2015

The Relationship Between Terrorism, Oil Prices, and Airline Profitability

Ubirathan Miranda
Walden University

Walden University

College of Management and Technology

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Ubirathan Miranda

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Review Committee
Dr. Kevin Davies, Committee Chairperson, Doctor of Business Administration Faculty

Dr. Judith Blando, Committee Member, Doctor of Business Administration Faculty

Dr. Lisa Kangas, University Reviewer, Doctor of Business Administration Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

Given the financial challenges faced by the airline industry, understanding of the combined effect of terrorism and the price of petroleum on airline profitability is imperative. The purpose of this correlational study was to determine if a combination of terrorism and the price of petroleum significantly predicted airline profitability, and which variable was the most significant. This study collected samples of financial records from major American commercial passenger and cargo airlines on costs of fuel (n = 84) and airline profitability (n = 84). The terrorism data (n = 84) were comprised of terrorist attacks on petroleum infrastructure in oil-producing nations, and incidents of highjacking aboard American aircraft. Systems theory, which explains complexity within systems, was the theoretical framework for this study. The results of the multiple linear regression analysis indicated the model was able to significantly predict airline profitability, $F(2,81) = 5.447$, $p = .006$, $R^2 = .12$. Both terrorism and cost of fuel were statistically significant, with the cost of fuel (*beta* = -.511, $p = .002$) indicating a higher contribution to the model than terrorism (*beta* = .452, $p = .005$). This study is important to airline executives as the results of the study indicate that the leaders in the airline industry should focus on operational efficiencies to maximize profitability. Positive social change implications include increased employment in the civil aviation industry, higher commercial activity in tourist and other travel-related service businesses, and the adoption of green technologies by the civil aviation manufacturing industry.

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by

Ubirathan Miranda

MS, Florida Metropolitan University 2005

BS, Life Christian University 1996

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Business Administration

Walden University

April 2015

Dedication

The completion of this dissertation would have never been possible without the grace, guidance, and strength from the Lord. To him I remain eternally grateful. I am also thankful for the love, patience, support, and encouragement I received from my treasured wife Tamara Miranda. Her personal example of excellence continues to inspire me towards greater horizons. Tamara, this dissertation is also dedicated to your belief in the potential for growth and development of every person.

Moreover, I dedicate this dissertation to my precious daughters Elysaveth, Rebecca, and Daniela. Their sense of humor and forgiveness for the numerous hours I spent in the dissertation was a balm to my soul and kept me going. To my beloved father and mother, thank you for your sacrifice in leaving our homeland to ensure that I had the opportunities to pursue my aspirations in America. I can never repay such devotion you have shown.

To my dear father-in-law, thank you for nudging me towards school almost 20 years ago. To my aunt Zaira, thanks for instilling in me a love for books and a thirst for knowledge. My dissertation is also dedicated to my family and friends, both in America and in Brazil, who encouraged me on the path of the pursuit of educational, professional, and personal excellence.

Acknowledgments

I want to first thank my Committee Chair, Dr. Kevin Davies for his valued guidance, support, and encouragement through this process. You are indeed a true mentor in every sense of the word. I also want to thank Dr. Judith Blando and Dr. Lisa Kangas for their insightful, constructive, and important feedback on multiple reviews of the doctoral study to the committee. I am indebted to the guidance and support I received from my doctoral committee. Your many challenges, reviews, and insightful questions enabled me to add structure, refinement, polish, and relevance to my dissertation. But most importantly, you helped me to develop my character in the process.

I remain deeply grateful to Dr. Reginald Taylor. His guidance was instrumental in helping me through this journey. I want to extend a special thank you to my cohort dissertation group. You are the epitome of a learning community at Walden University. We laughed, cried, challenged, and encouraged one another. Never did I feel any sense of competiveness or pettiness among us. The process united us in a common goal. A special thanks to Bruce Towes, my fellow colleague who has kept me encouraged with his generous feedback.

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Section 1: Foundation of the Study

The commercial aviation industry is important to the health of the global economy. Airline executives must have a good understanding of the many market forces that drive airline profitability. Ignorance of internal or external market dynamics can be detrimental to airline profitability. The purpose of this study was to comprehend the relationship between terrorism, oil price, and airline profitability. The understanding of this relationship could influence airline executives to make better decisions towards increased profitability and to influence positive social change.

Background of the Problem

The American commercial aviation industry's economic activity is consequential to the American economy. At the height of the United States recession in 2009, commercial aviation accounted for 5.2% of total United States gross domestic product, was responsible for over $1.3 trillion in economic activity, and supported 10.2 million jobs (The Economic Impact of Civil Aviation on the U.S. Economy, 2011). However, the aviation industry operates on small profit margins and is sensitive to internal and external market sources like terrorism and the price of petroleum (Kumari, 2012). Airlines must understand the relationship between terrorism, oil price, and profitability to prepare business contingencies, enhance managerial and operational processes, and promote efficiencies across the business to address the challenges influencing profitability.

Problem Statement

The increase in petroleum prices affects airlines in a negative manner. Increased oil prices have resulted in the reduction of services, operations, the number of scheduled

flights, and airline bankruptcies (Bazargan, Lange, Tran, & Zhou, 2013). As of 2015, the forecast of the price of fuel is to account for 26.1% of operating costs for the airline industry. In 2003, the cost of fuel accounted for only 14% (The International Air Transport Association, 2014). In addition to the high cost of fuel, terrorism added a financial burden of over $3 trillion to the United States economy since 2001, further contributing to challenges in airline profitability (Mueller & Stewart, 2011). The general business problem is the negative influence of the high cost of oil and terrorism on the airline industry. The specific business problem is that some airline business leaders do not understand the relationship between the price of petroleum, terrorism, and airline profitability.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between the price of petroleum, terrorism, and airline profitability. The independent variables are the price of petroleum and terrorism. The dependent variable is airline profitability. The targeted population comprises American commercial airlines with domestic or international routes. The implications for positive social change included the potential to assist airlines in a better understanding of the relationship between terrorism, oil prices, and airline profitability. Increased airline profitability could translate into improved socioeconomic conditions through additional employment and additional funds for the research and development of green technologies in the aircraft manufacturing industry.

Nature of the Study

In my study, I used the quantitative method. According to Castellan (2010), quantitative method agrees with positivism, which holds no previous assumptions of the phenomena, and relies on the scientific method as a means of analysis and understanding complex issues. The quantitative method was optimal for the study because I used only statistical analysis to understand the relationship between terrorism, oil price, and airline profitability.

The motivation of qualitative research is to analyze the human side of the phenomena and complexity of the business problem or process, and taking into consideration dynamics such as lived experiences of individuals or groups (Hyett, Kenny, & Dickson-Swift, 2014). The qualitative and mixed methods were not applicable to this study because I did not seek to understand lived experiences or conduct interviews. The goal of my study was to understand empirically the relationship between petroleum, terrorism, and airline profitability.

Specifically, I used a correlation design in this study. Correlational design was the optimal choice to test the relationship between variables (Janson, 2012). The objective of the study was to determine the relationship between terrorism, oil prices, and airline profitability. I did not use a quasi-experiment or experiment quantitative design in the study because I did not manipulate data, or performed cause-and-effect analysis of the price of petroleum, terrorism, and airline profitability data.

Research Question and Hypotheses

To support the hypotheses, I addressed the following research question:

Does a linear combination of terrorism and price of petroleum significantly predict airline profitability?

Literature about the price of petroleum, terrorism, and airline profitability was the basis for the hypotheses of this study. The alternative hypothesis was whether a significant relationship exists between terrorism, price of petroleum, and airline profitability. The null hypothesis was the absence of a relationship between terrorism, price of petroleum, and airline profitability. The null and alternative hypotheses for the study are:

H_0: The linear combination of terrorism and price of fuel does not significantly predict airline profitability.

H_1: The linear combination of terrorism and price of fuel significantly does predict airline profitability.

Theoretical Framework

The theoretical framework model used in the study was systems theory. This theory was optimal to explain the possible relationship between terrorism, the price of petroleum, and airline profitability because as it applied to this study, oil process and terrorism comprised the two interrelated systems that explained airline profitability. At its broadest definition, systems theory is an interdisciplinary study of the system and the relationships between its subsystems (Ludwig, 1972). The central concept in system theory is that systems interconnect with their environment (Bar-Yam, 2011). Bar-Yam

stated that by applying the principles of systems theory, one could study a system in isolation or by focusing on the interactions within the system. In this research, I studied the interactions between terrorism, oil price, and airline profitability. The systems theory was able to provide a deeper grasp of the patterns within the interrelationships between the predictor and dependent variables of the study. The study of these variables yielded a more robust and comprehensive approach to airline profitability.

Operational Definitions

Deregulation: A policy from the United States government signed into law in 1978, which removed entry and pricing barriers in the airline industry (Avent-Holt, 2012).

Flight Safety Foundation: The Flight Safety Foundation is a nonprofit international organization dedicated to education, advocacy, and publishing of air safety concerns (Flight Safety Foundation, 2014).

Global Terrorism Database (GTD): The Global Terrorism Database is a comprehensive database of terrorist events, used by academia and government (National Consortium for the Study of Terrorism and Responses to Terrorism, 2012).

Organization of the Petroleum Exporting Countries: OPEC is an organization of petroleum exporting countries. The members are a group of oil-producing nations predominantly in Middle Eastern countries (Kisswani, 2014).

Open skies: A policy from the United States government between participating foreign countries to eliminate government interference on airline decisions about pricing, routes, and operations (U.S. Department of State, 2011).

Skyjacking: Skyjacking or highjacking is the unlawful seizure or control of the aircraft or crew (Flight Safety Foundation, 2014).

Systems theory: Systems theory is the study of the system and the relationships between its sub-systems (Ludwig, 1972).

Assumptions, Limitations, and Delimitations

Assumptions

Assumptions are factors in the research that, to a certain degree, are out of the control of the researcher, but are relevant to the integrity of the study (Simon & Goes, 2011). Assumptions are also not verified opinions held by the readers of this study (Roy & Pacuit, 2013). The first assumption was that terrorism has a negative effect on airline profitability. Another assumption was that only external factors as oil prices or terrorism affect airline profitability. The assumptions and generalizations discussed in the study were important in the context and purpose of the study, which was to accept or reject the hypothesis of a relationship between terrorism, oil price, and airline profitability.

Limitations

Limitations are potential weaknesses in the study beyond the control of the researcher (Simon & Goes, 2011). The main limitation of the study was the use of archived records from the Flight Safety Foundation, the GTD, and the Research and Innovative Technology Administration from the Bureau of Transportation Statistics (RITA). Any inaccuracy in the data reported by these civilian, academic, and United States government sources would negatively affect the accuracy of the study. The selected time span of the study (1990-2010) was a restrictive factor because there may

have been economic or terrorist events clustered around other years that could have provided further insights on airline profitability.

The selection of only American airline companies limited the scope of the study. By excluding foreign carriers from the research, the study of the effects of oil price and terrorism on airline profitability was limited to a regional perspective. The incidents of terrorism were restricted to events of skyjacking, attacks on oil production, refinery, and distribution infrastructure. Other types of terrorist activities such as attacks on financial targets or assassination of a head of state or senior government officials could have had an adverse effect on the petroleum and airline industry. However, they were not included in the study.

Delimitations

The delimitations in research limit the scope and explain the boundaries of the study (Simon & Goes, 2011). The sample sizes of the airline data were restricted to only American commercial airlines with domestic or international routes. Of the 94 airlines in the study, 64 were passenger carriers, and the remaining 30 were air cargo carriers. The analyses of the airline business data were limited to the years 1990-2010.

The number of incidents of terrorist activities was restricted to data from the GTD. The GTD is a complete database of terrorist events, often used by academia and government (National Consortium for the Study of Terrorism and Responses to Terrorism, 2012). The terrorist data were limited to attacks by civilian, political, or religious factions. The terrorist event types were limited to armed assault, bombing of oil producing, refining, and distribution infrastructure. The highjacking data were restricted

to the civilian Flight Safety Foundation. The highjacking incident type was restricted to incidents involving fatal or non-fatal highjacking in airlines around the world. The period of terrorist events was limited to 1990-2010.

The geographic area of the airline business data were restricted to the continental United States and international flight routes of American commercial airlines. The geographic location of incidents of terrorism was limited to OPEC and non-OPEC oil producing countries. Twelve countries are members of OPEC, and 10 are non-OPEC members. The highjacking data were restricted to events of highjacking onboard commercial carriers irrespective of geographic location.

Significance of the Study

Contribution to Business Practice

The study was significant at several levels. The disruption of the production or distribution of petroleum because of incidents of terrorism was costly in terms of loss of business and the inflationary effect on fuel-dependent products or services (Blomberg, Fernholz, & Levin, 2013). Terrorist attacks result in adverse economic effects in sensitive industries like airlines (Mueller, 2010).

