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Financial health indicators: an analysis of financial statement information to determine the financial health of DoD contractors

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NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

FINANCIAL HEALTH INDICATORS: AN ANALYSIS OF FINANCIAL STATEMENT INFORMATION TO DETERMINE THE FINANCIAL HEALTH OF DOD CONTRACTORS

December 2016

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Prior to awarding a contract, government contracting officers must be able to determine the financial health of prospective contractors. In fact, according to the Federal Acquisition Regulation (FAR) 9.104-1(a), the very first general requirement to being considered a "responsible" prospective contractor is to show "adequate financial resources to perform the contract or the ability to obtain financing."

The purpose of this research is to identify a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. This research study may help DOD contracting officers determine the financial health of potential contractors prior to awarding a contract.

The findings of this study provide a recommended framework that a contracting officer could follow in order to assess the financial health of a prospective contractor. The framework includes a ratio analysis using selected ratios compiled by this study, as well as a comparative analysis using industry average driven data. The framework also incorporates horizontal and vertical analyses, as well as bankruptcy and fraud analyses. The financial assessment framework created in this study is a comprehensive financial health assessment tool that can be utilized by DOD contracting officers.

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AN ANALYSIS OF FINANCIAL STATEMENT INFORMATION TO
DETERMINE THE FINANCIAL HEALTH OF DOD CONTRACTORS

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Submitted in partial fulfillment of the requirements for the degree of

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LIST OF ACRONYMS AND ABBREVIATIONS

AICPA	American Institute of Certified Public Accountants
CCC	Cash Conversion Cycle
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COGS	Cost of Goods Sold
COSO	Committee of Sponsoring Organizations
DOD	Department of Defense
FAR	Federal Acquisition Regulations
GAAP	Generally Accepted Accounting Principles
GMI	Gross Margin Index
LT	Long-Term
ROA	Return on Assets
ROE	Return on Equity
ROI	Return on Investment
RONA	Return on Net Assets
SEC	Securities Exchange Commission
SGA	Sales, General, and Administration
SGAI	Selling, General, and Administration Index
UPS	United Parcel Service

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I.   INTRODUCTION

A.   BACKGROUND

The Department of Defense (DOD) spends billions of American taxpayer dollars annually to support programs that are designed to increase warfighter capabilities. DOD should fulfill demands of the end user by identifying strategic gaps and capabilities. In part, this may be done by ensuring the most efficient and technologically sound equipment will reach the warfighter in order to meet the mission in support of national security. With improper business contracting practices and personal conflicts of interest rising, DOD leaders are starting to reassess how government contracting is conducted (Schwartz & Church, 2013). There has been an increase in federal investigations of government contracts in the Pacific areas of operations with the more notable scandals committed by upper Naval leadership affiliated with the Glenn Defense and Marine Scandal (Defense News, 2016). It is imperative that the DOD research and determine a method of awarding contracts to help avoid scandals. This can be done by thoroughly researching and identifying potential contractors who are deemed financially capable of conducting business with the DOD.

Prior to awarding contracts, government contracting officers must be able to determine the financial health of prospective contractors. In fact, according to the Federal Acquisition Regulation (FAR), the very first general requirement to be considered a "responsible" prospective contractor is to show "adequate financial resources to perform the contract, or the ability to obtain financing" (2016, 9.104-1(a)). The objective of this research is to place an emphasis on key financial factors that will aid DOD contracting officers in determining a prospective contractor's financial health. Financial health is just one facet of the overall broad assessment of a contractor.

The incentive to commit fraud may be high for a prospective contractor, particularly to alter financial statements to appear financially healthy and to appear to be a responsible contractor in order to be awarded a government contract (Wolfe & Hermanson, 2004). To aid the DOD, contracting offices need to employ a more

systematic approach to identify financial issues with contractors before contractors are in a position to take improper advantage of DOD programs and misuse U.S. taxpayers' dollars. Merely providing more training to contracting officers and upper leadership may not be the best answer to this contracting problem of potential fraud activities. There needs to be a more defined internal control process within the DOD, such as processes that measure the liquidity or financial health of contractors to whom DOD awards contracts. Utilizing the fraud triangle framework and other key financial ratio analysis tools, the DOD contracting officers may be able to determine if there are any early fraud indicators.

B.   PURPOSE OF RESEARCH

The purpose of this research is to identify a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. This research study may help DOD contracting officers determine the financial health of potential contractors prior to awarding a contract. This study will compile a set of up-to-date financial analysis tools, which if made available to contracting officers, could serve to complement an assessment of the financial health of prospective DOD contractors.

C.   RESEARCH QUESTIONS

The following research questions will be addressed in this research study:

1.   What financial statement ratios can be used to determine the financial health of a DOD contractor?

2.   What financial health indicators can be determined from the balance sheets, income statements, and statements of cash flows of DOD contractors?

3.   What particular financial indicators may signal red flags to a DOD contracting officer regarding a potential DOD contractor's financial health?

4.   What factors should be taken into consideration that would indicate publicly traded companies might be engaged in inappropriate behavior to appear financially healthy?

D.   METHODOLOGY

This research follows a four-step logical progression from start to finish, which will be discussed in Chapter III. The first step is to conduct a literature review focusing on the research questions posed by this study in Chapter I and addressed in Chapter II. The second step is to take the information from step one and apply it toward determining or identifying financial statement health indicators as part of a financial statement analysis which includes ratio analysis, bankruptcy analysis, and fraud analysis. The third step is to select a sample of DOD contractors from a pool of all DOD prime recipient contractors. The sample consists of publicly traded companies from various industries and contract sizes. The fourth and final step is to collect financial statement information from the sample of DOD contractors and conduct a financial analysis based on the research criteria determined from step two. The objective is to determine the appropriate financial assessment framework that can be used to assess the financial health of DOD contractors.

E.   IMPORTANCE OF RESEARCH

The importance of this research study is to provide a financial assessment framework that DOD contracting officers can use to assess the financial health of contractors prior to awarding a contract. Faced with multiple potential contractors, contracting officers may use the framework to focus on contractors with better financial ability to meet DOD requirements.

F.   ORGANIZATION OF REPORT

This research study consists of six chapters, including this introduction, which is designed to introduce the research and identify the research questions. Chapter II includes a literature review, which provides the basis for the financial analysis in Chapter V. Chapter III details the methodology used to identify the sample of DOD contractors and the analysis of their financial information. Chapter IV discusses the findings, which includes the selected ratios based on the literature review. Chapter V consists of the analysis, implications and limitations, as well as recommendations based on the analysis. Finally, Chapter VI provides a summary, conclusions, and areas for further research.

G.   SUMMARY

The DOD depends on contractors to provide a service or product in order to fulfill strategic requirements. The purpose of this research is to identify a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. This chapter proposed four research questions and provided a logical methodology to address each question. Additionally, this chapter concluded with a discussion on the importance of this research and presented a brief organization of the report. The next chapter is a literature review, which includes a background in financial reporting and financial health, a history of fraud in financial reporting, fraud triangle, financial ratio analysis using financial statements, and a description of horizontal, vertical, and multivariate analyses.

II.   LITERATURE REVIEW

A.   INTRODUCTION

This chapter provides a literature review to establish a foundational knowledge regarding a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. The importance of general financial reporting is introduced to provide an overview of financial statements, including income statements, balance sheets, statements of retained earnings, and statements of cash flows. This chapter also includes an overview of DOD contracting phases and the importance of contractor financial responsibility. Procurement fraud is also discussed. The history of fraud in financial reporting provides a foundation of ratios that can help deter fraud. This study further explains the fraud triangle applied to contractors, fraud behavior in financial reporting as it relates to ratios, and the board of directors relationship as it relates to influencing fraudulent activity within a company. This research study uses various types of financial analysis including ratio analyses and horizontal, vertical, and multivariate analyses. Within the multivariate analysis, Dr. Altman's Z-score for bankruptcy analysis and Dr. Beneish's M-score for fraud indicators are explained.

1.   Importance of General Financial Reporting

Financial reporting provides decision-makers with useful information. In financial reporting, accountants use Generally Accepted Accounting Principles (GAAP) to record the financial transaction of a company and to prepare financial statements. GAAP are rules and guidelines that govern a company's way of reporting financial data. The reports included in financial reporting are the balance sheet, income statement, statement of cash flows, and statement of retained earnings. The following sections provide basic descriptions of the major financial reporting statements in accordance with the principles of accounting.

a. Balance Sheet

The elements of the balance sheet consists of a company's assets, liabilities, and shareholders' equity (Figure 1). The purpose of the balance sheet is to provide users with a snapshot of the company's financial position.

QUARTZ CORPORATION
Balance Sheet
December 31, 20X9

Assets		Liabilities		
Cash	$192,000	Salaries payable	$ 34,000	
Accounts receivable	128,000	Accounts payable	166,000	
Inventories	120,000	Total liabilities		$200,000
Land	300,000	**Stockholders' equity**		
Building	100,000	Capital stock	$220,000	
Equipment	50,000	Retained earnings	480,000	
Other assets	10,000	Total stockholders' equity		700,000
Total assets	$900,000	Total liabilities and equity		$900,000

Figure 1. Balance Sheet Example. Source: Walther (2016).

b. Income Statement

A company states its profits and losses during a particular period on the income statement (Figure 2). An income statement, also known as profit and loss statement or earnings statement, represents the financial earnings performance of a company.

QUARTZ CORPORATION
Income Statement
For the Year Ending December 31, 20X9

Revenues		
Services to customers	$750,000	
Interest revenue	15,000	
Total revenues		$765,000
Expenses		
Salaries	$235,000	
Rent	115,000	
Other operating expenses	300,000	
Total expenses		650,000
Net income		$115,000

Figure 2. Income Statement Example. Source: Walther (2016).

c.   *Statement of Cash Flows*

All cash inflows and cash outflows of the company appear on the statement of cash flows (Figure 3). The operating, investing, and financing sections of the statement of cash flows provide information regarding the cash transactions of a company, which results in the net change of cash during a period (Averkamp, 2016).

Averkamp (2016) states that the operating section converts the items reported on the income statement from the accrual basis of accounting to the cash basis of accounting. Under the accrual basis of accounting, revenues are reported on the income statement when they are earned, and expenses are reported when they are incurred. Investing section reports any cash transaction involving the buying and selling of long-term assets and investments (Averkamp, 2016). The financing section reports any cash transactions that touch either creditors or shareholders such as dividends, long-term loans, and principal loan repayments (Averkamp, 2016).

Figure 3. Statement of Cash Flows Example. Source: Walther (2016).

d.   Statement of Retained Earnings

The statement of retained earnings is a financial statement that shows the accumulated earnings as well as dividend distributions. Averkamp (2016) describes retained earnings as ending retained earnings from the previous year plus current net income minus dividends distributed to shareholders by the company (Figure 4).

Figure 4. Statement of Retained Earnings Example. Source: Walther (2016).

### 2.	Department of Defense (DOD) Contracting Phases

The DOD contracting process can be very complicated. The following sections briefly describe the six phases of contracting used in the DOD process and how they relate to the contracting officer's responsibilities.

#### a.	Phase I – Procurement Planning

Planning and forecasting is the process identified in this phase in order to meet organizational needs. In accordance with Rendon and Rendon (2016) "this process involves determining whether to procure, how to procure, what to procure, how much to procure, and when to procure" (p. 756). Some examples of the procurement planning process activities include such things as an outsource analysis and the determination of the procurement requirement (Rendon & Rendon, 2016). The contracting officer is not involved in this phase.

#### b.	Phase II – Solicitation Planning

The contracting documents are prepared in the solicitation planning phase of the contracting process. Rendon and Rendon (2016) note that solicitation planning involves "documenting program requirements, selecting contract type and contract award strategy, and identifying potential sources of suppliers" (p. 756). The contracting officer is not involved in this phase.

#### c.	Phase III – Solicitation

In the solicitation phase, the organization is seeking potential bids from contractors in order to meet the goals of the organization. Some of the activities in this phase, which are not all inclusive, "are receiving the offeror's proposals and conducting pre-proposal conferences if needed," etc. (Rendon & Rendon, 2016, p. 757). The contracting officer is involved in this phase by preparing invitations for bids for the contract (FAR, 2016).

d. *Phase IV – Source Selection*

The source selection phase is the process of evaluating proposals to select a contractor. This process includes "reviewing technical, management and cost proposals, conducting cost/price analysis, negotiating cost, schedule and technical requirements, as well as agreeing on other contract terms and conditions" (Rendon & Rendon, 2016, p. 757). The contracting officer is responsible for reviewing all bids and making a bid award determination. The focus of this research is to develop a financial assessment framework to assist contracting officers in making a determination regarding the financial health of the prospective contractor prior to awarding the contract.

e. *Phase V - Contract Administration*

The contract administration phase is the process of meeting the contractual requirements and ensuring their performance fulfills contractual obligations. The contracting officer may delegate responsibility to the contracting administration office, which includes reviewing the compensation plan, insurance plan, post-award orientation, etc. (FAR, 2016). This phase includes making sure that the DOD contractor is monitored regarding its performance of the contract (Rendon & Rendon, 2016, p. 757).

f. *Phase VI – Contract Closeout*

The contract closeout phase is the last phase of the contracting process. This phase encompasses the completion or the termination of the contract, whichever is appropriate (Rendon & Rendon, 2016).

3. Procurement Fraud

Before introducing procurement fraud, understanding the meaning of procurement is important to defining procurement fraud. In order for a company to engage in business, it must spend a significant part its budget to procure goods and inventory. As cited in Tan (2013),

> Procurement fraud is defined as an intentional deception to negatively influence any stage of the procurement process so as to make a financial gain or cause a loss to the organization (p. 31).

The next section will give historical examples of fraud in financial reporting.

B. HISTORY OF FRAUD IN FINANCIAL REPORTING

a. *Roman Empire (A.D. 193)*

According to a CBS News article in 2011, the first example of financial fraud happened in a

> sale of the Roman Empire in 193 A.D. During unrest in the Roman Empire, the Praetorian Guard (a special army supposedly loyal to the emperor) killed the current emperor and offered the empire to the highest bidder. The winner was Julianus, who came up with a very generous price, 250 gold pieces for every member of the army, which comes out to approximately $1 billion in today's money. Unfortunately, the guards had sold something that did not belong to them, which is a classic financial fraud. The new emperor was never recognized as such and was quickly deposed. (James, 2011, p. 2)

b. *Enron*

The most well-known fraud in financial reporting is probably the Enron scandal. In 2000, Enron Corporation had annual revenue of $100 billion, and the company's stock price peaked at $90 per share (CBS News, 2006). At its height, Enron ranked seventh on the Fortune 500 company list and achieved a position as the sixth largest energy company in the world. Jeffery Skilling was appointed CEO after Ken Lay was released in August of 2001. Enron reported its first loss in a quarter in October 2001 of $618 million (CBS News 2006). Shortly after that, Enron filed for bankruptcy protection on December 2, 2001 resulting in about 5,600 losing their jobs (CBS News, 2006). In July 2004, Ken Lay pleaded not guilty to the 11 charges of fraud and making misleading statements (CBS News, 2006).

Enron is an example of financial fraud and how any company could commit fraud. This following section will discuss what the fraud triangle is and how it applies to contractors.

C. THE FRAUD TRIANGLE AND DOD POLICY

The components of fraud were first explained by Donald R. Cressey, an American criminologist. The factors that can be the reasons behind someone committing occupational fraud can be found in the fraud triangle. Pressure, opportunity, and rationalization are the three components that contribute to a person violating trust and committing fraud (Figure 5). Cressey's (1973) hypothesis is that

> trusted persons become trust violators when they conceive of themselves as having a financial problem which is non-shareable, are aware this problem can be secretly resolved by violation of the position of financial trust, and are able to apply to their own conduct in that situation verbalizations which enable them to adjust their conceptions of themselves as trusted persons with their conceptions of themselves as users of the entrusted funds or property. (p. 30)

Figure 5. Fraud Triangle. Source: Lucrum Consulting (n.d.).

Pressure. In accordance with the Association of Certified Fraud Examiners (2016), "pressure is what motivates the crime in the first place. The individual has some financial problem that he is unable to solve through legitimate means, so he begins to consider committing an illegal act, such as stealing cash or falsifying a financial statement, as a way to solve their problem" (p. 1).

Opportunity. Opportunity is defined by the Association of Certified Fraud Examiners (2016) as a "person must see some way that he can abuse his position of trust to solve his financial problem with a low perceived risk of getting caught" (p. 2). This

component is related to weak internal controls in a company. When internal controls are weak, the opportunity to commit fraud exists.

Rationalization. If a person has committed a crime for the first time, he or she generally do not consider himself or herself as a criminal. The Association of Certified Fraud Examiners (2016) states that, "The fraudsters must justify the crime to themselves in a way that makes it an acceptable or justifiable act" which is how they rationalize their actions (p. 3).

According to DOD Instruction 5505.2 (2003), Criminal Investigations of Fraud Offenses, "fraud can be defined as an intentional deception designed to deprive the United States of something of value or secure from the United States a benefit, privilege, allowance, or consideration to which he or she is not entitled" (p. 7). A list of fraud offenses, which are not all inclusive, includes, "offering payment or accepting bribes or gratuities, making false statements, submitting false claims, using false weights or measures, etc." (p. 7). The following section will discuss fraud behavior in financial reporting.

D.   FRAUD BEHAVIOR IN FINANCIAL REPORTING

Recent history reveals a trend in fraud behavior in financial reporting. A 1987 report from the National Commission on Fraudulent Financial Reporting revealed that a large majority of perpetrators of fraud originate from a company's top management (National Commission, 1987). The study also showed that while the perpetrators may use various means to commit fraud, the effect of their actions is almost always to inflate or smooth earnings or to overstate assets (National Commission, 1987). Although this report is now 29 years old, its relevance remains unchanged (Beasley, Carcello, Hermanson, & Neal 2010). Beasley et al. (2010) found that a majority of fraud cases involve top management in their use of fraudulent financial reporting. Therefore, it appears that fraud behavior originates from upper level management, and management commits fraud in financial reporting.

Various financial analyses of financial statements from publicly traded companies can provide a trail of clues to the potential fraudulent behavior of a company. According

to Wells (2001), "the balance sheet, income statement, and statement of cash flows are all interrelated" (p. 80). By performing typical auditor analytical procedures, investigators can frequently detect the indicators of financial statement fraud (Wells, 2001). For example, the well-known ZZZZ Best fraud case presents a scenario where a simple ratio analysis would have detected the fraud (Wells, 2001). According to the financial information collected, the debt to equity ratio went up 8600% from the previous year; and return on equity fell by more than 75% (Wells, 2001). This example shows how important financial analysis can be used in order to identify any significant fluctuations from year to year and to detect any potential fraud being perpetrated by people within a company (Wells, 2001).

1.   Industry Averages and Warning Signs of Fraudulent Behavior

Industry averages provide a source of information for an end user to compare against when using analytical procedures. By comparing the results of an analysis of a company's financial statements with industry averages, the end user may be alerted to potential fraudulent behavior by noting any departures from the norm (Whittington & Pany, 2012). An additional benefit to an end user in using industry averages is in determining the financial health of the company (Whittington & Pany, 2012).

One example of a source of industry averages is the Dun & Bradstreet report on industry norms and key business ratios. In the report, Dun & Bradstreet (1989) take over one million companies, break them down according to industry, and present fourteen business ratios that address solvency, efficiency, and profitability. Other examples of sources of industry averages are the Department of Commerce Financial Report, the Robert Morris Associates Annual Statement Studies, the Standard and Poor's Industry Surveys, and the Almanac of Business and Industrial Financial Ratios among others (Gibson, 1992). Reuters is an additional online source of industry averages. Industry averages may not always be reliable since some averages come from small samples providing a distorted view of the industry (Gibson, 1992). Industry averages act as a baseline. A baseline to determine the performance of a company allows for a comparison

against specific industry averages, which may warn the end user of any irregularities that may be caused by possible fraud.

Two studies sponsored by the Committee of Sponsoring Organizations of the Treadway Commission (COSO) provide a comprehensive analysis of fraudulent financial reporting (Beasley, Carcello, & Hermanson, 1999; Beasley et al., 2010). The first study encompassed a 10-year period starting from 1987 to 1997 and analyzed more than 200 companies engaged in financial statement fraud. Beasley, Carcello, and Hermanson (1999) discovered the following three key insights:

- in terms of total assets, small companies are more likely to commit fraud

- in 72% of cases, the CEO was linked to the fraud

- Audit committees and boards of the fraud companies consisted of insider board members, were weak, and held infrequent meetings

Many of the companies where fraud was detected were owned by the founder and board members (Beasley et al., 1999). The companies that were most vulnerable to fraud were experiencing financial strain or distress with net losses or barely breaking even before the fraud occurred. Most cases of fraud overlapped at least two fiscal periods. One, typical fraud issue found on fraudulent financial statement reporting involved overstatement of revenues and assets (Beasley et al., 1999). Furthermore, the status of the auditing company did not matter since over half of the sample fraud companies were audited by a Big Eight auditor (Beasley et al., 1999).

The second study encompassed a nine-year period starting from 1998 to 2007, and its findings with respect to causations were similar to the first study. However, the number of public company fraud cases in the second study increased significantly from 294 to 347 (Beasley et al., 2010). Additionally, the study highlights that in 89% of cases, the CEO and/or CFO had some level of involvement in the fraud (Beasley et al., 2010). Both reports provide significant insight into fraudulent behavior of public companies over the last two decades. Importantly, most of these fraudulent behaviors or warning signals can be gleaned from financial statement analysis.

2.   Board of Directors' Composition Influence on Fraudulent Behavior

The board of directors' composition may have significant influence on whether or not a company will engage in fraudulent activity. The American Institute of Certified Public Accountants (AICPA) maintains that management is capable of overriding controls that appear to be operating effectively in order to manipulate accounting records and prepare fraudulent financial statements (American Institute of Certified Public Accountants [AICPA], 2012). The internal control capable of monitoring the behavior of top level management is the board of directors (Fama & Jensen, 1983). Fama and Jensen (1983) argue that inside directors have little "incentive to carry out their tasks," and often cooperate with higher management bypassing an otherwise effective internal control mechanism (p. 315). If the board of directors is compromised, then nothing can limit the actions of top management. Whittington and Pany (2012) provide examples of fraud risk factors, including the opportunity for top management to commit fraud due to ineffective monitoring of management as a result of a weak board of directors or a lack of audit committee oversight.

A study on board of directors' composition, as it relates to fraud, makes some interesting claims. The empirical analysis of 75 fraud and 75 no-fraud companies found board of directors' composition to be a significant factor in financial statement fraud (Beasley, 1996). Findings reveal that the no-fraud companies have a larger proportion of outside directors in a board compared to fraud companies that have a smaller proportion (Beasley, 1996). Specifically, fraud companies have boards with 50.2% of their membership on average from outside of the company, while the no-fraud companies have boards with 64.7% of their membership on average from outside of the company (Beasley, 1996). Beasley (1996) also states that "board composition, rather than audit committee presence, is more important for reducing the likelihood of financial statement fraud" (p. 463). Company's where boards were made up of a majority of insider members, especially those in top management, and where negative pressures and incentives were evident, were most likely to commit fraud. Top management and the members of the board of directors can be found by name on the financial statements. An

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end user looking for fraudulent behavior in a company should note the board of directors' composition.

Financial analysis of a company does not always detect fraudulent behavior. Financial analysis may also provide a false positive, detecting fraud behavior when a company is in fact engaged in legitimate activities. According to Wells (2001), a company that "manipulates its earnings only once might avoid discovery altogether" (p. 83). A one-time change from one period to another could be the result of a change in policy, such as the method of recording of accounts receivable. The use of financial ratios to detect and/or predict fraudulent reporting is limited (Kaminski, Wetzel, & Guan, 2004). Kaminski et al. (2004) took a sample of "79 matched pairs of firms" where the "time period was from three years prior to the fraud year through three years post" (p. 17). Using 21 financial ratios, Kaminski et al. (2004) found 16 ratios to be significant, "only three were significant for three time periods…and five were significant during the period prior to the fraud year" (p. 24). A discriminant analysis revealed a misclassification rate for fraud companies ranging from 58% to 98% (Kaminski et al., 2004). Kaminski et al. (2004) acknowledged that some of the limitations of their study included the difficulty in selecting companies and the inability to incorporate the statement of cash flows information. Wells (2001) argued that "no one irregularity is a sign of financial statement manipulation," and that patterns over a period of time can tell a better story (p. 83). He stresses the point that fraud indicators derived from ratio analyses should be treated as indicators, not as an identifier of fraud. Further investigation into a company's financial situation may be required to address any red flags of fraudulent behavior. The next section will address the determinants of financial health of a company.

E.   FINANCIAL HEALTH DETERMINANTS

Financial health may also be referred to as financial strength. Kennedy & McMullen (1973) describe financial strength as "the ability for a company to meet the claims of creditors not only under current economic and business conditions, but also under unfavorable situations that may occur in the future" (p. 206). Understanding the

financial health of a company is critical to anyone looking to conduct business in any industry. In 2015, an article in the Entrepreneur Magazine stated, "to get an idea of the company's anticipated returns and future financial needs, ask the business owner and/or accountant to show projected financial statements for the business" (p. 1). Contracting officers may utilize key financial statements such as the balance sheets, income statements, and statement of cash flows to determine the financial health of a company (Entrepreneur Magazine, 2015). The financial health of a company can be derived from several financial data sources include inventory, accounts receivable, net income, working capital, sales activity, fixed assets, and operating environment (Kennedy & McMullen, 1973). The following section discusses these financial data sources in regards to determining the financial health of a company.

1.   Inventory

Inventory is a product of a company on hand or in transit at any given point (Oxford, 2006). Inventory consists of goods for sale for a retail company or raw materials, work in progress, and finished goods for a manufacturing company. The ability for a company to properly manage inventory is key when analyzing a company's financial health.

2.   Accounts Receivable

Accounts receivable consists of amounts owed to a company by its customers stemming from past transactions such as the sale of goods on account (Friedman, 2000). It is very important to ensure that accounts receivable are monitored thoroughly. Payments not received affects a company's current assets and may make the company dependent on unnecessary loans if the company is not able to cover day-to-day expenses.

3.   Net Income

Net income is what remains from earnings after all expenses have been deducted from sales including taxes (Braggs, 2012). Company managers and end users need to understand the contribution to net worth of the company being analyzed. If a company

has expenses that exceed revenue for extended periods, then it results in a net loss (Friedman, 2000).

4.   Working Capital

Gross working capital includes a company's cash, accounts receivables, inventory, and other current assets (Friedman, 2000). Net working capital includes all current assets minus current liabilities. A company's cash conversion cycle (CCC) includes a combination of inventory, accounts receivable, and accounts payable, which are all working capital accounts (Braggs, 2012).

5.   Sales Activity

Sales activity is described as any exchange of goods or services for consideration (Friedman, 2000). It is important to understand whether the sale of a good is from a cash or accrual basis of accounting (Friedman, 2000). Accrual basis of accounting is a method whereby revenue is earned (product or service delivered; cash not necessarily received) (Friedman, 2000). In addition, under the accrual basis of accounting, expenses are included when incurred (resources used; cash not necessarily paid). The cash basis of accounting recognizes income and expenses when cash is received and expenses are paid (Friedman, 2000).

6.   Fixed Assets

Fixed assets, such as property, plant, and equipment, are used for providing goods and services. If an analysis determines that a company is investing heavily in fixed asset, a contracting officer must understand why. Fixed assets are normally defined as items that have a life perceived to be greater than one year. Furthermore, fixed assets need to be depreciated over their useful economic life (Oxford, 2006).

7.   Operating Environment

When determining the financial health of a company it is important to understand the company's operating environment and corporate culture. Oxford (2006) states that the operating environment may be referred to as the "location strategy, which is the process

of choosing where to locate a unit producing goods or services" (p. 379). If end users are utilizing the operating environment as a financial measurement, they need to take into account their own financial strategy as well as the competitor's financial strategy (Oxford, 2006). Non-financial factors such as the political environment, economic environment, social forces, and customer base should be taken into consideration when determining the financial health of a company (Entrepreneur Media Inc., 2015). The next section discusses key financial ratios used in determining a company's financial health.

F.   FINANCIAL RATIO ANALYSIS FROM FINANCIAL STATEMENTS

This section provides key financial ratios that may assist contracting officers in making sound decisions when determining the financial health of potential DOD contractors. Data from company financial statements may be used to aid end users in determining the financial health of a company. They have many interfaces and serve different purposes for both internal and external users in determining the overall financial health of the company. Financial statements are records presented by companies to formally report the financial activates during a certain period of time (Paramasivan & Subramanian, 2009). Financial statements are designed to aid companies in quantifying performance, strength, and the liquidity of the company's financial health to end users. The next step is to utilize those financial statements to conduct a financial analysis.

1.   Financial Statement Analysis

Analyzing financial statements provide end users with the necessary data for determining the financial health of a company. For publicly traded companies, end users consider not only published financial statements, but also other indicators of the business climate that affect the company's health, including stock prices, cost of living and inflation (Lev, 1974). Table 1 shows a map for financial statement analysis. The purpose of the map is to provide different end user perspectives of financial statement analysis. According to Temte (2015), "Upon beginning the financial statement analysis, the first step for an end user is to determine the purpose of the analysis. The user may be management, investors, or creditors. It is key to identify the users upfront, so that their goals or objectives can be established" (p. 74).

Table 1.   Map of Financial Statement Analysis. Adapted from Temte (2015).

Step 1	Step 2	Step 3	Step 4	Step 5
Audience	Goals or Objectives	Sources of Information	Analytical Tools	Financial Position
Investors	Valuation	Financial statements (annual report or 10-K)	Common-size financial statements	Valuation
Creditors	Ability to pay debt	Footnotes	Ratio Analysis	Liquidity
Management	Efficiency	Management discussion	Cash flow projections	Profitability
		Other industry data		Solvency

One of the most common methods used to analyze a company's financial health is to compare historical financial statements. By focusing on trends, management and key shareholders can quickly analyze the performance of the company. Elements such as debt, gross margin, accounts receivable, cash, and revenues may show valuable trends. (Bragg, 2014). By analyzing historical data, the end user is able to compare changes in current year statements in relationship to previous years. The comparisons allow for a visual analysis of quantitative increases or decreases in value throughout that specified time period.

Prior to understanding how financial ratios define a company's financial health, it is critical that the end user fully understand and competently analyze financial statements. Understanding the accounting language may quickly aid the end users by assisting in the identification process. Having a greater knowledge and understanding of financial statements, end users may be able to correctly determine what questions to ask when certain financial statement issues arise. They can also utilize financial statements to determine the current state of the company and to conduct estimates for future investments for the company.

Lev (1974) contends that financial statement analysis includes a review of appropriate "activities that involve the examination of financial and operational information, with the intent of deriving conclusions and presenting actionable

recommendations to management" (p. 1). Financial statement information is used by decision makers for forecasting purposes and for assessing the financial health of a company (Lev, 1974). Once the end user has determined the importance of financial analysis and its understandings, the next step would be to put ratio analysis to practice.

a.   *Financial Ratio Analysis*

Ratios are used to identify specific relationships between different categories of financial data (Lev, 1974). End users may find a relationship between the denominator and numerator when analyzing ratios (Lev, 1974). Data within ratios tend to possess some form of economic, or functional relationship (Lev, 1974). Financial managers use ratios to convert financial data into useable information regarding the direction of the company (Lev, 1974). Financial ratios have many other uses to include company acquisition, company financial planning, and stock portfolio planning (Rist & Pizzica, 2015).

The facilitation of financial statement interpretation is considered to be a major objective of ratio analysis (Lev, 1974). This process is easily conducted by reducing the large number of financial statement categories into relatively small sets of ratios (Lev, 1974). The financial analysis literature usually views ratios as indicators of company deficiencies, such as poor liquidity or low profitability. Thus, if the negative function of ratios is emphasized, a favorable ratio may mean nothing, and then an unfavorable ratio may be deemed significant (Lev, 1974). Lev (1974) states that, "financial ratios are not intended to provide definite answers, but their real value is derived from the questions that arise from the analysis" (p. 34). Ratios display an outcome between a company and its economic conditions, in which, end users may utilize the results as guidelines when conducting financial analysis on a company (Lev, 1974).

According to Gates (1993), "The usefulness of ratio information is limited not by the availability of underlying numbers needed for their computation, but by the willingness of managers to put those numbers to work" (p. 6). According to Gates (1993), "Company ratios are well known for their ability to answer questions like, can the company pay its bills if things tighten up temporarily?" (Current ratio). "Is the money we

have invested in our company bringing as much return obtained from alternate investments?" (Return on net worth). "Are our inventories working hard enough?" (Inventory turnover) (p. 7). By maintaining a greater understanding on where the company stands with its current ratio, return on net worth, and inventory turnover, managers may be able to determine the financial health of the company.

Whittington and Pany (2012) describes financial ratio analysis as "involving comparisons of relationships between two or more financial statement accounts or comparisons of account balances to nonfinancial data (e.g., revenue per sales order)" (p. 152). Financial ratios may be classified by sources of data such as balance sheet ratios (Table 2), income statement ratios (Table 3), and statement of cash flow ratios (Table 4). Ratios can also be classified according to the different economic aspects of the company's operations to include short-term solvency ratios (liquidity) (Table 5), long-term solvency ratios (leverage) (Table 6), profitability ratios (return on assets) (Table 7), efficiency or activity ratios (inventory turnover) (Table 8), and commonly used ratios to determine fraud (Table 9).

b.   *Balance Sheet Ratios*

Balance sheet ratios are financial metrics that assist in the analysis of determining the relationships between different financial figures such as total liabilities versus total shareholders' equity. Balance sheet ratios include only the items found on the balance sheet (i.e., financial components of assets, liabilities, and shareholders' equity). Refer to Table 2 for commonly utilized balance sheet financial ratios (Rist & Pizzica, 2015).

Table 2.   Balance Sheet Description for Ratio Analysis.
Adapted from Gates (2012).

Financial Ratios from Balance Sheet (Common)	
Current Ratio	Current Assets / Current Liabilities
Quick Ratio	Cash + Marketable Securities + Accounts Receivables / Current Liabilities
Debt Equity Ratio	Total Debt (Short-Term and Long-Term / Total Equity
Sales To Operating Income Ratio	Operating Income / Net Sales – Investment Income

c.   *Income Statement Ratios*

The Income statement ratio is a financial ratio computed from numbers found in the profit and loss statement (Gates, 1993). Some key income statement ratios are shown in Table 3. Many of those ratios are used differently based solely on the company and its respective industry and their business models for generating profits.

Table 3.   Commonly Used Income Statement Financial Ratios.
Adapted from Rist & Pizzica (2015).

Financial Ratios from Income Statement (Common)	
Gross Margin	Gross Profit / Net Sales
Profit Margin	Net Income After Tax / Net Sales
Earnings Per Share (EPS)	Net Income After Tax / Weighted Average Number of Common Shares Outstanding
Times Interest Earned	Earnings for the Year before Interest and Income Tax / Interest Expense for the Year
Return on Stockholders' Equity	Net Income for the Year After Taxes / Average Stockholders' Equity during the Year

d.   *Statement of Cash Flows Ratios*

Cash flow ratios measure a company's ability to generate cash in regards to financing, operating, and investing activities (Braggs, 2007). The performance and financial health of a company can be determined by analyzing the company's statement of cash flows (Rist & Pizzica, 2015). Many use the term "cash is king" because cash is so vital to the health of a company (Rist & Pizzica, 2015). The statement of cash flow shows inflows and outflows of cash and cash equivalents for a company over an accounting period under various sub headings (Oxford 2006). Table 4 shows commonly utilized statement of cash flow financial ratios (Rist & Pizzica, 2015). The following section discusses financial statement ratio analysis.

Table 4.   Cash Flow Statement Financial Ratios.
Adapted from Rist & Pizzica (2015).

Financial Ratios from Cash flow Statements (Common)	
Cash Flow to debt Ratio	Operating cash flow Total debt
Dividend Payout Ratio	Annual dividend per share Earnings per share
Free Cash Flow	NOPAT - Net investment in operating capital
Operating Cash Flow	NOPAT + depreciation + amortization

G.   FINANCIAL STATEMENT RATIO CATEGORIES

The next sections provide contracting officers with information regarding ratios used to assess the financial health of a company. The four major categories of ratios consist of short-term solvency, long-term solvency, profitability, and efficiency ratios. Within these categories, there are several ratios that may assist the end user in determining the financial health of a company.

a.   *Short-Term Solvency (Liquidity) Ratios*

Short-term solvency or liquidity ratios can be described as ratios based on the degree to which a company is able to pay short-term debt obligations as they come due.

