Chapter IV.

The Impact of Terrorist Attacks on Stock Returns for Airline Industry: the Example of US Airline Companies

Svetlana Li, Standard Chartered / Lazarski University
iD *0000-0002-4008-1162*

Olha Zadorozhna, Lazarski University
iD *0000-0002-2160-6904*

Terrorism is a threat to the economic development, as well as the stable functioning of financial markets. Terrorist acts, as unexpected and uncontrolled events, can cause panic among market participants and affect their behavior on the market. This work discusses the impact of terrorist attacks on the US economy in general and airline companies in particular.

Among the different types of crime, terrorism has a special paradoxical place. It is very difficult to quantify all costs, direct and indirect, caused by terrorism. Moreover, it is difficult to predict how different sectors of the economy will react to the catastrophe. Companies of such industries as the defense and insurance industry can increase their profits after terrorist attacks, while tourism and airline companies will most probably suffer losses. Gong (2009) considered outcomes for airline industry after 9/11. He came to the conclusion that the four large airports of the USA (Atlanta International Airport, O'Hare International Airport, Logan Airport, and Denver International Airport) took two years after the September 11 to restore the volume of passenger traffic, which was before the disaster. Certainly, it had a negative impact on airlines' profits. Cordesman (2004) states arms sales in the USA increased by 17% after 9/11, while the US government increased spending on the war against terrorism by $390 million. Terrorist crimes are perceived as the most dangerous threat to society destabilizing its socio-political and economiclife.

In this research work, terrorism means the use of extraordinary violence to achieve any political or economic goals with the help of intimidation of society (Sandler, Enders, 2004, p. 302). This definition does not contradict the everyday understanding of terrorism involving violence against civilians in the political struggle, for example, mass murder, hostage-taking etc. This interpretation excludes from the analysis mafia terrorism related to activities of organized crime.

The main problem of the economic analysis of terrorism is the economic explanation of its causes, as well as the quantification of the costs of terrorist attacks to the world.

In the research paper "The Impact of Terrorism on Financial Markets", Johnston and Nedelescu (2005) analyze the economic impact of major terrorist attacks on the pace of development of the affected countries' economies. They take into account September 11 in the USA, the bombings in Bali in Indonesia, and bombings at a train station in Madrid which took place in October 2002 and in March 2004, respectively, as well as the bombings in the London Underground in July 2005. As it turned out, the economy of these countries showed a negative development results within 3–6 months after the attack, but then they quickly recovered from the shock. By the degree of the devastating impact on stock exchanges, the negative effect of terrorist attacks is considerably smaller in comparison with other events, such as World War I, World War II, or the Vietnam War. Similar disasters have a negative impact on the economy of the affected states for at least a year. After the declaration of war between the Austro-Hungarian Empire and Serbia which marked the beginning of WWI, the US stock market was closed as there was a fear that European investors will try to pull all their money out of US public companies' securities (Broadberry and Harrison, 2005). The market was opened after 5 months, on December 12, 1914. Dow Jones was 24% lower than during the period of closing in July (Murphy, 2004). During the Second World War, DJA decreased from November 1941 till May 1942. In December 1941, it fell by 6.3% in two days; DJA exceeded the mark 200, its previous level before WWII, in 1947 (Stock Trader's Almanac, 2002). The September 11 attacks led to the biggest collapse of DJA in the history of the American Stock Exchange: a decrease by 7.1% during the first session. However, two months later, the market regained all the losses (Quillen, 2002). The terrorist attacks in London and Madrid had even smaller influence on the stock markets. According to BK Asset Management, after the London bombings in 2005, FTSE index showed a sharp decline, but the minimum values were reached on the first day. The pound lost 250 points, but two days later, it increased by 475 points. Although during the explosions in Madrid in 2004, the Spani stock market lost 5%, this movement ended in three trading sessions (Lien, 2015). These events demonstrate that terrorist acts have a very short-term impact on the markets.

The above data indicate that terrorist attacks do affect the financial performance to a greater or lesser extent depending on the scope of the event or the country. This paper conducts a study on the US economy and US airline companies. It includes the companies' performance after the terrorist attacks from 1999 to 2013 in the USA. The USA as a country of the research was made based on the

work of two economists, Blomberg and Hess. The reasons for choosing the airline industry and events directly related to airline companies are presentedbelow.

In 2004, Blomberg and Hess (2004) published a report entitled "Macro-economic Consequences of Terrorism". The authors of this study analyze the terrorist attacks committed in 177 countries for the period from 1968 to 2000. The authors have made a number of conclusions. Firstly, attacks occurred more frequently in the industrialized countries than in the developing countries, but the economic damage caused by terrorists was less significant. Secondly, the investment patterns are changed as a result of a major terrorist attack. The number of private investments declines. The volume of public investment, on the contrary, grows as the government hires more security personnel and increases the size of the armed forces. In the paper "Economic Consequences of Terrorism in developed and developing countries", Sandler and Enders (2006) conclude that despite the fact that an act of terrorism has little effect on a particular developed country, the consequences will be more noticeable to other developed countries than in the case of a terrorist act on the territory of a developing country. Due to the active trade and common markets among developed countries and due to a huge dependence on each other as a result, a negative change in one market can cause a negative wave in other countries. Basing on the above conclusions, the United States was chosen as the object of the research. It is one of the most developed countries in the world that is able to affect other countries' economies. Moreover, on the US territory, there was a significant act of terrorism – September 11 attacks – that affected financial markets, which entailed the closing of US stock exchanges for five days. A large number of terrorist attacks in the United States, which differ in the impact on the markets, allows the author to expand the field of research covering a long period of time. In the United States, there were several terrorist attacks which are differentiated on the basis of the scale of the consequences and the impact on the US economy. It was decided to select a few of terrorist events that could have an impact on the US economy that have occurred in different periods. In the research into consequences for the Turkish Stock Market after terrorist attacks, Aksoy (2014) concludes the market becomes more flexible, and it reacts more quickly to events because of the availability of information, but it defies the growing panic that could cover the world in the late 20th century. For this reason, it was decided to choose seven events occurring in different years in the United States to compare their impact on the market. All events were officially recognized as terrorist attacks by the US government. They are directly related to airline industry: terrorist attacks or attempts of terrorist attacks happened either in an airport or on an airplane.

As it was said, consequences of terrorism can be different for each individual sector. There are studies by different researchers who considered outcomes for industries and economies after terrorist events. John Robb (2007), a military analyst, has come to the conclusion that the actions of today's terrorists are gradually acquiring the business features. Robb notes that the number of attacks against individual private companies has been significantly increased in recent years. Also, terrorist attacks have been more frequent in the oil infrastructure as this allows to have an impact on global oil prices and individual states. Terrorists are trying to worsen the situation in their economies and to reduce investment attractiveness. Thus, the terrorist attacks have gradually become an important factor in the world economy. Moreover, terrorism has become a part of life in such countries as Iraq, Afghanistan, Nigeria, Pakistan, and Syria.

Counter-terrorism measures are costly to their economies. As a result, consumers are faced with a gradual increase in prices of goods and services. The fight against terrorism is reflected seriously on the cost of goods, which are transported by air and sea. Moreover, the country's position in international trade can be seriously weakened if the terrorist threat has a significant scale, and security measures are beginning to have a negative impact on business travel, transport and investment (Report of the World Trade Organization "World Trade2006").

According to estimates by the US Department of Commerce (2002), the US economy has lost $80 billion after the terrorist attacks in September 2001; retail sales fell by 2.1%; the volume of new orders for durable goods fell by 6.8%. The number of new applications for unemployment benefits rose by $50 thousand; it was the biggest jump during one month after August 1982.

For the research, the airline industry was chosen. This choice is motivated by the fact that the September 11 attacks occurred as a result of explosions of planes in New York, which had a direct impact on the airline industry. Makinen (2002), Johnson (2002), Rhoades and Reynolds (2005) consider the negative trends for the industry after 9/11. This event was selected because of its scale and the huge consequences for the entire industry. Aksoy (2014) considers the theory of the reduction of the impact of the terrorist attacks on the market in the course of time. For this reason, other terrorist events that took place in different years in the USA were included in the study. Ultimately, the choice included seven events that occurred from 1999 to 2013.

According to the data from the Statistics Portal, the official website of the statistical agency Statista Inc. (2015), airlines reduced the number of flights by 30% immediately but despite this fact remaining planes were not fully filled. Obviously, airline companies suffered huge losses. As a result of the major attack of 9/11, airline stocks traditionally showed a negative trend. In 2001, the passenger

turnover of airports in New York fell by 16%, and in general, the global aviation industry missed 90 million passengers which corresponded to a decline of 3.8%. Furthermore, quotes on the NYSE returned to the levels preceding the attacks just two months later. However, it should be noted that the sphere of tourism and transport remains one of the most dynamic in the US. From 1985 to 2014, the scale of international tourism increased by 3.5 times. In 2004, the volume of air traffic in the United States exceeded the level of 2000 (World Bank's database, 2016.

Research aim. The aim of this work is to explore the reaction of stock exchanges and the behavior of American airlines after significant terrorist attacks in the USA. The aim includes the testing of the assumption of the existence of considerable market reaction to the terrorist attack and impact of terrorism on returns of airlines' companies. In order to understand how the size of a company helps to overcome consequences after terrorist attacks, not only large airline corporations were chosen for this investigation, but small local companies as well.

Event study analysis (ESA) is the foundation of the paper. ESA is one of the possible ways of assessing the impact of events on a company's value and its share prices. This method is based on the efficient market hypothesis which states that prices reflect all available information to the market (Fama, 1970, p. 383).

Recently, after the financial crisis, there have been many disputes about whether this hypothesis on real markets performs or not (Krugman, 2009; Fama, 2010).

The main hypothesis of the paper is:

Information on the occurrence of terrorist attacks is able to influence the changes in stock prices of airlines through investors' perceptions.

Abnormal returns were measured to determine the impact of the events on airline companies. The abnormal return is the difference between the actual return and the return which was expected before the event. The cumulative abnormal return (CAR), the sum of abnormal returns over the event window, is used to measure the effect that events such as terrorist attacks have on stock prices. In the research, the results of CAR covered the event window[1].

The major aims considered in the paper are presented below:
- To figure out whether terrorist attacks are able to affect the airline industry of countries;

---

[1] i.e. two days before the event and two days after the event.

- To investigate how the news about the terrorist attack may change the preferences and behavior of market participants, and therefore the share price of the airlines;
- To measure the impact of terrorist attacks on the US airlines' stock prices that are listed on two main stock exchanges of the USA, NASDAQ andNYSE.

Research objectives. Objectives of the study are presented below:
- To review and compare the views of different economists about the economic state of countries after the terrorist attacks;
- To explore significant terrorist attacks in the United States and their consequences for the airline industry;
- To investigate the advantages and disadvantages of the Efficient Market Hypothesis and how it explains the market reaction to the information;
- To analyze how share prices of the airline companies are changing after terrorist attacks.

The significance of the study. It is impossible to be prepared for such an event as terrorism and therefore it is difficult to predict how long it will have an impact on the behavior of market participants. However, the experience of past years and the analysis of the market changes may smooth the panic on the stock exchanges among their participants and reduce surges in stock prices. So, the results of the research show that the reaction to an event was more palpable in 1999 than in 2013. Certainly, the share prices change depending on the size of companies.

After studying the works relating to the impact of terrorism on the global economy, it turned out a lot of authors (Johnston and Nedelescu, 2005; Lenain, Bonturi, and Koen, 2002)) who have studied the impact of terrorist attacks which happened before 2001 mention a huge negative impact and long-term consequences for the market and the economy. Nowadays, the market is becoming more stable in comparison with the beginning of the 21st century, and there is a contrary view stating that due to the fact that terrorist acts are not an unexpected phenomenon anymore, the markets are not so sensitive to acts of terrorism. In order to confirm or refute this assumption, the broad range of events from 1999 to 2013 was investigated.

The structure of the paper. The work consists of three sections. The first part begins with the consequences for the economy after terrorist attacks. It includes information on countries that are faced with terrorism, and it compares their state before and after the event. Also, it describes September 11 attacks, the most significant event in the research, and airline industry inthe USA after the event. The second section reveals approaches of economists to measure the impact of

terrorism and the Efficient Market Hypothesis with its pros and cons. The third section describes the Event Study Analysis, the method used in the research to measure the changes of companies' share prices due to terrorist attacks. Also, it provides and describes the results of the research. The final part of the paper includes the author's conclusions of thework.

The Impact of Terrorism on the Economic State of the Countries

It is possible to calculate the number of deaths as a result of a terrorist act. However, it is difficult to assess the damage to the economy. Nedelescu and Johnston (2005), Todd and Walter (2004), and Brian (2004) mention that terrorism has an extremely negative impact on the economic situation. Nedelescu and Johnston (2005) and Chen and Siems (2004) study how terrorist attacks happened in one country affect the capital markets of others.

Most terrorist attacks have a relatively short-term negative effect. Rarely, separate terrorist attacks, such as bombings or murders, might have a long-term and very serious impact on the economy. Such a huge effect can be caused by either terrorist campaigns continuing for a long time or by particularly large and bloody attacks that have a significant psychological effect (Zicher, 1976).

The danger of a terrorist attack lies in the fact that it may give the impression that such attacks will continue. People are waiting for the terrible continuation and meet their expectations. Primarily, it has an impact on business. Investors and companies begin to consider their investments in cities, regions, or countries as unnecessary risk. They try to put an additional risk premium in the cost of their products or services. This leads to lower business activity and higher prices. Fear of terrorist attacks also enforces companies to spend more on their own security by doing less productive investments (for example, the development of innovations, improvement of working processes, or investment inscience).

According to the annual report of the Institute for Economics and Peace (2015), the annual decline in investment in the countries attacked by terrorists is on average from 1.3% to 2.1%. Bykov and Vlasov (2005) believe that the activity of the Basque terrorist groups was the reason why the Basque Country was the least economically developed region of Spain Economic growth in the Basque Country was 10% lower than the average for Spain (OECD report, 2004). In Colombia, at the time of high activity of terrorist groups, foreign investments were a rarity, and the standard of living was 45% lower than the average for Latin America.

Among all terrorist attacks in the United States directly related to the hijacking or bombing of aircrafts, the September 11 attacks are most massive: 2993

killed and 8900 injured (Johnston, 2016). But compared with the number of victims per population in Northern Ireland or Israel, the September 11 attacks were relatively small. For example, members of the Irish Republican Army and similar organizations made tens of thousands of terrorist attacks during the period from 1969 to 2002. They made more than 10 thousand bombings and almost 36 thousands of attacks using firearms. The result of their activity was the death of 3.5 thousand people, and approximately 36 thousand were wounded (Burleig, 2009). According to the RAND Institute, if a similar number of people were killed and wounded in proportion to the total population in the USA, it would kill annually more than 3.8 million Americans, while more than 240 thousand would have been wounded (2004).

The Impact of 9/11 on the US Economy and Stock Exchange

Indirect damage of September 11 attacks that turned out to be very significant spread to all regions of the world and many sectors of the global economy. The combination of lower demand and increasing transaction costs causes additional harm. After September 11, many companies and governments significantly increased security costs. This required the use of new tools for processing additional information, improving coordination, and increasing the number of staff. Such measures reduce the productivity of companies and, as a result, cause an increase in costs, which are ultimately passed on to consumers. This, in turn, reduces purchasing power and aggregate demand. Security in different modes of transport leads to an increase in transport costs, which, according to OECD (2001), account for 3% of the value of sold goods on world markets. The costs of private American companies to improve safety led to the decline of their outputs by 1.12%, which corresponds to a decrease in US GDP by $70 billion.

In contrast to the political events of the past (the Cuban missile crisis, the war in Kuwait, etc.) that affected the financial markets of particular regions, the events in September 2001 affected the state of the global financial markets as a whole. This is due to the fact that globalization of financial markets has reinforced their dependence on political developments. Overall, however, the global financial markets demonstrated the ability to resist: in comparison with the stock market crash of 1929 or 1987, after the September 11 disaster, Dow Jones quickly regained its position. An important mechanism for transferring the negative consequences of these events was a decline in demand, which was only partially offset by an increase in government spending (World Bank, 2003).

The terrorist attacks of Al-Qaeda on New York and Washington had a huge impact on the global economy and on international politics. According to the International Monetary Fund (2002), the losses from these acts of terrorism amounted to $21 billion. It included losses of insurance companies and property. Experts of the National Center for Policy Analysis (2001) came to different conclusions. The damage to the US economy due to destruction of buildings and other facilities and job losses was approximately $100 billion. In addition to the huge expenses for repair and restoration of buildings, the US federal government paid from $500 thousand to $3 million to the families of killed people. However, this is only the tip of the iceberg. Within a month after the September 11 attacks, the retail volume declined by 2.1% in the United States, the portfolio of orders of industrial enterprises decreased by 6.8%, industrial production decreased by 1%; 50 thousand Americans applied for unemployment benefits. According to Milken Institute, as a result of terrorist attacks, the US lost 1.8 million jobs.

Tourism and entertainment industries were particularly affected. According to Smith Travel Research (2008), the occupancy rate of hotels and motels did not exceed 60%.This was 6% less than in 2000. According to Travel Industry Association of America (2009), five months after the terrorist attacks, 237,000 people employed in the tourism business lost their jobs. During the year, because of the threat of terrorist attacks and the tightening of procedures for the admission of foreigners to the United States, the flow of foreign tourists decreased by 20%; the industry lost $15 billion.

Airlines began to experience serious difficulties; their direct losses reached $30 billion, while the world's largest airline US Airways was on the verge of bankruptcy. According to Forecast International (2001), after the September 11 attacks, airlines decreased orders for new aircraft. As a result, the decline in production in this sector of the world economy amounted to 15–20%. The loss of U.S. insurance companies totaled $40-$50 billion. Terrorists caused damage to insurers more harm than the most devastating natural disasters. According to estimates of the Insurance Information Institute (2001), at that time, the most destructive in U.S. history hurricane Andrew caused damages in the amount of $15.5 billion. The terrorist attacks exacerbated the process of falling equity prices on the stock market: the loss for the year amounted to $2 trillion. Significant funds were spent by the US government on medical and financial assistance to victims. Total US spending on the security of the country reached $100 billion. For these purposes, Federal government spending was $17 billion in 2001, it increased to $29 billion in 2002. After the attack on 11 September, 2001, the US government had to spend approximately $6 billion on improving the safety

level. For the same purpose, municipalities of cities and settlements spent $2.6 billion (FED, 2001).