The study could raise the awareness of the need for the ongoing protection of the oil industry's oil production, refinement, and distribution infrastructure. With the dependence of the airline industry on petroleum, the study could be a catalyst for airlines to adopt more fuel saving technologies. These measures can translate into higher profit margins for the airlines.

Implications for Social Change

The study has social change implications. Promoting awareness of the challenges affecting airline profitability could improve operational efficiencies across the airline industry, resulting in increased profitability and employment in airline companies. Because of increased employment, communities could experience higher standards of living. Research and development of fuel saving technologies by airplane manufacturers has the potential to reduce carbon emissions. Green technologies developed by airplane manufacturers for the airline industry could enable a gradual move from fossil fuel dependent propulsion systems to hybrid technologies breakthroughs in jet propulsion. A technological breakthrough of this magnitude would lessen the dependence of several industries on fossil fuels. I plan to share the approved dissertation with the academic and business scholastic community to add the results of my research to the body of professional literature.

A Review of the Professional and Academic Literature

A review of the academic body of literature was extensive. Airline financial information, including information on the dollar amount the airlines paid for jet fuel for the last decade originates from the United States Department of Transportation. The dataset for global terrorism incidents came from the GTD of the National Consortium for the Study of Terrorism and Responses to Terrorism at the University of Maryland. The security information on highjacking of American airlines was from the Flight Safety Foundation. The professional and academic literature review included peer reviewed

articles, papers, theses, and books on the themes of terrorism, airline profitability, the petroleum industry, and systems theory.

The review of the professional and academic literature was organized by the following themes: (a) systems theory, (b) airline profitability, and (c) terrorism. The works researched are from both current and archived sources in books and peer reviewed articles from various professional databases. Key words used in the various databases included *airline profitability, airline profit, green aviation technology, systems theory, terrorism, terrorism and international business, terrorism database, highjacking, OPEC, shipping vessels, petroleum industry*, and *fuel hedging.*

The total number of references used in this study is 138. The percentage of references used in the study that are 5 or less years old based on the anticipated doctoral approval date is 90%. The percentage of articles that are peer reviewed is 87%. Both percentages of peer reviewed references and references that fall within 5 years or less of the anticipated doctoral approval date meet the required 85% rule. The review of the professional and academic literature was very important to understand the relationship between terrorism, oil price, and airline profitability.

Systems Theory

Mangal (2013) defined a system as a group of elements organized in a particular way. These elements in a system interact with each other. Systems theory formed the conceptual framework of my study to explore the interactivity between the predictor and response variables, and to arrive at a comprehensive understanding of airline profitability. For the purpose of thematic organization of the literature review of systems theory, the

price of petroleum, terrorism, and airline profitability are separate systems with critical interactions between them.

Characteristics of a System

According to Mangal (2013), four aspects are necessary to make systems function well: (a) resilience, (b) self-organization, (c) hierarchy, and (d) efficiency. These dynamics must be in alignment to affect airline profitability in a positive direction (Borenstein, 2011). A system shows resilience when it can recover from a setback resulting from internal or external negative forces (Mangal). Airline profits are very sensitive to the price of fuel (Kumari, 2012). External forces like terrorism have an adverse effect on the price of petroleum. Additionally, disruptions to the production, refinement, and distribution of oil can lead to higher fuel prices. However, the oil supply chain has shown remarkable resilience in the face of both terrorism and non-terrorism disruption (Shukla, Vishal, & Venkatasubramanian, 2011). In systems theory, resilience allows the system to recover and exist in a fluid environment (Mangal). The airline and petroleum industries are resilient systems existing in an ever-changing social, political, and business environment with critical dependencies on each other.

Self-organization is the process by which a system regulates, cooperates, and manages some or all of its parts (Mangal, 2013). According to systems theory, self-organization is an integral part of all systems, be it biological, social, or managerial (Ludwig, 1972). Nevertheless, unlike the randomness of the evolutionary theoretical construct, self-organization in systems theory is guided by corporate and government policies, and managerial constructs which influence self-organization (Mangal, 2013).

Ludwig explained that the higher order of intelligence must be present for the process of the biological self-maintenance, leaving differential reproduction a systematic impossibility. The characteristic of self-organization is present in the oil and airline industry. Self-organization is also evident in efforts by businesses to mitigate potential acts of terrorism against economic targets by adopting proactive steps such as airline and airport security (Federal Emergency Management Agency, 2013). Airline profitability is also a strong influence toward self-organization. Mangal stated that self-organization happens when a self-organized system works toward common goals. In the airline industry as in any business, the primary concern is that of making a profit.

Hierarchy is the ordered nature of the system in which entities, individuals, or groups align based on rank, authority, or power (Mangal, 2013). The airline industry, like any business or system, is hierarchical. Airline companies have ordered layers of management contributing toward profitability and the advancement of the organization. In addition, systematic hierarchy increases resilience. Replacement or repair of the faulty sub-system happens in case a system loses one or most of its subsystems (Mangal). A good example of this dynamic is the role of technology as an enabler of higher profits in the airline industry (Jawabreh, Allahham, Alrjoub, & Ahmad, 2012).

According to Mangal (2013), efficiency is the capability of the system to behave according to its function while working toward its goals, with the least amount of energy or resources. The airline industry works in an ever-changing environment with labor, fuel, capital, regulatory constraints, and limited resources. Additionally, because airline profit margin is traditionally small, efficiency at all levels of the airline are expected

(Kumari, 2012). More fuel-efficient aircraft, the use of one aircraft model, the adoption of direct routes versus hubs, customer loyalty programs, and other operational cost reductions are strategies for increased profitability (Raynor, 2011).

Systems Theory and Risk Management

Business activities and processes have varying degrees of risk. The ultimate goal of risk management is to provide optimal information to the company on how to handle risk (Skoko, 2013). Systems theory provides a model on how to measure and mitigate risk in the airline industry by using causal relationships between dependent and independent variables in the system. The airline industry is a very risky business. Reducing operational risks has a positive effect on airline profitability (Nataraja & Al-Aali, 2011).

The first step is to take inventory of the risks. According to Skoko (2013), the risks are user factors (culture, tradition, education); economic factors (costs, infrastructure, and human resources); and macro factors (political stability, economic development, educational policy, health policy, environmental policy). After risk identification, the mitigation of these risks is by a systems theory method.

Systems Theory and Complexity

Mangal (2013) said that the system is composed of sub-systems with interrelated linkages. The strength of systems theory is the ability to account for the complexity in the system. Properly defined, complexity in the system refers to interrelations resulting in cause and effect events. These events are not directly observable or intuitively straightforward (Bachman, 2008). The complexity between terrorism, oil prices, and

airline profitability, while not fully understood, is evident by market results. Ludwig (1972) linked the genesis of systems theory in studies of biology in an effort to understand a system and its sub-systems. Accordingly, the foundation of systems theory is an attempt to understand the relationship between the sub-systems of the system to understand the whole. Bachman said that the complexity within systems is evident in the pattern of natural ecosystems. Within the natural world are patterns of flow, synergy, inter-dependency, and order. These patterns are in the systems that account for airline profitability. Waltuck (2011) stated that the complexity in the system is not predictable. However, the interaction with the system will provide patterns of behavior that makes it possible to understand and influence their outcomes on the long term.

System Theory and Management

Systems theory has paved the way for the rise of the concept of industrial symbiosis. This concept involves cooperative management of the flow of resources through business networks (Chertow & Ehrenfeld, 2012). A shown by Kumari (2012), the concept of cooperative processes and function within the airline's operations is the driver of profitability. However, the idea of industrial symbiosis is bigger in application than a single idea as profitability. In a larger sense, industrial symbiosis is the concept that a company's waste or by-products are another company's feed (Frosch & Gallopoulos, 1989). This particular concept is evident in the petroleum industry in which many by-products of petroleum are essential for the airline industry (Chertow & Ehrenfeld, 2012). At such level of complexity and interdependence between several systems, require dynamic and cooperative management. Systems theory provides

management with a system's comprehensive perspective on aspects of the company's inflows and outflows, including the relational linkages of the sub-systems (Mangal, 2013). Bachman (2008) illustrated this cooperative linkage through a complexity lens within the system. In the view of such complexity and the potential for unintended consequences, active managerial cooperation is vital to the health, vitality, and success of the business.

The focus of my study was on airline profitability and the predictor variables' influence on profitability. Systems theory provided for a multi-disciplinary and multiple use approach to the dynamic relationship between the variables. In the course of the literature review on the subject of systems theory, tangible instances when systems theory touched on factual business issues were apparent. The versatility of systems theory is the multidisciplinary reach of the theory and its business application (Ludwig, 1972).

Application of Systems Theory

Mangal (2013) conducted a quantitative study using systems theory as the conceptual framework to predict how users would respond to new functions and services offered by social networks like Facebook and LinkedIn. Mangal focused on the ability of systems theory to explain social networks as a system by exploring system characteristics such as resilience, hierarchy, self-organization, and efficiency as possible predictors of user preferences. In my study, I examined terrorism and petroleum price as possible predictors of airline profits. The study conducted by Mangal is critical because the conceptual framework of systems theory lends itself well as a means of predictability.

Trop, Trop, and Burke (2013) applied the theoretical concept of systems theory to the study of psychotherapy. The authors concluded that psychotherapists must consider the dynamics of systems theory when applying the psychological treatment because psychotherapy is rooted in static or fixed mental structures. Trop et al. stated that a systems theory approach considers the complex interactions within an individual. The study was important because of the direct application of the concepts of systems theory to the real world. I successfully examined the interactions and complexity of the independent and dependent variables in my study within the conceptual framework of systems theory. Trop et al. stated that a static approach to complex and interactive systems is not optimal. Mangal's (2013) study of social networks has a strong link to the study conducted by Trop et al. because both studies focus on the dynamic interaction and complexity of systems and the applicability of systems theory as a conceptual framework in which to examine their respective variables.

Nobles and Schiff (2012) examined the ability of systems theory to provide a foundation for the use of legal pluralism. As defined by Nobles and Schiff, legal pluralism is the existence of multiple legal systems and framework within the same geographical location. Nobles and Schiff concluded that the systems theory principles of practical differentiation within distinct social subsystems and self-replication are essential for the successful use of legal pluralism. Differentiation and self-replication are key components in any system, be it financial or legal, and without these components systems would not exist.

Mangal (2013) focused on the properties of systems theory as a means of possible predictability. Trop et al. focused on the strength of systems theory to account for complexity within systems, and Nobles and Schiff (2012) focused on the ability of systems theory to accommodate complex legal structures in a pluralistic society. In my study, terrorism, profitability, and the price of petroleum had properties of distinct, yet interrelated systems. As systems, these variables (terrorism, profitability, and the price of petroleum) displayed differentiation, self-replication, resilience, efficiency, and hierarchy.

Airline Profitability

Internal and External Factors

Airlines usually operate on very thin profit margins and are very sensitive to external or internal factors (Kumari, 2012). To increase profitability airlines must consider several factors other than the price of petroleum or acts of terrorism. I examined the following factors that influence airline profitability in the literature review: business model, service quality, technology, pricing, brand loyalty, strategic management, government policy, strategic management, and fuel hedging. The professional body of literature included interesting information on external and internal forces that account for changes in airline profitability. In such a competitive environment, airline executives need to understand these market dynamics.

Business Model

The company's business model described how it makes money and competes in its industry (Malone et al., 2006). The choice of the business model of the business

affects its profit margin (Easton, McAnally, Fairfield, Zhang, & Halsey, 2010). In the airline industry, two basic business models are network (full-service) and low-cost (discount) carriers. The network carrier model employs diversification strategy by increased domestic destinations, serving international routes, providing diverse seating arrangements (business, economy, and first class), maintaining a complex system of hubs, offering high quality service. Conversely, low-cost (discount) airlines focus on lower airfares. To keep operating costs down, discount airlines offer shorter routes, provide point-to-point destinations rather than through sophisticated hubs and flights are primarily in domestic destinations. Discount airlines operate a common model aircraft fleet, maintain a lean infrastructure, offer a single seating arrangement, and reduce amenities and flight services offered by network airlines (Collins, Román, & Chan, 2011).

Potter (2011) examined the link between profitability and airline business models as expounded by Collins, Román, and Chan (2011) and concluded that network carriers showed a more long-term persistent profit margin than their low-cost competitors did. Potter also stated that the traditional network (full-service) business model, while maintaining high operating costs, provides enough differentiation of services, which translates into higher profit margins on the long run. Flamholtz and Randle (2012) suggested that the airlines integrate corporate culture into the business model as a competitive advantage. Given the fierce competition in the airline industry, the choice of a business model continues to be critical to the airline's profit margin (Easton et al., 2010).

