

# **A study of airline stock prices before and after pricing policy change in American, Brazilian and European carriers**

by  
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## **Resumen**

Se estudiaron los efectos que los cargos por equipaje han tenido en el precio de las acciones de líneas aéreas tradicionales y de bajo costo de Estados Unidos, Europa y Brasil utilizando un análisis de regresión múltiple para el periodo de enero del 2006 a diciembre del 2011. Se evaluó el impacto que tuvieron los cargos por equipaje antes y después de su implementación.

De los resultados se concluye que el cargo por equipaje, entre otras variables, tuvo un impacto positivo en el precio de las acciones. Los resultados demuestran que antes de la implementación del cargo, el precio de la acción disminuía, mientras que después de la implementación el precio de las acciones aumentaba, si la línea aérea era de bajo costo.

## **Abstract**

This study looks at the effects of baggage fees on the stock prices of legacy and low cost airlines (carriers) in the United States, Europe, and Brazil using a multiple regression analysis for the period between January 2006 and December 2011. The impact that baggage fees had on airlines' stock prices before and after their implementation was studied. From the results, it was concluded that baggage fee, among other variables, does have a positive impact on the price of airlines' stock.

Results showed that before the implementation of the baggage fee, stock prices decreased whenever the airlines were low cost carriers (LCCs), while after the fee implementation, stock prices seemed to be positive affected whether airlines were low cost carriers.

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To my daughter Victoria Leonor, may this study someday motivate you to follow your dreams and work your hardest to achieve them

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## List of Abbreviations

ADA	Airline Deregulation Act
AMR	American Airlines
ASM	Available Seat Miles
ASTA	American Society of Travel Agents
BA	British Airways
BTC	Business Travel Coalition
CAA	Civil Aeronautics Act
CTA	Consumer Travel Alliance
DOT	Department of Transportation
EMH	Efficient Market Hypothesis
EU	European Union
EZY	EasyJet
GOL	Gol Brazilian Airlines
JBLU	JetBlue Airways
LCC	Low-Cost Carrier
LF	Load Factor
LUFT	Lufthansa
LUV	Southwest Airlines
NYSE	New York Stock Exchange
RPM	Revenue Passenger Miles
RYA	Ryanair
UAL	United Airlines
UK	United Kingdom
US	United States

## **Chapter 1: Introduction**

### **1.1 Introduction**

Historically, aviation has been a field that has captured the imagination, interests, and dreams of many people. From even before the historic first flight in a sandy beach in North Carolina, many thinkers and visionaries have tried to come up with ways to put man on the same playing field as birds. Some of these thinkers include Leonardo Da Vinci, who in as far back as the Renaissance drew models of what he thought would be a flying machine. Aviation has fascinated mankind ever since.

Commercial airlines were first created in January 1914 with the establishment of a short route between the cities of St. Petersburg and Tampa, FL (Simons & Withington, 2005). Although a very short distance, just 32 km., the airline cut automobile driving time from two hours to just 20 minutes. It was not a successful route, with space for only one passenger and the operation went under after four months. However, this short operation proved the potential and benefits of traveling by air, and paved the way for one of the biggest industries in the world.

With the advent of new technology, airplanes became safer, more reliable, and able to take more passengers on longer distances. After World War II, the knowledge and application of more technological aircrafts used during the war was passed on to the commercial sector, especially in the United States, where airlines like Pan Am and TWA were taking in these new aircrafts, while airlines in the United Kingdom were still dependent on the older hydroplane technologies (Simons & Withington, 2005).

With improvement in aviation's technologies like navigation aid and higher flying aircraft came the dawn of passenger transport as we know it. Aircraft like the Boeing 247 led the way in the new form of commercial aviation with amenities and services that were considered extra luxurious for the time (Simons & Withington, 2005). Airlines began using long haul airplanes with the ability to fly across the country and across the Atlantic, and later across the Pacific with just a few stops.

In 1978, the US Government passed the Airline Deregulation Act (ADA). Previous to this act, airline fares, routes and service were highly regulated by the Federal government. Before, regulations did not let the industry grow, but after the ADA passed, airlines could now offer a better service to their passengers with better on time departures, more flights, more destinations, and fewer stops. Fares were also reduced due to the growth in competition and the creation of new smaller airlines, increasing the amount of air travelers dramatically.