Definitely, 11 September had to be reflected in the stock market. Primarily, there was reaction of the shares of companies that were directly related to these events and their direct consequences: airlines, insurance companies, firms in the World Trade Center, as well as manufacturers of weapons and ammunition that were used in the subsequent wars in Afghanistan and Iraq. After September 11, the price of United Airlines' shares fell from $30.82 to $17.50; that was more than 43%. American Airlines' shares fell from $29.70 to $18.00; it was almost 40% (NASDAQ and NYSE websites). Insurance and financial companies also suffered from terrorist attacks. According to Ernst & Young (2008), Munich Re of Germany suffered losses amounting to $2 billion, AXA Group of France lost $0.55 billion, and Swiss Re of Switzerland lost 1.2 billion pounds. Shares of companies which had occupied the WTC also dropped after September 11. For example, Morgan Stanley lost 13%, while share prices of Merrill-Lynch and Bank of America decreased by 11.5%.

Analysis of Empirical Results of Changes in Stock Prices of US Airlines After

Terrorist attacks

The third chapter reveals the method that was used in the research to analyze the changes of US airlines' share prices as a result of terrorist attacks. The first part describes the Event Study Analysis. The second section contains the brief description of airline companies selected for the research and the stock exchanges where the companies are listed on. The final part includes the derived results and conclusions of the author basing on the data.

Data description

The airlines' share prices and their returns were used in the model. 14 US airline companies listed on NASDAQ and NYSE were selected as objects of the study. They are presented below:
- Air Transport ServicesGroup,
- Alaska AirGroup,
- Allegiant TravelCompany,
- American AirlinesGroup,
- Atlas Air WorldwideHoldings,
- Delta Air Lines, Inc.,

- FedExCorporation,
- HawaiianHoldings,
- JetBlue AirwaysCorporation,
- Republic AirwaysHoldings,
- SkyWest,Inc.,
- Southwest AirlinesCo.,
- Spirit Airlines, Inc.,
- United ContinentalHoldings.

NASDAQ (National Association of Securities Dealers Automated Quotation) is one of the three national US stock exchanges with AMEX and NYSE and the largest US electronic stock exchange on which the shares of approximately 3,700 companies and corporations are listed and traded. NASDAQ Composite is a composite index of 5,000 stocks traded on the electronic stock exchange NASDAQ. The index is calculated based on the weighted average price at the time of the end of trading on the stock exchange.

Air Transport Services Group (ATSG) is a US cargo airline with headquarters in Airborne-Airpark, in unincorporated Clinton County, Ohio. The company provides a full range of scheduled and charter freight services including overnight express flights. It covers the whole territory of the United States, Canada, and Puerto Rico. The airline provides professional training, technical and engineering services including outsourcing. After the merger of DHL and Airborne Freight in 2003, the airline took the corporatization process and listed its shares on the NASDAQ stock market.

Allegiant Travel Company (ALGT) is a budget airline, headquartered in Las Vegas, a subsidiary of the holding company Allegiant Travel Co (ALGT website). In 1997, the airline received an operating certificate of the operator of the US Federal Aviation Administration to perform scheduled and charter air transportation. In early 1999, Allegiant Air acquired the rights to charter flights to Canada and Mexico. In November 2006, Allegiant Air announced the initial public offering of its common shares on the stock exchange NASDAQ where its shares received "ALGT" as a ticker.

American Airlines Group (AAL) is one of the biggest airlines in the world according to such parameters as the amount of passenger ships (655 units), as well as the total number of passenger kilometers. This company is a leader in the field of air transport between the United States and Latin America (AAL website). On September 11, 2001, the flight 11 of American Airlines was the first airliner captured during the terrorist attacks. The airliner Boeing 767-223ER carried out a regular commercial flight from Boston's Logan Airport to Los Angeles International Airport. It was captured during the flight and crashed into the north tower

of the World Trade Center in New York (Report of the US Department of Justice, 2001). Among all four planes hijacked on that day, Flight 11 had the greatest number of people on board (92 people). Flight 77, another plane of "American Airlines", was also captures and directed to Pentagon. After the scandals associated with the terrorist attacks of 11 September 2001, the company suffered losses for several years. In 2003, the company was on the verge of bankruptcy, and it began negotiations with Wall Street's companies about obtaining DIP financing scheme. However, in the same year, the company was able to get out of the crisis (Assotiated press, 2007). In 2015, American Airlines' net profit amounted to $ 7,610 billion. Company's shares are traded on the stock exchange NASDAQ and included in the S& P500.

Atlas Air Worldwide Holdings (AAWW) is an American cargo airline based in New York. Atlas Air Worldwide is the parent company for the cargo carrier Atlas Air and Titan Aviation Holdings, a leasing company, specializing in freighters (AAWW website). In addition, Atlas owns a controlling stake in cargo airline Polar Air Cargo (51%). In 1995, the company's shares were on the NASDAQ quotation system.

Hawaiian Holdings (HA) is the largest airline in Hawaii. Hawaiian Airlines is the oldest airline in the United States, which boasts that it has never had accidents in its history (HA website). Initially, the company sold its shares on the American Stock Exchange, but in June 2008 it was moved to NASDAQ. Hawaiian Holdings was added to the Russell 3000 Index on June 30, 2008 American City Business Journals, 2011).

JetBlue Airways Corporation (JBLU) is an American budget airline headquartered in New York, with home airport at John F. Kennedy International Airport. In early 2000, the airline was granted a license for passenger transport, and it proceeded to the regular flights immediately. JetBlue Airways was one of the few US airlines that managed not only to survive, but also to earn money in the aftermath of terrorist attacks of September 11, 2001. This stability helped the company when it placed its shares on the stock exchange in 2002. Thanks to successful trading, JetBlue capitalization reached two billion dollars.

Republic Airways Holdings (RJET) is an aviation holding company of the United States of America, headquartered in Indianapolis, Indiana (RJET website). It is an owner of five US airlines: Chautauqua Airlines, Republic Airlines, Shuttle America, Midwest Airlines, and Frontier Airlines.

SkyWest, Inc. (SKYW) is an American company that owns two airlines, SkyWest Airlines and ExpressJet. It has been listed on NASDAQ since December 1986 (SkyWestwebsite).

Spirit Airlines, Inc. (SAVE) is an American low-cost airline based in Miramar, Florida with the main directions of flights in North and South America (Spirit Airlines Fact Sheet, 2011). Currently, Spirit Airlines uses hubs in Fort Lauderdale (Florida) and Detroit (Michigan). More than half of the company's flights are made to the Bahamas, the Caribbean Islands, and Latin America (SAVE website).

NYSE (New York Stock Exchange) is the major US stock exchange, the largest in the world in terms of turnover. The stock exchange determines the world famous Dow Jones index for shares of industrial companies (Dow Jones Industrial Average), as well as NYSE Composite and NYSE ARCA Tech 100 Index. New York Stock Exchange is considered the largest in terms of capitalization, because the volume of shares listed on it is more than 60%.

Alaska Air Group (ALK) is an American aviation holding company headquartered in SeaTac, Seattle suburbs, which owns two certified commercial air carriers: Alaska Airlines mainline airline and the regional airline Horizon Air (Corporate Structure of American Airlines, 2009). The holding was established in 1985 on the basis of an air carrier Alaska Airlines and a year later it acquired the local airline Jet America Airlines and Alaska Horizon Air.

Delta Air Lines, Inc. (DAL) is an American airline with headquarters in Atlanta, Georgia. It is one of the four companies which founded SkyTeam, the airline alliance of passenger traffic. Delta Air Lines is the world's largest airline in three significant criteria: the size of the fleet, the volume of passenger traffic, and the number of destinations. Its route network covers countries of North America, South America, Europe, Asia, Africa, the Middle East, and the Caribbean. In 2009, Delta opened flights to Australia, which gave it the status of the only US carrier that connects all the continents of the world except Antarctica. On October 29, 2008 Delta acquired 100% stake in another US airline Northwest Airlines. After a long merger and reorganization of companies routes, in the beginning of 2010, Delta became the world's largest commercial airline (DAL website).

FedEx Corporation (FDX) is an American company providing postal, courier, and other logistics services worldwide. FedEx Express is an American cargo airline based in Memphis, Tennessee (Kjelgaard, 1981). It is a subsidiary of FedEx Corporation, delivers daily loads and parcels to more than 375 destinations in almost all countries of the world.

Southwest Airlines Co. (LUV) is an American low-cost airline, founded in 1971. Southwest Airlines is the largest low-cost airline in the US and in the world by the number of passengers (LUV website). It has been listed on NYSE since February 1980.

United Continental Holdings (UAL) is an American Airlines, one of the largest in the United States and the world. After the merger with Continental Airlines

Table 1. Terroristic attacks that are investigated in the paper.

Date	Location	Killed	Injured	Type	Description
1 Nov 2013	Los Angeles, CA	1	7	TER	Shooting attack at Los Angeles International Airport; 1 TSA officer killed, 2 TSA officers and several civilians injured.
18 Feb 2010	Austin, Texas	2	13	TER	Suicide crash of small plane into federal office building.
25 Dec 2009	Michigan	0	3	TER-islm	Yemeni terrorist attempts to detonate bomb on flight from Amsterdam to Detroit; bomb only ignites, and passengers and crew subdue the terrorist.
4 Jul 2002	Los Angeles, California	2	4	TER-islm	Egyptian gunman kills two Israelis, injures four at the El Al ticket counter at the Los Angeles International Airport.
22 Dec 2001	Atlantic Ocean, Florida	0	1	THW	British citizen prevented from igniting shoe bomb on flight from Paris to Miami.
11 Sep 2001	New York City, New York	2759	8700	TER-islm	Crashing of two hijacked planes into World Trade Center towers, causing fires and collapse.
11 Sep 2001	Alexandria, Virginia	189	200	TER-islm	Crashing of hijacked plane into Pentagon.
11 Sep 2001	Somerset County, Pennsylvania	45	0	TER-islm	Crashing of hijacked plane into rural area of Pennsylvania, following attempt by passengers to regain control of aircraft.
14 Dec 1999	Port Angeles, Washington	0	0	THW	Terrorist arrested crossing from Canada with material to bomb Los Angeles International Airport.

Source: based on the work "Terrorism, Counterterrorism, and Unconventional Warfare" written by Wm. Robert Johnston, 2016.
*in the table, TER – terrorist attack, THW – thwarted terrorist attack, islm–islamist.

airline in 2010, United Airlines became the largest airline in the world (UAL website). The airline was also the first in the world, where the plane was the victim of a terrorist act. On October 11, 1933 Boeing 247 was blown up in the air and fell on the territory of the State of Indiana. On September 11, 2001 two airplanes of

the company were captured by terrorists. Boeing 767 Flight 175 was sent to the south tower of the World Trade Center, and the Boeing 757 Flight 93 was crashed in Pennsylvania (the report of US Department of Justice).

The following events have been considered in this paper. All these events are officially recognized as terrorist attacks by the US government and directly related to the hijacking or bombing of aircraft.

Graphs below present returns of companies listed on NASDAQ and NYSE in the period of the event window of investigated terrorist attacks.

Graphs below present abnormal returns of companies listed on NASDAQ and NYSE in the period of the event window of investigated terrorist attacks. The share prices of the companies were taken from the database of NYSE and NAS-DAQ. Event window is calculated for each event from table 1, and it covers the date of the event, two days before and after the event.

In the figures 3 and 4, the returns from 30.10.2013 till 05.11.2013 of fourteen companies listed on NASDAQ and NYSE can be seen. The returns were generated on the basis of adjusted stock. So it is seen on November 1, the date of the terrorist attack in Los Angeles, the return of one company, Hawaiian Holdings, was higher than zero, while all others were negative. During the next working days, more than half of the companies achieved a positivemark.

Figure 3. Returns of companies listed on NASDAQ (30th October 2013 – 5th November 2013).
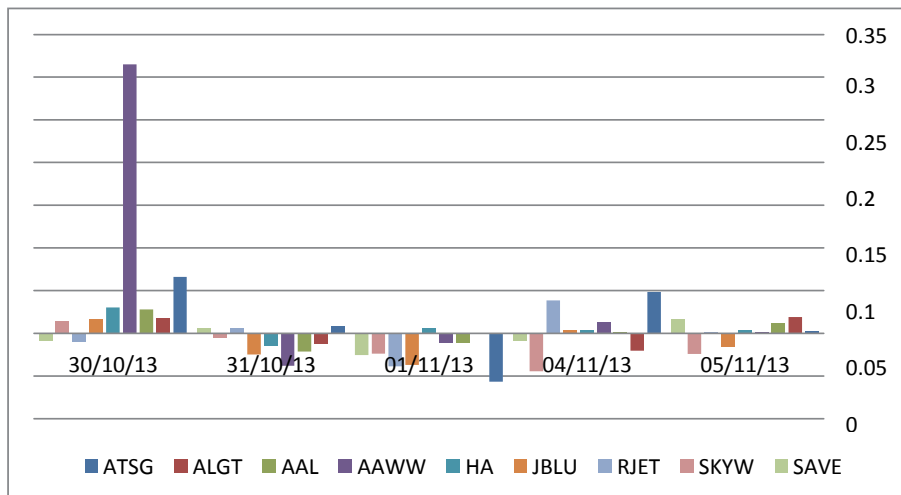
Source: database of NASDAQ.

Figure 4. Returns of companies listed on NYSE (30th October 2013 – 5th November 2013).
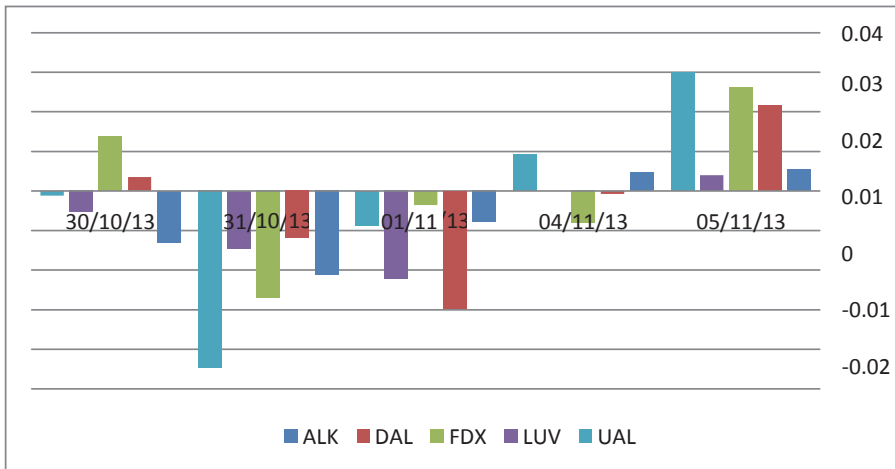
Source: database of NYSE.

On November 18th, 2010, another terroristic act occurred in Texas. Figures 5 and 6 show how share prices of the companies were changing during this event. When comparing returns of the companies before the terroristic act and on the event day, there is a significant decreasing for most companies.

Figure 5. Returns of companies listed on NASDAQ (16th February 2010 – 22nd February 2010).
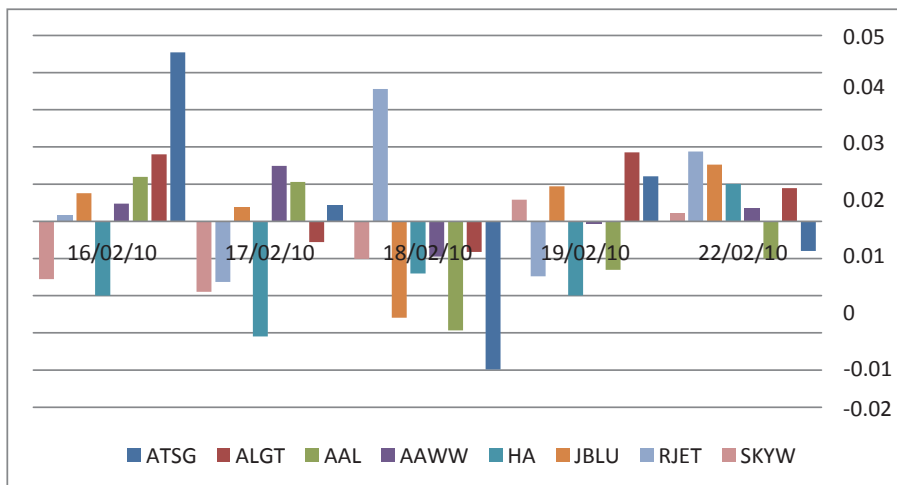
Source: Database of NASDAQ.

Figure 6. Returns of companies listed on NYSE (16th February 2010 – 22nd February 2010).
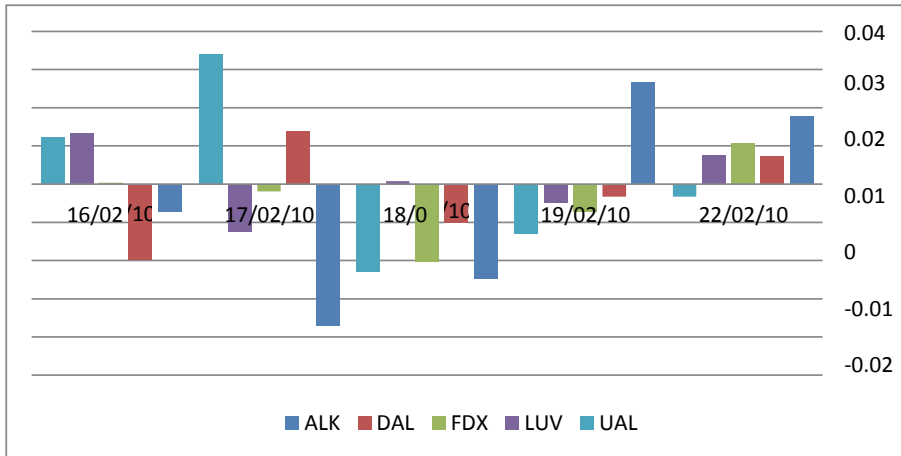
Source: Database of NYSE.

The next two events investigated in the research happened during the holidays when the stock exchanges are closed: at Christmas 2009 and on Independence Day 2002. Two days after the events were Saturday and Sunday that are not working days. Thus, it is possible to compare values of the day before the event with values obtained in three days after the event. The figures below show most companies were able to generate the positive value after the event. Negative values for the few companies, with the exception of FDX, were not significant.