Short-term lenders such as merchandise suppliers and banks tend to believe that liquidity is a prime interest for determining a company's financial health (Lev, 1974). The two most referred to short-term solvency ratios are the current ratio and the quick ratio. Table 5 shows several commonly utilized short-term solvency or liquidity ratios (Rist & Pizzica, 2015).

Table 5.   Commonly Used Short-Term Solvency Financial Ratios. Adapted from Rist & Pizzica (2015).

Short-Term Solvency or Liquidity Ratios (Common)	
Current Ratio	Total Current Assets Total Current Liabilities
Quick Ratio	Net Income After Tax Net Sales
Cash Flow Liquidity Ratio	Cash Flow From Operating Activities Current Liabilities
Cash Flow Margin Ratio	Cash Flow From Operating Activities Net Sales

b.   *Long-Term Solvency (Leverage) Ratios*

Long-term solvency ratios are designed to identify a company's ability to meet and pay long-run financial obligations (Lev, 1974). Debt ratios measure a company's financial leverage situation in relation to equity in a company's capital structure (Friedman, 2000). As opposed to the short-term liquidity ratios, debt ratios stress the long-run financial and operating structure of the company (Rist & Pizzica, 2015). Table 6 shows the commonly utilized long-term solvency or leverage ratios (Rist & Pizzica, 2015).

Table 6.   Commonly Used Long-Term Solvency Financial Ratios.
Adapted from Rist & Pizzica (2015).

Long-Term Solvency or Leverage Ratios (Common)	
Asset to equity	Total Assets / Shareholders' Equity
Asset turnover	Sales / Assets
Cash flow to debt ratio	Operating cash Flow / Total Debt
Debt to equity	Total Liabilities / Total Equity
Equity multiplier	Total Assets / Shareholders' Equity
Interest coverage	EBIT / Interest Expense

c.   *Profitability Ratios*

Profitability ratios measure a company's performance in terms of profits generated from their business operations. In reference to the profitability ratio, Lev (1974) states that "The ratios thus yield an indicator of the firm's efficiency in using the capital committed by shareholders and lenders" (p. 13). Table 7 shows the commonly utilized profitability ratios (Rist & Pizzica, 2015).

Table 7.   Commonly Used Profitability Financial Ratios.
Adapted from Rist & Pizzica (2015).

Profitability Ratios (Common)	
Current Yield	Dividend Per Share / Price Per Share
Gross Profit Margin	Sales-Cost of Goods Sold / Sales
Break-Even Margin	Net Income / Total Assets X 100
Return on Assets (ROA)	Net Income / Total Assets
Return on Net Assets (RONA)	Net Income / Fixed Assets + Working Capital
Return on Equity (ROE)	Net Income / Shareholders' Equity
Return on Investment (ROI)	Gain from Investment-Cost of Investment / Cost of Investment

d.   *Efficiency (Turnover) Ratios*

Efficiency ratios are defined as company ratios examining or reporting the competency in the management of company resources (Gates, 1993). Efficiency ratios usually consist of sales figures and assets. In order to obtain the correct ratio, the amount of sales should be divided by the amount of assets (Lev, 1974). Efficiency ratios allow end users to view operational efficiencies when they exist (Lev, 1974). The primary goal for efficiency ratios is to determine how well the company is able to convert inventory into sales and sales into cash. Table 8 shows the commonly utilized efficiency (turnover) ratios (Rist & Pizzica, 2015). The next section consists of ratios from the four major financial ratio categories that may be used to assist end users in determining fraudulent activity in a company.

Table 8.   Commonly Used Efficiency (Turnover) Financial Ratios.
Adapted from Rist & Pizzica (2015).

Efficiency (Turnover) Ratios (Common)	
Average Daily Net Sales	Annual Net Sales / 360 Days
Average Collection Period	Average Balance of Accounts Receivable / Average Daily Net Sales
Inventory Turnover Rate	Cost of Goods Sold / Inventory
Fixed Asset Turnover	Sales Revenue / Fixed Assets
Total Asset Turnover	Sales Revenue / Total Assets
Days Sales Outstanding	Accounts Receivable / Average Sales Per Day
Days Sales in Inventory	Inventory / Average COGS Per Day
Total Expense	Total Expense / Net Sales

e.   Common Ratios Used to Detect Fraudulent Activity

According to Gee (2015), "Fraud is an act of intentional deception or dishonesty perpetrated by one or more individuals, generally for financial gain" (p. 1). The following elements must be addressed in order to prove fraud exists:

1.   The statement must be false and material.

2.   The individual must know that the statement is untrue.

3.   The intent to deceive the victim must be present.

4.   The victim relied on the statement.

5.   The victim is injured financially or otherwise.

According to Zack (2013), "use of operating ratio analysis is one of the most reliable methods of detecting financial statement fraud. These ratios are most likely to detect fraud when the fraud impacts the numerator and denominator in a proportion that differs from the normal (properly stated) ratio" (p. 217). Table 9 shows a list of ratios that may aid end users in determining fraudulent activity (Rist & Pizzica, 2015). The next

section provides end users with advantages and disadvantages of using financial ratios to determine the financial health of a company.

Table 9.   Commonly Used Financial Ratios to Detect Fraud.
Adapted from Gee (2015).

Liquidity Ratios	Current Ratio	Total Current Assets Total Current Liabilities
	Quick Acid Test	Cash + Cash Equivalents + Short-term Investments + Accounts Receivable Current Liabilities
Activity Ratios	Accounts Receivable Turnover	Annual Net Sales Average Accounts Receivable
	Inventory Turnover	Cost of Goods Sold Average Inventory
Leverage Ratios	Debt to Equity Ratio	Total Debt (Short-Term and Long-Term Total equity
	Debt to Assets	Total Debt Total Assets
Profitability Ratios	Gross Profit Margin	Net Sales-Cost of Goods Sold Net Sales
	Operating Profit Margin	Net Income before Interest and Taxes Net Sales

2.   Advantages and Disadvantages of Financial Ratios Used to Determine the Financial Health of a Company

Based on the several financial ratios covered in this chapter, contracting officers need to ensure that the appropriate financial ratios are utilized when determining the financial health of a company. Utilizing financial ratios to determine the health of a company may have both advantages and disadvantages for contracting officers. The next section covers a few of the advantages and disadvantages.

a.   Advantages of Using Financial Ratios to Determine the Financial Health of a Company

1.   Aids in simplifying the financial statements.

2.   Eases burdens of corporate managers and shareholders in comparing companies of different operating capacities with one another.

3.   Establishes a more defined method in developing trend analysis to aid in the tracking and reporting of a company's finances statements over short and long periods.

4.   Breaks out the important information in a more reliable and simple form. Allows for end users to perform rapid determinations of a company's financial status by focusing on the critical ratios in a more reasonable time without reading the financial statements in their entirety.

b.   ***Disadvantages of Using Financial Ratios to Determine the Financial Health of a Company***

1.   Establishing baselines for companies in different industries may always be a challenge based solely on different operating environments and other external regulations. These factors tend to become misleading when comparing two industries with different market structures, but operating under the same regulations.

2.   Estimating is a disadvantage as most financial accounting information is perceived based on estimations and assumptions. Since accounting standards allow the usage of different accounting policies, there could always be room for mistakes in the outcome due to ambiguity with various ratio analysis tools. Some end users may find different ratios useful while others may find the same ratios useful based on different situations. Not all ratios apply to all companies.

3.   Lacking predictions for future results is also a disadvantage, as ratio analysis tends to focus on historical information while most users are more concerned about future information.

Financial ratios are data points derived from financial statements that provide end users quick access to determining the financial health of a company. They do not always provide end users with final answers to the company's true financial health. Ratios often, identify strong and weak areas associated with a company's financial statements. Financial ratios should be viewed as the initial step to analyzing the financial health of a company since further investigations may sometimes be necessary (Lev, 1974). Developing a greater understanding of a company's financial health is critical to both managers and shareholders. The financial ratios are all tools available when end users are looking to analyze the financial health and performance of a company. The next section will discuss comparative analysis.

H.   COMPARATIVE ANALYSIS

Financial statement analysis can be an important investigative tool. Financial statement analysis involves the study of relationships and trends. According to Revsine, Collins, and Johnson (2002), "a company's financial statements are like an optical lens" (p. 173). Financial statement analysis is important because it can be used to determine the financial health, operating performance, and the financial trend of the company (Kennedy & McMullen, 1973). Financial statement analysis incorporates a judgmental process where one objective is to identify major changes in trends and relationships. These major shifts can provide an early warning signal to the success or failure of a company. This judgment process can be improved by using analytical tools (Gibson, 1992).

A starting point in financial analysis may be with comparative financial statements. Framing a reference is important to understanding the significance of that reference. Likewise, in finance, financial data is meaningless without a basis for comparison (Gibson, 1992, p. 145). For example, a dollar to a child may be worth more than a dollar to a millionaire. Comparisons provide a frame of reference. According to Kennedy & McMullen (1973), "comparative statements are useful to the analyst [end user] because they contain not only the data appearing on single statements but also information necessary to the study of financial and operating trends over a period of years" (p. 207). For example, a balance sheet shows assets, liabilities, and shareholders' equity. A comparative balance sheet arranges the data in columnar form. Each column represents a timeframe where there can be two or more periods presented. There can also be a column showing the increase or decrease in terms of dollars or percentages from the reference period (Kennedy & McMullen, 1973). Figure 6 provides an example of a comparative balance sheet. The information is arranged by columns with each column representing a reporting period. The most recent period appears first followed by the previous periods.

Exhibit 5.2(a) ▣ QUAKER OATS COMPANY

Comparative Balance Sheets

($ in millions)	1999	1998	1997	1996	1995
Assets					
Cash and cash equivalents	$ 282.9	$ 326.6	$ 84.2	$ 110.5	$ 93.2
Marketable securities	0.3	27.5	–	–	–
Trade accounts receivable—net of allowances	254.3	283.4	305.7	294.9	398.3
Inventories:					
Finished goods	186.6	189.1	172.6	181.8	203.6
Grains and raw materials	50.0	48.4	59.0	62.1	69.7
Packaging materials and supplies	29.6	23.9	24.5	31.0	33.4
Total inventories	266.2	261.4	256.1	274.9	306.7
Other current assets	193.0	216.1	487.0	209.4	281.9
Total current assets	996.7	1,115.0	1,133.0	889.7	1,080.1
Other assets	55.9	79.4	48.8	66.8	63.3
Property, plant and equipment at cost	1,851.9	1,818.8	1,913.1	1,943.3	1,946.0
Less accumulated depreciation	(745.2)	(748.6)	(748.4)	(742.6)	(778.2)
	1,106.7	1,070.2	1,164.7	1,200.7	1,167.8
Intangible assets—net of amortization	236.9	245.7	350.5	2,237.2	2,309.2
Total assets	$2,396.2	$2,510.3	$2,697.0	$4,394.4	$4,620.4
Liabilities and Owners' Equity					
Short-term debt	$ 73.3	$ 41.3	$ 61.0	$ 517.0	$ 643.4
Current portion of long-term debt	81.2	95.2	108.4	51.1	68.6
Trade accounts payable	213.6	168.4	191.3	210.2	298.4
Various accrued payables	570.2	704.2	585.0	576.4	691.3
Total current liabilities	938.3	1,009.1	945.7	1,354.7	1,701.7
Long-term debt	715.0	795.1	887.6	993.5	1,051.8
Other liabilities	523.1	533.4	615.2	797.3	769.9
Preferred stock	61.0	70.1	77.7	19.0	17.7
Common stock	840.0	840.0	840.0	840.0	840.0
Treasury stock	(1,457.4)	(1,176.0)	(898.6)	(959.8)	(998.4)
Retained earnings	776.2	438.6	229.4	1,349.7	1,237.7
Total common shareholders' equity	158.8	102.6	170.8	1,229.9	1,079.3
Total liabilities and equity	$2,396.2	$2,510.3	$2,697.0	$4,394.4	$4,620.4

Figure 6. Comparative Balance Sheet Example. Source: Revsine et al. (2002).

A disadvantage of comparative statements is that it ignores the effects of price level changes. Accounting data are recorded in such a way as to reflect a great variety of amounts due to the changing price levels from year to year, whether from inflation or general price level changes of products or services (Kennedy & McMullen, 1973). The end user should note any trends observed in comparative statements and be ready to investigate further to rule out price level changes or inflation as the cause of the observed trend (Kennedy & McMullen, 1973). For example, a company may be showing a 2% growth in revenue across several time periods. Inflation may actually be the reason for

the apparent growth and not some other driver that would correlate to the health of the company. The next section discusses horizontal analysis.

I.   HORIZONTAL ANALYSIS

Another type of analysis involves the study of trends across periods of time, commonly referred to as horizontal analysis. Horizontal analysis involves the review of a company's ratios and trends over time (Whittington & Pany, 2012). This method of analysis requires the selection of a base year, and then each item of a statement is then compared to the base year value as a percentage (Kennedy & McMullen, 1973). An example of horizontal analysis can be seen in Figure 7. In this example, the base year is 1995.

(1995 = 100%)	1999	1998	1997	1996	1995
Assets					
Cash and cash equivalents	303.9	379.9	90.3	118.6	100.0
Trade accounts receivable—net of allowances	63.8	71.2	76.8	74.0	100.0
Inventories:					
Finished goods	91.7	92.9	84.8	89.3	100.0
Grains and raw materials	71.7	69.4	84.6	89.1	100.0
Packaging materials and supplies	88.6	71.6	73.4	92.8	100.0
Total inventories	86.8	85.2	83.5	89.6	100.0
Other current assets	68.5	76.7	172.8	74.3	100.0
Total current assets	92.3	103.2	104.9	82.4	100.0
Other assets	88.3	125.4	77.1	105.5	100.0
Property, plant and equipment at cost	95.2	93.5	98.3	99.9	100.0
Less accumulated depreciation	95.8	96.2	96.2	95.4	100.0
	94.8	91.6	99.7	102.8	100.0
Intangible assets—net of amortization	10.3	10.6	15.2	96.9	100.0
Total assets	51.9	54.3	58.4	95.1	100.0

Figure 7.   Horizontal Analysis Example. Source: Revsine et al. (2002).

Horizontal analysis provides trend information, which can be used to observe growth or decline in a particular line item of a financial statement. It is important to compare trends of line items on financial statements that bear a logical relationship to one another. A trend is only relevant when compared to another related trend (Kennedy & McMullen, 1973). For example, sales and cost of goods sold are related in that when sales increases, cost of goods sold are also expected to increase. Trends are limited in

their ability to give clues, and they serve to only point the way to further analysis (Kennedy & McMullen, 1973). The next section will discuss vertical analysis.

J.   VERTICAL ANALYSIS

Another analysis method that provides a different perspective than a comparative analysis or horizontal analysis is commonly called vertical analysis or common-size statements. Instead of comparing one item across multiple periods, a comparison is made between two items on the financial statement down a reporting period. This is accomplished by selecting one item from the financial statement and dividing it by some selected total, such as total assets, total liabilities, or total sales. These comparisons expressed in percentages can be displayed over multiple periods similar to the previous analyses. An example of vertical analysis of a balance sheet is presented in Figure 8. The figure shows the information as a percentage of total assets.

(% of total assets)	1999	1998	1997	1996	1995
Assets					
Cash and cash equivalents	11.8	14.1	3.1	2.5	2.0
Trade accounts receivable—net of allowances	10.6	11.3	11.3	6.7	8.6
Inventories:					
Finished goods	7.8	7.5	6.4	4.2	4.4
Grains and raw materials	2.1	1.9	2.2	1.4	1.5
Packaging materials and supplies	1.2	1.0	0.9	0.7	0.7
Total inventories	11.1	10.4	9.5	6.3	6.6
Other current assets	8.1	8.6	18.1	4.8	6.1
Total current assets	41.6	44.4	42.0	20.3	23.3
Other assets	2.3	3.2	1.8	1.5	1.4
Property, plant and equipment at cost	77.3	72.4	70.9	44.2	42.1
Less accumulated depreciation	−31.1	−29.8	−27.7	−16.9	−16.8
	46.2	42.6	43.2	27.3	25.3
Intangible assets—net of amortization	9.9	9.8	13.0	50.9	50.0
Total assets	100.0	100.0	100.0	100.0	100.0

Figure 8.   Vertical Analysis Example. Source: Revsine et al. (2002).

Vertical analysis provides proportional information. This is valuable when studying a company's current financial health and when making comparisons between companies in the same industry (Kennedy & McMullen, 1973). Discussed in an earlier section, industry averages can be found from different sources. A problem with these

industry average reports is picking the industry that represents the company under examination as some companies operate in multiple industries (Gibson, 1992). The next section discusses some of the limitations of financial statement analysis.

K.   LIMITATIONS OF FINANCIAL STATEMENT ANALYSIS

While financial statement analysis is a useful tool, it also has some limitations. One limitation has to do with price level changes. As previously mentioned, the end user should be aware of price level changes on the relationship of items, trends, and ratios from period to period. However, there are also arguments to support that adjusting for price level changes is irrelevant to decision-makers, management, or shareholders (Hakansson, 1969; Lev, 1974). While the evidence is mixed as to the significance of price level changes and their effect on financial statements, small or large changes noted as a result of financial analysis may be due to something other than malfeasance. The end user may need to question the results as being a part of a company policy change or a price level change. This may lead to further investigation and questions for a company to answer in order to explain the variance.

Another limitation related to price level changes is inflation. The principal culprit for price level changes is inflation, or in some cases, deflation. Financial statements are presented in historical cost format and are not adjusted for inflationary effects. Many agree that not compensating for inflation may influence the results of a financial analysis (Kennedy & McMullen, 1973; Konchitchki, 2011; Gibson, 1992). Depending on the period under review, an abnormally high rate of inflation may mislead the end user as to the true financial performance of a company.

The accuracy of the data reported on a financial statement may be another limitation. Each financial analysis tool is constructed around reported data; therefore, each tool is subject to how the data is reported, who reports it, and whether it is distorted. "No tool of financial statement analysis is completely immune to distortions caused by GAAP or by management's reporting choices" (Revsine et al., 2002, p. 175). An end user should be aware of these limitations before making a final decision regarding the performance of a company.

One single method of financial statement analysis may provide a limited view into the financial health of a company. Each analysis has its own limitations. For example, vertical analysis recasts each statement as a percentage of sales, total assets, total liabilities and equity, or any category selected. This analysis provides only proportional information. Another example is that horizontal analysis recasts each statement in percentage terms using a base year number rather than sales or some other line item on a financial statement. This analysis provides trend information, which offers a clearer indication of growth and decline compared to vertical analysis statements. However, when both methods of analysis are set up over multiple time periods, it is easier to recognize significant events or changes (Revsine et al., 2002). A combination of different types of analyses used by an end user may be better than one single type of analysis. A mixture of the financial analysis tools can reveal meaningful details about the current state of the company as well as reveal any changes that might affect the future state of the company (Revsine et al., 2002). This following section discusses multivariate analysis, which includes bankruptcy ratios and fraud ratios.

L.   MULTIVARIATE ANALYSIS

Unlike the comparative analyses in the previous section, the multivariate form of analysis focuses on a few select factors or financial ratios that, when combined, can be used as a predictor of a company's behavior, sometimes multiple years in advance of the actual event occurring. Examples of multivariate analyses are bankruptcy analysis and fraud analysis, which are discussed next.

1.   Bankruptcy Analysis

In an early effort to develop a statistical method to identify company failure through the selection of financial ratios, William Beaver (1966) used 79 failed companies paired with 79 non-failed companies. The pairing design helped to eliminate the financial differences between industries. These companies spanned 38 different industries and ranged in asset-size from $0.6 million to $45 million. Financial data selected for the study encompassed five years prior to a company's failure, as well as 30 financial ratios. The study found evidence that ratio analysis can assist in predicting the failure of a company

at least five years in advance (Beaver, 1966). Beaver (1966) discovered that the ratio of annual cash flow to total debt to predict failure is the best. "In the first year before the failure the error is only 13 percent, while in the fifth the error percentage is 22" (Beaver, 1966, p. 85). Beaver's model is highly accurate in correctly predicting a company's future bankruptcy. While this is a useful ratio for predicting bankruptcy, it is dated and may require additional testing utilizing a more recent sample of companies.

According to Beaver (1966), his study may be "understating the usefulness of ratios" because it does not account for companies who detected their "illness" using financial ratios and corrected for it prior to going bankrupt (p. 101). The potential usefulness of Beaver's model resulted in further study and exploration by other experts in the field.

Dr. Edward I. Altman, a well-known expert on corporate bankruptcy, built a model expanding on Beaver's work. Altman (1968) recognized the vulnerabilities of looking at ratios from only a univariate perspective by utilizing a multiple discriminant analysis. The study selected 66 companies, 33 failed and 33 non-failed (Altman, 1968). The asset size ranged from $0.7 million to $25.9 million (Altman, 1968). The model that was eventually selected, referred to as the Altman Z-score model, was able to forecast the failure of a company up to two years prior to its bankruptcy (Altman, 1968). According to Altman (1968), the model is able to predict a bankrupt company from a non-bankrupt company with 95% accuracy. To account for changes in the financial structure of companies over time, Dr. Altman updated his model in order to maintain its level of accuracy (Altman, 2000). As a result, the adapted model draws down the number of financial ratios utilized from five to four (Altman, 2000). The four ratios are 1) working capital divided by total assets, 2) retained earnings divided by total assets, 3) net profit before interest and taxes divided by total assets, and 4) stockholder's equity divided by total liabilities (Altman, 2000). The formula and the variables (bankruptcy ratios) that describe the original and the updated Z-score model are further explained in Chapter IV.

The Z-score is an index, which is the sum of the four ratios with each ratio given a particular weight. The weights are 6.56, 3.26, 6.72, and 1.05, respectively. A Z-score less than 1.10 would indicate the company is headed toward bankruptcy, and a Z-score

greater than 2.60 would indicate the company is not headed toward bankruptcy. A Z-score between these two numbers indicates a gray area where bankruptcy could not be predicted (Gates, 1993). Altman (1968) suggests that his model can be a valuable tool to creditors. Additionally, he states that it should not be the sole means of credit assessment, but merely a cost saver by guiding the efforts of an investigation of loan applicants (Altman, 1968). The Z-score is a valuable tool for creditors as well as for DOD contracting officers.

Dr. Altman's Z-score bankruptcy model was challenged by Marc Blum (1974) who completed his own study of a bankruptcy model. He referred to his model as the Failing Company Model (Blum, 1974). Similar to Atlman, Blum (1974) used discriminant analysis to develop his model. He selected a sample of 115 failed and 115 non-failed companies, and used 12 variables that fit into three categories: liquidity, profitability, and variability (Blum, 1974). The specific variables are: "quick ratio, net quick ratio to inventory, cash flow to total liabilities, net worth at Fair Market Value to total liabilities, net worth at Book Value to total liabilities, rate of return to common Shareholders' Equity for three years, standard deviation of net income over a period, trend breaks for net income, slope for net income, and lastly standard deviation, trend breaks, and slope of quick assets to inventory" (Blum, 1974, p. 16). The major result of the Failing Company Model is that it "predicts failed companies to fail and non-failed companies not to fail with an accuracy of approximately 93 to 95 percent at the first year before failure," and maintains a high level of predictive accuracy up to five years before failure (Blum, 1974, p. 8). Blum (1974) argues that Altman's model produces "illogical" results for failure predicted after two years and that the accuracy of Altman's model decreases significantly beyond the third year before failure (p. 12). Blum (1974) asserts that his model is superior to Altman's Z-score model.

Despite Blum's assertions regarding his model versus other models, the Altman Z-score remains more popular today, and it is frequently referred to in recent literature (Altman, 2000; Gates, 1993; Beneish, Lee, & Nichols, 2013). Perhaps this is due to the simplicity of Altman's model that it retains its notoriety, or perhaps it is the fact that Altman himself is more recognized in the field of bankruptcy. Altman continues to test

his model over various sample periods. In one of his more recent studies, he describes testing his model on 120 companies that went bankrupt between 1997 and 1999 (Altman, 2000). Based on the sample, his model predicted bankruptcies accurately at 94% (Altman, 2000), an encouraging testament to the success and applicability of the Altman Z-score model from a more recent perspective.

2.   Fraud Analysis

Dr. Messod D. Beneish, a leading expert on detecting financial statement fraud, performed another study that incorporates a statistical process, but for a different purpose. This study is particularly interesting because it seeks to detect earnings manipulation or financial statement fraud. Beneish (1999) took a sample of 74 carefully selected companies found to have committed financial statement fraud. He then matched that sample to 2,332 non-fraud companies. The model tested eight variables: days' sales in receivables index; gross margin index; asset quality index; sales growth index; depreciation index; selling, general, and administrative expense index; leverage index; and total accruals to total assets. The results of the study were not surprising. He found the profile of a typical earnings manipulator to include extreme growth, deteriorating fundamentals, and aggressive accounting practices (Beneish, Lee, & Nichols, 2013). Similar to the Altman Z-score model, a weight is applied to each one of the variables and then summed up to arrive at what is called the M-score. A company with an M-score greater than -1.78 would be flagged as a potential manipulator (Beneish, 1999). In another study, the model's performance was tested by applying it to well-known fraud cases over a four-year period starting in 1998 (Beneish et al., 2013). The model predicted the fraud for 12 of the 17 companies. The popular Enron scandal was predicted by Beneish's fraud model prior to the debacle (Beneish et. al., 2013). Dr. Beneish's research regarding fraud ratios and his M-score model provide an end user with a valuable tool for predicting fraud behavior in a company. The formula and the variables (fraud ratios) that describe the M-score model are further explained and applied to three companies in Chapter IV.

M.   SUMMARY

This chapter provided a literature review to establish a foundational knowledge regarding a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. The chapter began with an overview of financial statements including income statements, balance sheets, and statements of cash flows. This chapter also included an overview of the DOD contracting process. Procurement fraud was discussed along with the history of fraud in financial reporting. The fraud triangle as it applies to contractors, fraud behavior in financial reporting, and the board of directors' relationship to fraud were discussed. This chapter also covered ratio analyses, and horizontal, vertical, and multivariate analyses. Additionally, within the multivariate analysis, Dr. Altman's Z-score for bankruptcy and Dr. Beneish's M-score for earnings manipulation were explained. The next chapter will discuss the methodology used in this research study.

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III.   METHODOLOGY

A.   INTRODUCTION

This chapter discusses the methodology used in this research study. This research includes a review of literature generated from scholarly articles and publications, federal government/agency official policy and guidance, federal government spending reports, and select Department of Defense (DOD) contractors. This research follows a four-step approach.

B.   STEPS

The first step is to conduct a literature review focusing on the research questions posed in this study. The second step is to take the information from step one and apply it toward identifying financial statement indicators as part of a financial statement analysis, to include ratio analysis, bankruptcy analysis, and fraud analysis. The third step is to select a sample of DOD contractors from a pool of all DOD prime recipient contractors (usaspending.gov, n.d.). The final step is to collect financial statement information from the sample of contractors and conduct a financial analysis based on the research from step two. The goal of the final step is two-fold. One goal is to obtain an overview of the financial health of the sample of DOD contractors. The other goal is to put theory into practice, hopefully to display the usefulness of the research to contracting officers. Ultimately, this research should provide the DOD contracting officers with appropriate financial ratios that can be used to assess the financial health of prospective DOD contractors.

C.   FRAUD BEHAVIORS

This research recognizes the need to determine the existence of financial fraud reporting by a prospective DOD contractor. The financial health of a company as determined by financial analysis of its financial statements is limited to the accurate reporting by the company under review. Therefore, it is important to assess the level of accuracy or truthfulness in reporting by that company. An extensive amount of research has been conducted regarding fraud behaviors (Beneish, Lee, & Nichols, 2013). To arrive

at what fraud behaviors may exist in financial reporting, this research will conduct a review of the literature on fraud behavior to include prospective contractor motivation to commit fraud as described in the Fraud Triangle, as well as common fraud behaviors that have been identified through prior research and reporting. As a result of this research, a compilation of the findings will be made available into a table for reference as part of the overall assessment of a company under review. The sample selection is discussed in the following section.

D.   SAMPLE SELECTION

The sample selection involves three criteria. The first criterion selects only DOD contractors that are publicly traded companies. Publicly traded companies are required to submit financial statements to the Securities Exchange Commission (SEC). The SEC makes these financial statements available to the public; therefore, acquiring the data for analysis is straightforward. Additionally, the SEC requires that the financial statements submitted by publicly traded companies comply with Generally Accepted Accounting Principles (GAAP). All analysis methods discussed in this research are designed around GAAP reporting; therefore, it is logical to choose appropriate data to fit the analysis applicable to this study.

The second criterion for sample selection is to account for the potential differences in financial performance among various industries. As an example, one may find that an automotive manufacturer has a high debt to asset ratio as an operating norm in the auto industry. This differs from an advertising company that has a very low debt to asset ratio, which is normal in the advertising industry.

The third and final criterion for sample selection is contract size. The selected companies are chosen from a list of all DOD prime recipient contractors for FY2016 obtained from usaspending.gov (n.d.). Companies are selected based on contract size according to the dollar amount awarded.

Three companies were chosen based on the sample selection criteria. The three companies were Lockheed Martin Corporation, United Parcel Service (UPS) Incorporated, and Delta Airlines Incorporated. Each company selected represents a

different industry and different contract amounts awarded. The sample size serves as an introduction to the financial assessment framework that can be used by contracting officers when determining the financial health of prospective contractors. The following section discusses the process used to analyze data.

E.   PROCESS USED TO ANALYZE DATA

A thorough financial analysis of the financial statements will be performed on each of the selected DOD contractors. Six methods of analysis are utilized on the sample of DOD contractors: ratio, comparative, horizontal, vertical, bankruptcy, and fraud analysis. The primary reason for the ratio, comparative, horizontal, and vertical analysis methods is to discover any variance or significant departure from the normal financial performance of a company. Any abnormality in the trend of the financial performance of a company could indicate a negative change in the financial health of that company or worse, a potential fraud behavior. The bankruptcy analysis provides a current and future prediction of a company's ability to remain in business. The fraud analysis also provides a current and future prediction of a company's use of fraudulent financial reporting to appear healthy. Each analysis method should provide a unique point of view into the financial health of the selected DOD contractor. A financial assessment framework is developed to assist contracting officers when determining the health of a prospective DOD contractor.

F.   SUMMARY

The methodology behind this research involves a four-step approach. The first step reviews the literature for common financial fraud reporting behaviors. The second and third steps involve selecting a sample of DOD contractors and conducting a thorough financial analysis on those companies. The final step is to collect financial statement information from the sample of contractors and conduct a financial analysis based on the research from step two. The financial analysis framework incorporates six different analysis methods to be used by a contracting officer to determine the health of a prospective contractor. The next chapter discusses the findings of this research study.

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IV. FINDINGS

A. INTRODUCTION

This chapter presents the findings of this research. The ultimate goal for this research is to provide DOD contracting officers with a system or process to adequately assess the financial health of prospective contractors. In light of that goal, this research found several useful financial analysis methods that can be combined to provide a comprehensive assessment into the financial health of a company. Each particular analysis provides a different point of view or way to determine the financial health of a company. The following analyses are discussed in detail: horizontal analysis, vertical analysis, ratio analysis, comparative analysis, bankruptcy analysis, and fraud analysis. The sample selection is discussed next.

B. SAMPLE SELECTION

The sample pool consisted of all DOD prime contract recipients of FY 2016 with information collected from usaspending.gov (n.d.). The sample pool size was comprised of 1000 contractors. A statistical analysis of the sample pool revealed the mean contractor was awarded $206.4 million; however, the standard deviation was high at $1,288.7 million resulting in a coefficient of variation of 624%. The high coefficient of variation suggests the mean contractor to be irrelevant. The median may be more relevant. The median contractor was awarded $38.5 million. The lowest paid contractor received $18.9 million, and the highest paid contractor received $31,294.7 million. The total amount collected by DOD contractors was $206,410 million in FY 2016. From the sample pool, three companies were selected based on the criteria outlined in Chapter III.

The first company is Lockheed Martin Corporation. Lockheed Martin is a publicly traded company and is the highest paid DOD contractor with $31,294.7 million awarded in FY 2016. Lockheed Martin is a global organization that employs 98,000 people (Lockheed Martin, n.d.). Lockheed Martin operates in four industries: aeronautics, missile and fire control, rotary and mission systems, and space systems (Lockheed Martin.com, n.d.).

The second company is United Parcel Service (UPS), Incorporated. UPS is a publicly traded company, and in FY 2016, the company was awarded $39.3 million. UPS ranks slightly above the median of the sample pool of DOD contractors. UPS is a worldwide package delivery company, and it employs 444,000 people (UPS, n.d.).

The third, and final, company selected is Delta Airlines, Incorporated. Delta is a publicly traded company, and it was awarded $37.0 million. Delta ranks slightly below the median of the sample pool of the DOD contractors. Delta is a global airline company that operates in the air transportation industry (Delta Airlines, n.d.). It employs 80,000 people (Delta Airlines, n.d.). The following section discusses the financial ratios selected as part of the financial assessment framework.

C. MOST COMMONLY USED RATIOS SELECTED FOR DETERMINING THE FINANCIAL HEALTH OF A COMPANY

Hundreds of financial ratios can be utilized to help assist end users in determining the strength of a financial company. The four most commonly analyzed financial health determinants utilized by corporate managers and shareholders are categorized as

- Liquidity—Short-Term
- Solvency—Long-Term (Debt Management)
- Profitability
- Efficiency

A ratio analysis covers profitability, efficiency, solvency, and liquidity ratios. Each category addresses different aspects of the financial structure of a company which together accounts for its overall financial health. Although there are many different financial ratios that can be used, this study acknowledges that resources may not be available to perform a financial ratio analysis utilizing all available financial ratios. This study suggests a financial ratio analysis approach using a select few of the most commonly used financial ratios from each category of financial health to be used as a good starting point for the contracting officer (Rist & Pizzica, 2015; Bragg, 2012; Dunn & Bradstreet, 1989; Gates, 1993; Lev, 1974). This study selected two financial ratios

from each category of ratios for a total of eight financial ratios to be used in the assessment of the financial health of a company.

a. *Liquidity—Short-Term*

Liquidity ratios, also called short-term ratios, measure whether or not a company can meet their current obligations, which is usually within 12 months (Hawkins, 1986; Rist & Pizzica, 2015). Solvency ratios may also be used to determine the direction in which the company is financially heading. End users may utilize the data obtained from financial statements to determine if a company is in financial trouble and to evaluate the company's ability to repay debt. In addition, solvency ratios help a company make financial decisions regarding debt management, company spending, and future company growth (Rist & Pizzica, 2015). The two ratios selected to be included in the financial assessment framework are the quick ratio and the current ratio. Both ratios are key financial health determinants and aid end users in determining the amount of liquid assets versus liabilities in a company at any given period. Table 10 provides the commonly utilized short-term liquidity ratios chosen for determining the financial health of a company.

b. *Common Short-Term Liquidity Ratios*

From the list of the most commonly used short-term liquidity ratios shown in Table 5 of Chapter II, this study identified two financial ratios to be used in the financial ratio analysis. As previously stated the two liquidity ratios selected are the quick ratio and the current ratio.

Quick Ratio. The Quick ratio is the quickest and easiest way to measure the liquid assets of a company. According to Rist and Pizzica (2015), the quick ratio "is used to assist in measuring the company's ability to assess cash quickly in order to support immediate demands" (p. 88). The quick ratio, sometimes referred to as the acid test ratio, is current assets minus inventory divided by current liabilities minus any current long-term debt (Rist & Pizzica, 2015). The actual values of this ratio may differ based on the industry; however, companies generally seek to maintain a quick ratio of 1.0 or greater (Rist & Pizzica, 2015). A low quick ratio indicates a company may have trouble meeting

current obligations; however, a high quick ratio indicates a company may be underutilizing its capital assets (Rist & Pizzica, 2015).

Current Ratio. The current ratio measures the ability of a company to generate cash from current assets in order to meet short-term obligations (Rist & Pizzica, 2015). The current ratio, sometimes referred to as the working capital ratio, of a company is current assets divided by current liabilities (Rist & Pizzica, 2015).

Table 10.   Common Short-Term Liquidity Ratios.
Adapted from Rist & Pizzica (2015).

Ratio	Determinants	Financial Statement	Measurement
Quick Ratio	**Cash + Marketable Securities + Accounts Receivable** **Current liabilities**	**Balance Sheet** **Balance Sheet**	**The quick ratio shows whether a company has enough short-term assets to cover its immediate liabilities without selling inventory.**
Current Ratio	**Current Assets** **Current Liabilities**	**Balance Sheet** **Balance Sheet**	**The current ratio indicates the extent to which current liabilities can be "covered" by current assets.**

c.   *Solvency—Long-Term (Debt Management)*

Long-term solvency may also be referred to as debt ratios (Rist & Pizzica, 2015). A quick look at the company's overall debt load and mix of equity can be measured through debt ratios (Rist & Pizzica, 2015). Debt ratios are also indications of the company's financial leverage situation (Rist & Pizzica, 2015). Debt ratios tend to vary based on a host of factors mostly associated with who is the analyzing. (Rist & Pizzica, 2015).