Service Quality and Profitability

As concluded by Collins et al. (2011), exceptional service is a contributor toward increased profitability of the network (full-service) airlines. Hersh, Aladwan, and Aburoub (2011) stated that an increase in service quality resulted in increased profitability, increased sales of passenger tickets, and increased customer loyalty. Yayla-Kullu and Tansitpong (2013) validated the positive correlation between airline profitability and the quality of service, and concluded that high quality of service results in increased customer satisfaction, enhanced customer loyalty, increased market share, and enhanced profitability. However, the authors also said that room exists for enhancement of service quality in United States carriers. Yayla-Kullu and Tansitpong demonstrated that major airlines in the United States lacks staff enthusiasm, sufficient cabin presence, and consistency in professional behavior. Customers demand seats that are more comfortable, improved meal offerings, better in-flight entertainment, and cleaner cabin environment. Curry and Gao (2012) highlighted the importance of customer satisfaction as a significant driver of profitability because of ticket repurchases.

Technology and Profitability

Technology plays a critical role in airline profitability. Bazargan, Lange, Tran, and Zhou (2013) stated that airlines have shown fuel savings by the adoption of ground equipment such as Towbarless Towing Vehicles (also known as supertugs) used to transport an airliner from terminal to the maintenance hangar. Cost-saving initiatives also apply to the aircraft used by the airline. Raynor (2011) said that Southwest's profitability was because the company adopted more fuel-efficient aircraft fleet in combination with

the company's business model and other operational efficiencies. Aircraft manufacturers understand the challenges to airline profitability and build newer fuel-efficient airplanes. Boeing is a major American aircraft manufacturer. Its new airplane design, the 787 Dreamliner, boasts cutting-edge aerodynamics, composite structures, and more fuel-efficient jet engines. This technological edge translates to a 20% reduction in fuel consumption (The Boeing Company, 2013).

In addition to dynamic aircraft designs and fuel-efficient jet engines, other technologies allow airlines to increase efficiencies, provides a better customer experience, and in the process increase profit margins. Suparta (2012) stated that airlines could adopt Near Field Communication (NFC) technology to enhance their airline ticketing systems in mobile platforms. NFC technology would offer a more efficient ticketing, gating, and aircraft boarding operation. Quicker aircraft cycle time at the gate translates to increased profit (Diepen, Van den Akker, Hoogeveen, & Smeltink, 2012). Additionally, the internet has revolutionized the airline reservation system, allowing for efficiencies that translate into increased passenger load, better value for the customer, enhanced customer experience, and increased profits for the airline (Tee, Gharleghi, Benjamin, & Lim, 2014). Barkai and Harison (2013) proposed the implementation of an IT system that would monitor the airline's service infrastructure by actively identifying and preventing lapses in service, communicating the failures to passengers, and effectively following up with the passengers. The effective integration and use of technology in the commercial aviation industry is necessary for the increase in profitability (Jawabreh, Allahham, Alrjoub, & Ahmad, 2012).

Pricing and Brand Quality

Customers are more conscious of the cost of airline tickets, and price is a strong influence in the choice of airline. Frustrated with the confusion of pricing structure of the network carriers, customers began to turn to low-cost carriers in the early 1990s. As of mid-2012, low-cost airlines are growing in most regions of the world attesting to the power of price in influencing buying behavior (Westermann, 2012). The challenge to low-cost operators is to retain customers not influenced by brand loyalty.

However, brand loyalty is an important element that has implications in buying behavior (Anuwichanont, 2011). Airlines realized the power behind brand loyalty and instituted Frequent Flyer Programs (FFP) to encourage customer loyalty. Brunger (2013) found that FFPs resulted in short-term revenue, and the effect did not diminish overtime with elite customers paying between 2% and 12% higher for similar routes. Mathies and Gudergan (2012) noted that members of frequent flyer programs are more sensitive to gain or loss of higher membership status in the loyalty program. Additionally, the authors said that airlines capitalize on this purchase behavior toward increased profits and customer loyalty. Westermann (2012) stated that even low-cost airlines are signing up to Global Distribution System and offering Frequent Flyer Programs to their customers to capitalize on brand loyalty. Cant and Toit (2012) concluded that the price is a lesser influence of customer purchase behavior when compared with brand loyalty. With this phenomenon in mind, Westermann correctly concluded that low-cost operators are attempting to capitalize on brand loyalty as a means of capturing increased market share and profitability.

Government Policy and Profitability

Government policies are influencing factors toward airline profitability. Calzada and Fageda (2012) concluded that government subsidies increased the profitability of subsidized routes because of higher customer demands and the financial stability of the subsidized routes. Airlines remain among the world's most regulated industries with either partial or full state ownership in most cases (Grosso, 2012). On October 25, 1978, President Carter, removing costly barriers to industry entry and price regulations, signed the Airline Deregulation Act into law (Avent-Holt, 2012). Avent-Holt also noted that the deregulation of the American commercial aviation industry provided for increased competition, creation of new markets, and lower fares. Adrangi, Chow, and Raffiee (1997) reaffirmed that deregulation achieved its objectives of increased competition and consumer welfare.

Another policy of the United States government that has positive economic influence on the airline industry is Open Skies. The policy is an agreement between the United States and participating foreign countries that allow airlines to provide affordable, convenient, and efficient air travel to customers by eliminating interference by governments in airline decisions concerning capacity, routes, and airfare (U.S. Department of State, 2011). Open Skies continue to have a positive effect on the economies of participating countries. In the United States alone, Open Skies resulted in an average of $720 million in economic activity for cities with new international ports of entry. For example, the Memphis-Shelby County Airport Authority reported that, in

2005, the partnership with Amsterdam's KLM resulted in $120 million in economic activity, including the addition of 2200 local jobs (U.S. Department of State, 2011).

However, despite the benefits of deregulation and Open Skies, there remain restrictions on airlines around the world by governments (Grosso, 2012). In a study sponsored by Boeing on the benefits of liberalization, the influence of liberalization could provide a 63% increase in air traffic, create 24.1 million jobs globally, and generate $450 billion in economic activity (InterVISTAS, 2014). In the Brazilian market, liberalization would decrease the average airfares by 30% allowing for an increase of consumer discretionary surplus of between R$1.3 Billion and R$3.7 Billion (InterVISTAS, 2009). Therefore, as seen in the professional body of literature, airline profitability is sensitive to government policies.

Strategic Management and Profitability

Strategic management is a strong influence toward profitability in any business. Huefner (2011) provided good insight into the nature of strategic management. The author stated that the resource the company possesses is not what makes the difference. The company must be efficient in the administration of its resources. Nataraja and Al-Aali (2011) in a case study of Emirate Airlines said that competitive strategies in operations, diversification, business model, and human resources are essential for exceptional performance of an organization. Shi (2012) stated that the primary driver of airline profitability is operational efficiency. Because of the fluid nature of the airline business, management must be aware of forces that may affect profitability. As an

example, a time existed when labor costs were the most influential on profitability. As of 2008, the cost of fuel replaced labor costs (Jackson & Jackson, 2009).

Another important element of strategic management is the ability for airlines to decide on which key financial indicators to use to develop their strategic business policies (Wu & Ying-Kai, 2014). Airline executives must understand the fluid nature of asset turnover, investment return, profit margin, and the earning power of the airline (Zarb, 2010). Because the profit margin of airlines is so thin, airlines must establish sound strategic financial management practices to stimulate a healthy stream of working capital and liquidity (Ammons & Gosman, 2012).

Fuel Hedging and Profitability

Fuel hedging is a strategy some airlines use to help save in jet fuel costs by purchasing jet fuel price futures at a set price. However, that particular strategy is not without risk (Triana, 2011). Southwest was a pioneer in fuel hedging and exceeded profit projections during the turbulent period of 2008 when the price of petroleum went up to $150 in July. Southwest's strategic strength became a major weakness when the price of petroleum dropped to $30 by the end of 2008. Southwest suffered major financial loss from hedging (Tokic, 2012). Fuel hedging can have either a positive or a negative influence on airline profitability.

Petroleum

Oil Volatility

Jet fuels (A-1, Jet A, Jet B, and TS-1) are by-products of petroleum and powers turbine-based aircraft in the airline industry. Jet fuels A-1 and A are mostly used in the

United States (Shell Global). Nandha, Brooks, and Faff (2013) noted that the price of crude oil (West Texas Intermediate, also known as Texas Light Sweet) is an appropriate proxy for the cost of airline jet fuel. As a by-product of petroleum, the price of jet fuel is relative to the volatility of petroleum (Nandha, Brooks, & Faff, 2013). The volatility of petroleum is because of the classic economic law of supply and demand. Additionally, petroleum is a finite resource with rising global demand (Nandha, Brooks, & Faff, 2013). Additional forces that contribute to the volatility of the price of petroleum are terrorism, petroleum refinery capacity, oil transport and distribution capacity, natural disasters, and political instability in oil-producing regions. Airline management should become sensitive to these external market forces and their effect on the price of jet fuel (Frumkin, Hess, Parker, & Schwartz, 2011). Nandha, Brooks, and Faff concluded that external forces govern the relationship between airline profitability and oil volatility.

Supply Chain Volatility

Hassan (2011) stated that volatility of the price of petroleum continues to influence economies globally. Many factors contribute to the volatility of oil. Drilling petroleum is a hazardous operation, be it on land, or at sea because of the precedence of high volumes of flammable hydrocarbons at the drilling site (Pinheiro, Cranor, & Anderson, 2011). Despite the hazards to oil drilling, the rising demand on petroleum continues to fuel the expansion of oil exploration (Boesch, 2012). In 2010, an explosion on a British Petroleum offshore drilling rig resulted in the death of 11 personnel and leaked approximately 4.9 billion barrels of crude oil into the Gulf of Mexico (This is not a drill, 2011). The financial damage was at the tens of billions of dollars across the

United States tourist, fishing, and oil industries (Viscusi & Zeckhauser, 2011). From the explosion at the Deepwater Horizons drilling rig on April 20, 2010 to April 30, 2010, the price of crude oil increased resulting in negative economic effects to energy sensitive industries such as airlines (U.S. Energy Information Administration, 2015). Figure 1 is a graphical depiction of the petroleum spot price from the week of April 19 to April 30, 2010. Figure 2 depicts the sensitivity of the price of petroleum to outside forces like the Deepwater Horizons drilling rig explosion.

Week Of	Mon	Tue	Wed	Thu	Fri
2010 Apr-19 to Apr-23	81.52	82.98	82.78	82.89	84.34
2010 Apr-26 to Apr-30	84.20	82.43	83.22	85.17	86.07

Figure 1. Price of petroleum per barrel in 2010. From "Cushing, OK WTI Spot Price FOB" (p. 1), by U.S. Energy Information Administration (February 2015). Public domain. Reprinted with permission.

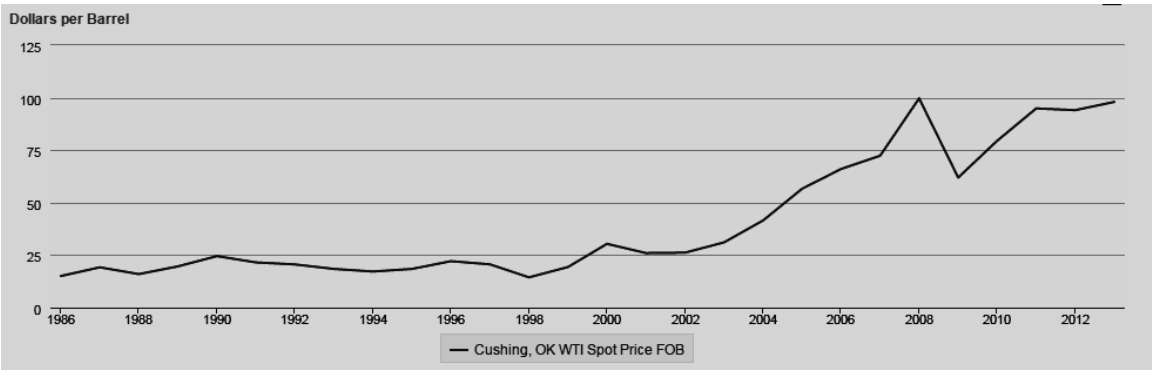

Figure 2. Annual figures of petroleum in 2010. From "Cushing, OK WTI Spot Price FOB" (p. 1), by U.S. Energy Information Administration (February 2015). Public domain. Reprinted with permission.

The United States Department of the Interior commissioned a report from the National Academies concerning the safety of offshore drilling on the aftermath of the

2010 Deepwater Horizon disaster on the Gulf of Mexico. The panel of academics acknowledged the need for the United States to maintain, and secure its sources of petroleum (National academies report urges system safety approach to offshore drilling, 2012). Because of the high demand of petroleum and the hazards involved in the procurement of oil, the price of petroleum will continue to be volatile. Airlines must continually adapt to these market realities.

