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SECURITY CLASSIFICATION OF THIS PAGE

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REPORT DOCUMENTATION PAGE

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED		1b RESTRICTIVE MARKINGS NONE	
2a SECURITY CLASSIFICATION AUTHORITY		3 DISTRIBUTION/AVAILABILITY OF REPORT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED.	
2b DECLASSIFICATION/DOWNGRADING SCHEDULE			
4 PERFORMING ORGANIZATION REPORT NUMBER(S)		5 MONITORING ORGANIZATION REPORT NUMBER(S) AFIT/CI/CIA-89-032	
6a NAME OF PERFORMING ORGANIZATION AFIT STUDENT AT SAN DIEGO STATE UNIV	6b OFFICE SYMBOL (if applicable)	7a NAME OF MONITORING ORGANIZATION AFIT/CIA	
6c ADDRESS (City, State, and ZIP Code)		7b ADDRESS (City, State, and ZIP Code) Wright-Patterson AFB OH 45433-6583	
8a NAME OF FUNDING/SPONSORING ORGANIZATION	8b OFFICE SYMBOL (if applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
8c ADDRESS (City, State, and ZIP Code)		10 SOURCE OF FUNDING NUMBERS	
		PROGRAM ELEMENT NO	PROJECT NO
		TASK NO	WORK UNIT ACCESSION NO
11 TITLE (Include Security Classification) (UNCLASSIFIED) A TEST OF INSIDER TRADING WITHIN THE DEFENSE INDUSTRIAL COMPLEX			
12 PERSONAL AUTHOR(S) MARIE CARTIER CZECH			
13a TYPE OF REPORT THESIS/DISSERTATION	13b TIME COVERED FROM _____ TO _____	14 DATE OF REPORT (Year, Month, Day) 1989	15 PAGE COUNT 107
16 SUPPLEMENTARY NOTATION APPROVED FOR PUBLIC RELEASE IAW AFR 190-1 ERNEST A. HAYGOOD, 1st Lt, USAF Executive Officer, Civilian Institution Programs			
17 COSATI CODES		18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
19 ABSTRACT (Continue on reverse if necessary, and identify by block number)			
DTIC ELECTE FEB 01 1990 S D & D			
20 DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS		21 ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED	
22a NAME OF RESPONSIBLE INDIVIDUAL ERNEST A. HAYGOOD, 1st Lt, USAF		22c OFFICE SYMBOL AFIT/CI	

A TEST OF INSIDER TRADING WITHIN THE
DEFENSE INDUSTRIAL COMPLEX

A Thesis

Presented to the

Faculty of

San Diego State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in

Business Administration

by

Marie Cartier Czech

Spring 1989



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Unannounced	☐
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Approved by:

Nikolai P. Varanga

5/22/89
Date

Robert C. Hutchins

[Signature]

Edmund J. Dexter

ACKNOWLEDGEMENTS

There is no doubt that undertaking this Master's Thesis was indeed difficult and a great challenge for me. I know it would never have been completed without the support and understanding of my husband, Thomas. I would also like to thank the rest of my family for their never-ending faith in me and in my endeavors.

I would like to thank my Thesis Committee, Nikhil Varaiya (Thesis Chairman), Robert Hutchins, Moon Song, and Edmund Deaton. Their expert assistance and helpful guidance and motivation enabled me to accomplish this project for which I am grateful. I am glad I had this opportunity to work so closely with these fine professors.

I especially want to thank Dr. Dave Ely for allowing the use of his computer program in calculating the returns of the sample. I also want to thank Dr. Song for his computer expertise and significant contribution in processing my sample. Without his help in adapting the computer program for my thesis, I might still be tabulating returns.

I would also like to acknowledge Susan Blunt who provided help and suggestions from her own knowledge of

the problems associated with the industry undertaken. I am truly grateful for her advice.

Finally, I would like to thank Mr. Walt Wilson and the staff at the Automated Management Information Systems Office at Wright-Patterson Air Force Base for all their help in understanding the complex contracting system and all of its codes. The basis of this research was a direct result of initial samples provided by their office.

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CHAPTER I

INTRODUCTION

Considerable research has been undertaken to determine the extent of profitability of insider trading. The research has ranged from testing trading strategies based on the trades of insiders by utilizing the published Securities and Exchange Commission's (SEC) Official Summary of Security Transactions and Holdings [Jaffe, 1974b; Finnerty, 1976; Givoly & Palmon, 1985] to tracking returns of insiders around various information events [Keown & Pinkerton, 1981; Penman, 1982; Moss, 1986]. However, to date, very little research has confined its examination to a particular industry. This thesis investigates whether or not the Military Industrial Complex, defined as the Federal Government, the Military Service Departments, and especially, defense contractors, has exhibited wide-spread insider trading activities.

This thesis will examine the presence of insider trading by prime defense contractors prior to the release of major military contract award announcements. In the context of this thesis, a prime defense contractor is a firm which earns over 25% of its annual sales from

defense-related contracts. To be tested is the proposition that defense industry insiders, assumed to be trading on inside information, consistently earn above average returns based on these announcements. It is expected that insiders would purchase stock prior to the announcement of a very favorable contract award. Specifically, this thesis tests the extent to which returns are related to a specific event, in this case a major contract award. An empirical assessment of insider trading and overall trading volume trends surrounding these events are examined.

The contracts (events) included in the final sample were selected based on rigorous criteria. The final sample are those contracts that are considered significant to the contractor and which would most cause reaction in the capital markets.

An important aspect of this thesis relates to the differences between corporate and government announcements. In ordinary corporate announcements, the directors, managers, and others will most likely be aware of important news and because of this, there may be increased insider trading. In the awarding of government contracts to corporations, the only persons who know of the selected contractor are government related, i.e. the contracting officer, selection team, and others in the formal approving chain of command.

Inspecting insider trading of sample-selected defense firms prior to the release of government contract award announcements, may possibly illuminate leaks within this information channel. Procedures in announcing defense contract awards are strictly adhered to. The announcement of major contract awards (those in excess of \$3,000,000) are required to follow certain procedures. The most important of these include the following:

- 1) The contract announcement is sent from the contracting agency to the Congressional Liaison Office;
- 2) Publication of this announcement is processed through the Public Affairs Office at the Pentagon and;
- 3) The contract award is announced 4:00PM Eastern Standard Time (EST) to coincide with the close of the New York Stock Exchange for that day ["Code of Federal," 5.303 (a), p. 51].

Significant increases in trading volume prior to these announcements and/or actual increases in registered insider trades, may provide additional evidence that the market is less than perfect.

Organization of Remaining Chapters

This thesis is organized into eight chapters. The first chapter provides a brief introduction to the subject.

Chapter II covers the objectives of this research and describes the defense industry in greater detail.

In Chapter III, the Efficient Market Hypothesis (EMH) is discussed, an overview is provided on the growing insider trading scandal, and finally the Securities and Exchange Commission responsibilities are fully explored.

Chapter IV presents the hypotheses to be tested while Chapter V reviews the pertinent literature in this field focusing exclusively on the findings of the strong-form efficient market studies.

The methodology utilized and the sample tested is described in detail in Chapter VI.

The empirical results are summarized in Chapter VII while Chapter VIII contains the conclusions of this study.

CHAPTER II

OBJECTIVES

The purpose of studying the defense industry is to ascertain whether a specific industry can be shown to have consistent, abnormal returns earned by its insiders. By focusing on one industry, it can provide valuable information to not only investors but to the SEC as well. Investors routinely review insider trading activity in hopes of duplicating the returns earned by the insiders. Because trading on insider information is illegal, the SEC may want to investigate insider-trading patterns within the industry to scrutinize unusual trading to further their enforcement objectives.

Overview of the Defense Industry

The defense industry is worthy of analysis due to its complex structure and unique business condition. The industry is characterized by a limited number of prime contractors which depend primarily on the United States Government for the main percentage of their sales. The winning of a major contract award is indicative of the firms' future profitability and stability and insiders would be inclined to watch these developments very

closely as large government contracts are not as common as they once were [Burnett, 1987, p. 29].

Because weapons systems are so costly, the government is limiting the amount of contracts approved in order to hold the overall cost down [Toy, Payne, Helm, & Kelly, 1988, p. 29]. As an example, the number of new and different aircraft procured by the Air Force has steadily decreased since the 1950s from 6 fighters to only one fighter for the 1980s and 1990s [Toy et al., 1988, p. 29].

The average defense contractor is much different than the average private corporation. The main customer of the defense firm is the U.S. government. Additionally, the government controls the defense industry with voluminous regulations [Apagos, 1975, p. 59]. The bureaucracy within which the defense firm operates is massive and requires strict adherence to regulations in order to acquire new contracts and to win follow-on contracts.

Defense contractors experience different risks than that of other firms. Additional risk and instability are caused by dependence of the firm on federal budgets and the whims of the President and Congress. Many defense contractors are clearly dependent on the government because their defense-related sales run between 25% and 50% of their total business [see Table 9 under Appendix

A]. Some companies such as General Dynamics, Grumman Corp., and McDonnell-Douglas have defense-related business between 75 and 95%. On the other hand, the majority of private firms are normally not as heavily dependent on the government as their customer or on the federal budget and do not bear this degree of risk.

There are only a very limited number of large prime contractors that do the majority of their business with the defense department.

However, the amount of subcontractors reaches into the thousands. As a matter of fact, in one prime contract award, it was estimated that 15,000 companies would produce the hardware and support for this system alone [Melman, 1970, p. 80].

The competition between defense contractors to secure government business has increased dramatically in the last several years. An overhaul of the federal procurement system was inevitable due to overpricing of supplies rendered to the government. In 1984, the Competition in Contracting Act was passed. This Act is summarized below:

It requires the obtaining of full and open competition through the use of competitive procedures; eliminates the preference for formal advertising; establishes sealed bidding and competitive proposals as competitive procedures; significantly limits the circumstances under which other-than-competitive procedures can be used....[Thybonny, 1987, p.7].

The change in the procurement and awarding of government contracts has required defense contractors to scrutinize their operations and to stay on top of changes in order to remain competitive in the industry [Barry, Sandza, & Waller, 1988, p. 21].

All service departments are striving to award more contracts on a competitive basis. For instance, in Fiscal Year 1987, the United States Air Force awarded 56.5% of their contract dollars to competitive contracts ["USAF surpasses," 1988, p. 147]. This was an increase of 12% over the previous year. Between 1962 and 1976, only 8% of Department of Defense contract awards were done through formal advertising and price competition [Gansler, 1980, p. 75].

The defense budget increased substantially after President Reagan took office. The plans for rebuilding defense posture was one of his prime objectives. This period of time (1980-1988) provided defense contractors with increased sales.

Currently the defense budget comprises nearly 27% of the federal budget and has grown from \$282 billion in 1987 to estimates of \$320 billion in 1991 [see Table 10 under Appendix B]. Defense research and development and procurement budgets comprise approximately 40% of the defense budget [see Table 11 under Appendix C].

Reductions in the federal budget, program cancellations or severe curtailment can play havoc with a defense company's forecast. Because of the nature of government policy and procedure, defense contractor stability and profitability from year to year can be more volatile than the average company.

With the large budget deficits of today, the defense industry has come upon leaner times [Siegel, 1988, p. 551]. With these pertinent variables, the competition between contractors is very high and winning of awards is even more important [Mann, 1988, p. 63].

A consequence of reduced defense spending and more rigorous enforcement of procurement policies is the further concentration of the defense industry as more firms are leaving the industry for more stable, commercial enterprises or are teaming together. The increase in prime defense contractors exiting also impacts greatly on the number of subcontractors who rely on those companies for business ["Earnings Outlook," 1988, p. 40]. This exodus of some firms, will cause the further consolidation and concentration of a few firms in the military industrial base [p. 41].

In conclusion, the competition for defense contracts is steep. More and more awards are causing the losing firm to protest the award especially if it was particularly lucrative [Paul, 1988, C5]. Together with

the massive procurement scandal that is currently being investigated within the industry, the industry as a whole, has a future of tougher requirements and closer scrutinization [Barry, Sandza & Waller, 1988, p. 20]. Receiving large military contracts will become harder and because of this, insiders and other investors will be watching with extreme diligence.