A company's ability to repay long-term debt is a critical factor in determining its financial health. It is important for companies to understand the importance of solvency. Even though companies may have adequate liquidity to pay short-term debt and appear to be financially stable, there still has to be solvency and adequate liquidity to pay long-term

debt. In some cases, a high total debt ratio may be good for shareholders, but bad for creditors of the company (Rist & Pizzica, 2015). That all depends on the shareholders views on diluting their shares or not (Rist & Pizzica, 2015). The two ratios selected to be included in the financial assessment framework are long-term debt-to-equity and debt-to-equity. Both ratios are key financial health determinants and aid end users in determining the amount of debt in comparison to equity in a company at any given period. Table 11 shows the commonly utilized long-term solvency ratios selected for determining the financial health of a company in regards to managing debt.

d.   *Common Long-Term Solvency Ratios*

From the list of most commonly used long-term solvency ratios shown in Table 6 of Chapter II, this study identified two financial ratios to be used in the financial ratio analysis. As previously stated, the two solvency ratios selected are the long-term debt-to-equity ratio and debt-to-equity ratio.

Long-Term Debt-to-Equity. Long-term debt is categorized as any debt that requires payments into the future, which will extend past one or more years (Braggs, 2007). Corporate managers and shareholders have to be consistently focused on the capital structure of their organizations. Effectively managing long-term debt is a key component to managing a financially healthy company. Rist and Pizzica (2015) states that "capitalization ratio," also known as the "capital structure ratio" "measures the debt component of a company's capital structure or how much of the company's financing is represented by long-term debt" (p. 21). Utilizing capitalization ratios allows for the end user to have a more realistic view of how the company is operating whether through increased debt or equity. Depending on the industry, capital intensive companies tend to have a higher long-term debt-to-equity ratio.

Debt-to-Equity. The debt-to-equity ratio is normally utilized to measure the leverage of a company's financial health. End users typically use this ratio to determine the riskiness of the corporate investments. Investing in companies that carry a higher debt-to-equity ratio is generally not recommended due to the interest expense associated with the investment. However, the interest expense is a deductible item, which can be

viewed as an advantage to having debt in the capital structure of a company. Braggs (2012) states, "this ratio is one of the most closely watched by creditors and investors because it reveals the extent to which company management is willing to fund its operations with debt rather than equity" (p. 114).

Table 11.   Common Long-Term Solvency Ratios.
Adapted from Rist & Pizzica (2015).

Ratio	Determinants	Financial Statement	Measurement
LT Debt-to-Equity	**Long-Term Debt** **Long-Term Debt +** **Shareholders' Equity**	**Balance Sheet** **Balance Sheet +** **Balance Sheet**	**Measures the debt component of a company's capital structure or how much of the company's financing is represented by long-term debt compared to equity**
Debt-to-equity	**Total Liabilities** **Total Equity**	**Balance Sheet** **Balance Sheet**	**Measures the extent to which company management is willing to fund its operations with debt rather than equity.**

e.   *Profitability Ratios*

Profitability ratios are sometimes referred to as being the king of all ratios. Profitability ratios are a set of specific ratios designed to give end users a complete financial picture of how the company is operating in order to make profits (Rist & Pizzica, 2015). Therefore, profitability ratios are used more often as performance measures to assist companies in determining or predicting their ability to survive in a specific market (Rist & Pizzica, 2015). The two ratios selected to be included in the financial assessment framework are return on assets and return on equity. Both ratios are key financial health determinants and aid end users in determining the return in profits compared to the investments. Table 12 shows the commonly utilized profitability ratios selected for determining the financial health of a company in regards to managing debt.

f. Common Profitability Ratios

From the list of most commonly used long-term solvency ratios shown in Table 7 of Chapter II, this study identified two financial ratios to be used in the financial ratio analysis. As previously stated, the two solvency ratios selected are the return on assets (ROA) ratio and the return on equity (ROE) ratio.

Return on Assets (ROA). Many end users tend to utilize the ROA ratio as an indicator to aid in analyzing their corporate profitability in comparison to their total assets and the ability to generate net income (Braggs, 2012). Braggs (2012) contends that the company is considered efficient when it uses the least amount of assets to create the greatest return for the company. If capital intensive, depreciation should be added to net income in the formula to measure the impact of depreciation on net income.

Return on Equity (ROE). The return on equity ratio is used by end users to aid in determining the amount of return for their investments in a company (Braggs, 2012). Rist and Pizzica (2015) state that, "ROE is the amount of net income generated as a percentage of shareholders equity. ROE measures the company's profitability by how much profit is generated with the money that shareholders have invested" (p. 91). Since the higher ROE indicates a more profitable company, there is a better chance of attracting additional investors.

Table 12.   Common Profitability Ratios. Adapted from Rist & Pizzica (2015).

Ratio	Determinants	Financial Statement	Measurement
Return on Assets	**Net Income Total Assets**	**Income Statement Balance Sheet**	**Measures how profitable a company's assets are in generating profits, that is, a ratio of 10% means that for every $1 invested in assets, $.10 net income is generated**
Return on Equity	**Net Income Shareholders' Equity**	**Income Statement Balance Sheet**	**Measures the company's profitability by how much profit is generated with the money shareholders have invested.**

g.   *Efficiency Ratios (Turnover)*

Efficiency ratios may sometimes be referred to as either turnover or performance ratios. A company's ability to generate sales and gain profits from its resources is a measurement found under the efficiency ratio (Rist & Pizzica, 2015). Generally, the higher the ratios in this category, the more efficient a company is in managing assets (Magoon, 2008). The two ratios selected to be included in the financial assessment framework are total asset turnover and inventory turnover. Both ratios are key financial health determinants and aid end users in determining the efficiency of a company in regards to investment turnover and their ability to make sales. Table 13 shows the commonly utilized efficiency ratios selected for determining the financial health of a company in regards to managing assets.

h.   *Common Efficiency Ratios*

From the list of most commonly used long-term solvency ratios shown in Table 8 of Chapter II, this study identified two financial ratios to be used in the financial ratio analysis. As previously stated, the two efficiency ratios selected are the total assets turnover ratio and inventory turnover ratio.

Total Asset Turnover. The total asset turnover ratio measures the ratio of sales of a company or other organization to its capital utilized (assets less current liabilities) (Oxford, 2006). The total asset turnover ratio is designed to allow end users to have a better understanding of how the company is performing regarding sales versus inventory. It is designed as a performance measure, which allows end users to measure all monies invested in assets. As the name implies, this ratio measures how a company using all its available assets to generate sales profits (Magoon, 2008).

Inventory Turnover. The inventory turnover measures how well a company is able to sell and replace inventory during a given time period (Rist & Pizzica, 2015). Inventory turnover is calculated by taking the cost of goods sold (COGS) for any period and dividing it by the ending inventory for the same period (Rist & Pizzica, 2015). This is one of several ratios under the broader heading of inventory ratios. Even though inventory is an asset on the balance sheet, it also consumes large amounts of cash, and

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therefore, hurts the company's overall liquidity position (Magoon, 2008). Rist and Pizzica (2015) states, "COGS can also be used here to give a more accurate number but most industry publications use sales (which are inflated by the difference between retail price and COGS)" (p. 66). The next section covers the findings associated from the horizontal analysis.

Table 13.   Efficiency (Turnover). Adapted from Rist & Pizzica (2015).

Ratio	Determinants	Financial Statement	Measurement
Total Asset Turnover	**Sales** **Total Assets**	**Income Statement** **Balance Sheet**	**Measures the sales generated per dollar of assets and are an indication of how efficient the company is in utilizing their assets to generate sales.**
Inventory Turnover	**COGS** **Inventory**	**Income Statement** **Balance Sheet**	**Measures how many times a company's inventory is sold and replaced over a given period**

D.   HORIZONTAL ANALYSIS

Horizontal analysis is a useful method to look at financial data presented in financial statements. It involves the horizontal comparison between a period and a base period, which is usually presented as a percentage of the base period. The main benefit of conducting a horizontal analysis is the ability to observe trends (Revsine et al., 2002). Contracting officers can quickly conduct a horizontal analysis of a company's financial statements over multiple periods. They are able to observe both positive and negative trends that might provide a financial picture of the company's current and future financial health.

A horizontal analysis using financial statements was completed on each company selected in this research. An example of the findings is presented in Table 14. Five years of financial statement data was collected for each company. The base year selected is the earliest. In the example provided, this is December 31, 2011. This calculation works as long as values do not swap from negative to positive or vice-versa across the periods. In

those cases, the results of the analysis may be confusing showing a decrease in levels when the actual values recorded for the line item shows increased levels. Careful attention must be made to these occasions in order to apply the proper interpretation of the results. The base year should always be 100% because one would be comparing the base year to the base year. The far left column lists the appropriate financial statement and certain select line items from each statement. A data point that shows as less than 100% would indicate a decline from the base year, and a data point that shows as greater than 100% would indicate an increase from the base year. A complete presentation of all the analysis conducted on all three companies selected by this study is shown in the Appendix, and the results of the analysis are discussed in Chapter V.

Table 14.   Example Horizontal Analysis of Lockheed Martin Corp.

Lockheed Martin Corp Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	115%	87%	95%	98%	100%
Total assets	130%	98%	95%	102%	100%
Total current liabilities	116%	92%	92%	100%	100%
Long-term debt, net	221%	95%	95%	95%	100%
Total liabilities	125%	91%	85%	105%	100%
Retained earnings	119%	125%	119%	111%	100%
Total stockholders' equity	309%	340%	491%	4%	100%
Total liabilities and stockholders' equity	130%	98%	95%	102%	100%
Consolidated Statements of Earnings - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total net sales	99%	98%	98%	101%	100%
Total cost of sales	96%	94%	96%	101%	100%
Earnings from continuing operations before income taxes	138%	145%	114%	112%	100%
Income tax expense	147%	171%	125%	138%	100%
Net earnings from continuing operations	135%	136%	111%	103%	100%
Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	120%	91%	107%	37%	100%
Net cash used for investing activities	1235%	219%	142%	149%	100%
Net cash provided by (used for) financing activities	-199%	155%	126%	96%	100%

E.   VERTICAL ANALYSIS

Vertical analysis offers a different viewpoint in the analysis of financial statements compared to horizontal analysis. Vertical analysis can be very useful when studying a company's current financial health and when making comparisons between companies in the same industry (Kennedy & McMullen, 1973). The benefit is that if a

contracting officer has multiple contractors bidding for a contract, the contracting officer would be able to conduct a side-by-side comparison of the financial health of each potential contractor. Vertical analysis involves the comparison of select items from the financial statements to some stated total vertically down a period. This is different from horizontal analysis, which is a comparison across periods horizontally. Vertical analysis reveals how one financial aspect of the company is affecting the other. For example, if revenues rise in a company, one would expect cost of goods sold to rise by the same proportion. This is another analysis method that is capable of pointing out changes in a company's financial position or health. A contracting officer should use both horizontal and vertical analysis methods in conjunction to capture all aspects of a company's financial health.

A vertical analysis using financial statements was completed on each company selected in this research. An example of the findings is presented in Table 15. Five years of financial statement data was collected for each company. Balance sheet line items are compared against total assets. It does not matter if total assets or total liabilities and shareholders' equity are selected as the basis for comparison since both line items in the balance sheet equal each other. Based on that fact, total assets and total liabilities and shareholders' equity will always be shown as 100%. For the income statement, total sales or revenues are used as the basis for comparison. For the statement of cash flows, total sales or revenues taken from the income statement are also used as the basis for comparison (Revsine et al., 2002). This shows cash flow line items as a percentage of total sales or revenues (Revsine et al., 2002). The far left column lists the appropriate financial statement and certain select line items from each financial statement. All data points represent a percentage of the basis selected for comparison, total assets for example. The calculations are computed by taking a line item from the financial statement and dividing it by the basis selected for comparison. A complete presentation of the analysis of all three companies selected in this study is in the Appendix, and the results of the analysis are discussed in Chapter V. The next section discusses bankruptcy analysis.

Table 15.   Example Vertical Analysis of Lockheed Martin Corp.

Lockheed Martin Corp Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	33%	33%	37%	36%	37%
Total assets	100%	100%	100%	100%	100%
Total current liabilities	29%	30%	31%	31%	32%
Long-term debt, net	29%	17%	17%	16%	17%
Total liabilities	94%	91%	86%	100%	97%
Retained earnings	29%	40%	39%	34%	31%
Total stockholders' equity	6%	9%	14%	0%	3%
Total liabilities and stockholders' equity	100%	100%	100%	100%	100%
Consolidated Statements of Earnings - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total net sales	100%	100%	100%	100%	100%
Total cost of sales	89%	88%	91%	91%	92%
Earnings from continuing operations before income taxes	11%	12%	9%	9%	8%
Income tax expense	-3%	-4%	-3%	-3%	-2%
Net earnings from continuing operations	8%	8%	7%	6%	6%
Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	11%	8%	10%	3%	9%
Net cash used for investing activities	-21%	-4%	-2%	-2%	-2%
Net cash provided by (used for) financing activities	9%	-7%	-6%	-4%	-5%

F.   BANKRUPTCY ANALYSIS

A company's financial health is based on its ability to fund its activities; therefore, predicting a company's bankruptcy should be part of a contracting officer's assessment of the financial health of a company. This study selected Dr. Altman's Z-score model to serve as the bankruptcy analysis. The Z-score model has the ability to predict a company's bankruptcy up to two years in advance with a type I accuracy of 94% and a type II accuracy of 97% (Altman, 1968). Type I and Type II are statistical terms referring to a null hypothesis. A Type I error can be explained simply as the Z-score model incorrectly predicts a company's bankruptcy when in fact the company does not go bankrupt 6% of the time, and a Type II error is when the Z-score model incorrectly predicts a healthy company when in fact it does go bankrupt 3% of the time. The high predicting accuracy of the Z-score model cannot be ignored.

The Dr. Altman's original Z-score model incorporates five variables. It is important to note that all of the variables used in the Z-score model are computed using information obtained from financial statements. Financial statements are easily obtained from company websites as publicly traded companies are required by law to release these statements to the

public; therefore, obtaining the required information to complete the calculations is relatively easy. The model is represented by a formula shown in Figure 9. The "Z" identified is the summation of five variables, often called the Z-score. The Z-score describes three scenarios. If the Z-score is greater than 2.99, this indicates that the company is not bankrupt or likely to go bankrupt. If the Z-score is below 1.81, this indicates that the company is bankrupt or likely to be bankrupt in the future. For Z-scores between 2.99 and 1.81, this represents a gray area where the company could go either way (Altman, 1968).

$$\text{(I)} \quad Z = .012X_1 + .014X_2 + .033X_3 + .006X_4 + .999X_5$$
$$\text{where } X_1 = \text{Working capital/Total assets}$$
$$X_2 = \text{Retained Earnings/Total assets}$$
$$X_3 = \text{Earnings before interest and taxes/Total assets}$$
$$X_4 = \text{Market value equity/Book value of total debt}$$
$$X_5 = \text{Sales/Total assets}$$
$$Z = \text{Overall Index}$$

Figure 9. Original Z-Score Formula for Bankruptcy Detection.
Source: Altman (1968).

Each variable of the Z-score formula is weighted differently. All the variables, except for the fifth variable, are expressed as percentages. This is not intuitively obvious from looking at the formula shown in Figure 9. For example, to calculate the first variable, one must take working capital and divide by total assets. This results in a ratio not a percentage. The ratio must be multiplied by 100 in order to convert it to a percentage; however, there is a better way to calculate each variable without converting to a percentage. A slight adjustment to the formula results in a simplified version. The simplified version of the original Z-score model is shown in Figure 10. Notice the changes in the model. For example, .012 is replaced with 1.2, which is made possible by multiplying .012 by 100 to adjust for the percentage. The last variable is not changed, but rounded to 1 for simplicity.

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5.$$

Figure 10. Simplified Z-Score Formula for Bankruptcy Detection.
Source: Altman (2000).

All the variables in the formula are explained in Figure 9. The information comes directly from the financial statements. Some items require additional calculation such as working capital. Working capital is found by taking total current assets and subtracting total current liabilities (Altman, 2000). Earnings before interest and taxes are the sum of net profit before taxes and interest expense. Market value equity is equal to stockholders' equity, and book value of total debt is equal to total liabilities. Finally, sales are sometimes referred to as revenue on an income statement. Table 16 shows where to find the information embedded in the financial statements.

Table 16.   Financial Statement Reference for Z-Score Bankruptcy Model.

Item	Financial Statement
Total Current Assets	Balance Sheet
Total Current Liabilities	Balance Sheet
Total Assets	Balance Sheet
Retained Earnings	Balance Sheet
Net Profit Before Taxes	Income Statement
Interest Expense	Income Statement
Stockholders' Equity	Balance Sheet
Total Liabilities	Balance Sheet
Sales (or Revenue)	Income Statement

By applying the simplified Z-score formula, a Z-score is obtained for each of the three companies selected in this study. A summary of the findings is presented in Table 17. The left column presents the name of each company. The subsequent columns going from left to right represent the last five periods observed with the most recent period presented first. The Z-score is displayed for each company under each period. The color coding is explained in the legend. A Z-score below 1.81 indicates a bankrupt or potentially bankrupt company, highlighted in red; a score above 2.99 indicates a non-bankrupt company, highlighted in green; and a score between 1.81 and 2.99 represents a gray area where the company could be bankrupt or not bankrupt, highlighted in yellow.

Table 17.   Original Z-Score Summary of Selected Companies.

	Z-score				
	2015	**2014**	**2013**	**2012**	**2011**
Delta Airlines, Inc	1.403961	0.888347	1.086653	0.588013	0.527648
Lockheed Martin Corp	1.80458	2.394589	2.381181	2.132662	2.09283
UPS	2.524895	2.460794	2.779766	2.102481	2.875445

🟥	Bankrupt/Future Bankruptcy
🟨	Gray area
🟩	Not Bankrupt/Healthy Future

Since the original Z-Score model was developed in the late 60s, coupled with the need to prove its applicability to a more current company environment, Altman updated the Z-Score model by eliminating one variable and changing the coefficients; therefore, the updated Z-score model is selected. The resulting accuracy for Type I has dropped slightly from 94% to 91%; and for Type II, the accuracy level remained the same at 97% (Altman, 2000). The new model is described with a "Z," and shown in Table 18. Note how the new model went from five variables to four, as well as the values of the coefficients applied to the variables. The variables remain the same except for the elimination of the fifth variable; therefore, one can reference the description of each variable from the original Z-score model discussed previously.

(verbal equation)

$$\text{BANKRUPTCY MODEL} = 6.56 \times \frac{\text{Working Capital}}{\text{Total Assets}} + 3.26 \times \frac{\text{Retained Earnings}}{\text{Total Assets}} + 6.72 \times \frac{\text{Net Profit Before Taxes} + \text{Interest Expense}}{\text{Total Assets}} + 1.05 \times \frac{\text{Stock-holder Equity}}{\text{Total Liabilities}}$$

(acronymic equation)

$$\text{BANKMODEL} = 6.56 * (\text{CURRASSET} - \text{CURRLIAB}) / \text{TOTASSET} + 3.26 * \text{RTDEARN} / \text{TOTASSET} + 6.72 * (\text{NETPROFBEFTAX} + \text{INTEREXP}) / \text{TOTASSET} + 1.05 * \text{STOCKHOLDEQ} / (\text{CURRLIAB} + \text{LONGTERMLIAB})$$

(symbolic equation)

$$R48 = 6.56 * (S5 - S10) / S8 + 3.26 * S13 / S8 + 6.72 * (S29 + S22) / S8 + 1.05 * S14 / (S10 + S11)$$

Figure 11. New Z"-Score Formula for Bankruptcy Detection.
Source: Gates (1993).

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By applying the new Z"-score formula, a Z"-score is calculated for each of the three companies selected in this study (Figure 11). A summary of the findings is presented in Table 18. Similar to Table 17, the left column presents the name of each company. The subsequent columns going from left to right represent the last five periods observed with the most recent period presented first. The Z"-score is displayed for each company under each period. With the new model comes a new set of cutoffs. A Z"-score below 1.1 indicates a bankrupt or potentially bankrupt company, highlighted in red; a score above 2.6 indicates a non-bankrupt company, highlighted in green; and a score between 1.1 and 2.6 represents a gray area where the company could be bankrupt or non-bankrupt, highlighted in yellow. The analysis of both the original Z and new Z"-Score findings will be discussed later in Chapter V. The following section discusses fraud analysis.

Table 18.   New Z"-Score Summary of Selected Companies.

	Z"-score				
	2015	2014	2013	2012	2011
Delta Airlines, Inc	0.657412	-0.30633	0.360757	-1.00058	-1.11354
Lockheed Martin Corp	2.048994	2.651932	2.68135	2.178091	2.10133
UPS	2.361441	2.02169	3.294961	2.268323	3.498681

(red)	Bankrupt/Future Bankruptcy
(yellow)	Gray area
(green)	Not Bankrupt/Healthy Future

G.   FRAUD ANALYSIS

Can financial health be exaggerated by a company? Certainly prospective contractors are aware of the need to appear financially healthy, which poses a problem to contracting officers. The ability of contracting officers to assess a company's financial health using the financial statements released by that company creates an interesting dilemma. If a company is altering financial data to appear financially healthy, then the results of the analysis of financial data by the contracting officer cannot be trusted. Financial analysis would be rendered worthless. However, thanks to Dr. Beneish's M-score model, there is one possible solution. This model is a fraud behavior detector,

which specifically detects possible fraud behavior as it relates to the manipulation of financial data. A recent test of the model revealed its accuracy. The study selected a sample of 17 high profile fraud cases. The model identified 12 out of the 17 companies at least a year before the fraud was discovered (Beneish et al., 2013). Although far from perfect, this model could help a contracting officer as part of an initial assessment of the health of a prospective contractor.

The M-score is the summation of eight fraud ratios. The M-score formula is shown in Figure 12, and the fraud ratios are explained in Figure 13. Most of the elements used to calculate each ratio are explained in Figure 13; however, some elements need further explanation. For instance, SGA stands for Sales, General, and Administrative expense. Leverage can be found by adding long-term debt with current liabilities, and then dividing the result by total assets. Additionally the subscript t and t-1 indicate values from the current period and the previous period.

$$
\begin{aligned}
M\text{-score} = {} & -4.84 + 0.920(\text{DSR}) + 0.528(\text{GMI}) \\
& + 0.404(\text{AQI}) + 0.892(\text{SGI}) \\
& + 0.115(\text{DEPI}) - 0.172(\text{SGAI}) \\
& + 4.679(\text{Accruals}) - 0.327(\text{LEVI}).
\end{aligned}
$$

Figure 12. M-Score Formula for Fraud Detection. Source: Beneish et al. (2013).

Exhibit A1. Description of Variables and Rationale for Inclusion

Variable	Description (numbers in brackets are Compustat codes)	Rationale
DSR	$(\text{Receivables}_t\ [2]/\text{Sales}_t\ [12])/(\text{Receivables}_{t-1}/\text{Sales}_{t-1})$	Captures distortions in receivables that can result from revenue inflation
GMI	$\text{Gross margin}_{t-1}/\text{Gross margin}_t$, where Gross margin = $1 - \text{Costs of goods sold}\ [8]/\text{Sales}$	Deteriorating margins predispose companies to manipulate earnings
AQI	$[1 - (\text{PPE} + \text{CA}_t)/\text{TA}_t]/[1 - (\text{PPE}_{t-1} + \text{CA}_{t-1})/\text{TA}_{t-1}]$, where PPE is net [8], CA is current assets [4], and TA is total assets [6]	Captures distortions in other assets that can result from excessive expenditure capitalization
SGI	$\text{Sales}_t\ [12]/\text{Sales}_{t-1}$	Managing the perception of continuing growth and capital needs predisposes growth companies to manipulate sales and earnings
DEPI	$\text{Depreciation rate}_{t-1}/\text{Depreciation rate}_t$, where Depreciation rate equals Depreciation $[14–65]/(\text{Depreciation} + \text{PPE}\ [8])$	Captures declining depreciation rates as a form of earnings manipulation
SGAI	$(\text{SGA}_t\ [189]/\text{Sales}_t\ [12])/(\text{SGA}_{t-1}/\text{Sales}_{t-1})$	Decreasing administrative and marketing efficiency (larger fixed SGA expenses) predisposes companies to manipulate earnings
Accruals[a]	$(\text{Income before extraordinary items}\ [18] - \text{Cash from operations}\ [308])/\text{Total assets}_t\ [6]$	Captures where accounting profits are not supported by cash profits
LEVI	$\text{Leverage}_t/\text{Leverage}_{t-1}$, where Leverage is calculated as debt to assets: $(5 + 9)/6$	Increasing leverage tightens debt constraints and predisposes companies to manipulate earnings

Figure 13. M-Score Fraud Ratios Explained. Source: Beneish et al. (2013).

All information can be collected from the financial statements of each respective company. Table 19 shows where to find the information embedded in the financial statements.

Table 19.   Financial Statement Reference for M-Score Fraud Model.

Item	Financial Statement
Receivables	Balance Sheet
Sales (or Revenue)	Income Statement
Cost of Goods Sold (or Cost of Services)	Income Statement
Property, Plant, and Equipment, net	Balance Sheet
Total Current Assets	Balance Sheet
Total Assets	Balance Sheet
Depreciation	Balance Sheet
SG&A	Income Statement
Income Before Extraordinary Items	Income Statement
Cash From Operations	Statement of Cash Flows
Total Current Liabilities	Balance Sheet
Long-Term Debt	Balance Sheet

By applying the M-score formula, an M-score is found for each of the three selected companies. A summary of the findings is presented in Table 20. An M-score of less than -1.78 indicates no fraud, highlighted in green, and an M-score of greater than -1.78 indicates possible fraud, highlighted in red.

Table 20.   M-Score Summary of Selected Companies.

	M-Score			
	2015	2014	2013	2012
Delta Airlines, Inc	-3.12402	-1.96383	-1.89121	-2.41462
Lockheed Martin Corp	-2.15299	-2.27395	-2.66921	-2.09038
UPS	-2.76026	-2.30402	-3.06655	-1.192

	No Fraud
	Fraud

The analysis of the findings is discussed in Chapter V. The following section discusses board composition in relation to fraud.

H.   BOARD COMPOSITION

Board composition analysis utilizes a fraud prediction model derived from non-financial information; however, the source of the information is found in financial statements. Beasley conducted two studies, one in 1997 and one in 2010, which cover a period from 1987 to 2007. For the first study, 72% of the reported fraud cases investigated linked the CEO/CFO with the fraud, and for the second study, 89% of the cases observed CEO/CFO links to fraud (Beasley et al, 1997; Beasley et al., 2010). Beasley (1996) found that boards with 50.2% or less of their membership composed of outside directors committed fraud, and that boards with 64.7% or more of their membership composed of outside directors did not commit fraud. Just as fraud can be predicted using the statistical relationship between fraud companies and the M-score, so can predicting fraud using the statistical relationship between fraud companies and board composition. Since the evidence regarding top management and board composition is so

compelling, it is obvious that board composition should be incorporated into determining the financial health of a company.

The composition of the board of directors is found in the annual report, or Form 10-K, published by each of the publically traded companies. Additionally, each publically traded company usually maintains an investor relations website where corporate governance and board of director descriptions are made available. A summary of board composition findings for each of the companies selected for this research is found in Table 21. The term "insider" represents those board members that are employed by the company, and the term "outsider" represents those board members who have no employment ties with the company. The percentage outsider is computed by taking the number of outside board members and dividing by the total number of board members. If the board composition is less than 50.2%, then the percentage outsider is highlighted in red. If the board composition is more than 64.7%, then the percentage outsider is highlighted in green.

Table 21.   Summary of Board Composition.

Company	Inside	Outside	Total	% Outsider
Delta Airlines	5	14	19	74%
Lockheed Martin	1	11	12	92%
UPS	1	10	11	91%

I.   SUMMARY

A contracting officer has many financial tools available to use during the assessment of the financial health of a company. The assessment process begins with selecting the company and retrieving all the relevant financial statements. This research selected three companies that represent differing industries of contractors in the DOD. This research selected the most recent five-year period to analyze each company. However, a contracting officer could also go back to the period when the company first went public. This research incorporates the most commonly used financial ratios,

horizontal and vertical analysis, bankruptcy prediction, and fraud prediction to use as indicators of the financial health of the sample companies. A contracting officer can incorporate the same assessment process to arrive at some conclusion regarding the financial health of a prospective contractor. In the next chapter, the findings from this chapter are used to conduct an analysis on the three selected companies.

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V. ANALYSIS AND RECOMMENDATIONS BASED ON ANALYSIS

A. INTRODUCTION

The analysis in this chapter represents what process a contracting officer might follow to make a determination of the financial health of a prospective contractor. This chapter consists of three identical analyses of three different DOD contractors, which include UPS, Delta Airlines, and Lockheed Martin. The analysis of each company involves a compilation of five analyses that were selected in Chapter IV to arrive at an assessment into the health of a prospective contractor. The first analysis is a financial ratio analysis using selected ratios from Chapter IV. Embedded within the financial ratio analysis is a comparative analysis using industry averages. Peer averages were calculated using Mergent Online data. Peer averages are similar to industry averages; therefore, industry average is used throughout. The second and third analyses are a horizontal analysis and a vertical analysis, respectively. The fourth analysis is a bankruptcy analysis, and the fifth analysis is a fraud analysis. A discussion of the implications and limitations of this study as well as a discussion on recommendations based on the analysis are also presented.

B. UPS'S FINANCIAL ANALYSIS

As previously stated, this financial analysis of UPS encompasses five different analyses. The first financial analysis will be a ratio and comparative analysis. The second and third analyses will be a horizontal analysis and a vertical analysis. The fourth analysis will be a bankruptcy analysis, and the fifth analysis will be a fraud analysis.

1. Ratio Analysis

The ratio analysis completed on the UPS financial statements is presented in this section. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. The key financial components of this ratio analysis are broken down into four major ratio categories: Liquidity, Solvency, Profitability, and Efficiency. Each category is further broken down,

and the analysis is focused on two specific ratios in each category selected from the list of financial ratios discussed in Chapter II. In addition to the ratios selected for determining the UPS financial health, further analysis compares the UPS ratio averages to the industry averages. It is very important to note that company financial health cannot be determined based solely on the analysis of only one specific category of ratios.

a.   Liquidity Ratios

The first step to determining the financial health of UPS is to focus heavily on that company's core financial statements. In this particular case, it was important to look at the liquidity of the company first. The liquidity or short-term ratio analysis completed on UPS's financial statements is presented in Table 22. All analysis shown in Table 22 are compared to the industry averages. Short-term liquidity focuses on UPS's ability to raise cash from all its available resources.

Table 22.   Analysis of UPS's Financial Statements.
Adapted from Mergent Online (n.d.).

Liquidity Ratios	10/31/2015	10/31/2014	10/31/2013	10/31/2012	12/31/2011
Quick Ratio	1.11	1.15	1.65	1.67	1.62
Industry Avg.	**1.35**	**1.44**	**1.62**	**1.77**	**1.79**
Current Ratio	1.23	1.37	1.88	1.86	1.89
Industry Avg.	**1.35**	**1.36**	**1.69**	**1.54**	**1.51**

The quick ratio is analyzed first. The analysis included conducting a 5-year trend analysis of UPS's financial statements and comparing current assets to current liabilities, which are both found on the company's balance sheet. UPS's ability to access cash quickly in order to support immediate demands showed a positive increase of 3% from 2011 to 2012. Even though the financial records show a positive increase, it is hard to justify that the health of UPS is stable by just looking at this ratio. Figure 14 shows that UPS's quick ratio for 2011 is approximately 10.5% below the industry average. As noted in Table 22, UPS has a continuous decrease in its quick ratios throughout the next four years. Although the company has been able to sustain a ratio greater than the generally

accepted ratio of 1.0, it would be beneficial for any contracting officer to perform more research regarding the steady decrease prior to approving future contracts.
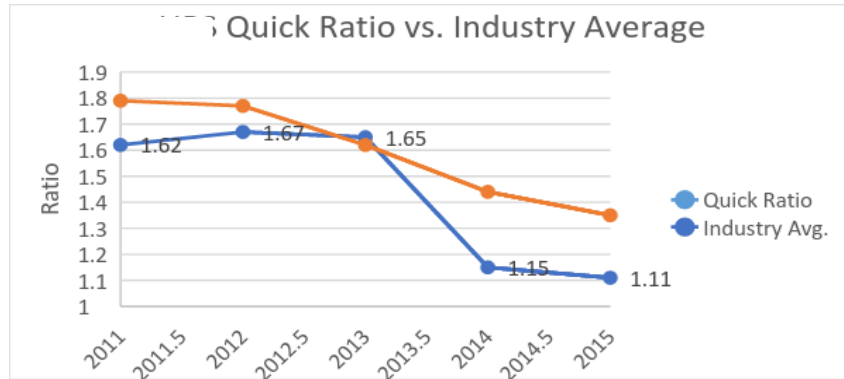
Figure 14. UPS's Trend Analysis—Quick Ratio versus Industry Average.

The second liquidity ratio analyzed is the current ratio. The current ratio is designed for internal and external oversight in which the ratio aids end users in determining the extent to which current liabilities can be covered by current assets (Rist & Pizzica, 2015). In this particular analysis, it would benefit the contracting officer to ensure that the company maintains a high current ratio, which is an indication of whether or not the company is capable of repaying current obligations on time. Table 22 shows UPS's current ratio figures, and Figure 15 shows UPS's current ratios compared to the industry average covering 2011–2015 financial years. In Figure 15, a scatter plot gives a comparison between UPS's current ratio versus the industry average.
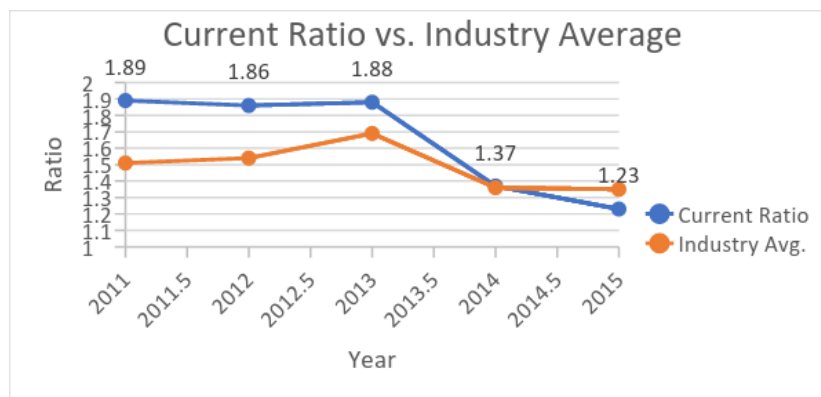
Figure 15. UPS's Current Ratio versus Industry Average Trend Analysis.

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b. *Solvency Ratios (Debt Management)*

Solvency ratios may also be referred to at times as leverage ratios or debt management ratios. These leverage ratios allow for end users to quickly analyze the ability of a company to repay long-term debt. The solvency ratios selected for the UPS analysis consisted of long-term (L-T) debt-to-equity and total debt-to-equity. Both ratios are used to focus on the capital structure of UPS when referring to their ability to repay debt. Table 23 illustrates UPS's long-term debt-to-equity and total debt-to-equity over the most current five years. Both ratios are compared against the industry average for each respective year.

Table 23.   Solvency Ratio Analysis of UPS's Financial Statements.
Adapted from Mergent Online (n.d.).

Solvency Ratios	2015	2014	2013	2012	2011
L-T Debt-to-Equity	4.58	4.61	1.67	2.38	1.58
Industry Avg.	**2.53**	**1.71**	**0.91**	**1.23**	**0.84**
Total Debt-to-Equity	5.80	5.04	1.68	2.77	1.58
Industry Avg.	**3.14**	**1.86**	**0.93**	**1.44**	**0.85**

The first solvency ratio analyzed is the L-T debt-to-equity ratio, which is an indication of how much long-term debt a company is using in its capital structure. In this case, L-T debt is compared to L-T debt plus shareholder's equity, in which all determining factors are found on UPS's balance sheet. Based on the trend analysis displayed in Figure 16, UPS's L-T debt is well above the industry average and could easily be described as a company that may be considered risky when it comes to repaying long-term debt. As noted in 2011 through 2013, UPS's L-T debt-to-equity ratio could have been considered moderate, but since 2013, the ratio has almost doubled the industry average.
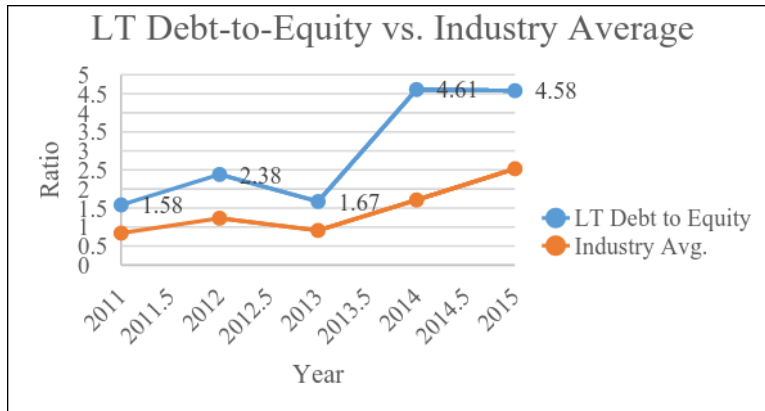
Figure 16. UPS's LT Debt-to-Equity Ratio versus Industry Average Trend
Analysis.