The transport of crude oil from producing sites to refineries on client countries is hazardous, which adds to the volatile nature of petroleum pricing. Idelhakkar and Hamza (2011) stated that the majority of the oil producing sites is located far from advanced transport infrastructure of developed nations and older tankers mainly perform the sea transport of crude petroleum. Older oil tankers result in cheaper transport fees. However, the use of older tankers increases operational risk (Idelhakkar & Hamza, 2011). A tanker collision is the main operational risk concern. The typical consequence of oil tanker collision is the spillage of petroleum resulting in environmental and economic losses. Although risk management strategies exist to mitigate oil tanker transport hazards, oil transport continues to have risks that influence oil prices (Van Dorp & Merrick, 2011). Additionally, the petroleum tanker supply chain is quite complex, and mismanagement can result in serious financial losses (Hennig, Nygreen, Furman, Song, & Kocis, 2011). The dangers of petroleum transport are not limited to oil tankers. On July 6, 2013, a major derailment of 74 train cars carrying crude oil in Canada resulted in fatalities, environmental, and economic losses (Fernandez & Tomalty, 2013). The United States

imports approximately two-thirds of its petroleum and its transportation system remains vulnerable to disruptions (Kositkanawuth et al., 2012).

The sea routes taken by oil tankers also add to the volatility of oil price. Fifty percent of the global oil tanker shipments occur in the South China Sea. $1.2 trillion in trade pass through those sea-lanes. Any conflict in that region of the world can have severe consequences on the price of petroleum (Creehan, 2012). Another problematic sea-lane is Iran's Strait of Hormuz. Any potential blockade by Iran of oil tanker traffic could have a severe effect on the price of petroleum (Verleger, 2012). A dangerous sea route for oil tankers is the area around Somalia. Somali sea pirates have taken oil tankers hostage as part of their criminal activities (Seay, 2013).

Political instability or conflict in oil-producing regions can result in the disruption of petroleum. Al-Sahlawi (2013) said that Saudi Arabia is the world's leading producer and exporter of petroleum and has the world's largest oil reserves. According to International Energy Agency, the United States import two million barrels of petroleum daily from the Middle East (Voth, 2013). Unfortunately, the Middle East is a very politically unstable region with negative consequences to the price of petroleum. Gresham (2014) noted that, in the 1970s, OPEC declared an oil embargo against the United States resulting in gasoline prices going from 33 cents to over $1.20 a gallon. Jaffe and Miller (2012) reported that, in 2011, the Libyan civil war reduced the country's oil production by 75%. Additionally, in January 2011, oil prices rose from $92 per barrel to $120 by April of the same year because of the upheavals in Tunisia and later in Libya. Jaffe and Miller also noted that an oil embargo by the European Union on Syrian

petroleum reduced Syrian oil exports from 130,000 barrels per day to next to zero. Of note, is the fact that because of the close relationship between petroleum and gas exploration, disruptions of petroleum often means disruption of gas, and other forms of energy (Lochner & Dieckhöner, 2011).

Natural disasters are agents of disruption of the supply chain of petroleum particularly because of the damage done to infrastructure (Akhtar & Santos, 2013). Hurricane Katrina in 2005 stands among the most destructive natural events that had profound economic effect on the petroleum infrastructure (Mancuso, Alijani, & Kwun, 2011). Hurricane Katrina destroyed or damaged 30 oil platforms and damaged nine refineries, causing the refineries to shut down for a few weeks after the hurricane, which resulted in the loss of about 24% of the annual oil production in the Gulf of Mexico (U.S. Department of Commerce, 2006). These types of natural disasters can have an adverse effect on the price of petroleum.

Refinery Capacity

Another factor that influences the price of distillates of petroleum (gasoline, kerosene, jet fuel, motor oil, asphalt, and diesel) is the capacity of refineries to refine crude oil into its by-products. Refineries in the United States face tremendous challenges in the form of restrictive government regulations, high taxes, and the high price of petroleum (Parkinson, 2012). Another factor is that while increasing import and domestic production of oil, the number of refineries continue to decrease from 158 in 2000 to 142 in 2014 (Number and Capacity of Petroleum Refineries, 2014).

Terrorism

Definition and Economic Focus

Terrorism is the most challenging variable in the study because of its complex nature, as well as inconsistent conclusions by researchers in the body of academic and professional literature. At its broadest interpretation, terrorism is premeditated violence conducted against civilian targets by subnational groups (Central Intelligence Agency, 2011, p. 3). In his study of terrorist financing and threats to financing institutions, Simser (2011) stated that while profit is not the main motivation of terrorism, terrorist groups engage in kidnapping and hostage taking as a means of financing terrorist activities. Terrorists understand the importance of economics. Financial targets of opportunity are included in the definition by the CIA. Mueller and Stewart (2011) stated that the overall financial cost of the September 11, 2001 terrorist attacks against the United States is well over $3 trillion, highlighting the economic vulnerability of the economy to terrorism.

Terrorism and Business

Business and terrorism are interlinked. In a psychological qualitative ethnographic study of posttraumatic disorder treatment programs, in the Israeli city of Sderot, which has a history of Quassam rocket attack from their Palestinian neighbors, the results reflected an interesting linkage between the citizenry feeling of safety and positive economic development (Friedman-Peleg & Goodman, 2010). Businesses need a safe environment to develop and thrive, positively contributing to the economic development of the region.

Larobina and Pate (2009) stated that the goal of terrorism is to disrupt and destroy businesses. It becomes critical for governments to target and destroy terrorism to ensure the stability of the global economy. Terrorism is a direct challenge for countries wanting to attract and retain foreign investment. Alexander (2004) said that terrorism's implications on business merits scrutiny given its relation to economic security. Terror changes business-generating firms to deal with current threats and craft plans to reduce future challenges. Terrorists weaken industry and society through their manipulation of economic systems and companies (nonprofits, labor, capital, and technology) against their targets (Alexander, 2004).

Some businesses are more sensitive to terrorism than others are. Gupta (2011) stated that the tourism industry is responsible for the generation of tax revenues, foreign exchange earnings, regional employment, and opportunities for entrepreneurs. However, Gupta concluded that the fear of repeated terrorist events has caused a slowdown of tourist activities in affected regions of the world. Ramiah and Graham (2013) noted a flight of capital from regions of the world affected by terrorist events. Moreover, Ramiah and Graham (2013) said that the consequence of terrorism to select industries like securities is not limited to regions that experienced terrorism. The adverse economic effect is global. Alam (2013) further highlighted the adverse effect of terrorism on securities for the long-term.

The result of terrorism to the securities industry is not limited to the long-term. Eldor, Hauser, Kroll, and Shoukair (2012) reported that share prices decline significantly after a terrorist attack and that more fatal the attack, the higher the negative economic

effect. Tavor (2011) noted that the location and response to the terrorist event determine the intensity of the economic response. However, Sandler (2013), Chen and Siems (2004) concluded that short-term losses are temporary and do not last over a few days, the only exception being the American stock market after the September 11, 2001 attacks. The stocks took over 30 days to recoup the values lost. Brounen and Derwall (2010) said that stock markets are more sensitive to terror attacks than to natural disasters, but that the markets soon recover from the economic losses. However, Kollias, Papadamou, and Arvanitis (2013) stated the long-term danger to affected markets because of the flight-to-safety effect.

The transportation industry is sensitive to terrorism. Blomberg, Fernholz, and Levin (2013) stated the challenges ships face from pirates in the Gulf of Aden, a strategically conduit for most of the petroleum from the Middle East and trade between Asia and Europe. Disruption of trade because of a terrorist or pirate attack could significantly affect the cost of petroleum and commodities globally (Blomberg, Fernholz, & Levin, 2013). James (2013) highlighted the vulnerability of the global transportation infrastructure to terrorist events. In assessing measures to protect the American homeland, Mueller (2010) identified airports, ports, and transportation networks as potential economic targets for terrorism. Luongo (2011) showed the economic liability airlines face in case of terrorist attacks at airports. However, terrorist financial targets are not limited to the transportation industry and infrastructure. Stegen, Gilmartin, and Carlucci (2012) reported the security challenges facing the energy sector and the negative financial consequences of terrorist attacks.

The mitigation of terrorism is costly to companies. Thatcher (2013) stated that since the September 11, 2001 attacks, the costs of securing businesses have increased. Shahin (2013) said that the banking and financing industry has also struggled with the costs of regulation and compliance as money laundering and terrorist financing threats are significant expenses to banks. Helms, Costanza, and Johnson (2012) discussed the possibility of cyber-terrorism, which could strike at financial institutions, transportation infrastructure, energy infrastructure, and government installations. Considering the destructive pattern of terrorist actions against international business interests, companies must be aware that as governments tighten security, companies are attractive terrorist targets. International businesses must be more cognizant of the effects of terrorism on organizational preparedness, company strategy, and distribution channels. Terrorism will continue to pose significant hazards for decades to come, and the economics of terrorism favors the terrorists. The cost of protecting against terrorist acts is quite high, and the costs of planning and launching terrorist attacks are much less (Czinkota, Knight, Liesch, & Steen, 2010). Kumar and Liu (2013) cautioned the business community and governments that in our inter-linked global economy, any terrorist attack, regardless of region, would have an adverse effect on the global economy.

Transition

In Section 1, I presented the problem statement as the foundation of the study. I wanted to understand the relationship between terrorism, high oil prices, and airline profitability. To do so, I selected the quantitative method to investigate the relationship between terrorism, oil price, and airline profitability. I examined archived data from the

United States government, and security data from academic and airline organizations to determine the relationship between the selected variables.

During the literature review, I identified a few gaps related to terrorism, oil price volatility, and airline profitability. The initial impression during the literature review was the saturation of research related to airlines. Nevertheless, the impression proved to be wrong. Although many studies dedicated to airline profitability are available, gaps in the literature exist of the ramification of combined variables such as terrorism and oil price on airline profitability. Additionally, the consequences of specific types of terrorist attacks such as airline highjacking or an attack on petroleum infrastructure has on airline profitability were unknown. In addition, gaps in the professional literature exist about fuel saving techniques by the airlines other than employing fuel hedging.

In Section 2, I will introduce a comprehensive discussion of the project. Detailed information on the research method and design, population, sampling, ethical concerns, participants, and my role as the researcher is given. Moreover, the project phase involves a comprehensive description of how the research data is gathered and analyzed, as well how to handle issues of validity and reliability. In Section 3, I will analyze and interpret the downloaded data, and apply the results to current professional practice in the airline industry. In the final phase of this research, implications of my study for positive social change are the thrust of the Walden University's mandate from every scholar.

Section 2: The Project

In Section 2, I discuss in detail the purpose of the study, the selected methodology, research design, participants, and my role as the researcher. I addition, I provide specific information on the selected population, sampling, the collection and how the data is analyzed, as well as addressing any ethical concerns. Moreover, I discuss potential issues with reliability and validity.

Purpose Statement

The purpose of this quantitative correlation study was to examine the relationship between terrorism, the price of petroleum, and airline profitability. The independent variables in the study were the price of petroleum and acts of terrorism. The dependent variable was airline profitability. The targeted population was American commercial airlines with domestic or international routes. The population of American commercial airlines represented companies with distinct management and operational styles. These dissimilarities between the airlines provided additional insight on how the independent variables affect airline profitability across different airlines.

The implications for positive social change included assisting airlines in a better comprehension of the relationship between terrorism, oil prices, and profitability. Increased airline profitability could translate into increased employment. Enhanced aircraft fuel efficiency could benefit the environment. The research, development, and adoption of fuel saving technologies by airlines could minimize the carbon footprint in the environment.

Role of the Researcher

My role as a researcher was restricted to retrieving and analyzing archived security and airline financial data through private and government open source data websites. As the adopted method is restricted to quantitative analysis of archived data, I used no surveys, interviews, or participants. As a researcher, I had no experience with the subject of terrorism or petroleum, or the airline industry. The inspiration for my chosen topic was the desire to understand the relationship between terrorism, oil prices, and airline profitability. I have spent the last 7 years employed in the global business environment and have become aware of how sensitive international business is to events such as terrorism, and fluctuations of oil prices. I remained independent of the subjective nature of the social and economic variables as I determined the significance of the relationship between terrorism, oil price, and airline profitability.

Participants

I used archival data from the United States government, the GTD, and the Safety Flight Foundation. I did not need participants for the study.

Research Method and Design

The quantitative method and a correlational design were the most appropriate, and efficient choice to test the hypothesis of this study. The focus of this study was to determine the relationship between terrorism, oil price, and airline profitability. I selected the research method and design of this study to follow the purpose of the research.

Research Method

To study the potential relationship between terrorism, oil price, and airline profitability, I used the quantitative method. As expounded by a growing body of research studies the quantitative process aligns with the scientific method with an emphasis on objectivity, facts, and empirical data (Ahmad & Yunos, 2012). Hopkins (2000) stated that the quantitative method supports a post positivist worldview. Castellan (2010) expounded further on the nature of the quantitative approach by stating the role of positivism in quantitative research. Positivism is a worldview in which physical and social phenomena are independent of the observer.