As competition grew and fares decreased so did the profitability margins of airlines. Between 1988 and 2003, the average airline profit margins were between two and a half and three percent (Doganis, 2006). With such low profit margins, and increases in operating costs associated to salaries and fuel prices, airlines have turned to other forms of revenue to remain profitable. One way airlines have tackled this problem is by using yield management, a technique where they price their seats differently depending on the flexibility of the traveler. This strategy allow airlines to charge less for passengers traveling for pleasure in one seat, than business travelers in seats nearby, by having the leisure traveler commit earlier to traveling with the airline, and forgoing a refund.

More recently, airlines began using other strategies to reduce costs and increase revenues, such as the space allocated to each traveler. Many carriers began to pack more seats into the aircraft to fit more passengers, thus reducing leg room and space. With low profit margins, the difference between a profitable and non-profitable flight could be as little as a couple of seats sold. Airlines kept cutting costs by reducing food or replacing it for purchased snacks and food. And more recently, airlines came to the practice of charging for the luggage passengers took on flights. In the US, Spirit Airlines led the way charging passengers a low fare for their ticket, but increasing it with fees of \$25 for their first checked bag and higher fees for the next. Today the same airline also charges for the bags passengers take on board the cabin (Mayerowitz, 2010).

These fees together with other miscellaneous such as charging for processing of tickets, paying for pillows and blankets, seat assignments, and priority boarding among others have come to be known as ancillary revenue. The definition given to ancillary revenue is revenue beyond the sale of tickets that is generated by direct sales to passengers, or indirectly as a part of the travel experience (Sorensen, 2011). Even though the traveling public has been left with a bad sentiment towards these new pricing methodologies, they are almost the only way airlines will be able to compete and stay profitable (McCartney, 2008).

## **1.2 Justification**

It is clear that airlines will continue with their pricing policies of ancillary revenue, unbundling the price of the ticket and charging passengers individually for what they use or consume until there is a new form of revenue. Still, most airlines continue using these pricing strategies and creating new ones to offset their rising costs.

Low-cost carriers (LCCs) in Europe have been working with unbundled fares for some years now. These carriers moved away from LCC pioneer Southwest Airlines' business model of providing overall value, into an '*a la carte*' business model where everything is paid for separate from the fare. In 2005 Europe's top four LCC generated US\$593 million from non-ticket products (Sorensen, 2006).

The effects that changes in pricing policies have on airline stock price are the reason for this investigation. The understanding of these effects, be it positive or negative, can help better comprehend the way airlines can implement other strategies in the future. Granted, there are other factors that can affect stock prices greatly, but this investigation aims to see if the new policies have a significant effect on it, by analyzing airlines in the United States (US), the European Union (EU), and Brazil that have both ancillary revenue policies and traditional business methods.

### **1.3 Objective**

The main objective of this investigation is to identify if the shift towards the imposition of baggage fees by some airlines has affected the stock price of these airlines in a positive or negative way. Furthermore, an analysis will be performed to identify if there was a reaction on the individual stock price of airlines that imposed the fee both before and after implementation. The time frame analyzed will be from January 2006 to December 2011, and the variables that we consider might affect stock price include passenger Load Factor (LF)<sup>1</sup>, oil prices, the imposition of the baggage fee and the type of carrier. Focus will be given to both low cost carriers (LCCs) and legacy

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<sup>1</sup> Load factor is the percentage of available seats that are filled with paying passengers, or the percent of freight capacity that is utilized.

carriers<sup>2</sup> in the US, the EU and Brazil since low cost carriers traditionally have charged for different services rather than offering the complete package like legacy carriers. The legacy carriers, however, have unbundled their ticket price and are charging for different services including baggage.

#### **1.4 Limitations**

Performing analysis within the airlines industry has become very complex due to uncertainty and dynamic business models employed by different types of carriers. New business strategies used to manage airlines revenues and costs had definitely impacted the profit levels of these companies. Historically, airlines have had very low profit margins due to their high operating costs. For example, the volatility of oil prices, one of the biggest cost for airlines (Sharif, Ranjbar, & Arumugan, 2009), might affect airlines profits, and consequently impact airlines stock prices. It is worthwhile to mention that our research focuses on stock prices and not airlines profits, although the firm's performance might contribute to stock price behavior.