The second ratio analyzed is the total debt-to-equity ratio. Similar to the previous ratio, total debt-to-equity is also used to determine a company's financial leverage. In this analysis, UPS's total debt-to-equity ratio almost doubles the comparative industry average, which could be considered somewhat on the risky side. UPS's total debt-to-equity is considerably moderate during 2011 through 2013; however, there is a major peak and steady rise from 2014 and 2015. Based upon the analysis, contracting officers should carefully analyze UPS's debt-to-equity ratios. Figure 17 shows UPS's total debt-to-equity compared to the industry average.
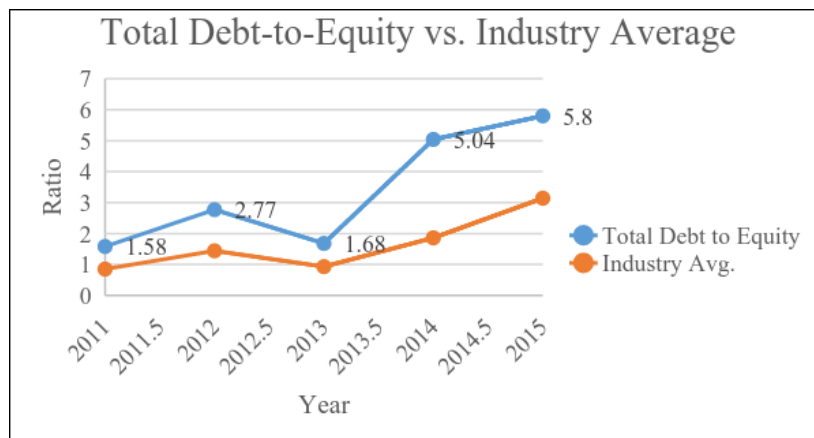
Figure 17. UPS's Total Debt-to-Equity Ratio versus Industry Average Trend
Analysis.

c.   ***Profitability Ratios***

Determined to be the ratio that provides a financial picture of a company's financial health, the profitability ratio has been deemed as the king of all ratios (Rist & Pizzica, 2015). Table 24 shows the two profitability ratios analyzed and provides more details on how UPS is really operating financially in comparison to its industry peers. The two profitability ratios selected for this analysis are return on assets (ROA) and return on equity (ROE).

Table 24.   Profitability Ratio Analysis of UPS's Financial Statements.
Adapted from Mergent Online (n.d.).

Profitability Ratios	2015	2014	2013	2012	2011
Return on Assets	13.13	8.46	11.65	2.19	11.14
Industry Avg.	**8.06**	**6.82**	**8.28**	**4.63**	**8.35**
Return on Equity	210.11	70.39	78.58	13.77	50.67
Industry Avg.	**108.52**	**31.17**	**44.15**	**13.65**	**30.34**

The first ratio analyzed is the return on assets. Based on the data obtained from Mergent Online, UPS Corporation has done quite well compared to its US peers. Table 24 describes UPS's ability to maximize return on assets from 2011 through 2015. Based on the analysis, the ratios between 8.5% - 13.1% indicate a financially healthy company. What that means to end users of UPS's financial data is that for every $100.00 invested in assets, UPS is earning positive income between $8.00-$13.00 and is receiving income above the industry average of $6.00 during the years analyzed. Based on the data shown in Table 24, UPS is outperforming the industry in profitability and would be considered financially healthy in this category.

In 2012, it is clear that there was some form of domestic constraint in this industry as both UPS and the industry average took a significant decrease from 2011, with UPS suffering an 87% decline. While the industry suffered a 55% decline in return on assets, based on the trend analysis displayed in Figure 18, both UPS and the US industry have been on an up and down slope in regards to the ROA.
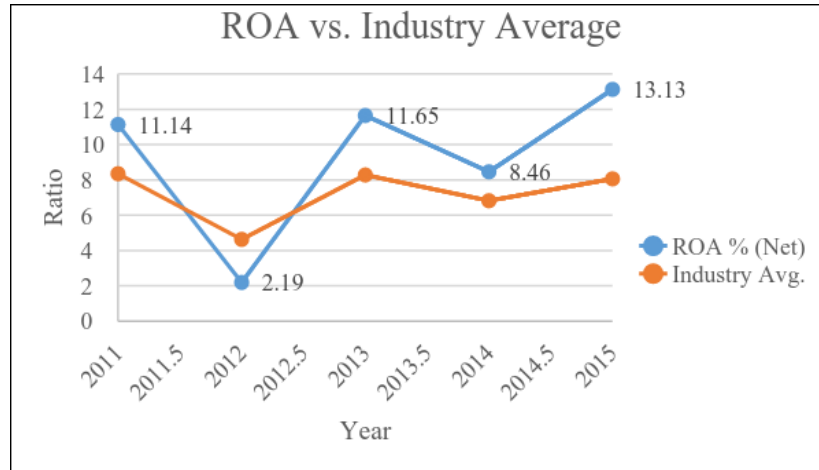
Figure 18. UPS's Return on Assets Ratio versus Industry Average Trend
Analysis.

The second profitability ratio analyzed is return on equity. In this analysis it is particularly important to pay close attention to shareholder's equity and net income. Based on the data obtained from Mergent Online and reflected in Table 24, UPS has been able to maintain a return on equity above industry average. As depicted in Figure 19, return on equity decreased by 87% from 2011 to 2012.
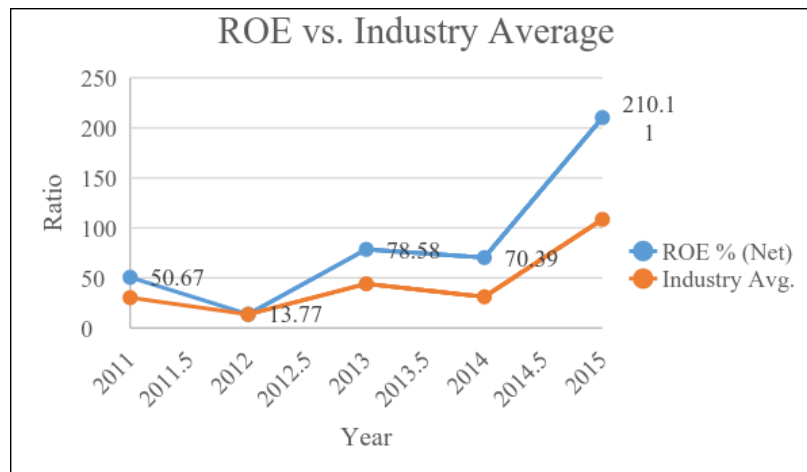
Figure 19. UPS's Return on Equity Ratio versus Industry Average Trend
Analysis.

Overall, UPS's return on equity has been steady with the exception of the decrease in 2012. Figure 19 shows a graphical depiction of the five-year trend. Based on the profitability analysis, UPS could be considered a financially healthy company and is maximizing returns on shareholders' investments. Financial health determinants must take into consideration multiple ratios, and contracting officers should utilize all available financial data to come to a conclusion when analyzing the financial health of DOD prospective contractors.

d.   *Efficiency Ratios*

Sometimes referred to as turnover or performance ratios, efficiency ratios help companies analyze their ability to make profits from the sales generated (Rist & Pizzica, 2015). Generally, a company should maintain a higher ratio in this category to be considered financially healthy. Sometimes, companies inappropriately invest in too many long-term assets that do not meet the company's sales objectives; therefore, companies should properly manage their assets. In this particular analysis, UPS's total assets turnover and inventory turnover are both analyzed (Table 25).

Table 25.   Efficiency Ratio Analysis of UPS's Financial Statements. Adapted from Mergent Online (n.d.).

Efficiency Ratios	2015	2014	2013	2012	2011
Total Asset Turnover	1.58	1.62	1.48	1.47	1.56
Industry Avg.	**1.42**	**1.55**	**1.44**	**1.42**	**1.47**
Inventory Turnover	42.04	42.90	34.00	34.54	39.15
Industry Avg.	**24.61**	**27.50**	**26.67**	**27.20**	**30.47**

The first efficiency ratio analyzed is total asset turnover. In this case, UPS's total assets are above average for the timeframe analyzed. This ratio determines UPS's ability to generate sales from each dollar invested in assets. From 2011 through 2015, UPS has operated above the industry average and operated on an average total asset turnover rate of 1.54 compared to the five-year industry average of 1.46 (Table 25). What this analysis means for end users is that for every dollar invested over this five-year span, UPS

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generates 1.54 of sales on a yearly average. Figure 20 shows a comprehensive trend analysis of UPS's total assets turnover compared to the industry average.
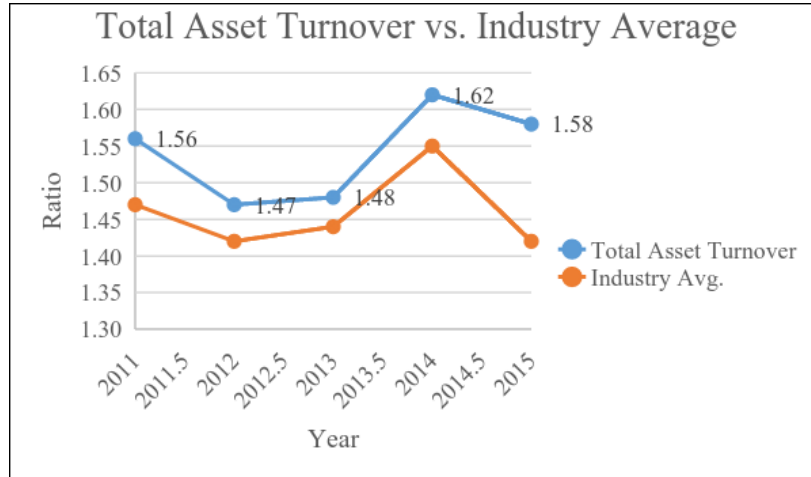
Figure 20. UPS's Total Asset Turnover Ratio versus Industry Average Trend Analysis.

The second efficiency ratio analyzed is inventory turnover. For the five-year span, UPS effectively operated with a higher inventory turnover ratio than the industry average. UPS's inventory turnover has consistently been up and down, but has effectively been maintained above the industry average with a decrease in 2012 and a significant increase in 2014, but then it slightly declined from 2014 to 2015. The slight decline in 2015 does not show a negative impact on UPS's inventory turnover. The comparison between UPS and industry average is shown in Figure 21.
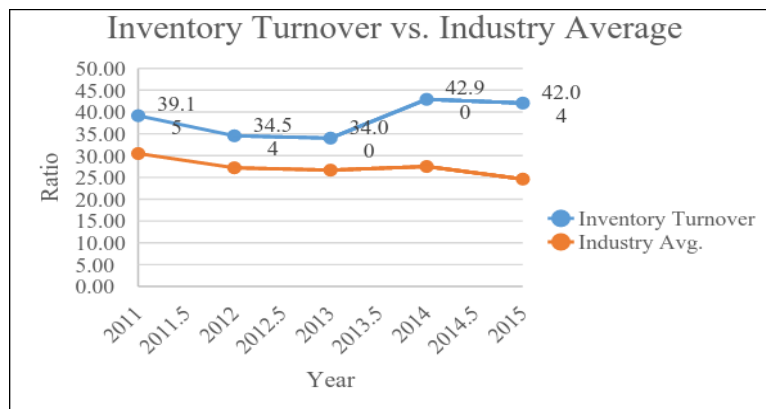

Figure 21. UPS's Inventory Turnover Ratio versus Industry Average Trend Analysis.

2.   Horizontal Analysis

The horizontal analysis completed on UPS's financial statements is presented in Table 26. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. Not all of the line items are presented here as only the major categories are represented (Table 26). Total assets always equal total liabilities and shareholder's equity; therefore, only total assets are shown. A more comprehensive horizontal analysis of UPS's financial statements is presented in the Appendix.

Table 26.   Horizontal Analysis of UPS's Financial Statements.

UPS CONSOLIDATED BALANCE SHEETS - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total Current Assets	108%	91%	109%	127%	100%
Total Assets	110%	102%	104%	112%	100%
Total Current Liabilities	164%	132%	109%	129%	100%
Long-Term Debt	102%	89%	98%	100%	100%
Total Liabilities	130%	121%	108%	124%	100%
Retained earnings	59%	57%	68%	79%	100%
Total Shareowners' Equity	35%	30%	91%	67%	100%
Total Liabilities and Shareowners' Equity	110%	102%	104%	112%	100%
STATEMENTS OF CONSOLIDATED INCOME - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Revenue	110%	110%	104%	102%	100%
Total Operating Expenses	108%	113%	103%	112%	100%
Income Before Income Taxes	127%	80%	116%	17%	100%
Income Tax Expense	127%	81%	117%	8%	100%
Net Income	127%	80%	115%	21%	100%
STATEMENTS OF CONSOLIDATED CASH FLOWS - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash from operating activities	105%	81%	103%	102%	100%
Net cash used in investing activities	209%	110%	83%	53%	100%
Net cash used in financing activities	32%	106%	161%	37%	100%

The balance sheet is analyzed first. A graphical depiction of the horizontal analysis conducted on UPS's balance sheets is presented in Figure 22. UPS lists shareowners instead of stockholders; however, both terms mean the same when referring to equity in a company. From the 2011 base year, total current liabilities increased to 164% in 2015 showing a positive trend over the past five years. However, total shareowners' equity showed a negative trend over the past five years. It decreased to 35% in 2015. Total assets remained stable to slightly increasing since the base year of 2011. Total current assets and long-term debt remained stable across the five-year period.
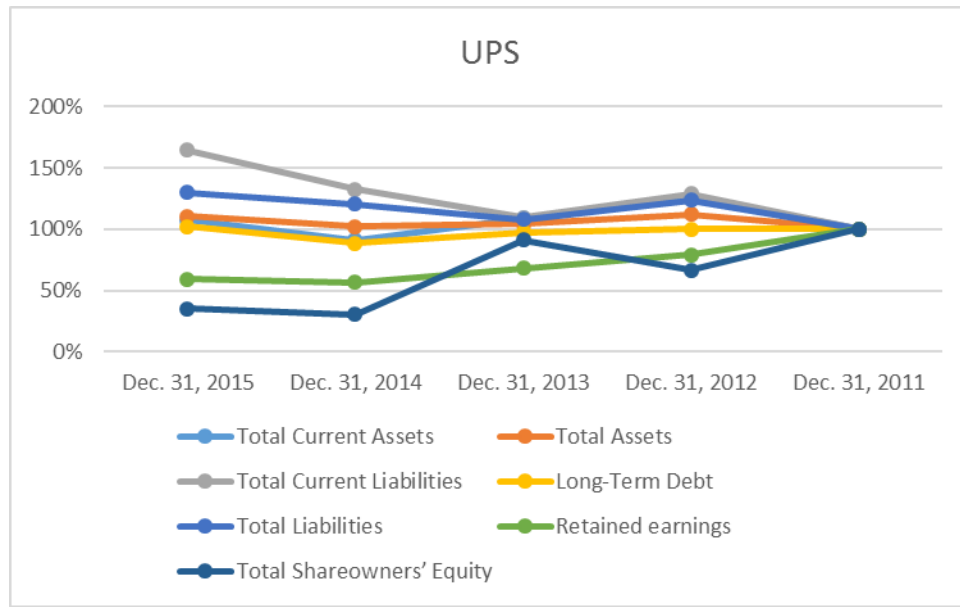
Figure 22. UPS's Balance Sheet Horizontal Analysis.

The income statement is analyzed second. A graphical depiction is presented in Figure 23. Net income appears to have risen every odd numbered year. From the 2011 base year, revenues are relatively steady with a slight increase to 110% in 2015. Total operating expenses have also increased slightly; however, not as much as revenues. Net income is mixed across the years. In 2012, net income decreased to 21%; however, since then, it has recovered to 127% in 2015. Despite the decreases in net income experienced by UPS over the even-numbered years, there seems to be an overall increasing trend in net income.

Figure 23. UPS's Income Statement Horizontal Analysis.

The statement of cash flows is analyzed third. A graphical depiction is presented in Figure 24. From the 2011 base year, net cash inflows generated from operating activities have remained stable across the five-year period with a slight decrease to 81% in 2014. Net cash outflows on investing activities initially decreased to 53% in 2012; however, net cash outflows have increased since then with the most significant in 2015 to 209%. Financing activities saw an increase in net cash outflows in 2013 to 161%, but it has since decreased to 32% in 2015, which has offset the increase in investment net cash outflows.
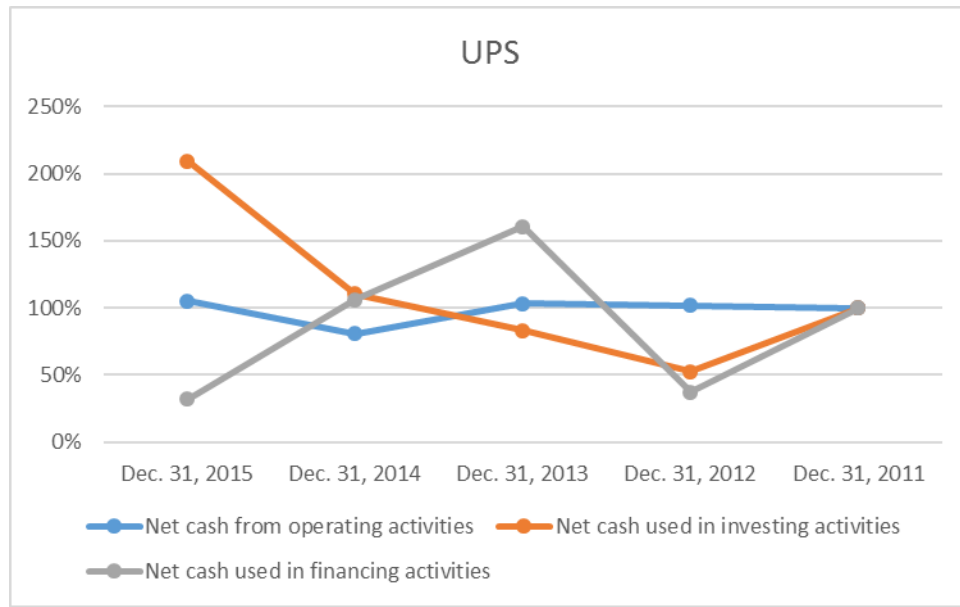
Figure 24. UPS's Statement of Cash Flows Horizontal Analysis.

3.   Vertical Analysis

The vertical analysis completed on UPS's financial statements is presented in Table 27. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. Vertical analysis of the balance sheets was performed using total assets as the basis of comparison. The income statements and statement of cash flows used total sales or revenues for the basis of comparison. Not all of the line items are presented here as only the major categories are represented (Table 27). A more comprehensive vertical analysis of UPS's financial statements is presented in the Appendix.

Table 27.   Vertical Analysis of UPS's Financial Statements.

UPS

CONSOLIDATED BALANCE SHEETS - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total Current Assets	34%	32%	37%	40%	35%
Total Assets	100%	100%	100%	100%	100%
Total Current Liabilities	28%	24%	20%	22%	19%
Long-Term Debt	30%	28%	30%	29%	32%
Total Liabilities	93%	94%	82%	88%	80%
Retained earnings	16%	16%	19%	21%	29%
Total Shareowners' Equity	7%	6%	18%	12%	20%
Total Liabilities and Shareowners' Equity	100%	100%	100%	100%	100%

STATEMENTS OF CONSOLIDATED INCOME - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Revenue	100%	100%	100%	100%	100%
Total Operating Expenses	87%	91%	87%	98%	89%
Income Before Income Taxes	13%	8%	12%	2%	11%
Income Tax Expense	4%	3%	4%	0%	4%
Net Income	8%	5%	8%	1%	7%

STATEMENTS OF CONSOLIDATED CASH FLOWS - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash from operating activities	13%	10%	13%	13%	13%
Net cash used in investing activities	-9%	-5%	-4%	-2%	-5%
Net cash used in financing activities	-3%	-9%	-14%	-3%	-9%

The balance sheets are analyzed first. The relative proportions across the periods remained relatively stable (Figure 25). Total liabilities and total current liabilities increased from 80% and 19% in 2011 to 93% and 28%, respectively, in 2015. All other line items remained fairly constant with slight decreases.
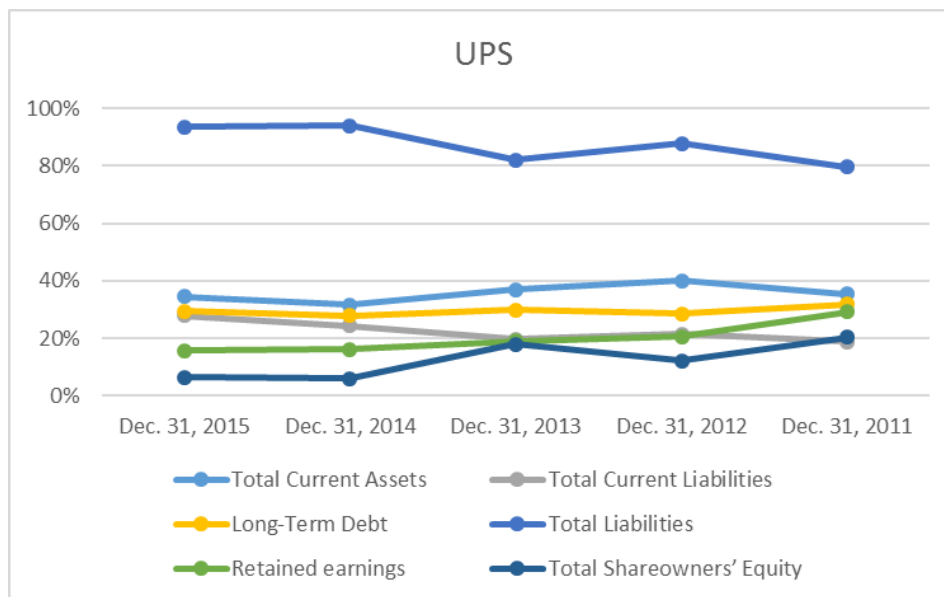
Figure 25. UPS's Balance Sheet Vertical Analysis.

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The income statements are presented next. A graphical depiction is presented in Figure 26. Total operating expenses have decreased slightly over the years with one relatively large increase in 2012. Total operating expenses as a percentage of sales went from 89% in 2011 to 87% in 2015. Net income increased by 1% from 2011 to 2015.
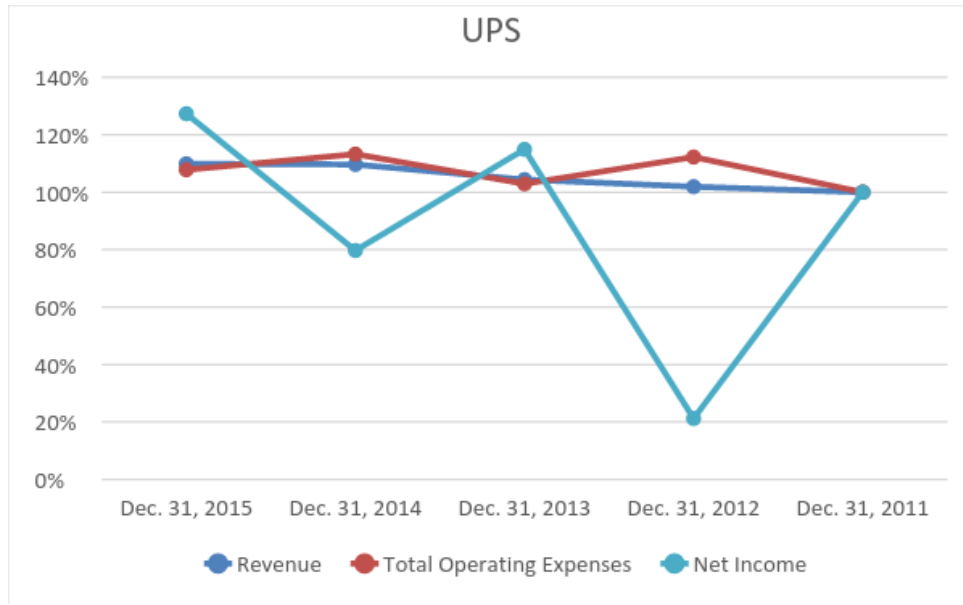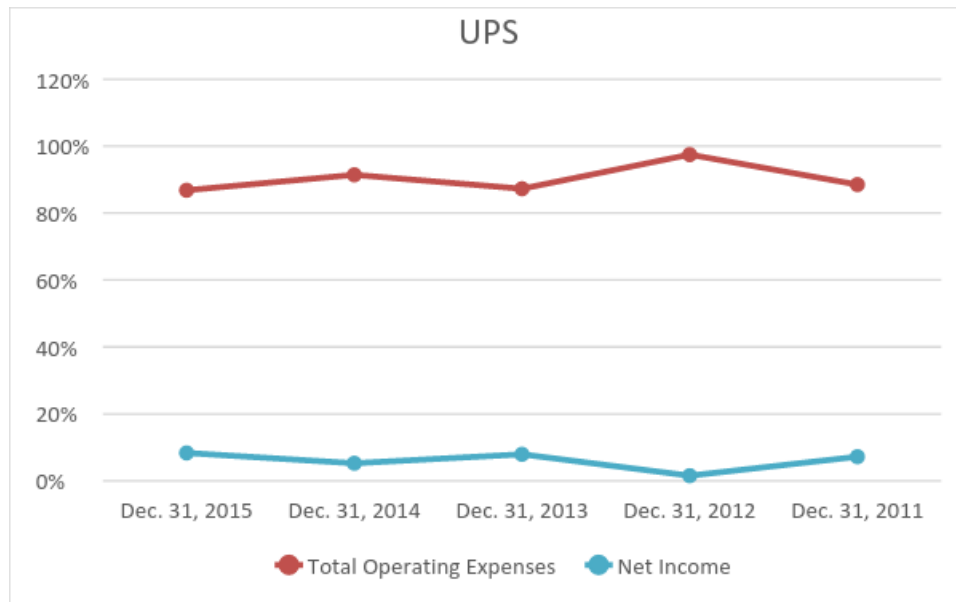

Figure 26. UPS's Income Statement Vertical Analysis.

The statement of cash flows is analyzed last. A graphical depiction is presented in Figure 27. From the 2011 base year, net cash inflows generated from operating activities remained stable over the five-year period except for 2014, where it decreased to 10% of total revenues. In all the other periods, operating activities generated 13% of total revenues. Net cash outflows on investing activities increased to 9% in 2015. Net cash outflows on financing activities increased significantly to 14% in 2013; however, net cash outflows decreased to 3% in 2015.
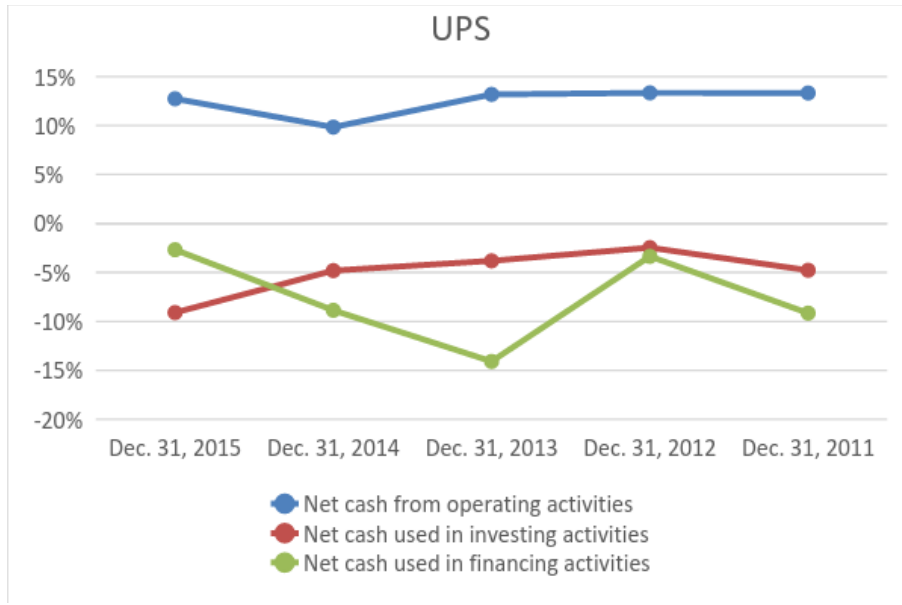
Figure 27. UPS's Statement of Cash Flows Vertical Analysis.

4.   **Bankruptcy Analysis**

The bankruptcy analysis of UPS shows the company mostly within the unknown region of where bankruptcy could go either way. The results of both the original Z-score and the updated Z"-score analyses are shown in Table 28. The most recent period is to the far left and labeled "0," and all subsequent periods are shown as a subtraction from the current period. One can see how each variable contributes to the overall Z-score. UPS benefited from its working capital to assets ratio over multiple periods; however, its two most recent periods saw a reduction in the contribution from this ratio. The updated model paints a slightly more optimistic picture with two periods clearly indicating non-bankruptcy for the company.

Table 28.　　UPS's Bankruptcy Analysis.

UPS Z"-Score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	0.430	0.481	1.133	1.216	1.091
Retained Earning to Assets	0.511	0.527	0.623	0.671	0.951
Earnings Before Interest and Taxes to Assets	1.348	0.946	1.309	0.236	1.186
Shareholder's Equity to Liabilities	0.073	0.068	0.229	0.146	0.270
Sales to Assets					
Total	2.361	2.022	3.295	2.268	3.499

🟥	Z"<1.1, Bankrupt
🟨	1.1<Z"<2.6, Unknown
🟩	Z">2.6, Non-Bankrupt

UPS Z-Score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	0.079	0.088	0.207	0.222	0.200
Retained Earning to Assets	0.219	0.226	0.268	0.288	0.409
Earnings Before Interest and Taxes to Assets	0.662	0.465	0.643	0.116	0.582
Shareholder's Equity to Liabilities	0.042	0.039	0.131	0.083	0.155
Sales to Assets	1.523	1.643	1.531	1.393	1.530
Total	2.525	2.461	2.780	2.102	2.875

🟥	Z<1.81, Bankrupt
🟨	1.81<Z<2.99, Unknown
🟩	Z>2.99, Non-Bankrupt

5.　　Fraud Analysis

Overall UPS's financial statements do not suggest fraud, except for one period back in 2012. The results of the financial statement fraud analysis are shown in Table 29. A closer look at 2012 shows an abnormally high Gross Margin Index (GMI) ratio of 4.614 compared to .196 in 2013. With all other ratios normal, it appears that the GMI ratio contributed greatly to the indication of potential fraud in the company. GMI is a comparison of the gross margin of the previous period to the present period. The income statement for 2012 shows a huge reduction in operating profit due to an abnormal increase in compensation and benefits expense (as shown in UPS's income statements in the Appendix). The abnormal increase may need to be further investigated; however, that is beyond the scope of this analysis. Additionally, the Selling, General, and Administrative Index (SGAI) fraud ratio could not be calculated since the required

income statement data was not provided. Absent SGAI and the abnormality in 2012, the results indicate no financial statement fraud.

Table 29.　UPS's Fraud Analysis.

Fraud Ratio	2015	2014	2013	2012
DSRI	1.069	0.975	1.039	0.960
GMI	0.649	1.487	0.196	4.614
AQI	1.051	1.248	0.971	1.001
SGI	1.002	1.050	1.024	1.019
DEPI	0.978	0.984	0.979	0.978
SGAI	0.000	0.000	0.000	0.000
LVGI	1.102	1.051	0.989	0.988
TATA	-0.068	-0.076	-0.081	-0.165
M Score	-2.760	-2.304	-3.067	-1.192

M<-1.78, no fraud
M>-1.78, fraud

UPS has a favorable board composition. A favorable board composition implies the potential for fraud behavior is low; whereas, an unfavorable board composition would imply the potential for fraud behavior is high. There are 11 members on the board, and only one is employed by UPS, the remaining 10 members are considered outsiders. The percentage of outsiders is 91%, which is above the threshold between a favorable and unfavorable board composition. An unfavorable board composition is when the percentage of outsiders drops below 50.2%. The next section discusses the financial analysis of Delta Airlines.

C.　DELTA AIRLINES' FINANCIAL ANALYSIS

As previously stated, this financial analysis of Delta Airlines encompasses five different analyses. The first financial analysis will be a ratio and comparative analysis. The second and third analyses will be a horizontal analysis and a vertical analysis. The fourth analysis will be a bankruptcy analysis, and the fifth analysis will be a fraud analysis.

1.   **Ratio Analysis**

The ratio analysis completed on Delta's financial statements is presented in this section. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. The key financial components of this ratio analysis are broken down into four major ratio categories: Liquidity, Solvency, Profitability, and Efficiency. Each category is further broken down, and the analysis is focused on two ratios selected from the list of financial ratios discussed in Chapter II. In addition to the ratios selected for determining Delta's financial health, further analysis compares Delta's ratio averages to the industry averages. It is very important to note that company financial health cannot be determined based solely on the analysis of only one specific category of ratios.

a.   Liquidity Ratios

The first step to determining the financial health of Delta is to focus heavily on the company's core financial statements. In this particular case, it was important to look at the liquidity of the company first. The liquidity or short-term ratio analysis completed on Delta's financial statements is presented in Table 30. All analysis shown in Table 30 are compared to the industry averages. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. Short-term liquidity focuses on Delta's ability to raise cash from all its available resources.

Table 30.   Liquidity Ratio Analysis of Delta Air Lines Financial Statements. Adapted from (Mergent Online, n.d.).

Liquidity Ratios	2015	2014	2013	2012	2011
Quick Ratio	0.32	0.39	0.39	0.41	0.43
Industry Avg.	**0.78**	**0.81**	**0.80**	**0.78**	**0.89**
Current Ratio	0.52	0.74	0.68	0.62	0.61
Industry Avg.	**0.97**	**1.07**	**1.12**	**1.11**	**1.17**

The quick ratio is analyzed first. The analysis included conducting a 5 year trend analysis of Delta's financial statements, and comparing current assets to current liabilities, which are both found on the company's balance sheet. Based upon the analysis conducted using Mergent Online financial statements, Delta Air Lines is operating below the industry average for all years analyzed. Delta's five year quick ratio average is approximately 52% below the industry average. Figure 28 shows the five year quick ratio comparison between Delta Air Lines Inc. and industry peers.
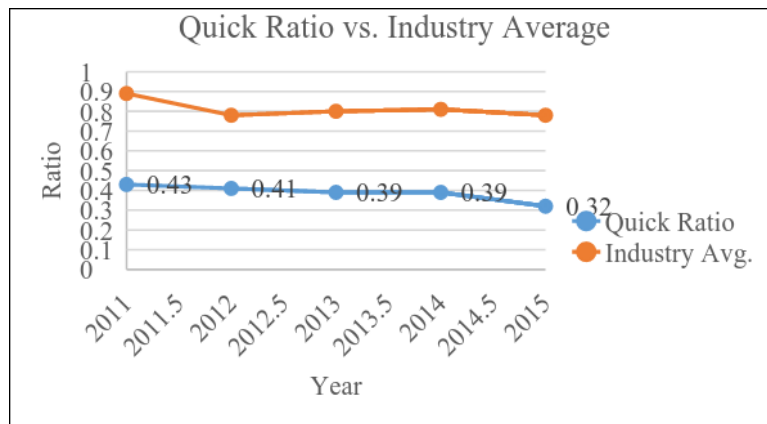
Figure 28. Delta's Quick Ratio versus Industry Average Trend Analysis.

The second liquidity ratio analyzed is the current ratio. The current ratio is designed for internal and external oversight in which the ratio aids end users in determining the extent to which current liabilities can be covered by current assets (Rist & Pizzica, 2015). When analyzing a company's financial health, contracting officers need to understand that current ratios should be at or above 1.0. Anything below 1.0 should be considered a red flag, and further investigation should be conducted. When analyzing current ratios, the higher the ratio, the better. Based on Table 30 shows Delta's current ratios are all below 1.0 and also below the industry average. This is a sign that Delta may have some short-term liquidity issues.