Since the defense industry has not been scrutinized for insider trading in the literature reviewed, this thesis provides a baseline for others to analyze either this industry or other industries.

Blunt [1988] studied the effects of political and military events on the prices of defense stocks. Blunt found that certain military and political events did in fact produce abnormal returns in the defense portfolio of stocks examined.

Moss [1986] looked at government contract awards and insider trading. Though the exact nature of the government contracts in the study were not defined as "defense contracts," Moss found that insiders, too, earned abnormal returns after the announcement of these favorable awards.

CHAPTER III

BACKGROUND

Insider trading has received considerable attention in the last couple of years. The Securities and Exchange Commission has prosecuted and received convictions on some well-known investment bankers [Cohen, Hertzberg, & Stewart, 1988, p. 1] and arbitrageurs [Russell, 1986, p. 71]. Insider trading has grown considerably as the market in securities has grown. However, the technological advances of the computer age has greatly enhanced the detection of insiders. The evolving and forever changing financial markets and emergence of new instruments makes for an interesting scenario as the markets change as fast as the technology to detect activities changes.

Insider trading is not only a problem in the United States but is a problem in other countries such as Britain, West Germany, Italy, Spain, and France [Forman, 1989, p. C1]. Recent trading scandals involving the Japanese have recently received public attention as well ["Former high," 1989, p. A17]. However, the penalties for insider trading in these countries are not as severe as they are in the United States. This is due primarily

to the low rate of individual ownership in these countries. Because of this fact, insider trading does not receive the same kind of attention as it does in the United States. Another significant difference between the U.S. and other countries is the operation of bank secrecy laws which effectually stop insider trading investigations [Forman, 1989, p. C17].

Insider trading is a critical issue in the market today. Insiders can and do affect the functioning of markets in various ways. Investors want markets that are reliable and which reflect fairly, the market value of securities available for investment. Since insiders, occasionally, do in fact have information that is "non-public," security prices may not reflect the true value of all information known. This can in turn lead to mispricing of securities and the probability that some investors will profit over others because of this privileged inside information.

The Efficient Market Hypothesis

A study of insider trading is clearly a study of the Efficient Market Hypothesis. Insider trading and the processing of information is central to the theory of efficient capital markets. Eugene Fama [1970] states, "A market in which prices always 'fully reflect' available information is called efficient" [p. 383]. This is known

as the Efficient Market Hypothesis (EMH). Fama further delineates this theory into three levels of efficiency.

Fama describes the first level as the "weak-form" wherein security prices reflect all past, historical data. This basically means that no investor can create a trading rule based on past information as this information is already impounded in the security price. Most of the research supports the weak-form of the Efficient Market Hypothesis.

The second level, "semi-strong form," states that all past and public information is adjusted for in security prices. This means that public announcements by corporations (ie. earnings or dividend announcements) are quickly impounded into the security price and consequently, abnormal profits cannot be made. The research studies on the semi-strong form of the Efficient Market Hypothesis have, for the most part, supported the market at this efficiency level [p. 409].

The last and third level of this theory is referred to as the "strong-form." This level states that stock prices fully reflect all information known, public, private, and historical [p. 383]. This essentially means that no investor has information over which he or she can make abnormal profits in the market as the security prices reflect this information instantaneously. The results of these tests do not provide significant

evidence of strong-form market efficiency as will be seen in Chapter IV.

Insider Trading Overview and Analysis

Insider trading is nothing new. It has been happening as long as financial markets have existed. In the late 1800s, most businesses were either partnerships or proprietorships where owners and managers were one in the same [Skousen, 1987, p. 1]. Because of this, there was little concern or need for regulation of securities. However, as the number of corporations and businesses grew and became public entities, with the corresponding separation of owners and managers, a need for regulation arose.

Some corporate officers who took advantage of the unregulated securities markets were involved in such abuses as price manipulation of their stock to include "wash sales" and "matched orders." This manipulation caused prices to rise with the resulting profits pocketed by the corporate officers at the expense of the public [Skousen, 1987, p. 4]

In the early 1900s, many corporate directors believed that speculating in their own company's stock was "compensation" and they did not see anything wrong with this practice [Bradley & Teweles, 1982, p. 286].

In recent years, insider trading convictions and cases have proliferated to an all time high. Though many were not large insider trading cases, it is imperative to look at the extent to which this activity has permeated all levels of the society. Mark Stevens [1987] in his book, The Insiders, states:

The truth is that although the Stock Exchanges, the SEC, and the assorted watchdogs of the securities market prefer to play this down, insider trading is a game for the masses. Insiders at all levels aspire to play; many who have the opportunity do. Unlike robbing a bank or stealing a car, insider trading is not generally viewed as a crime [p. 219].

Insiders range from secretaries, taxi-cab drivers, and printers to the most prestigious of arbitrageurs, namely Ivan Boesky [Russell, 1986, p. 71]. The arrest and conviction of Ivan Boesky stunned the financial world.

The latest "insider trading scandal" began in 1986 when the Securities and Exchange Commission arrested Dennis Levine, a managing director for Drexel, Burnham, Lambert and charged him with 54 violations of the federal securities law [Henry, 1986, p. 48]. By utilizing inside information, Mr. Levine amassed \$12.6 million dollars in five years through buying stock in targeted companies and then selling the securities at a profit after the takeover announcement was revealed [p. 48].

The most important outcome of this case was the revelation made by Mr. Levine that he was working with Mr. Ivan Boesky. Mr. Boesky, as described by SEC Chairman John Shad, was known as "one of Wall Street's richest and most frenetically active individual speculators" [Russell, 1986, p. 71]. Though Boesky never admitted any guilt, the SEC indicted him and he was charged with one count of securities fraud. Boesky was fined \$100 million dollars of which \$50 million was a return of illegal profits and the remaining \$50 million was considered his penalty [Stevens, 1987, p. 246].

Being able to track all the insiders involved in a particular case is especially important for the SEC. As Stevens [1987] noted:

The SEC's strategy for going after insider traders is to build so strong a case against them before they're indicted that two things will happen. First, they'll settle without a trial and second, and more important, they'll rat on others in order to save themselves [p. 243].

The impact of insider trading convictions is relatively short-lived. Weiss, Power, & Crock [1987] found that once these cases fade away, people forget their fear and return to their prior activities with little apprehension [p. 20].

The case just recently completed against Drexel, Burnham, Lambert by the SEC involved a variety of charges

to include securities, mail, and wire fraud [Cohen et al., 1988, p. 1]. Drexel was able to plea-bargain and have racketeering charges dropped. The penalties assessed against Drexel were the largest to date, exceeding \$650 million.

In another important milestone for the SEC, they recently won their first conviction by a jury trial [Ricks, 1989, p. C16]. The SEC has now received convictions on both fronts; jury and judge.

The main arguments against insider trading focus on the impact to the investing public and the ability of the market to raise capital for business. All investors want equity in the marketplace.

Huss & Leete [1988] argue the integrity of the market is at risk unless insiders, found to be illegally using inside information for profit, are appropriately dealt with [p. 5]. They believe there is a greater risk to the financial system if action is not taken immediately.

The argument centering on the raising of capital in the marketplace is a concern to many. If investors feel they are not receiving "equitable" treatment, some experts feel they will leave the market. Arthur Levitt, Jr., former Chairman of the American Stock Exchange states, "If the investor thinks he's not getting a fair shake, he's not going to invest, and that is going to

hurt capital in the long run" [Laderman, Glaberson, Marcial, Philippe, & Frank, 1985, p. 79]. Since the American Stock Exchange relies to a large extent on the individual investor for investment, insider trading can disrupt this market greatly.

A recent article in The Wall Street Journal reported that the number of individual shareowners in the New York Stock Exchange had been overstated over the past several years due to inaccuracies in trade tabulations [Power, 1989, p. C1]. The real volume of the small investor is only 18.2% which is only half of what was reportedly their volume. This new information, further details the magnitude and departure of the small investor into other trading arenas.

Table 1 reflects individual ownership among the exchanges between 1965 and 1985. This supports the recent report that individual investors are increasingly moving away from the New York Stock Exchange (NYSE). Though the table shows a large increase in overall individual ownership since 1965 of 233.8%, the percentage of individual investors on the NYSE has been dropping. In 1980, over 78.8% of individual owners were on the NYSE. However, the latest figures show only 53.8% remaining. This 25% drop is considerable and has happened in only a short period of time.

Table 1

Individual Shareowners in the Stock Market, 1965-1985(in millions)

	1965	1975	1980	1983	1985
Total No. Owning Shares on NYSE	12.4	18.0	23.8	24.5	25.3
Total No. Owning Shares on other than NYSE	7.7	7.3	6.4	17.9	21.7
Total No. of Individual Shareowners	20.1	25.3	30.2	42.4	47.0

SOURCE: New York Stock Exchange Fact Book, 1987, p. 57.

There are different opinions as to whether or not insider trading is really detrimental to the marketplace. Young [1985] argues that insider trading is beneficial to the market and investors. He supports arguments made by Henry Manne, a strong critic of SEC regulations for many years [p. 180]. One of the arguments purports that insider trading promotes "entrepreneurial" activity in businesses and is rightful compensation for this activity. The other argument clearly states that insider trading makes the market more efficient by impacting stock prices as early as possible. This would make stock prices fully reflect the value of all possible information. Young also suggests some ways non-insiders can protect themselves against insiders, mainly to "buy and hold" securities for the long run thus reducing insiders profits [p. 181].

Ludman [1986] refutes Young's [1985] arguments that insider trading is good for market efficiency and entrepreneurial activity. Instead, Ludman staunchly defends the regulation of insider trading based on both ethical and economic consequences [p. 120]. Ludman agrees with the SEC that insider trading is so close to "fraud" that monitoring should be continued [p. 121]. He cites the jeopardizing of market liquidity and confidence as ample support for continued regulation.

One final study by Douglas [1988] looks at whether or not insider trading is a "victimless crime." In his study, Douglas demonstrated that injury does result on both good news and bad news situations. He argues that the uninformed shareholder is injured as the insider trades with the uninformed shareholder thereby profiting from his or her inside information [p. 129]. Because Douglas shows that there is injury, insider trading regulations should continue to be enforced. Douglas opts for "immediate disclosure" as opposed to insider trading. In conclusion, Douglas states:

These uninformed stockholders have a clear right to the information monopolized by insiders because the information is generated with corporate funds. Insiders have no special claim to the information because they have not incurred any cost in generating it [p. 137].

The Securities and Exchange Commission

The Securities and Exchange Act of 1934 authorized the formation of the Securities and Exchange Commission (SEC). The main objective of the SEC is the monitoring of securities markets.

The first insider trading law that was passed came under the Securities and Exchange Act of 1934. Under this Act, a registered insider is defined as, "any officer, director, or person who owns more than 10% of a registered company." Rule 16a requires insiders to file

an initial report with the SEC and must file a report in any month where there are any changes in their security holdings [Skousen, 1987, pp. 19-27]. These reports are published by the SEC in their Official Summary of Security Transactions and Holdings Publication. This publication is available to the general public and is used extensively by researchers. The insider must report the transaction within 10 days of the month in which the securities were transacted. However, a recent study which appeared in The Wall Street Journal concluded that 32.5% of all insider filings with the SEC were late [Dorfman, Nov 9, 1988, p. C1]. This figure is lower than the 43.0% reported by the SEC itself.

The SEC is diligently working to improve this rate of filing and has recently overhauled the reporting procedures for insiders. One of the new rules requires only those insiders shown on a firm's proxy statement to file reports. This one change may cause report filings to drop by 50% and is currently causing great concern among those investors who watch insider transactions [Dorfman, Feb 22, 1989, p. C1].