Figure 7. Returns of companies listed on NASDAQ (23rd December 2009 – 30th December 2009).
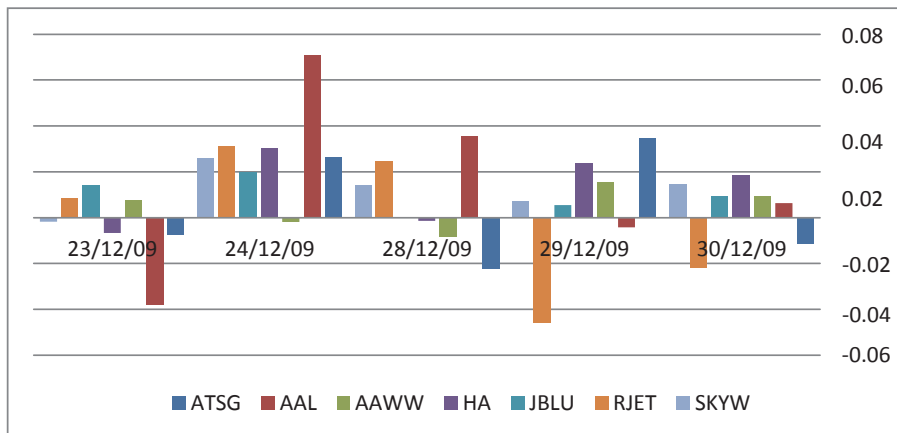
Source: Database of NASDAQ.

Figure 8. Returns of companies listed on NYSE (23rd December 2009 – 30th December 2009).
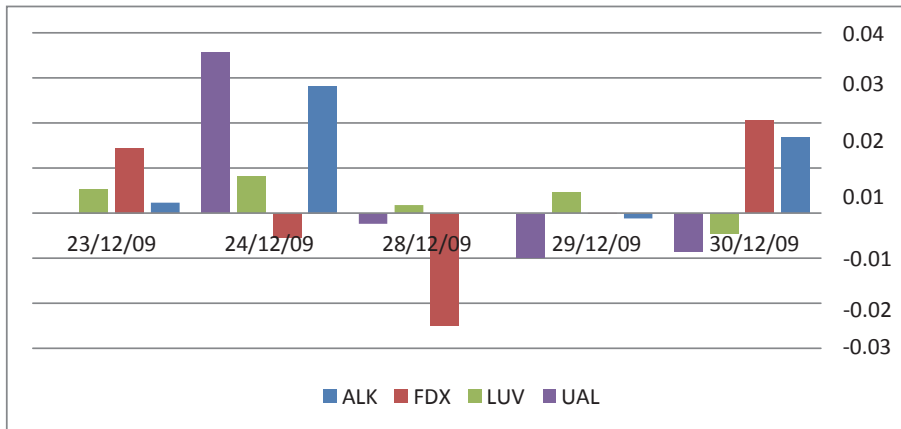
Source: Database of NYSE.

Figure 9. Returns of companies listed on NASDAQ (2nd July 2002 – 8th July 2002).
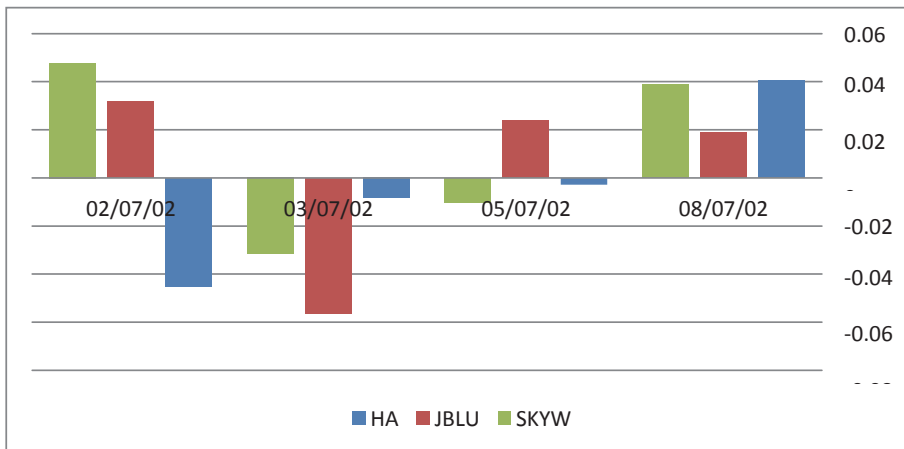
Source: Database of NASDAQ.

The terroristic act which happened on 22nd December 2001 was only an attempt to ignite the shoe bomb in the airport of Florida. As a result of the attempt, there was only one victim and the event did not receive such a huge response. The values of the companies were either improved or remained unchanged (figures 10 and 11).

Figure 10. Returns of companies listed on NYSE (2nd July 2002 – 8th July 2002).
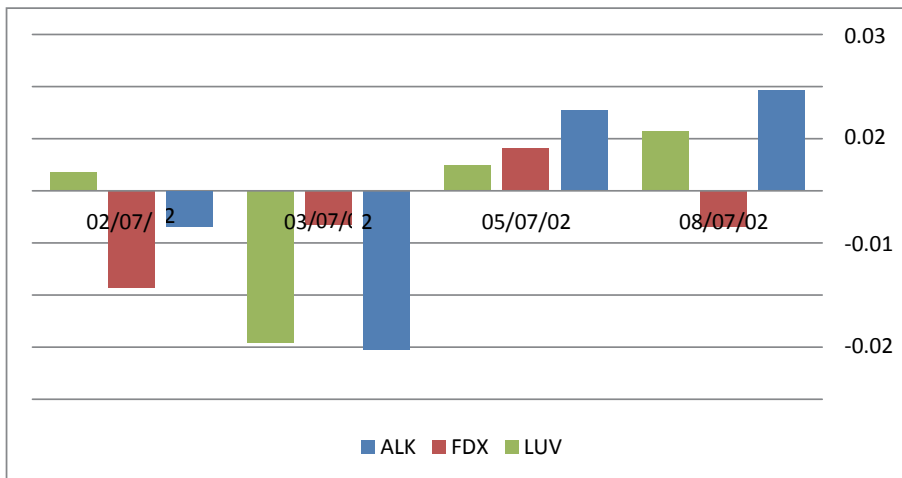
Source: Database of NYSE.

Figure 11. Returns of companies listed on NASDAQ (20th December 2001 – 26th December 2001).
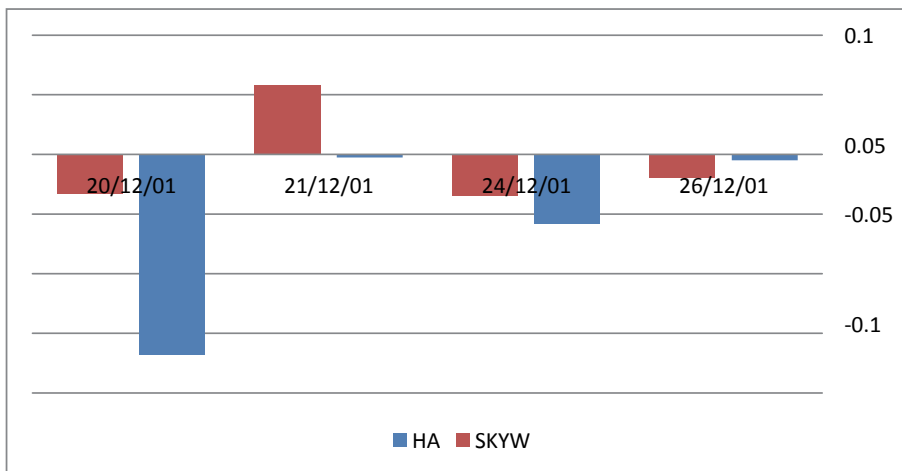
Source: Database of NASDAQ.

The September 11 attacks had a crucial economic impact on the US and world markets. NYSE and NASDAQ did not open on September 11th and stayed closed during five days. After the longest period of inactivity, the Dow Jones Index ("DJIA") lost 684 points or 7.1%. It was the largest fall in a single day. By the end of the week, DJIA fell to1369.7 points (14.3%). It was the biggest weekly drop in history (Jim Ritter, 2002). Figures 13 and 14 show the significant decrease in share prices for the companies.

Figure 12. Returns of companies listed on NYSE (20nd December 2001 – 26th December 2001).
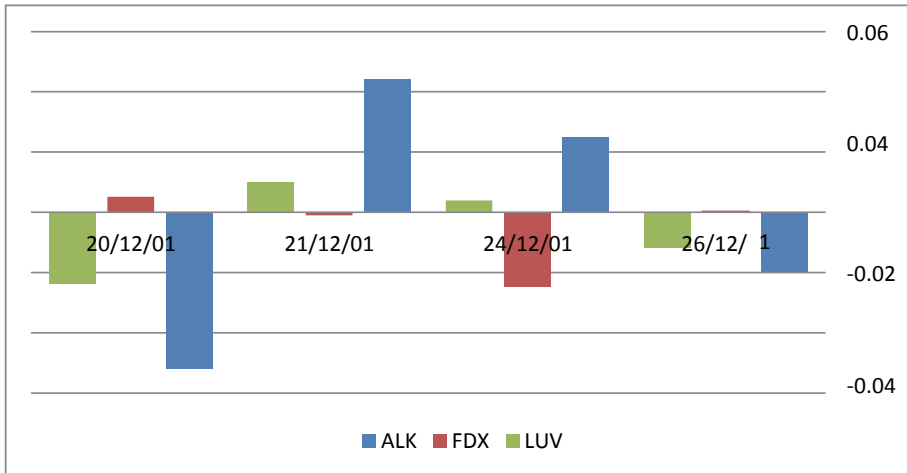
Source: Database of NYSE.

Figure 13. Returns of companies listed on NASDAQ (7th September 2001 – 18th September 2001).
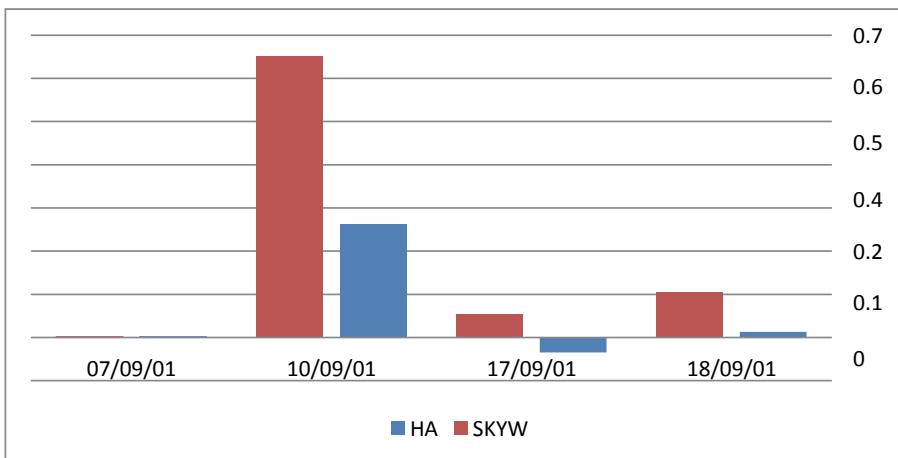
Source: Database of NASDAQ.

Figure 14. Returns of companies listed on NYSE (7th September 2001 – 18th September 2001).
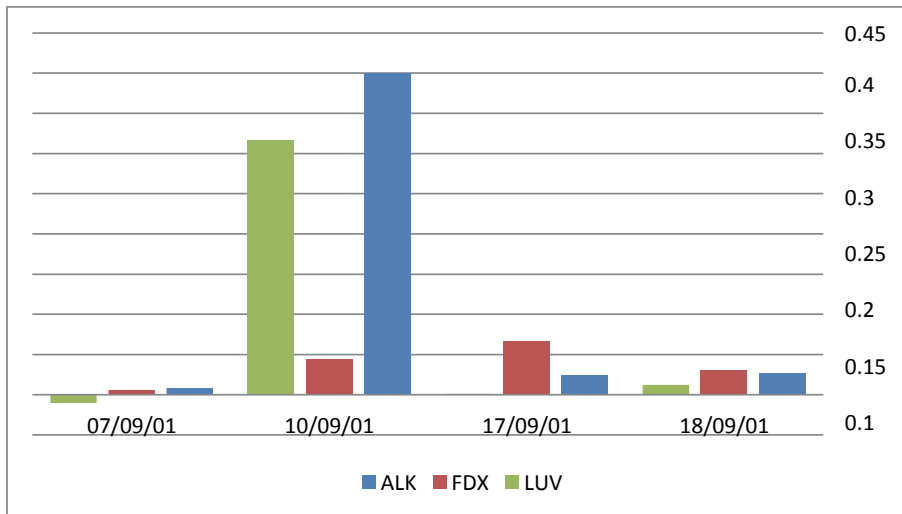
Source: Database of NYSE.

Figures 15 and 16 show the returns of the companies during the period from 10th December 199 till 16th December 1999. It was an attempt to smuggle bombs across the border with Canada.

Figure 15. Returns of companies listed on NASDAQ (10th December 1999 – 16th December 1999).
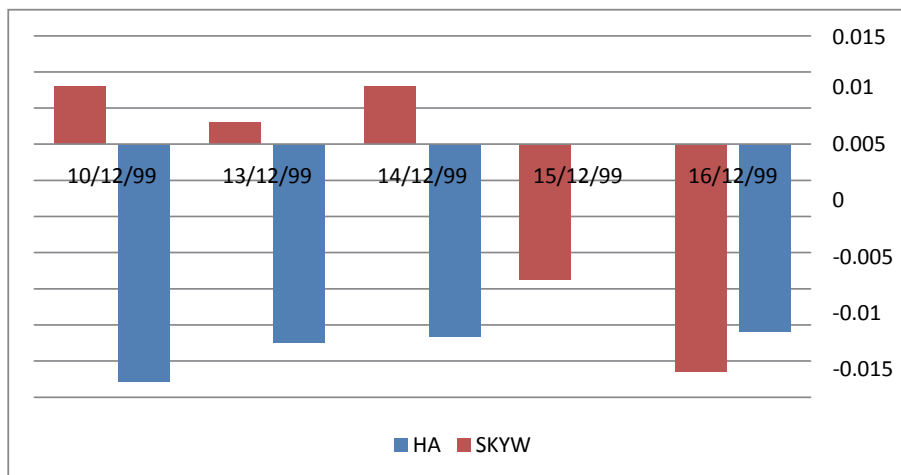
Source: Database of NASDAQ.

Figure 16. Returns of companies listed on NYSE (10th December 1999 – 16th December 1999).
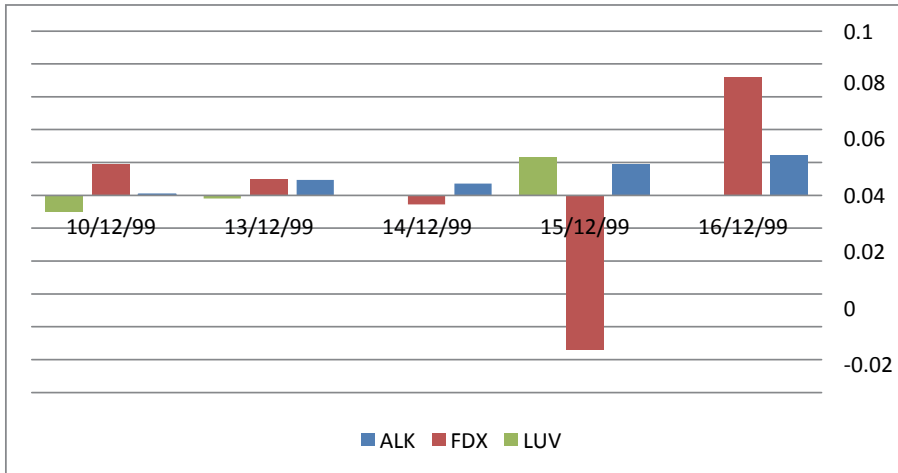
Source: Database of NYSE.

Two next parts of the chapter describe the ESA used to make research and results obtained in STATA.

Event Study Analysis

The major aim of this work is to investigate how terrorist attacks affected the share prices of US airlines. To measure the impact of terrorism, Event Study Analysis was applied. It is assumed that all relevant information is immediately and fully reflected in the share prices (Jegadeesh and Kim 2006).

Traditional event analysis method is described in detail in the work written by Kothari and Warner (1997).

$$r_t = \alpha + \beta r_t^M + \gamma r_t^I + e_t$$

where r_t is the daily stock return, r_t^M is the market return during estimation window, r_t^I is the return of an index for considered industry, e_t is the abnormal return.

In this method, r_t^M is defined as the average market rate of return calculated on the basis of daily changes of the market index.

The ESA includes steps described below.

The first step is to choose a model that describes the daily returns R_t of the investigated financial instrument (for example, the company's shares). The model is built on the basis of historical data. The model parameters are

estimated in the estimation window (Picture 1). Typically, the model is estimated in the estimation window lasting at least 3 months. Based on the economic point of the task, the selection of the event window is the second step of the model. In most cases, the period $[t_2 – t_3]$ covers a few days. Researchers take into account when the market and its participants get information. For example, when analyzing the effect of securitization on share prices, it is considered that some investors might be aware of the upcoming event in advance. Thus, the required number of days is included in the event window. Additionally, it should be mentioned that the effect of an event may happen after the event. This also affects the range of the event window. Depending on the task, the period $[t_2 – t_3]$ may cover even a month. In this research, event window covers five days. It is described below.

Picture 1. Event Study Periodization.
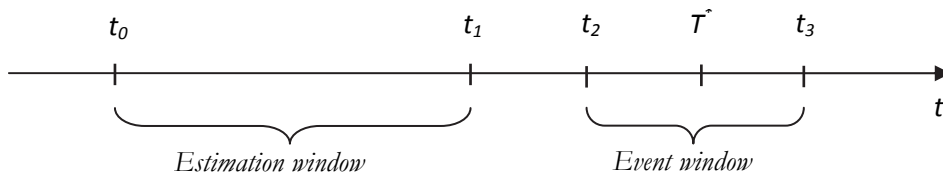
Source: Zadorozhna and Zaderey (2013).

For this investigation, estimation window includes 180 working days for stock exchanges NASDAQ and NYSE. Event Study Analysis is used to measure the effect of events on stock market. For many studies, estimation window covered the period of more than 3 months (Okulov, 2010). For this study, the length of the event window was chosen based on the paper of Khotari and Warner(2006).