From 2012 to 2014, Delta saw a steady rise in the current ratio of 6%, which would be a positive sign for the company. Delta's five year average is not greater than 1.0

(.64) compared to the industry five year average of 1.1. Figure 29 shows a five-year current ratio comparison between Delta Air Lines Inc. and industry peers.
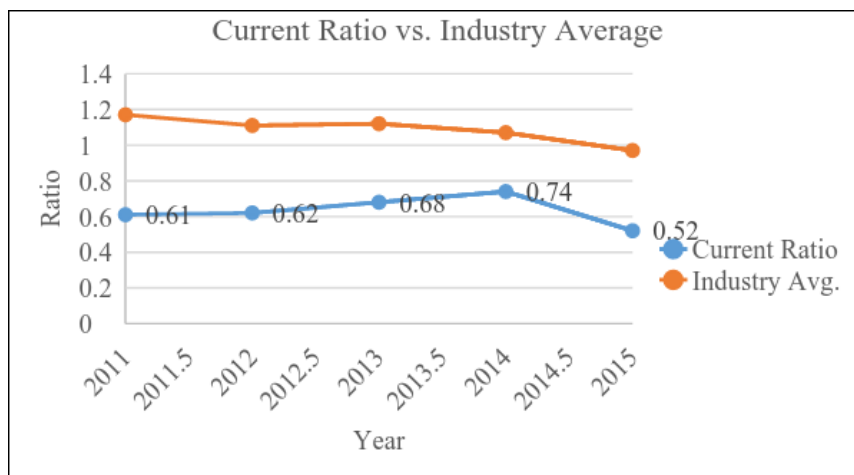
Figure 29.   Delta's Current Ratio versus Industry Average Trend Analysis.

b.   *Solvency Ratios (Debt Management)*

Solvency ratios may also be referred to at times as leverage ratios or debt management ratios. These leverage ratios allow for end users to quickly analyze the ability of a company to repay long-term debt. The solvency ratios selected for Delta consisted of long-term debt-to-equity and total debt-to-equity. Both ratios are used to focus in on the capital structure of Delta when referring to their ability to repay debt. Table 31 is used as an illustration in which the figure displays Delta L-T debt to equity and total debt-to-equity over the most previous five years. Both ratios are compared against the industry average for each respective year.

Table 31.   Solvency Ratio Analysis of Delta Air Lines Financial Statements.
Adapted from Mergent Online (n.d.)

Solvency Ratios	2015	2014	2013	2012	2011
LT Debt to Equity	0.62	0.97	0.84	Equity<0	Equity<0
Industry Avg.	**0.95**	**1.88**	**1.28**	**4.80**	**2.07**
Total Debt to Equity	0.77	1.11	0.97	Equity<0	Equity<0
Industry Avg.	**1.10**	**2.12**	**1.46**	**5.62**	**2.32**

The first solvency ratio analyzed is the L-T debt-to-equity ratio. In this case, L-T debt is compared to L-T debt plus shareholder's equity, which all are found on Delta's balance sheet. Based on the trend analysis shown in Figure 30, Delta's L-T debt is well below the industry average and could be considered as a company that may be less risky when it comes to repaying long-term debt. In 2011 and 2012, Delta Airlines was operating off of little to no debt-to-equity (Figure 30).

Since 2013, Delta has seen a small increase in debt but is still operating at a three year average of .81 debt-to-equity, which is low compared to the industry three year average of 1.37. Delta's L-T debt-to-equity ratio may be considered low or less risky compared to the industry average. Figure 30 shows a five-year L-T debt-to-equity ratio comparison between Delta Air Lines Inc. and industry peers.
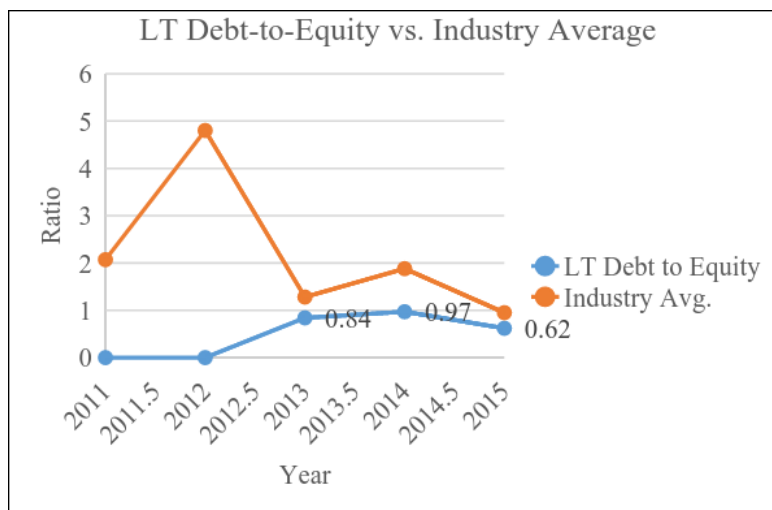
Figure 30. Delta's LT Debt-to Equity Ratio versus Industry Average Trend Analysis.

The second ratio analyzed is the total debt-to-equity ratio. Similar to the previous ratio, total debt-to-equity is also used to determine a company's financial leverage. In this analysis, Delta's total debt-to-equity ratio is well below the comparative industry average which could be considered as not risky, which is good for the company when analyzing financial health. Table 31 shows the ratio analysis, and Figure 31 shows the comparative analysis.

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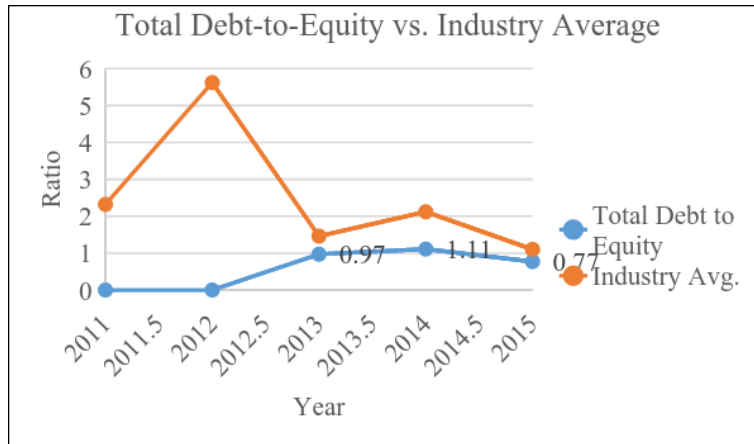
Figure 31. Delta's Total Debt-to Equity Ratio versus Industry Average Trend Analysis.

c.   Profitability Ratios

Determined as the ratio that provides a financial picture of a company's financial health, the profitability ratio has been deemed as the king of all ratios (Rist & Pizzica, 2015). Table 32 shows the two profitability ratios analyzed and provides more details on how Delta is really operating financially in comparison to its industry peers. The two profitability ratios selected for this analysis are ROA and ROE.

Table 32.   Profitability Ratio Analysis of Delta Air Lines Financial Statements. Adapted from Mergent Online (n.d.)

Profitability Ratios	2015	2014	2013	2012	2011
Return on Assets	8.44	1.24	21.78	2.29	1.97
Industry Avg.	**12.73**	**5.77**	**5.55**	**2.20**	**1.65**
Return on Equity	46.04	6.44	221.61	Avg Eqty<0	Avg Eqty<0
Industry Avg.	**60.11**	**30.79**	**43.61**	**2.90**	**16.57**

The first ratio analyzed is the ROA. Based on the data obtained from Mergent Online, Delta's return on assets ratios for 2011 through 2012 were above the industry average, but decreased in 2013. In 2012, the company had a 90% increase in return on assets, but immediately suffered a 95% decrease the following year. Since the decline in

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2013, it appears that Delta is regaining its competitive edge with a slight rise in 2015. Based on the analysis from 2015, Delta's ROA ratios are increasing, but as a whole, the company is still operating at 66% below the industry average. Table 33 shows a complete ratio breakdown and industry comparison.

What this means to the end users of Delta's financial data is that for every $100 invested in assets, Delta is earning positive income of $7.00 and is receiving income above the industry average of $5.58 during the years analyzed. Figure 32 shows how both Delta and its industry peers have experienced unstable ROAs for the past 5 years.
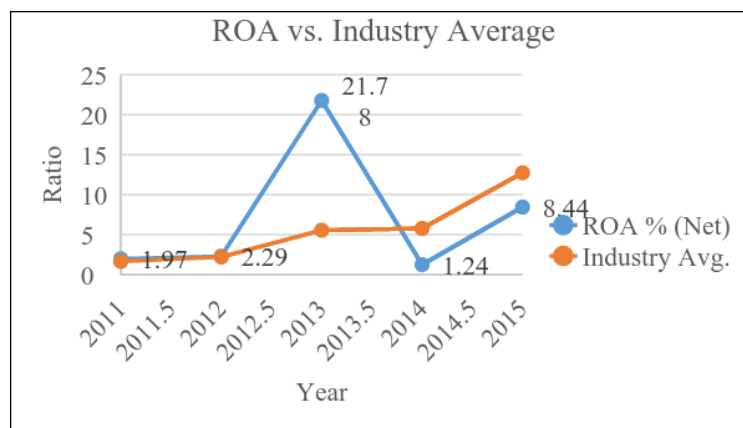
Figure 32. Delta's Return on Assets Ratio versus Industry Average Trend Analysis.

The second profitability ratio analyzed is return on equity. In this analysis, it is particularly important to pay close attention shareholder's equity and net income. Based on the data obtained from Mergent Online and reflected in Table 32 Delta has not been able to maintain a return on equity above the industry average. With the exception of the increase in ROE in 2013, Delta has been below the industry average for the whole five-year analysis. Figure 33 shows a graphical depiction of Delta's inability to maintain stability on its ROE compared to the industry during the five-year analysis.
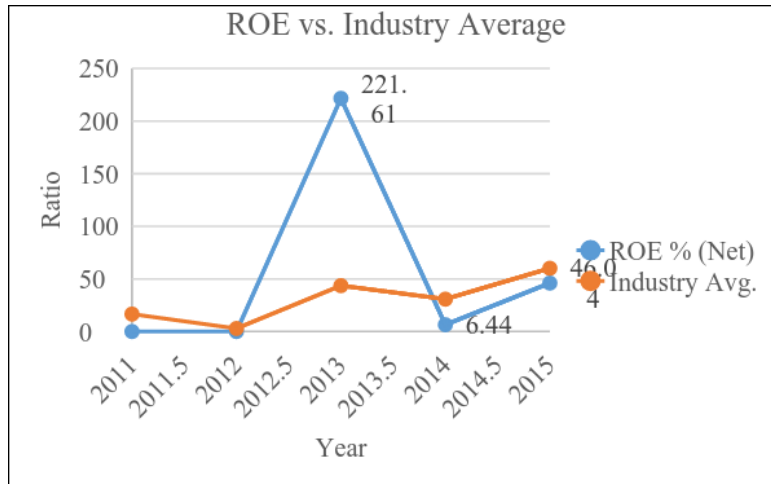
Figure 33. Delta's Return on Equity Ratio versus Industry Average Trend
Analysis.

d. Efficiency Ratios

Sometimes referred to as turnover or performance ratios, efficiency ratios help companies analyze their ability to make profits from the sales generated (Rist & Pizzica, 2015). Generally, a company should maintain a higher ratio in this category to be considered financially healthy. Sometimes, companies inappropriately invest in too many long-term assets that do not meet the company's sales objectives; therefore, companies should properly manage their assets. In this particular analysis, Delta's total asset turnover and inventory turnover are both analyzed (Table 33).

Table 33.   Efficiency Ratio Analysis of Delta Air Lines Financial Statements.
Adapted from Mergent Online (n.d.).

Efficiency Ratios	2015	2014	2013	2012	2011
Total Asset Turnover	0.76	0.76	0.78	0.83	0.81
Industry Avg.	**0.90**	**1.03**	**1.10**	**0.99**	**1.00**
Inventory Turnover	22.07	23.99	20.1	31.16	61.04
Industry Avg.	**28.85**	**33.41**	**31.74**	**33.82**	**37.81**

The first efficiency ratio analyzed is total asset turnover. In this case, Delta's total asset turnover ratios are below the industry average for all five years analyzed. This ratio

determines Delta's ability to generate sales from each dollar invested in assets. From 2011 through 2015, delta has operated below the industry average and operated on an average total asset turnover rate of .79 compared to the five-year industry average of 1.00 (Table 33). What this analysis means for end users is that for every dollar invested over this five-year span, Delta is only generating .78 of sales on a yearly average. Based on the data, Delta is not operating above the industry average. Figure 34 shows a comprehensive trend analysis of Delta's total asset turnover compared to the industry average.
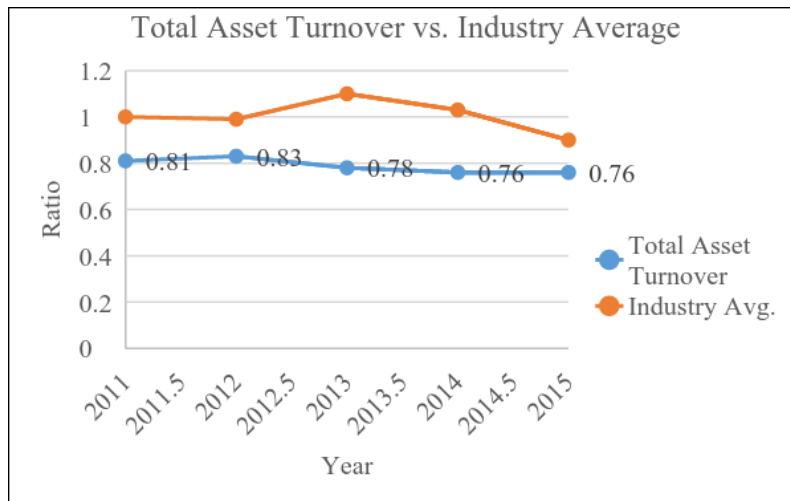
Figure 34. Delta's Total Asset Turnover Ratio versus Industry Average
Trend Analysis.

The second efficiency ratio analyzed is inventory turnover. For the five-year span, Delta effectively operated with a higher inventory turnover ratio than the industry average, but fell well below average during the next four years. Delta's inventory turnover has been on a consistent decline below the industry average following 2011. This indicates Delta's inability to maintain, sell, and replace inventory in a timely fashion and is a negative reflection to the company's ability to be considered a financially healthy company. Table 33 shows the inventory ratio analysis. A graphical comparison between Delta's inventory turnover ratios and industry averages are depicted in Figure 35.
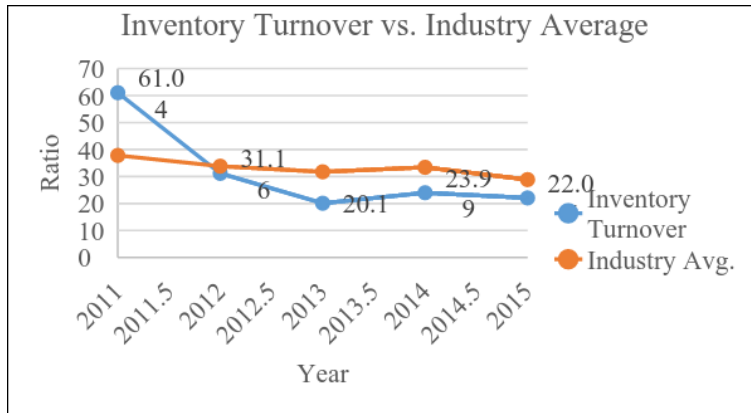
Figure 35. Delta's Inventory Turnover Ratio versus Industry Average
Trend Analysis.

2.   Horizontal Analysis

The horizontal analysis completed on Delta Airlines' financial statements is presented in Table 34. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. Not all of the line items are presented here as only the major categories are represented (Table 34). Total assets always equal total liabilities and shareholder's equity; therefore, only total assets are shown. A more comprehensive horizontal analysis of Delta Airlines' financial statements is presented in the Appendix.

Table 34.   Horizontal Analysis of Delta Airlines' Financial Statements.

Delta Airlines

Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	117%	118%	125%	107%	100%
Total assets	122%	124%	120%	102%	100%
Total current liabilities	138%	133%	111%	104%	100%
Total noncurrent liabilities	77%	88%	82%	104%	100%
Total liabilities	94%	101%	90%	104%	100%
Total stockholders' equity	-777%	-631%	-834%	153%	100%
Total liabilities and stockholders' equity	122%	124%	120%	102%	100%

Consolidated Income Statement - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total operating revenue	116%	115%	108%	104%	100%
Total operating expense	99%	115%	104%	104%	100%
Operating Income	395%	112%	172%	110%	100%
Total non-operating expense, net	53%	94%	72%	95%	100%
Income Before Income Taxes	931%	139%	329%	133%	100%
Income Tax (Provision) Benefit	-3095%	-486%	9427%	-19%	100%
Net Income	530%	77%	1234%	118%	100%

Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	280%	175%	159%	87%	100%
Net cash used in investing activities	264%	164%	184%	131%	100%
Net cash used in financing activities	260%	206%	84%	48%	100%

The balance sheet is analyzed first. A graphical depiction of the horizontal analysis conducted on Delta Airlines' balance sheets is presented in Figure 36. Here is an example of when horizontal analysis can be misleading when the values go from positive to negative across time. In 2011 and 2012, the balance sheets show a negative balance in stockholders' equity. From 2013 to 2015, stockholders' equity returns to a positive balance (see Appendix for Delta Airlines' balance sheets). The switch in balances causes the horizontal analysis to show a negative 777% for stockholders' equity in 2015. The, reality of course, is that stockholders' equity grew substantially in 2013 from 2011 and remained fairly stable from then on. The sudden rise in stockholders' equity can be explained by a large increase in retained earnings in 2013. All other line items of the balance sheet increase slightly from 2011 to 2015.

Figure 36. Delta Airlines' Balance Sheet Horizontal Analysis.

The income statement is analyzed second. A graphical depiction is presented in Figure 37. From the 2011 base year, net income for 2013 shows a large and unusual increase to 9234%. According to the income statement, in 2013, Delta Airlines received a massive increase in income tax benefits to 9327%. This explains the large increase in net income for that period, as well as the large increase in retained earnings recorded on the balance sheet. Total operating revenues have increased modestly year after year, and total operating expenses have decreased modestly year after year. Overall, the income tax provision seems to be sporadic; however, this is offset by the significant increase in income before taxes in 2013. Delta's tax structure needs to be investigated further in order to understand this behavior, which is beyond the scope of this study.

Figure 37. Delta Airlines' Income Statement Horizontal Analysis.

The statement of cash flows is analyzed third. A graphical depiction is presented in Figure 38. There is a positive trend from all three cash flow activities. From the 2011 base year, net cash inflow from operating activities has increased to 280%. Net cash outflow from investing activities has increased to 264%, and net cash outflow from financing activities has increased to 260%. Operating activities are providing net cash inflow to support the net cash outflow for investing and financing activities.
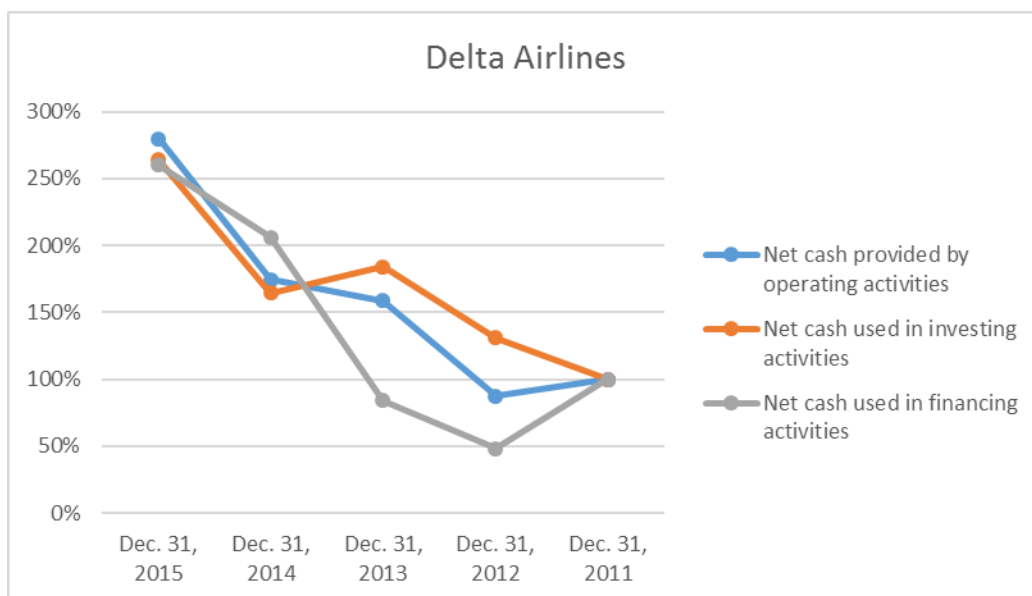
Figure 38. Delta Airlines' Statement of Cash Flows Horizontal Analysis.

3.   Vertical Analysis

The vertical analysis completed on Delta Airlines' financial statements is presented in Table 35. The balance sheets, income statements, and statements of cash flows were all analyzed spanning a five-year period, starting with the most recent period first. Vertical analysis of the balance sheets was performed using total assets as the basis of comparison. The income statements and statement of cash flows used total sales or revenues for the basis of comparison. Not all of the line items are presented here as only the major categories are represented (Table 35). A more comprehensive vertical analysis of Delta Airlines' financial statements is presented in the Appendix.

Table 35.   Vertical Analysis of Delta Airlines' Financial Statements.

Delta Airlines

Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	17%	17%	18%	19%	18%
Total assets	100%	100%	100%	100%	100%
Total current liabilities	33%	31%	27%	30%	29%
Total noncurrent liabilities	47%	52%	51%	75%	74%
Total liabilities	80%	84%	78%	105%	103%
Total stockholders' equity	20%	16%	22%	-5%	-3%
Total liabilities and stockholders' equity	100%	100%	100%	100%	100%

Consolidated Income Statement - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total operating revenue	100%	100%	100%	100%	100%
Total operating expense	81%	95%	91%	94%	94%
Operating Income	19%	5%	9%	6%	6%
Total non-operating expense, net	-2%	-3%	-2%	-3%	-3%
Income Before Income Taxes	18%	3%	7%	3%	2%
Income Tax (Provision) Benefit	-6%	-1%	21%	0%	0%
Net Income	11%	2%	28%	3%	2%

Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	19%	12%	12%	7%	8%
Net cash used in investing activities	-10%	-6%	-7%	-5%	-4%
Net cash used in financing activities	-10%	-8%	-3%	-2%	-4%

Balance sheets are analyzed first. A graphical depiction is presented in Figure 39. From the 2011 base year, total current assets remain relatively the same as a percentage of total assets. Total current liabilities increased slightly, and stockholder's equity increased substantially as a percentage of total assets to 20 % in 2015.
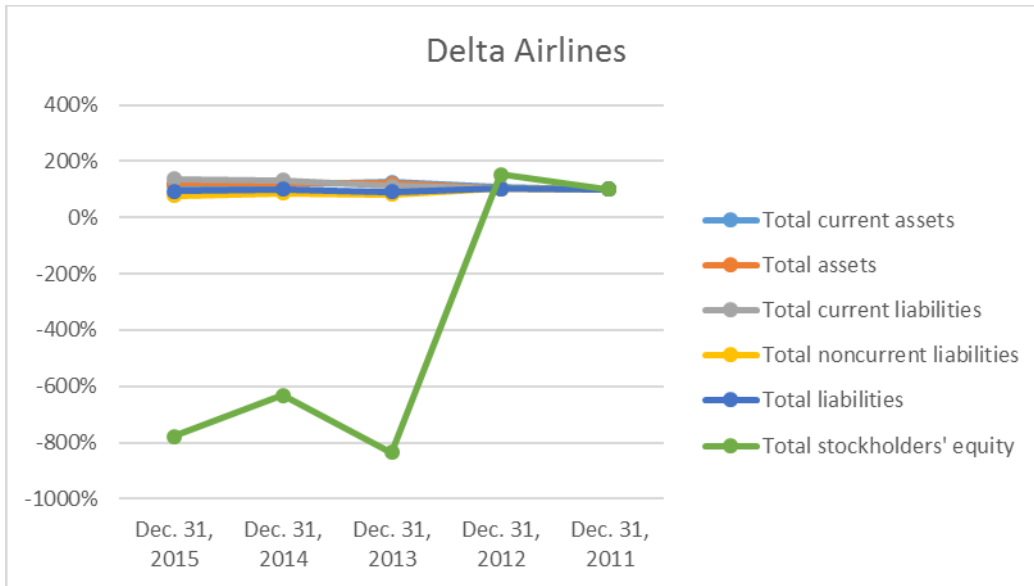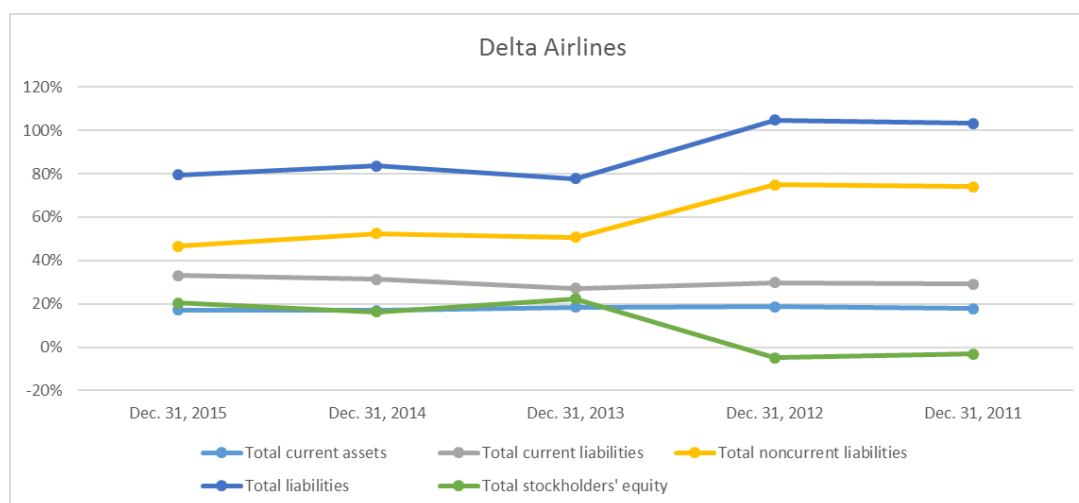

Figure 39. Delta Airlines' Balance Sheet Vertical Analysis.

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The income statements are presented next. A graphical depiction is presented in Figure 40. From the 2011 base year, total operating expenses as a percentage of total revenues showed a gradual decrease with a significant decrease to 81% in 2015. Further investigation of Delta's 2015 income statement revealed a substantial decrease in aircraft fuel expense. Net income as a percentage of total revenues showed a gradual increase with a significant increase to 28% in 2013 due to the income tax benefit. Net income returned to its normal level of 2% the following year.
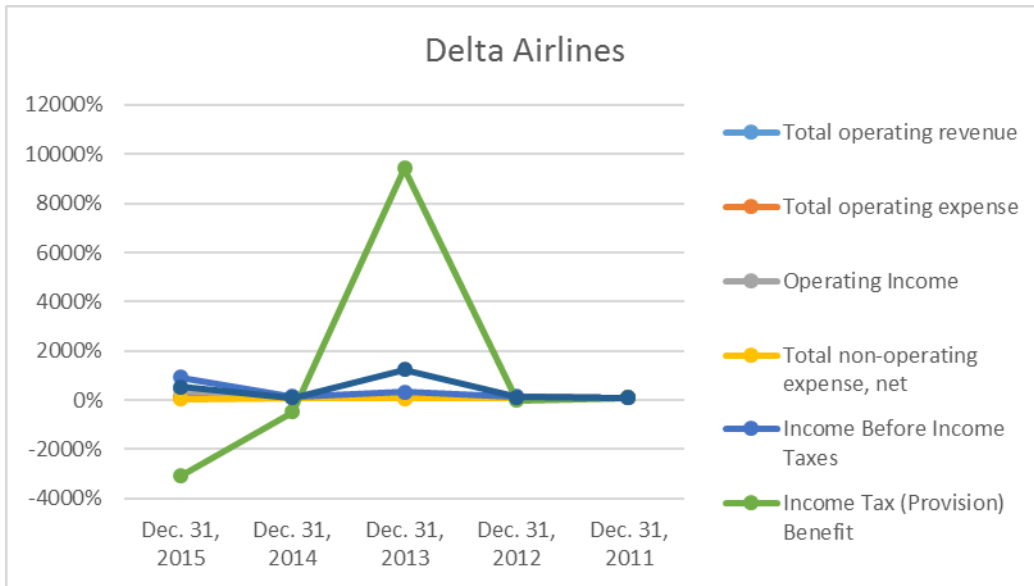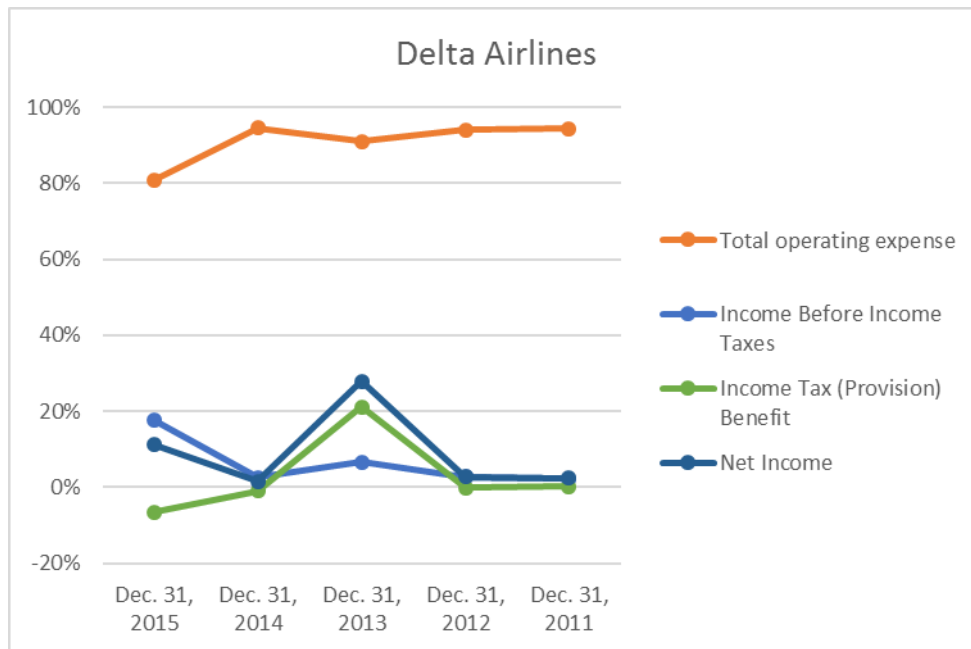

Figure 40. Delta Airlines' Income Statement Vertical Analysis.

The statement of cash flows is analyzed last. A graphical depiction is presented in Figure 41. Operating activities are generating more net cash outflow as a percentage of total revenues, and both investing and financing activities are equally taking more net cash inflow as a percentage of total revenues. From the 2011 base year, net cash inflow from operating activities increased to 19% in 2015. Both net cash out flows from investing and financing activities increased to 10% in 2015. Delta maintained a healthy balance between net cash inflows and net cash outflows.
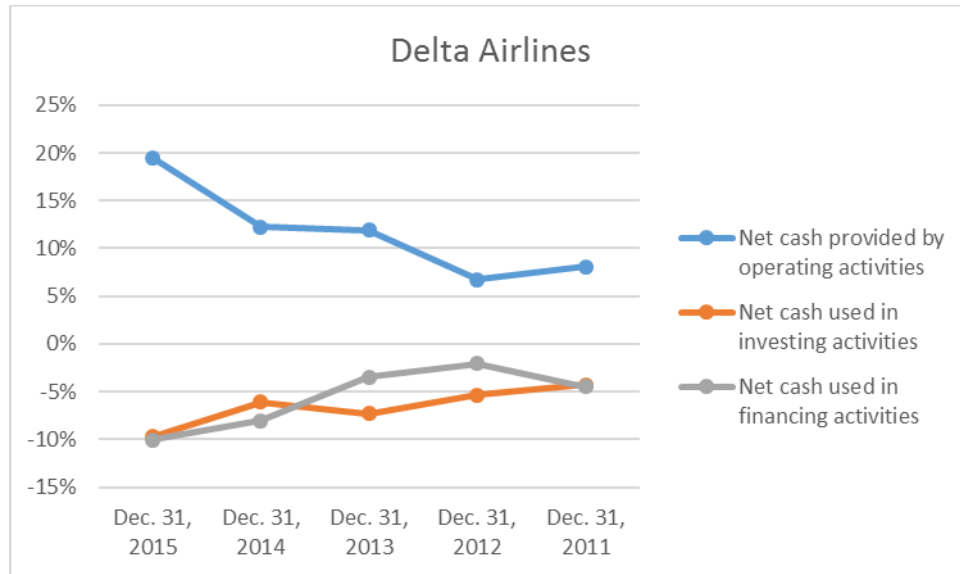
Figure 41. Delta Airlines' Statement of Cash Flows Vertical Analysis.

4.   Bankruptcy Analysis

The bankruptcy analysis of Delta Airlines reveals that it should be bankrupt. The results of both the original Z-score and the updated Z"-score analyses are shown in Table 36. The most recent period is to the far left and labeled "0," and all subsequent periods are shown as a subtraction from the current period. For example, the second year is represented as "-1". One can see how each variable contributes to the overall Z-score.

Delta Airlines is an interesting case. In 2005, Delta Airlines filed for bankruptcy, along with a few other airlines that were experiencing hard times. According to the bankruptcy analysis, it appears that Delta Airlines' Z"-score is getting better from -1.114 in 2011 to .657 in 2015. Although still in the red now (Table 36), they seem to be improving.

Table 36.   Delta Airlines' Bankruptcy Analysis.

Delta Airlines Z"-Score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	-1.046	-0.934	-0.565	-0.736	-0.750
Retained Earning to Assets	0.468	0.209	0.190	-0.541	-0.629
Earnings Before Interest and Taxes to Assets	0.966	0.214	0.435	0.324	0.298
Shareholder's Equity to Liabilities	0.269	0.205	0.301	-0.048	-0.033
Sales to Assets					
Total	0.657	-0.306	0.361	-1.001	-1.114

🟥	Z"<1.1, Bankrupt
🟨	1.1<Z"<2.6, Unknown
🟩	Z">2.6, Non-Bankrupt

Delta Airlines Z-Score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	-0.191	-0.171	-0.103	-0.135	-0.137
Retained Earning to Assets	0.201	0.090	0.082	-0.232	-0.270
Earnings Before Interest and Taxes to Assets	0.474	0.105	0.213	0.159	0.146
Shareholder's Equity to Liabilities	0.154	0.117	0.172	-0.027	-0.019
Sales to Assets	0.766	0.747	0.723	0.823	0.807
Total	1.404	0.888	1.087	0.588	0.528

🟥	Z<1.81, Bankrupt
🟨	1.81<Z<2.99, Unknown
🟩	Z>2.99, Non-Bankrupt

5.   Fraud Analysis

Delta Airlines' financial statements do not suggest fraud. The results of the financial statement fraud analysis are shown in Table 37. The SGAI fraud ratio could not be calculated since the required income statement data was not provided. Absent SGAI, the results indicate no financial statement fraud.

Table 37.   Delta Airlines' Fraud Analysis.

Delta Airlines				
Fraud Ratio	2015	2014	2013	2012
DSRI	0.872	1.336	0.923	1.037
GMI	0.285	1.647	0.659	0.948
AQI	0.933	1.069	1.136	0.978
SGI	1.008	1.069	1.030	1.044
DEPI	0.923	0.870	0.919	1.004
SGAI	0.000	0.000	0.000	0.000
LCGI	0.975	1.023	0.838	0.969
TATA	-0.064	-0.079	0.116	-0.033
M Score	-3.124	-1.964	-1.891	-2.415

M<-1.78, no fraud
M>-1.78, fraud

Delta Airlines has a favorable board composition. A favorable board composition implies the potential for fraud behavior is low; whereas, an unfavorable board composition would imply the potential for fraud behavior is high. There are 19 members on the board, and five are employed by Delta, the remaining 14 members are considered outsiders. The percentage of outsiders is 74%, which is above the threshold between a favorable and unfavorable board composition. An unfavorable board composition is when the percentage of outsiders drops below 50.2%. The next section discusses the financial analysis of Lockheed Martin.

D.   LOCKHEED MARTIN'S FINANCIAL ANALYSIS

This financial analysis of Lockheed Martin (hereafter referred to as Lockheed) encompasses five different analyses. The first financial analysis will be a ratio and comparative analysis. The second and third analyses will be a horizontal analysis and a vertical analysis. The fourth analysis will be a bankruptcy analysis, and the fifth analysis will be a fraud analysis.

