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PREDICTING FRAUDULENT BEHAVIOR: AN
EXAMINATION OF CHARACTERISTICS COMMONLY
EXHIBITED BY FRAUDULENT DOD CONTRACTORS

THESIS

Dwayne P. Sellers, Captain, USAF

AFIT/GCM/LAS/96S-5

DEPARTMENT OF THE AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY

DTIC QUALITY INSPECTED 3

Wright-Patterson Air Force Base, Ohio

AFIT/GCM/LAS/96S-5

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The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

AFIT/GCM/LAS/96S-5

PREDICTING FRAUDULENT BEHAVIOR: AN EXAMINATION OF
CHARACTERISTICS COMMONLY EXHIBITED BY FRAUDULENT DOD
CONTRACTORS

THESIS

Presented to the Faculty of the School of Logistics and
Acquisition Management
of the Air Force Institute of Technology
Air University
Air Education and Training Command
In Partial Fulfillment of the
Requirements for the Graduate Degree in
Contracting Management

Dwayne P. Sellers, B.A.

Captain, USAF

September 1996

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Dwayne Sellers

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Abstract

This study examines the relationship among company size, slack, return on investment, and the frequency of fraudulent behavior. A model is proposed in which an increase in company size and a decrease in both company slack and return on investment would increase the frequency of fraudulent behavior. A test of the model showed strong support of a relationship between company size and incidents of fraudulent behavior. Additionally, the results suggest that levels of slack may contribute to the frequency of fraud. Further tests provide no support for the relationship between the decrease in return on investment and the increase in the frequency of fraudulent behavior. Overall, the results suggest that large companies with lower levels of slack are more likely to engage in fraudulent behavior. Several explanations for this pattern are explored in the study.

PREDICTING FRAUDULENT BEHAVIOR: AN EXAMPLE OF
CHARACTERISTICS COMMONLY EXHIBITED BY FRAUDULENT DOD
CONTRACTORS

I. Introduction

For nine years, Litton Systems, Inc. took advantage of Government agencies by employing questionable business practices. The numerous fraudulent pricing schemes and false statements resulted in losses to the United States Government totaling \$6.3 million. Litton had a series of prime contracts and subcontracts with the Department of Defense (DoD) to develop, produce, and market aircraft instrumentation, radar equipment, and other material hardware used in F-16, F-106, F-4, and B-52 aircraft, Cobra jet helicopters, Navy Destroyers, and other warships (DoD, Mar 88).

In *United States v. Litton Systems, Inc.*, Litton was indicted for Racketeer Influenced and Corrupt Organizations (RICO) Act violations, false statements, conspiracy, and mail fraud offenses. Litton and its senior officials were convicted on five counts of false statements, conspiracy, and RICO violations. Litton was fined \$3,020,000; it was

ordered to make restitution in the amount of \$5,785,000 and to place \$2,000,000 in escrow to repay any possible labor mischarging. Two officials received prison sentences and were ordered to pay fines, one paid \$10,000 and the other paid \$5,000 fines; another official was sentenced to five years probation and ordered to pay a \$10,000 fine. A civil settlement was reached for \$6,128,997 in damages to resolve claims of material-cost mischarging, and in 1988, Litton was suspended indefinitely from doing business with the Government. The suspension was lifted after an agreement was reached between the Government and Litton who consented to a program of cooperation with the Government (DoD, Mar 88).

This example illustrates the impact contract fraud can have on both the Government and the contractor. Large amounts of taxpayers' money are spent investigating and prosecuting fraud. Corporations lose large sums of money in fines and penalties. Individuals are sentenced to prison and fined. The impact is felt throughout the process--all the way down to the taxpayer.

Rationale for the Study

Unfortunately, contract fraud is all too common in the DoD. Recoveries through contract fraud convictions for the Defense Criminal Investigative Organizations (DCIOs) in the DoD have totaled \$786 million in FY 93, \$1.975 billion in FY 94, and \$1.156 billion in FY 95. The DCIOs are the Air Force Office of Special Investigations (AFOSI), the Naval Criminal Investigative Service (NCIS), the Defense Criminal Investigative Service (DCIS), and the Criminal Investigation Division Command (CIDC). Figure 1.1 presents total recoveries for all the investigative agencies during FY 93, FY 94, and FY 95 (Burwell, 1995). It has been estimated that between 12 and 14% of spending by the DoD on procurement can be attributed to fraud. This is approximately 15 to 21 billion dollars each year wasted on fraud (Sellers, 1996).

The effectiveness of all four investigative agencies in fraud detection can be determined by dividing the total procurement dollars spent which can be attributed to fraud by the total dollars recovered through fraud convictions. Currently, the investigative agencies are less than 7%

effective in detecting fraud. The low rate of fraud detection is a result of the reactive nature of investigations.

Recoveries (Millions)

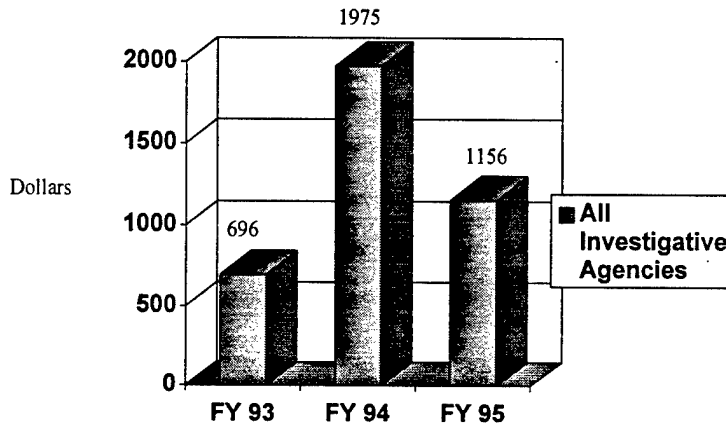


Figure 1.1
Recoveries by All Investigative Agencies

Currently, investigative agencies wait for someone outside the agency to identify and to report fraudulent activity. That agency would then react to this information and conduct an investigation. The reactive investigative procedures are a result of every investigative agency having a large volume of cases without having an established methodology for identifying a company with a high potential to commit fraud. Therefore, the best they can do at this time is react to information provided to them. The

information the investigative agencies receive can be the result of a disgruntled employee identifying fraudulent behavior, an auditor finding violations during a routine audit, or a government employee identifying false reports. Each of these incidents results in the investigative agency reacting to the situation (Sellers, 1995).