The event window consists of five days: 2 days before the event and 2 days after the event. The event window was divided into several groups of days' combination: [-2; +2], [-2; +1], [-2; 0], [-1;+2], [-1;+1], [-1;0], [0;+1],[0;+2], and [0], where 0 – the event's day. This length of the event window is usual for event studies. Basing on the research described in chapter I, it is assumed that terrorist attacks have a short-term effect on the market. Thus, only two days after the event were included in the event. Moreover, a longer period might be a source of additional noise that discredits the results.

In some studies, event window is more expanded, as information or rumors concerning investigated event (for example, coming dealings) can penetrate into the market before its announcement. Moreover, market may require a large

amount of time to generate an adequate reaction to the received information, and the actual reaction may not immediately be reflected in the prices. However, in this study, it was preferred to avoid "noise" described in the section 2 and its effect on the market prices and get the results of immediate reaction on the event.

Correcting data on the availability of omissions is a necessary procedure before starting calculations. Missing values in the data may be caused by several reasons. Firstly, it is unclear values of which days should be considered: trading or calendar. In the case of calendar days, it would be incorrect to carry out adjustments on the weekend ignoring price changes during this period. This will lead to an underestimation of dispersion for profitability: during the weekend, there will be created a low volatility zone. All this leads to the fact that it makes sense to consider the financial quotes of trading days. In the database for this research, missing values were fulfilled basing on the method of Little and Rubin (2002) that is described below.

Secondly, missing data may be caused by the lack of trading in a particular date. There are many ways of dealing with missing data (Little, Rubin, 2002). For example, data can be filled at the price of the last transaction. However, this filling is not correct, since the potential share price reflecting investor sentiment can change, and the lack of trading is explained only by the fact that there are no counter orders on the stock exchange. In addition to the previous method, missing values can be filled with average values as well as the moving average method (Little, Rubin, 2002, p. 16).

Returns were calculated according to the following formula:

$$r_t = \frac{P_t - P_{t-1}}{P_{t-1}} \tag{2}$$

where P_t is the share price at the close of trading on a particular day.

Using CAR assumes the calculation of normal stock returns k_t. Normal profitability means the rate of return of a company's shares in the absence of a specific event.

The next step is to calculate e_t, error term for each event in the event window:

$$e_t = r_t - \left(\alpha + \beta r_t^M + \gamma r_t^I \right) \tag{3}$$

Then, it is needed to calculate CAR with the following formula:

$$CAR_t = \sum_{j=t_0}^{t} e_j \tag{4}$$

It is important to explain values of CAR correctly. In case of CAR's significance, it will serve as proof that the terrorist attacks have an impact on the market return. Its absence will mean the opposite. The value of CAR can be positive, negative, or zero. The positive value will mean positive influence of the event on the return, while the negative value will mean that the event had a negative effect on the return. The results are explained below.

In the model, t-test was used in order to check the impact of the event on the return and determine if this indicator is statistically significant.

The t- statistic is found by the formula below (Ahern, 2009):

$$T-test = \frac{\dfrac{\sum AR}{N}}{\dfrac{AR_{SD}}{sqrt(N)}}$$

where AR is the abnormal return,

AR_{SD} is the abnormal return standard deviation,

N is the number or days in the event window (Princeton University Library, 2008).

Based on this methodology, the model was built and its results are presented in the next chapter.

Empirical Results

The data used in the econometric model represents the daily performance of shares of fourteen American airlines that are listed on two stock exchanges, NYSE and NASDAQ. Changes in prices for shares of companies were considered in different periods, focusing on the events that may affect the companies' stock. In this study, terrorist acts directly connected with the airlines and their transportation (e.g. aircraft hijacking, explosion at the airport, etc.) are considered to be the event having a possible impact on companies' share prices.

The aim of the research is to figure out whether such a type of chosen events may have an impact on stock prices of companies. With a positive result of the study, the second aim is to analyze how stock prices of the companies changed under the influence of a particular event.

In the research, nine event windows were tested. All results of the model are presented in Appendices 1–14. A particular interest is caused by the results obtained from the data of the event day and two days after the terroristic act. Basing on the papers and investigations mentioned above, it is assumed that

terrorist events have a short-term impact on the economy and the behavior of investors. It is figured out that terrorist attacks happened in the recent time have even less impact on the market than events of the beginning of the 21st century. Lien (2013) mentioned that bombings in Madrid caused no reaction of the US stock exchanges. Table 2 and table 3 present the retrieved data.

Basing on the results from table 2 and the table 3, the value of CAR is negative in most cases. From Table 2 and Table 3, it is seen that CAR of American Airlines Group (AAL) decreased by 1.5% and by 1.9% due to "1 Nov 2013" and "18 Feb 2010" events, respectively. During the terrorist attack in Los Angeles which happened on the 1st November, 2013, CAR for Atlas Air Worldwide Holdings (AAWW) dropped by 14.7%. During "18 Feb 2010" and "29 Dec 2009" events, CAR of FedEx (FDX) decreased by 1.9% and 5.3%. Hawaiian Holdings (HA) experienced a huge loss in CAR due to "24 Dec 2001" and "14 Dec 1999" events. It fell by 11.6% and 10.5%. After the terrorist attack on the 24th December, CAR for SkyWest (SKYW) decreased by 6.4%. As a result of the terrorist attack on the 1st November, 2013, CAR of Spirit Airlines (SAVE) decreased by 3.3%. Due to "18 Feb 2010" and "28 Dec 2009" events, CAR for United Continental Holding (UAL) decreased by 0.9% and 2%. Only, as a result of "28 Dec 2009", CAR for SkyWest (SKYW) shows an increasing value. It grew by 3.3%. Table 4 shows the difference between abnormal returns of the day of the event and the day after the event. Table 5includes the difference of two days after the event. Tables are made up of two columns. The first column shows if the value of CAR was positive or negative on the next day after the event. The second column shows how CAR changed after the day of the event, whether it was a positive or negative change. If for AAL, it was equal to – 0.018701 on the day of the "18 Feb 2010" event and then it decreased to - .0332001 on the nextday after the event. Column B for AAL reflects "-", as the value decreased. Column A reflect "-"as well because CAR was negative on the next day after the event. Table 5 shows the value of CAR and its changed happened in two days after the event.

Table 2. The summary of the results for [0; +1] event window for the whole data sample.

Company		1 Nov 2013	18 Feb 2010	28 Dec 2009	5 Jul 2002	24 Dec 2001	17 Sep 2001	14 Dec 1999
ATSG	CAR	-0.0533279	-0.0405235					
	t-stat	-0.5365278	-0.8210205					
ALK	CAR	-0.0067784	-0.0166724	-0.0034714	0.0135789	0.0261375	0.0845208**	0.0046849
	t-stat	-1.290308	-0.3771943	-0.6924477	0.6240196	0.4922119	2.004168	0.5817595
ALGT	CAR	0.0020209	-0.0036003					
	t-stat	0.099131	-0.1569041					
AAL	CAR	-0.014659***	-0.018701***	0.0263548				
	t-stat	-4.683468	-4.4507	0.7319473				
AAWW	CAR	-0.146604***	-0.007803	-0.0115693				
	t-stat	-2.691467	-1.485234	-0.3593314				
DAL	CAR	-0.0283448	0.0000292					
	t-stat	-0.9558927	0.0109139					
FDX	CAR	0.0003695	-0.0187948*	-0.0532997*	0.0005106	-0.0205199	0.2086113***	-0.0209656
	t-stat	0.0253248	-1.705348	-1.797239	0.0147394	-0.684411	2.789034	-0.1529894
HA	CAR	0.0054752	-0.0102268	-0.0060413		-0.1158408*	-0.0333015	-0.1052633***
	t-stat	0.6306805	-1.048813	-0.1816639		-1.936065	-0.5741864	-2.48478
JBLU	CAR	-0.0381086	-0.019093	-0.0039149				
	t-stat	-1.127767	-0.6701545	-0.3188898				
RJET	CAR	-0.0389488	0.0390114	0.0421564				
	t-stat	-0.5636244	0.7097796	0.5490991				

Company		1 Nov 2013	18 Feb 2010	28 Dec 2009	5 Jul 2002	24 Dec 2001	17 Sep 2001	14 Dec 1999
SKYW	CAR	-0.0240552	-0.0049336	0.0229048***		-0.064166***	0.1276066***	0.0328292
	t-stat	-0.9157034	-0.4611429	6.151947		-4.797311	3.272357	0.7776984
LUV	CAR	-0.0220658	0.004677	-0.0013678	0.0041216	0.0134034	0.0189864	-0.0046743
	t-stat	-1.41124	0.4873886	-0.2266385	0.2773488	0.6621285	0.7089317	-0.1863215
SAVE	CAR	-0.0229059*						
	t-stat	-1.950349						
UAL	CAR	-0.0117014	-0.008990***	-0.0206144***				
	t-stat	-0.8894109	-2.686713	-6.637991				

Notes: *** – significance at 1% level; ** – significance at 5% level; * – significance at 10 % level.

Table 3. The summary of the results for [0; +2] event window for the whole data sample.

Company		1 Nov 2013	18 Feb 2010	28 Dec 2009	5 Jul 2002	24 Dec 2001	17 Sep 2001	14 Dec 1999
ATSG	CAR	-0.0533279	-0.0405235	-0.0532208				
	t-stat	-0.6188183	-0.9458268	-0.7556931				
ALK	CAR	-0.0067784	-0.0166724	-0.0034714	0.0135789	0.0261375	0.0845208	0.0046849
	t-stat	-0.7662801	-0.4317726	-0.164998	0.6240196	0.499488	0.9904747	0.1153147
ALGT	CAR	0.0020209	-0.0036003					
	t-stat	0.0599295	-0.1721406					
AAL	CAR	-0.01146594	-0.018701**	0.0263548				
	t-stat	-0.9550151	-2.080042	0.7257101				
AAWW	CAR	-0.146604	-0.007803	-0.0115693				
	t-stat	-0.9338247	-0.6605568	-0.3609894				
DAL	CAR	-0.0283448	0.0000292					
	t-stat	-0.6818711	0.0120111					
FDX	CAR	0.0003695	-0.0187948	-0.0532997	0.0005106	-0.0205199	0.2086113	-0.0209656
	t-stat	0.0106347	-1.263496	-1.174185	0.0147394	-0.4611677	1.32762	-0.0831007
HA	CAR	0.0054752	-0.0102268	-0.0060413	-0.00222	-0.1158408	-0.0333015	-0.1052633**
	t-stat	0.2573902	-0.6588894	-0.1914743	-0.063338	-1.284537	-0.4655972	-2.228559
JBLU	CAR	-0.0381086	-0.019093	-0.0039149	0.0456323			
	t-stat	-1.055646	-0.7185888	-0.3122465	1.543183			
RJET	CAR	-0.0389488	0.0390114	0.0421564				
	t-stat	-0.6120514	0.816163	0.556488				

Company		1 Nov 2013	18 Feb 2010	28 Dec 2009	5 Jul 2002	24 Dec 2001	17 Sep 2001	14 Dec 1999
SKYW	CAR	-0.0240552	-0.0049336	0.0229048***	-0.012399	-0.064166	0.1276066	0.0328292
	t-stat	-1.013664	-0.3934178	6.424819	-0.504293	-1.190943	0.5402728	0.5998117
LUV	CAR	-0.0220658	0.004677	-0.0013678	0.0041216	0.0134034	0.0189864	-0.0046743
	t-stat	-1.612774	0.5595701	-0.0957303	0.2773488	0.5337886	0.1306755	-0.1906937
SAVE	CAR	-0.0229059						
	t-stat	-1.014675						
UAL	CAR	-0.0117014	-0.0089906***	-0.0206144***				
	t-stat	-1.026886	-2.373746	-5.261341				

Notes: *** – significance at 1% level; ** – significance at 5% level; * – significance at 10 % level.

Table 4. The changes in the volatility of returns for [0; +1] event window.

Company	1 Nov 2013		18 Feb 2010		28 Dec 2009		5 July 2002		24 Dec 2001		17 Sep 2001		14 Dec 1999	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
ATSG	-	+	-	+										
ALK	-	-	-	+	-	-	+	-	+	+	+	+	+	+
ALGT	+	-	-	+										
AAL	-	-	-	-	+	+								
AAWW	-	+	-	-	-	+								
DAL	-	+	+	-										
FDX	+	-	-	-	-	-	+	-	-	-	+	+	-	-
HA	+	-	-	+	-	+			-	-	-	-	-	+
JBLU	-	-	-	+	-	+								
RJET	-	+	+	-	+	-								
SKYW	-	-	-	+	+	+			-	-	+	+	+	-
LUV	-	-	+	-	-	+	+	-	+	-	+	+	-	+
SAVE	-	-												
UAL	-	+	-	-	-	-								

Notes: A: the value of the return on the event date. "+" means a positive value; "-" means a negative value. B: the returns' changes after the event. "+" means a positive change, "-" means a negative change. Purple color stands for significant results.

Table 5. The changes in the volatility of returns for [0; +2] event window.

Company	1 Nov 2013		18 Feb 2010		28 Dec 2009		5 July 2002		24 Dec 2001		17 Sep 2001		14 Dec 1999	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
ATSG	-	+	-	-	-	+								
ALK	-	-	-	+	-	+	+	-	+	-	+	+	+	+
ALGT	+	+	-	+										
AAL	-	-	-	-	+	+								
AAWW	-	+	-	-	-	+								
DAL	-	+	+	-										
FDX	+	+	-	-	-	+	+	-	-	+	+	-	-	-
HA	+	-	-	-	-	+	-	+	-	+	-	-	-	-
JBLU	-	-	-	+	-	+	+	+						
RJET	-	+	+	-	+	-								
SKYW	-	-	-	-	+	+	-	-	-	-	+	+	+	-
LUV	-	-	+	-	-	+	+	-	+	-	+	-	-	+
SAVE	-	-												
UAL	-	-	-	-	-	-								

Notes: A: the value of the return on the event date. "+" means a positive value; "-" means a negative value. B: the returns' changes after the event. "+" means a positive change, "-" means a negative change. Purple color stands for significant results.

From tables 4 and 5, it is seen that for all companies, during all events, CAR was negative, except for SKYW after the "28 Dec 209" event. It is interesting that the "11 Sep 2001", the most large-scale terrorist event, shows the opposite result. It should be taken into consideration that on the 11th September stock exchanges were closed during the working day and were opened after 5 days. Thus, it is difficult to assume how CAR will change, if stock exchanges work without interruption.

Despite the fact that there are more results representing the negative impact than the positive one, it should be mentioned that there are many results showing

a non-significant reaction. This fact requires a deeper analysis of the impact of terrorism on the economy. The general opinion about the economic impact of terrorism is that such events involve significant negative consequences. For sure, it is not a positive sign for a country as terrorism and its threat cause panic among the people and form the instability in the country. Furthermore, the government has to allocate additional funds for the fight against terrorism and the protection of the population. However, as it was mentioned in chapter I, due to growing demand and needs of the population such industries as defense industry and insurance industry may gain profit after terrorist attacks. Analyzing the impact of terrorism on airline industry, the first reaction is to say that it will lead to disastrous effect for the whole industry. This paper does not focus on the reaction of ordinary people to terrorist attack. The work investigates how the market and its participants behave during such events. Eldor and Melnick (2004) noticed that the markets always do their best. Markets do not have human traits; they are able to assess the information and respond to it rationally. Many economists (Evan Lucas (2015),Howard Archer (2015), Ferguson (2003), Chen and Siems (2004)) mentioned the short- term effect after huge terrorist attacks and no reaction after non significant events.

In order to check how terrorist attacks affected share prices of the airlines, the difference between share prices on the day of the event and the next trading day was calculated. The results are presented in the table 6. It can be seen that there was no collapse in prices excluding the "11th September attacks" event. In most cases, share prices increased. The biggest decrease in share prices was recorded for AAL after the event "28th December 2009". It decreased by 7%. Analyzing positive changes, it cannot be said that there was an unprecedented increase of share prices. The highest positive change was fixed at7%.

Table 6 shows the change in real share prices of the airline companies in percentage terms on the next day after the terrorist attacks.

From table 6, it is seen that there was no decrease in share prices after the event. Only the "11th September attacks" event can be considered an exception. It is obvious as this event led to the greatest number of deaths among all other events, and it was the first mass terrorist attack involving aircrafts in the United States. At that time, the US economy experienced not the best period in history, and this event only aggravated the situation. As a result of these attacks, the WTC was ruined damaging the communication network between stock exchanges and corporations. It caused chaos and panic on the market. In general, it affected negatively all industries, not only airline industry. Due to unstable and unclear situation on the market, DJIA dropped by 684 points. The behavior of DJIA can be seen on the figure below.

Table 6. The change in real share prices of the airline companies.

Company	1 Nov 2013	18 Feb 2010	28 Dec 2009	5July 2002	24 Dec 2001	17 Sep 2001	14 Dec 1999
ATSG	6%	4%	-3%				
ALK	1%	3%	0%	3%	-4%	-29%	-1%
ALGT	0%	1%					
AAL	1%	3%	-7%				
AAWW	1%	1%	0%				
DAL	3%	1%					
FDX	0%	2%	1%	1%	0%	-4%	1%
HA	-1%	1%	-3%	1%	0%	-21%	3%
JBLU	4%	3%	-2%	6%			
RJET	4%	-3%	-3%				
SKYW	2%	1%	-3%	3%	-5%	-39%	-1%
LUV	2%	0%	-1%	3%	-1%	-24%	0%
SAVE	3%						
UAL	1%	-1%	-3%				

Figure 17. The behavior of Dow Jones Industrial Average during September 11th Attacks.
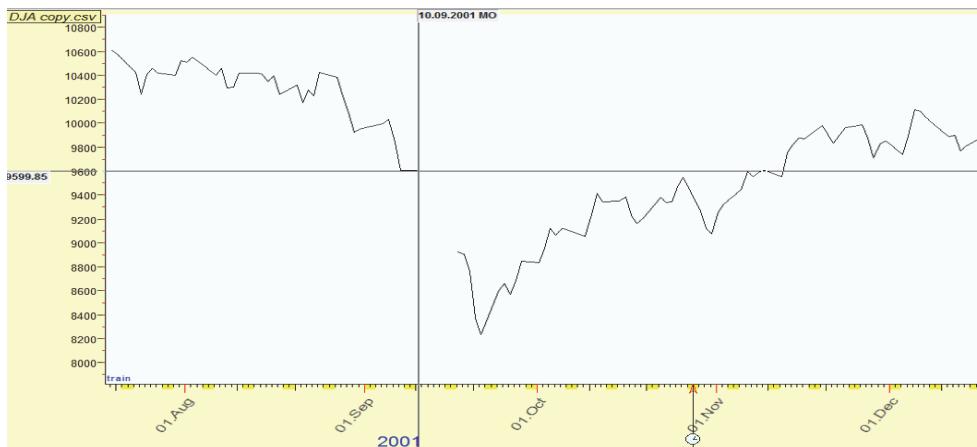
Source: The project of Golubitskiy, 2016.