Rule 16-b allows a corporation to recover gains on short sales of insiders. A short sale is a holding of less than six months. But the rule that aids in SEC prosecution of insiders is Rule 10-5b which prohibits "any person from engaging in security transactions on the

basis of inside information without prior disclosure." This rule applies to all persons; not just registered insiders. These three rules have provided the SEC with the foundation in which to enforce the regulations.

It was not until fifty years later that additional insider trading legislation was enacted. In 1984, the Insider Trading Sanctions Act of 1984 was passed and this legislation increased penalties for illegal insider trading. It provided the SEC with the ability to triple the fines on insiders and also increased criminal penalties from \$10,000 to \$100,000. However, this legislation still did not define "material inside information" or who an insider was [Skousen, 1987, p. 35].

In November of 1988, President Reagan signed into law, the latest bill to curb insider trading. This bill substantially increases the criminal penalties associated with insider trading and provides for a maximum prison sentence of ten years [Staff, 1988, p. A3]. This bill also set up a bounty reward program for informants and also gives investors, who were in the market at the time of the illegal insider trading, the right to take legal action against the insiders. With this new bill, the SEC gained additional and considerable new powers.

However, the thread that links all the securities regulations together is the absence of a definition which

clearly defines insider trading. The government has left both the interpretation of who an insider is as well as insider trading to the SEC and court system [Tell, 1986, p. 56; Bleiberg, 1987, p. 9; Weiss, 1987, p. 22]. By so doing, this allows the SEC more leeway in prosecuting cases and closes the loopholes that would automatically appear if these acts were clearly defined [Ricks, 1988, p. 2].

Though insider trading is not defined legally, regulators utilize a concept that has developed over time based on court decisions [Solodar, 1987, p. 24]. This concept has four main parts. The first part states insider trading must involve advance, non-public information. Secondly, the information received must be material in nature. What this basically means is that the information has to be of consequence to the market. The information can, in fact, sway the market. Thirdly, the information used must provide profits to the insider through the trading of securities. The insider can either be the one who learned first-hand of the information or the insider could be the tippee (a person finding out information from an inside person). Finally, cases involving insider trading result in a compromise of fiduciary responsibility [p. 24].

To get a better understanding of the magnitude of the SEC's job in monitoring the securities markets, it is

important to look at the trading volume of the New York Stock Exchange. The majority of stock and security transactions occur on this secondary exchange. Figure 1 illustrates the growth in the volume on the New York Stock Exchange from 1976 through 1986 in terms of dollars. Trading volume climbed from 5.3 billion in 1976 to 35.7 billion in 1986; an increase of 674%. With the dramatic increase in activity on the New York Stock Exchange during the period from 1976 through 1985, it is interesting to note that the SEC enforcement staff fell 5% [Henry, 1986, p. 49].

SEC enforcement activities also increased during this time. All areas of enforcement to include litigation, enforcement actions, and filings reviewed have steadily increased over this time. Filings reviewed increased significantly since 1982 by 68%.

The SEC's fight against illegal insider trading has recently reached new records. In 1986, a record 34 insider trading cases were tried ["United States," 1986, p. 2]. This is considerable when comparing the number of insider trading cases which had been tried over the last 47 years which came to only 77 cases.

Effectiveness of Insider Trading Regulations

Several studies have looked at the effectiveness of securities regulations in deterring insider trading.

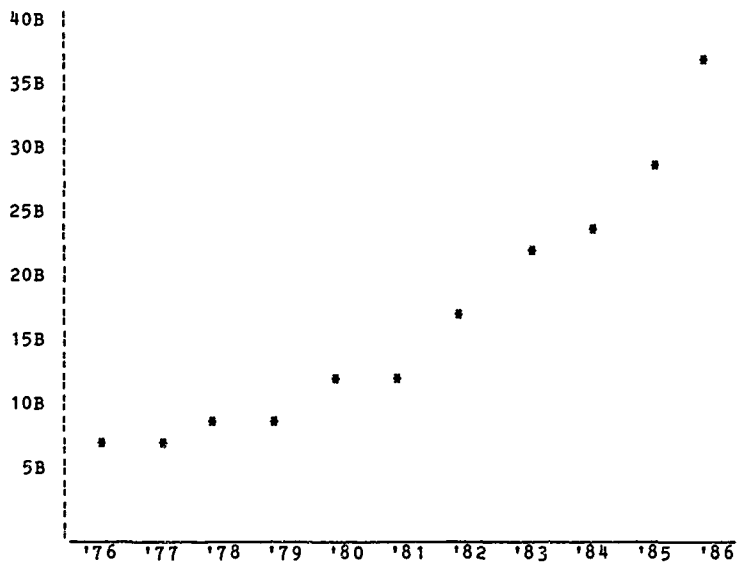


Figure 1. NYSE Trading Dollar Volume, 1976-1986,
(\$ in billions)

SOURCE: New York Stock Exchange Fact Book, 1987, p. 17.

Jaffe [1974a] found no significant changes in insider trading since the passage of the Securities and Exchange Act of 1934 and subsequent court cases which further defined insider trading [p. 114]. Jaffe looked at three important court cases involving insider trading and proceeded to measure their effects on the volume and profitability of insider trading. By using the residual method to calculate profitability, he compared the performance of intensive trading companies before and after the legal decisions (events) were rendered. Jaffe defines "intensive trading companies" as those with three more sellers than buyers and vice versa [p. 104]. He found that the average profitability of insider trades before an event were not significantly different than after the event.

Jaffe also looked at the level of trading volume. By utilizing a time series model, a sample containing the total number of insider trades before and after the change in regulations were analyzed. He looked at both daily and monthly data and found that total volume of insider trading did not change appreciably as a result of these court case events [p. 114].

Cleeton and Reeder [1987] found that regulations were not particularly effective in preventing insider trading and suggest there are many ways in which insiders can still trade and avoid detection under the current

laws [p. 72]. The authors outline different trading strategies insiders can use to reduce both the legal risk of being detected and downside risk. These include the level of volume trading, when to trade, and not trading on "major information." By following these rules, the insider can still profit from their trades but will avoid detection by authorities [p. 68]. Other strategies involve the use of more sophisticated instruments such as options. Cleeton and Reeder question whether or not the regulatory agencies involved can regulate a financial market that has become so complex in recent years.

CHAPTER IV

LITERATURE REVIEW

Introduction/Overview

To ascertain the effects of insider trading, it is important to look at the research completed on this subject. Most of the research tests the strong-form efficient market hypothesis to reveal whether or not insiders consistently realize abnormal profits.

The basic problem in testing the strong-form efficient market hypothesis is that inside information is unobservable. As a result, other methods must be used. Probably the most popular method is to examine returns and trading volume prior to public announcements [Dyckman & Morse, 1986, p. 40]. Researchers know that certain behavior is consistent with inside information.

Strong-Form Market Efficiency Studies

Lorie and Niederhoffer [1968] did a comprehensive study on the trading of insiders and its information content for outsiders. The authors provided some of the first evidence that "proper and prompt analysis of data on insider trading can be profitable" [p. 35]. They

reviewed some of the methodological problems associated with insider trading studies. In particular, the problem associated with accurately determining the precise date an insider placed a trade. The Official Summary of Security Transactions and Holdings, which provides the data on insiders for researchers, provided only the month the trade took place instead of the specific date. (This is no longer the case.) This one area caused researchers to believe insiders made less profits than they really did. This was true because researchers arbitrarily chose either an average price for the month, the price at mid-month, or the price at the end of the month [p. 36]. This selection date is critical to valid conclusions.

Lorie and Niederhoffer looked at several insider trading properties to determine their validity. The properties analyzed were whether or not 1) insiders had superior ability to forecast significant price changes in their own stock, 2) intensive buying or selling of stock by insiders indicated stock performance six months later (intensive buying/selling event requires have at least two more buyers than sellers and vice-versa) and 3) insiders were consistently more proficient in trading in consecutive periods over other insiders.

After statistically analyzing insider stock transactions before a major change (considered to be 8% or more), the authors found "the odds in favor of a large

increase were 2.5 to 1 after a purchase and 1.1 to 1 after a sale" [p. 47]. Other analyses provide similar support that insiders can successfully predict large price changes in their stocks.

Lorie and Niederhoffer also found when insiders do trade intensively, the subsequent outcome will approximate the trading (ie: if intensive buying, the stock price should increase, and vice versa for intensive selling) [p. 51]. Finally, the authors were not able to support the contention that insiders are routinely and consistently able to predict price movements over other insiders [p. 53].

Pratt & DeVere [1968] did an exhaustive review of 52,000 insider transactions of 800 firms traded on the NYSE between 1960-1966. The authors computed the "investment performance" of both buy and sell groups. A buy group was considered to have at least three insiders buying and no insiders selling and vice-versa for the sell group. Pratt & DeVere found that "the insider buy group continues to outperform the insider sell group" [p. 272]. The average rate of return for the buy group was 27.1% after 12 months and 9.6% for the sell group [p.272].

Jaffe [1974b] researched the profitability of insider trading and at the same time analyzed the information content of the Official Summary of Security

Transactions and Holdings. Jaffe randomly selected 200 companies from the New York Stock Exchange. The trading months between 1962 and 1968 were picked. Jaffe looked at three separate samples that included, but is not limited to, large insider transactions (in excess of \$20,000) and intensive trading events.

Jaffe used a modified version of the Capital Asset Pricing Model to determine expected returns. With the data from the Official Summary, Jaffe calculated cumulative average residuals (CAR) for different portfolio holding periods (ie. 1, 2, and 8 months) after the insider trading event [p. 420]. What he concluded was that insiders do, in fact, possess special information. After adjusting for assumed transaction costs of 2%, Jaffe found that only the intensive trading samples held 8 months were fairly profitable at 5% over the 8 month period [p. 423].

To determine whether or not information contained in the Official Summary had been discounted, Jaffe calculated residuals following the publication of the Summary. He found positive residuals in some of the samples in excess of the 2% transaction costs [p. 425]. Jaffe concluded the Official Summary still contained information at publication which had yet to be discounted thus allowing outsiders the ability to profit on the information.

Another test of the strong-form efficient market hypothesis was conducted by Finnerty [1976]. However, instead of focusing only on companies who had intensive trading, as did Jaffe, Finnerty studied "the average insider." According to Finnerty, the average insider includes any company in which an insider traded [p. 1141].

Finnerty's study included insider transactions from January 1969 through December 1972. Utilizing the Official Summary of Security Transactions and Holdings, he arranged both buy and sell portfolios which included securities traded by any insider and which were weighted in the portfolio based on the number of times traded [p. 1142]. Using the Market Model, Finnerty calculated the differential returns. Finnerty concluded that insiders do make above average returns when purchasing stock of their own companies and are also able to reduce their losses when selling the stock [p. 1146].

Keown and Finkerton [1981] also look at insider trading but concentrate on merger and takeover announcements as their premise. The focal point of the study was to determine if insiders earned returns above the market prior to the public announcement of planned mergers. The authors studied insiders other than "registered insiders" to determine the activity levels of this group with reference to merger events.

The sample consisted of 194 successfully acquired firms of which 101 were listed on the New York Stock Exchange and 93 in the Over the Counter Market [p. 857]. The period of announcements ranged from 1975 through 1978. Utilizing the market model and daily stock prices, Keown and Pinkerton calculated both daily and cumulative average residuals. The results of Keown and Pinkerton's study revealed the CAR became positive 25 days prior to the public announcement date and the daily average residuals were positive 26 out of 27 days prior to this announcement [p. 860]. The authors conclude the preponderance of insider trading prior to the official public announcement date. Analyzing the increased trading volume that was present, Keown and Pinkerton state:

In fact, 76% of the firms studied experienced no open market purchases or sales by registered insiders during the month prior to the announcement date...Thus the frantic trading that occurred prior to the merger announcement was not caused by registered insiders for whom trades during this period would attract unwanted attention [p. 863].

Keown and Pinkerton conclude registered insiders are not responsible for the large increase in trading volume prior to these announcements.

Another recent study also revealed how wide-spread insider trading was in takeover and merger companies.