Impact of Contract Fraud

Contract fraud has a negative impact on the DoD. The four types of impact caused by contract fraud are monetary, safety, physical harm, and social. First, substantial amounts of money are lost to contract fraud. In defective pricing cases where fraud is found, the Government is paying millions of dollars more than necessary on a contract. This results in excessive billing by the contractor, and the Government pays more while receiving less (DoD, Dec 86; DoD, Jul 86; DoD, Jun 88; DoD, Jan 89). In *United States v. Greer Industries, Inc.*, Greer Industries, a subcontractor for General Dynamics, provided the U.S. Air Force with support-equipment tools to maintain and repair the F-16. During negotiations, Greer consistently misrepresented its actual costs. As a result, the U.S. Air Force unknowingly

paid between \$700,000 and \$2,000,000 in overcharges (DoD, Mar 88).

A second type of impact that contract fraud has on the DoD is decrease in safety. In a product substitution case, a corporation will use substandard material and falsely represent its product as conforming to the contract specifications. In *United States v. Lucas AUL*, the contractor falsely certified that its circuit boards to be installed in the Maverick missile conformed to the contract specifications. The circuit boards were defective, which resulted in numerous Maverick missiles being unreliable due to possible misfiring (DoD, Mar 88). In the Lucas case, there was a potential for a loss of life or essential warfighting equipment. The potential for a loss of life or degradation of the warfighting capability is an impact the DoD cannot afford.

Physical harm is a third type of impact contract fraud has on the DoD. Monetary concerns are only part of the total losses accrued from contract fraud. They do not cover the losses attributed to environmental pollution, the sale of unsafe food and drugs, and accidents as a result of

defective parts. This area is not as easily quantifiable in terms of dollars and cents, but the consequences are clearly visible. This may be why citizens tend to view physical harm as more serious than monetary losses (Meier, 1982).

Although the monetary and physical harm due to contract fraud are enormous, perhaps the criterion of harm that has been stressed most strongly by sociologists is the set of broader social consequences that result from crimes committed by persons of high social status. Because of the high status of the contract fraud offenders (corporate executives), some people have maintained that these violations create cynicism and foster the attitude that "if others are doing it, I will too." For example, tax authorities have used this interpretation of the fact that, after exposure of former President Nixon's tax deceits, false reporting of taxes increased substantially. It is held that contract fraud and white-collar crimes threaten the trust which is basic to community life (Meier, 1982).

The evidence indicates that contract fraud has a wide impact on the operational mission and financial management of the DoD. A way of reducing the impact of contract fraud

is to provide the investigative agencies a method for proactive detection of fraudulent contractors. One method of being proactive is to try to determine the conditions which foreshadow fraudulent behavior.

Modeling Technique

The first attempt to develop a model that predicts a company's likelihood to commit fraud was published in 1949 by Edwin Sutherland. After Sutherland published his model, the next significant contribution of research for developing a predictive model of fraudulent behavior was accomplished in the 1970s. At this time, several researchers developed models for evaluating a company's likelihood of committing an antitrust violation (Asch, 1975; Hay, 1974; Perez, 1978; Sonnenfeld, 1978).

In the 1980s, Clinard (1980), Vaughan (1982), Szawajkowski (1985) and Kesner (1986) developed more complex models. These models used numerous antecedents to fraudulent behavior and evaluated companies that had committed fraud in numerous areas including OSHA, antitrust, and labor violations. In the 1990s, Baucus (1991), Hill

(1992), and Daboub (1995) refined the predictive models developed in the 1970s and 1980s.

The impact of contract fraud on the DoD has been significant. Developing modeling techniques similar to those of Baucus (1991), Hill (1992), and Daboub (1995) to assess fraudulent contractors may provide an avenue to improve the investigative process, thereby reducing the impact of contract fraud on the DoD.

Investigative Questions

The main objective of this research is to develop a model that will help investigative agencies identify those companies that are most likely to commit contract fraud. This model will allow investigative agencies to be proactive and to improve their ability to detect fraud. To address this specific problem, the main objective has been broken down into three related questions.

Investigative Question 1a. **Is a company's size positively associated with fraudulent behavior?** A number of studies have suggested that company size is a useful factor for determining fraud propensity. Large company size can act as insulation against the negative effects of legal

sanctions; in addition, larger firms can afford better defense counsel. The threat of sanctions can be expected to have less of an effect on larger corporations because they can more easily absorb the costs of being penalized for their criminal activity (Baucus, 1991; Clinard, 1980; Daboub, 1995; Hill, 1992).

Investigative Question 1b. **Are companies with little organizational slack more likely to engage in fraudulent behavior?** Organizational slack is another factor believed to be an important antecedent of fraudulent behavior (Galbraith, 1973). Companies with more slack resources will have more alternatives to fraudulent behavior. For example, a company with additional capacity could increase research and development (R&D) activities to counteract a competitor's action. Without slack, increasing R&D would not be possible (Baucus, 1991). Lack of slack resources creates uncertainty, possibly leading to efforts to cut costs or to find additional resources. Additionally, the lack of slack resources provides managers with fewer strategic choices. The outcome of fewer choices when trying

to cut costs or find additional resources may lead to fraudulent behavior.

Investigative Question 1c. **Are companies with poor internal financial performance more likely to engage in fraudulent behavior?** Poor financial performance is a frequently hypothesized internal condition that pressures companies to commit contract fraud (Baucus, 1991; Clinard, 1980). Poor financial performance could pressure companies to substitute inferior materials, to ignore safety problems, to falsify reports, or to cut costs in ways that may not be legal. This relationship has been supported in a number of studies that have considered various types of violations (Clinard, 1979; Staw, 1975).

Nature of Study

This research is primarily descriptive in nature. Being able to categorize contract fraud and fraudulent behavior is expected to be useful for investigators and will be useful for future studies of this phenomenon. In this study, categorizing contract fraud and fraudulent behavior has been accomplished by identifying those fraudulent characteristics that can be scientifically validated.

Additionally, this research is prescriptive in nature. Anecdotal and archival data are used to develop a model for predicting a company's likelihood to engage in fraudulent behavior.

II. Literature Review

Overview

The purpose of this chapter is to provide a review of the applicable literature concerning the definition and classification of contract fraud and the development of predictive models for identifying fraudulent contractors.

Definition and Classification of Contract Fraud

To understand contract fraud, a review of the definition of white-collar crime is necessary. Contract fraud is a part of white-collar crime. The term white-collar crime was developed by Edwin Sutherland (Geis, 1983; Sutherland, 1983). He defined it "as a crime committed by a person of respectability and high social status in the course of his [or her] occupation." From Sutherland's definition, numerous variations were developed. Edelhertz (1970:65) has considered as white-collar crime any "illegal act or series of illegal acts committed by nonphysical means and by concealment or guile, to obtain business or personal advantages." Marshall Clinard (1980:25) has defined white-collar crime "as a concept developed to distinguish a body

of criminal acts that involve monetary offenses not ordinarily associated with criminality." Gary Green (1990:22) has provided another definition: "Any act punishable by law which is committed through opportunity created in the course of an occupation that is legal."