It is not surprising that a disaster of this scale had a huge impact on the stock exchanges and companies' share prices. Among all companies considered in the research, five airlines – ALK, FDX, HA, SKYW, and LUV – were listed on NAS-DAQ or NYSE in that time frame. The share prices of four companies collapsed by more than 20% on the next trading day after the September 11th attacks. The stock prices of FedEx Corporation decreased by only 4%. FedEx is not an airline, but this corporation owns a huge number of airplanes as it is engaged in delivery of items all over the world and provides logistics services. The company is highly dependent on the security of transportation. It is impossible to exclude that the increasing panic on the markets and concerns regarding aviation security reflected negatively on the company's share prices. However, it should be appreciated that compared with ALK, HA, SKYW, and LUV, drop in prices of other airline companies was not dramatic. After 2 months, the market recovered its losses. Terrorists could not inflict a significant blow to the US economy with the disastrous attacks of 11 September in New York (Kramer, 2015).

The probability of terrorist attacks always increases during public holidays and Christmas, and the government always warns of a possible imminent threat. Markets are aware of this fact. In 2001, on Christmas Eve, there was an attempt of a terrorist attack in Florida. On December 25, 2009, there was another attempt to blast the plane flying from Amsterdam. After these two terror attacks, share prices of most companies showed a negative trend. However, the greatest negative change does not exceed 7% (AAL).These attacks did not have any impact on ALK and AAWW in 2009 and FDX in 2001. At least, it was not reflected in their share prices. In 2003, the aggravation of the threat of international terrorism on Christmas holidays did not cause a significant reaction of the US stock market (Economist, 2003). On December 21, the US government raised the level of warnings about the threat of a terrorist attack to "orange" level, which is only one step below the highest "red" mark. During the next trading days, the major stock indexes finished trading with an increase. In those days, DJA and S&P 500 closed at the record level during the last 19 months (Economist, 2003). Scott Wren (2003) explained the stability of the markets to the threats of terrorism pointed out that there are plenty of things like Iraq policy or corporative scandals that can be confusing for investors. But the market is able to overcome these unpleasant moments taking into account favorable underlying fundamentals. Wren meant considerable economic growth and corporate profits at that time.

Another terrorist event happened on the Independence Day, the fourth of July. On the next trading day, stock of all companies showed only positive growth. JBLU share prices increased by 6%. Eiji Kinouchi (2015) analyzing the market behavior after terrorist attacks in Paris in 2015 mentioned that if this

happens during the trading hours, it will cause a great panic on the markets, but markets had the weekend to digest all the information. After attacks in Paris, CAC-40 decreased by 2%, while DAX and FTSE increased by 0.15% and 0.11% respectively (Colas, 2015). For comparison, after 9/11, S&P 500 dropped by 11.6% (Nedelescu and Johnston, 2005). The attack on the Independence Day had even less impact than attacks in Paris. In the case of favorable economic conditions and confidence in the companies based on their stable earnings, investors will not overreact to such events as a terrorist attack or a threat to the country. Furthermore, markets learn from the past and their participants are able to assess the impact of an event on the economy. Howard Archer (2015) stated that previous similar events over the past 15 years, as a rule, did not have long-term economic consequences. The results of the 1ˢᵗ November 2013 and 18ᵗʰ February 2010 show that all airlines' stock prices did not decrease after the terrorist attacks.

Different levels of market reactions to the event may have several explanations. First, the scale of events plays a significant role in the behavior of markets and market participants, which reflect in the companies' stocks. The September 11 attacks had an impact on the markets of all developed countries, while other events had a localeffect.

The second fact influencing the market reaction to terrorism is the government policy and actions regarding the event. If the government announces immediately how it plans to solve the problem and help the economy by reducing the negative impact on the market, as much as it is possible, the panic among the participants of the market will be reduced. This happened after 11 September attacks. Indeed, it caused a collapse on the US market but it was less significant that on the capital markets of London, Frankfurt, Tokyo, Hong Kong etc. (Chen and Siems, 2004).

The next fact that should be mentioned is that economic conditions in the country during an event can make a difference. In 2001, during two events, the US economy experienced a severe crisis due to the dotcom crisis mentioned in chapter I. In 2009, there was a post-crisis period. Negative changes in companies' prices cannot be explained only by terrorist attacks. It is needed to take into consideration the economic situation in the country and the world.

In conclusion, it can be said that the market is becoming more flexible and stable to terrorist attacks basing on the previous experience. It is difficult to make the market overreact to events, especially if in the past the market has already experienced similar events with a huge impact.

Conclusions

The normal human reaction to severe stress, in particular to the terroristic attack, is a deep shock. In this state, people are prone to emotional and illogical actions. Judging by the behavior of the stock market, the world of finance is prone to making money and as a result it does not overreact to unexpected events. The reason for the so-called calmness is the experience gained in many years. In the 20th century, the attacks have ceased to be exceptional and extraordinary incidents. They have become a part of daily life of the community. However, the importance of terrorism in the decision making and on the market was not apparent for a longperiod.

It is believed that market represents billions of decisions, and the results of these decisions are reflected primarily in stock prices, the volume of transactions, interest for the loan etc. The purpose of terrorism is not only killing and explosions, but also the general information about the committed terrorist acts. The primary effect of terror is information: how it may affect the stock exchanges and share prices of companies.

Certainly, not all companies will face the same consequences caused by terrorism. It is necessary to take into account the scale of an event, its number of injured and killed as well as economic and political conditions. The biggest act of terrorism which had an impact on the entire financial world is the September 11 attacks. After the disaster, NYSE was closed, and after the restoration, the market was essentially lower than the closing level. FED was forced to reduce the base rate to unprecedented 3% to help collapsed stock market. Most American indexes fell to the lowest mark in three years; Dow Jones, the most affected, decreased by more than 7%. Most suffered industries belong to airlines, touristic and insurance companies.

It is needed to note September 11 attacks which took place against the backdrop of the general economic downturn had an impact on many countries. It was the time of the biggest corporate scandals in large companies. According to the official statistics, only two months later, there was a new cycle of economic growth in the USA.

Next major terrorist attacks did not affect the world markets to the same extent as the 9/11. The attacks in Madrid in 2004 and London in 2005 were also accompanied by a drop in prices. However the London events did not affect the US stock exchanges.

World business is gradually adapted to all kinds of eventualities, including massive events. The attack is a deterrent, and serious companies and serious investors have a high psychological stability. In addition, the economic mechanisms of

protection against these risks were found. Federal Commission for the Securities and Exchange Commission took unprecedented measures: it lifted restrictions on the purchase of companies' own shares. Large speculators refrain voluntarily from deals that could bring down the stock prices of securities (Low, 2001).

The September 11 attacks have had an immeasurable indirect impact on the whole world. In addition to the crisis and panic in the markets, terrorist attacks changed the attitude of people to safety. Market participants and governments have increased the chances of continuation of the business during and after disasters.

The US government has taken care that the financial institutions have invested millions of dollars in upgrading internal IT systems to ensure compliance with the adopted Patriot Act in October 2001.This law, in particular, requires financiers to empower the identification of suspicious transactions and customers. Companies are seeking to change their technological infrastructure so that in the event of a disaster they will be able to return to work as soon as possible. For this, it is necessary that all the data accumulated up to the time of the accident will remain intact. Naturally, the increasing level of security is more attractive and makes the financial world more stable as people feel more confident.

A proof of this is the fact that the market's reaction to the terrorist attacks decreases with each successive year. Lien (2015) measured it with the changes of major stock indexes of countries. In UK, for instance, she analyzed the behavior of FTSE after the terrorist attack.
- The attack on Charlie Hebdo magazine in January 2015 – a two-day marketreaction;
- The bombings in London in July 2005 – a two-day marketreaction;
- The bombings in Madrid in 2004 – a three-day marketreaction;
- September 11 attacks in New York in 2001 – an eight-day marketreaction.

These examples show that historically terrorist acts have a very short-term impact on markets, as investors as well as society will not be terrorized for a long time.

The research's results also show that in the course of time overreaction of markets is reduced and it does not bring an excessive havoc on the stock exchange. Basing on the results from table 1 and table 2, it is seen that CAR of the biggest part of the investigated companies was decreasing. Other results are not significant, and it explains non-significant reaction to terrorist attacks. The market is more stable as it was assumed. Certainly, it is impossible to explain the drop of share prices only with the event which happened in the USA. It is needed to consider a company's position before the attack and the level of trust on the part of market participants. However, it is impossible not to notice

a significant difference in the companies' share prices before and after the terroristattack.

In conclusion, it can be said that the terrorist attacks caused a negative drop in prices only in the short term and in case of significant terrorist attacks. In most cases, the market does not overreact to this type of events. In the future, the market is trying to compensate for lost opportunities during theevent.

Bibliography

Abadie, A and Gardeazabal J. (2003). *The Economic Costs on Conflict: A Case Study of the Basque Country*. "American Economic Review" 93(1),113–132.

Abadie, A and Gardeazabal J. (2008). *Terrorism and the World Economy*. "European Economic Review" 52(1),1–27.

Aksoy, M. (2014). *The Effect of Terrorism on Turkish Stock Market*. Ege Academic Review

Bandyopadhyay,S.andSandler,T.(2014).*ImmigrationPolicyandCounterterrorism*. "Journal of Public Economics" 110, 112–123.

Bandyopadhyay, S. and Sandler, T. (2014). *The Effects of Terrorism on Trade: A Factor Supply Analysis*. "Federal Reserve Bank of St. Louis Review" 96(2), 229–241.

Bandyopadhyay, S., Sandler, T., and Younas, J. (2014). *Foreign Direct Investment, Aid, and Terrorism*. "Oxford Economic Papers" 66(1), 25–50.

Black F. (1986). *Noise*. "The Journal of Finance" 41(3), 529–543.

Blomberg, S.B. and Hess, G.D. (2006). *How Much Does Violence Tax Trade?*"The Review of Economics and Statistics" 88(4), 599–612.

Blomberg, S.B., Hess, G.D., and Orphanides, A. (2004). *The Macroeconomic Consequences of Terrorism*. "Journal of Monetary Economics" 51(5), 1007–1032.

Broadberry, S. and Harrison, M. (2005). *The Economics of World War I*. Cambridge UniversityPress.

Burleigh, M. (2009).*Blood & Rage: A Cultural History of Terrorism*. New York: Harper CollinsPublishers.

Christopher, J. W. (2003). "It's up. It's down. Wait, it's back up, … The US economy in 2002". Kentucky Annual Economic Report, Center for Business and Economic Research, University ofKentucky.

Cordesman, A. (2004). *The Military Balance in the Middle East*. Center for Strategic and InternationalStudies.

De Jong, J.B., Shleifer A.M., Summers, L.H., and Waldmann, R.J. (1990). *Positive Feedback Investment and Destabilizing Rational Speculation*. "Journal of Finance" 45(2), 379–395.

De Jong, J.B., Shleifer A.M., Summers, L.H., and Waldmann, R.J. (1991). *The Survival of Noise Traders in Financial Markets*. "Journal of Business" 64, 1–19.

De Jong, J.B., Shleifer A.M., Summers, L.H., and Waldmann, R.J. (1990). *Noise Trader Risk in Financial Markets.*"Journal of Political Economy" 98, 703–738.

Egger, P. and Gassebner, M. (2015). *International Terrorism as a Trade Impediment?*,"Oxford Economic Papers" 67(1), 42–62.

Enders, W. and Sandler, T. (1996). *Terrorism and Foreign Direct Investment in Spain and Greece*. Kyklos 49(3), 331–352.

Enders, W. and Sandler, T. (2000). *Is Transnational Terrorism Becoming More Threatening?*,"Journal of Conflict Resolution"44(3), 307–332.

Enders, W. and Sandler, T. (2012). *The Political Economy of Terrorism*, 2ndedn. New York: Cambridge University Press.

Fama E. (1965). *The Behavior of Stock Market Prices*. "Journal of Business" 38, 34–105.

Fama E. (1970). *Efficient Capital Markets: A Review of Theory and Empirical Work*. "The Journal of Finance" 25(2), 383–417.

Fama E. and Macbeth J.(1973). *Risk, Return and Equilibrium: Empirical Tests*. "Journal of Political Economy" 81, 609–636.

Fama E., Fisher L., Jensen M., and Roll R. (1969). *The Adjustment of Stock Prices to New Information*. "International Economic Review" 10(1), 1–21.

Fama F. and French K. (1993). *Common Risk Factors in the Returns on Stocks and Bonds* "Journal of Financial Economics" 33, 3–56.

Fama F. and French K. (1988). *Business cycles and the behavior of metals prices*. "The Journal of Finance" 43(5), 1075–1093.

Ferson, W., Heuson A., and Su, T. (2005). *Weak and Semi-strong Form Stock Return Predictability Revisited*. "Management Science" 51, 1582–1592.

Gaibulloev, K. and Sandler, T. (2009). "The Impact of Terrorism and Conflicts on Growth in Asia". Economics and Politics 21(3), 359–383.

Gencay, R., Dacorogna, M., Muller, U., Pictet, O., and Olsen, R. (2001). *An Introduction to High Frequency Finance*. 1st ed. California: Academic Press.

Gong, F. (2009). *Global Anti-terrorism Law and Policy*. Oxford University Press.

Grossman S. and Stiglitz J. (1980). *On the Impossibility of Informationally Efficient Markets*. "The American Economic Review" 70(3), 393–408.

James K. Galbraith and Travis Hale (2004). "Income Distribution and the Information Technology Bubble". University of Texas Inequality Project Working Paper.

Jensen M. (1968). *The Performance of Mutual Funds in the Period 1945–1964*. "Journal of Finance" 23(2), 389–416.

Johnston, R.B. and Nedelescu, O.M. (2005). "The Impact of Terrorism on Financial Markets". N.Y.: IMF, 21–22.

Landes, W.M. (1978). *An Economic Study of US Aircraft Hijackings 1961–1976*, "Journal of Law and Economics" 21(1), 1–31.

Legaspi, A. (2014). "Global Terrorism Index: PHL 9th country most affected by terrorism in 2013", GMA NewsOnline.

Lenain, P., Bonturi, M., and Koen, V. (2002). *The Economic Consequencesof Terrorism* OECS Economics Department Working Papers, 334.

Line, K. (2015). "Terror and its Impact on FOREX" [online] Available at:http://www.bkass-etmanagement.com/featured/terror-and-its-impact-on-forex_8847/ [viewed 3rd Jan. 2017].

Lo A. (2004). *The Adaptive Markets Hypothesis: Market Efficiency from an Evolutionary Perspective*. "Journal of Portfolio Management" 30, 15–29.

Moody's Investors Service (2015). *Terrorism has a long-term negative effect on economic activity and the cost of the stateloan*.

Murphy, J. (2004). *Inter market analysis: principles of interaction of financial markets*.

Nitsch V. and Schumacher D. (2004). *Terrorism and International Investigation*. "European Journal of Political Economy" 20(2), 423–433.

Nordhaus, W.D. (2002). *The Economic Consequences of War with Iraq*. "The New York Review of Books", 49(19).

Palombi, S. and Gomis, B (2016). *Lone-Actor Terrorism*. The Royal Institute of Inernational Affairs.

Quillen, Chris (2002). *A Historical Analysis of Mass Casualty Bombers*. "Studies in Conflict & Terrorism", 25(5), 279–292.

Raby, G. (2003). "The Cost of Terrorism and the Benefits of Cooperating to Combat Terrorism". Secure Trades in the APEC Region (STAR)Conference.

Rhoades, D. and Reynolds, R. (2005). *The Effect of Line Maintenance Activity on Airline Safety Quality*. "Journal of Air Transportation", 10(1).

Robb, J. (2007). *Brave New War: The Next Stage of Terrorism and the End of Globalization*

Roberts H. (1967). *Statistical Versus Clinical Prediction of the Stock Market*.

Rockinger, M. and Urga, G. (2000). *The Evolution of Stock Markets in Transition Economies*. "Journal of Comparative Economics" 28, 456–472.

Rockinger, M. and Urga, G. (2001). *A Time Varying Parameter Model to Test for Predictability and Integration in Stock Markets of Transition Economies*. "Journal of Business of Economics andStatistics".

SamuelsonP.(1965).*Proof that Properly Anticipated Prices Fluctuate Randomly*. "Industrial Management Review" 6, 41–49.

Sandler, T. and Enders, W. (2004). *An Economic Perspective on Transnational Terrorism*."European Journal of Political Economy" 20(2), 301–316.

Schmid, A. (2016). *Links between Terrorism and Migration*. ICCT Research paper.

Sheffi, Y. (2001). *Supply Chain Management infers the Threat of International Terrorism*. "The International Journal of Logistics Management" 12, 1–11.

Shiller, R. (1981). *Do Stock Prices Move Too Much to Be Justified by Subsequent Changes in Dividends?* "American Economic Review" 71(3), 421–436.

Sunstein, C. R. (2003*). Terrorism and Probability Neglect*. "The Journal of Risk and Uncertainty" 26, 126–136.

Zalewska-Mitura, A. and Hall, S.G. (1999). *Examining the First Stages of Market Performance. A Tests for Evolving Market Efficiency*. "Economics Letters" 64, 1–12.

Zicher , B. (1972). *Trouble with terrorism*. "Economist" 244, 42.