I analyzed the security and financial data of the airline industry. I did not apply qualitative analysis of the social, political, religious, or economic variables of terrorism in an attempt to determine if a relationship occurs between oil price, incidents of terrorism, and airline profitability. Focusing on the human and social dynamics of profitability, and terrorism would have detracted from the purpose of the study. This fact was the basis of the rejection of the qualitative method. The strength of qualitative method is the ability to analyze the human side of the issue, taking into consideration lived experiences, and complexity of the business problem (Mack et al., 2005).

Research Design

The goal of correlational research is to define the relationship among the variables of the research rather than to assume cause and effect (Lapped, 2000). The study was correlational as the principal emphasis of the research was on the measurement of the relationship between airline profitability, oil price, and incidents of terrorism across the

American commercial aviation industry. A correlational design was a critical component to test the hypothesis. The purpose of the empirical analysis in the study was to focus on the hypothesis, so it followed that the closer the alignment between the research design, and the hypothesis, the stronger the study (Gerring, 2011).

Other research methods and designs were available to examine the potential relationship between terrorism, oil price, and airline profitability. Nevertheless, the primary reason I did not use these methods was the quantitative objective of the study. A phenomenological approach is the best model to understand the human complexity in terrorism. Phenomenology is a philosophical viewpoint that assists researchers in understanding and exploring experiences without forming assumptions about those experiences (Converse, 2012). The phenomenological design is applicable to determine the complexity of shared experiences from individuals who experienced the phenomena in the form of in-depth interviews (Applebaum, 2012). I did not conduct interviews or collected surveys from any participant because the data were in the form of archived financial and security information. No shared experiences of the sample population in the study existed.

Another choice of design for the research was a case study. In a qualitative case study approach, the research looks at individuals, a small group, or a group. The researcher collects information about participants using direct observations, interviews, financials, and analysis of multiple documents (Lalor et al., 2013). The strength of case studies is the ability given the researcher to understand complex social issues, and real life events such as managerial and organizational processes (Ridder, 2012). The case

study approach was not part of the study because the study of the complexity of the variables of profitability, oil price, and terrorism would have detracted from the quantitative purpose of the study.

Population and Sampling

The airline profitability sample consisted of financial records from major American commercial passenger and cargo airlines with domestic or international routes. The records were as follows: 64 commercial passenger carriers and 30 commercial air cargo carriers. The data originated from the United States government's RITA of the Bureau of Transportation Statistics. The price of jet fuel paid by the airlines for the period of 1990 to 2010 also originated from RITA.

The terrorism records comprised the frequency of terrorist events against oil production, refinery, and distribution infrastructure and originate from the GTD for the period of 1990-2010. The geographic targets of these terrorist events were 12 OPEC oil-producing nations and 10 non-OPEC oil-producing nations. The highjacking information was the frequency of highjacking of American aircraft for the period of 1990-2010. It originated from the Flight Safety Foundation.

Because I tested the hypotheses, I used a power analysis to identify the minimum sample size required to achieve a minimum power of .80. The sample size was 43 points of data for each variable. Figure 3 illustrated the sample size requirements of the study.

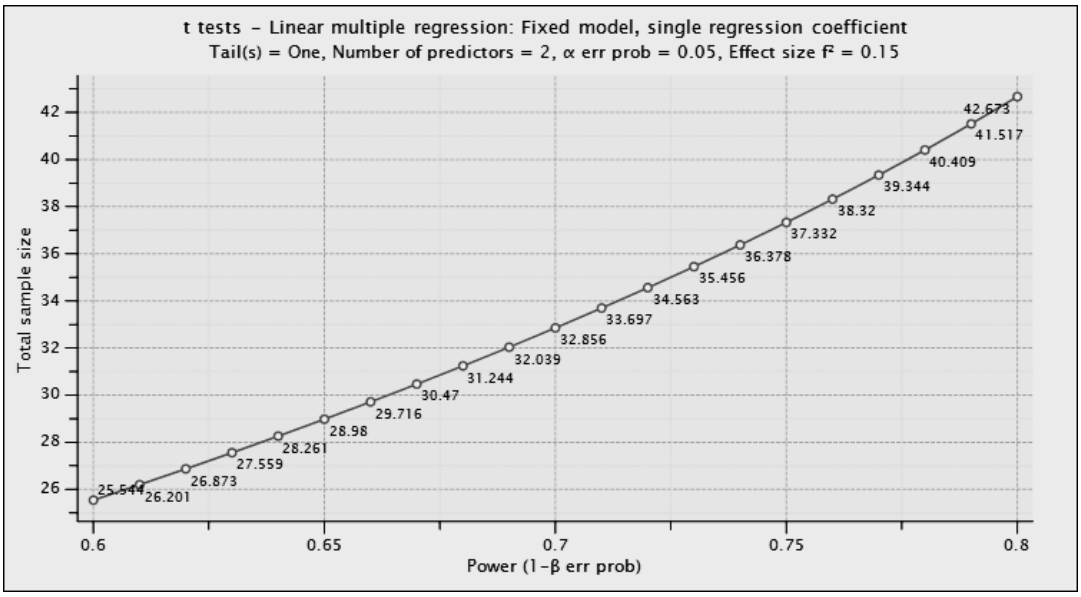

Figure 3. Power analysis of linear multiple regression and sample justification.

I used a nonrandom sampling technique called convenience sampling. In convenience sampling, a researcher uses the most available or easily selected sample for the study (Gemayel, Stasny, Tackett, & Wolfe, 2012). In this case, the security, petroleum price, and airline profitability data were the most accessible and convenient records. These archived records were the primary data used for the quantitative analysis of this study

Ethical Research

The airline profitability, the price of petroleum, the frequency of terrorist events in the GTD were in the public domain and did not contain names of individuals or any other type of confidential data. No ethical concerns existed with the analysis data in the study. However, in the unlikely event of a loss of the original data on the RITA or the GTD servers, I kept a copy of the primary archived data on a DVD, which will be in a safe for a period of 5 years. The name of the American commercial carriers used in the

study is in Appendix A. My National Institutes of Health (NIH) certificate of completion of the Protecting Human Research Participants course is included in Appendix B.

Data Collection Instruments

Because I downloaded archival data as the primary source for analysis, I determined that no need existed for surveys or interviews for the study. Below are the details of the variables used in the study.

Table 1

Variables used in the Study

Dependent	Independent
Airline Profitability	Terrorism Price of Petroleum

Table 2

Data Type of Dependent Variables

Dependent	Scale
Airline Profitability	Expressed as billions of dollars

Table 3

Data Type of Independent Variables

Independent	Scale
Terrorism	Expressed as the total number of terrorist events and highjacking
Price of Petroleum	Expressed as the cost of jet fuel

I operationalized the airline profitability dependent variable used in the study as Profitability. I measured the airline profitability in United States dollars. I operationalized the cost of petroleum independent variable used in the study as Cost of Fuel. I measured the cost of jet fuel in United States dollars.

The frequency count of terrorism events and airline hijacking comprised the independent variable. I operationalized the independent variable as Terrorism. Terrorist events included violent attacks on the production, refinement, and transportation infrastructure of petroleum of OPEC (Algeria, Angola, Ecuador, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela) and non-OPEC (Russia, United States, China, Brazil, Canada, Mexico, Kazakhstan, Norway, United Kingdom, and Sudan) oil-producing countries. I included the frequency of airline hijackings (fatal, non-fatal) globally.

The downloaded airline financial and cost of fuel data originated from the United States government. The terrorist data originated from the National Consortium for the study of Terrorism and Responses to Terrorist (START), and the Flight Safety Foundation. The United States government, START, and the Flight Safety Foundation have integrity of data and reporting. As such, I had no concern about the internal consistency of the data. Data manipulation was limited to the input of the data into the Statistical Package for the Social Sciences (SPSS) software.

Data Collection Technique

I downloaded the archival data from the RITA, the National Consortium for the Study of Terrorism and Responses to Terrorism, and Flight Safety Foundation websites.

After I received permission from the Walden University Institutional Review Board (IRB), I downloaded the data into my personal laptop and stored data in a password protected electronic folder until I was ready for the analysis phase of the study. I did not use a pilot study in the research. The IRB approval number is 10-10-14-0292680.

Data Analysis Technique

Does a linear combination of terrorism and price of petroleum significantly predict airline profitability?

H_0: The linear combination of terrorism and price of fuel does not significantly predict airline profitability.

H_1: The linear combination of terrorism and price of fuel significantly does predict airline profitability.

In the study, I used the quantitative statistic test multiple linear regression of the response, or dependent variable (airline profitability), and the predictors, or regressor variables (terrorism, and oil price). The multiple linear regression statistical test models the relationship between predictor variables and multiple response variables, and is a way to predict the effect predictor variables have on response variables (Jadhav & Kashid, 2012). In a multiple linear regression, rejection of the null hypothesis implied that the predictor variables (terrorism and oil price) have a significant effect on the response variable (airline profitability). The multiple linear regression statistical test was the optimal test for my research because of the predictive qualities of multiple regression analysis. I used the hypothesis testing method to ensure proper testing of the hypotheses. In quantitative studies, the researcher uses the hypothesis method to ensure that the

hypothesis is properly accepted or rejected without type I or type II errors (Vasilopoulos, 2012).

The objective in testing the null hypotheses was to ascertain if a linear relationship existed between the dependent variable (airline profitability), and the predictors variables (terrorism, and oil price). I used the test for significance of regression to test the null hypotheses (Stang & Poole, 2013). The criterion for rejection of the null hypotheses was the p-value. The *p* value is a numerical value that details how much evidence exists to accept or reject the null hypotheses (Lijffijt, Papapetrou, & Puolamäki, 2014). If the *p* value was less than 5% (0.05), statistically strong evidence existed to reject the null hypotheses. If the *p* value was higher than 5% (0.05), insufficient evidence existed to reject the null hypotheses. Because the *p* value was lesser than .05, the null hypothesis was rejected.

The platform that I used to determine the correlation is the statistical analysis software SPSS from International Business Machines (IBM). This statistic tool offered business managers and researchers the analytical resources to address pressing business and research questions and was the most appropriate software to use in the study (IBM, 2013). Other statistic software such as Statistical Analysis System (SAS), Number Cruncher Statistical System (NCSS), and Statistical Solution were applicable to the study. These programs are proprietary, but open source statistical software was available for the study. In addition to the SPSS statistical functionality, I am familiar with the use of the software.

I accounted for the sensitive nature of linear regression by conducting thorough assumption testing before conducting the final regression test. Specifically, the assumptions were: (a) outliers, (b) linearity, (c) multicollinearity, (d) normality, (d) homoscedasticity, and (e) independence of residuals. Without verifying that the data has met the assumptions, the results of the final regression test would have been misleading.

In linear regression, an outlier is an observation in which the value of the dependent variable is unusual and contains high residuals. An outlier could indicate a peculiarity of the sample, or could indicate an error in data entry (Regression with SPSS, 2014). According to Satman (2013), the best way to address outliers is to examine scatter diagrams and residuals of each variable. Accordingly, I used a scatterplot of the airline profitability, terrorism, and oil price variables to account for any potential problems before running the final regression test. The test for linearity in linear regression is straightforward. The assumption is a linear relationship exists between the predictor and response variable (Regression with SPSS, 2014). Accordingly, I ran a scatterplot between the response and predictor variables. No issues of linearity were present.

I also performed the assumption test for multicollinearity. Multicollinearity is an adverse situation where the correlations between the independent variables are very strong (Regression with SPSS, 2014). If there existed a strong correlation between terrorism and the price of petroleum, these variables would in essence have conveyed the exact information and the result of the final regression testing would have been paradoxical. I used the Variance Inflation Factors (VIF) test in SPSS to flag for multicollinearity. If the VIF resulted in a score of 1, no strong correlation between the

independent variables was evident. If the VIF score was 10 or above, I would have needed to remove one of the variables from the study. The resulting VIF scores were acceptable.

In linear regression, an assessment of the normality of the data is essential because of the underlying assumption that the data is normally distributed (Regression with SPSS, 2014). I used the Shapiro-Wilk tests in SPSS to determine the normality of the data. If the Sig. value of the test was greater than 0.05, the data would have been considered normal. If the Sig. value was below 0.05, a significant deviation possibly existed from a normal distribution. However, the Sig. value was not the main determinant of a normal distribution. I also used boxplots and scatterplots before making a final determination.

Homoscedasticity, also known as homogeneity of variance, assumes that the dependent variable exhibits similar amount of variance across the range of the independent variables. In other words, the error variance should be constant between the variables (Regression with SPSS, 2014). I conducted a scatterplot graph to test for homoscedasticity. No issues were present.