One DoD pamphlet defines contract fraud as "the intent to deceive the Government" (DoD, Jul 86:5). A January 1989 DoD pamphlet, "Role of the Contract Auditor in Criminal Investigations," has provided a more thorough definition of contract fraud:

Fraud is characterized by acts of guile, deceit, trickery, concealment or breach of confidence which are used to gain some unfair or dishonest advantage. The objective may be to obtain money, property or services; to avoid the payment or loss of money, property or services; or to secure business or personal advantage. Fraud may occur at any stage of the Government process and may have criminal, civil, contractual, and administrative ramifications. (p. 12)

For purposes of this research, contract fraud is defined as any criminal act intended to deceive the Government that is in violation of a federal statute, and is committed in conjunction with contract performance. This operational definition supports the research objective of identifying

characteristics of fraudulent contractors and allows a narrowing of the study's focus to DoD contractors only.

Contract fraud in the Government primarily relates to the violation of federal statutes. The federal statutes which are most commonly violated are as follows:

1. The False Statement Statute, 18 U.S.C. § 1001, provides that someone who knowingly and willfully falsifies, conceals, or covers up by any trick, scheme, or device a material fact, or makes any false, fictitious, or fraudulent statement shall be fined not more than \$10,000, or imprisoned not more than five years, or both (DoD, Jan 89; DoD, Mar 88; DoD, Dec 86; Elmer, 1993). This statute has become the most frequently charged offense in the prosecution of civilian government contractors (Elmer, 1993).

2. The False Claims Act, 18 U.S.C. § 287, provides that whoever makes or presents to any person in the service of the United States any claim upon or against the United States knowing such claim to be false shall be imprisoned not more than five years and shall be subject to a fine (DoD, Jan 89; DoD, Mar 88; DoD, Dec 86; Elmer, 1993).

3. Mail and Wire Fraud, 18 U.S.C. § 1341, penalizes any mailings or interstate wire communications that are made for the purpose of executing any scheme to defraud or obtain money by means of false pretenses, representations, or promises (Elmer, 1993).

4. The Program Fraud Civil Remedies Act of 1986 is designed to provide Executive Branch agencies with a method of prosecuting cases of false claims and false statements of under \$150,000 (DoD, Jan 89; DoD, Oct 87; Elmer, 1993).

5. The Conspiracy statute, 18 U.S.C. § 371, provides that if two or more persons conspire either to commit any offense against, or to defraud the United States and one or more of such persons do any act to effect the object of the conspiracy, each shall be fined not more than \$10,000, or imprisoned not more than five years, or both (DoD, Jan 89; Elmer, 1993).

6. The Racketeer Influenced and Corrupt Organizations (RICO) Act penalizes not just a single criminal act, but the conduct of the affairs of an enterprise through a pattern of racketeering activity (Daboub, 1995; DoD, Jan 89; Elmer, 1993).

7. The Anti-kickback Act of 1986 specifically prohibits kickbacks provided by subcontractors to prime contractors in connection with federal procurement contracts (Daboub, 1995; DoD, Jun 88; Elmer, 1993).

8. Bribery, 18 U.S.C. § 201, provides that anyone who gives anything of value to any public official with the intent to influence or induce the public official to act in violation of the lawful duty shall be fined not more than three times the monetary equivalent of the thing of value, or imprisoned for not more than fifteen years, or both (Elmer, 1993).

9. Obstruction of an Audit, 18 U.S.C. § 1516, provides that anyone with the intent to defraud the United States, or who endeavors to obstruct a federal auditor in the performance of official duties shall be fined, or imprisoned not more than five years, or both (DoD, Dec 86; Elmer, 1993).

10. Environmental laws such as the Clean Air Act, Clean Water Act, Toxic Substances Control Act, Resource Conservation and Recovery Act, and the Comprehensive

Environmental Response, Compensation and Liability Act

normally require self-monitoring and self-reporting of violations. Convictions are frequently based on one of these environmental statutes (Elmer, 1993).

These federal statutes are the most commonly violated by DoD Government contractors. Many of the companies that have been convicted of contract fraud in relation to a Government contract are part of the largest *Fortune 500* companies in the United States. Over the past 45 years, several research efforts have developed predictive models of *Fortune 500* companies committing illegal corporate acts. Past research efforts have provided the theoretical foundation for the model developed in this study.

Development of Predictive Models

The impact contract fraud has on the DoD is far-reaching. The amount of time and personnel the four DoD investigative agencies put into investigating contract fraud is enormous. Specifically, the AFOSI has 177 people authorized in support of central-systems fraud and has an annual budget of over \$2.4 million. In the last three years, the four investigative agencies have recovered over

\$4 billion (Burwell, 1995), but it has all come at a cost. Besides handling the cost of investigations, the Government incurs legal costs, lost productivity, and diminished operational capability.

Unfortunately, not all contract fraud is detected and prosecuted; therefore, many corporations are still receiving Government money illegally. On every Government contract, a large cadre of auditors, inspectors, and engineers attempts to ensure that the contractor complies with the contract terms and legal statutes. Despite their efforts, approximately between 12 and 14% spent on procurement within the DoD can be attributed to fraud (Sellers, 1995). The impact of contract fraud reaches the airmen on the flightline who use the support equipment furnished by a contractor, the pilot who flies the F-15 carrying a Maverick missile, and each taxpayer who wants the Government to spend wisely and frugally.

With the pervasive impact it has on the DoD, one would expect that extensive research has been conducted on contract fraud. Surprisingly, very little research on this phenomenon has been conducted within the DoD. The majority of the information available in the DoD is available in

pamphlets issued by the Inspector General's office. These pamphlets are filled with fictitious scenarios and contract fraud indicators, but they fail to show how or where they develop their information.

Research in the civilian sector is also limited. Edwin Sutherland carried out the first empirical study on white-collar crime. *White-collar Crime*, which was published in 1949, examined the illegal behavior of 70 of the 200 largest U.S. nonfinancial corporations (Sutherland, 1983). Since Sutherland's research in 1949, only limited follow-up research has been accomplished. Relatively few articles have appeared, and they have dealt with antitrust violations and have been rather narrow in scope (Clinard, 1980).