Data Resources Inc. completed an analysis of pre-bid trading in takeover stocks for Business Week [Weiss et al., 1987, p. 21]. Data from Mergers and Acquisitions Magazine was examined between 1986 and 1987 and 70% of the 130 acquisition targets analyzed revealed significant trading patterns in stock price prior to the public announcement. This trading resulted in higher than normal returns for the stocks during that period as compared to the New York Stock Exchange Composite.

Studies have also looked at the timing of insiders trades to specific news announcements about the firm. Penman [1982] provides ample evidence that insiders do time their trades to benefit the changes in their firm's stock. Penman looked at announcements of earnings forecasts located in the Wall Street Journal between 1968 and 1973. A total of 550 corporations listed on the New York Stock Exchange and American Stock Exchange were involved in the sample. Additionally, all insider trading data was extracted from the SEC Official Summary of Security Transactions and Holdings.

Penman utilized the Capital Asset Pricing Model to estimate expected returns. Penman then found the mean abnormal return on the day prior to the Wall Street Journal announcement was .92%. He also observed that most of the abnormal returns in the sample were positive.

By ranking the abnormal returns and including them into 20 portfolios, Penman found that in 75% of the portfolios, the trading patterns were the same direction as "predicted by the sign of the mean abnormal return" [p. 488].

Moss [1986] studied a wide range of corporate announcements to examine the impacts of insider trading around these events. The announcements covered typical corporate activities from announcements of earnings (both more than and less than expected), dividends (both increases and decreases), stock splits, the reduction in the corporate bond rating, and the receipt of major government contracts. Moss concentrated on the period between 1982 and 1983 and included 280 different announcement events and 1078 insider transactions. By calculating the expected returns using the Capital Asset Pricing Model, residuals surrounding the announcement date (one day prior, day of, and day after announcement) were determined. Moss then used a "paired differences test" to measure the significance of the results. Moss found that in all the announcement events, insiders were able to outperform the market and to also reduce their losses on those trades prior to bad news.

Elliot, Morse, & Richardson [1984] also studied various corporate announcements which included annual earning statements, dividend changes, bankruptcies,

mergers, and bond rating changes. The authors researched the direct relationship between insider information and these public announcements.

Elliot et al. [1984] analyzed insider trading data from the SEC Official Summary of Security Transactions and Holdings for the period between 1975 and 1979. Analysis was limited to firms traded on the NYSE or ASE. After examining trading volume of insiders, the authors found that insiders do use their private information to their advantage. However, the relationship between use of insider information and subsequent public release of announcements was not significantly different than trading of insiders at other times.

Seyhun [1986] studied a sample of 769 firms between 1975 and 1981. Seyhun examined over 59,000 insider transactions and by employing the market model to determine expected returns, found that insiders profits do not appear as large as what was found in other studies [Jaffe, 1974b; Finnerty, 1976]. Seyhun attributed the difference to the selection of the expected return models used, particularly, the CAPM [p. 199]. In this study, Seyhun, also found that insiders such as directors and chairman are better predictors of future stock performance than officers or other shareholders [p. 210].

Gupta & Misra [1988] examined the impact of the insider trading scandal (that began with Dennis Levine of

Drexel, Burnham, & Lambert) on price run-ups prior to corporate takeovers. Gupta & Misra included in their sample all firms that were targeted for takeover between January 1985 and December 1986. These companies had to be traded on the NYSE or ASE and have data available from the Center for Research on Security Prices (CRSP) tapes. The authors had a final sample of 87 firms. Daily abnormal returns and cumulative abnormal returns (CAR) were calculated and the authors found that the CAR became positive on Day -20 and remained positive [p. 456].

Gupta & Misra then divided their sample between companies that were targeted for takeover prior to the insider trading scandal (which for the study was May 12, 1986) and after that date. They found that there was no significant difference in trading volume or abnormal returns for these two groups and concluded that insider trading was not a large contributor to the price run-ups seen.

A study conducted by Givoly and Palmon [1985] set out to determine whether or not abnormal returns made by insiders were a result of inside information that was later revealed or by subsequent price changes resulting from others trading based on the insider trades.

Instead of focusing on the New York Stock Exchange, as most studies have done, the authors selected 68 random companies which were listed on the American Stock

Exchange in the period 1973-1975. Classification of events were separated into three categories to include good, bad, or neutral. Utilizing the Official Summary of Security Transactions and Holdings and the market model, cumulative average residuals were calculated using daily returns [p. 72].

The findings supported earlier studies in that abnormal returns were found after insider trading activities. Givoly and Palmon calculated abnormal returns to be 8% over an 8 month holding period [p. 76]. Furthermore, they found insider trading profits were more than a result of a "specific news release," but were a consequence of trades by outsiders following the insider lead. These increased profits were magnified by the outsiders.

Rozeff and Zaman's [1988] research focuses on the insider trading anomaly and studies whether or not outsiders can profit off of information contained in the Official Summary of Security Transactions and if insiders can also profit from trading in their own firm's stock. The authors argue that the main reason for the insider trading anomaly is due to the incorrect appraisal of abnormal returns which are due to effects of the stock's size and earnings/price ratio.

The authors studied the period between January 1973 and December 1982 and obtained their sample from the

SEC's Official Summary of Security Transactions. They utilize the same "intensive trading criterion" employed by Jaffe [1974b] in determining their sample. The sample contained all New York Stock Exchange Companies which also had 60 months of CRSP (Center for Research on Security Prices) data.

For their test, Rozeff and Zaman also put together a control portfolio that considered size and earnings/price effects. By utilizing the market model, the authors compared the control portfolio to the sample portfolio after calculating the prediction error.

Rozeff and Zaman conclude the study by adjusting the returns for transaction costs of 2% and find that by adjusting the market model for size and earnings/price effects, outsiders that use trading rules based on the Official Summary will not receive excess returns. On the other hand, insiders (when returns adjusted in the same manner as those for outsiders) will only see abnormal returns in excess of the market if they hold the stock for 12 months and will realize a 3.12% return.

CHAPTER V

STATEMENT OF HYPOTHESES

Null and Alternative HypothesesAbnormal Returns

This thesis tests the null hypothesis that the abnormal returns for this defense sample, prior to the announcement (event) date are zero but are positive after the announcement. This is shown as:

$$H_{01}: \sum_{t < 0} \bar{U}_{it} = 0, \quad \bar{U}_{i0} > 0$$

where:

$\bar{U}_{it}$ = average excess return on security i ;
trading day t relative to the announcement
date which is designated as Day "0".

These results would be anticipated if the semi-strong form efficient market was in operation. Basically, when the announcement is published, it is expected that average excess returns would become greater than zero at or after Day "0" and not before.

The alternative hypothesis tested is that abnormal returns will be positive before the public announcement date and that abnormal returns would be zero at Day "0."

This is shown as:

$$H_{a1}: \sum_{t < 0} \bar{U}_{it} > 0, \quad \bar{U}_{i0} = 0$$

The alternative hypothesis indicates insiders are expected to receive positive excess returns prior to the announcement as a result of their utilization of inside information prior to the public announcement. If the alternative hypothesis is accepted, this would suggest that insiders can earn excess returns prior to public announcement.

Overall Trading Volume

This study not only looks at abnormal returns but also analyzes overall trading volume. The null hypothesis to be tested here is that there is no abnormal trading volume before the announcement date, but there is abnormal trading volume on the announcement date or $t = 0$. This is represented below:

$$H_{02}: \frac{ATV_{it}}{NV_{it}} = 1.0$$

where:

ATV_{it} = is equal to the average total trading volume on day t for security i .

NV_1 = is equal to the average normal trading
volume for security 1.

The result of the trading volume ratio being equal to one would indicate overall volume remained the same and did not increase over the test period.

If the null hypothesis cannot be rejected, this might indicate that inside information was not a factor in the level of trading volume observed before and during the announcement period.

Abnormal trading volume before the announcement/ event date and no abnormal trading volume on Day "0" is the alternative hypothesis. This is represented as:

$$H_a : \frac{ATV_{it}}{NV_1} > 1.0$$

If the alternative hypothesis is accepted, this would indicate that the average trading volume during the event period was greater than the average in the prior period. Insider use of private information would cause an increase in trading volume if the award was considered significant to the firm. A t-test is performed to test the significance of this statistic.

Insider Trading Volume

The final null hypothesis to be tested is that there is no significant difference between the number of insider purchases to the number of insider sales prior to the announcement date. This is shown as:

$$H_0 : \frac{IP_{it}}{IS_{it}} = 1.0$$

where:

IP_{it} = insider open market purchases for firm i
at day t .

IS_{it} = insider open market sales for firm i at day t .

The acceptance of this null hypothesis would indicate insider trading patterns & volume is not different than what is considered to be a neutral ratio, neither intensive buying nor intensive selling.

The alternative hypothesis states the insider trading activity of purchases to sales is greater than 1.0 prior to the public announcement and is represented by the statement below:

$$H_a : \frac{IP_{it}}{IS_{it}} > 1.0$$

The acceptance of the alternative hypothesis would indicate insider trading activity is headed in the same direction that can be expected when a "good news" announcement is present: higher buying and less selling. This movement in trading activity would be considered a signal to the market if open market purchases greatly exceeded that of open market sales. Outsiders who carefully watch insider transactions would be most interested in a ratio greater than 1.0.

CHAPTER VI

DATA AND METHODOLOGY

To test whether or not defense industry insiders are carefully making use of private information in the trading of their firm's stock, inferences can be made while looking at price changes and trading volume surrounding these events. It is expected that insiders would purchase securities prior to the announcement of positive news and sell prior to negative news. In this case, insider purchases would be consistent with the winning of large, major military contracts.

First, the market model is employed to estimate expected returns. Daily abnormal returns and cumulative abnormal returns are then calculated. Finally a z-test statistic is tabulated to determine the significance of the results.

Comparative analysis of trading volume is also completed. Trading volume during the event period will be compared to the normal daily trading volume during the estimation period. A t-test is utilized to test the significance of the trading volume results.

Data and Sample Characteristics

To test for abnormal returns, a sample was compiled of prime defense contractors. To do this, a review of the annual "Department of Defense Top 100 Prime Contractor List" was accomplished. This list is published annually and can be found in a variety of publications. The information for this research was taken from annual issues of Aviation Week and Space Technology. A total of 197 contractors made the DOD list at least once during the Fiscal Years, 1980 through 1987 (see Table 12 under Appendix D). In order to be in the sample, a firm must have been included in this list at least six times out of the eight years between 1980 and 1987. Exactly 80 firms made the list at least 75% of the time.

With this information, it was necessary to calculate the extent of a firm's defense-related business. Quarterly data were retrieved for each company which was then compared to the government's fiscal year which runs October through September. This information was gathered from various issues of The Value Line Investment Survey. To make the sample, the firms had to have at least 25% of their business related to defense in the year in which they made the list. Utilizing this criterion brought the sample down to 34 firms.

Finally, to remain in the sample, each firm was required to be on the Center for Research on Security Prices (CRSP) data file. One final company was eliminated leaving 33 firms [see Appendix A]. Since all the firms in the sample have met the CRSP specification, market model measurement is simpler.

The Wall Street Journal Index was utilized in gathering the major defense contract awards for the 33 companies identified above. The Wall Street Journal (WSJ) is considered a primary source of business information and news and has a considerable circulation. The WSJ Index was searched for awards between October 1979 and September 1987 (Fiscal Years 1980-1987). In order to be included as an event in the sample, the contract award had to meet the following criteria to be considered a major sale for that firm:

- 1) Must be a prime contract awarded by one of the Military Service Departments or the DOD itself.
- 2) Contract amount must be worth at least 25% of that firm's annual defense sales for the fiscal year the firm made the DOD list.

A review of the Wall Street Journal Index during this time period provided 5,345 military contract

announcements (see Table 13 under Appendix E for breakout by firm and year). From the original sample, and by using the above standards, a total of 23 companies and 59 contract award announcements remained. However, to be considered in the final sample, no other major announcements by the defense contractor could have occurred within -150 and +15 trading days of the award announcement. A major announcement, for the purpose of this thesis, is defined as:

- 1) Announcement of unanticipated increase or decrease in earnings or dividends;
- 2) Takeover announcement;
- 3) Another major military contract award announcement as measured above;
- 4) Stock splits;
- 5) Buybacks;
- 6) Any other major sale that would be comparable to a military contract in terms of size.