Appendix

APPENDIX 1. Car Estimation Results for American for American Airlines Group (AAL)

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	ttest	CAR	ttest
30 oct 2013	0.0467769	0.7264093	0.0467769	0.8162056	0.0467769	0.8291003		
31 oct 2013	0.0440667	0.6843219	0.0440667	0.7689154	0.0440667	0.781063	-0.0027102	-0.1281556
01 nov 2013	0.0294073	0.4566725	0.0294073	0.5131248	0.0294073	0.5212312	-0.0173696	-0.8213441
04 nov 2013	0.0178779	0.2776301	0.0178779	0.3119498			-0.028899	-1.366525
05 nov 2013	-0.0103252	-0.1603421					-0.0571021	-2.700143

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	0.0081264	0.275357	0.0081264	0.3352087	0.0081264	0.3475588		
17 feb 2010	0.0054677	0.1852678	0.0054677	0.2255377	0.0054677	0.2338472	-0.0026587	-0.1420887
18 feb 2010	-0.0132333	-0.4483991	-0.0132333	-0.5458633	-0.0132333	-0.5659747	-0.0213597	-1.141508
19 feb 2010	-0.0277325	-0.9396914	-0.0277325	-1.143943			-0.0358589	-1.916375
22 feb 2010	-0.0525539	-1.780745					-0.0606803	-3.242884

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	-0.046958	-0.4844079	-0.046958	-0.4777723	-0.046958	-0.4705666		
24 dec 2009	-0.0208657	-0.2152461	-0.0208657	-0.2122975	-0.0208657	-0.2090957	0.730502	1.406158
28 dec 2009	0.0054891	0.0566241	0.0054891	0.0558484	0.0054891	0.0550061	0.099405	1.913467
29 dec 2009	0.221885	0.2288919	0.221885	0.2257565			0.1161045	2.234917
30 dec 2009	0.232044	0.2393717					0.1171204	2.254472

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0027102	-0.2525317	-0.0027102	-0.2268109					
-0.0173696	-1.618465	-0.0173696	-1.453622	-0.0146594	-0.9550151	-0.0146594	-4.683468	-0.0146594
-0.028899	-2.691749			-0.0261888	-1.706118	-0.0261888	-8.366935	
				-0.0543919	-3.543461			

-0.0026587	-0.1845271	-0.0026587	-0.1657338					
-0.0213597	-1.482448	-0.0213597	-1.331468	-0.018701	-2.080042	-0.018701	-4.4507	-0.018701
-0.0358589	-2.488748			-0.0332001	-3.692733	-0.0332001	-7.9014	
				-0.0580216	-6.453531			

0.730502	1.547387	0.730502	6.22039					
0.099405	2.105648	0.099405	8.464561	0.0263548	0.7257101	0.0263548	0.7319473	0.0263548
0.1161045	2.459384			0.0430542	1.185549	0.0430542	1.195738	
				0.0440701	1.213523			

vent, and b stands for the number of days after the event.

APPENDIX 2. Car Estimation Results for Air Transport Serivices Group (ATSG).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	t test
30 oct 2013	0.0651674	0.6268826	0.0651674	0.6254561	0.0651674	0.6341345		
31 oct 2013	0.0765632	0.7365051	0.0765632	0.7348291	0.0765632	0.7450252	0.0113958	0.1374849
01 nov 2013	0.0232353	0.223514	0.0232353	0.2230053	0.0232353	0.2260996	-0.419321	-0.505892
04 nov 2013	0.0693019	0.6666542	0.0693019	0.6651372			0.0041344	0.0498802
05 nov 2013	0.0615445	0.5920321					-0.0036229	-0.0437083

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	0.0447281	0.6264299	0.0447281	0.6397466	0.0447281	0.6058034		
17 feb 2010	0.0474485	0.6645299	0.0474485	0.6786565	0.0474485	0.6426489	0.0027204	0.0606263
18 feb 2010	0.0069249	0.0969857	0.0069249	0.0990474	0.0069249	0.0937923	-0.0378031	-0.8424731
19 feb 2010	0.0157589	0.2207083	0.0157589	0.2254002			-0.0289692	-0.6456007
22 feb 2010	-0.003007	-0.0421132					-0.047735	-1.063813

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	-0.0160623	-0.2116394	-0.0160623	-0.2291855	-0.0160623	-0.3119326		
24 dec 2009	0.0040109	0.052848	0.0040109	0.0572294	0.0040109	0.077892	0.0200732	0.2646963
28 dec 2009	-0.0291367	-0.383909	-0.0291367	-0.415737	-0.0291367	-0.5658384	-0.0130743	-0.1724055
29 dec 2009	0.0033189	0.0437303	0.0033189	0.0473558			0.0193812	0.2555714
30 dec 2009	0.0167122	0.2202018					0.0327745	0.4321823

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0113958	0.1304166	0.0113958	0.1760682					
-0.419321	-0.4798832	-0.419321	-0.6478636	-0.0533279	-0.6188183	-0.0533279	-0.5365278	-0.0533279
0.0041344	0.0473158			-0.0072613	-0.0842607	-0.0072613	-0.0730557	
				-0.0150186	-0.1742769			

0.0027204	0.0583746	0.0027204	0.0629083					
-0.0378031	-0.811832	-0.0378031	-0.8741835	-0.0405235	-0.9458268	-0.0405235	-0.8210205	-0.0405235
-0.0289692	-0.6216227			-0.0316896	-0.73964	-0.0316896	-0.642041	
				-0.0504554	-1.177639			

0.0200732	0.294141	0.0200732	0.3723773					
-0.0130743	-0.1915838	-0.0130743	-0.2425417	-0.0532208	-0.7556931			-0.0532208
0.0193812	0.284001			-0.0207652	-0.2948495			
				-0.0073719	-0.1046757			

vent, and b stands for the number of days after the event.

APPENDIX 3. Car EstimationResults for AllegiantTravel Company (ALGT).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	t test
30 oct 2013	0.0206156	0.5228521	0.0206156	0.6097592	0.0206156	0.7727913		
31 oct 2013	0.0106658	0.2705059	0.0106658	0.3154687	0.0106658	0.3998159	-0.0099498	-0.2947259
01 nov 2013	0.0126867	0.32176	0.0126867	0.3752421	0.0126867	0.475571	-0.0079289	-0.2348641
04 nov 2013	-0.0056786	-0.1440195	-0.0056786	-0.1679581			-0.0262941	-0.7788678
05 nov 2013	0.0148795	0.3773748					-0.005736	-0.1699092

16 feb 2010	0.0207834	0.7443479	0.0207834	0.7417239	0.0207834	0.8323371		
17 feb 2010	0.0160493	0.5747986	0.0160493	0.5727723	0.0160493	0.6427454	-0.0047341	-0.2122089
18 feb 2010	0.012449	0.4458539	0.012449	0.4442821	0.012449	0.4985582	-0.0083344	-0.3735969
19 feb 2010	0.0317948	1.138715	0.0317948	1.134701			0.0110114	0.4935918
22 feb 2010	0.0331446	1.187057					0.0123612	0.5540966

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0099498	-0.5607344	-0.0099498	-0.8311791					
-0.0079289	-0.4468436	-0.0079289	-0.6623582	0.0020209	0.0599295	0.0020209	0.099131	0.0020209
-0.0262941	-1.481845			-0.0163443	-0.4846896	-0.0163443	-0.801738	
				0.0042137	0.1249579			

-0.0047341	-0.2011639	-0.0047341	-4.175612					
-0.0083344	-0.3541519	-0.0083344	-7.351225	-0.0036003	-0.1721406	-0.0036003	-0.1569041	-0.0036003
0.0110114	0.4679014			0.0157455	0.7528257	0.0157455	0.6861917	
				0.0170952	0.8173618			

vent, and b stands for the number of days after the event.

APPENDIX 4. Car Estimation Results for Atlas Air Worldwide Holdings (AAWW).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	t test
30 oct 2013	0.083379	0.8373438	0.083379	0.883895	0.083379	0.8766621		
31 oct 2013	0.0748775	0.7519663	0.0748775	0.793771	0.0748775	0.7872757	-0.0085015	-0.4991479
01 nov 2013	0.0602171	0.6047377	0.0602171	0.6383574	0.0602171	0.6331338	-0.0231619	-1.3599
04 nov 2013	0.0510037	0.512211	0.0510037	0.5406868			-0.0323753	-1.900845
05 nov 2013	0.024093	0.241957					-0.059286	-3.480849

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	0.0113274	0.3275705	0.0113274	0.4109524	0.0113274	0.4246381		
17 feb 2010	0.0339963	0.9831228	0.0339963	1.233373	0.0339963	1.274448	0.0226689	0.6788931
18 feb 2010	0.0261932	0.7574704	0.0261932	0.9502818	0.0261932	0.9819285	0.0148659	0.4452064
19 feb 2010	0.023644	0.6837485	0.023644	0.8577342			0.0123166	0.3688596
22 feb 2010	0.0075663	0.2188076					-0.003761	-0.1126353

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	0.0316091	0.8320891	0.0316091	0.8745759	0.0316091	1.036453		
24 dec 2009	0.0293322	0.7721496	0.0293322	0.8115758	0.0293322	0.9617923	-0.002277	-0.0725239
28 dec 2009	0.015486	0.4076572	0.015486	0.4284723	0.015486	0.5077793	-0.0161232	-0.5135412
29 dec 2009	0.0202305	0.532555	0.0202305	0.5597475			-0.0113786	-0.3624212
30 dec 2009	0.0259461	0.6830124					-0.0056631	-0.1803753

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0085015	-1.45684	-0.0085015	-1.380369					
-0.0231619	-3.969079	-0.0231619	-3.760738	-0.146604	-0.9338247	-0.146604	-2.691467	-0.0146604
-0.0323753	-5.547909			-0.0238738	-1.520692	-0.0238738	-4.382934	
				-0.0507845	-3.234828			

CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0226689	0.8034533	0.0226689	0.7439274					
0.0148659	0.5268908	0.0148659	0.4878547	-0.007803	-0.6605568	-0.007803	-1.485234	-0.007803
0.0123166	0.4365363			-0.0103523	-0.8763644	-0.0103523	-1.970469	
				-0.0264299	-2.237395			

CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.002277	-0.0732017	-0.002277	-0.2122093					
-0.0161232	-0.5183407	-0.0161232	-1.502653	-0.0115693	-0.3609894	-0.0115693	-0.3593314	-0.0115693
-0.0113786	-0.3658083			-0.0068247	-0.2129468	-0.0068247	-0.2119687	
				-0.0011091	-0.0346081			

vent, and b stands for the number of days after the event.

APPENDIX 5. Car Estimation Results for Hawaiian Holdings (HA).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
30 oct 2013	0.0388122	0.8048779	0.0388122	0.9544252	0.0388122	0.9830385		
31 oct 2013	0.0340244	0.7055908	0.0340244	0.8366905	0.0340244	0.8617742	-0.0047877	-0.2385739
01 nov 2013	0.0394997	0.819135	0.0394997	0.9713314	0.0394997	0.9713314	0.0006875	0.0342583
04 nov 2013	0.0362934	0.7526448	0.0362934	0.8924872			-0.0025187	-0.1255092
05 nov 2013	0.0175288	0.3635073					-0.0212834	-1.060557

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	-0.0155602	-0.7277535	-0.0155602	-1.078186	-0.0155602	-1.029535		
17 feb 2010	-0.0428445	-2.003843	-0.0428445	-2.968745	-0.0428445	-2.834788	-0.0272843	-1.236172
18 feb 2010	-0.0530714	-2.482153	-0.0530714	-3.677374	-0.0530714	-3.511441	-0.0375111	-1.69952
19 feb 2010	-0.0730491	-3.416512	-0.0730491	-5.061651			-0.0574888	-2.604651
22 feb 2010	-0.0751282	-3.513753					-0.059568	-2.698851

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	-0.0038557	-0.0906148	-0.0038557	-0.089371	-0.0038557	-0.1058105		
24 dec 2009	0.0487803	1.146425	0.0487803	1.130688	0.0487803	1.338675	0.052636	1.439938
28 dec 2009	0.042739	1.004444	0.042739	0.9906563	0.042739	1.172884	0.0465947	1.27467
29 dec 2009	0.0942975	2.21616	0.0942975	2.18574			0.0981532	2.685131
30 dec 2009	0.1164062	2.735755					0.1202619	3.28995

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
02 jul 2002	-0.0494042	-0.7283161	-0.0494042	-0.7283161	-0.0494042	-1.004819		
03 jul 2002	-0.0478732	-0.7057463	-0.0478732	-0.7057463	-0.0478732	-0.9736809	0.001531	0.045936
05 jul 2002	-0.050093	-0.7384692	-0.050093	-0.7384692	-0.050093	-1.018827	-0.0006887	-0.0206646
08 jul 2002	-0.0172672	-0.2545531	-0.0172672	-0.2545531			0.032137	0.9642426

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
20 dec 2001	-0.3230501	-1.537824	-0.3230501	-1.718377	-0.3230501	-1.931503		
21 dec 2001	-0.3356487	-1.597798	-0.3356487	-1.785393	-0.3356487	-2.00683	-0.0125987	-0.1441139
24 dec 2001	-0.4640882	-2.209211	-0.4640882	-2.468591	-0.4640882	-2.774764	-0.1410381	-1.613311
26 dec 2001	-0.476295	-2.26732	-0.476295	-2.533522			-0.1532449	-1.752942
27 dec 2001	-0.4391958	-2.090715					-0.1161457	-1.32857

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0047877	-0.5002478	-0.0047877	-0.4665058					
0.0006875	0.0718336	0.0006875	0.0669884	0.0054752	0.2573902	0.0054752	0.6306805	0.0054752
-0.0025187	-0.2631709			0.002269	0.1066654	0.002269	0.261361	
				-0.0164957	-0.7754599			

-0.0272843	-1.840712	-0.0272843	-1.599552					
-0.0375111	-2.53066	-0.0375111	-2.199103	-0.0102268	-0.6588894	-0.0102268	-1.048813	-0.0102268
-0.0574888	-3.87844			-0.0302045	-1.946003	-0.0302045	-3.097626	
				-0.0322837	-2.079956			

0.052636	1.431308	0.052636	1.553723					
0.0465947	1.26703	0.0465947	1.375395	-0.0060413	-0.1914743	-0.0060413	-0.1816639	-0.0060413
0.0981532	2.669037			0.0455172	1.442638	0.0455172	1.368723	
				0.0676259	2.143361			

0.001531	0.045936	0.001531	0.4081874					
-0.0006887	-0.0206646	-0.0006887	-0.1836252	-0.0022197	-0.0633382			-0.0022197
0.032137	0.9642426			0.030606	0.8733236			

-0.0125987	-0.2037082	-0.0125987	-0.2407401					
-0.1410381	-2.280451	-0.1410381	-2.695011	-0.1158408	-1.284537	-0.1158408	-1.936065	-0.1158408
-0.1532449	-2.477823			-0.1280476	-1.419896	-0.1280476	-2.140079	
				-0.0909483	-1.00851			

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
07 sep 2001	0.004203	0.0131581	0.004203	0.0140146	0.004203	0.0141054		
10 sep 2001	0.3650262	1.142766	0.3650262	1.217149	0.3650262	1.225033	0.3608232	1.133373
17 sep 2001	0.5121363	1.603315	0.5121363	1.707675	0.5121363	1.718737	0.5079333	1.595457
18 sep 2001	0.4653882	1.456963	0.4653882	1.551798			0.4611852	1.448617
19 sep 2001	0.4302306	1.346897					0.4260275	1.338185
10 dec 1999	-0.1259819	-2.188435	-0.1259819	-2.188003	-0.1259819	-13.1127		
13 dec 1999	-0.2229204	-3.872357	-0.2229204	-3.871592	-0.2229204	-23.20244	-0.0969385	-1.78292
14 dec 1999	-0.3604965	-6.262197	-0.3604965	-6.26096	-0.3604965	-37.52192	-0.2345147	-4.313259
15 dec 1999	-0.3553821	-6.173353	-0.3553821	-6.172311			-0.2294002	-4.219193
16 dec 1999	-0.4049754	-7.03484					-0.2789935	-5.131327

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.3608232	1.229092	0.3608232	1.258424					
0.5079333	1.730201	0.5079333	1.771492	-0.0333015	-0.4655972	-0.0333015	-0.5741864	-0.0333015
0.4611852	1.57096			-0.0800496	-1.119195	-0.0800496	-1.38022	
				-0.1152072	-1.610743			
-0.0969385	-1.807109	-0.0969385	-10.69181					
-0.2345147	-4.371777	-0.2345147	-25.86574	-0.1052633	-2.228559	-0.1052633	-2.48478	-0.1052633
-0.2294002	-4.276434			-0.1001489	-2.1202879	-0.1001489	-2.364052	
				-0.1497422	-3.170232			

vent, and b stands for the number of days after the event.

APPENDIX 6. Car Esitmation Results for Jetblue AirwaysCorporation (JBLU).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	ttest
30 oct 2013	0.0270868	0.4305192	0.0270868	0.5024893	0.0270868	0.4749754		
31 oct 2013	0.0135547	0.2154396	0.0135547	0.2514548	0.0135547	0.2376863	-0.0135321	-0.3648959
01 nov 2013	-0.0245539	0.3902608	-0.0245539	-0.4555009	-0.0245539	0.4305598	-0.0516407	-1.392505
04 nov 2013	-0.0288713	-0.4588817	-0.0288713	-0.5355932			-0.0559581	-1.508924
05 nov 2013	-0.0712222	-1.13201					-0.098309	-2.650928

16 feb 2010	0.0081025	0.3114255	0.0081025	0.3083824	0.0081025	0.3355586		
17 feb 2010	0.0079322	0.3048765	0.0079322	0.3018975	0.0079322	0.3285022	-0.0001704	-0.0067913
18 feb 2010	-0.0111608	-0.4289714	-0.0111608	-0.4247797	-0.0111608	-0.4622134	-0.0192634	-0.7677972
19 feb 2010	-0.0017634	-0.0677764	-0.0017634	-0.0671141			-0.0098659	-0.3932352
22 feb 2010	0.0032475	0.1248184					-0.0048551	-0.193513

23 dec 2009	0.0125227	0.7089998	0.0125227	0.6992584	0.0125227	0.6949756		
24 dec 2009	0.0325937	1.845361	0.0325937	1.820006	0.0325937	1.808859	0.0075483	0.6122957
28 dec 2009	0.0286789	1.623713	0.0286789	1.601403	0.0286789	1.591595	0.0036334	0.2947325
29 dec 2009	0.0381978	2.16265	0.0381978	2.132936			0.0131524	1.066888
30 dec 2009	0.0483403	2.736887					0.0232949	1.889619

02 jul 2002	0.0153306	0.1675061	0.0153306	0.1675061	0.0153306	0.1604608		
03 jul 2002	-0.0460546	-0.5032034	-0.0460546	-0.5032034	-0.0460546	-0.4820388	-0.0613852	-0.6412895
05 jul 2002	-0.0004223	-0.004614	-0.0004223	-0.004614	-0.0004223	-0.0044199	-0.0157529	-0.1645702
08 jul 2002	0.0156398	0.1708838	0.0156398	0.1708838			0.0003091	0.0032296

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0135321	-0.4472633	-0.0135321	-0.5506095					
-0.0516407	-1.706833	-0.0516407	-2.101219	-0.0381086	-1.055646	-0.0381086	-1.127767	-0.0381086
-0.0559581	-1.849531			-0.042426	-1.175242	-0.042426	-1.255533	
				-0.0847769	-2.348403			

-0.0001704	-0.0067849	-0.0001704	-0.0090044					
-0.0192634	-0.7670718	-0.0192634	-1.018009	-0.019093	-0.7185888	-0.019093	-0.6701545	-0.019093
-0.0098659	-0.3928637			-0.0096955	-0.3649042	-0.0096955	-0.340309	
				-0.0046847	-0.1763142			

0.0075483	0.6276021	0.0075483	0.8501751					
0.0036334	0.3021003	0.0036334	0.4092373	-0.0039149	-0.3122465	-0.0039149	-0.3188898	-0.0039149
0.0131524	1.093559			0.0056041	0.4469818	0.0056041	0.45664916	
				0.0157466	1.255938			

-0.0613852	-0.6412895	-0.0613852	-0.5735997					
-0.0157529	-0.1645702	-0.0157529	-0.1471994	0.0456323	1.543183			0.0456323
0.0003091	0.0032296			0.0616944	2.086366			

vent, and b stands for the number of days after the event.