1.   Ratio Analysis

The ratio analysis completed on the Lockheed's financial statements is presented in this section. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The

base year selected is December 31, 2011, which is the earliest period. The key financial components of this ratio analysis are broken down into four major ratio categories: Liquidity, Solvency, Profitability, and Efficiency. Each category is further broken down, and the analysis is focused on two ratios selected from the list of financial ratios discussed in Chapter II. In addition to the ratios selected for determining Lockheed's financial health, further analysis compares Lockheed's ratios to the industry averages. It is very important to note that the financial health of a company cannot be determined based solely on the analysis of only one specific category of ratios.

a.   Liquidity Ratios

The first step to determining the financial health of Lockheed is to focus heavily on the company's core financial statements. In this particular case, it was important to look at the liquidity of the company first. The liquidity or short-term ratio analysis completed on Lockheed's financial statements is presented in Table 38. All analysis shown in Table 38 are compared to the industry averages. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. Short-term liquidity focuses on Lockheed's ability to raise cash from all its available resources.

Table 38.   Liquidity Ratio Analysis of Lockheed Martin's Financial
             Statements. Adapted from Mergent Online (n.d.).

Liquidity Ratios	2015	2014	2013	2012	2011
Quick Ratio	0.65	0.66	0.76	0.70	0.80
Industry Avg.	**1.02**	**0.98**	**1.14**	**1.02**	**1.04**
Current Ratio	1.15	1.11	1.20	1.14	1.16
Industry Avg.	**2.06**	**1.55**	**1.64**	**1.52**	**1.51**

The quick ratio is analyzed first. The analysis included conducting a 5-year trend analysis of Lockheed's financial statements and comparing current assets to current liabilities which are both found on the company's balance sheet. It measures whether or not assets that are readily convertible into cash could meet current obligations. Therefore,

a ratio of 1 or higher is generally considered satisfactory (Mergent online, n.d.). Based upon the analysis using Mergent Online financial statements, Lockheed is operating below the industry average for all years analyzed (Table 38). After averaging out the five-year breakdown, Lockheed's quick ratio is 32% below industry average. Based on the financial statements, Lockheed's quick ratio shows negative signs of liquidity. Figure 42 shows a five-year quick ratio comparison between Lockheed Martin and industry peers.
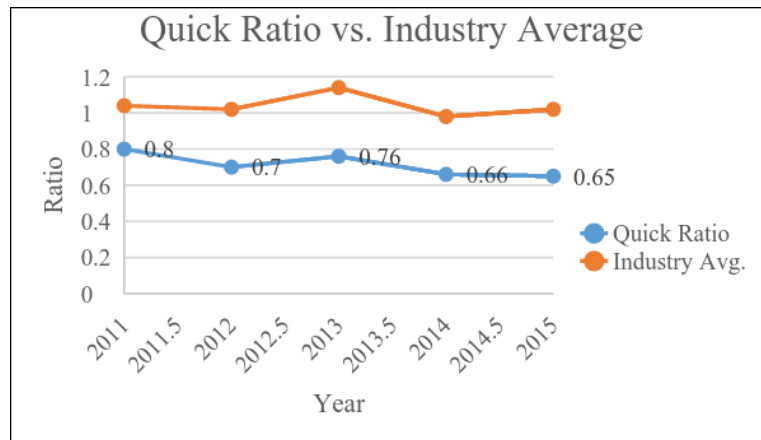
Figure 42. Lockheed Martin's Quick Ratio versus Industry Average Trend Analysis.

The second liquidity ratio analyzed is the current ratio. The current ratio is designed for internal and external oversight in which the ratio aids end users in determining the extent to which current liabilities can be covered by current assets (Rist & Pizzica, 2015). This ratio divides current assets by current liabilities and generally considered desirable for industrial companies when it has a ratio of 2.5 or higher (Mergent online, n.d.). In this analysis, Lockheed's current ratio fails to meet the benchmark of the industry average for all five years.

Based on the consistent decline in current ratio, it could be determined that Lockheed's current liabilities dominate current assets, which indicate that the company may have liquidity issues. Figure 43 shows a graphical representation of a five-year current ratio comparison between Lockheed Martin and industry peers.
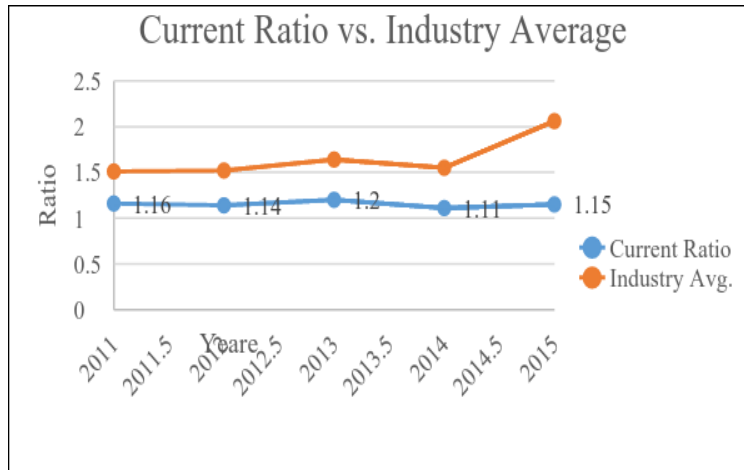
Figure 43. Lockheed Martin's Current Ratio versus Industry Average Trend
Analysis.

b.   *Solvency Ratios (Debt Management)*

Solvency ratios may also be referred to at times as leverage ratios or debt management ratios. These leverage ratios allow for end users to quickly analyze the ability of a company to repay long-term debt. The solvency ratios selected for Lockheed consisted of L-T debt-to-equity and total debt-to-equity. Both ratios are used to focus on the capital structure of Lockheed when referring to their ability to repay debt. Table 39 shows Lockheed's long-term debt-to-equity and total debt-to-equity over the most current five years. Both ratios are compared against the industry average for each respective year.

Table 39.   Solvency Ratio Analysis of Lockheed Martin's Financial
Statements. Adapted from Mergent Online (n.d.).

Solvency Ratios	2015	2014	2013	2012	2011
LT Debt to Equity	4.62	1.81	1.25	157.9	6.45
Industry Avg.	**1.95**	**1.50**	**1.04**	**32.58**	**2.58**
Total Debt to Equity	4.93	1.81	1.25	161.74	6.45
Industry Avg.	**1.75**	**1.35**	**0.95**	**33.40**	**2.77**

The first solvency ratio analyzed was the L-T debt-to-equity ratio. L-T debt-to-equity is determined through the comparison of external funding with equity funding (Mergent online, n.d.). As shown in Table 39, Lockheed's L-T debt-to-equity is well

above the industry average with a significant increase in 2012. In comparison to the industry average, Lockheed's five year ratio is above the average by over 29%. This would easily put Lockheed in a category of being considered a risky company. Since 2012, Lockheed has seen some decline in debt, in which the gap in the ratio slowly closed compared to the industry. Figure 44 shows a five-year L-T debt-to-equity ratio comparison between Lockheed and its industry peers.
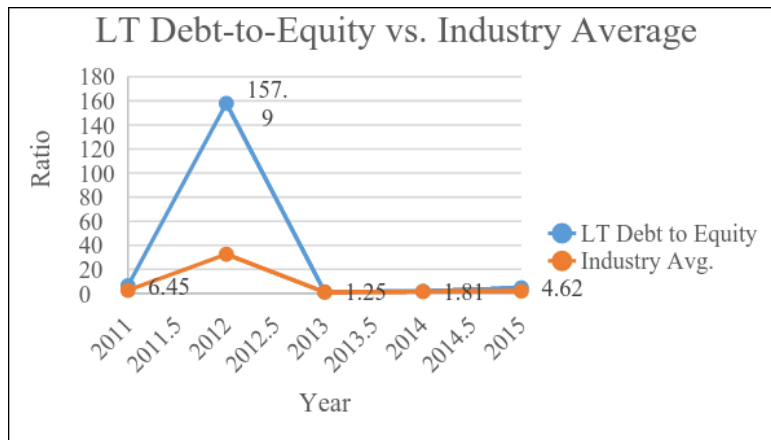
Figure 44. Lockheed Martin's LT Debt-to-Equity Ratio versus Industry Average Trend Analysis.

The second ratio analyzed is the total debt-to-equity ratio. Similar to the previous ratio, total debt-to-equity is also used to determine the company's financial leverage. In this analysis, Lockheed's total debt-to-equity ratio is again well above the comparative industry average, and therefore, could be considered as being risky. Table 39 shows the ratio analysis, and Figure 45 shows a five-year total debt-to-equity ratio comparison between Lockheed and its industry peers.
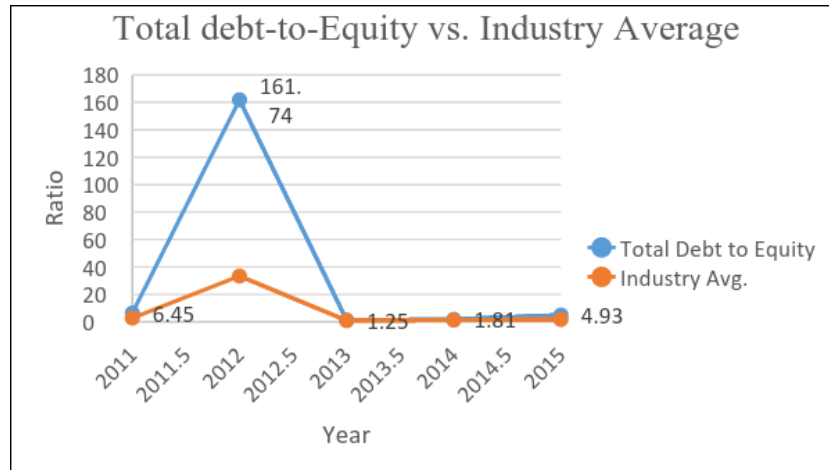
Figure 45. Lockheed Martin Total Debt-to Equity Ratio versus Industry
Average Trend Analysis.

c.   *Profitability Ratios*

Determined as the ratio that provides a financial picture of a company's financial health, the profitability ratio has been deemed as the king of all ratios (Rist & Pizzica, 2015). Table 40 shows the two profitability ratios and provides more details on how Lockheed is really operating financially in comparison to its industry peers. The two profitability ratios selected for this analysis are ROA and ROE.

Table 40.   Profitability Ratio Analysis of Lockheed Martin's Financial
Statements. Adapted from Mergent Online (n.d.).

Profitability Ratios	2015	2014	2013	2012	2011
ROA % (Net)	8.36	9.87	7.97	7.15	7.28
Industry Avg.	**-35.83**	**-104.14**	**4.70**	**3.24**	**4.98**
ROE % (Net)	110.97	86.90	120.27	526.44	112.76
Industry Avg.	**-14.47**	**-199.4**	**38.35**	**123.17**	**56.08**

The first ratio selected is the return on assets. Based on the data obtained from Mergent Online, Lockheed Martin's return on assets for 2011 through 2015 are all above the industry average. This is a good sign for the financial health of Lockheed. Based on the previous ratios, the company could have been easily been depicted as being in financial trouble. Compared to the other financial ratios, in profitability, Lockheed has done well in comparison to its peer companies. Lockheed's five-year average on returns

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exceeds the industry averages. In 2014 and 2015, the industry declined in the profitability ratio category, but Lockheed was able to retain positive growth.

What this means to the shareholders of Lockheed is that for every 100 dollars invested in assets, Lockheed is earning positive income between $8.13 and receiving returns above the industry average of $.75 during the years analyzed. Table 40 shows a complete ratio breakdown and US industry comparison.
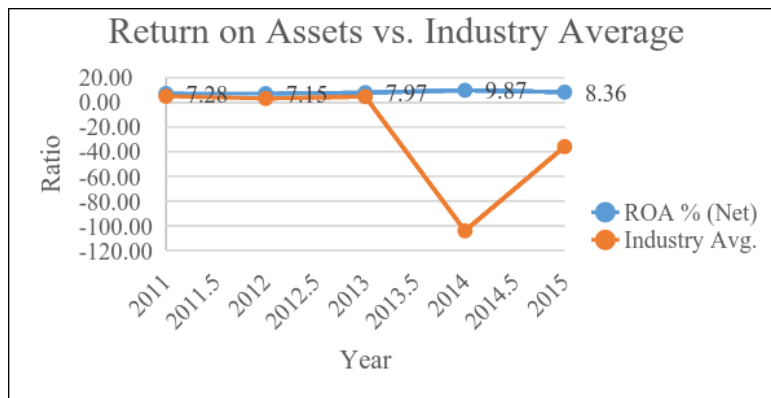
Figure 46. Lockheed's Inventory Turnover Ratio versus Industry Average
Trend Analysis.

The second profitability ratio analyzed is return on equity. Similar to the ratios obtained in return on assets, Lockheed's return on equity provides insight that the company is operating well in this industry and could be considered financially healthy. Based on the data obtained from Mergent Online and reflected in Table 40, Lockheed has been able to maintain return on equity well above industry average. With the exception of the decrease in 2014, Lockheed is still producing returns well over the industry average and has done well with investments. Figure 47 shows a graphical depiction of Lockheed's ability to maintain stability of its ROE compared to the US industry during the five-year analysis.
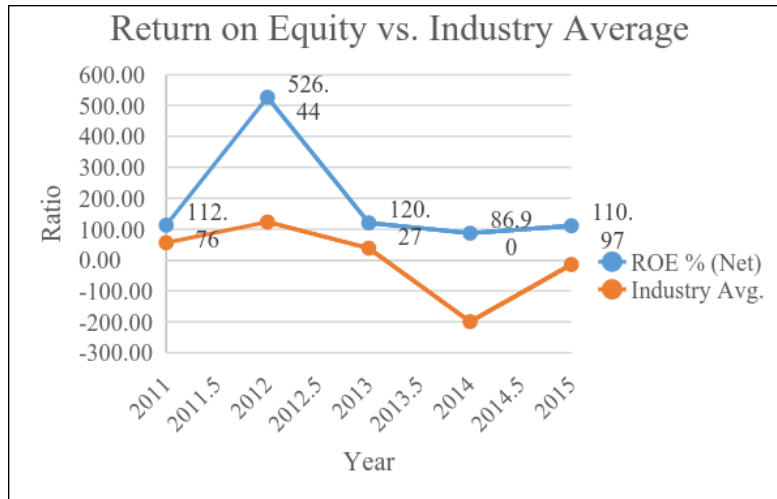
Figure 47. Lockheed's Inventory Turnover Ratio versus Industry Average
Trend Analysis.

d. *Efficiency Ratios*

Sometimes referred to as turnover or performance ratios, efficiency ratios help companies analyze their ability to make profits from sales generated (Rist & Pizzica, 2015). Generally, a company should maintain a higher ratio in this category to be viewed as financially healthy. Sometimes companies inappropriately invest in too many long-term assets that do not meet the company's sales objectives; therefore, companies should properly manage assets. In this particular analysis, Lockheed's total asset turnover and inventory turnover are both analyzed (Table 41).

Table 41.   Efficiency Ratio Analysis of Lockheed Martin's Financial
Statements. Adapted from Mergent Online (n.d.)

Efficiency Ratios	2015	2014	2013	2012	2011
Total Asset Turnover	1.07	1.24	1.21	1.23	1.27
Industry Avg.	0.71	0.80	0.97	0.99	1.02
Inventory Turnover	10.44	13.77	13.92	15.87	17.61
Industry Avg.	8.48	11.69	12.37	12.79	13.17

The first efficiency ratio analyzed is total asset turnover. Lockheed has operated above the industry average for the five years analyzed. Based on the ratio analysis obtained through Mergent Online, Lockheed's total asset turnovers have outperformed its

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peer companies in the US industry by a ratio greater than .29 for the past five years (Table 41). What this analysis means for shareholders of Lockheed's financial statements is that for every dollar invested over this five-year span, Lockheed is generating a profit of $1.19 compared to the industry average of $.90. Figure 48 shows a comprehensive trend analysis of Lockheed's total assets turnover compared to industry averages.
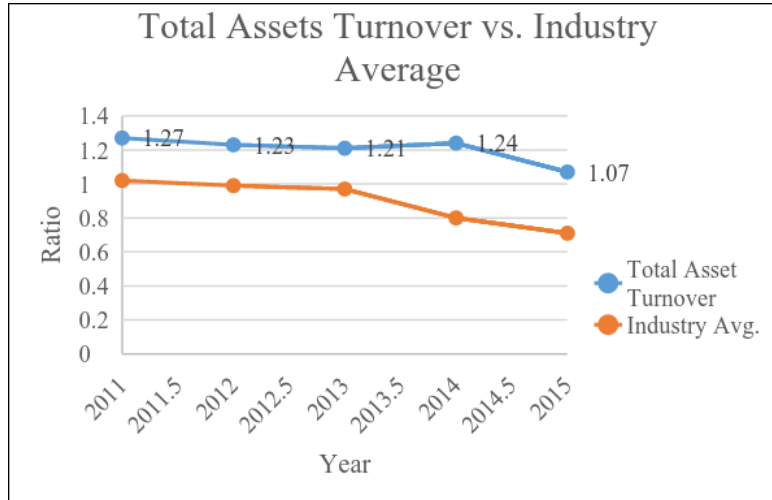
Figure 48. Lockheed Martin's Inventory Turnover Ratio versus Industry Average Trend Analysis.

The second efficiency ratio analyzed is inventory turnover. This ratio is determined by the annualized cost of sales divided by average inventories. Throughout the five-year analysis, Lockheed effectively operated with a higher inventory turnover ratio than the industry average. Throughout the analysis, Lockheed has been on a steady decline (Figure 48). Based on the analysis, one could argue that Lockheed is operating in a financially healthy state and has the capabilities to maintain, sell, and replace inventory in a timely manner. A graphical comparison between Lockheed Martin and its industry average is depicted in Figure 49. Again, one should be cautious of measuring financial health based only on a single ratio category.
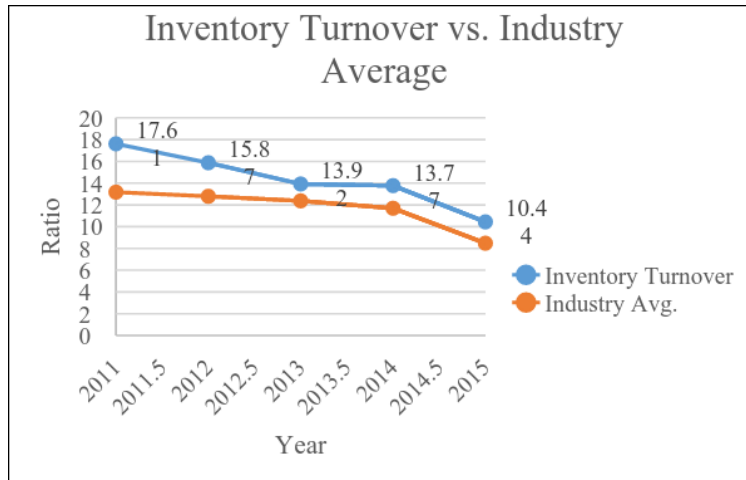
Figure 49. Lockheed's Inventory Turnover Ratio versus Industry Average
Trend Analysis.

2.   Horizontal Analysis

The horizontal analysis completed on Lockheed Martin's financial statements is presented in Table 42. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. The base year selected is December 31, 2011, which is the earliest period. Not all of the line items are presented here as only the major categories are represented (Table 42). Total assets always equal total liabilities and shareholder's equity; therefore, only total assets are shown. A more comprehensive horizontal analysis of Lockheed Martin's financial statements is presented in the Appendix.

Table 42.　Horizontal Analysis of Lockheed Martin's Financial Statements.

Lockheed Martin Corp

Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	115%	87%	95%	98%	100%
Total assets	130%	98%	95%	102%	100%
Total current liabilities	116%	92%	92%	100%	100%
Long-term debt, net	221%	95%	95%	95%	100%
Total liabilities	125%	91%	85%	105%	100%
Retained earnings	119%	125%	119%	111%	100%
Total stockholders' equity	309%	340%	491%	4%	100%
Total liabilities and stockholders' equity	130%	98%	95%	102%	100%

Consolidated Statements of Earnings - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total net sales	99%	98%	98%	101%	100%
Total cost of sales	96%	94%	96%	101%	100%
Earnings from continuing operations before income taxes	138%	145%	114%	112%	100%
Income tax expense	147%	171%	125%	138%	100%
Net earnings from continuing operations	135%	136%	111%	103%	100%

Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	120%	91%	107%	37%	100%
Net cash used for investing activities	1235%	219%	142%	149%	100%
Net cash provided by (used for) financing activities	-199%	155%	126%	96%	100%

　　　　The balance sheet is analyzed first. A graphical depiction of the horizontal analysis conducted on Lockheed Martin's balance sheets is presented in Figure 50. From the 2011 base year, Lockheed Martin remained relatively stable with modest increases on all line items, except for long-term debt and stockholders' equity. Long-term debt is flat until 2015 when it jumped to 121%. Stockholders' equity decreased significantly in 2012, and then subsequently increased to 491% in 2013. From 2013 to 2015, stockholders' equity decreased slightly for the next two years to 309%. Further investigation showed a decrease in accumulated other comprehensive loss which accounts for the increase in stockholders' equity.
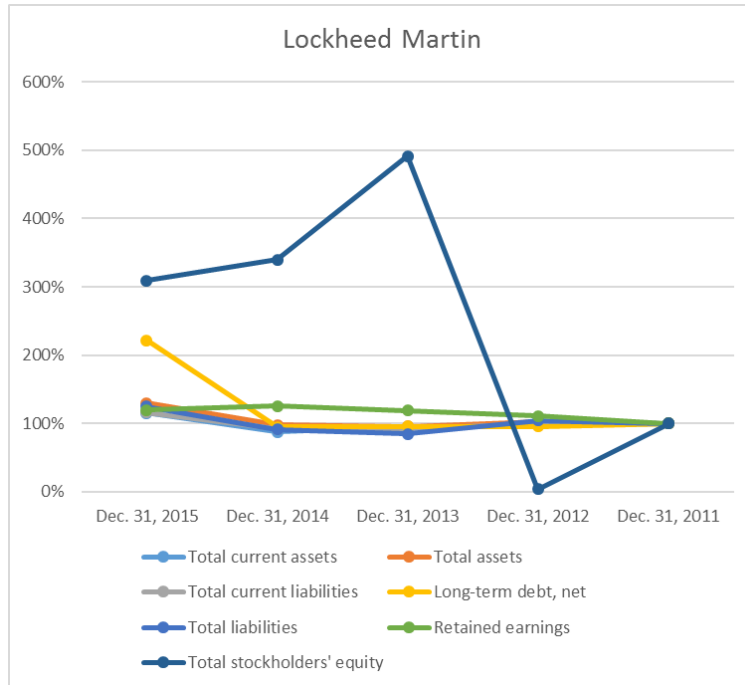
Figure 50. Lockheed Martin's Balance Sheet Horizontal Analysis.

The income statement is analyzed second. A graphical depiction is presented in Figure 51. From the 2011 base year, net income had a gradual increase to 2013, until 2014, when net income showed a significant increase to 135% in 2014. Net income remained stable after 2014. Sales and Cost of Sales gradually decreased to 98% and 94%, respectively, in 2013 and 2014, and remained stable after 2014.

Figure 51. Lockheed Martin's Income Statement Horizontal Analysis.

The statement of cash flows is analyzed third. A graphical depiction is presented in Figure 52. Net cash flows were unchanged from 2011 to 2014. After 2014, cash flow activities change significantly. In 2015, the net cash inflows from operating activities increased to 120%; however, the net cash outflows on investing activities increased substantially to 1235%. The large increase in net cash outflows from investing activities was offset by net cash inflows provided by financing activities in 2015 (refer to the Appendix for a more comprehensive horizontal analysis of Lockheed Martin).
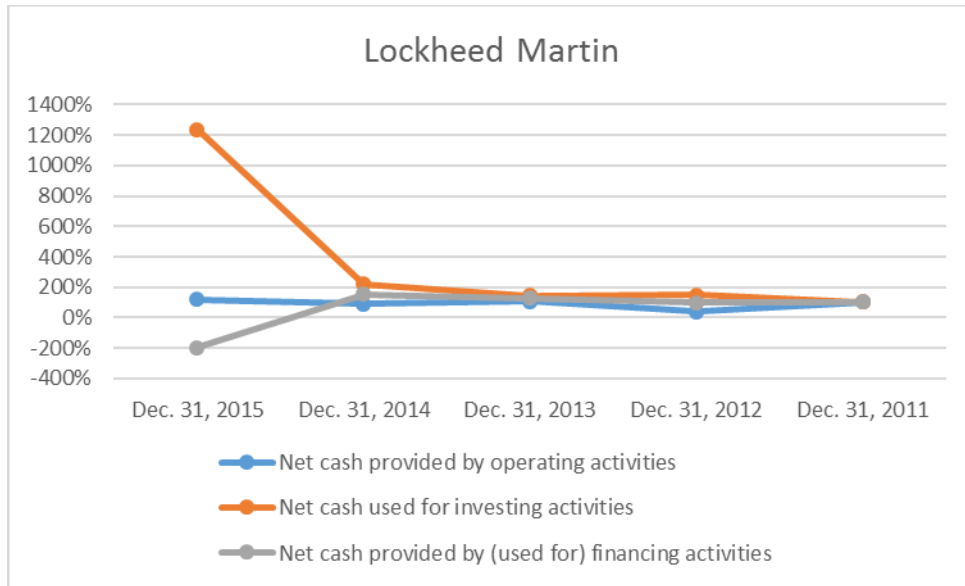
Figure 52. Lockheed Martin's Statement of Cash Flows Horizontal Analysis.

3.   Vertical Analysis

The vertical analysis completed on Lockheed Martin's financial statements is presented in Table 43. The balance sheets, income statements, and statements of cash flow were all analyzed spanning a five-year period, starting with the most recent period first. Vertical analysis of the balance sheets was performed using total assets for the basis of comparison. The income statements and statement of cash flows used total sales or revenues for basis of comparison. Not all of the line items are presented here as only the major categories are represented (Table 43). A more comprehensive vertical analysis of Lockheed Martin's financial statements is presented in the Appendix.

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Table 43.   Vertical Analysis of Lockheed Martin's Financial Statements.

Lockheed Martin Corp

Consolidated Balance Sheets - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total current assets	33%	33%	37%	36%	37%
Total assets	100%	100%	100%	100%	100%
Total current liabilities	29%	30%	31%	31%	32%
Long-term debt, net	29%	17%	17%	16%	17%
Total liabilities	94%	91%	86%	100%	97%
Retained earnings	29%	40%	39%	34%	31%
Total stockholders' equity	6%	9%	14%	0%	3%
Total liabilities and stockholders' equity	100%	100%	100%	100%	100%

Consolidated Statements of Earnings - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Total net sales	100%	100%	100%	100%	100%
Total cost of sales	89%	88%	91%	91%	92%
Earnings from continuing operations before income taxes	11%	12%	9%	9%	8%
Income tax expense	-3%	-4%	-3%	-3%	-2%
Net earnings from continuing operations	8%	8%	7%	6%	6%

Consolidated Statements of Cash Flows - USD ($) in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net cash provided by operating activities	11%	8%	10%	3%	9%
Net cash used for investing activities	-21%	-4%	-2%	-2%	-2%
Net cash provided by (used for) financing activities	9%	-7%	-6%	-4%	-5%

The balance sheets are analyzed first. A graphical depiction is shown in Figure 53. Total current assets remained fairly stable with a slight decreasing trend. As a percentage of total assets, total current assets went from 37% in 2011 to 33% at the end of 2015. Total current liabilities follow a similar trend with total current assets with a decrease from 32% in 2011 to 29% in 2015. Long-term debt remains constant until the end of 2015 where it increased from 17% as a percentage of total assets to 29%. Total liabilities decreased to 86% in 2013, and then returned to 94% in 2015. Retained earnings increased to 40% in 2014, and then returned to 29% in 2015. Total stockholders' equity increased to 14% in 2013, and then returned to 6% in 2015.
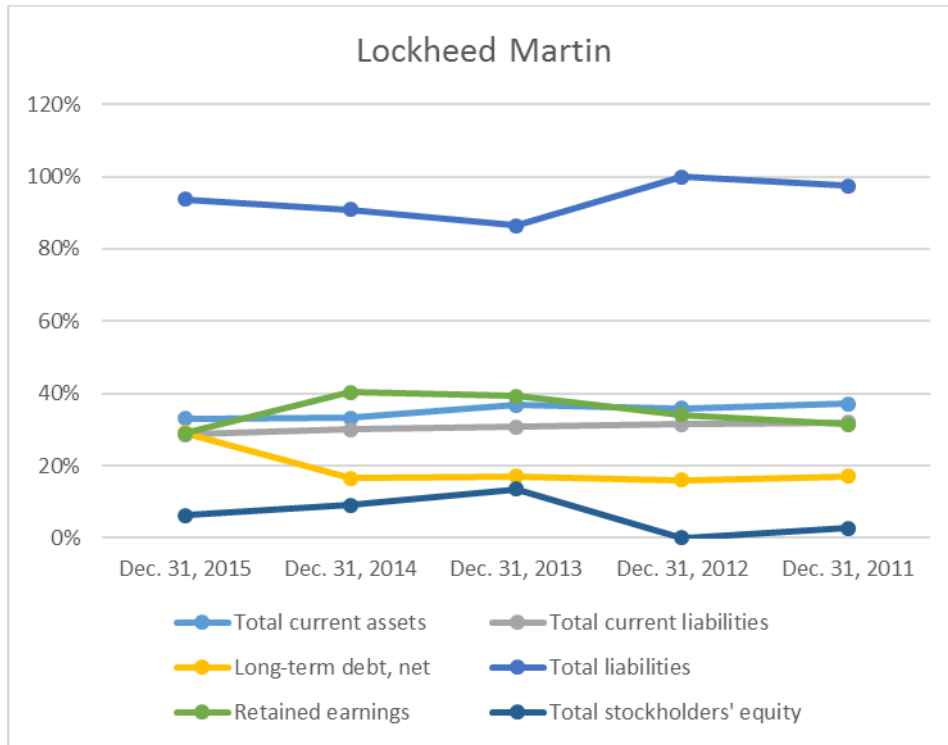
Figure 53. Lockheed Martin's Balance Sheet Vertical Analysis.

The income statements are presented next. A graphical depiction is presented in Figure 54. Total cost of sales as a percentage of total sales remained stable with only a slight decrease from 92% in 2011 to 89% in 2015. As expected, income was stable with only a slight increase from 6% in 2011 to 8% in 2015. This was most likely due to the slight decrease in the percentage of total cost of sales.
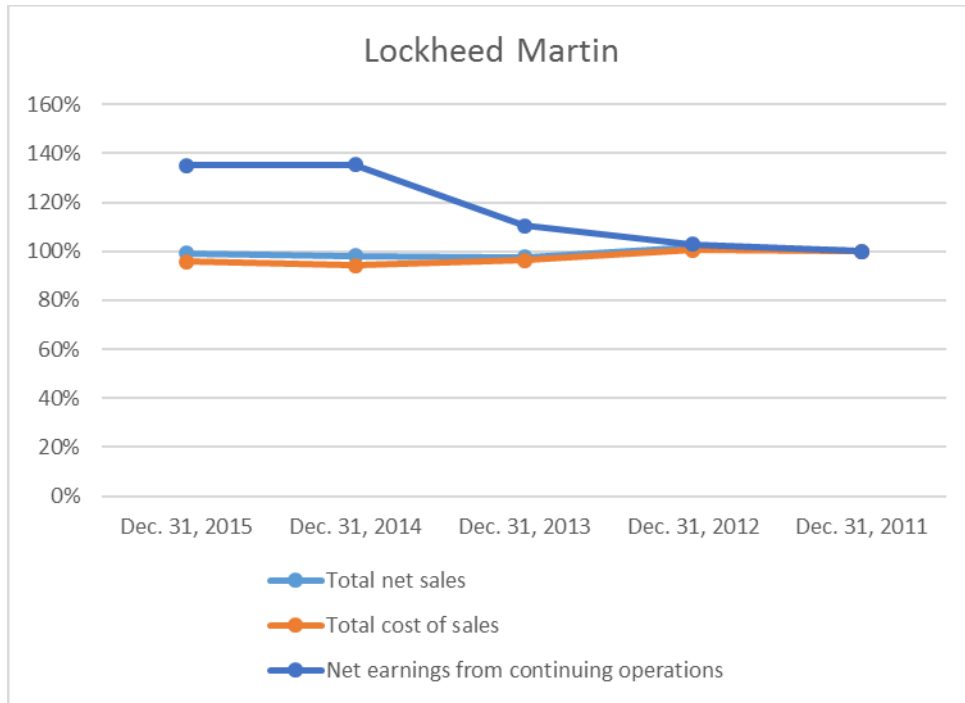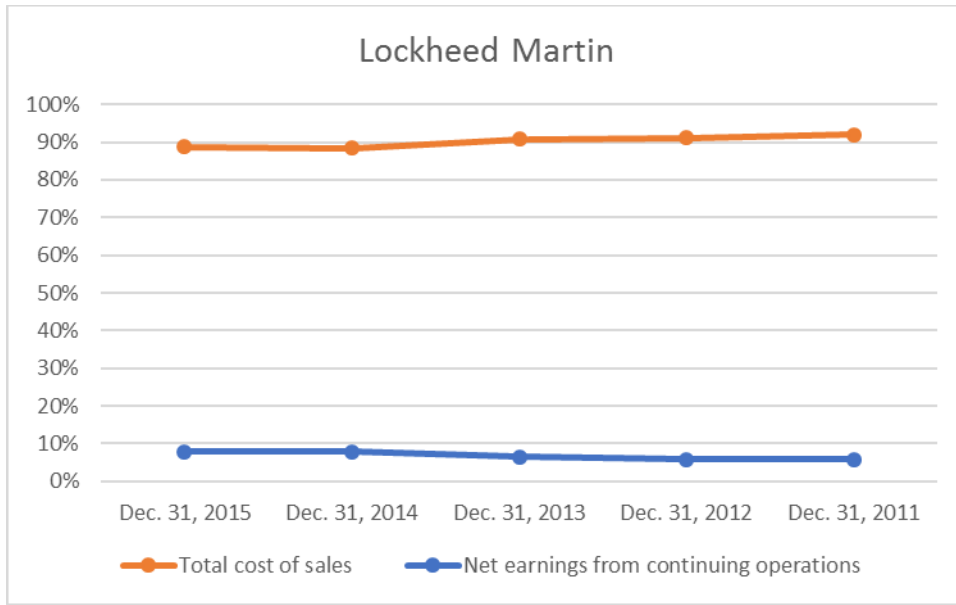
Figure 54. Lockheed Martin's Income Statement Vertical Analysis.

The statement of cash flows is analyzed last. A graphical depiction is presented in Figure 55. Net cash flows generated from operating activities remained fairly stable fluctuating between 8 and 11% as a percentage of total sales. The only inconsistency was a decrease to 3% in 2012; however, operating activities recovered to 10% in 2013. Net cash outflows for investing activities remained stable with a slight decrease to 4% in 2014. In 2015, net cash outflows for investing activities increased significantly to 21%. Net cash outflows for financing activities followed the same trend as investing activities; however, financing activities went from a net outflow to a net inflow to compensate for the increase in net cash outflows in investing activities in 2015.
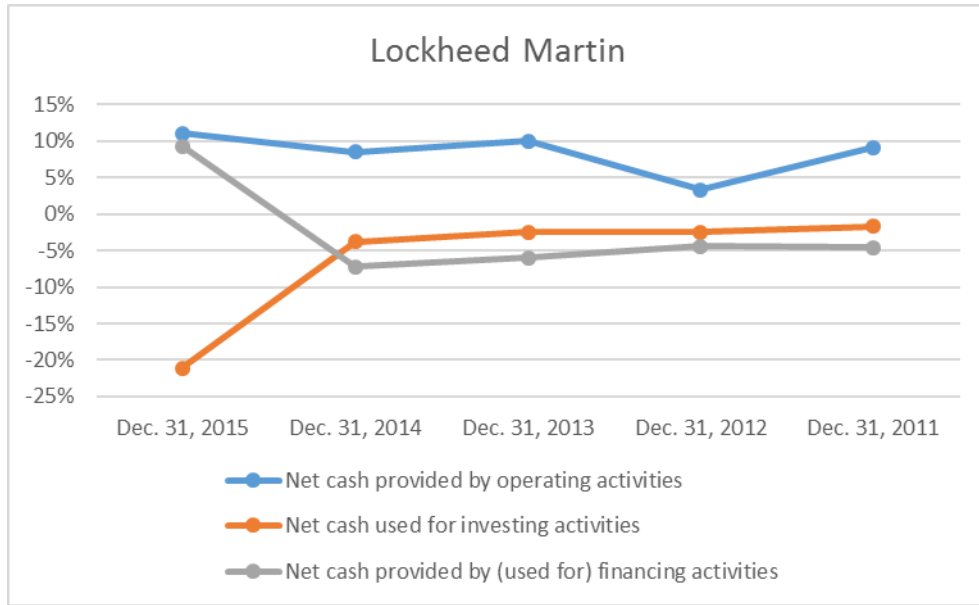
Figure 55. Lockheed Martin's Statement of Cash Flows Vertical Analysis.