The final sample to be tested included 41 events and 22 contractors. Table 2 lists the final contractors in the sample.

Table 2

Final Sample of Defense Contractors and Events

COMPANY	EVENTS
1. Avco Corp.	1
2. Eaton Corp.	3
3. Fairchild Industries	1
4. FMC Corp.	3
5. General Dynamics	2
6. Grumman Corp.	1
7. Harsco Corp.	2
8. Hercules Inc.	1
9. Litton Industries	3
10. Lockheed Corporation	5
11. Loral Corporation	1
12. McDonnell-Douglas	1
13. Morrison-Knudsen	1
14. Northrop Corporation	3
15. Raytheon Co.	2
16. Rockwell Intl.	4
17. Sanders Associates	1
18. Tenneco	1
19. Texas Instruments	2
20. Textron Inc.	1
21. Todd Shipyards	1
22. United Technologies	1
Total Events	41

Table 3 provides a summary of the value of the contracts in the final sample. The average contract award in this sample is \$1.296 billion (\$.667 billion is

Table 3

Dollar Value of Contract Awards in Final Sample

Contract Amount (\$ in millions)	No. Contracts/ Events
\$ 35M - \$ 250M	8
\$ 251M - \$ 500M	7
\$ 501M - \$1000M	9
\$1001M - \$2000M	9
\$2001M - \$8000M	8

the median award). As can be seen, the range in contract value is rather dramatic. In addition, the average equity market value of these contractors is \$2.127 billion (the median is \$1.930 billion).

The Market Model

This study uses the Market Model to measure the expected returns for the defense company securities in the sample [see Brown & Warner 1985]. The market model

estimates the "normal" return for each company. The normal return is calculated using Equation (1):

$$R_{it} = a_i + B_i R_{mt} + e_{it} \quad (1)$$

where:

R_{it} = is the continuously compounded rate of return on security i on day t ;

a_i = is the regression intercept of the equation;

B_i = is the regression slope of the equation;

R_{mt} = represents the continuously compounded rate of return on the CRSP value weighted market index on day t ;

e_{it} = is the error term which is assumed to be normally distributed with zero mean and constant variance.

The event date for this test is the date the Wall Street Journal published the announcement. This correctly represents Day "0" as the DOD Public Affairs Office announces the award at 4:00PM EST at which time the information is released to the press. It is subsequently published the next business day. The first impact of this announcement would logically be the next

business day. That would be the day one would expect to see an increase in the stock price based on this "good news" announcement.

In order to determine the regression parameters in Equation (1), returns were derived from period $t = -150$ to $t = -31$. This estimation period was also used by Blunt (1988) to determine normal returns for defense stocks. This period is decidedly shorter than in many other studies. This is due to the inherent nature of the defense industry (awarding of large military contracts are done year-round) which requires the estimation period to be shorter so as to reduce the noise in the firm and marketplace.

After determining normal returns, actual returns were calculated for the period $t_1 = -15$ to $t_2 = +15$.

Cumulative Abnormal Returns

To calculate the extent of excess or abnormal returns, the prediction error was computed as in Equation (2):

$$PE_{it} = R_{it} - (a_i + B_i R_{imt}) \quad (2)$$

The coefficients a_i and B_i are estimated using ordinary least squares with 120 observations over the period $[-150, -31]$ relative to Day "0." The prediction

errors are then calculated for each contractor beginning 15 days prior to the award and to Day + 15.

The Average Prediction Error (APE) is calculated:

$$APE_t = \frac{1}{M} \sum_{i=1}^M PE_{it} \quad (3)$$

where:

M = portfolio of securities over the event period.

With the prediction errors calculated, cumulative data can be figured. The formula for the cumulative prediction error is shown in Equation (4):

$$CPE_{t1,t2}^i = \sum_{t=t_1}^{t=t_2} PE_{it} \quad (4)$$

The average of these cumulative prediction errors across the sample of events yields the Average Cumulative Prediction Error (ACPE) which represents a proxy for the abnormal performance for the defense portfolio between $t = -15$ to $t = +15$. This thesis utilizes the same methodology as annotated in Rosenfeld [1984]. This is represented in Equations (5-9).

$$ACPE_{t1,t2} = (1/M) \sum_{i=1}^M CPE_{t1,t2}^i \quad (5)$$

A z-test statistic is used to evaluate the significance of the findings of Equations (4) and (5). Each prediction error is standardized by its estimated standard error S_{it} to form the standardized prediction error as shown below:

$$SPE_{it} = PE_{it} / S_{it} \quad (6)$$

This standardized prediction error is calculated for $t = -15$ to $t = +15$. The standard error is calculated as:

$$S_{it} = S_i \left[\frac{1 + \frac{1}{T_i} + \frac{(R_{mt} - \bar{R}_m)^2}{\sum_{j=1}^{T_i} (\bar{R}_m - R_{mj})^2}}{T_i} \right]^{1/2} \quad (7)$$

where:

- T_i = is the number of days in the estimation period for security i
- $\bar{R}_m$ = is the (time series) average return to the market index over the estimation period

S_i = is the square root of the
estimated residual variance from
the market model

The standardized prediction errors are summed (through time) for a given security to form its standardized cumulative prediction error as shown in Equation (8):

$$w_i = \sum_{t_1}^{t_2} SPE_{it} / \sqrt{t_2 - t_1 + 1} \quad (8)$$

where:

w_i = is assumed to have a unit normal distribution.

To determine the exact significance of the abnormal performance for the sample of securities over the time interval ($t_1 = -15$ to $t_2 = +15$), a Z-statistic is used. This is defined in Equation (9):

$$Z = \bar{w} \sqrt{M} \quad (9)$$

where:

$$\bar{w} = (1/M) \sum_{i=1}^M w_i$$

Given the above assumptions, Z is unit normally distributed, provided that the w_i 's are independent across the firms in the sample.

Trading Volume Analysis

Overall Trading Volume Analysis

When researching the impacts of insider trading, a thorough analysis of the trading volume should coincide with the estimation of abnormal returns. Both the overall trading volume and insider trading volumes will be discussed.

Using the contract announcement dates and firms in the sample, daily trading volume data was collected from the Standard & Poor's Daily Stock Price Record. Data was gathered beginning with trading day $t = -150$ to $t = +5$.

In order to compare the trading volume at the time of the announcement with the trading prior to this time, a "normal" trading volume had to be determined. This was calculated by taking the daily volume between -150 and -31 (the same parameters as for the market model) and dividing by 120 (trading days). With this normal trading volume derived, a comparison could now be made as well as statistical testing done to see whether or not trading during the announcement period was statistically different.

The measure of abnormal trading volume used in this thesis is based on the insider trading study of Gupta & Misra [1988]. Abnormal trading volume is measured as:

$$AV_{it} = (V_{it} / NV_i) \quad (10)$$

where:

AV_{it} = is the abnormal volume for firm i
on day t .

V_{it} = is the trading volume for firm i
on day t .

NV_i = is the normal trading volume for
firm i . This is computed by adding the
daily trading volume for firm i between
 $t = -150$ and $t = -31$ and dividing by
120 trading days.

With Equation (10), abnormal volume was determined for the portfolio of defense stocks. A t -test statistic (Equations 11-12) is computed to test the significance of the results.

$$S^2 = \frac{\sum_{i=1}^n (AV_{it} - \overline{AV}_t)^2}{n - 1} \quad (11)$$

where:

n = number of firm events in sample

AV_{it} = the mean for firm i

$\overline{AV}_t$ = the mean of the sample

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} \quad (12)$$

where:

$$\frac{s}{\sqrt{n}} = \frac{s}{\sqrt{n}}$$

The results of these tests and their corresponding t-test statistics are reviewed in Chapter VII.

Registered Insider Trading Analysis

Insider trading has many participants. The SEC watches it to detect if insiders are using illegal inside information and then trading on it. Outsiders (other investors, brokerage houses, etc.) watch as well because they feel insiders can predict the direction and movement of the stock [Dorfman, Nov 30, 1988, p. C1].

In order to analyze insider trading, a collection of all registered insider trades must be gathered. This is done by looking at the Securities and Exchange Commission's Official Summary of Security Transactions and Holdings around the period of the award announcements/event. This exercise will uncover the extent of insider trading around these times and the pattern of insider trading, i.e.; buy, sell or neutral.

Insider trades beginning three months prior and three months after the announcement date were tracked and recorded. Going out at least three months after the announcement date will reveal any late filings which should be considered in the analysis. (Even though insiders are required to file their stock trading promptly to the SEC, as was stated in Chapter III, filings by insiders are late a third of the time.)

Table 4 summarizes the insider trading transactions between day -30 and day +5. The exercise of options are included, though other studies have left them out [Seyhun, 1988]. The reason for this action is to see whether or not insiders can time the exercise of their options to coincide with good news announcements which allows them to purchase additional securities normally at a lower price than the prevailing market. By so doing, they can experience an increase in their wealth which may be triggered by these announcements.

One problem in analyzing insider trading volume is determining an appropriate volume that can be considered the norm. Without this measurement tool, inferences about the level of insider trading cannot be made with confidence.

Because of the problem just mentioned, many authorities contend that looking at the ratio of purchases to sales can be an indication of the firm's

Table 4

Insider Transactions Summary

<u>PURCHASES</u>		
Percent	Total	Type
35.1%	59	Acquisition/Plan
29.8%	50	Exercise Options
16.1%	27	Other Acquisition
15.5%	26	Open Mkt Purchases
3.5%	6	Miscellaneous
100.0%	168	Total Purchases

<u>SALES</u>		
Percent	Total	Type
62.6%	87	Open Market Sales
20.9%	29	Other Disposition
15.8%	22	Disposed of by Gift
.7%	1	Private Sale
100.0%	139	Total Sales

<u>INSIDERS</u>		
Percent	Total	Type
59.9%	184	Officers
16.6%	51	Directors
6.5%	20	Officers/Directors
5.9%	18	Chairman/Board
4.9%	15	Divisional Officers
3.9%	12	Affiliated Person
1.3%	4	Trustee
1.0%	3	Unknown
100.0%	307	Total Insiders

outlook and prospects [Jaffe, 1974b; Penman, 1985; Dorfman, Nov 30, 1988; Lee & Solt, 1986].

Penman (1985) sets up Equation (13) to measure this insider trading activity:

$$T_{it} = \frac{P}{S} \quad (13)$$

where:

T_{it} = the insider trading activity for security i at time t.

P = open market purchases

S = open market sales

Referring back to Table 4, open market purchases and open market sales refer to 15.5% and 62.6% of all insider transactions respectively. The results of equation (13) will be noted in the next chapter along with additional descriptive statistics describing this section.

Support for Methodology

There have been some criticisms of the methods in testing the efficient market hypothesis, and in particular the strong-form. In order to determine abnormal returns, normal or expected returns must be determined. Different models have been used to calculate these returns including

the Capital Asset Pricing Model (CAPM). Critics have been particularly harsh on this model claiming the CAPM is biased and therefore cannot adequately or accurately predict expected returns [Dyckman & Morse, 1986, p. 68]. On the other hand, those who have tested the CAPM in different time periods did not find that the abnormal returns witnessed were a result of flaws in the CAPM, but rather the market was inefficient [Watts, 1978, p. 145].

If the expected returns are incorrect, the abnormal returns cannot be accurately predicted as well. Mis-specified models can result in erroneous conclusions.

Since the CAPM is laden with controversy, the market model was used in this research. The methodology used in this study is comparable to other studies that have analyzed insider trading returns [Finnerty, 1976; Givoly & Palmon, 1985; Seyhun, 1986; Keown & Pinkerton, 1981].