APPENDIX 7. Car EstimationResults for Republic Airways Holdings (RJET).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	ttest
30 oct 2013	0.0017968	0.0275476	0.0017968	0.0297491	0.0017968	0.0351492		
31 oct 2013	0.0202074	0.3098101	0.0202074	0.3345683	0.0202074	0.3952996	0.0184106	0.2744246
01 nov 2013	-0.0187415	-0.2873357	-0.0187415	-0.3102979	-0.0187415	-0.3666237	-0.0205383	-0.3061397
04 nov 2013	0.0114139	0.1749931	0.0114139	0.1889776			0.0096171	0.1433513
05 nov 2013	-0.0146175	-0.2241096					-0.0164143	-0.2446692

16 feb 2010	0.0032331	0.0635273	0.0032331	0.06179	0.0032331	0.0658353		
17 feb 2010	-0.0137444	-0.2700666	-0.0137444	-0.2626809	-0.0137444	-0.2798782	-0.0169775	-0.3230013
18 feb 2010	0.025267	0.4964744	0.025267	0.4828972	0.025267	0.5145116	0.0220339	0.4191997
19 feb 2010	0.0093157	0.183045	0.0093157	0.1780392			0.0060826	0.1157226
22 feb 2010	0.0164837	0.3238904					0.0132506	0.2520957

23 dec 2009	0.0180873	0.1970755	0.0180873	0.2163901	0.0180873	1.147261		
24 dec 2009	0.0618801	0.6742334	0.0618801	0.7403142	0.0618801	3.925002	0.0437928	0.485176
28 dec 2009	0.1040365	1.133561	0.1040365	1.24466	0.1040365	6.598947	0.0859492	0.9522224
29 dec 2009	0.0132168	0.1440081	0.0132168	0.1581222			-0.0048704	-0.0539592
30 dec 2009	-0.0154174	-0.1679854					-0.0335047	-0.3711953

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0184106	0.2874645	0.0184106	0.3209686					
-0.0205383	-0.3206866	-0.0205383	-0.3580628	-0.0389488	-0.6120514	-0.0389488	-0.5636244	-0.0389488
0.0096171	0.1501629			-0.0087934	-0.1381821	-0.0087934	-0.1272488	
				-0.0348249	-0.5472471			

-0.0169775	-0.3059954	-0.0169775	-0.30323					
0.0220339	0.397129	0.0220339	0.39354	0.0390114	0.816163	0.0390114	0.7097796	0.0390114
0.0060826	0.1096299			0.0230601	0.4824437	0.0230601	0.4195592	
				0.0302281	0.6324068			

0.0437928	0.5175007	0.0437928	46.35235					
0.0859492	1.015664	0.0859492	90.97264	0.0421564	0.556488	0.0421564	0.5490991	0.0421564
-0.0048704	-0.0575542			-0.0486633	-0.642382	-0.0486633	-0.6338527	
				-0.0772975	-1.02037			

vent, and b stands for the number of days after the event.

APPENDIX 8. Car Estimation Results for Skywest, Inc. (SKYW).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
30 oct 2013	0.0206197	0.3041998	0.0206197	0.3318105	0.0206197	0.5292894		
31 oct 2013	0.0234616	0.3461265	0.0234616	0.3775427	0.0234616	0.6022394	0.0028419	0.0594086
01 nov 2013	-0.0005935	-0.0087562	-0.0005935	-0.009551	-0.0005935	-0.0152353	-0.0212132	-0.4434468
04 nov 2013	-0.0509183	-0.7511911	-0.0509183	-0.8193731			-0.071538	-1.495449
05 nov 2013	-0.09486	-1.399458					-0.1154797	-2.414018

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	-0.0137051	-0.63621	-0.0137051	-0.6160208	-0.0137051	-1.056897		
17 feb 2010	-0.0335337	-1.556687	-0.0335337	-1.507288	-0.0335337	-2.586031	-0.0198286	-0.9415526
18 feb 2010	-0.0384673	-1.785713	-0.0384673	-1.729046	-0.0384673	-2.966497	-0.0247623	-1.175822
19 feb 2010	-0.0327023	-1.51809	-0.0327023	-1.469916			-0.0189972	-0.9020723
22 feb 2010	-0.0407373	-1.891089					-0.0270322	-1.283611

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	-0.0020881	-0.115327	-0.0020881	-0.1140002	-0.0020881	-0.1112892		
24 dec 2009	0.0286094	1.580089	0.0286094	1.561911	0.0286094	1.524768	0.0306975	3.762768
28 dec 2009	0.0515142	2.845116	0.0515142	2.812384	0.0515142	2.745503	0.0536023	6.570338
29 dec 2009	0.0597422	3.299548	0.0597422	3.261588			0.0618303	7.578895
30 dec 2009	0.0774282	4.276344					0.0795164	9.746774

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
02 jul 2002	0.037453	0.9186803	0.037453	0.9186803	0.037453	0.8661935		
03 jul 2002	0.047606	1.167721	0.047606	1.167721	0.047606	1.101006	0.010153	0.4295601
05 jul 2002	0.0352067	0.8635793	0.0352067	0.8635793	0.0352067	0.8142406	-0.0022464	-0.0950412
08 jul 2002	0.0473949	1.162543	0.0473949	1.162543			0.0099419	0.4206274

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
20 dec 2001	-0.0074655	-0.0986167	-0.0074655	-0.109525	-0.0074655	-0.1128113		
21 dec 2001	0.0410733	0.5425659	0.0410733	0.602581	0.0410733	0.620661	0.0560043	0.7283937
24 dec 2001	-0.0230927	-0.3050475	-0.0230927	-0.3387898	-0.0230927	-0.348955	-0.0081617	-0.1061518
26 dec 2001	-0.0435923	-0.5758404	-0.0435923	-0.639536			-0.0286613	-0.3727699
27 dec 2001	-0.0380844	-0.5030833					-0.0231534	-0.3011345

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0028419	0.0617212	0.0028419	0.1056597					
-0.0212132	-0.4607085	-0.0212132	-0.7886806	-0.0240552	-1.013664	-0.0240552	-0.9157034	-0.0240552
-0.071538	-1.553661			-0.0743799	-3.134308	-0.0743799	-2.831407	
				-0.1183216	-4.985976			

-0.0198286	-0.8906198	-0.0198286	-1.331225					
-0.0247623	-1.112217	-0.0247623	-1.662449	-0.0049336	-0.3934178	-0.0049336	-0.4611429	-0.0049336
-0.0189972	-0.8532751			0.0008314	0.0663009	0.0008314	0.0777142	
				-0.0072036	-0.5744319			

0.0306975	3.929567	0.0306975	6.822995					
0.0536023	6.861594	0.0536023	11.91394	0.0229048	6.424819	0.0229048	6.151947	0.0229048
0.0618303	7.914858			0.0311328	8.73279	0.0311328	8.361896	
				0.0488189	13.69374			

0.010153	0.4295601	0.010153	0.4501964	-0.0002111	-0.0085869			
-0.0022464	-0.0950412	-0.0022464	-0.0996071	-0.0123994	-0.5042934			-0.0123994
0.0099419	0.4206274							

0.0560043		0.0560043						
-0.0081617	-0.1168654	-0.0081617	-0.1176376	-0.064166	-1.190943	-0.064166	-4.797311	
-0.0286613	-0.4103924			-0.0846656	-1.571422	-0.0846656	-6.329942	
	0.8019082		0.8072066	-0.0791577	-1.469194			

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
07 sep 2001	-0.00576	-0.0155844	-0.00576	-0.0193644	-0.00576	-0.0190688		
10 sep 2001	0.4250743	1.150085	0.4250743	1.429037	0.4250743	1.407219	0.4423544	1.595175
17 sep 2001	0.7738581	2.093757	0.7738581	2.601597	0.7738581	2.561877	0.7911382	2.852925
18 sep 2001	1.116267	3.020183	1.116267	3.752727			1.133548	4.087688
19 sep 2001	1.629011	4.407465					1.646291	5.936693

10 dec 1999	0.0220163	0.2668364	0.0220163	0.3537077	0.0220163	0.7022446		
13 dec 1999	0.0915231	1.109256	0.0915231	1.470386	0.0915231	2.919276	0.003458	0.0580316
14 dec 1999	0.1255049	1.521115	0.1255049	2.016329	0.1255049	4.003181	0.0374398	0.6283105
15 dec 1999	0.1057908	1.28218	0.1057908	1.699607			0.0177257	0.2974702
16 dec 1999	0.0197988	0.2399612					-0.0682663	-1.145637

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

APPENDIX 9. Car Estimation Results for Spirit Airlines, Inc. (SAVE).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
30 oct 2013	-0.0033105	-0.1058821	-0.0033105	-0.107026	-0.0033105	-0.1036508		
31 oct 2013	0.0106391	0.340275	0.0106391	0.3439513	0.0106391	0.3331045	0.0139496	0.4321846
01 nov 2013	-0.0122668	-0.3923365	-0.0122668	-0.3965753	-0.0122668	-0.3840689	-0.0089563	-0.2774835
04 nov 2013	-0.0234282	-0.749317	-0.0234282	-0.7574127			-0.0201177	-0.6232843
05 nov 2013	-0.0203083	-0.649533					-0.0169978	-0.5266253

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.4423544	2.033223	0.4423544	2.095084					
0.7911382	3.636362	0.7911382	3.746998	0.1276066	0.5402728	0.1276066	3.272357	0.1276066
1.133548	5.210201			0.470016	1.989998	0.470016	12.05314	
				0.9827591	4.160897			

0.003458	0.0806213	0.003458	0.3242191					
0.0374398	0.8728902	0.0374398	3.510335	0.0328292	0.5998117	0.0328292	0.7776984	0.0328292
0.0177257	0.4132651			0.013115	0.2396207	0.013115	0.3106858	
				-0.0728769	-1.331513			

vent, and b stands for the number of days after the event.

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0139496	0.4277705	0.0139496	0.3784942					
-0.0089563	-0.2746494	-0.0089563	-0.2430116	-0.0229059	-1.014675	-0.0229059	-1.950349	-0.0229059
-0.0201177	-0.6169184			-0.0340672	-1.509097	-0.0340672	-2.900698	
				-0.0309474	-1.370895			

vent, and b stands for the number of days after the event.

APPENDIX 10. Car Estimation Resultsfor Alaska Air Group (ALK).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	ttest
30 oct 2013	-0.0052993	-0.5387859	-0.0052993	-0.6236597	-0.0052993	-0.8995355		
31 oct 2013	-0.0170884	-1.737391	-0.0170884	-2.011078	-0.0170884	-2.900679	-0.0117891	-1.205404
01 nov 2013	-0.0238667	-2.426553	-0.0238667	-2.808802	-0.0238667	-4.051275	-0.0185674	-1.898475
04 nov 2013	-0.0253918	-2.581608	-0.0253918	-2.988283			-0.0200925	-2.05441
05 nov 2013	-0.0371297	-3.775011					-0.318304	-3.254583

16 feb 2010	-0.0070044	-0.1182069	-0.0070044	-0.1216287	-0.0070044	-0.2220155		
17 feb 2010	-0.0495146	-0.830911	-0.0495146	-0.8549639	-0.0495146	-1.560612	-0.0424706	-0.6903759
18 feb 2010	-0.066187	-1.110693	-0.066187	-1.142844	-0.066187	-2.086096	-0.059143	-0.961392
19 feb 2010	-0.0386583	-0.6487305	-0.0386583	-0.6675096			-0.0316143	-0.5139028
22 feb 2010	-0.028158	-0.4725232					-0.021114	-0.3432159

23 dec 2009	-0.0005262	-0.0225915	-0.0005262	-0.033682	-0.0005262	-0.0330491		
24 dec 2009	0.0092739	0.3981949	0.0092739	0.5936747	0.0092739	0.5825186	0.0103262	0.4674389
28 dec 2009	0.0161286	0.6925212	0.0161286	1.03249	0.0161286	1.013088	0.0171809	0.7777374
29 dec 2009	0.0143976	0.6181958	0.0143976	0.9216774			0.0154499	0.6993787
30 dec 2009	0.0292992	1.25803					0.0303515	1.373935

02 jul 2002	-0.0180959	-0.637047	-0.0180959	-0.637047	-0.0180959	-0.631013		
03 jul 2002	-0.0119919	-0.4221635	-0.0119919	-0.4221635	-0.0119919	-0.4181649	0.0061039	0.3187404
05 jul 2002	0.001587	0.055868	0.001587	0.055868	0.001587	0.0553388	0.0196828	1.027813
08 jul 2002	-0.0065945	-0.2321527	-0.0065945	-0.2321527			0.0115014	0.600587

20 dec 2001	-0.0307611	-0.4262823	-0.0307611	-0.4238608	-0.0307611	-0.4590108		
21 dec 2001	-0.027216	-0.3771548	-0.027216	-0.3750123	-0.027216	-0.4061114	0.0343062	0.6284375
24 dec 2001	-0.0010785	-0.0149454	-0.0010785	-0.0148605	-0.0010785	-0.0160928	0.0604437	1.107237
26 dec 2001	0.0052087	0.0721817	0.0052087	0.0717717			0.0667309	1.222409
27 dec 2001	-0.0212286	-0.2941822					0.0402936	0.07381179

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0117891	-1.326148	-0.0117891	-2.352774					
-0.0185674	-2.088642	-0.0185674	-3.705548	-0.0067784	-0.7662801	-0.0067784	-1.290308	-0.0067784
-0.0200925	-2.260197			-0.0083034	-0.9386862	-0.0083034	-1.580615	
				-0.0200413	-2.265634			

-0.0424706	-0.6926568	-0.0424706	-1.646262					
-0.059143	-0.9645684	-0.059143	-2.292523	-0.0166724	-0.4317726	-0.0166724	-0.3771943	-0.0166724
-0.0316143	-0.5156007			0.0108563	0.2811501	0.0108563	0.2456114	
				0.0213566	0.553082			

0.0103262	0.6680705	0.0103262	0.6481386					
0.0171809	1.111554	0.0171809	1.078391	-0.0034714	-0.164998	-0.0034714	-0.6924477	-0.0034714
0.0154499	0.9995623			-0.0052024	-0.247275	-0.0052024	-1.03774	
				0.0096992	0.4610116			

0.0061039	0.3187404	0.0061039	0.8165876					
0.0196828	1.027813	0.0196828	2.633175	0.0135789	0.6240196	0.0135789	0.6240196	0.0135789
0.0115014	0.600587			0.0053974	0.2480391	0.0053974	0.2480391	

0.0343062	0.6424023	0.0343062	3.306847					
0.0604437	1.131841	0.0604437	5.826296	0.0261375	0.499488	0.0261375	0.4922119	0.0261375
0.0667309	1.249573			0.0324247	0.6196365	0.0324247	0.6106101	
				0.0059874	0.1144195			

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	ttest
07 sep 2001	-0.0089057	-0.0210268	-0.0089057	-0.0209427	-0.0089057	-0.0216925		
10 sep 2001	-0.7869369	-1.858002	-0.7869369	-1.850567	-0.7869369	-1.916824	-0.7602198	-1.809992
17 sep 2001	-0.7024161	-1.658444	-0.7024161	-1.651807	-0.7024161	-1.710948	-0.6756991	-1.608758
18 sep 2001	-0.6276751	-1.481976	-0.6276751	-1.476045			-0.6009581	-1.430809
19 sep 2001	-0.6887748	-1.626236					-0.6620578	-1.57628

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
10 dec 1999	0.0190068	0.4463099	0.0190068	0.6184575	0.0190068	0.6532101		
13 dec 1999	0.0942356	2.2128	0.0942356	3.066305	0.0942356	3.238608	0.0182083	0.4369327
14 dec 1999	0.1535454	3.605488	0.1535454	4.996171	0.1535454	5.276918	0.0775182	1.860151
15 dec 1999	0.1688834	3.965648	0.1688834	5.495251			0.0928561	2.228207
16 dec 1999	0.2930346	6.880913					0.2170073	5.207379

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

APPENDIX 11. Car Estimation Results for Delta Airlines, Inc. (DAL).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	t test	CAR	t test	CAR	ttest
30 oct 2013	0.0077553	1.928533	0.0077553	0.2459964	0.0077553	0.2477618		
31 oct 2013	-0.0010001	-0.0248702	-0.0010001	-0.0317235	-0.0010001	-0.0319512	-0.0087554	-0.2207136
01 nov 2013	-0.0293449	-0.7297274	-0.0293449	-0.9308129	-0.0293449	-0.9374928	-0.0371002	-0.9352509
04 nov 2013	-0.028037	-0.6972035	-0.028037	-0.8893266			-0.0357923	-0.9022803
05 nov 2013	-0.0088671	-0.2204995					-0.0166224	-0.4190296

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	-0.0206018	-0.9579507	-0.0206018	-0.9459478	-0.0206018	-0.8996957		
17 feb 2010	-0.0165661	-0.7702974	-0.0165661	-0.7606458	-0.0165661	-0.7234541	0.0040357	0.7222903
18 feb 2010	-0.0165369	-0.7689419	-0.0165369	-0.7593073	-0.0165369	-0.722181	0.0040648	0.727508
19 feb 2010	-0.019179	-0.8917924	-0.019179	-0.8806185			0.0014228	0.2546475
22 feb 2010	-0.0197508	-0.9183793					0.000851	0.1523129

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.7602198	-1.80187	-0.7602198	-1.916461					
-0.6756991	-1.601539	-0.6756991	-1.70339	0.0845208	0.9904747	0.0845208	2.004168	0.0845208
-0.6009581	-1.424389			0.1592618	1.866342	0.1592618	3.776435	
				0.0981621	1.150333			

0.0182083	0.7250145	0.0182083	0.7234877					
0.0775182	3.086601	0.0775182	3.0801	0.0046849	0.1153147	0.0046849	0.5817595	0.0046849
0.0928561	3.697325			0.0200229	0.4928462	0.0200229	2.486395	
				0.1441741	3.548719			

vent, and b stands for the number of days after the event.