Issues of independence of residuals can be very serious (Regression with SPSS, 2014). Independence of residuals is when errors of one observation are not in correlation with errors of other observations. The assumption of independence is particularly broken with data collected on the same variable over a period of time (Regression with SPSS, 2014). I used the Durbin-Watson test in SPSS to flag for issues of independence in the variables. The value of the Durbin-Watson test ranges from 0 to 4. The residuals show no

serial correlation if the test value is 2 or less. A value of 4 indicates a strong negative correlation. The optimal value for the test would be a value of 2. The result of the Durbin-Watson tests was acceptable.

Violations of the assumptions listed above will require data transformations as a minimum. In the event that I rejected the null hypothesis, or issues with assumption testing existed, my plan was to rerun the analysis as the means of eliminating errors in the input or analysis of the data.

Reliability and Validity

Reliability

Thomas and Magilvy (2011) specified that reliability occur when another researcher can successfully follow and reproduce the results of a published study. This type of reliability is applicable to this study. I am confident that any researcher can duplicate the findings of this study in an audit process by exactly following the components of my study. Because I utilized archived records in the research, future researchers could easily reproduce the study.

I used archived records from the United States government, the Flight Safety Foundation, and the Global Terrorist Database. Archival research is accessing and using original records generated by individuals or organizations McCausland (2011) stated that this type of research has reliability issues. Gaillet (2012) presented a few reliability issues when dealing with archival data: (a) undocumented method on the use of the data, (b) ineffective codification of the data, and (c) lack of effective oversight by the collecting agencies.

I mitigated the reliability concerns about the archived records used in the study by presenting the methods the Flight Safety Foundation, START, and RITA use to compile and archive their records. The Flight Safety Foundation, START, and RITA are very strict and rigorous in their collection and disclosure of archived data. The archived data protocols from the respective organizations are helpful in addressing reliability concerns of archived data.

The Research and Innovative Technology Administration from the Bureau of Transportation Statistics is very rigorous in its method of gathering and disclosing airline financial and fuel usage records. RITA is bound to confidentiality policy, laws and regulations, statement of commitment to scientific integrity, and statistical policy of research (Policies and Methods). As a Federal statistical agency, RITA must observe confidentiality agreements between the agency and reporting airlines. RITA conducts periodical audits of its employees related to data security, provides for limited sharing of statistical data, and offers severe criminal penalties for violation of confidential data (Policies and Methods). Additionally, by federal law (Moving Ahead for Progress in the 21st Century Act; Safe, Accountable, Flexible, Efficient Transportation Equity Act; and Transportation Equity Act for the 21st Century), the Secretary of Transportation may collect data from commercial airlines to further the progress of American transportation infrastructure (Policies and Methods). RITA is also committed to scientific integrity in reporting statistical data. The organization follows the *Principles and Practices for a Federal Statistical Agency* from the National Research Council of the National Academies (Policies and Methods).

The National Consortium for the Study of Terrorism and Responses to Terrorism (START) is very strict in the collection of data for the Global Terrorism Database (GTD). The GTD is a set of longitudinal records on national and international events of terrorism (National Consortium for the Study of Terrorism and Responses to Terrorism, 2012). START designed the GTD to collect situational and etiological variables pertaining to a terrorist event. When available, 120 separate attributes of each terrorist event is present in the GDT for statistical analysis. Additionally, START commissioned Pinkerton Global Intelligence Service (PGIS), the Center for Terrorism and Intelligence Studies (CETIS), and the Institute for the Study of Violent Groups (ISVG) at the University of New Haven to collect and code the data of terrorist events for the GTD (National Consortium for the Study of Terrorism and Responses to Terrorism, 2012). Finally, START consulted Professor Alex P. Schmidt, Director of the Terrorism Research Initiative (TRI) for records of terrorist events and access to his databases. Professor Schmidt was instrumental in developing databases pertaining to terrorism while at the United Nations and his career in academia.

The frequency of highjacking records originated from the Flight Safety Foundation accident database. The Flight Safety Foundation uses various sources to compile the accidents and highjacking database (See Appendix D). The Flight Safety Foundation is very rigorous in the compilation of their databases, and uses reputable sources from across the aviation industry (Flight Safety Foundation, 2014).

Validity

According to Trochim (2006), internal validity is relevant in research that tries to determine correlation. The internal validity of the research pertained primarily with the correlational relationship between airline profitability, oil price, and frequency of incidents of terrorism. Additionally, Conway (2011) stated that validity issues in archival research pertain mainly to the quality and trust of the data. The element that could have undermined the study was the accuracy of the airline financials and fuel price from the Research and Innovative Technology Administration (RITA), the terrorist event data from the Global Terrorism Database (GTD), and the hijacking records from the Flight Safety Foundation. I am confident that the inclusion of the archived records in the study was acceptable and addressed the issue of archival internal validity because of the strict data collection and compiling methodology, high standards of data integrity, and data validation by RITA, the GTD, and the Flight Safety Foundation.

Sampling is critical to internal validity of quantitative research. Random sampling assures that all samples had equal chance of treatment by the research. Non-probability sampling could affect the dependent variable and produce paradoxical results (Farrokhi & Mahmoudi-Hamidabad, 2012). Non-probability sampling could be problematic because of the lack of proper representation of the available samples in the research resulting in eschewed results (Trochim, 2006). I used nonrandom sampling in the study. In convenience sampling, the researcher uses the most available or easily selected sample for the study (Gemayel, Stasny, Tackett, & Wolfe, 2012). I mitigated the threat of internal validity as related to sampling by the fact that the records used in the study were

archived data comprised of security and financial data, and not social variables. The result of the analysis of the archived records was not dependent on any socioeconomic variable of the represented sample population such as gender, employment status, marital status, or religion. The terrorist event data were limited to frequency of such events, and the financial records from the airlines was limited to profit and cost of fuel.

Benge, Onwuegbuzie, and Robbins (2012) stated that internal validity is a critical element in quantitative research, which it ensures that the study's design closely follows cause and effect. Whereas the purpose of my study was to determine correlation and not cause and effect, a mathematical linkage lent transferability to the validity of my study regarding design. The design of my study conformed to a sound theoretical framework of systems theory as well as a robust approach to quantitative method. I used a quantitative correlational design to test the hypotheses. The selected design provided the parameters for the study, and in the process mitigated for potential internal validity issues regarding research design.

A known threat to validity is ambiguous temporal precedence. The researcher based on the data, is unable to specify which variable is the effect and which variable is the cause (Benge, Onwuegbuzie, & Robbins, 2012). For the study, I mitigated the ambiguous temporal precedence issue by clearly specifying the dependent and independent variables. Additionally, the archived data used in the study is not ambiguous and clearly identified as dependent or independent variable.

External validity in quantitative research is the generalization of causal relationships to different persons, time, and measures (Steckler & McLeroy, 2008). My

research had external validity because of the applicability and generalization of the results beyond the target population of the study. Other industries struggling with terrorism and the price of petroleum can benefit from the study.

Transition and Summary

In Section 2 I identified key points, which included the purpose statement to assess if a correlation existed between terrorism, the price of petroleum, and airline profitability. In Section 2, I deepened the discussion on the research method. The main reason I selected the quantitative method was to understand the correlation between terrorism, price of petroleum, and airline profitability. I downloaded the RITA, Flight Safety Foundation, and GTD data, and analyzed the correlation between terrorism, oil price, and airline profitability in IBM SPSS. I am confident that the research study will be relevant beyond the research environment and the academic community because understanding the relationship between terrorism, oil price, and airline profitability can be valuable to the airline and other industries.

In Section 3, I will analyze the downloaded data and interpret the results. Moreover, a main component of Section 3 is the application of the results of this study to current professional practices of the airline industry. Additionally, Walden University encourages students to concentrate on studies that have implications for positive social change. As such, recommendations for further studies are an integral part of Section 3.

Section 3: Application to Professional Practice and Implications for Change

Overview of Study

The purpose of this quantitative correlation study was to examine the relationship between terrorism, the price of oil, and airline profitability. In this section, I will discuss the overview of the study, presentation of the findings, applications to professional practice, and social change. I also provide recommendation for future research.

In a brief summary of the findings, I rejected the null hypothesis that the linear combination of terrorism and price of fuel does not significantly predict airline profitability. The volatility of the price of oil, and terrorism has a predictive influence on airline profitability. The price of jet fuel has a more significant influence on airline predictability than terrorism.

Presentation of the Findings

In this section, I addressed the descriptive statistics, assumption testing, inferential statistic results, and concluded with a brief summary of the findings of the study. In addition, for purposes of disclosure, a technique known as bootstrapping that combats the possible violation of assumptions is used. I utilized 2000 samples for bootstrapping, and provided appropriate confidence intervals where applicable.

Descriptive Statistics

I used 84 samples each for terrorism, price of fuel, and airline profit. I did not eliminate any records. Table 4 depicts descriptive statistics of the study variables.

Table 4

Means (*M*) *and Standard Deviations* (*SD*) *for Study Variables (N = 84)*

Variable	*M*	*SD*	Bootstrap 95% CI (*M*)
Profit[a]	-$0.39550	$3.833553	[-$1.18266, $0.45230]
Fuel Cost[b]	$5.25037	$3.505985	[$4.56533, $6.02271]
Terrorism[c]	22.87	18.589	[14.629, 21.947]

[a]Average profit per gallon of jet fuel
[b]Average cost per gallon of jet fuel
[c]Average number of terrorism incidents per year

Results of Assumption Testing

I evaluated the assumptions of multicollinearity, outliers, normality, linearity, homoscedasticity, and independence of residuals. I used 2000 samples for bootstrapping, to combat the influence of assumption violations.

Multicollinearity. I evaluated multicollinearity by viewing the correlation coefficients among the predictor variables. All bivariate correlations were small to medium (Table 5); therefore, no violation of the assumption of multicollinearity was present. The VIF values were within the acceptable parameters, showing no multicollinearity of fuel cost and terrorism.

Table 5

Correlation Coefficients and VIFs Among Study Predictor Variables

Variable	Profit	Fuel Cost	Terrorism	VIF
Profit	1.00	-.172	.068	-
Fuel Cost	-.172	1.00	.751	2.293
Terrorism	.068	.751	1.00	2.293

Outliers, normality, linearity, homoscedasticity, and independence of residuals. I evaluated outliers, normality, linearity, homoscedasticity, and independence of residuals by examining the normal probability plot (Figure 4) and the scatterplot of the standardized residuals (Figure 5). The normal probability plot indicated potential violations of these assumptions. I computed 2000 bootstrapping samples to curb any potential influence of assumption violations and I reported 95% confidence intervals based on the bootstrap samples, where appropriate.

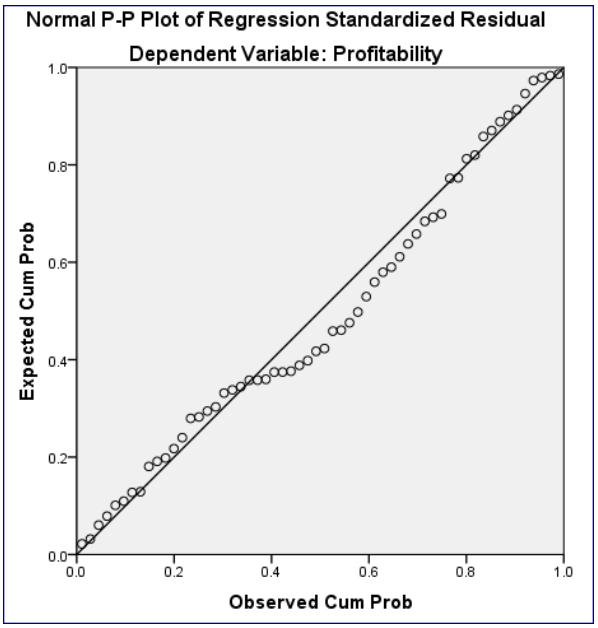

Figure 4. Normal Probability Plot of the regression standardized residual.

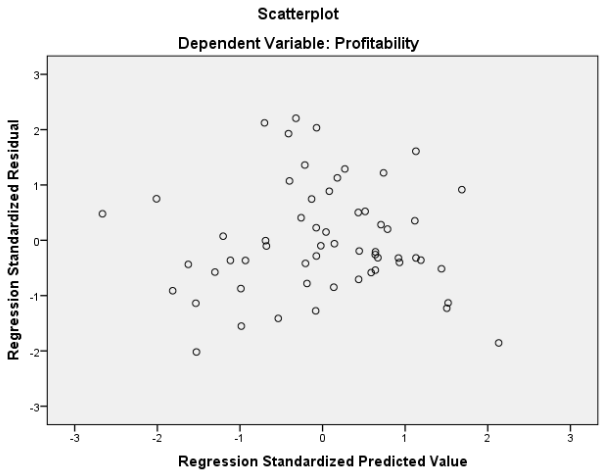

Figure 5. Scatterplot of the standardized residuals.