As Seyhun [1986] states in his study, "The market model prediction errors have an expected value of zero for firms of any size, thereby avoiding the bias introduced by the Capital Asset Pricing Model" [p. 194]. However, Rozeff & Zaman [1988] argue in their research that the market model does not provide complete control for "nonmarket" effects such as size [p. 30]. They strongly urge the inclusion of a parameter to take this into account.

Brown & Warner [1980, 1985] have done considerable work on event study methodology and have found that the simple market model performs well under a great variety of situations. The authors also support the use of daily return data and found few problems using daily versus monthly data.

McDonald [1987] also studied more complex models which determine abnormal returns but found that with using either monthly or daily data, the Ordinary Least Squares Market Model was just as sufficient in detecting abnormal performance as was more complex models.

Most advocate the use of the Market Model and have confidence in its ability to accurately detect the presence of abnormal returns. Because of this, the market model was selected for this thesis.

The methodology used in testing the overall trading volume and insider trading volume are accepted methods not under considerable debate.

CHAPTER VII

RESULTS

Market Model Results

Table 5 contains the daily average and cumulative average abnormal returns that were calculated using Equations (1) through (8). The results were tested for significance using the z-test statistic (described previously in Equation (9)).

In utilizing the market model to detect abnormal returns, positive significant returns were only found on Day "0" (the event date) which would support the efficient market hypothesis. A one-tailed z-test statistic was computed and on day "0", the result was +1.99 at the 95% confidence level. Interpretation of this result indicates the market reacted favorably to the event which resulted in a significant increase in abnormal returns on that day. However, the abnormal returns after that time are not significant except for Day 5 where the return is significantly negative. The reason for this could possibly be a sell-off which could have decreased the return. However, that is speculation.

Table 5

Abnormal Returns Before and After Contract Award Announcements

DAY	APE	Z(APE)	ACPE	Z(ACPE)
-15	0.0015166	0.3844953	0.0015106	0.3844953
-14	0.0039925	1.3656014	0.0055030	1.3501213
-13	-0.0000859	0.3359645	0.0054171	1.5440905
-12	-0.0039902	-1.4901099	0.0014270	0.7990356
-11	-0.0019642	-0.5098817	-0.0005373	0.5710096
-10	-0.0006101	-0.2000720	-0.0011474	0.4893305
-9	-0.0030135	-1.2713485	-0.0041609	0.0088059
-8	0.0013675	0.9513814	-0.0027934	0.3451700
-7	-0.0000416	0.2265842	-0.0028350	0.4206981
-6	-0.0012317	-0.5637669	-0.0040666	0.2424193
-5	-0.0011221	-0.2390117	-0.0051887	0.1703546
-4	-0.0016879	-0.8951598	-0.0069767	-0.0880558
-3	0.0001255	0.0336084	-0.0067511	-0.0787345
-2	0.0040099	1.2108047	-0.0027412	0.2448667
-1	0.0026285	1.1860378	-0.0001128	0.5511003
0	0.0049331	1.9914250 *	0.0048203	1.0489566
1	-0.0030827	-1.1860332	0.0017375	0.7613013
2	0.0018062	0.6650022	0.0035437	0.9180438
3	-0.0014968	-0.4999604	0.0020469	0.8033450
4	-0.0019908	-0.4323484	0.0005610	0.7066690
5	-0.0045500	-1.7056559 *	-0.0044939	0.3344643
6	0.0026736	0.9786297	-0.0018203	0.5431089
7	-0.0005210	-0.3739328	-0.0023414	0.4651385
8	-0.0009498	-0.6702302	-0.0032912	0.3283283
9	0.0017260	0.5494295	-0.0015652	0.4382142
10	0.0002697	0.2328494	-0.0012955	0.4838798
11	-0.0000768	-0.4551652	-0.0013723	0.3962832
12	-0.0017161	-0.7238982	-0.0030884	0.2594793
13	0.0012637	0.5815414	-0.0018247	0.3674688
14	0.0016241	1.0396364	-0.0002007	0.5572796
15	-0.0005017	0.0071791	-0.0007023	0.5585690

* SIGNIFICANT AT .05 CONFIDENCE LEVEL

It is apparent the market correctly assessed the significance of the news and the price of the stocks were impacted precisely when they should according to the EMM. It appears, therefore, that the null hypothesis that insiders earn excess returns equal to zero cannot be rejected.

The rise in the abnormal returns on Day "0" and not before also provides evidence that the information channel within which the contract is awarded is apparently free of leakage, at least for contracts awarded on the New York Stock Exchange. These potential findings are important to the military service departments. It appears that the strict controls in place may be working properly and that the winning contractor is advised of the award at the same time as the general market. If insiders are aware of the award prior to this announcement time, it does not appear they are making profitable returns off of the information. If they were, significant, positive abnormal returns should be seen prior to the announcement date of the award.

Trading Volume Test Results

Overall Trading Volume Results

The analysis of trading volume during the event period and calculated by using Equation (10) are

presented in Table 6. The first analysis looks at the average daily trading volume during the event period as compared to the "normal" daily trading volume calculated between $t = -150$ and $t = -31$. Using a one-tailed t-test (see Equations (11 & 12)) for significance, the only periods that were positively significant at the 95% level were periods -1 to 0 and 0. These two periods provide considerable support for semi-strong market efficiency. The trading volume results together with the market model results complement each other. The abnormal returns were statistically significant at Day "0" and the daily trading volume also was statistically significant on this day. When looking at other periods which did not include Day "0", t-statistics are not significant. Only when Day "0" volume is considered are the results significant.

Period -15 to -6 also had a statistically significant result. However, the volume was significantly lower than the "normal" trading volume. This substantial decline in trading volume during this time could be due to a variety of factors; to determine the exact reason for this substantial downturn is not possible without additional information.

Reviewing the trends in Table 6, as the announcement date gets closer, the significance in volume also increases greatly. It is also important to note that

Table 6

Daily Average Trading Volume Analysis

Trading Day Period	t-Test Results
-30 to -16	.903
-15 to -5	-5.137**
-5 to -2	.365
-5 to -1	.815
-5 to 0	1.527
-1 to 0	2.237*
-1	1.188
0	2.055*
+1 to +5	~ .130

Note: All trading periods were divided by the normal trading volume which was computed over the period $t = -150$ to $t = -31$.

-
- * Significant at .025 confidence level
 ** Significant at .0005 confidence level

once the announcement date has passed, the t-test results are insignificant.

The results do not support the alternative hypothesis of the presence of abnormal trading volume prior to day "0". This supports the position that investors, after analyzing the information that comes to the market, will adjust their portfolio as they deem appropriate. At day "0", when this major military contract award is published, the winning contractor's share price should increase and should also experience increased trading activity if the event is considered to be of value to the company and its shareholders. The fact the volume is significantly different at day "0" only, generally supports the semi-strong form of the efficient market hypothesis.

Table 7 shows the percentage change in average abnormal volume for all firms/events in the study. As is shown, the greatest percentage change in trading volume is at period -1 to 0 and this is entirely due to Day "0" trading volume.

Insider Trading Results

The 307 insider transactions shown in Table 4 represent all transactions between trading days -30 to +5. Of these, 106 were reported late thereby resulting in a 34.5% rate for reporting late. This is in line with

Table 7

Average Abnormal Volume (Percentage Above Normal Volume)

Period	All Events
-30 to -16	-1.3%
-15 to - 6	-5.8%
- 5 to - 2	-3.0%
- 5 to - 1	-.01%
- 5 to 0	+2.2%
- 1 to 0	+12.7%
+ 1 to + 5	-10.2%

Note: Normal Volume [$t = -150$ to $t = -31$]

the latest SEC reports which state that over 32.5% reports are filed late [Dorfman, Nov 9, 1988, p. C1].

Insiders of the sample firms hold common stock ranging from less than 1% to 25% [see Table 14 under Appendix F]. Therefore, in some firms, such as General Dynamics, whose insiders hold 25% of the common stock outstanding, it would be appropriate to pay greater attention to their trading activity.

Using Equation (13), a ratio analysis was conducted on the sample of insider trading activity. Lee & Solt

[1986] chart the different positions of insider trading into three levels: high buying, high selling, and neutral [p. 67].

Following the cutoffs described in the article, Table 8 reveals the patterns of insider trading in this study.

Table 8

Ratio of Purchases to Sales for all Firms

Buy/Sell Ratio		Sample Frequency
Greater than 1.0	High Buying	.025
Between .25 and 1.0	Neutral	.073
Less than .25	High Selling	.902

These ratios are calculated by using only open market purchases divided by open market sales. Over 29% of the firms/announcements had no open market purchases or open market sales. Most of the purchases done by industry insiders was in the form of acquiring shares through a plan (35.1%) or exercising options (29.8%).

The results in Table 8 indicate a "bearish" attitude toward the market. However, if examining the total net volume (all purchases minus all sales regardless of type of transaction) during each period of the sample event, the results show that 18 events had a "net buy" final position, and 17 had a "net sell" final position. A total of 6 events had no insider activity at all. These findings can be interpreted several ways. It appears that for this sample of events and contractors, the insider "signal" was neutral as a group. Buys and sells were evenly divided between the events. Because of this mixed signal, an outsider would have to be cautious of following the leads of this group overall.

Limitations of Thesis

A few of the limitations of this thesis are outlined below. These modifications to the sample may have caused different results to be obtained.

This thesis only looked at large contract awards which had to be at least 25% of the company's total sales for that particular year. This may have eliminated the following from the sample:

- 1) Those contracts that have a smaller initial contract value award but turn out to be very profitable. By eliminating these smaller

initial awards, many contracts were immediately deleted.

- 2) The 25% threshold may be too high as many of the prime defense contractors did not meet that criteria in any of the years in which they were in the study, ie: Boeing. By lowering the threshold to 20%, additional contracts would be picked up which could change the results.

This thesis only looked at Fiscal Years 1980 - 1987. Because this was a high-growth period for defense, it is possible that because funds were so plentiful, insiders did not react like they might have when times are leaner. Sampling some years during the Carter Presidency (1976-1980) may have provided some different results.

CHAPTER VIII

CONCLUSIONS

This study examined the presence of insider trading in the defense industry. The acceptance of the null hypothesis that insider trading abnormal returns are equal to zero prior to the announcement/event date and are positive at the announcement day provides support for the semi-strong form efficient market hypothesis; i.e. no detection of insider trading prior to public announcement. The study also conveyed the significance of trading volume around the day of the event which would support the efficiency of the market as well. The results of the ratio of insider purchases to insider selling is less clear but the overall net volume was to purchase stock which is in line with the above findings.

In this thesis, the market operated at the semi-strong form of the efficient market hypothesis. When the major announcement of the contract award hit the public, there was sharp rise in abnormal returns on the date of the announcement with a corresponding increase in the trading volume for that day. The market quickly impounded this "news item" and reflected this information in the stock price of the firms.

It is quite evident after reviewing the considerable literature on insider trading that the monitoring and prosecution of insiders is a formidable task. There are many ways to skirt the law. Registered insiders might possibly trade through friends and relatives as no requirement exists for the reporting of these trades. Trading through foreign banks and countries where secrecy is the law makes detecting insider trading almost impossible. The SEC also is forced to determine whether insiders are trading based on inside information or because they just want to change their portfolio. Proving the former is most difficult. As was stated earlier, the complexity of the markets add to the difficult job of the SEC in keeping up with insiders and their expanded trading arena.

Nevertheless, the SEC, the exchanges, and individual firms continue to support the regulations and investigate questionable practices promptly. The new 1989 insider trading legislation should cause insiders to think twice with its increased penalties. The bounty program included in this law should also help deter insiders. The continued prosecution and conviction of high-level companies and their executives engaged in insider trading should stand as a deterrent to others. However, as many others have remarked, the question of whether or not the cost of regulating insider trading is worth the benefit

received needs to be further researched [Penman, 1982, p.481].

Insiders trade on inside information because of greed and power [Stein, 1987, p. 16]. Some people are just interested in making money and no amount of rules or regulations can alter their behavior, unless of course, the price of getting caught 's much too high.

