the definition of an ‘enquiry’. A limitation to the data set provided was that media spend, although disaggregated by service, was not disaggregated by media channel. Thus, it was not possible to analyze the ROI or cost effectiveness of different media channels. Notwithstanding this issue, models investigating the influence of ADF advertising expenditure on ADF enquiries, applications and enlistments were estimated and initial results obtained. Regression models were also estimated for individual service marketing and advertising expenditure and the generation of enquiries. Other independent variables of interest, propensity and unemployment, were also analyzed to investigate their independent effect on ADF and individual service enquiries, applications and enlistments.

These results answer a number of the questions that were the basis of this study. As predicted, monthly ADF advertising expenditure had a significant positive effect on the number of enquiries generated and, to a lesser extent, the number of applications received. However, no relationship was found between advertising expenditure and enlistments. While the data set had a limited number of time-series observations, the findings also suggest that although advertising expenditure has diminishing marginal returns, currently ADF advertising expenditure is within the increasing marginal returns range and has not reached the saturation levels described in prior literature. These results indicate enquiries can still be generated by increasing the DFR M&A budget. The study also offers confirmation of the relationship between unemployment and recruitment success obtained in the NATSEM study. The results indicate that youth unemployment is an important predictor of enquiries and enlistments and that youth unemployment and enlistment targets are a more significant predictor of recruitment success than advertising expenditure.

Mixed results were obtained for the effect of individual service advertising efforts on service-specific enquiries. Army advertising was found to have a positive effect on the number of Army enquiries. However, Navy and Air Force advertising spending does not appear to have a significant influence on the generation of individual service enquiries.

Limitations of the data set did not allow cost effectiveness comparisons to be made across the many media channels. This study was unable to answer the questions of the relative effectiveness of different media channels, how cost-effective M&A expenditure is compared to other recruitment instruments and whether increases to the DFR M&A budget affects the attitudes of new enlistments. These questions remain interesting areas for future research.

B. RECOMMENDATIONS

This study has identified a number of areas where changes can be made to DFR M&A expenditure to generate a more effective recruiting outcome. These results suggest that a more efficient use of DFR media expenditure could occur through ADF branded advertisements at the expense of individual service expenditure. As detailed in Chapter III, DFR is already currently pursuing a media strategy similar to this. DFR now runs lower weights of individual service advertising to create a “Halo” effect. The idea is that there are complementarities between individual services advertising which increases enquiries for all three services. The results from this study suggest that ADF branded advertising, which depict all three services, could also lead to increases in enquiries for all three services.

The findings also indicate DFR advertising expenditure is currently in increasing marginal returns range for both ADF and individual service M&A. DFR should consider increasing M&A expenditure to generate more enquiries in order to reach enlistments targets.

Finally, as unemployment was found to be a significant predictor of recruitment success, DFR should consider increasing its M&A expenditure during periods of low unemployment in order to continue to generate enquiries into the recruiting system.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

Future research analyzing the predictors of ADF recruiting and the ROI of ADF M&A expenditure requires additional data. Data on expenditure by advertising channel by service by month or quarter is needed. In order to accurately capture the influence of recruiters and recruiter effort, data on the numbers of recruiters, as well as their geographic allocation, is also required.

This study has also identified a number of areas where further research is needed. Further research is needed to analyze the effect of individual service advertising and its cost-effectiveness in generating enquiries as compared to the effect of ADF advertising. This would provide evidence to indicate the most effective mix of joint ADF and indirect service advertising to maximize the pull of enquirers into DFR.

Additionally, research is needed to analyze the importance and cost effectiveness of spending on specific media channels by ADF and by the individual services. This research would be invaluable in justifying the total advertising budget required and utilizing the most efficient mix of advertising media. To accurately capture the effect of M&A spending on enlistments, the effect of DFR recruiters also needs to be controlled in any multivariate modeling. Additional research employing models with variable functional form, which would allow determination of minimum and maximum advertising levels, is also required, to provide greater fidelity of the most efficient range of expenditure.

Finally, in line with the U.S. Navy ROI studies conducted by GMAX and GALLUP, advertising effects by enlistment category such as Officer or General Entry soldier should also be investigated for the ADF. Results from this type of study could be used to drive advertising campaigns to meet targets for hard-to-fill occupations. Additional research is also required to estimate how much additional M&A expenditure is required to generate enlistments in these hard-to-fill occupations.