Results of Multiple Regression

Standard multiple linear regression, $\alpha = .05$, was used to examine the efficacy of terrorism and price of fuel in predicting airline profitability. The independent variables were terrorism and the price of fuel. The dependent variable was airline profitability. The

null hypothesis was that terrorism and the price of fuel would not significantly predict airline profitability. The alternative hypothesis was that terrorism and the price of fuel would significantly predict airline profitability. The model as a whole was able to significantly predict airline profitability, $F(2, 81) = 5.447$, $p = .006$, $R^2 = .12$. The R^2 (.12) value indicated that approximately 12 % of variations in airline profitability is accounted for by the linear combination of the predictor variables (terrorism and cost of fuel). In the final model, terrorism and cost of fuel were statistically significant with cost of fuel (beta = -.511, $p = .002$) accounting for a higher contribution to the model than terrorism (beta = .452, $p = .005$). Table 6 depicts the regression summary table.

Table 6

Regression Analysis Summary for Predictor Variables

Variable	*B*	*SE B*	*β*	*t*	*p*	*B* 95% Bootstrap CI
Constant	.408	.722		.565	.574	[-1.028, 1.844]
Fuel Cost	-.559	.173	-.511	-3.235	.002	[-.903, -.215]
Terrorism	.093	.033	.452	2.860	.005	[.028, .158]

Note. *N*=84

Analysis Summary. The purpose of this study was to examine the effectiveness of terrorism and price of fuel in predicting airline profitability. I used standard multiple linear regression to study the capacity of terrorism and price of fuel in predicting airline profitability. I assessed the assumptions surrounding the multiple regression and noted no

serious violations. The model as a whole was able to significantly predict airline profitability, $F(2,81) = 5.447$, $p = .006$, $R^2 = .12$. Both terrorism and cost of fuel provided useful predictive information about airline profitability.

Application to Theoretical Framework

The theoretical framework model I used in the study was systems theory. This theory was optimal to explain the relationship between terrorism, the price of fuel, and airline profitability. At its broadest definition, systems theory is an interdisciplinary study of the system and the relationships between its sub-systems (Ludwig, 1972). The central concept in system theory is that systems interconnect with their environment (Bar-Yam, 2011). The application of systems theory to my research yielded a deeper understanding of the patterns of the interrelationships between terrorism, cost of fuel, and airline profitability. The application of systems theory to business practice yields a more robust and comprehensive approach to airline profitability.

In my research, 66% of airline profitability is accounted by factors other than terrorism or cost of fuel. Mangal (2013) stated that the four characteristics of a system are: (a) resilience, (b) self-organization, (c) hierarchy, and (d) efficiency. Resilience is a major contributor to profitability. Based on the results of the regression model I used in my research, terrorism and fuel cost are predictors of approximately 34% of airline profitability. In a regression model that is a very robust figure, indicating that the airline and petroleum industries are resilient to internal and external forces. Kumari (2011), Shukla, Vishal, and Venkatasubramanian (2011) and my own research confirmed the resiliency factor in systems theory.

According to systems theory, the concept of self-organization is the process by which a system regulates, manages, and cooperates with some or all of its parts (Mangal, 2013). Self-organization is evident by corporate policies and managerial constructs of the airline industry that contribute towards airline profitability. I confirmed that the systems theory concept of hierarchy is another factor leading to airline profitability. Hierarchy is somewhat connected with self-organization in that individuals or groups within a system aligns based on rank, authority, or power (Mangal, 2013). However, in a hierarchy, systems also replace or repair its faulty parts. In a practical application of the theoretical framework to business, both the airline and oil industry have been leaders in the adoption of technology as a means of increasing profitability.

The systems theory concept of efficiency is another factor contributing to airline profitability. According to Mangal (2013), efficiency is the capability of systems to behave according to its functions while working towards its goals with the least amount of resources. Raynor (2011) confirmed that efficiency of operational processes, fuel-efficient aircraft, and efficient managerial policies were major contributors towards airline profitability.

Another alignment between my study and systems theory was the ability of systems theory to account for the complexity between terrorism, price of fuel, and airline profitability. The correlation between fuel price and terrorism were small. In terms of the predictability model that was optimal for the purposes of the regression to determine profitability. However, the smaller correlation between the predictors highlighted the complexity around these variables. Bachman (2008) stated that these complexities have a

cause and effect dynamic and are difficult to observe. However, I observed the complexity between terrorism, cost of fuel, and airline profitability through market results. Waltuck (2011) stated that the complexities in a system are not predictable. However, Bachman (2008) stated that within nature exist observable and understandable patterns of flow, synergy, interdependency, and order. While the predictive level of terrorism and fuel cost stands at 34% for airline profitability, airline and oil company executives must become adept of identifying patterns of interaction within the complexities of the variables. According to systems theory and the results of my research, observable and understandable complexities and interactions between the predictor and response variables are evident.

Further alignment between my study and the theoretical framework was evident in a study conducted by Trop et al. (2013) into the application of systems theory in the area of psychotherapy. I agreed with the authors that a static approach to complex and interactive systems is not optimal. In my research, I have concluded that the airline and oil industries operate on very fluid social, political, and economic environments and must constantly adapt to those conditions.

The results of my research are in complete alignment with the theoretical framework of systems theory and confirmed the existing principles of the theory as applied to business management. Additionally, I contributed new insights about terrorism, cost of fuel, and profitability as related to systems theory that are not currently part of the professional body of literature.

Application to Professional Practice

In the process of analyzing the practical applications to professional business practice I reflected on the research I conducted on terrorism, the petroleum industry, and airline profitability. My challenge was to synthesize my findings with the academic literature and translate them into practical business solutions for the airline industry. As the focus of my research is on airline profitability, the applications to professional practice are for airline executives.

I confirmed that the cost of fuel is a more significant predictor of airline profitability. Kumari (2012) stated that the profit margin for airlines is small; therefore, the airline industry must take every step to minimize fuel costs. The airline industry must invest on more fuel-efficient aircraft as the means of reducing fuel liability. A modernized fleet will take advantage of fuel saving technologies such as the use of lighter composites for airframe construction, advanced engines, advanced avionics, composite ceramics for increased combustion thresholds, and more aerodynamic aircraft design. In addition, the airline industry needs to focus on operational efficiencies to reduce fuel costs. Operations at the airport terminal (gate) must become more efficient to maximize the profitability of each aircraft.

In my research, I found that terrorism was a lesser predictor of airline profitability than the cost of fuel. However small the influence, airline industry executives must deal with terrorism as a business threat. As the airline industry has no control over factors that influence terrorism, the viable option is to implement comprehensive business continuity programs that address the disruptive nature of terrorism. The mitigation of terrorism is

costly to businesses (Thatcher, 2013), but unpreparedness to possible terrorist event is costlier.

Implications for Social Change

The implications for positive social change include the potential of higher employment rate because of increased profitability in the airline industry. Higher employment rates translate into enhanced social-economic conditions in respective communities. Enhanced profitability results in more research and development of new technologies that have social change implications.

Research and development of fuel-saving technologies by airplane manufacturers has the potential to reduce carbon emissions into the environment. Green technologies developed by airplane manufacturers for the airline industry could enable a gradual move from fossil fuel dependence. The pursuit of greener technologies can also help develop a shift in industries and society towards sustainability. Changes in consumer behaviors can influence the way industries conduct business.

Business schools can implement aspects of this research into curricula that address the issues of energy volatility and the impact of terrorism on international business. As shown, assumptions abound concerning the impact of terrorism. Unfounded assumptions have the power to influence political and business leaders to make unwise policies that negatively influence businesses and society. The results of this research can help influence industry and government leaders to reconsider their assumptions concerning the impact of terrorism and adopt wise and productive policies regarding security.

Recommendations for Action

Based on the results of my research, I recommend the following actions by the banking, airline, and petroleum industries. The first round of recommendations is for the American airline industry concerning airline security, business model and the strategy of fuel hedging. Since the terrorist attacks on September 11, 2001, the danger of terrorism to the airline industry is common knowledge. I recommend that airlines in the United States adopt a more rigorous security screening at the point of sale. Once a potential traveler inputs his or her name, the information validates against national and Interpol databases of known criminals and terrorists. Additionally, the credit card used to secure a reservation validates against a banking database of potentially compromised credit cards used in money-laundering AML cases. To make this recommendation a reality the American airline industry, the banking industry, the United States government, and Interpol would need to cooperate seamlessly from its conception to implementation. However, once implemented, the preventive system at the point of sale would reduce the possibility of known terrorists and criminals from boarding commercial airplanes.

Another recommendation for the American commercial aviation industry is the development of a National Airline Fuel Strategic Reserve (NAFSR) and the development of a predictive model to initiate the appropriate timing to tap into the reserve. The concept of a national airline fuel strategic reserve is the means of ensuring sustainable profitability against the volatility of the price of petroleum because of disruption or deep financial stress. The NAFSR would be a joint venture between all American commercial aviation companies. Reasonable surcharges in airline tickets, as well as tax incentives by

the government of the United States finances the NAFSR. In times of deep financial stress or disruption of petroleum due to wars or terrorist incidents, the NAFSR would allow the airlines to remain financially afloat until the economic environment improved. The consumers would also benefit because airlines would have no need to increase airfare prices because of the increase of the cost of fuel.

The next recommendation is for a business response to terrorism. Most corporations in the United States and Europe are familiar with business recovery. I recommend the creation of a national business recovery group. The group would be comprised of leaders from diverse industries with unique sets of skills. In the case of a business disruption because of terrorism, the group would convene and provide needed expertise to assist in the sustainable recovery of the affected businesses.

The final recommendation for action is radical and would need the cooperation of the international community to bring it to fruition. The concept is the creation of free maritime zones for the transport of petroleum. Military forces from the United Nations would patrol these internationalized free zones. Even in times of war and conflict, these zones are not blocked. Such a global treaty would result in less disruption in the petroleum supply chain and help to stabilize the price of petroleum during times of economic stress. I encourage the United Nations and United States government to consider the recommendations related to security issues. I also recommend the dissemination of the recommendations to business, government, and academic leaders.

Recommendations for Further Study

I recommend that future research include the major airlines from around the world to provide a global perspective of airline profitability. Additionally, I recommend the inclusion of all countries and all types of terrorist events in the research. I also recommend that the period of the research to include financial and security data from 1950 to 2014. The selected period would account for several economic, political, and social factors that could influence airline profitability.

I also recommend that future research include a mixed-method approach. The mixed method would allow for a richer investigation of the human dynamics surrounding terrorism, petroleum, and airline profitability. The qualitative method of this study limits the study to a positivist worldview.

Reflections

My experience with the research process has been challenging, humbling, exciting, and cooperative. I held several assumptions about terrorism, profitability, and the petroleum industry prior to this study. My first assumption was that the effect of terrorism on airline profitability was disastrous. Through my research, I found that the systems theory concept of resilience as applied to airline profitability is a major force contributing to the relative stability of airline profitability.

My second assumption was that the petroleum supply chain was relatively impervious to terrorism and natural disasters. However, I found that the petroleum supply chain is sensitive to conflicts, terrorism, transport technology, natural disasters, economics, and political polices. I changed my assumptions according to the results of

my study and the review of the body of literature. I have also learned that at Walden University we are a learning community. The contribution from and interaction with my Dissertation Committee and my cohort was invaluable in the process of this dissertation.

Summary and Study Conclusions

The purpose of my study was to determine the relationship between terrorism, the price of petroleum, and airline profitability. The research question was does a linear combination of terrorism and price of petroleum significantly predict airline profitability? I used the quantitative method and multiple linear regression analysis of incidents of terrorism, price of jet fuel, and airline profitability data to analyze the relationship between terrorism, petroleum, and airline profitability.

Based on the results of my research, I concluded that terrorism and the price of fuel are significant predictors of airline profitability. Also, the price of fuel was a more significant predictor of airline profitability than terrorism. The results of my research are important for the airline industry. With these results, the airline industry can address the areas of concern I raised in the study and maximize profitability. I also offered applications to business practice and recommended several courses of action that will enhance the airline and petroleum industries. Finally, I suggested parameters for further research.