A key limitation of this study is that ancillary revenue policies are quite recent in the airlines industry, so, research cannot be done farther into historical stock prices. Additionally, the use of monthly data in the analysis fails to capture the volatility of stock prices during the studied period.

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<sup>2</sup> Legacy carriers are the US airlines that were established and operating routes before airline deregulation in 1978. It is usually used to refer to the big four airlines – American, Delta, United, and US Airways in the US, but in the study it will also include the big airlines from the EU.



Furthermore, this research study does not analyze additional factors that might influence stock prices. These factors can create a bullish or bearish<sup>3</sup> market and in turn affect stock prices. For example, macroeconomic variables, such as unemployment rates, interest rates, inflation rates and Gross Domestic Product, have proved to influence stock prices. Business specific variables, like union contracts and labor costs, or corporate restructuring (i.e. mergers and acquisitions) might directly affect airlines, triggering cost differences among airline companies. Although acknowledged, the aforementioned factors will not be studied in the research.

### **1.5 Thesis Outline**

The following chapters include the literature review, research and analysis that will comprise this thesis. Chapter two consists of the literature review pertinent to the subject. Studies on consumer sentiment towards the new ancillary revenues and where these revenues will be in the future will be studied, as well as the behavior of airline stock prices in relation to load factor and oil prices, and the financial performance of the airlines for the period. The third chapter which consists of methodology will have an explanation of it, the selection of the data sampled, and how the study was conducted. The empirical results of the study and the corresponding analysis will be demonstrated in the fourth chapter. Finally, chapter five presents the conclusions and recommendations for future research.

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<sup>3</sup> Bullish market is characterized by optimism and investor confidence in the market behavior, which translate into purchasing stocks and price increases. Bearish market is known as one in which stock prices are falling and there is a pessimistic outlook, turning investors into sell their investments decreasing stock prices.

## **Chapter 2: Literature Review**

### **2.1 Introduction**

This section presents different studies that have been conducted regarding ancillary revenue on airlines and sentiment of consumers towards this type of business. Studies on the behavior of airline stock prices are also researched.

### **2.2 Airline Industry**

#### **2.2.1 Economics of Airline Industry**

In the US, with the implementation of the ADA in 1978 came a number of changes in the ways airlines did business. Many of the proponents of deregulation argued that it would push competition based only on service on the route and this would create higher fares than when regulated (Rhoades & Waguespack, 1999). Deregulation brought also great benefits like the ability to enter and exit routes when airlines wanted giving way for an increase in service and load factors and decreasing excessive competition; promoted the flexibility of carriers to adjust their pricing, routes, and equipment so they could decrease their operating costs at their will and increase their profits (Adrangi, Chow, & Raffiee, 1996). However the industry has gone through years of very low profits, if any, due to the low barriers of entry that airlines have, as a result, competition has steeply increased, costs have soared, and profits have plummeted. Since ADA's the industry has been battered by a wave of new entry and mass exits (Chung & Szenberg, 1996).

The optimistic side in the US airline industry has been the Low-Cost Carriers (LCC). This airline model was pioneered by Southwest Airlines in 1971. Since then, there have been other successful LCCs that have entered in the market like ValueJet

which later became known as AirTran, and JetBlue who has become one of the most successful new entrants in the industry. In 2006, LCCs served 32.9% of all domestic origin and destination passengers, and an estimated 75% of domestic passengers have had access to LCCs (Daraban, 2007).

In Europe, the airline industry was regulated until around ten years after the ADA. The deregulation in the EU brought positive changes to the industry including the emergence of LCCs who would not have been able to operate under the regulated model used before. From March 2001 to March 2007, seat capacity on LCCs in Europe increased from four to twenty six percent of all intra Europe routes (Domanico, 2007).