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0087554	-0.3352264	-0.0087554	-0.4469481					
-0.0371002	-1.420487	-0.0371002	-1.893896	-0.0283448	-0.6818711	-0.0283448	-0.9558927	-0.0283448
-0.0357923	-1.37041			-0.0270369	-0.6504079	-0.0270369	-0.9117854	
				-0.0078669	-0.1892496			

0.0040357	0.6932392	0.0040357	1.007276					
0.0040648	0.6982471	0.0040648	1.014553	0.0000292	0.0120111	0.0000292	0.0109139	0.0000292
0.0014228	0.2444054			-0.0026129	-1.076513	-0.0026129	-0.9781722	
				-0.0031847	-1.312087			

vent, and b stands for the number of days after the event.

APPENDIX 12. Car Estimation Results for FEDEX Corporation(FDX).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	ttest	CAR	t test	CAR	t test
30 oct 2013	0.011836	0.2670905	0.011836	0.3734908	0.011836	0.3721453		
31 oct 2013	-0.012276	-0.2770203	-0.012276	-0.3873763	-0.012276	-0.3859809	-0.24112	-0.5597224
01 nov 2013	-0.0119065	-0.2686818	-0.0119065	-0.375716	-0.0119065	-0.3743626	-0.0237425	-0.5511447
04 nov 2013	-0.0261281	-0.5896056	-0.0261281	-0.8244855			-0.0379641	-0.8812763
05 nov 2013	-0.0006871	-0.015504					-0.012523	-0.2907026

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	0.0025899	0.1314812	0.0025899	0.1295996	0.0025899	0.1235375		
17 feb 2010	0.004312	0.218909	0.004312	0.2157762	0.004312	0.2056832	0.0017221	0.0959405
18 feb 2010	-0.0144828	-0.7352545	-0.0144828	-0.7247321	-0.0144828	-0.6908323	-0.0170727	-0.9511285
19 feb 2010	-0.0222565	-1.129905	-0.0222565	-1.113735			-0.0248464	-1.384206
22 feb 2010	-0.0241314	-1.225087					-0.0267213	-1.488655

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	0.0177332	0.3307142	0.0177332	0.3690768	0.0177332	0.3631575		
24 dec 2009	0.0193725	0.3612867	0.0193725	0.4031957	0.0193725	0.3967292	-0.0160939	-0.3612331
28 dec 2009	-0.0339271	-0.6327215	-0.0339271	-0.7061167	-0.0339271	-0.694792	-0.0693936	-1.557563
29 dec 2009	-0.0348938	-0.6507484	-0.0348938	-0.7262347			-0.0703602	-1.579259
30 dec 2009	-0.0071527	-0.133393					-0.0426191	-0.9566006

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
02 jul 2002	-0.0201835	-0.3725673	-0.0201835	-0.3725673	-0.0201835	-0.4804666		
03 jul 2002	0.0079734	0.1471819	0.0079734	0.1471819	0.0079734	0.1898073	0.0281569	0.5208526
05 jul 2002	0.0084841	0.156608	0.0084841	0.156608	0.0084841	0.2019632	0.0286676	0.5302987
08 jul 2002	-0.0256503	-0.4734804	-0.0256503	-0.4734804			-0.0054669	-0.1011274

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
20 dec 2001	0.0264385	0.5588228	0.0264385	0.6890123	0.0264385	0.7134762		
21 dec 2001	0.0206758	0.4370182	0.0206758	0.5388308	0.0206758	0.5579623	-0.0057627	-0.1325888
24 dec 2001	-0.0056069	-0.1185106	-0.0056069	-0.1461201	-0.0056069	-0.1513082	-0.0320454	-0.7373023
26 dec 2001	-0.0152365	-0.3220499	-0.0152365	-0.3970782			-0.041675	-0.9588624
27 dec 2001	0.0109474	0.2313922					-0.0154911	-0.3564202

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.24112	-1.130348	-0.24112	-0.9849063					
-0.0237425	-1.113025	-0.0237425	-0.9698126	0.0003695	0.0106347	0.0003695	0.0253248	0.0003695
-0.0379641	-1.779719			-0.0138521	-0.3986635	-0.0138521	-0.9493504	
				0.011589	0.3335315			

0.0017221	0.0968326	0.0017221	0.0839367					
-0.0170727	-0.9599731	-0.0170727	-0.8321266	-0.0187948	-1.263496	-0.0187948	-1.705348	-0.0187948
-0.0248464	-1.397078			-0.0265685	-1.78609	-0.0265685	-2.410695	
				-0.0284434	-1.912129			

-0.0160939	-0.5537577	-0.0160939	-0.7492232					
-0.0693936	-2.38769	-0.0693936	-3.230497	-0.0532997	-1.174185	-0.0532997	-1.797239	-0.0532997
-0.0703602	-2.42095			-0.0542663	-1.195479	-0.0542663	-1.829833	
				-0.0265252	-0.5843465			

0.0281569	0.5208526	0.0281569	1.018471					
0.0286676	0.5302987	0.0286676	1.036942	0.0005106	0.0147394	0.0005106	0.0147394	0.0005106
-0.0054669	-0.1011274			-0.0336238	-0.9705212	-0.0336238	-0.9705212	

-0.0057627	-0.201975	-0.0057627	-0.3381831					
-0.0320454	-1.123146	-0.0320454	-1.880575	-0.0205199	-0.4611677	-0.0205199	-0.684411	-0.0205199
-0.041675	-1.460653			-0.0301496	-0.6775858	-0.0301496	-1.005594	
				-0.0039657	-0.0891251			

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	t test	CAR	ttest	CAR	t test	CAR	t test
07 sep 2001	0.001988	0.0047315	0.001988	0.0047197	0.001988	0.0048034		
10 sep 2001	-0.2279236	-0.5424497	-0.2279236	-0.2279236	-0.2279236	-0.5506939	-0.2338877	-0.5630642
17 sep 2001	-0.4870878	-1.159251	-0.4870878	-1.156367	-0.4870878	-1.176869	-0.4930519	-1.186979
18 sep 2001	-0.4457275	-1.060815	-0.4457275	-1.058176			-0.4516917	-1.087408
19 sep 2001	-0.5749562	-1.368374					-0.5809203	-1.398515

10 dec 1999	0.0642595	0.2520959	0.0642595	0.33429	0.0642595	1.531308		
13 dec 1999	0.1005754	0.3945665	0.1005754	0.5232121	0.1005754	2.396719	0.0148961	0.0592209
14 dec 1999	0.0945059	0.3707554	0.0945059	0.4916376	0.0945059	2.252083	0.0088266	0.035091
15 dec 1999	-0.010114	-0.0396783	-0.010114	-0.0526151			-0.0957934	-0.3808367
16 dec 1999	-0.2299476	-0.9021055					-0.3156269	-1.254808

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.2338877	-0.5573781	-0.2338877	-0.5745397					
-0.4930519	-1.174992	-0.4930519	-1.21117	0.2086113	1.32762	0.2086113	2.789034	0.2086113
-0.4516917	-1.076427			0.2499715	1.590839	0.2499715	3.342001	
				0.1207429	0.7684177			

0.0148961	0.0885252	0.0148961	0.6824915					
0.0088266	0.0524551	0.0088266	0.4044068	-0.0209656	-0.0831007	-0.0209656	-0.1529894	-0.0209656
-0.0957934	-0.5692862			-0.1255855	-0.4977805	-0.1255855	-0.9164201	
				-0.3454191	-1.36913			

vent, and b stands for the number of days after the event.

APPENDIX 13. Car Estimation Results for Southwest Airlines Co. (LUV).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	t test	CAR	t test	CAR	t test
30 oct 2013	0.0009367	0.0490962	0.0009367	0.0484569	0.0009367	0.0462012		
31 oct 2013	-0.0058629	-0.3073149	-0.0058629	-0.3033138	-0.0058629	-0.2891938	-0.0067996	-0.4663684
01 nov 2013	-0.0279287	-1.463928	-0.0279287	-1.444868	-0.0279287	-1.377607	-0.0288654	-1.979211
04 nov 2013	-0.0343588	-1.800969	-0.0343588	-1.777521			-0.0352954	-2.420834
05 nov 2013	-0.0466479	-2.445126					-0.0475846	-3.263721

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
16 feb 2010	0.0143683	0.6224552	0.0143683	0.6035887	0.0143683	0.5944896		
17 feb 2010	0.0012259	0.0531059	0.0012259	0.0514963	0.0012259	0.05072	-0.0131424	-0.8781255
18 feb 2010	0.0059028	0.2557197	0.0059028	0.2479689	0.0059028	0.2442307	-0.0084654	-0.5656278
19 feb 2010	0.0009838	0.0426204	0.0009838	0.0413286			-0.0133844	-0.8942976
22 feb 2010	-0.0000297	-0.0012861					-0.0143979	-0.962016

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
23 dec 2009	0.0107156	0.6539523	0.0107156	1.283624	0.0107156	1.435702		
24 dec 2009	0.0103249	0.6301117	0.0103249	1.236828	0.0103249	1.383361	-0.0003906	-0.0278595
28 dec 2009	0.0085665	0.5227958	0.0085665	1.026181	0.0085665	1.147758	-0.0021491	-0.1532661
29 dec 2009	0.017652	1.077268	0.017652	2.114537			0.0069364	0.494676
30 dec 2009	0.0008123	0.0495731					-0.0099033	-0.7062622

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
02 jul 2002	-0.0046053	-0.3383751	-0.0046053	-0.3383751	-0.0046053	-0.5775302		
03 jul 2002	-0.0023041	-0.1692962	-0.0023041	-0.1692962	-0.0023041	-0.2889506	0.0023012	0.1639069
05 jul 2002	0.0018175	0.1335437	0.0018175	0.1335437	0.0018175	0.2279291	0.0064228	0.4574832
08 jul 2002	-0.0089217	-0.6555262	-0.0089217	-0.6555262			-0.0043164	-0.3074498

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
20 dec 2001	-0.0091495	-0.3201589	-0.0091495	-0.4184067	-0.0091495	-0.4619963		
21 dec 2001	-0.0314982	-1.102179	-0.0314982	-1.440407	-0.0314982	-1.590468	-0.0223487	-0.7717608
24 dec 2001	-0.0180948	-0.6331695	-0.0180948	-0.8274716	-0.0180948	-0.9136775	-0.0089453	-0.3089042
26 dec 2001	-0.028924	-1.012102	-0.028924	-1.322687			-0.0197744	-0.6828653
27 dec 2001	-0.0261215	-0.9140374					-0.0169719	-0.5860875

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0067996	-0.4399806	-0.0067996	-0.4454013					
-0.0288654	-1.867791	-0.0288654	-1.890803	-0.0220658	-1.612774	-0.0220658	-1.41124	-0.0220658
-0.0352954	-2.28386			-0.0284958	-2.082742	-0.0284958	-1.82248	
				-0.040785	-2.98095			

-0.0131424	-0.8507904	-0.0131424	-0.7375343					
-0.0084654	-0.5480204	-0.0084654	-0.4750687	0.004677	0.5595701	0.004677	0.4873886	0.004677
-0.0133844	-0.8664591			-0.000242	-0.0289584	-0.000242	-0.0252229	
				-0.0012555	-0.1502175			

				-0.009122	-0.6384269			
-0.0003906	-0.0607181	-0.0003906	-1.153629					
-0.0021491	-0.334034	-0.0021491	-6.346566	-0.0013678	-0.0957303	-0.0013678	-0.2266385	-0.0013678
0.0069364	1.078116			0.0077177	0.540144	0.0077177	1.278774	

0.0023012	0.1639069	0.0023012	1.264036					
0.0064228	0.4574832	0.0064228	3.528072	0.0041216	0.2773488	0.0041216	0.2773488	0.0041216
-0.0043164	-0.3074498			-0.0066176	-0.4453023	-0.0066176	-0.4453023	

-0.0223487	-0.9978647	-0.0223487	-1.082707					
-0.0089453	-0.3994044	-0.0089453	-0.4333633	0.0134034	0.5337886	0.0134034	0.6621285	0.0134034
-0.0197744	-0.8829253			0.0025742	0.1025187	0.0025742	0.1271674	
				0.0053767	0.2141275			

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	t test	CAR	t test	CAR	t test
07 sep 2001	-0.0483528	-0.1120995	-0.0483528	-0.1118691	-0.0483528	-0.1169527		
10 sep 2001	-0.3482036	-0.8072634	-0.3482036	-0.805604	-0.3482036	-0.8422131	-0.2756744	0.651006
17 sep 2001	-0.8805661	-2.041474	-0.8805661	-2.037278	-0.8805661	-2.129858	-0.8080368	-1.908181
18 sep 2001	-0.8435687	-1.955701	-0.8435687	-1.951681	-0.8435687		-0.7710395	-1.820812
19 sep 2001	-0.9456744	-2.19242					-0.8731452	-2.061935

10 dec 1999	0.00704	0.2815602	0.00704	0.2816295	0.00704	0.3687364		
13 dec 1999	0.0340742	1.362769	0.0340742	1.363105	0.0340742	1.784707	0.0059141	0.2404222
14 dec 1999	0.0471422	1.885411	0.0471422	1.885875	0.0471422	2.469169	0.018982	0.7716683
15 dec 1999	0.0807965	3.231387	0.0807965	3.232183			0.0526364	2.139803
16 dec 1999	0.0946304	3.784661					0.0664703	2.702185

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

[-1;+1]		[-1;0]		[0;+2]		[0;+1]		[0;0]
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.2756744	-0.6443906	-0.2756744	-0.6973292					
-0.8080368	-1.888791	-0.8080368	-2.043961	0.0189864	0.1306755	0.0189864	0.7089317	0.0189864
-0.7710395	-1.80231			0.0559837	0.3853124	0.0559837	2.090371	
				-0.046122	-0.3174387			

0.0059141	0.238279	0.0059141	0.3694436					
0.018982	0.7647892	0.018982	1.18578	-0.0046743	-0.1906937	-0.0046743	-0.1863215	-0.0046743
0.0526364	2.120727			0.0289801	1.182287	0.0289801	1.155179	
				0.0428139	1.74666			

vent, and b stands for the number of days after the event.

APPENDIX 14. Car Estimation Results for United Continental Holdings (UAL).

	[-2;+2]		[-2;+1]		[-2;0]		[-1;+2]	
date	CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest
30 oct 2013	0.0147839	0.397831	0.0147839	0.3854935	0.0147839	0.3778295		
31 oct 2013	-0.0153756	-0.4137529	-0.0153756	-0.4009217	-0.0153756	-0.3929509	-0.0301595	-1.104877
01 nov 2013	-0.027077	-0.728634	-0.027077	0.7060378	-0.027077	-0.6920009	-0.0418609	-1.533551
04 nov 2013	-0.025622	-0.6894818	-0.025622	-0.6680997			-0.0404059	-1.48025
05 nov 2013	-0.0305732	-0.8227158					-0.0453571	-1.661633

16 feb 2010	0.0101054	0.3000186	0.0101054	0.326206	0.0101054	0.3946297		
17 feb 2010	0.0302138	0.8970159	0.0302138	0.9753127	0.0302138	1.179891	0.0201084	0.6326139
18 feb 2010	0.0212232	0.6300952	0.0212232	0.6850936	0.0212232	0.8287963	0.0111178	0.3497689
19 feb 2010	0.0088863	0.2638262	0.0088863	0.2868545			-0.0012191	-0.0383516
22 feb 2010	-0.004216	-0.1251685					-0.0143214	-0.4505537

23 dec 2009	-0.0177673	-1.35659	-0.0177673	-1.486395	-0.0177673	-1.463178		
24 dec 2009	-0.0178424	-1.362322	-0.0178424	-1.492675	-0.0178424	-1.46936	-0.0000751	-0.0057315
28 dec 2009	-0.0385319	-2.94203	-0.0385319	-3.223537	-0.0385319	-3.173187	-0.0207646	-1.585312
29 dec 2009	-0.0537673	-4.105308	-0.0537673	-4.498124			-0.036	-2.748497
30 dec 209	-0.0647718	-4.945535					-0.0470045	-3.588657

Notes: The event window length is shows as [-a;+b], where a stands for the number of days before the

| [-1;+1] | | [-1;0] | | [0;+2] | | [0;+1] | | [0;0] |
CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0301595	-1.096432	-0.0301595	-1.633943					
-0.0418609	-1.521829	-0.0418609	-2.267885	-0.0117014	-1.026886	-0.0117014	-0.8894109	-0.0117014
-0.0404059	-1.468936			-0.0102464	-0.8992032	-0.0102464	-0.7788216	
				-0.0151976	-1.333704			

CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
0.0201084	0.6505828	0.0201084	0.6910347					
0.0111178	0.3597038	0.0111178	0.3820694	-0.0089906	-2.373746	-0.0089906	-2.686713	-0.0089906
-0.0012191	-0.039441			-0.0213275	-5.631007	-0.0213275	-6.373426	
				-0.0344298	-9.090367			

CAR	ttest	CAR	ttest	CAR	ttest	CAR	ttest	CAR
-0.0000751	-0.0064598	-0.0000751	-0.0063539					
-0.0207646	-1.786749	-0.0207646	-1.757466	-0.0206144	-5.261341	-0.0206144	-6.637991	-0.0206144
-0.036	-3.097733			-0.0358499	-9.149839	-0.0358499	-11.54393	
				-0.0468544	-11.95847			

vent, and b stands for the number of days after the event.