4.   Bankruptcy Analysis

The bankruptcy analysis of Lockheed initially shows the company trending away from possible bankruptcy; however, the most recent period shows a complete reversal of the company toward possible bankruptcy. The results of both the original Z-score and the updated Z"-score analyses are shown in Table 44. The most recent period is to the far left and labeled "0," and all subsequent periods are shown as a subtraction from the current period. One can see how each variable contributes to the overall Z-score. The updated Z-score model portrays a slightly more favorable situation compared with the original version of the model. Lockheed's Z-score in 2015 is within the bankruptcy level, however only slightly inside this zone. Both models indicate Lockheed's best periods were its past two reporting periods with a decline to their lowest Z"-score and Z-score in the most current period.

Table 44.   Lockheed Martin's Bankruptcy Analysis.

Lockheed Martin Corporation Z"-score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	0.286	0.214	0.400	0.288	0.340
Retained Earning to Assets	0.945	1.316	1.279	1.114	1.027
Earnings Before Interest and Taxes to Assets	0.748	1.015	0.837	0.774	0.706
Shareholder's Equity to Liabilities	0.071	0.106	0.165	0.001	0.028
Sales to Assets					
Total	2.049	2.652	2.681	2.178	2.101

🟥	Z"<1.1, Bankrupt
🟨	1.1<Z"<2.6, Unknown
🟩	Z">2.6, Non-Bankrupt

Lockheed Martin Corporation Z-score

Variable	0	-1	-2	-3	-4
Working Capital to Assets	0.052	0.039	0.073	0.053	0.062
Retained Earning to Assets	0.406	0.565	0.549	0.478	0.441
Earnings Before Interest and Taxes to Assets	0.367	0.499	0.411	0.380	0.347
Shareholder's Equity to Liabilities	0.040	0.061	0.094	0.001	0.016
Sales to Assets	0.939	1.231	1.253	1.221	1.227
Total	1.805	2.395	2.381	2.133	2.093

🟥	Z<1.81, Bankrupt
🟨	1.81<Z<2.99, Unknown
🟩	Z>2.99, Non-Bankrupt

5.   Fraud Analysis

Lockheed's financial statements do not suggest fraud. The results of financial statement fraud analysis are shown in Table 45. The SGAI fraud ratio could not be calculated since the required income statement data was not provided. Absent SGAI, the results indicate no financial statement fraud.

Table 45.   Lockheed Martin's Fraud Analysis.

Lockheed Martin Corporation

Fraud Ratio	2015	2014	2013	2012
DSRI	1.356	1.002	0.925	1.067
GMI	1.037	1.040	0.940	0.960
AQI	1.036	1.075	0.963	1.028
SGI	1.012	1.005	0.961	1.015
DEPI	1.041	1.000	0.988	0.985
SGAI	0.000	0.000	0.000	0.000
LVGI	1.240	0.976	1.008	0.966
TATA	-0.030	-0.007	-0.044	0.031
M Score	**-2.153**	**-2.274**	**-2.669**	**-2.090**

M<-1.78, no fraud
M>-1.78, fraud

Lockheed has a favorable board composition. A favorable board composition implies the potential for fraud behavior is low; whereas, an unfavorable board composition would imply the potential for fraud behavior is high. There are 12 members on the board, and only one is employed by Lockheed, while the remaining 11 members are considered outsiders. The percentage of outsiders is 92%, which is above the threshold between a favorable and unfavorable board composition. An unfavorable board composition is when the percentage of outsiders drops below 50.2%. The next section discusses the implications and limitations of this study.

E.   IMPLICATIONS AND LIMITATIONS

Some of the implications related to DOD contracting officers are discussed in this section. In addition, some of the problems that this study faced regarding financial reporting standardization, horizontal analysis, and vertical analysis are discussed. This section also discusses some of the benefits and limitations associated with bankruptcy and fraud analysis. Lastly, board composition and the problems encountered in selecting an industry as a basis for comparison are discussed.

1. Financial Reporting Standardization

Financial reporting is fairly standard among publicly traded companies. However, some end user interpretation may be required during analysis. US publicly traded companies are required to follow standards of reporting financial data. This makes it easier to apply a standardized process to companies when analyzing their financial health. However, not every publicly traded company interprets GAAP the same way. The end user may find that companies use different words that mean the same thing.

Therefore, the implications to DOD contracting officers is that they need to have a working knowledge of accounting terminology and be able to refer to financial statement footnotes if required. For example, Lockheed Martin reports total sales in their income statement, and Delta Airlines reports total revenue. Both line items are used interchangeably in accounting, depending on how the company operates. A formula developed for a particular financial statement analysis may call for total sales as a variable. If a company reports total revenue, then the end user would substitute total sales with total revenue as the specified variable.

2. Horizontal Analysis

Horizontal analysis is a great tool to detect a company's financial trends across periods. It displays information in such a way for a DOD contracting officer to easily identify an increase or decrease in the raw financial data for a particular line item on a financial statement. This trend information is dependent upon the number of periods under investigation. The more periods under review, the more likely an end user will be able to identify trend relationships found during the analysis of the financial statements.

However, there are some limitations and problems with using this financial tool. One problem has to do with picking the base year. For publicly traded companies, there is no limit to the number of periods to cover, other than the constraint as to when the company first began financial reporting. If there are five years of financial data or ten years of financial data, the process to perform horizontal analysis is the same. However, basing the analysis on the earliest selected base year can have significant effects on the outcome. A company can have a one-off bad financial period selected as its base year.

Delta Airlines, for example, had negative equity for two periods; however, the company quickly recovered afterwards. The negative equity skewed the analysis by indicating a large change from an otherwise stable trend (refer to Figure 36 of Delta Airlines' Balance Sheet Horizontal Analysis). The implications for contracting officers is that they should be careful when interpreting the analysis based on the selected base year and always return to the raw data when a significant change is observed.

Another limitation with horizontal analysis has to do with the calculation. As previously stated, to perform a horizontal analysis, one divides the selected period by the base period. This calculation works as long as values do not swap from negative to positive or vice a versa across the periods. In those cases, the results of the analysis may be confusing showing a decrease in levels when the actual values recorded for the line item show increased levels (refer to shareholders' equity in Figure 36 of Delta Airlines' Balance Sheet Horizontal Analysis). Delta Airlines had negative shareholders' equity for the base period, so when the following period showed a positive shareholders' equity, due to the rules of mathematics, the result is a negative percentage. From looking at the horizontal analysis, one would conclude that Delta's shareholders' equity significantly decreased in 2013. However, if one refers back to the raw data, there was in fact a large increase in shareholders' equity. Careful attention must be made during these situations in order to apply the proper interpretation of the results.

3. Vertical Analysis

Vertical analysis, which is about proportions, is another valuable financial tool. As with horizontal analysis, it is important to see how a company's financial health changes from period to period in relation to using vertical analysis in proportion to vertical line items. Any major change is highlighted by the analysis and may be pertinent information to the end user. The comparison is made about a selected line item, such as total assets or total sales. An important difference to note between a horizontal analysis and a vertical analysis is in how the data is processed and displayed. For example, in vertical analysis, an increase in proportion for a particular line item on a financial statement from one period to the next does not necessarily mean that there has been an

increase in the raw financial data. It is important for DOD contracting officers to understand that vertical analysis is only showing proportions.

4.   Bankruptcy Analysis

Bankruptcy analysis using Dr. Altman's Z-score can be useful. DOD contracting officers can compare the Z-score for a company across periods to identify fluctuations. Delta Airlines is a good example of observing the Z-score across periods (refer to Table 36 of Delta Airlines' Bankruptcy Analysis). The Z-score for Delta reflects a positive trend in its financial health. According to both the original and the updated Z-score models calculated for Delta, they predict the company as going bankrupt or already bankrupt; however, this is not true for Delta. There are limitations and flaws in the Z-score prediction as seen in the case for Delta Airlines. According to the low Z-scores, Delta should have been bankrupt five years ago. The results may put doubt into the usefulness of the Z-score model as a predictive tool. Nevertheless, it does highlight a company to the end user as to an area that may need further investigation. Delta did in fact go bankrupt in 2005; therefore, the low Z-scores may be reflective of that previous condition.

5.   Fraud Analysis

End users rely on the honest and accurate financial reporting by publicly traded companies. Dr. Beneish provides fraud analysis as a tool by utilizing his selected eight fraud ratios and a combined M-score. Unfortunately, the fraud ratios are derived from financial statements, and sometimes the financial statements do not provide all of the necessary information. For example, Lockheed Martin does not report selling, general, and administrative expenses directly on their income statement (refer to the Appendix for their financial statements). As a result, one ratio, the Selling, General, and Administrative Index (SGAI), could not be calculated and combined with the M-score (see Table 45 of Lockheed Martin Fraud Analysis). How significant is the SGAI on the overall M-score? This is difficult to answer since each of the eight ratios is weighted differently. The end user needs to be aware of these limitations prior to making an assessment into the health of a company.

Despite this limitation with fraud analysis, each fraud ratio tells a story, so it can still be useful to DOD contracting officers. For example, there are indications that UPS may have committed fraud in 2012 (refer to Table 29 UPS Fraud Analysis). Further investigation reveals that the Gross Margin Index (GMI) ratio to be abnormally high in 2012, but it returns to normal in all of the subsequent years. That abnormally high GMI drove the M-score to a level that indicate potential fraud. In the case of UPS, in 2012, it had a larger than normal operating expense due to an increase in compensation and benefits expense which caused the GMI ratio to read high. The DOD contracting officer can use these fraudulent indicators to identify potential issues.

6.   Industry Norms

Another limitation is that the financial structure of one publicly traded company may be different from another publicly traded company. When assessing the financial health of a company, it becomes difficult to determine what the normal financial behavior is for that company; therefore, a comparative analysis utilizing industry averages can be a useful benchmark. As previously discussed in Chapter II, there are many sources available to retrieve industry average data. This study utilized Mergent Online to obtain peer average data which is similar to industry average data. Since contracting officers may not have access to Mergent Online, they can access industry average data from easily accessible sources such as Reuters or Yahoo finance for free. DOD contracting officers can use industry average financial data to measure the performance of a company by comparing it to the industry norm. If a company meets or exceeds industry norms, then its financial health could be justified. If a company is below industry norms, then its financial health could be in question and might require further investigation. The problem is selecting the appropriate industry. For example, Lockheed Martin could be considered a company that operates within many industries. Lockheed Martin might be considered to fall within a research and development industry. It might also be considered to fall within an aircraft manufacturer industry. Another problem is the number of companies that operate within the industry. An industry that only has a few competing publicly traded companies might produce an industry average with a great degree of variation. The end user must be careful when selecting companies for a comparative analysis.

For example, as previously discussed, Delta had a 30% decline in 2015. This study suggests that Delta needs to justify this decline in order to continue to be considered financially healthy. In addition, Delta consistently had a current ratio below 1.0 throughout the five-year ratio analysis. This suggests that a greater detail of analysis may be necessary before DOD contracting officers award any additional contracts to this company.

7. Board Composition

Board composition can be used to predict fraud. The three companies analyzed in this study did not have board compositions that would indicate possible fraud. The lowest % of outsiders was for Delta Airlines, which was 74%. A board composition of less than 50.2% of outsiders would indicate possible fraud. The other two companies had a board composition composed of approximately 90% of outsiders. Board composition is easy to determine as the information can be collected from annual financial statements or company investor websites. DOD contracting officers could easily analyze the board composition of a prospective contractor.

8. Private Companies

Financial statement analysis of a company depends on obtaining the pertinent financial statements. Publicly traded companies are required to maintain financial statements in accordance with Generally Accepted Accounting Principles (GAAP). As previously discussed, a DOD contracting officer can easily acquire the pertinent financial statements from publicly traded companies. However, private companies are not required to maintain financial statements to the standard that publicly traded companies are required by law. As a result, a contracting officer would not be able to easily acquire the appropriate financial statements from a private company. This creates a problem for a DOD contracting officer since not all prospective DOD contractors are publicly traded companies. In order to address these limitations, a DOD contracting officer may still be able to conduct a financial statement analysis of a private company by requesting audited financial statements as part of the bid proposal package submitted by a prospective DOD contractor. The next section will discuss the recommendations based on analysis.

F.   RECOMMENDATIONS BASED ON ANALYSIS

Based on the analysis, it is recommended that a contracting officer conduct an assessment of the financial health of a prospective contractor by following the example illustrated in this study. Figure 56 illustrates the framework of this study. It is important to note that this study is limited to only publicly traded companies. A contracting officer attempting to assess the financial health of a prospective contractor would first obtain their financial statements. The contracting officer would then use the financial statements to calculate the applicable financial ratios. The result of the financial analyses is a complete financial health assessment of a prospective contractor.
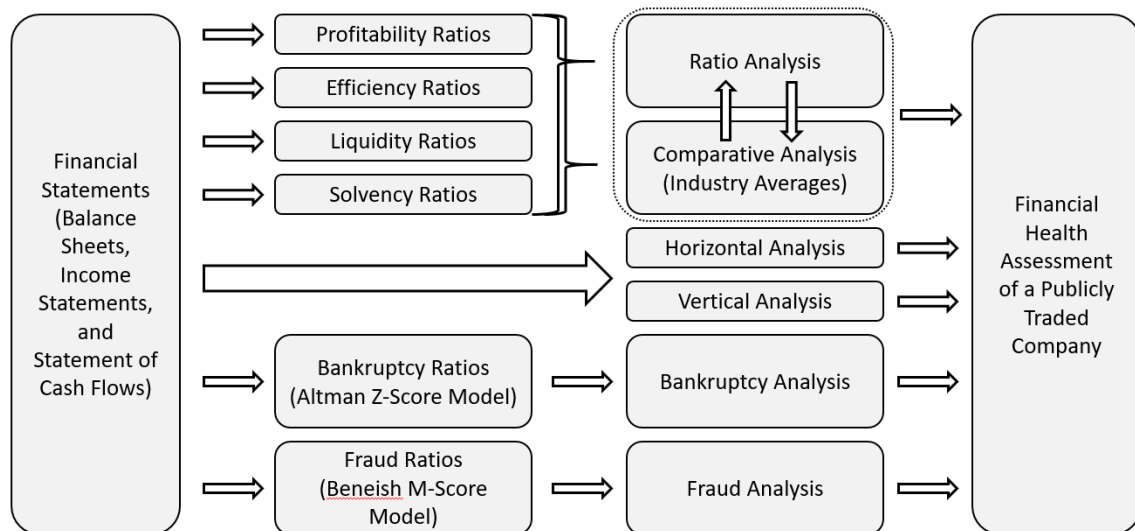
Figure 56. Financial Health Assessment Framework.

a.   *Perform a Ratio Analysis Using Select Financial Ratios and Compare Select Company Financial Ratios against Industry Averages*

The first recommendation is for the contracting officer to analyze the financial health of a publicly traded company by performing a ratio analysis. A ratio analysis covers profitability, efficiency, solvency, and liquidity ratios. Each category addresses different aspects of the financial structure of a company which together accounts for its overall financial health. Although there are many different financial ratios that can be used, this study acknowledges that resources may not be available to perform a financial

ratio analysis utilizing all available financial ratios. This study suggests a financial ratio analysis approach using a select few of the most commonly used financial ratios from each category of ratios to assess the financial health of a company, which would be a good starting point for the contracting officer. Table 46 is a summary of the selected financial ratios to assess the financial health of publicly traded companies.

Table 46.   Summary of Selected Financial Ratios.

Category	Ratio	Determinants	Measurement
Short-Term Liquidity	Quick Ratio	Cash + Marketable Securities + Accounts Receivable / Current liabilities	The quick ratio shows whether a company has enough short-term assets to cover its immediate liabilities without selling inventory.
	Current Ratio	Current Assets / Current Liabilities	The current ratio indicates the extent to which current liabilities can be "covered" by current assets.
Long-Term Solvency	L-T Debt-to-Equity	Long-Term Debt / Long-Term Debt + Shareholders' Equity	Measures the debt component of a company's capital structure or how much of the company's financing is represented by long-term debt compared to equity
	Debt-to-equity	Total Liabilities / Total Equity	Measures the extent to which company management is willing to fund its operations with debt rather than equity.
Profitability	Return on Assets	Net Income / Total Assets	Measures how profitable a company's assets are in generating revenue
	Return on Equity	Net Income / Shareholders' Equity	Measures the company's profitability by how much profit is generated with the money shareholders have invested.
Efficiency (Turnover)	Total Assets Turnover	Sales / Total Assets	Measures the sales generated per dollar of assets and is an indication of how efficient the company is in utilizing their assets to generate sales.
	Inventory Turnover	COGS / Inventory	Measures how many times a company's inventory is sold and replaced over a given period

In order to get a complete picture of the financial health of a publicly traded company, a contracting officer should select a relevant industry to which to compare the results. Financial ratios alone complete only part of the analysis. One other part requires a comparison to industry averages. Not all companies are alike as their financial structures may be different; therefore, not all ratios will apply to all of the companies. Any departure from the industry average should result in further investigation by the contracting officer.

b. Conduct a Horizontal and Vertical Analysis to Identify Trends or Significant Changes

The second recommendation is that the contracting officer should conduct a horizontal analysis and a vertical analysis of the financial statements of a prospective contractor. Both analyses capture trend data and behavioral relationships specific to potential contractor companies. Careful attention for any significant changes or deviations from a company's normal financial structure should be noted by the contracting officer. All departures from the norm should be investigated further. Usually reviewing the raw data and any footnotes contained in the financial statements provides sufficient explanation for the reasons for the fluctuations.

c. Complete a Bankruptcy Analysis Using Predictive Modeling

The third recommendation is that the contracting officer conduct a bankruptcy analysis utilizing Dr. Altman's Z-score model. The Z-score provides predictive capability that is highly accurate. When the Z-score is calculated across multiple periods, it can provide trend information. The complexity of the ratios and the formula adds to the time required to compute each Z-score. The contracting officer should not treat the Z-score as a single tool to assess the health of a company, but as part of a combination of analyses that together can provide a comprehensive assessment of the financial health of a prospective contractor.

d. Conduct a Fraud Analysis Using Predictive Modeling

The fourth recommendation is for the contracting officer to conduct a fraud analysis in assessing the financial health of a prospective contractor. Fraud analysis does not necessarily determine financial health, but it helps to ensure the reliability of the financial information being reported. As all the other types of analyses previously discussed depend on the reliability of the financial information reported. A fraud analysis can aid the contracting officer to rule out the possibility of fraudulent financial statement reporting perpetrated by the prospective contractor. The M-score incorporates eight fraud ratios, and therefore, is extremely time consuming. During this study, the complete M-score could not be computed for all the companies because certain companies do not

report some of the required information to be able to calculate the M-score. This is a potential limitation of the M-score; however, when the M-score is calculated across multiple periods, it can provide trend information similar to calculating the Z-score across multiple periods. Any large or unusual changes or deviations from the normal are highlighted by the analysis to indicate a possible need for further investigation by the contracting officer. Anything unusual should be investigated further by the contracting officer. Due to time and effort constraints, the contracting officer may have to decide to forgo the complete analysis, so he or she could just calculate one or two fraud ratios to see if anything looks unusual. The fraud ratios are merely indicators of possible fraud.

Board composition is another predictive tool that could be incorporated into the fraud analysis. Board composition can be easily determined from the non-financial data contained in annual financial statements or investor websites of publicly traded companies. Similar to the M-score, if the percentage of outsider board members is below a certain threshold, there exists the potential for fraud.

G. SUMMARY

This chapter presented a process that DOD contracting officers might follow when determining the financial health of a prospective contractor before awarding a contract. This chapter consisted of three identical analyses of three different companies. The analysis of each company involved a compilation of five analyses that were selected in Chapter IV to arrive at an assessment of the financial health of a prospective contractor. The first analysis was a ratio and comparative analysis using industry averages. The second and third analyses were a horizontal analysis and a vertical analysis, respectively. The fourth analysis was a bankruptcy analysis, and the fifth analysis was a fraud analysis. In addition, the implications and limitations of this study as well as the recommendations based on the analysis were discussed. The final chapter includes a summary, conclusions, and areas for further research.

VI. SUMMARY, CONCLUSIONS, AND AREAS FOR FURTHER RESEARCH

The Department of Defense (DOD) spends billions of American taxpayers' dollars annually to support programs which are designed to increase warfighter capabilities. Based on many recent events relating to improper contracting, it is imperative that the DOD research and determine a method of awarding contracts to help avoid scandals. Prior to the awarding of a contract, a DOD contracting officer must be able to determine the financial health of a prospective contractor.

This study identified a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. The first chapter covered the introduction, as well as the background of this study. Chapter II provided a literature review focusing on the topics relevant to the research purpose and research questions. The focus was given to the selection of a few key financial ratios applicable to the assessment of financial health and the analysis methods used for the assessment of the financial health of a publicly traded company.

Chapter III explained the methodology used in this research study. First, this study involved a literature review to construct a framework of knowledge in order to address the research questions. Second, the study took the information from the literature review and applied it toward identifying financial statement indicators as part of a financial statement analysis to include ratio analysis, bankruptcy analysis, and fraud analysis. Third, this study selected a sample of Department of Defense (DOD) contractors from a pool of all DOD prime recipient contractors. Finally, this study developed a financial assessment framework, and using that framework, conducted a financial analysis of the sample companies. The overall objective was to identify a financial assessment framework to be used by a DOD contracting officer when assessing the health of a prospective contractor.

Chapter IV provided the findings of this study, and Chapter V provided the analysis of the study. A major component involved the selection of financial ratios based on four key categories of ratios to assess the financial health of a company. Three

companies representing three different industries were selected from a DOD contractor database. A financial analysis was performed on each company utilizing ratio, horizontal, and vertical analyses. Additional analysis involved bankruptcy and fraud analyses. Furthermore, this study provided recommendations based on the analysis.

A.   CONCLUSION

The purpose of this research was to identify a financial assessment framework that could assist DOD contracting officers with determining the financial health of potential DOD contractors. DOD contracting officers should determine the financial health of potential contractors prior to awarding a contract. This study compiled a set of up-to-date financial analysis tools which, if made available to contracting officers, could serve to complement an assessment of the financial health of prospective contractors.

B.   RESEARCH QUESTIONS

The following are the four research questions addressed in this study. Below each question is a short summarized answer.

1.   What financial statement ratios can be used to determine the financial health of a DOD contractor?

There are hundreds of financial statement ratios available to use in determining the financial health of a company. There are four categories of ratios that can be used to assess the financial health of a company: liquidity, solvency, profitability, and efficiency. While, there are many different financial ratios that can be used, this study acknowledges that resources may not be available to perform a financial ratio analysis utilizing all available financial ratios. This study suggests a financial ratio analysis approach using a select few of the most commonly used financial ratios from each category of ratios for financial health which could be a good starting point for the contracting officer. This study selected two financial ratios from each category of ratios that can be used to assess the financial health of a company. Table 46 provides a summary of the eight financial ratios selected for this study. For liquidity, the ratios selected were Current Ratio and Quick Ratio. For solvency, the ratios selected were Long-Term Debt to Equity and Total Debt to Equity. For profitability, the ratios selected were Return on Assets and Return on

Equity. For efficiency, the ratios selected were Total Asset Turnover and Inventory Turnover.

2.   What financial health indicators can be determined from the balance sheets, income statements, and statements of cash flows of DOD contractors?

The financial health indicators of a DOD contractor can be derived from four financial health categories. Each category points to a particular aspect of financial health of a company. The four categories are liquidity, solvency, profitability, and efficiency. Liquidity measures a company's ability to pay off short-term debt. Solvency measures the ability of a company to manage its long-term debt. Profitability measures a company's ability to generate profits. Finally, efficiency measures a company's ability to generate revenue and derive profit from its resources.

Information to support each category is derived from the line items contained in the balance sheet, income statement, or statement of cash flows reported by publicly traded companies. Table 47 shows the financial health category and some of its associated financial health indicators identified in this study.

Table 47.   Financial Health Indicators.

Financial Health Category:	Liquidity	Solvency	Profitability	Efficiency
Indicators of Financial Health:	Level of Current Assets, Current Liabilities, and Inventory	Level of Long-term Debt, Shareholders' Equity, Total Liabilities, and Total Equity	Level of Net Income, Total Assets, and Shareholders' Equity	Level of Sales Revenue, Total Assets, Cost of Goods Sold, and Inventory

3.   What particular financial indicators may signal red flags to a DOD contracting officer regarding a potential DOD contractor's financial health?

Some red flags to a DOD contractor's financial health are negative trends and significant changes in the performance of the company. The significant change or negative trend can be found by noting the behavior of the particular indicators of

financial health identified in Table 47. For example, a year after year decrease in net income with an increase in total assets suggests the performance of the company's profitability is progressively getting worse. A thorough ratio, horizontal, and vertical analyses can highlight these negative trends or significant changes to the contracting officer to facilitate further investigation.

A significant departure from the industry average is another red flag to DOD contracting officers regarding the financial health of a prospective contractor. Industry averages may suggest what the normal levels should be of particular indicators of financial health. A prospective DOD contractor who exhibits a significant departure from the industry average in terms of particular financial indicators may be a red flag to the performance of the company.

Additionally, a bankruptcy analysis using Dr. Altman's Z-score model can act as a red flag regarding the contractor's financial health. The Z-score predicts the bankruptcy of a company. If a prospective DOD contractor is found to have a Z-score that meets the threshold for bankruptcy, then this should serve as a red flag to a DOD contracting officer.

4. What factors should be taken into consideration that would indicate publicly traded companies might be engaged in inappropriate behavior to appear financially healthy?

The fraud triangle lists three factors that are unusually present when someone commits fraud. The factors are pressure, opportunity, and rationalization. Publicly traded companies may have an opportunity and pressure to commit fraud. The Federal Acquisition Regulation (FAR, 2016) requires a prospective DOD contractor to "show adequate financial resources to perform the contract or the ability to obtain financing" (9.104-1(a)); therefore, a DOD contractor might have the pressure to commit fraud in order to meet that FAR requirement. DOD contracting officers may not have the necessary training to detect fraud. Therefore, a DOD contractor may take advantage of that weakness and capitalize on the opportunity for fraud to go undetected.

The following is a list of possible factors that may indicate that a prospective DOD contractor may be engaged in inappropriate behavior to appear financially healthy in order to be awarded the contract:

- Unexplained departures from the observed financial trends as seen during a financial analysis of the company.

- Unusually high earnings or assets compared to the industry average.

- A board of directors composed of 50.2% or less of outsiders.

In addition, a contractor's M-score, as calculated using Dr. Beneish's M-score fraud model, can alert a contracting officer to a company's potential fraudulent behavior. The M-score predicts fraudulent financial reporting committed by a company. If a prospective DOD contractor is found to have an M-score that meets the threshold for fraud, then this should serve as a red flag to a DOD contracting officer that the DOD contractor may be engaged in inappropriate behavior to appear financially healthy. The next section addresses areas for further research.

C.   AREAS FOR FURTHER RESEARCH

This section discusses several recommendations of areas for further research. The following three areas are recommended for further research: industry specific financial ratios, financial framework for private companies, and industry methods of awarding contracts.

1.   Determine Industry Specific Financial Ratios

Industry specific financial ratios are one area that requires further research. The financial ratios selected for this study represent the most commonly used ratios; however, perhaps more specific ratios that apply to a particular industry may provide a better assessment of a company's financial health. This might be helpful to a contracting officer who is concerned about a certain industry pertaining to the type of work involved by the contractor. For example, a contracting officer may need research and development on a new capability requirement on an existing asset. The contracting officer may then be concerned with a capital intensive type industry. If certain financial ratios apply toward a

capital intensive type industry, a contracting officer would then select those specific and appropriate financial ratios. Industry specific ratios may be helpful to a contracting officer in determining the financial health of a company.

2. Develop a Financial Framework for Private Companies

Another area of further research might be finding a process or method to assess the financial health of private companies. This study focused on publicly traded companies; however, the DOD awards contracts to private companies as well. Private companies are not required to follow the level of standard accounting procedures that are required of publicly traded companies. A couple of questions arise because of this difference between the two types of companies. First, if the accounting standards are not enforced, how does this change the financial analysis of a private company? Do the same financial ratios apply as they do for publicly traded companies? Can a bankruptcy analysis, such as Dr. Altman's Z-score, work in predicting possible bankruptcy for private companies? In addition, can a fraud analysis, such as Dr. Beneish's M-score, apply to a private company? Private companies may have different financial structures compared to publicly traded companies. What are those differences, and how might that change in the assessment of the financial health of a private company? Private companies are awarded contracts by the DOD; therefore, a process or method to assess the financial health of a private company may be helpful to a contracting officer.

3. Analyze Industry Methods of Awarding Contracts

Lastly, large public or private companies must utilize their own contracting officers when awarding contracts. Further research into what methods or processes a public or private company may engage in to assess the financial health of their contractors might be helpful to the DOD. Any takeaways or differences gleaned from this research may be incorporated into the DOD's own processes for assessing the financial health of its potential contractors.

CONSOLIDATED BALANCE SHEETS - USD ($) $ in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Current Assets:															
Cash and cash equivalents	2730	2291	$4,665	$7,327	$3,034	90%	76%	154%	241%	100%	7%	6%	13%	19%	9%
Marketable securities	1996	992	580	597	1,241	161%	80%	47%	48%	100%	5%	3%	2%	2%	4%
Accounts receivable, net	7134	6661	6,502	6,111	6,246	114%	107%	104%	98%	100%	19%	19%	18%	16%	18%
Deferred income tax assets			684	583	611	0%	0%	112%	95%	100%	0%	0%	2%	2%	2%
Other current assets	1348	1274	956	973	1,152	117%	111%	83%	84%	100%	4%	4%	3%	3%	3%
Total Current Assets	13208	11218	13,387	15,591	12,284	108%	91%	109%	127%	100%	34%	32%	37%	40%	35%
Accum. Depreciation and Amortization	23566	22339	21,190	20,147	18,920	125%	118%	112%	106%	100%	62%	63%	59%	52%	55%
Property, Plant and Equipment, Net	18352	18281	17,961	17,894	17,621	104%	104%	102%	102%	100%	48%	52%	50%	46%	51%
Goodwill	3419	2184	2,190	2,173	2,101	163%	104%	104%	103%	100%	9%	6%	6%	6%	6%
Intangible Assets, Net	1549	847	775	603	585	265%	145%	132%	103%	100%	4%	2%	2%	2%	2%
Investments and Restricted Cash	473	489	444	307	303	156%	161%	147%	101%	100%	1%	1%	1%	1%	1%
Derivative Assets			323	535	483	0%	0%	67%	111%	100%	0%	0%	1%	1%	1%
Deferred Income Tax Assets	255	1219	110	684	118	216%	1033%	93%	580%	100%	1%	3%	0%	2%	0%
Other Non-Current Assets	1055	1202	1,022	1,076	1,206	87%	100%	85%	89%	100%	3%	3%	3%	3%	3%
Total Assets	38311	35440	36,212	38,863	34,701	110%	102%	104%	112%	100%	100%	100%	100%	100%	100%
Current Liabilities:															
Current maturities of long-term debt and commercial paper	3018	923	48	1,781	33	9145%	2797%	145%	5397%	100%	8%	3%	0%	5%	0%
Accounts payable	2587	2754	2,478	2,278	2,300	112%	120%	108%	99%	100%	7%	8%	7%	6%	7%
Accrued wages and withholdings	2253	2373	2,325	1,927	1,843	122%	129%	126%	105%	100%	6%	7%	6%	5%	5%
Hedge margin liabilities	717	548									2%	2%	0%	0%	0%
Self-insurance reserves	657	656	719	763	781	84%	84%	92%	98%	100%	2%	2%	2%	2%	2%
Other current liabilities	1464	1367	1,561	1,641	1,557	94%	88%	100%	105%	100%	4%	4%	4%	4%	4%
Total Current Liabilities	10696	8621	7,131	8,390	6,514	164%	132%	109%	129%	100%	28%	24%	20%	22%	19%
Long-Term Debt	11316	9856	10,824	11,089	11,095	102%	89%	98%	100%	100%	30%	28%	30%	29%	32%
Pension and Postretirement Benefit Obligations	10638	11452	7,051	11,068	5,505	193%	208%	128%	201%	100%	28%	32%	19%	28%	16%
Deferred Income Tax Liabilities	115	78	1,244	48	1,900	6%	4%	65%	3%	100%	0%	0%	3%	0%	5%
Self-Insurance Reserves	1831	1916	2,059	1,980	1,806	101%	106%	114%	110%	100%	5%	5%	6%	5%	5%
Other Non-Current Liabilities	1224	1359	1,415	1,555	773	158%	176%	183%	201%	100%	3%	4%	4%	4%	2%
Total Liabilities	35820	33282	29724	34130	27593	130%	121%	108%	124%	100%	93%	94%	82%	88%	80%
Shareowners' Equity:															
Additional paid-in capital	0	0	0	0	0										
Retained earnings	6001	5726	6,925	7,997	10,128	59%	57%	68%	79%	100%	16%	16%	19%	21%	29%
Accumulated other comprehensive loss	-3540	-3594	-460	-3,354	-3,103	114%	116%	15%	108%	100%	-9%	-10%	-1%	-9%	-9%
Deferred compensation obligations	51	59	69	78	88	58%	67%	78%	89%	100%	0%	0%	0%	0%	0%
Less: Treasury stock (1 share in 2015 and 2014)	-51	-59	-69	-78	-88	58%	67%	78%	89%	100%	0%	0%	0%	0%	0%
Total Equity for Controlling Interests	2470	2141	6,474	4,653	7,035	35%	30%	92%	66%	100%	6%	6%	18%	12%	20%
Noncontrolling Interests	21	17	14	80	73	29%	23%	19%	110%	100%	0%	0%	0%	0%	0%
Total Shareowners' Equity	2491	2158	6,488	4,733	7,108	35%	30%	91%	67%	100%	7%	6%	18%	12%	20%
Total Liabilities and Shareowners' Equity	38311	35440	36,212	38,863	34,701	110%	102%	104%	112%	100%	100%	100%	100%	100%	100%

UPS   Balance Sheet Analysis.

STATEMENTS OF CONSOLIDATED INCOME - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Income Statement [Abstract]															
Revenue	58363	58232	55438	$54,127	$53,105	110%	110%	104%	102%	100%	100%	100%	100%	100%	100%
Operating Expenses:															
Compensation and benefits	31028	32045	28557	33,102	27,575	113%	116%	104%	120%	100%	53%	55%	52%	61%	52%
Repairs and maintenance	1400	1371	1240	1,228	1,286	109%	107%	96%	95%	100%	2%	2%	2%	2%	2%
Depreciation and amortization	2084	1923	1867	1,858	1,782	117%	108%	105%	104%	100%	4%	3%	3%	3%	3%
Purchased transportation	8043	8460	7486	7,354	7,232	111%	117%	104%	102%	100%	14%	15%	14%	14%	14%
Fuel	2482	3883	4027	4,090	4,046	61%	96%	100%	101%	100%	4%	7%	7%	8%	8%
Other occupancy	1022	1044	950	902	943	108%	111%	101%	96%	100%	2%	2%	2%	2%	2%
Other expenses	4636	4538	4277	4,250	4,161	111%	109%	103%	102%	100%	8%	8%	8%	8%	8%
Total Operating Expenses	50695	53264	48404	52,784	47,025	108%	113%	103%	112%	100%	87%	91%	87%	98%	89%
Operating Profit	7668	4968	7034	1,343	6,080	126%	82%	116%	22%	100%	13%	9%	13%	2%	11%
Other Income and (Expense):															
Investment income	15	22	20	24	44	34%	50%	45%	55%	100%	0%	0%	0%	0%	0%
Interest expense	-341	-353	-380	-393	-348	98%	101%	109%	113%	100%	-1%	-1%	-1%	-1%	-1%
Total Other Income and (Expense)	-326	-331	-360	-369	-304	107%	109%	118%	121%	100%	-1%	-1%	-1%	-1%	-1%
Income Before Income Taxes	7342	4637	6674	974	5,776	127%	80%	116%	17%	100%	13%	8%	12%	2%	11%
Income Tax Expense	2498	1605	2302	167	1,972	127%	81%	117%	8%	100%	4%	3%	4%	0%	4%
Net Income	4844	3032	4372	$807	$3,804	127%	80%	115%	21%	100%	8%	5%	8%	1%	7%
Basic Earnings Per Share (in dollars per share)	5.38	3.31	4.65	$0.84	$3.88	139%	85%	120%	22%	100%	0%	0%	0%	0%	0%
Diluted Earnings Per Share (in dollars per share)	5.35	3.28	4.61	$0.83	$3.84	139%	85%	120%	22%	100%	0%	0%	0%	0%	0%

UPS   Income Statement Analysis.