Most articles published have been attempts to develop characteristics of corporations committing illegal acts. In the 1970s, the emphasis was on antitrust violations. Asch (1975) had determined that firms violating antitrust laws were generally less profitable and larger, and were centered in industries of low-advertising intensity. In another article involving firms violating antitrust laws, Hay (1974) concluded that characteristics of collusive firms were most

likely to occur when numbers were small, concentration was high, and the product was homogeneous. Sonnenfeld (1978) also wrote an article supporting both Asch (1975) and Hay (1974). Perez (1978) found that profitability was not significantly related to antitrust behavior; however, he did find firm size to be positively associated with the occurrence of antitrust violations.

In the 1980s, the research trend left the antitrust arena and shifted to an evaluation of all areas of white-collar crime. Marshall Clinard (1980) was the first to delve into the other areas of white-collar crime. He evaluated firms on the *Fortune 500* list and concluded that illegal corporate behavior could be predicted by financial strain, and both firm and industry structure [manufacturing firms only]. Following Clinard, Vaughn (1982) concluded that increases in size led to decentralization, which in turn created more units in which wrongdoing could occur. Szawajkowski (1985) identified three underlying general factors-environment, structure, and choice processes-predicting illegal corporate behavior. In 1986, Kesner determined that corporate managers and executives had a

determined that corporate managers and executives had a positive impact on whether a company would engage in illegal behavior.

Reviewing the research conducted in the 1990s, Baucus (1991) determined that large firms operating in dynamic, munificent environments were the most likely to behave illegally, and firms with poor performance were not prone to commit wrongdoings. Membership in certain industries and a history of prior violations also increased the likelihood that a firm would behave illegally. Additional research was conducted by Hill (1992), who concluded that size had no impact on corporate wrongdoing. He emphatically concluded that an arms-length "management by the numbers" approach to internal control by the corporate headquarters could increase the incidence of wrongdoing. Daboub (1995) stated that top-management-team characteristics, such as length of service, functional background, formal business education, and military service could be useful for understanding under what conditions corporations would be likely to engage in illegal activity.

Chapter Summary

The literature review has provided an operational definition of contract fraud. This definition deals with a contractor's intent to deceive the Government and the violation of criminal statutes during contract performance. Additionally, several research efforts have dealt with the development of predictive models for fraudulent contractors. The results of the literature review indicated that a limited amount of research has been conducted in this area; however, several useful research efforts have been conducted in related areas and can provide a strong theoretical foundation for this study.

III. Methodology/Research Design

Overview

The purpose of this chapter is to explain the research design and methodology used in the development of the preliminary model. The first part of the chapter explains the methodology used to gather and to evaluate available data and develops operational definitions for each of the antecedents. The next part of the chapter develops the predictive model. The last part explains the economic trends within the United States which might have an impact on company performance and the data collected for each company.

Description of the Population and Sample

Data on firm and industry characteristics were obtained from several sources. First, corporation name and other information were obtained from the DoD Inspector General's *Semiannual Report to the Congress* from 1 Oct 89 to 1 Apr 95. From these reports, 310 contractors were selected. The reports are issued every 6 months and provide 25 to 65 examples of significant convictions by the DoD defense

criminal investigative agencies. From the population of 310 companies, a sample of 90 companies was randomly selected. The 90 companies were randomly assigned to 1 of 2 groups of 45 companies each. For group one, data was obtained on 29 of the 45 companies. For group two, data was obtained on 32 of the 45 companies. The first group of companies was used to test the elements of the predictive model. The second group of companies was used to validate the predictive model. Table 3.1 shows the type of fraud committed. It also shows the conviction frequency for each type of fraud.

Table 3.1. Fraud Type and Frequencies

Fraud Type	Frequency
False Statements	40 of 316 (12.66%)
Product Substitution	64 of 316 (20.25%)
Conspiracy	10 of 316 (3.16%)
False Claims	51 of 316 (16.14%)
Defective Pricing	30 of 316 (9.49%)
Undelivered Product	1 of 316 (.32%)
Cost Mischarging	32 of 316 (10.13%)
Bid Rigging	17 of 316 (5.38%)
Mail Fraud	6 of 316 (1.90%)
Health Care Fraud	8 of 316 (2.53%)

Fraud Type	Frequency
False Progress Payments	4 of 316 (1.27%)
Bribery	12 of 316 (3.80%)
Theft	4 of 316 (1.27%)
Defective Product	1 of 316 (.32%)
Environmental Crimes	11 of 316 (3.48%)
Embezzlement	1 of 316 (.32%)
Illegal Campaign Contributions	1 of 316 (.32%)
Kickbacks	13 of 316 (4.11%)
Foreign Corrupt Practices Act	1 of 316 (.32%)
Proprietary Information	1 of 316 (.32%)
Racketeering	2 of 316 (.63%)
Foreign Military Sales	1 of 316 (.32%)
Labor Mischarging	1 of 316 (.32%)
Surety Bond Fraud	2 of 316 (.63%)
Illegal Export	1 of 316 (.32%)
Perjury	1 of 316 (.32%)
Note: The numbers in this table do not add up to 310 as some of the companies were convicted of more than one type of fraud.	

Financial information on the companies was obtained from the Compact Disclosure Database (Schoch, 1996). This database contains financial and management information on over 10,000 public companies. Company data were extracted from annual and periodic reports filed with the U.S.

Securities and Exchange Commission (SEC). Additional financial and management information was obtained from *Dun's Business Rankings* (Duns & Bradstreet, 1996). Lastly, financial and management information was obtained from the SEC's EDGAR (Electronic Data Gathering Analysis and Retrieval System) database (SEC, 1996).

The types of companies included in the sample range from companies producing instruments and related products (SIC code 38) to health care management (SIC code 80). Table 3.2 shows the industry distribution of the selected cases (as indicated by 2-digit SIC code).

Table 3.2. Industries by two-digit Sic Code

SIC Code	Population Frequency	Group One Sample Frequency	Group Two Sample Frequency
10	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
13	2 of 61 (3.28%)	1 of 29 (3.45%)	1 of 32 (3.13%)
17	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
20	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
28	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
29	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
30	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
33	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)

SIC Code	Population Frequency	Group One Sample Frequency	Group Two Sample Frequency
34	2 of 61 (3.28%)	N/A	2 of 32 (6.25%)
35	5 of 61 (8.20%)	4 of 29 (13.79%)	1 of 32 (3.13%)
36	7 of 61 (11.48%)	4 of 29 (13.79%)	3 of 32 (9.38%)
37	11 of 61 (18.03%)	5 of 29 (17.24%)	6 of 32 (18.75%)
38	11 of 61 (18.03%)	5 of 29 (17.24%)	6 of 32 (18.75%)
45	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
48	2 of 61 (3.28%)	1 of 29 (3.45%)	1 of 32 (3.13%)
49	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
50	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
54	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
59	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
62	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
63	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)
72	1 of 61 (1.64%)	1 of 29 (3.45%)	N/A
73	2 of 61 (3.28%)	1 of 29 (3.45%)	1 of 32 (3.13%)
80	2 of 61 (3.28%)	N/A	2 of 32 (6.25%)
87	1 of 61 (1.64%)	N/A	1 of 32 (3.13%)

Operationalization of the Antecedents

Independent Antecedents. This study focused on a small subset of antecedents that had received the most theoretical support in the literature. The discussion focuses on three antecedents: company size, slack, and return on investment.