Even though airlines worldwide, but especially in the US have gone through lower profit margins due to their increased operational costs and competition to LCCs, they have filed for Chapter 11 protection (US Bankruptcy Code). Consequently, they have emerged leaner and with lower operational costs, and should be a better competition to LCCs (Daraban, 2007). The latest to seek Chapter 11 protection has been American Airlines who filed for bankruptcy in November 2011. Currently, the US airline industry is composed of about 600 companies that generate revenue of about \$170 billion, with around 75% of the revenue generated by the ten largest companies in the industry (First Research, 2012), so it is highly concentrated. According to the Association of European Airlines, in the EU aviation contributes to around € 235 Billion in GDP, and the 34 member airlines in the association generate a total turnover of € 86 Billion (Association of European Airlines, 2010). Worldwide, the numbers increase to about \$500 billion in revenue.

### 2.2.2 Low Cost Carriers vs. Legacy Carriers

There is a difference between these groups of carriers, and their business model and method of operation, although greatly changed from before the ADA.

Legacy carrier is the name used in the airline industry to differentiate airlines that had established routes and operations before the ADA (Holloway, 2008). These carriers also tend to offer a higher level of service when compared to other carriers. At least, they used to do so before the implementation of the new ancillary fees and the removal of many of the services that defined legacy carriers. These services usually include First Class service, meals on board, an extensive route network that went cross country and overseas with various hubs, frequent flyer programs, and alliances with other airlines. Over the years, many of the legacy carriers have either gone under, or merged or been acquired by other airlines. The only remaining legacy carriers in the US at this moment, by the former definition, are American Airlines, United Airlines, Delta Airlines, and US Airways. However their business model has greatly changed to the point where many of the essential services they used to offer before have been either eliminated or are now on a fee based model<sup>4</sup>.

On the other side, the term low cost carrier (LCC) was first used around 1971 when Southwest was founded. This airline was the first to offer airfares at lower costs than other carriers by taking away many of the services that other airlines offered to save the customers money, and many times flying to airports that are cheaper to operate out of (i.e., Southwest flying to Chicago Midway instead of O'Hare). In the US the two big LCCs are Southwest and JetBlue, joined by Air Tran and Frontier among others. In Europe, the biggest LCCs are Ryanair and EasyJet (Holloway, 2008). Today

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<sup>4</sup> American Airlines Service Charges page - [http://www.aa.com/i18n/utility/aacom\\_services\\_charges.jsp](http://www.aa.com/i18n/utility/aacom_services_charges.jsp)

the LCCs in the US offer services that were essentially considered to be of a Legacy carrier, services that those carriers no longer offer. For instance, Southwest offers a snack box on board and does not have baggage fees, unlike American and United which charge for both baggage and snacks on board.

### **2.2.3 Recent changes in the airline industry**

Recently the airline industry has changed in ways that affects how business is done and how the financial markets react to industry changes that included bankruptcies, mergers and acquisitions, and world events that certainly might cause financial markets fluctuations

During 2010, the airline industry had two major acquisitions with the purchase of Continental Airlines by United Airlines (UAL), and the purchase of Air Tran Airways by Southwest Airlines (LUV). In October 2010, UAL completed the purchase of Continental Airlines for USD 3.5 billion, creating the world's largest airline by passenger enplanement (Parimucha, 2011). For the LCCs, LUV purchased Air Tran Airways for USD 1.5 billion in September although the deal will not be complete until 2012. This deal would make LUV the fourth largest airline in the US.

In the beginning of the period studied in this research, UAL had just emerged from bankruptcy (February 2006), after having the longest Chapter 11 restructuring in airline industry history. During this time, UAL had also created Ted, a LCC under the same parent company. Ted ceased operation in January 2009, with its aircraft being sent back and refitted for UAL. The most recent airline company to file for Chapter 11 was American Airlines (AMR) in November 2011. During the period of this research, the US airline industry had three different carriers as world's largest airline with

American Airlines in 2006, around 2009 Delta Airlines became the largest with its purchase of Northwest Airlines, and in 2011 UAL was the largest with the purchase of Continental (CAPA, 2011). In the EU, after many years of collaboration, British Airways (BA) merged with Iberia in 2009. Although internally they are operated under the same company (International Airlines consolidated Group) externally they operate independently.