STATEMENTS OF CONSOLIDATED CASH FLOWS - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Cash Flows From Operating Activities:															
Net Income	4844	3032	4372	$807	$3,804	127%	80%	115%	21%	100%	8%	5%	8%	1%	7%
Adjustments to reconcile net income to net cash from operating activities:															
Depreciation and amortization	2084	1923	1867	1,858	1,782	117%	108%	105%	104%	100%	4%	3%	3%	3%	3%
Pension and postretirement benefit expense	1189	3040	1115	5,753	1,660	72%	183%	67%	347%	100%	2%	5%	2%	11%	3%
Pension and postretirement benefit contributions	-1229	-1258	-212	-917	-1,436	86%	88%	15%	64%	100%	-2%	-2%	0%	-2%	-3%
pension obligation settlement	0	-2271	0								0%	-4%	0%	0%	0%
Self-insurance reserves	-80	-201	34	156	53	-151%	-379%	64%	294%	100%	0%	0%	0%	0%	0%
Deferred tax expense	540	385	-246	-2,083	314	172%	123%	-78%	-663%	100%	1%	1%	0%	-4%	1%
Stock compensation expense	574	536	513	547	524	110%	102%	98%	104%	100%	1%	1%	1%	1%	1%
Other (gains) losses	-185	218	35	1,082	245	-76%	89%	14%	442%	100%	0%	0%	0%	2%	0%
Changes in assets and liabilities, net of effect of acquisitions:															
Accounts receivable	-452	-523	-515	-124	-657	69%	80%	78%	19%	100%	-1%	-1%	-1%	0%	-1%
Other current assets	414	112	-13	10	107	387%	105%	-12%	9%	100%	1%	0%	0%	0%	0%
Accounts payable	-147	276	218	-58	249	-59%	111%	88%	-23%	100%	0%	0%	0%	0%	0%
Accrued wages and withholdings	-63	106	416	98	339	-19%	31%	123%	29%	100%	0%	0%	1%	0%	1%
Other current liabilities	-6	317	-140	206	186	-3%	170%	-75%	111%	100%	0%	1%	0%	0%	0%
Other operating activities	-53	34	-140	-119	-97	55%	-35%	144%	123%	100%	0%	0%	0%	0%	0%
Net cash from operating activities	7430	5726	7304	7,216	7,073	105%	81%	103%	102%	100%	13%	10%	13%	13%	13%
Cash Flows From Investing Activities:															
Capital expenditures	-2379	-2328	-2065	-2,153	-2,005	119%	116%	103%	107%	100%	-4%	-4%	-4%	-4%	-4%
Proceeds from disposals of property, plant and equipment	26	53	104	95	27	96%	196%	385%	352%	100%	0%	0%	0%	0%	0%
Purchases of marketable securities	-7415	-3525	-2948	-2,357	-4,903	151%	72%	60%	48%	100%	-13%	-6%	-5%	-4%	-9%
Sales and maturities of marketable securities	6388	3106	2957	2,985	4,490	142%	69%	66%	66%	100%	11%	5%	5%	6%	8%
Net decrease in finance receivables	5	44	39	101	184	3%	24%	21%	55%	100%	0%	0%	0%	0%	0%
Cash paid for business acquisitions	-1904	-88	-22	-100	-73	2608%	121%	30%	137%	100%	-3%	0%	0%	0%	0%
Other investing activities	-30	-63	-179	94	-257	12%	25%	70%	-37%	100%	0%	0%	0%	0%	0%
Net cash used in investing activities	-5309	-2801	-2114	-1,335	-2,537	209%	110%	83%	53%	100%	-9%	-5%	-4%	-2%	-5%
Cash Flows From Financing Activities:															
Net change in short-term debt	2529	0	0	0	-183	-1382%	0%	0%	0%	100%	4%	0%	0%	0%	0%
Proceeds from long-term borrowings	3783	1525	100	1,745	279	1356%	547%	36%	625%	100%	6%	3%	0%	3%	1%
Repayments of long-term borrowings	-2724	-1694	-1875	-16	-191	1426%	887%	982%	8%	100%	-5%	-3%	-3%	0%	0%
Purchases of common stock	-2702	-2695	-3838	-1,621	-2,665	101%	101%	144%	61%	100%	-5%	-5%	-7%	-3%	-5%
Issuances of common stock	249	274	491	301	290	86%	94%	169%	104%	100%	0%	0%	1%	1%	1%
Dividends	-2525	-2366	-2260	-2,130	-1,997	126%	118%	113%	107%	100%	-4%	-4%	-4%	-4%	-4%
Other financing activities	-175	-205	-425	-96	-395	44%	52%	108%	24%	100%	0%	0%	-1%	0%	-1%
Net cash used in financing activities	-1565	-5161	-7807	-1,817	-4,862	32%	106%	161%	37%	100%	-3%	-9%	-14%	-3%	-9%
Effect Of Exchange Rate Changes On Cash And Cash Equivalents	-117	-138	-45	229	-10	1170%	1380%	450%	-2290%	100%	0%	0%	0%	0%	0%
Net Increase (Decrease) In Cash And Cash Equivalents	439	-2374	-2662	4,293	-336	-131%	707%	792%	-1278%	100%	1%	-4%	-5%	8%	-1%
Cash And Cash Equivalents:															
Beginning of period	2291	4665	7327	3,034	3,370	68%	138%	217%	90%	100%	4%	8%	13%	6%	6%
End of period	2730	2291	4665	7,327	3,034	90%	76%	154%	241%	100%	5%	4%	8%	14%	6%
Cash Paid During The Period For:															
Interest (net of amount capitalized)	345	366	409	381	248	139%	148%	165%	154%	100%	1%	1%	1%	1%	0%
Income taxes	1913	1524	2712	$1,988	$1,527	125%	100%	178%	130%	100%	3%	3%	5%	4%	3%

UPS   Statement of Cash Flows Analysis.

Consolidated Balance Sheets - USD ($) $ in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Current assets															
Cash and cash equivalents	$1,090	$1,446	$2,617	$1,898	$3,582	30%	40%	73%	53%	100%	2%	4%	7%	5%	9%
Receivables, net	8,061	5,877	5,834	6,563	6,064	133%	97%	96%	108%	100%	16%	16%	16%	17%	16%
Inventories, net	4,962	2,804	2,977	2,937	2,481	200%	113%	120%	118%	100%	10%	8%	8%	8%	7%
Deferred income taxes	1,463	1,451	1,088	1,269	1,339	109%	108%	81%	95%	100%	3%	4%	3%	3%	4%
Other current assets	622	744	813	1,188	628	99%	118%	129%	189%	100%	1%	2%	2%	3%	2%
Total current assets	16,198	12,322	13,329	13,855	14,094	115%	87%	95%	98%	100%	33%	33%	37%	36%	37%
Accum. Depreciation and Amortization	9,057	8,740	8,660	8,310	7,859	115%	111%	110%	106%	100%	18%	24%	24%	21%	21%
Property, plant and equipment, net	5,490	4,751	4,706	4,675	4,611	119%	103%	102%	101%	100%	11%	13%	13%	12%	12%
Goodwill	13,576	10,862	10,348	10,370	10,148	134%	107%	102%	102%	100%	28%	29%	29%	27%	27%
Intangible assets	4,147	324									8%	1%	0%	0%	0%
Deferred income taxes	4,470	4,013	2,850	4,809	4,388	102%	91%	65%	110%	100%	9%	11%	8%	12%	12%
Other noncurrent assets	5,247	4,774	4,955	4,948	4,667	112%	102%	106%	106%	100%	11%	13%	14%	13%	12%
Total assets	49,128	37,046	36,188	38,657	37,908	130%	98%	95%	102%	100%	100%	100%	100%	100%	100%
Current liabilities															
Accounts payable	1,974	1,562	1,397	2,038	2,269	87%	69%	62%	90%	100%	4%	4%	4%	5%	6%
Customer advances and amounts in excess of costs incurred	6,988	5,775	6,349	6,503	6,399	109%	90%	99%	102%	100%	14%	16%	18%	17%	17%
Salaries, benefits and payroll taxes	1,916	1,824	1,809	1,649	1,664	115%	110%	109%	99%	100%	4%	5%	5%	4%	4%
Current maturities of long-term debt	956			150							2%	0%	0%	0%	0%
Other current liabilities	2,223	1,951	1,565	1,815	1,798	124%	109%	87%	101%	100%	5%	5%	4%	5%	5%
Total current liabilities	14,057	11,112	11,120	12,155	12,130	116%	92%	92%	100%	100%	29%	30%	31%	31%	32%
Accrued pension liabilities	11,807	11,413	9,361	15,278	13,502	87%	85%	69%	113%	100%	24%	31%	26%	40%	36%
Other postretirement benefit liabilities	1,070	1,102	902	1,220	1,274	84%	86%	71%	96%	100%	2%	3%	2%	3%	3%
Long-term debt, net	14,305	6,142	6,152	6,158	6,460	221%	95%	95%	95%	100%	29%	17%	17%	16%	17%
Other noncurrent liabilities	4,792	3,877	3,735	3,807	3,541	135%	109%	105%	108%	100%	10%	10%	10%	10%	9%
Total liabilities	46,031	33,646	31,270	38,618	36,907	125%	91%	85%	105%	100%	94%	91%	86%	100%	97%
Stockholders' equity															
Common stock, $1 par value per share	303	314	319	321	321	94%	98%	99%	100%	100%	1%	1%	1%	1%	1%
Additional paid-in capital	0	0		0	0									0%	
Retained earnings	14,238	14,956	14,200	13,211	11,937	119%	125%	119%	111%	100%	29%	40%	39%	34%	31%
Accumulated other comprehensive loss	-11,444	-11,870	-9,601	-13,493	-11,257	102%	105%	85%	120%	100%	-23%	-32%	-27%	-35%	-30%
Total stockholders' equity	3,097	3,400	4,918	39	1,001	309%	340%	491%	4%	100%	6%	9%	14%	0%	3%
Total liabilities and stockholders' equity	$49,128	$37,046	$36,188	$38,657	$37,908	130%	98%	95%	102%	100%	100%	100%	100%	100%	100%

Lockheed Martin   Balance Sheet Analysis.

Consolidated Statements of Earnings - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Net sales															
Products	$35,882	$36,093	$35,691	$37,817	$36,925	97%	98%	97%	102%	100%	77.78%	79.15%	78.69%	80.15%	79.41%
Services	10,250	9,507	9,667	9,365	9,574	107%	99%	101%	98%	100%	22.22%	20.85%	21.31%	19.85%	20.59%
Total net sales	46,132	45,600	45,358	47,182	46,499	99%	98%	98%	101%	100%	100.00%	100.00%	100.00%	100.00%	100.00%
Cost of sales															
Products	-32,006	-31,965	-31,346	-33,495	-32,968	97%	97%	95%	102%	100%	-69.38%	-70.10%	-69.11%	-70.99%	-70.90%
Services	-9,011	-8,393	-8,588	-8,383	-8,514	106%	99%	101%	98%	100%	-19.53%	-18.41%	-18.93%	-17.77%	-18.31%
Goodwill impairment charges		-119	-195												
Severance charges	-102		-201	-48	-136	75%	0%	148%	35%	100%	-0.22%	0.00%	-0.44%	-0.10%	-0.29%
Other unallocated, net	187	132	-841	-1,060	-1,137	-16%	-12%	74%	93%	100%	0.41%	0.29%	-1.85%	-2.25%	-2.45%
Total cost of sales	40932	40345	41171	42986	42755	96%	94%	96%	101%	100%	88.73%	88.48%	90.77%	91.11%	91.95%
Gross profit	5,200	5,255	4,187	4,196	3,744	139%	140%	112%	112%	100%	11.27%	11.52%	9.23%	8.89%	8.05%
Other income, net	236	337	318	238	276	86%	122%	115%	86%	100%	0.51%	0.74%	0.70%	0.50%	0.59%
Operating profit	5,436	5,592	4,505	4,434	4,020	135%	139%	112%	110%	100%	11.78%	12.26%	9.93%	9.40%	8.65%
Interest expense	-443	-340	-350	-383	-354	125%	96%	99%	108%	100%	-0.96%	-0.75%	-0.77%	-0.81%	-0.76%
Other non-operating income, net	30	6		21	-35	-86%	-17%	0%	-60%	100%	0.07%	0.01%	0.00%	0.04%	-0.08%
Earnings from continuing operations before income taxes	5,023	5,258	4,155	4,072	3,631	138%	145%	114%	112%	100%	10.89%	11.53%	9.16%	8.63%	7.81%
Income tax expense	-1,418	-1,644	-1,205	-1,327	-964	147%	171%	125%	138%	100%	-3.07%	-3.61%	-2.66%	-2.81%	-2.07%
Net earnings from continuing operations	3,605	3,614	2,950	2,745	2,667	135%	136%	111%	103%	100%	7.81%	7.93%	6.50%	5.82%	5.74%
Net earnings from discontinued operations			31		-12	0%	0%	-258%	0%	100%	0.00%	0.00%	0.07%	0.00%	-0.03%
Net earnings	$3,605	$3,614	$2,981	$2,745	$2,655	136%	136%	112%	103%	100%	7.81%	7.93%	6.57%	5.82%	5.71%
Basic															
Continuing operations per common share in USD	$11.62	$11.41	$9.19	$8.48	$7.94	146%	144%	116%	107%	100%	0.03%	0.03%	0.02%	0.02%	0.02%
Discontinued operations per common share in USD			0.1		($0.04)	0%	0%	-250%	0%	100%	0.00%	0.00%	0.00%	0.00%	0.00%
Basic earnings per common share in USD	11.62	11.41	9.29	8.48	$7.90	147%	144%	118%	107%	100%	0.03%	0.03%	0.02%	0.02%	0.02%
Diluted															
Continuing operations per common share in USD	11.46	11.21	9.04	8.36	$7.85	146%	143%	115%	106%	100%	0.02%	0.02%	0.02%	0.02%	0.02%
Discontinued operations per common share in USD			0.09		($0.04)	0%	0%	-225%	0%	100%					
Diluted earnings per common share in USD	$11.46	$11.21	$9.13	$8.36	$7.81	147%	144%	117%	107%	100%	0.02%	0.02%	0.02%	0.02%	0.02%

Lockheed Martin   Income Statement Analysis.

Consolidated Statements of Cash Flows - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Operating activities															
Net earnings	$ 3,605	$ 3,614	$ 2,981	$2,745	$2,655	136%	136%	112%	103%	100%	7.8%	7.9%	6.6%	5.8%	5.7%
Adjustments to reconcile net earnings to net cash provided by operating activities															
Depreciation and amortization	1,026	994	990	988	1,008	102%	99%	98%	98%	100%	2.2%	2.2%	2.2%	2.1%	2.2%
Stock-based compensation	138	164	189	167	157	88%	104%	120%	106%	100%	0.3%	0.4%	0.4%	0.4%	0.3%
Deferred income taxes	(445)	(401)	(5)	930	-2	22250%	20050%	250%	-46500%	100%	-1.0%	-0.9%	0.0%	2.0%	0.0%
Goodwill impairment charges		119	195								0.0%	0.3%	0.4%	0.0%	0.0%
Severance charges	102		201	48	136	75%	0%	148%	35%	100%	0.2%	0.0%	0.4%	0.1%	0.3%
Reduction in tax expense from resolution of certain tax matters					-89										-0.2%
Changes in assets and liabilities															
Receivables, net	(256)	28	767	-460	-363	71%	-8%	-211%	127%	100%	-0.6%	0.1%	1.7%	-1.0%	-0.8%
Inventories, net	(398)	77	(60)	-422	-74	538%	-104%	81%	570%	100%	-0.9%	0.2%	-0.1%	-0.9%	-0.2%
Accounts payable	(160)	95	(647)	-236	609	-26%	16%	-106%	-39%	100%	-0.3%	0.2%	-1.4%	-0.5%	1.3%
Customer advances and amounts in excess of costs incurred	(32)	(572)	(158)	57	502	-6%	-114%	-31%	11%	100%	-0.1%	-1.3%	-0.3%	0.1%	1.1%
Postretirement benefit plans	1,068	(880)	(375)	-1,883	-393	-272%	224%	95%	479%	100%	2.3%	-1.9%	-0.8%	-4.0%	-0.8%
Income taxes	(48)	351	364	-535	304	-16%	115%	120%	-176%	100%	-0.1%	0.8%	0.8%	-1.1%	0.7%
Other, net	501	277	104	162	-197	-254%	-141%	-53%	-82%	100%	1.1%	0.6%	0.2%	0.3%	-0.4%
Net cash provided by operating activities	5,101	3,866	4,546	1,561	4,253	120%	91%	107%	37%	100%	11.1%	8.5%	10.0%	3.3%	9.1%
Investing activities															
Capital expenditures	(939)	(845)	(836)	-942	-987	95%	86%	85%	95%	100%	-2.0%	-1.9%	-1.8%	-2.0%	-2.1%
Acquisitions of businesses and investments in affiliates	(9,003)	(898)	(269)	-259	-624	1443%	144%	43%	42%	100%	-19.5%	-2.0%	-0.6%	-0.5%	-1.3%
Maturities of short-term investments					510	0%	0%	0%	0%	100%	0.0%	0.0%	0.0%	0.0%	1.1%
Other, net	208	20	(16)	24	313	66%	6%	-5%	8%	100%	0.5%	0.0%	0.0%	0.1%	0.7%
Net cash used for investing activities	(9,734)	(1,723)	(1,121)	-1,177	-788	1235%	219%	142%	149%	100%	-21.1%	-3.8%	-2.5%	-2.5%	-1.7%
Financing activities															
Repurchases of common stock	(3,071)	(1,900)	(1,762)	-990	-2,465	125%	77%	71%	40%	100%	-6.7%	-4.2%	-3.9%	-2.1%	-5.3%
Proceeds from stock option exercises	174	308	827	440	116	150%	266%	713%	379%	100%	0.4%	0.7%	1.8%	0.9%	0.2%
Dividends paid	(1,932)	(1,760)	(1,540)	-1,352	-1,095	176%	161%	141%	123%	100%	-4.2%	-3.9%	-3.4%	-2.9%	-2.4%
Proceeds from the issuance of long-term debt	9,101				1,980	460%	0%	0%	0%	100%	19.7%	0.0%	0.0%	0.0%	4.3%
Repayments of long-term debt			(150)		-632	0%	0%	24%	0%	100%			-0.3%		-1.4%
Premium paid on debt exchange				-225										-0.5%	
Proceeds from borrowings under revolving credit facilities	6,000										13.0%				
Repayments of borrowings under revolving credit facilities	(6,000)										-13.0%				
Other, net	5	38	(81)	59	-48	-10%	-79%	169%	-123%	100%	0.0%	0.1%	-0.2%	0.1%	-0.1%
Net cash provided by (used for) financing activities	4,277	(3,314)	(2,706)	-2,068	-2,144	-199%	155%	126%	96%	100%	9.3%	-7.3%	-6.0%	-4.4%	-4.6%
Net change in cash and cash equivalents	(356)	(1,171)	719	-1,684	1,321	-27%	-89%	54%	-127%	100%	-0.8%	-2.6%	1.6%	-3.6%	2.8%
Cash and cash equivalents at beginning of year	1,446	2,617	1,898	3,582	2,261	64%	116%	84%	158%	100%	3.1%	5.7%	4.2%	7.6%	4.9%
Cash and cash equivalents at end of year	$ 1,090	$ 1,446	$ 2,617	$1,898	$3,582	30%	40%	73%	53%	100%	2.4%	3.2%	5.8%	4.0%	7.7%

Lockheed Martin   Statement of Cash Flows Analysis.

Consolidated Balance Sheets - USD ($) $ in Millions	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Current Assets:															
Cash and cash equivalents	1972	2088	$2,844	$2,416	$2,657	74%	79%	107%	91%	100%	4%	4%	5%	5%	6%
Short-term investments	1465	1217	959	958	958	153%	127%	100%	100%	100%	3%	2%	2%	2%	2%
Accounts receivable, net of an allowance for uncollectible accounts of $9 and $11 at December 31, 2015 and 2014, respectively	2020	2297	1609	1693	1563	129%	147%	103%	108%	100%	4%	4%	3%	4%	4%
Hedge margin receivable	119	925									0%	2%	0%	0%	0%
Fuel inventory	379	534	706	619	168	226%	318%	420%	368%	100%	1%	1%	1%	1%	0%
Expendable parts and supplies inventories, net of an allowance for obsolescence of $114 and $127 at December 31, 2015 and 2014, respectively	318	318	357	404	367	87%	87%	97%	110%	100%	1%	1%	1%	1%	1%
Hedge derivatives asset	1987	1078	1,736	463	461	431%	234%	377%	100%	100%	4%	2%	3%	1%	1%
Prepaid expenses and other	796	701	1,318	1,344	1,250	64%	56%	105%	108%	100%	1%	1%	3%	3%	3%
Total current assets	9056	9158	9,651	8,272	7,729	117%	118%	125%	107%	100%	17%	17%	18%	19%	18%
Accum. Depr and Ammortization	10871	9340	7,792	6,656	6,472	168%	144%	120%	103%	100%	20%	17%		15%	15%
Property and Equipment, Net:															
Property and equipment, net of accumulated depreciation and amortization of $10,871 and $9,340 at December 31, 2015 and 2014, respectively	23039	21929	21,854	20,713	20,223	114%	108%	108%	102%	100%	43%	41%	42%	46%	46%
Other Assets:											0%	0%	0%	0%	0%
Goodwill	9794	9794	9,794	9,794	9,794	100%	100%	100%	100%	100%	18%	18%	19%	22%	23%
Accum. Ammortization	811	793	738	670	600	135%	132%	123%	112%	100%	2%	1%	1%	2%	1%
Identifiable intangibles, net of accumulated amortization of $811 and $793 at December 31, 2015 and 2014, respectively	4861	4603	4,658	4,679	4,751	102%	97%	98%	98%	100%	9%	9%	9%	11%	11%
Deferred income taxes, net	4956	7595	4,992	0							9%	14%	10%	0%	0%
Other noncurrent assets	1428	926	1,303	1,092	1,002	143%	92%	130%	109%	100%	3%	2%	2%	2%	2%
Total other assets	21039	22918	20,747	15,565	15,547	135%	147%	133%	100%	100%	40%	42%	40%	35%	36%
Total assets	53134	54005	52,252	44,550	43,499	122%	124%	120%	102%	100%	100%	100%	100%	100%	100%
Current Liabilities:															
Current maturities of long-term debt and capital leases	1563	1184	1,547	1,627	1,944	80%	61%	80%	84%	100%	3%	2%	3%	4%	4%
Air traffic liability	4503	4296	4,122	3,696	3,480	129%	123%	118%	106%	100%	8%	8%	8%	8%	8%
Accounts payable	2743	2622	2,300	2,293	1,600	171%	164%	144%	143%	100%	5%	5%	4%	5%	4%
Accrued salaries and related benefits	3195	2266	1,926	1,680	1,367	234%	166%	141%	123%	100%	6%	4%	4%	4%	3%
Hedge derivatives liability	2581	2772									5%	5%	0%	0%	0%
Frequent flyer deferred revenue	1635	1580	1,861	1,806	1,849	88%	85%	101%	98%	100%	3%	3%	4%	4%	4%
Taxes payable			673	585	594	0%	0%	113%	98%	100%	0%	0%	1%	1%	1%
Fuel card obligation			602	455	318	0%	0%	189%	143%	100%	0%	0%	1%	1%	1%
Other accrued liabilities	1306	2127	1,121	1,128	1,549	84%	137%	72%	73%	100%	2%	4%	2%	3%	4%
Total current liabilities	17526	16847	14,152	13,270	12,701	138%	133%	111%	104%	100%	33%	31%	27%	30%	29%
Noncurrent Liabilities:															
Long-term debt and capital leases	6766	8477	9,795	11,082	11,847	57%	72%	83%	94%	100%	13%	16%	19%	25%	27%
Pension, postretirement and related benefits	13855	15138	12,392	16,005	14,200	98%	107%	87%	113%	100%	26%	28%	24%	36%	33%
Frequent flyer deferred revenue	2246	2602	2,559	2,628	2,700	83%	96%	95%	97%	100%	4%	5%	5%	6%	6%
Deferred income taxes, net			0	2,047	2,028	0%	0%	0%	101%	100%	0%	0%	0%	5%	5%
Other noncurrent liabilities	1891	2128	1,711	1,649	1,419	133%	150%	121%	116%	100%	4%	4%	3%	4%	3%
Total noncurrent liabilities	24758	28345	26,457	33,411	32,194	77%	88%	82%	104%	100%	47%	52%	51%	75%	74%
Stockholders' Equity:															
Additional paid-in capital	10875	12981	13,982	14,069	13,999	78%	93%	100%	101%	100%	20%	24%	27%	32%	32%
Retained earnings	7623	3456	3,049	-7,389	-8,398	-91%	-41%	-36%	88%	100%	14%	6%	6%	-17%	-19%
Accumulated other comprehensive loss	-7275	-7311	-5,130	-8,577	-6,766	108%	108%	76%	127%	100%	-14%	-14%	-10%	-19%	-16%
Treasury stock, at cost, 21,066,684 and 19,790,077 shares at December 31, 2015 and 2014, respectively	-373	-313	-258	-234	-231	161%	135%	112%	101%	100%	-1%	-1%	0%	-1%	-1%
Total stockholders' equity	10850	8813	11,643	-2,131	-1,396	-777%	-631%	-834%	153%	100%	20%	16%	22%	-5%	-3%
Total liabilities and stockholders' equity	53134	54005	$52,252	$44,550	$43,499	122%	124%	120%	102%	100%	100%	100%	100%	100%	100%

Delta Airlines   Balance Sheet Analysis.

Consolidated Statements of Operations - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Passenger:															
Mainline	28898	28688	26534	$25,173	$23,843	121%	120%	111%	106%	100%	71%	71%	70%	69%	68%
Regional carriers	5884	6266	6408	6,581	6,414	92%	98%	100%	103%	100%	14%	16%	17%	18%	18%
Total passenger revenue	34782	34954	32942	31,754	30,257	115%	116%	109%	105%	100%	85%	87%	87%	87%	86%
Cargo	813	934	937	990	1,027	79%	91%	91%	96%	100%	2%	2%	2%	3%	3%
Other	5109	4474	3894	3,926	3,831	133%	117%	102%	102%	100%	13%	11%	10%	11%	11%
Total operating revenue	40704	40362	37773	36,670	35,115	116%	115%	108%	104%	100%	100%	100%	100%	100%	100%
Operating Expense:															
Salaries and related costs	8776	8120	7720	10,150	9,730	90%	83%	79%	104%	100%	22%	20%	20%	28%	28%
Aircraft fuel and related taxes	6544	11668	9397	7,266	6,894	95%	169%	136%	105%	100%	16%	29%	25%	20%	20%
Regional carriers expense	4241	5237	5669	5,647	5,470	78%	96%	104%	103%	100%	10%	13%	15%	15%	16%
Aircraft maintenance materials and outside repairs	1848	1828	1852	1,955	1,765	105%	104%	105%	111%	100%	5%	5%	5%	5%	5%
Contracted services	1848	1749	1665	1,566	1,642	113%	107%	101%	95%	100%	5%	4%	4%	4%	5%
Depreciation and amortization	1835	1771	1658	1,565	1,523	120%	116%	109%	103%	100%	5%	4%	4%	4%	4%
Passenger commissions and other selling expenses	1672	1700	1603	1,590	1,682	99%	101%	95%	95%	100%	4%	4%	4%	4%	5%
Landing fees and other rents	1493	1442	1410	1,336	1,281	117%	113%	110%	104%	100%	4%	4%	4%	4%	4%
Profit sharing	1490	1085	506	732	721	207%	150%	70%	102%	100%	4%	3%	1%	2%	2%
Passenger service	872	810	762	372	264	330%	307%	289%	141%	100%	2%	2%	2%	1%	1%
Aircraft rent	250	233	209	272	298	84%	78%	70%	91%	100%	1%	1%	1%	1%	1%
Restructuring and other	35	716	402	452	242	14%	296%	166%	187%	100%	0%	2%	1%	1%	1%
Other	1998	1797	1520	1,592	1,628	123%	110%	93%	98%	100%	5%	4%	4%	4%	5%
Total operating expense	32902	38156	34373	34,495	33,140	99%	115%	104%	104%	100%	81%	95%	91%	94%	94%
Operating Income	7802	2206	3400	2,175	1,975	395%	112%	172%	110%	100%	19%	5%	9%	6%	6%
Non-Operating Expense:															
Interest expense, net	-481	-650	-852	-1123	-1162	41%	56%	73%	97%	100%	-1%	-2%	-2%	-3%	-3%
Miscellaneous, net	-164	-484	-21	-27	-44	373%	1100%	48%	61%	100%	0%	-1%	0%	0%	0%
Total non-operating expense, net	-645	-1134	-873	-1,150	-1,206	53%	94%	72%	95%	100%	-2%	-3%	-2%	-3%	-3%
Income Before Income Taxes	7157	1072	2527	1,025	769	931%	139%	329%	133%	100%	18%	3%	7%	3%	2%
Income Tax (Provision) Benefit	-2631	-413	8013	-16	85	-3095%	-486%	9427%	-19%	100%	-6%	-1%	21%	0%	0%
Net Income	4526	659	10540	$1,009	$854	530%	77%	1234%	118%	100%	11%	2%	28%	3%	2%
Basic Earnings Per Share (usd per share)	5.68	0.79	12.41	$1.20	$1.02	557%	77%	1217%	118%	100%	0%	0%	0%	0%	0%
Diluted Earnings Per Share (usd per share)	5.63	0.78	12.29	$1.19	$1.01	557%	77%	1217%	118%	100%	0%	0%	0%	0%	0%
Cash Dividends Declared Per Share (usd per share)	0.45	0.3	0.12	$0	$0						0%	0%	0%	0%	0%

Delta Airlines   Income Statement Analysis.

Consolidated Statements of Cash Flows - USD ($) $ in Millions	12 Months Ended					12 Months Ended					12 Months Ended				
	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011	Dec. 31, 2015	Dec. 31, 2014	Dec. 31, 2013	Dec. 31, 2012	Dec. 31, 2011
Cash Flows From Operating Activities:															
Net income	$ 4,526	$ 659	$ 10,540	$1,009	$854	530%	77%	1234%	118%	100%	11%	2%	28%	3%	2%
Adjustments to reconcile net income to net cash provided by operating activities:															
Depreciation and amortization	1,835	1,771	1,658	1,565	1,523	120%	116%	109%	103%	100%	5%	4%	4%	4%	4%
Amortization of Debt Discount, net				193	193	0%	0%	0%	100%	100%	0%	0%	0%	1%	1%
Hedge derivative contracts	(1,366)	2,186	(86)	-209	135	-1012%	1619%	-64%	-155%	100%	-3%	5%	0%	-1%	0%
Deferred income taxes	2,581	414	(7,991)	17	-2	-129050%	-20700%	399550%	-850%	100%	6%	1%	-21%	0%	0%
Pension, postretirement and postemployment payments greater than expense	(1,013)	(723)	(624)	-208	-308	329%	235%	203%	68%	100%	-2%	-2%	-2%	-1%	-1%
Restructuring and other	35	758	285	184	142	25%	534%	201%	130%	100%	0%	2%	1%	1%	0%
Extinguishment of debt	22	268	0								0%	1%	0%	0%	0%
Equity investment (earnings) loss	(35)	106	(24)								0%	0%	0%	0%	0%
SkyMiles used pursuant to advance purchase under American Express Agreements	0	0	(333)	-333	-49	0%	0%	680%	680%	100%	0%	0%	-1%	-1%	0%
Changes in certain assets and liabilities:															
Receivables	(56)	(302)	90	-116	-76	74%	397%	-118%	153%	100%	0%	-1%	0%	0%	0%
Restricted cash and cash equivalents	7	62	231	-51	153	5%	41%	151%	-33%	100%	0%	0%	1%	0%	0%
Fuel inventory	155	172	(87)	-451	-8	-1938%	-2150%	1088%	5638%	100%	0%	0%	0%	-1%	0%
Hedge margin	806	(922)	14								2%	-2%	0%	0%	0%
Prepaid expenses and other current assets	(102)	58	28	-134	-8	1275%	-725%	-350%	1675%	100%	0%	0%	0%	0%	0%
Air traffic liability	207	174	426	216	174	119%	100%	245%	124%	100%	1%	0%	1%	1%	0%
Frequent flyer deferred revenue	(301)	(238)	(121)	-115	82	-367%	-290%	-148%	-140%	100%	-1%	-1%	0%	0%	0%
Profit sharing	734	264	133	899	303	242%	87%	44%	297%	100%	2%	1%	0%	2%	1%
Accounts payable and accrued liabilities	(201)	(36)	80	-66	-373	54%	10%	-21%	18%	100%	0%	0%	0%	0%	-1%
Other, net	93	276	285	76	99	94%	279%	288%	77%	100%	0%	1%	1%	0%	0%
Net cash provided by operating activities	7,927	4,947	4,504	2,476	2,834	280%	175%	159%	87%	100%	19%	12%	12%	7%	8%
Cash Flows From Investing Activities:															
Flight equipment, including advance payments	(2,223)	(1,662)	(2,117)	-1,196	-907	245%	183%	233%	132%	100%	-5%	-4%	-6%	-3%	-3%
Ground property and equipment, including technology	(722)	(587)	(404)	-772	-347	208%	169%	116%	222%	100%	-2%	-1%	-1%	-2%	-1%
Purchase of equity investments	(500)	0	(360)	0	0						-1%	0%	-1%	0%	0%
Purchase of short-term investments	(998)	(1,795)	(959)	-958	-1,078	93%	167%	89%	89%	100%	-2%	-4%	-3%	-3%	-3%
Redemption of short-term investments	739	1,533	1,117	1,019	844	88%	182%	132%	121%	100%	2%	4%	3%	3%	2%
Acquisition of London-Heathrow slots	(276)	0	(47)								-1%	0%	0%	0%	0%
Other, net	25	48	14	-55	-10	-250%	-480%	-140%	550%	100%	0%	0%	0%	0%	0%
Net cash used in investing activities	(3,955)	(2,463)	(2,756)	-1,962	-1,498	264%	164%	184%	131%	100%	-10%	-6%	-7%	-5%	-4%
Cash Flows From Financing Activities:															
Payments on long-term debt and capital lease obligations	(2,558)	(2,928)	(1,461)	-2,864	-4,172	61%	70%	35%	69%	100%	-6%	-7%	-4%	-8%	-12%
Repurchase of common stock	(2,200)	(1,100)	(250)	0	0						-5%	-3%	-1%	0%	0%
Cash dividends	(359)	(251)	(102)	0	0						-1%	-1%	0%	0%	0%
Fuel card obligation	(340)	(41)	147	137	318	-107%	-13%	46%	43%	100%	-1%	0%	0%	0%	1%
Payments on hedge derivative contracts	(71)	0	0								0%	0%	0%	0%	0%
Proceeds from hedge derivative contracts	429	0	0								1%	0%	0%	0%	0%
Proceeds from long-term obligations	1,038	1,020	268	1,965	2,395	43%	43%	11%	82%	100%	3%	3%	1%	5%	7%
Other, net	(27)	60	78	7	-112	24%	-54%	-70%	-6%	100%	0%	0%	0%	0%	0%
Net cash used in financing activities	(4,088)	(3,240)	(1,320)	-755	-1,571	260%	206%	84%	48%	100%	-10%	-8%	-3%	-2%	-4%
Net (Decrease) Increase in Cash and Cash Equivalents	(116)	(756)	428	-241	-235	49%	322%	-182%	103%	100%	0%	-2%	1%	-1%	-1%
Cash and cash equivalents at beginning of period	2,088	2,844	2,416	2,657	2,892	72%	98%	84%	92%	100%	5%	7%	6%	7%	8%
Cash and cash equivalents at end of period	1,972	2,088	2,844	2,416	2,657	74%	79%	107%	91%	100%	5%	5%	8%	7%	8%
Supplemental Disclosure of Cash Paid for Interest	452	560	698	834	925	49%	61%	75%	90%	100%	1%	1%	2%	2%	3%

Delta Airlines   Statement of Cash Flows Analysis.

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