Company size has been measured in a number of different ways. However, the most commonly used proxies for size (sales, assets, and number of employees) have been found to be highly correlated (Kimberly, 1976). Number of employees is the most commonly used measure of company size (Hall, 1982; Kimberly, 1976). Therefore, number of employees will be used to measure company size. Number of employees for each company was obtained from the Compact Disclosure database (Schoch, 1996) or the Dun's Business Rankings (Duns & Bradstreet, 1996). The abbreviation used to represent this antecedent is **SIZE**.

Company slack was measured by subtracting the industry's quick ratio from the company's three-year average quick ratio. A company's quick ratio is the sum of cash, short-term marketable securities and receivables divided by total current liabilities. The quick ratio is a measure of liquidity and provides an indication of the excess resources available to the company (relative to other companies in the industry). Slack exists when the company's quick ratio is less than the industry average (Galbraith, 1973). A three-year average was used to counteract any increase or decrease

in a company's liquidity in the short run (Baucus, 1991). Each company's quick ratio was obtained from the Compact Disclosure database (Schoch, 1996), and the industry quick ratio (using the four-digit SIC code) was obtained from *Robert Morris Associates: Statement Studies* (Morris, 1995; Morris, 1991). As indicated by Galbraith's (1973) study, slack is a reflection of company resilience. If slack is low, the company finds it more difficult to withstand competitive pressures. As this resilience decreases, the company's vulnerability to fraudulent behavior rises. The abbreviation used to represent this antecedent is **SLACK**.

Return on investment is a reflection of the company's economic viability in its market. It indicates the degree of success or failure of a business for a specific time. This antecedent was used to test the hypothesis that poor internal financial performance will lead to contract fraud. Return on investment was measured by dividing net profit after taxes by total assets (Baucus, 1991). The data for this antecedent were obtained from the Compact Disclosure database (Schoch, 1996). The abbreviation used to represent this antecedent is **ROI**.

Dependent Antecedent. Each company in this study was convicted of contract fraud at least once in the past five years. In order to differentiate among the companies, the following scale was used to identify the total number of convictions a company had over the past five years.

- 0 - one conviction
- 1 - two to four convictions
- 2 - more than four convictions

The data for the dependent antecedent were obtained from the AFOSI database, CACTIS (Crime and Counterintelligence, Terrorism Information System) (AFOSI, 1996).

Development of the Predictive Model

Having operationalized each of the independent antecedents (size, slack, and return on investment), Figure 3.1 was developed to illustrate how these antecedents should relate (based on previous research) with the dependent variable of fraudulent behavior.

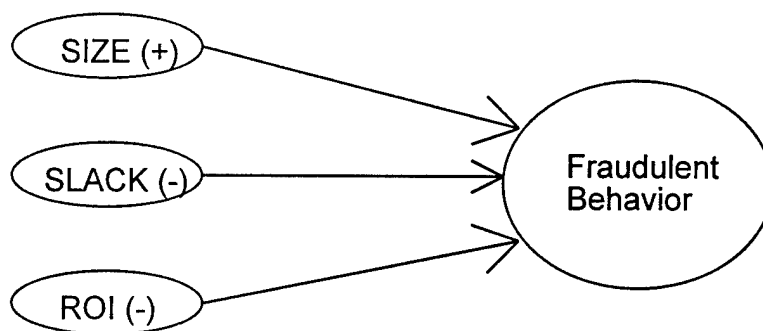


Figure 3.1. Predictive Model

Figure 3.1 depicts the following relationships:

1. The larger the size of a company, the more the likelihood of a company engaging in fraudulent behavior will increase.
2. The decrease in a company's slack will increase the likelihood of a company engaging in fraudulent behavior.
3. The decrease in a company's return on investment will increase the likelihood of a company to engage in fraudulent behavior.

However, Figure 3.1 does not indicate that any of the variables are correlated. Several past studies have shown that these variables are not correlated (Baucus, 1991; Clinard, 1980)

Sequence of Analysis

The analysis followed several deliberate steps. The first step used companies from group one. Each of the antecedents was analyzed independently and then all were analyzed together to determine if they significantly contributed to an explanation of a company's propensity to commit contract fraud. Second, based on the results of the regression analyses of group one companies, a revised model was developed. Third, another series of regression analyses was performed on the second group of companies to validate the model developed from the evaluation of the first group of companies. Lastly, the predictive model was reexamined and a final predictive model was presented.

Economic Trends

The overall economic trend over the past five years could have had an impact on each of the antecedents used in this study. Figure 3.2 shows the level of DoD spending over the past five years (DoD, 1996). DoD spending over the past five years has not fluctuated more than 10%, and it has remained constant the last four years. If the total DoD spending had decreased by a significant amount, this could

five years has not fluctuated more than 10%, and it has remained constant the last four years. If the total DoD spending had decreased by a significant amount, this could have affected the frequency of fraud because companies would have been in a more competitive environment for smaller amounts of money. However, the DoD spending amount has not fluctuated, and the environment has been relatively stable. Additionally, the economic trend is best controlled by the slack variable, which compares company performance to the industry.

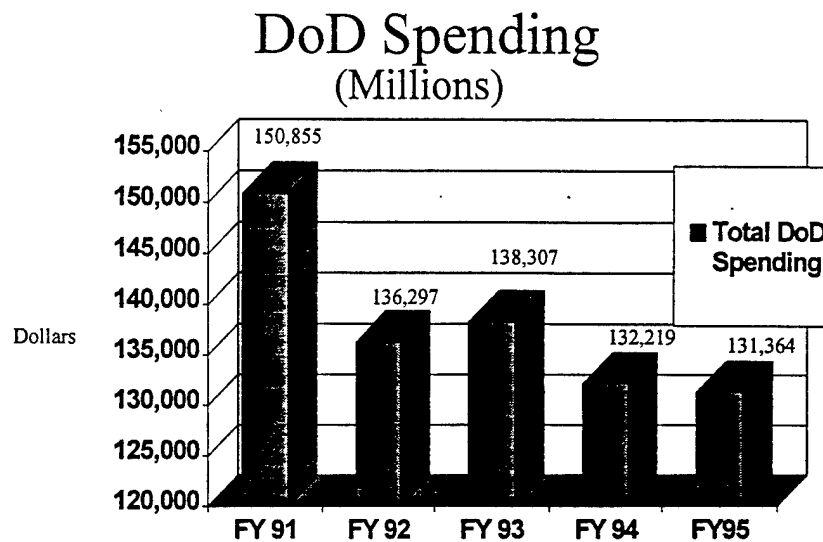


Figure 3.2. DoD Spending in Procurement over the Past Five Years

Chapter Summary

This chapter explained the research design and methodology. Initially, the chapter explained the methodology used to gather and evaluate the data. Next, the independent antecedents were operationalized and a graphical representation was used to describe the predictive model. After the model was explained, the sequence of analysis was outlined. Finally, economic trends in the United States over the last five years were described and an explanation was provided concerning how the economic trends could have an impact on the predictive model.