The magnitude and superior ability of the SEC to enforce insider trading regulations may be deterring insider trading in the industry just studied. If they are not deterring the inside trader from illegally using information, then it is possible that they have just gone underground by using other friends and relatives or they are trading in such a way as to not make a spectacle of themselves which would cause the SEC to investigate.

Economic Model Thesis (FDC)
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Possibilities for Further Research

Additional research is recommended in studying the defense industry prior to the Reagan era and possibly doing a comparison between the two groups. Another suggestion might be to look at the change in the contracting laws to see if insider trading in the defense industry was more prevalent prior to these changes in 1984.

A research study aimed at analyzing the trading activities of small businesses who receive government

contracts is also recommended. If these firms are traded Over The Counter or on the American Stock Exchange, they would be worthy of investigation. Then a comparison between the smaller business can be assessed against the large defense contractors (as studied herein) to see the differences.

The examination of defense sub-contractors could also reveal the "domino effect" of receiving government contracts. The intricate and complex functioning of defense sub-contractors could be studied while checking the impact on share prices of these contractors when the prime contractor fails to receive a contract or when the prime contractor wins an award. The effects on the sub-contractors' share prices would also provide evidence of the efficient market hypothesis.

Finally, a study of the effects of winning and losing major government contracts could be undertaken. A comparison of winners and losers who bid on the same contract should reveal the winner's stock rising and the loser's stock falling. At this time, no research has focused on this situation but this would, too, provide support to the efficient market hypothesis.

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APPENDICES

APPENDIX A

CONTRACTORS WITH DEFENSE SALES IN EXCESS
OF 25% OF TOTAL SALES

Table 9

Contractors with Defense Sales in Excess of 25% of Total Sales

25%	40%	50%
AVCO CORP.		
BOEING CO.	BOEING CO.	
COMPUTER SCIENCES		
E-SYSTEMS INC.	E-SYSTEMS INC.	E-SYSTEMS INC.
EATON CORP.		
FAIRCHILD INDS.	FAIRCHILD INDS.	FAIRCHILD INDS.
FMC CORP.		
GENCORP	GENCORP	
GENERAL DYNAMICS	GENERAL DYNAMICS	GENERAL DYNAMICS
GOULD INC.		
GRUMMAN CORP.	GRUMMAN CORP.	GRUMMAN CORP.
HARRIS CORP.		
HARSCO CORP.	HARSCO CORP.	HARSCO CORP.
HERCULES INC.		
HONEYWELL INC.		
LITTON INDUSTRIES	LITTON INDUSTRIES	LITTON INDUSTRIES
LOCKHEED CORP.	LOCKHEED CORP.	LOCKHEED CORP.
LORAL CORP.	LORAL CORP.	LORAL CORP.
* LTV CORP.		
MARTIN MARIETTA	MARTIN MARIETTA	MARTIN MARIETTA
MCDONNELL DOUGLAS	MCDONNELL DOUGLAS	MCDONNELL DOUGLAS
MORRISON KNUDSEN		
MORTON THIOKOL		
NORTHROP CORP.	NORTHROP CORP.	NORTHROP CORP.
RAYTHEON CO.	RAYTHEON CO.	RAYTHEON CO.
ROCKWELL INTL.	ROCKWELL INTL.	ROCKWELL INTL.
SANDERS ASSOCIATES	SANDERS ASSOCIATES	SANDERS ASSOCIATES
SINGER CO.	SINGER CO.	
SPERRY CORP.		
TENNECO		
TEXAS INSTRUMENTS		
TEXTRON INC.	TEXTRON INC.	TEXTRON INC.
TODD SHIPYARDS	TODD SHIPYARDS	TODD SHIPYARDS
UNITED TECHNOLOGIES		

NOTE: COMPANIES NOTED ABOVE WERE INCLUDED IN THE DEPARTMENT OF DEFENSE LIST OF TOP 100 PRIME CONTRACTORS BETWEEN FISCAL YEARS 1980 AND 1987. DEFENSE SALES WERE FIGURED FOR THE YEARS IN WHICH THE FIRM MADE THE LIST.

* ELIMINATED FROM FINAL SAMPLE. UNAVAILABILITY OF CRSP DATA.

APPENDIX B

FEDERAL BUDGET OUTLAYS (1987-1991)

Table 10

Federal Budget Outlays, 1987-1991

	(\$ in billions)				
	1987	1988*	1989*	1990*	1991*
Defense	282.0	285.4	294.0	306.2	320.2
Federal Budget	1004.6	1055.9	1094.2	1148.3	1203.7
% of Total Budget for Defense	28.1	27.0	26.9	26.7	26.6

*Estimates

SOURCE: The United States Budget in Brief, Fiscal
Year 1989, Executive Office of The
President, Office of Management and
Budget, pp. 106, 111.

APPENDIX C

NATIONAL DEFENSE OUTLAYS (1987-1991)

Table 11

National Defense Outlays, 1987-1991

	(\$ in billions)				
	1987	1988*	1989*	1990*	1991*
Procurement	80.7	79.2	79.8	80.6	82.5
RD&E	33.6	33.1	36.3	38.2	40.3
Total Defense	282.0	285.4	294.0	306.2	320.2
% of Proc. & RD&E to Total Defense Budget	40.5	39.3	39.5	38.8	38.4

*Estimates

SOURCE: Budget of The United States Government, Fiscal Year 1989, Executive Office of The President, Office of Management and Budget, p. 5-6.

APPENDIX D

TOP 100 DOD PRIME CONTRACTORS (FY 1980-1987)

Table 12

Top 100 DOD Prime Contractors (FY 1980-1987)

COMPANY	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
AEL INDUSTRIES								1	1
AEROSPACE CORP.	1	1	1	1	1	1	1	1	8
AGIP PETROLI SPA	1	1	1						3
AL HUSEINI		1							1
ALLIED CORP.				1	1				2
ALLIED-SIGNAL						1	1	1	3
AMERICAN MOTORS CO.	1	1	1						3
AMERADA HESS	1	1			1	1	1		5
AMOCO CORP.						1	1	1	3
ARVIN INDUSTRIES								1	1
ASHLAND OIL	1	1		1	1	1	1		6
AT & T CO.	1	1	1	1	1	1	1	1	8
ATLANTIC RICHFIELD	1	1	1	1	1	1	1	1	8
AVCO CORP.	1	1	1	1	1				5
AVONDALE INDUSTRIES							1	1	2
BAHRAIN NATIONAL OIL							1		1
BATH IRON WORKS CORP.							1		1
BDM INTERNATIONAL						1	1	1	3
BELL BOEING JV							1	1	2
BENDIX CORP.	1	1	1						3
BOEING CO.	1	1	1	1	1	1	1	1	8
BOLLINGER MCH. SHIPYD								1	1
BRITISH PETROLEUM		1			1	1			3
BRUNSWICK CORP.				1	1		1		3
CALTEX PETROLEUM					1	1			2
CAPITAL MARINE						1		1	2
CATERPILLAR TRACTOR				1	1				2
CENTEX CORP.	1								1
CFR INTERNATIONAL						1	1	1	3
CHAMBERLAIN MFG.	1								1
CHEVRON CORP.					1	1	1	1	4
CHIN HUENGAGEN CONTR JV		1							1
CHRYSLER CORP.	1	1					1	1	4
CITY INVESTING	1								1
CLABIR CORP.								1	1
COASTAL CORP.	1	1	1	1	1	1	1	1	8
COLT INDUSTRIES							1	1	2
COMPUTER SCIENCES	1			1	1	1	1	1	6
CONGOLEUM CORP.	1	1	1	1	1	1			6
CONTEL CORP.								1	1
CONTROL DATA CORP.	1	1	1	1	1	1	1	1	8
CRAY RESEARCH INC.								1	1
CUBIC CORP.				1				1	2

Table 12 (continued)

Top 100 DOD Prime Contractors (FY 1980-1987)

COMPANY	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
DAY & ZIMMERMAN INC.						1		1	2
DIGITAL EQUIPMENT				1			1	1	3
DRAPER CHARLES STARK LAB					1	1	1	1	4
DUCHOSSOIS INC		1	1	1	1	1		1	6
DUPONT		1	1	1	1	1			5
DYNALECTRON CORP.					1	1	1		3
DYNACORP INC.								1	1
E-SYSTEMS INC.	1	1	1	1	1	1	1	1	8
EASTMAN KODAK CO.	1	1			1	1	1	1	6
EATON CORP.			1	1	1	1	1	1	6
ELECTROSPACE SYSTEMS							1		1
EMERSON ELECTRIC	1	1	1	1	1	1	1	1	8
EI-CELL-O CORP.		1							1
EXXON CORP.	1	1	1	1	1	1	1	1	8
FAIRCHILD INDUSTRIES	1	1	1	1	1	1			6
FELIC SERVICES	1								1
FIGGIE INTL					1	1	1	1	4
FIRST COLONY FARMS	1		1						2
FMC CORP.	1	1	1	1	1	1	1	1	8
FORD MOTOR CO.	1	1	1	1	1	1	1	1	8
FORSTMANN LITTLE								1	1
GATES CORP.							1		1
GATX CORP.		1							1
GEC CORP.							1		1
GEMCORP INC.					1	1	1	1	4
GEN AGENCASM WHAN JV	1								1
GENERAL DYNAMICS	1	1	1	1	1	1	1	1	8
GENERAL ELECTRIC	1	1	1	1	1	1	1	1	8
GENRL ELECTRC PLC								1	1
GENERAL TIRE	1	1	1	1					4
GENERAL MOTORS CORP.	1	1	1	1	1	1	1	1	8
GETTY OIL	1	1	1						3
GIBBONS GREEN								1	1
G.K. TECHNOLOGIES	1								1
GOODYEAR TIRE	1	1	1	1	1	1	1		7
GOULD INC.	1	1	1	1	1	1	1	1	8
GROVES KIEWIT GRAM JV	1								1
GRUMMAN CORP.	1	1	1	1	1	1	1	1	8
GTE CORP.	1	1	1	1	1	1	1	1	8
SUAM OIL & REFINING	1	1	1	1	1				5
GULF OIL	1	1	1	1					4
GULF STATES OIL & REF.			1	1					2
HAMIL DEV & AL. MAR.	1		1						2

Table 12 (continued)

Top 100 DOD Prime Contractors (FY 1980-1987)

COMPANY	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
HARRIS CORP.	1	1	1	1	1	1	1	1	8
HARSCO CORP.	1			1	1		1	1	5
HBH CO.			1	1					2
HERCULES INC.	1	1	1	1	1	1	1	1	8
HEWLETT-PACKARD CO.	1		1	1	1	1	1	1	7
HOLLY CORP.							1		1
HONEYWELL INC.	1	1	1	1	1	1	1	1	8
HOSP. CORP. AMER.			1						1
HOUSTON OIL & REF.		1							1
HUGHES HELICOPTER				1					1
HUGHES MED INST.	1	1	1	1	1	1			6
IBM CORP.	1	1	1	1	1	1	1	1	8
ICCI & AL MIRABID JV		1							1
ICI AMERICAN HDGS						1			1
IMPERIAL CHEM. IND.	1								1
ITT CORP.	1	1	1	1	1	1	1	1	8
ITT & VARD JV							1		1
JOHNS HOPKINS UNIV.	1	1	1	1	1	1	1	1	8
KASLER COMT HELLER JV	1							1	1
KAMAN CORP.			1	1	1				4
KUWAIT NATIONAL PETR		1	1	1	1	1			5
LEAR SIEGLER INC.	1	1		1	1	1	1		6
LITTON INDUSTRIES	1	1	1	1	1	1	1	1	8
LOCKHEED CORP.	1	1	1	1	1	1	1	1	8
LOGICON INC.						1		1	2
LORAL CORP.	1				1	1	1	1	5
LTV CORP.	1	1	1	1	1	1	1	1	8
MARCO PRETAG. BLDG			1						1
MARINE TRANSPORT LINES						1			1
MARTIN MARIETTA	1	1	1	1	1	1	1	1	8
MAERSK LINE, LTD.				1					1
MASON & HANGAR SILAS					1	1			2
MASON CHAMB. INC.			1						1
MASON CO.								1	1
MCDONNELL-DOUGLAS	1	1	1	1	1	1	1	1	8
MCLEAN INDUSTRIES					1				1
MI RYUNG CONSTR.	1		1						2
MIP INSTANSETZ.								1	1
MIT	1	1	1	1	1	1	1	1	8
MITRE CORP.	1	1	1	1	1	1	1	1	8
MOBIL CORP.	1	1	1	1	1	1	1	1	8
MONTEDISON SPA	1								1
MORRIS KNUDSEN CORP.		1	1	1	1		1	1	6