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Appendix A: List of all American Commercial Air Carriers

Passenger air carriers

ATA Airlines d/b/a ATA (TZ)

Air Wisconsin Airlines Corp (ZW)

AirTran Airways Corporation (FL)

Alaska Airlines Inc. (AS)

Allegiant Air (G4)

Aloha Air Cargo (KH)

America West Airlines Inc. (HP)

American Airlines Inc. (AA)

American Eagle Airlines Inc. (MQ)

Boston-Maine Airways (E9)

Casino Express (XP)

Chautauqua Airlines Inc. (RP)

Colgan Air (9L)

Comair Inc. (OH)

Compass Airlines (CP)

Continental Air Lines Inc. (CO)

Continental Micronesia (CS)

Delta Air Lines Inc. (DL)

Endeavor Air Inc. (9E)

Executive Airlines (OW)

ExpressJet Airlines Inc. (EV)

ExpressJet Airlines Inc. (1) (XE)

Freedom Airlines d/b/a HP Expr (F8)

Frontier Airlines Inc. (F9)

GoJet Airlines, LLC d/b/a United Express (G7)

Hawaiian Airlines Inc. (HA)

Horizon Air (QX)

Independence Air (DH)

Island Air Hawaii (WP)

JetBlue Airways (B6)

Legend Airlines (LC (2))

Lynx Aviation d/b/a Frontier Airlines (L3)

Mesa Airlines Inc. (YV)

Mesaba Airlines (XJ)

Miami Air International (GL)

Midway Airlines Inc. (JI (1))

Midwest Airline, Inc. (YX (1))

National Airlines (N7)

North American Airlines (NA)

Northwest Airlines Inc. (NW)

PSA Airlines Inc. (16)

Pan American Airways Corp. (PN)

Pro Air Inc. (P9)

Reeve Aleutian Airways Inc. (RV)

Republic Airlines (YX)

Ryan International Airlines (RD)

Shuttle America Corp. (S5)

SkyWest Airlines Inc. (OO)

Skybus Airlines, Inc. (SX)

Southwest Airlines Co. (WN)

Spirit Air Lines (NK)

Sun Country Airlines d/b/a MN Airlines (SY)

Tatonduk Outfitters Limited d/b/a Everts Air Alaska and Everts Air Cargo (5V)

Trans States Airlines (AX)

Trans World Airways LLC (TW)

TransMeridian Airlines (T9)

UFS Inc. (U2)

US Airways Inc. (US)

USA 3000 Airlines (U5)

USAir Shuttle (TB (1))

United Air Lines Inc. (UA)

Vanguard Airlines Inc. (NJ)

Virgin America (VX)

Vision Airlines (0JQ)

All cargo air carriers

ABX Air, Inc. (ABX)

Air Transport International (8C)

Amerijet International (M6)

Arrow Air Inc. (JW)

Asia Pacific (PFQ)

Astar USA, LLC (ER)

Capital Cargo International (PT)

Cargo 360, Inc. (GG)

Centurion Cargo Inc. (WE)

Custom Air Transport (CTQ)

Emery Worldwide Airlines (TNQ)

Evergreen International Inc. (EZ)

Express One International Inc. (JKQ)

Express.Net Airlines (TCQ)

Federal Express Corporation (FX)

Florida West Airlines Inc. (PRQ)

Gemini Air Cargo Airways (GR)

Gulf And Caribbean Cargo (GFQ)

Kalitta Air LLC (KAQ)

Kalitta Charters II (KLQ)

Kitty Hawk Aircargo (KR)

Lynden Air Cargo Airlines (L2)

Northern Air Cargo Inc. (NC)

Omega Air Holdings d/b/a Focus Air (F2)

Polar Air Cargo Airways (PO)

Reliant Airlines (RLQ)

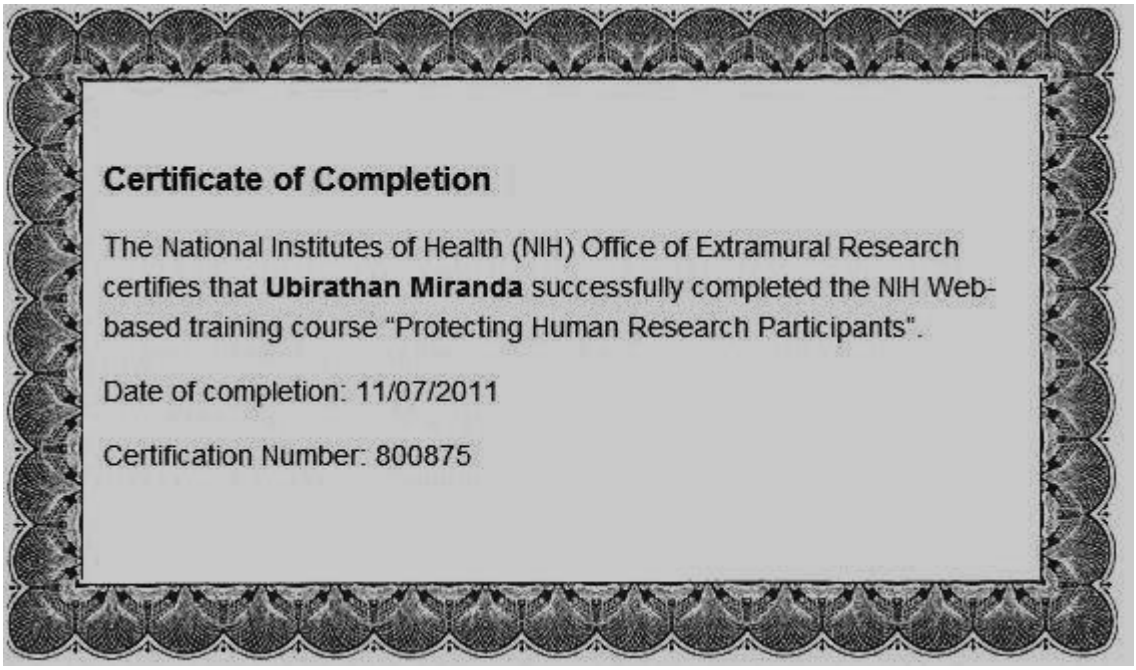
Southern Air Inc. (9S)

Tradewinds Airlines (WI)

United Parcel Service (5X)

Zantop International (ZKQ)

Appendix B: Certificate of Completion of National Institutes of Health Course



Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Ubirathan Miranda** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 11/07/2011

Certification Number: 800875

Appendix C: SPSS Output

Descriptive Statistics

		Statistic	Bootstrap[a]			
			Bias	Std. Error	95% Confidence Interval	
					Lower	Upper
Profit	Mean	-$0.39550	$0.00596	$0.42227	-$1.18266	$0.45230
	Std. Deviation	$3.833553	-$0.113275	$0.95873 1	$1.75482 3	$5.58400 5
	N	84	0	0	84	84
Fuel_Cost	Mean	$5.25037	$0.01299	$0.38774	$4.56533	$6.02271
	Std. Deviation	$3.505985	-$0.024763	$0.34464 8	$2.82056 6	$4.16576 7
	N	84	0	0	84	84
Terrorism	Mean	22.87	.03	2.01	19.06	26.84
	Std. Deviation	18.589	-.192	1.849	14.629	21.947
	N	84	0	0	84	84

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

Figure C1. Descriptive statistics.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.344[a]	.119	.097	$3.643325

a. Predictors: (Constant), Terrorism, Fuel_Cost

b. Dependent Variable: Profit

Figure C2. Model summary.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	144.600	2	72.300	5.447	.006[b]
	Residual	1075.179	81	13.274		
	Total	1219.779	83			

a. Dependent Variable: Profit

b. Predictors: (Constant), Terrorism, Fuel_Cost

Figure C3. ANOVA.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.408	.722		.565	.574	-1.028	1.844		
	Fuel_Cost	-.559	.173	-.511	-3.235	.002	-.903	-.215	.436	2.293
	Terrorism	.093	.033	.452	2.860	.005	.028	.158	.436	2.293

a. Dependent Variable: Profit

Figure C4. Coefficients.

Bootstrap for Coefficients

Model		B	Bootstrap[a]				
			Bias	Std. Error	Sig. (2-tailed)	95% Confidence Interval	
						Lower	Upper
1	(Constant)	.408	-.029	.534	.471	-.724	1.375
	Fuel_Cost	-.559	-.010	.301	.000	-1.219	-.058
	Terrorism	.093	.005	.061	.000	-.002	.235

a. Unless otherwise noted, bootstrap results are based on 2000 bootstrap samples

Figure C5. Bootstrap for coefficients.

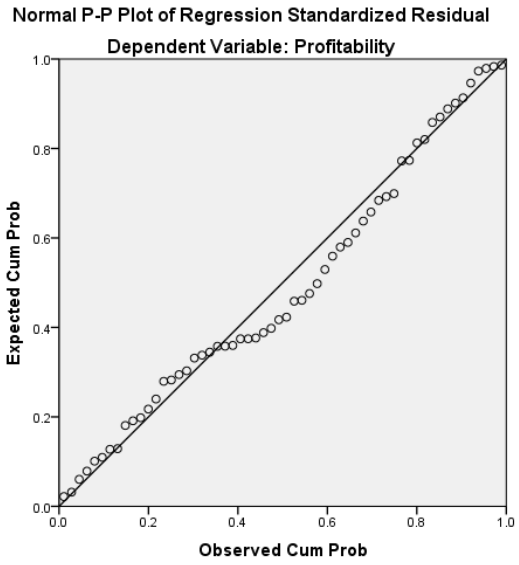


Figure C6. Normal P-P Plot of regression standardized residual.

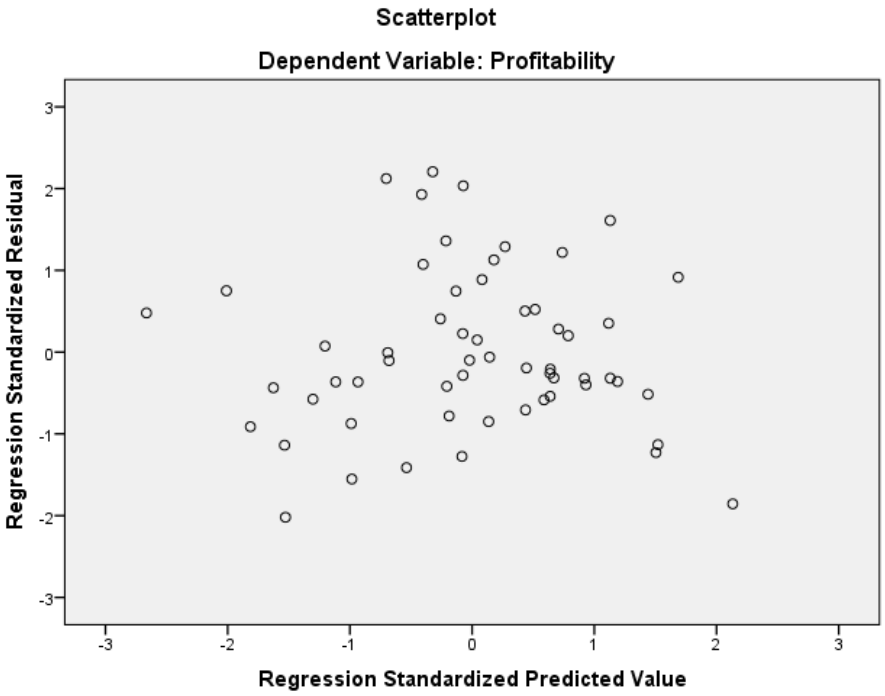


Figure C7. Scatterplot of the standardized residuals.

Appendix D: Flight Safety Foundation Sources for Databases

1. Eastwood, A. B., & Roach, J. (1992). *Jet airliner production list.* West Drayton: The Aviation Hobby Shop (TAHS).
2. Eastwood, A. B., & Roach, J. (1996). *Piston engine airliner production list.* West Drayton: The Aviation Hobby Shop (TAHS).
3. Eastwood, A. B., & Roach, J. (2001). *Turbo prop airliner production list*. West Drayton: The Aviation Hobby Shop (TAHS).
4. Hillman, P. S. J., & Ottenhof, G. (2004). *Soviet transports*. West Drayton: The Aviation Hobby Shop (TAHS).

The Flight Safety Foundation uses the following sources to compile the synopses of each accident or highjacking:

1. Civil Aviation Authority (n.d.). World airline accident summary (CAP-479). (Vol. 2). London: Airclaims Ltd.
2. Gero, D. (2004). *Aviation disasters: The world's major civil airliner crashes since 1950.* Sparkford: PSL.
3. ICAO (International Civil Aviation Organization) Adrep Summary
4. ICAO (International Civil Aviation Organisation) Circular Aircraft Accident Digests
5. NTSB (National Transportation Safety Board) Accident Synopses
6. NTSB (National Transportation Safety Board) Aircraft Accident Reports

The Flight Safety Foundation uses the following sources (books, periodicals) to validate the integrity of the accident records in the database:

1. Denham, T. (1996). *World directory of airliner accidents*. Sparkford: PSL
2. Kimura, C. (1993). *World commercial aircraft accidents 1946-1992*. Livermore, CA: Lawrence Livermore National Laboratory
3. Air Safety Week
4. Aviation Quantitative Reports on Safety
5. Aviation Week and Space Technology
6. Flight International