IV. Results

Overview

The purpose of this chapter is to provide the results of the methodology employed to test and to validate the predictive model. This chapter is separated into three parts. The first part presents an analysis of the results from group one and concludes with a modified model of predicting fraudulent behavior. The second part presents an analysis of the results from group two. The third part focuses on the results of group one and two combined and culminates in a final revision to the predictive model.

Part 1: Results of the Analysis of Group One

The model presented in Chapter III was based on the hypothesis that an increase in company size (SIZE) and a decrease in both company slack (SLACK) and return on investment (ROI) would increase fraudulent behavior. Two randomly selected groups were analyzed. Two separate analyses were conducted to test the model. The first group tested the model, and the second group validated the results

of the first group. Regression analysis was used on both groups to examine the effects of company size, slack, and return on investment on the frequency with which a company committed contract fraud. This part presents the results of group one.

Descriptive statistics for group one are listed in Table 4.1

Table 4.1. Descriptive Statistics for Group One

Antecedent	Total Number (N)	Mean	Standard Deviation	Minimum	Maximum
SIZE	29	37960	51,750	12	222,000
SLACK*	26	-.0196	.6474	-2.2	.87
ROI	26	-.2120	1.0533	-5.33	.15
* - a negative figure for SLACK is good					

The note in Table 4.1 states that a negative figure for SLACK is good. SLACK was determined by subtracting the industry's quick ratio from the company's quick ratio. A negative SLACK score indicates that the company maintains more slack than the industry average, which is good. The results of the regression analysis on group one for each antecedent are included in Table 4.2. The results of the

regression analysis for the preliminary model are found in Table 4.3.

Table 4.2. Group One Results for Testing Model for each Antecedent

Antecedent	P-value	T-value	R-squared
SIZE	.0039*	3.17	.4443
SLACK	.6556	.45	.0084
ROI	.2091	1.29	.0649
* Significant at P < .05			

Table 4.3. Group One Results for Testing Model for all the Antecedents Together

Antecedent	β -value	P-value	T-value	R-squared
SIZE	102,600	.0021*	3.48	
SLACK	.048	.8474	.19	
ROI	.133	.3935	.87	
TOTAL		.0071		.4161
* Significant at P < .05				

Of the three antecedents, only SIZE was found to be statistically significant to an explanation of fraudulent behavior. This supports a portion of the current model. The analysis of the antecedent SIZE indicates that it has a p-value of less than .004. Additionally, the analysis indicates that 44% of the variance between the observed cases can be explained by the antecedent SIZE. When all the

cases can be explained by the antecedent SIZE. When all the antecedents are evaluated together, a fairly strong relationship between SIZE and fraudulent behavior is also supported. The data indicate that neither SLACK nor ROI contributes significantly to the explanation of fraudulent behavior.

Considering the results above, a modified version of the initial model described in Chapter III was created; it is shown in Figure 4.1. This model indicates whether the hypothesized antecedent significantly contributes to fraudulent behavior. The model shows that SIZE significantly relates to fraudulent behavior, while SLACK and ROI do not appear to relate.

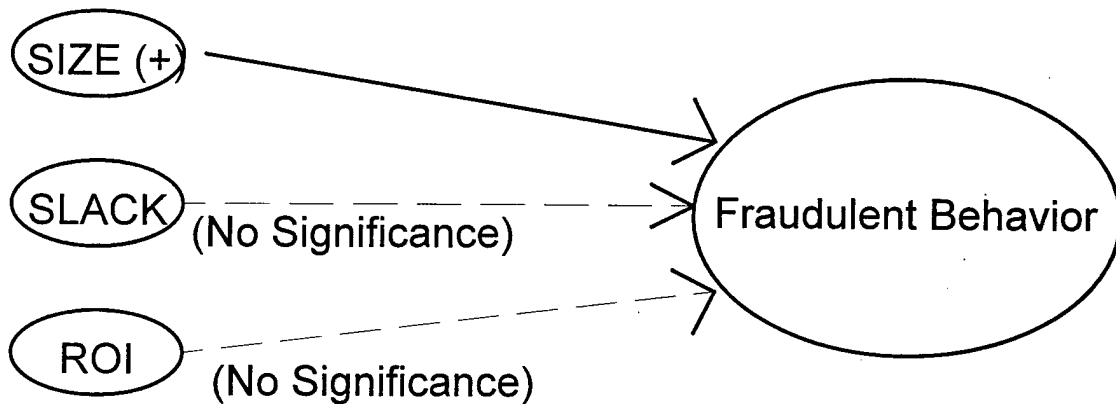


Figure 4.1. Modified Model of Fraudulent Behavior

Part II: Results of Analysis of Group Two

In part one of this chapter, a modified model of fraudulent behavior (Figure 4.1) was presented following the analysis of group one. This part of the chapter presents the results of group two and compares the results to the modified model.

The summary statistics for group two are included in Table 4.4.

Table 4.4. Descriptive Statistics for Group Two

Antecedent	Total Number (N)	Mean	Standard Deviation	Minimum	Maximum
SIZE	32	46,320	71330	6	300,000
SLACK*	28	.0496	.6837	-2.26	1.12
ROI	28	.0104	.0606	-.11	.1

* - a negative figure for slack is good

The note in Table 4.1 states that a negative figure for SLACK is good. SLACK was determined by subtracting the industry's quick ratio from the company's quick ratio. A negative SLACK score indicates that the company maintains more slack than the industry average, which is good.

The results of the regression analysis on group two for each antecedent are included in Table 4.5. The results of the regression analyses for all the antecedents are shown in Table 4.6.