Table 12 (continued)

Top 100 DOD Prime Contractors (FY 1980-1987)

COMPANY	1980	1981	1982	1983	1984	1985	1986	1987	TOTALS
MORTON THIOCOL INC.	1	1	1	1	1	1	1	1	8
MOTOR OILS HELLAS	1	1	1	1	1	1	1	1	8
MOTOROLA INC.	1	1	1	1	1	1	1	1	8
MI INDUSTRIES INC.				1	1				2
NORRIS IND.			1						1
NORTH AM. PHILIPS	1	1	1	1					4
NORTHROP CORP.	1	1	1	1	1	1	1	1	8
OGDEN CORP.				1	1	1			3
OLIN CORP.							1	1	2
OSHKOSH TRUCK CORP.			1	1	1	1	1	1	6
PACE INDUSTRIES INC.						1			1
PACIFIC RESOURCES	1	1	1	1			1		5
PAN AM CORP.	1	1	1	1	1	1	1	1	8
PENN CENTRAL CORP.		1	1	1	1	1	1	1	7
PETERSON BUILDERS			1						1
PHIBRO-SALOMON		1	1		1	1			4
PHILIPS GLOEILAMPEN.								1	1
PRIDE REFINING	1	1							2
RAYMOND BROWN ROOT.					1				1
RAYTHEON CO.	1	1	1	1	1	1	1	1	8
RCA CORP.	1	1	1	1	1	1			6
PEYNOLDS R.J. IND.	1	1	1	1	1				5
ROARDA INC.		1							1
ROCKWELL INTL.	1	1	1	1	1	1	1	1	8
ROLLS-ROYCE PLC				1		1	1	1	4
ROYAL DUTCH PETP.	1	1	1	1	1	1	1	1	9
SAM WHAM CORP.	1			1	1	1			4
SANDERS ASSOCIATES	1	1	1	1	1	1	1		7
SAUDI MAINTENANCE	1								1
SCIENCE APPLICATIONS		1	1	1	1	1	1	1	7
SEQUA CORP.								1	1
SIGNAL COMPANIES	1	1	1	1	1				5
SINGER CO.	1	1	1	1	1	1	1	1	8
SOBERBIO INC.			1	1	1	1	1		5
SOUTHERN UNION				1					1
SPERRY CORP.	1	1	1	1	1	1	1		7
STANDARD OIL/CA.	1	1	1	1					4
STANDARD OIL/IND.	1	1	1	1					4
STEUART INVESTMENT							1		1
SUMMA CORP.	1	1	1						3
SUN CHEN, CORP.	1		1						2
SUN CO. INC.	1	1	1		1	1	1		6
SUNDSTRAND CORP.				1		1	1	1	4

Table 12 (continued)

Top 100 DOD Prime Contractors (FY 1980-1987)

[illegible]

APPENDIX E

MILITARY CONTRACT AWARD ANNOUNCEMENTS AS REPORTED BY THE
WALL STREET JOURNAL: FISCAL YEARS 1980-1987

Table 13

Military Contract Award Announcements as Reported by The Wall Street Journal: Fiscal Years 1980-1987

	COMPANY	1980	1981	1982	1983	1984	1985	1986	1987	TOTAL	FINAL SAMPLE
1	AVCO CORP.			19	24	10				53	1
2	BOEING CO.	74	65	95	98	69	69			470	
3	COMPUTER SCIENCES					2	0	5	3	10	
4	E-SYSTEMS INC.	10	4	9	12	1	9			45	
5	EATON CORP.					12	14	12		38	3
6	FAIRCHILD INDS.	7	13		10					30	1
7	FMC CORP.		21	23	25	10	9	10		98	3
8	GEMCORP INC.			13	13	12			8	46	
9	GEN. DYNAMICS	64	95	115	124	89	82	88	71	728	2
10	GOULD INC.							6		6	
11	GRUMMAN CORP.	50	53	48	60	42	48	32	48	381	1
12	HARRIS CORP.				19		14	12		45	
13	HARSCO CORP.	3						9	5	17	2
14	HERCULES INC.								16	16	1
15	HONEYWELL INC.						33	23	34	90	
16	LITTON INDS.		29	34	44	22	28	23	27	207	3
17	LOCKHEED CORP.	56	53	84	72	40	42	48	51	446	5
18	LORAL CORP.	5				3	10	9	9	36	1
19	MARTIN MARIETTA	27	50	49	56	32	36	45	44	339	
20	MCDONN-DOWGLAS	56	67	78	89	86	80	76	82	614	1
21	MORRISON-KNUDSEN								7	7	1
22	MORTON-THIOKOL			1					11	12	
23	NORTHROP CORP.	36	22	30	28	16	22			154	3
24	RAYTHEON CORP.	58	68	81	86	49	43	51	62	498	2
25	ROCKWELL INTL.			59	87	53	33	39		271	4
26	SANDERS ASSOC.	4	8	15	16	12	10	7		72	1
27	SINGER CO.				33		11	20	25	89	
28	SPERRY CORP.					23	16	20		59	
29	TENNECO INC.				10					10	1
30	TEXAS INSTR.						20	18		38	2
31	TEITRON INC.					12	26	26	23	87	1
32	TODD SHIPYARDS	6	4	7	8		4	3		32	1
33	UNITED TECHN.	46	69	76	95		15			301	1
	TOTAL	502	621	836	1009	595	674	582	526	5345	41

Note: Contract Awards published by the Wall Street Journal are normally those in excess of \$10 million dollars. Each column represents total announcements in WSJ for each contractor for each year noted. Final sample includes only those contract awards that met all criteria.

APPENDIX F

COMMON SHARES OWNED BY INSIDERS

Table 14

Common Shares Owned by Insiders

Company	Value Line Publication Date	Total Common Shares Outstanding	% of Common Shares Owned by Insiders	No. of Shares Owned by Insiders
1 AVCO CORP.	82/11/26	21,009,103	6.0%	1,260,546
2 EATON	84/03/30	32,020,359	1.0%	320,204
3 EATON	84/09/28	32,266,139	1.0%	322,561
4 EATON	85/07/26	32,780,404	1.0%	327,804
5 FAIRCHILD	86/10/24	12,762,577	3.6%	459,453
6 FMC CORP.	82/02/26	32,539,509	1.0%	325,395
7 FMC CORP.	84/02/24	33,208,311	1.0%	332,083
8 FMC CORP.	85/05/24	25,368,999	1.0%	253,690
9 GEN DYN	86/07/18	42,453,850	25.0%	10,613,463
10 GEN DYN	87/04/17	42,926,659	25.0%	10,731,665
11 GRUNMAN	84/07/20	28,146,530	2.0%	562,931
12 HARSCO	86/10/24	10,075,000	2.0%	201,500
13 HARSCO	87/04/17	29,844,591	2.0%	596,892
14 HERCULES	86/11/14	54,567,036	1.0%	545,670
15 LITTON	81/08/28	39,371,607	5.0%	1,968,580
16 LITTON	83/05/27	40,838,154	5.0%	2,041,908
17 LITTON	84/02/24	41,857,458	4.5%	1,883,586
18 LOCKHEED	86/01/04	11,598,853	4.0%	463,954
19 LOCKHEED	83/07/22	53,951,478	1.4%	755,321
20 LOCKHEED	84/10/19	64,545,066	1.4%	903,631
21 LOCKHEED	85/10/18	64,969,241	1.4%	909,569
22 LOCKHEED	87/01/16	65,567,180	1.4%	917,941
23 LORAL	80/01/04	6,158,014	14.0%	862,122
24 McDONN-DOUG	96/10/17	40,531,537	15.0%	6,079,731
25 MORRIS-KNUD	87/01/30	10,533,234	4.0%	421,329
26 NORTHROP	80/01/04	14,208,822	2.0%	284,176
27 NORTHROP	82/07/23	15,108,824	2.0%	302,176
28 NORTHROP	83/07/22	15,150,764	7.0%	1,060,553
29 RAYTHEON	82/01/27	84,153,000	3.4%	2,861,202
30 RAYTHEON	87/04/17	74,078,000	1.3%	963,014
31 ROCKWELL	82/01/22	75,976,376	6.0%	4,558,583
32 ROCKWELL	83/01/21	76,478,107	6.0%	4,588,686
33 ROCKWELL	84/10/19	148,725,877	6.0%	8,923,553
34 ROCKWELL	85/07/19	148,940,527	6.0%	8,936,432
35 SANDERS	84/10/19	19,140,228	2.1%	401,945
36 TENNECO	82/10/15	129,115,306	1.0%	1,291,153
37 TEXAS INST.	85/05/10	24,616,098	14.0%	3,446,254
38 TEXAS INST.	86/05/09	25,167,671	14.0%	3,523,474
39 TEXTRON	87/02/20	39,702,000	7.0%	2,779,140
40 TODD SHIP.	80/07/04	2,692,748	8.0%	167,420
41 UNITED TECH.	80/07/04	42,115,571	2.7%	1,137,120
TOTAL		1,804,660,802		89,286,509
AVERAGE		44,016,117	4.9%	2,177,720

Note: Data was researched from The Value Line Investment Survey which came closest to announcement/event date to determine shares owned by insiders.

ABSTRACT

ABSTRACT

This thesis examined the presence of insider trading within the Defense Industrial Complex and evaluates whether or not defense industry insiders make abnormal returns on their firms' securities prior to the release of major military contract awards. Both abnormal returns and trading volume surrounding the announcement period are analyzed.

This thesis studied the defense industry between 1980 and 1987. The sample was compiled of defense firms that had at least 25% of their total sales related to defense work and which met other stringent criteria. The final sample contained 22 firms and 41 firm events (contract award announcements). Firm events were gathered from the Wall Street Journal Index and were selected based on rigorous criteria as well. The final sample represented large defense contract awards which would most likely result in a change in a firm's stock price as a result of this "good news" announcement.

The Market Model was utilized to determine expected returns for the sample firms. Prediction errors and cumulative prediction errors were calculated to determine the extent of abnormal returns earned around the

announcement period. The average of these cumulative prediction errors across the sample represents a proxy for the abnormal performance for the defense portfolio.

Overall trading volume, as well as insider trading volume, around the event period was examined. Normal trading volume was calculated and compared to the daily trading volume surrounding the announcement. To analyze insider trading around these events, the ratio of open market purchases to sales was examined.

The empirical results showed statistically significant results only on Day "0" or the public announcement date of the contract award. The market reacted favorably to the event which resulted in both abnormal returns and abnormal trading volume on that day. Trading volume on Day "0" was 12.7% above normal. The findings generally support semi-strong form market efficiency.

Insider trading around the event period was difficult to interpret. In analyzing the ratio of open market purchases to sales, over 90% of the insiders during this time period were categorized in the "high selling" bracket. However, when examining the total net volume (all purchases minus all sales regardless of transaction type) of insider trading, the results show that 18 events had a "net buy" final position, 17 events had a "net sell" final position, and 6 events had no

insider trading activity at all. The signal to the market to sell which is revealed by the high ratio of insider selling is not what would be expected if insiders were using inside information. Looking at overall trading activity by defense industry insiders, it does not appear that insiders are using inside information in their trading activities.

The results of this empirical investigation generally supports the semi-strong form of the efficient market hypothesis. It does not appear that insiders are using inside information prior to the public announcement of these favorable contract awards. There does not appear to be any significant insider trading in this industry from the sample studied.