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF REFERENCES

- Australian Bureau of Statistics (ABS). (2012). Labour force time series spreadsheets. Retrieved from <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6202.0Jan%202012>
- Australian Department of Defence. (2010). *Defence annual report 2009-10*. Commonwealth of Australia, Canberra, ACT. Retrieved from <http://www.defence.gov.au/budget/09-10>
- Australian Department of Defence. (2010a). *Defence force recruiting marketing and advertising September 2010. Executive overview*. Canberra, ACT: Author.
- Australian Department of Defence. (2010b). *Defence strategic workforce plan 2010-20*. Canberra, ACT: Author.
- Berner, J. K., & Daula, T. V., (1993). *Recruiting goals, regime shift, and the supply of labor to the Army*. Operational Research Center. West Point, NY.
- Bray, R. M., Jordan, B. K., & Bailey, S. L., (1999). *Military advertising exposure and service images: Finding from the 1988 youth attitude tracking study II*. Washington, D.C: Defense Manpower Data Center.
- Defence Force Recruiting (DFR). (2010). *Request for comparison information*. Canberra: ACT: Author.
- Defence Force Recruiting (DFR). (2010b). *Role of advertising in the defence force recruiting system*. Canberra, ACT: Author.
- Defence Force Recruiting (DFR). (2011). *Defence force recruiting Navy marketing plan financial year 2011-2012*. Manpower Services (Australia) Pty Ltd, Canberra, ACT: Author.
- Defence Force Recruiting (DFR). (2011a). *Defence force recruiting national marketing plan financial year 2011-2012*. Manpower Services (Australia) Pty Ltd, Canberra, ACT: Author.
- Dertouzos, J. N. (1989). *The effects of military advertising: Evidence from the advertising mix test*. Santa Monica, CA: RAND.
- Dertouzos, J. N. (2009). *The cost-effectiveness of military advertising. Evidence from 2002-2004*. Santa Monica, CA: RAND.

- Dertouzos, J. N., & Polich, J. M. (1989). *Recruiting effects of Army advertising*, Santa Monica, CA: RAND.
- Dertouzos, J. N., & Garber, S. (2003). *Is military advertising effective? An estimation methodology and application to recruiting in the 1980s and 90s*. Santa Monica, CA: RAND.
- Duncan, T. (2002). *IMC. Using advertising and promotion to build brands*. New York, NY: McGraw-Hill Irwin.
- Ford, M., Griepentrog, B., Helland, K., & Marsh, S. (2009). *The strength and variability of military propensity-enlistment relationship. Evidence from 1995-2003*. Arlington, VA: JAMRS.
- Gallup Inc, (GALLUP). (2010). *Marketing and advertising return on investment*. September 24 2010 briefing by Gallup to U.S. Navy Recruiting Command.
- Goldberg, L. (1980). *Recruiters, advertising and Navy enlistments*. Alexandria, VA: Center for Naval Analyzes.
- Joint Advertising Marketing Research & Studies (JAMRS). (2009,). *Military recruiting: War in the Middle East and propensity*. (Briefing) Arlington, VA: Author.
- Joint Advertising Marketing Research & Studies (JAMRS). (2011a,). *DoD advertising tracking study (2011). Overview of wave 33 results. Prepared for Army*. Arlington, VA: Author.
- Keller, K. L., (2003). *Strategic brand management. Building, measuring and managing brand equity* (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Kwinn, M. J., Davis, M. J., & McGinnis, M. L. (2000). *An evaluation of Joint and service-specific advertising efficiency for military recruitment*. West Point, NY: Operations Research Center.
- Miranti, R., McNamara, J., & Abello, A. (2010). *Defence recruiting success: Scoping study*. Canberra, ACT: NATSEM.
- Optimization Group (GMAX). (2010, September). *Advertising ROI analysis*. Paper presented at the meeting to U.S. Navy Recruiting Command. Author.
- Polich, J., Dertouzos, J. N., & Press, S. (1986). *The enlistment bonus experiment*. R-3353-FMP. Santa Monica, CA: RAND.

- Sackett, P. R., & Mavor, A. S. (2003). *Attitudes and aspirations of American youth: Implications for military recruiting*. Washington, D.C: The National Academies Press.
- Sackett, P. R., & Mavor, A. S. (Ed). (2004). *Evaluating military advertising and recruiting: Theory and methodology*. Washington, D.C: The National Academies Press.
- Stoker, C., & Mehay, S. (2010). *Recruiting, advertising and marketing strategies in all-volunteer force nations: Case studies of Canada, Australia, The United Kingdom and the United States*. Monterey, CA: Naval Postgraduate School.
- Thurecht, L., Miranti, R., Cassels, R., & Duncan, A. (2011). *Workforce intelligence project – Defence recruiting success: Phase 2 detailed investigation*. Canberra, ACT: NATSEM. (Draft)
- Warner, J. T., Simon, C. J., & Payne, D. M. (2001). *Enlistment supply in the 1990s: A study of the Navy college fund and other enlistment incentive programs*. Arlington, VA: Defense Manpower Data Center.
- Warner, J. T., Simon, C. J., & Payne, D. M. (2002). *Propensity, application and enlistment: Evidence from the youth attitude tracking survey*. (Draft)

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
Ft. Belvoir, Virginia
2. Dudley Knox Library
Naval Postgraduate School
Monterey, California