Table 4.5. Group Two Results for Testing Modified Model for each Individual Antecedent

Antecedent	P-value	T-value	R-squared
SIZE	.0318*	2.25	.1445
SLACK	.0493*	2.06	.1466
ROI	.4747	.73	.0201
* Significant at P < .05			

Table 4.6. Group Two Results for Testing Modified Model for all the Antecedents Together

Antecedent	β -value	P-value	T-value	R-squared
SIZE	3,211,000	.1496	1.49	
SLACK	.512	.0464	2.1	
ROI	3.64	.1899	1.35	
TOTAL		.0502		.2731
* Significant at P < .05				

The results from group two support the hypothesis underlying the model that there is a positive relationship between size and fraudulent behavior. The analysis of the antecedent SIZE indicates that it has a p-value of less than .04. Also, the analysis indicates that 14.45% of the variance between the predicted antecedents can be explained by the antecedent SIZE.

Interestingly, the results of the second test tend to support the hypothesis for SLACK underlying the original model. The data indicate a relationship between SLACK and fraudulent behavior. The analysis of the antecedent SLACK shows that it has a p-value of less than .05. Also, the analysis indicates that 14.66% of the variance among the predicted antecedents can be explained by the antecedent SLACK.

Group two's results confirm group one's results that a relationship does not exist between ROI and fraudulent behavior.

Analyzing all three antecedents together, the results suggest that a relationship exists between SLACK and

fraudulent behavior, with 27.31% of the variance between the cases in group two explained by this variable.

Part III: Reexamination of the Model of Fraudulent Behavior

In the previous sections of this chapter, the results of the regression analysis of both test groups were presented. The results of group one culminated in a modified model of fraudulent behavior. The intention of the analysis of group two was to validate the modified model. This, in fact, did not happen. The modified model was reexamined because of group two's results.

The modified model is shown in Figure 4.2. The results of group two validated two of the previous findings:

1. A relationship exists between SIZE and fraudulent behavior.
2. A relationship does not exist between ROI and fraudulent behavior.

However, group two results indicate that there may be a relationship between SLACK and fraudulent behavior. Figure

4.2 depicts the final model derived from the results of group one and two.

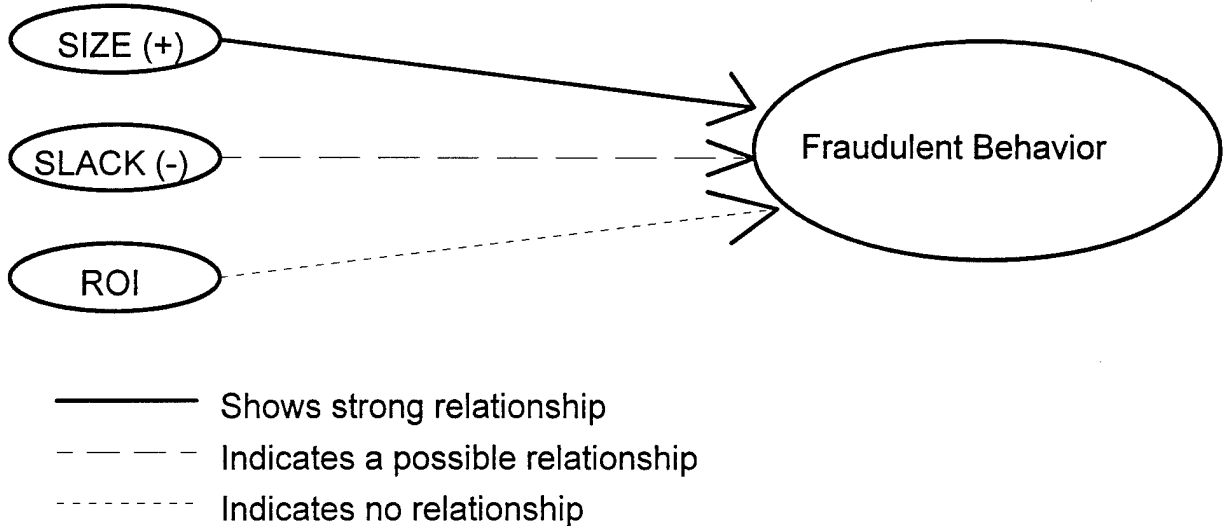


Figure 4.2. Final Model of Fraudulent Behavior

The results indicate that, as a company increases in SIZE, it is more likely that a company will engage in fraudulent behavior. It also appears, that as SLACK is reduced, and a company becomes more stressed, the company is more likely to exhibit fraudulent behavior. Finally, the model shows no indication that ROI has an impact on a company's likelihood to commit fraud.

The difference between the results of group one and group two might be explained by looking more closely at the nature of the two groups. Looking at the descriptive

statistics for each group (group one, Table 4.1; group two, Table 4.4), the mean SLACK value for group one is $-.0196$ and while for group two it is $.0496$. This shows that group two was on average well below the industry average. It also shows that group one was slightly above the industry average. It appears that group two companies were working with much less SLACK, which suggests these companies, as a whole, were much more stressed than group one. It is possible that the difference in results can be traced to a difference in the overall configuration of the two groups.

Chapter Summary

A number of different analyses were presented in this chapter. The analyses were examined and a final model of fraudulent behavior was suggested (Figure 4.2). This model showed that SIZE was positively associated, while SLACK was negatively associated with fraudulent behavior. Additionally, the results did not confirm a relationship between ROI and fraudulent behavior.

V. Summary, Conclusions, and Recommendations

Summary

The loss of taxpayer dollars is the most obvious impact of contract fraud on the DoD; however, the impact of fraud goes beyond the loss of money. The safety of military personnel is jeopardized by the rise in using substandard parts when contractors engage in fraud. Substandard parts contribute to equipment failures, which can inflict severe injury or cause loss of life. Companies that illegally pollute the environment or vend unsafe food and drugs can further harm the population. Finally, contract fraud can cause the degradation of societal values. If society sees large corporations getting away with contract fraud, this may create cynicism and eventually erode the values of society to a point where fraud is tolerated.

The impact of contract fraud is great. Unfortunately, little research has been conducted in order to specifically evaluate the conditions present when companies commit contract fraud. Almost all the research on fraudulent behavior has been conducted on *Fortune 500* companies by civilian institutions. While many of the companies that

commit contract fraud against the DoD are *Fortune 500* companies, many others are not. This research was concentrated solely on those companies that were convicted of fraud during performance on a DoD contract. While many theoretical constructs were adapted from previous research efforts, the pool of companies evaluated was unique.

The overall research objective was to develop a model that would allow investigative agencies the opportunity to identify companies with a high propensity to commit contract fraud on DoD contracts. To meet this objective and to create a model, several antecedents to contract fraud were identified and tested. Three research questions were developed to facilitate meeting the research objective. Below are the results to the questions.

IO 1a: Is a company's size positively associated with fraudulent behavior? As is consistent with previous studies (Baucus, 1991; Clinard, 1980; Daboub, 1995), this study has indicated a positive relationship between company size and fraudulent behavior. One explanation for the relationship between size and fraudulent behavior might be that larger companies tend to have less control over the individual

actions of their employees. Organizational theory has suggested that with increased organization size comes loss of control. Fraudulent behavior may be viewed as the loss of organizational control. More important, the remedy for fraud might be improved organizational control.

An alternative explanation for the relationship between size and fraudulent behavior might be seen by considering the phenomenon from the perspective of the investigative agencies. Large contractors tend to be responsible for larger and more contracts. It is possible that the fraud frequency is more a reflection of investigative attention than a definitive statement on the fraud propensity of individual companies. By investigating large contractors, fraud investigators are making the best use of their limited resources. However, they may also be sending some false signals concerning the tendency of a company to commit fraud. This study was unable to filter this potential noise, but it is reasonable to suspect that some of the relationship can be understood as a reflection of investigative attention.

IO 1b: Are companies with little company slack more likely to engage in fraudulent behavior? The results showed that there was some support for the relationship between slack and fraudulent behavior. The data from group one did not establish a relationship between the two factors, but the data from group two did establish the relationship. The antecedent SLACK attempted to capture some of the external pressure exerted on a company by the industry. The amount of slack a company held acted as a defensive measure against fluctuations and actions by competitors. The lower the slack in a company, the lower the resources a company had to react to fluctuations. Consequently, more stress is put on a company, and this increases the likelihood a company will act fraudulently. Even though one group did not show evidence of a relationship between slack and fraudulent behavior, taking a closer look at the data for both groups may provide support for the theory that the lower the slack, the higher the likelihood of fraudulent behavior. Group one had SLACK slightly above the industry average, while group two had SLACK below the industry average. Further, the difference between observations in group one (STD .45) was

less than the difference between observations in group two (STD .68), which may suggest that as the difference between cases becomes more pronounced, the influence of SLACK becomes more clear.

IO 1c: Are companies with poor internal financial performance more likely to engage in fraudulent behavior?

Contrary to the findings of several previous studies (Baucus, 1991; Clinard, 1979; Cochran, 1986; Staw, 1975), this study did not find a relationship between poor internal financial performance and fraudulent behavior. Internal performance was operationalized by developing an antecedent called return on investment (ROI). ROI was measured by dividing net profit after taxes by total assets. ROI attempted to capture the internal pressure to perform well exerted by stockholders on the company. The results of this study indicated that a relationship did not exist between ROI and fraudulent behavior. ROI, as defined in this study, might not be defined adequately enough to capture the internal pressure exerted on a company that might lead to fraudulent behavior. Consequently, it was unclear whether or not internal pressure contributes to the tendency to

commit fraud. Intuitively, one would suspect there to be a relationship, but better proxies will have to be developed before this relationship can be confirmed or rejected.

Conclusions

The results of this research indicate that both company SIZE and SLACK are related to fraudulent behavior. This information is potentially useful for investigative agencies as it might provide insight into which companies are more likely to engage in fraudulent behavior. More important, this information is valuable for auditors. An auditor has access to the data needed to compute company SIZE and SLACK. An auditor could then focus his or her attention on those companies with a higher likelihood to engage in fraudulent behavior. With their record for uncovering fraud, this lead could prove extremely valuable.

Strengths of the Study. There are several characteristics of the model which demonstrate its potential for use by investigative agencies and auditors. First, the model uses proven statistical techniques and scientific methodology to validate the antecedents. Currently, the

model and antecedents used within the DoD are supported by anecdotal evidence. This model should provide a higher level of confidence for the investigative agencies and auditors when using the antecedents.

Along with the statistical techniques, the model relies on established organizational theories. Each antecedent tested has been developed scientifically, which can also increase the confidence in the resulting data. Again, the theoretical support of the antecedents provides a higher level of confidence for the investigative agencies.

Limitations of the Study. No predictive model is without limitations. The primary limitation of the model is that only three antecedents were tested, only two of which were shown to be significant. Fraudulent behavior is very complex, and it would be very difficult to predict fraudulent behavior with only two antecedents.

Another limitation to this study is that the antecedent ROI might not have been operationalized properly. One explanation for the poor performance of ROI as a predictor is that ROI does not adequately capture the internal

pressure that possibly leads to fraudulent behavior. More research on measures of internal pressure needs to be conducted before this argument can be adequately tested.

Recommendations for Future Research

Because this study was the first attempt at developing a model to predict fraudulent behavior in DoD contractors, there are several areas for future research. A logical extension of this study would be to test additional antecedents. By adding variables, one could better capture the complexity of those conditions that lead to fraudulent behavior. Careful attention should be paid while operationalizing the antecedents, so that they will adequately reflect the pressure exerted on a company.

An important possibility for future research is to compare one group of companies that have committed contract fraud with another group of companies that have not committed such fraud. This method would be an excellent way of delineating the magnitude of the effect an antecedent has on fraudulent behavior.

Another possible area for future research would be to examine at what time during the contract's life cycle the fraud occurs, or at what time during the company's life cycle it commits the fraud. This research would attempt to isolate the time during contract performance or the time during a companies' growth that poses the highest risk for contract fraud. This could significantly add to the overall model for predicting fraudulent behavior.

A final area for future research would be to take the model developed in this research and test it on groups separated by types of contract fraud. This research would determine if different types of contract fraud had different antecedents.

As previously stated, this study has been the first attempt to develop a model for predicting fraudulent behavior of DoD contractors. The model in this study provides some key antecedents to predicting fraudulent behavior in DoD contractors. These antecedents can provide an avenue for investigative agencies and auditors to proactively identify those companies most at risk of committing contract fraud.

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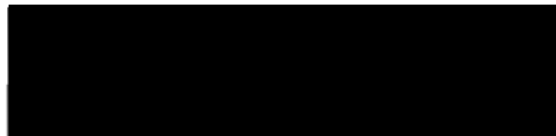
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Vita

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This study examines the relationship between company size, slack, return on investment, and the frequency of fraudulent behavior. A model is proposed in which an increase in company size and a decrease in company slack and return on investment would increase the frequency of fraudulent behavior. A test of the model showed strong support between a relationship between company size and incidents of fraudulent behavior. Additionally, the results suggest that levels of slack may contribute to the frequency of fraud. Further tests provide no support for the relationship between the decrease in return on investment and the increase in the frequency of fraudulent behavior. Overall, the results suggest that large companies with lower levels of slack are more likely to engage in fraudulent behavior. Several explanations for this pattern are explored in the study.

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