### **2.3 Consumer sentiment toward airline fees**

In many occasions, news articles and reports on consumer sentiment towards airline fees demonstrate that travelers are very upset at the fees they now have to pay for, especially with baggage. This may seem like a bad market strategy, yet airlines continue to add fees, and passengers continue to pay them. In some occasions passengers seem to be flexible. In an example provided by Sorensen (2010), United, an airline that has fees for checked bags, had a load factor in Denver of 85%, while Southwest had a load factor of 69% even though the airline does not charge for checked bags. The study explains how American, Continental, United and US Airways will carry approximately 192 million domestic passengers during 2010. The author estimates that carriers will receive revenue for passengers' baggage fees of about \$1.044 billion (Sorensen, 2010).

Robbins (2010) stated that a report made by The Consumer Travel Alliance shows how airlines do not transparently publish all the fees the passenger will incur on a trip. In some cases passengers have to scan web pages with lengthy documents to find baggage fees only. According to a survey made by the Consumer Travel Alliance (CTA), two thirds of travelers were surprised by hidden fees when checked in at the

airport. The same survey showed that 99.3% of the people surveyed requested that airlines showed all hidden fees upfront before ticket purchase. The research also stated that in some cases these hidden fees can increase the price of the base ticket by up to 54% (Robbins, 2010). On a survey published in January 2010 the number one complaint on the list was airline baggage fees (Sandaruwan, 2010).

Many groups including CTA, The American Society of Travel Agents (ASTA), and the Business Travel Coalition created a space on the internet called MadAsHell<sup>5</sup>, which had received the support of 50,000 people requesting to have airlines show fees upfront. These groups have also called on the Department of Transportation (DOT) to intervene and force airlines to have more transparency on their fees. The DOT is trying to move forward pushing airlines to disclosing their fees through all their distribution methods including websites and travel agencies in a simple manner (Boehmer, 2010). However there is a clash because airlines believe that by disclosing their fees completely they will have a harder time when negotiating with third parties and global distribution systems like Sabre and Travelport, which airlines use to sell their tickets. Airlines also complain that their fees are already disclosed in their websites and some third party websites have sprung up that compare the hidden fees from different airlines. ASTA's complaint is that they want to have the fees printed for them as well, as they are one of the distribution sources for many of the airline's tickets.

Not all reports show that the sentiment from travelers is always bad. Sometimes passengers prefer to pay the extra fees that airlines charge for priorities that were once reserved for frequent flyers and business travelers. According to McCartney (2010), some of these programs have been very successful for the airlines. LUV's Business

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<sup>5</sup> <http://www.madashellabouthiddenfees.com/>

Select program, which allows the passenger to board first, use shorter security line, extra frequent flyer credit, and on-board cocktail for a one way fee between \$15 or \$25 has been very lucrative for the airline. On the first quarter of 2010, sales on the program had risen 17% from the same time in 2009 (McCartney, 2010). The same report predicts that these types of bundled packages will catch on with airlines and their travelers and that someday airlines will be selling packages like hotels do where the traveler pays extra to sit together with family members or to have a preordered meal.

In another article relating to Southwest, the author argues that the ancillary fares are well worth the price (Sharkey, 2011). The author insists that airlines are not charging the passengers for everything, but rather are offering a legitimate product for a good price and in many cases, with airplanes flying full the way they are, it is really worth it.

#### **2.4 Load factors and Stock prices**

Findings from a recent research which evaluates operational improvements in airlines stated that investors, as opposed to analysts, react to changes in operational values (Williams, Ramdas, Li and Lipson, 2011). They also indicated that with an increase in Load Factor (LF), given that the level of service remains the same, the stock price should increase accordingly. After all, the airline's goal is to maximize the capacity of its aircraft.

However, the same research does bring an important point and it is that when LF increases, so does baggage mishandling, delays, and denied boardings. This would upset many consumers who take it out by switching airlines or not traveling anymore with a specific carrier. It is an interesting balance that the airlines have to keep to reach



the best LF percentage they can have while at the same time they keep their customers happy by providing them unparalleled service and maintain their investors pleased by posting profits.

## **2.5 Historical behavior of airline stock prices**

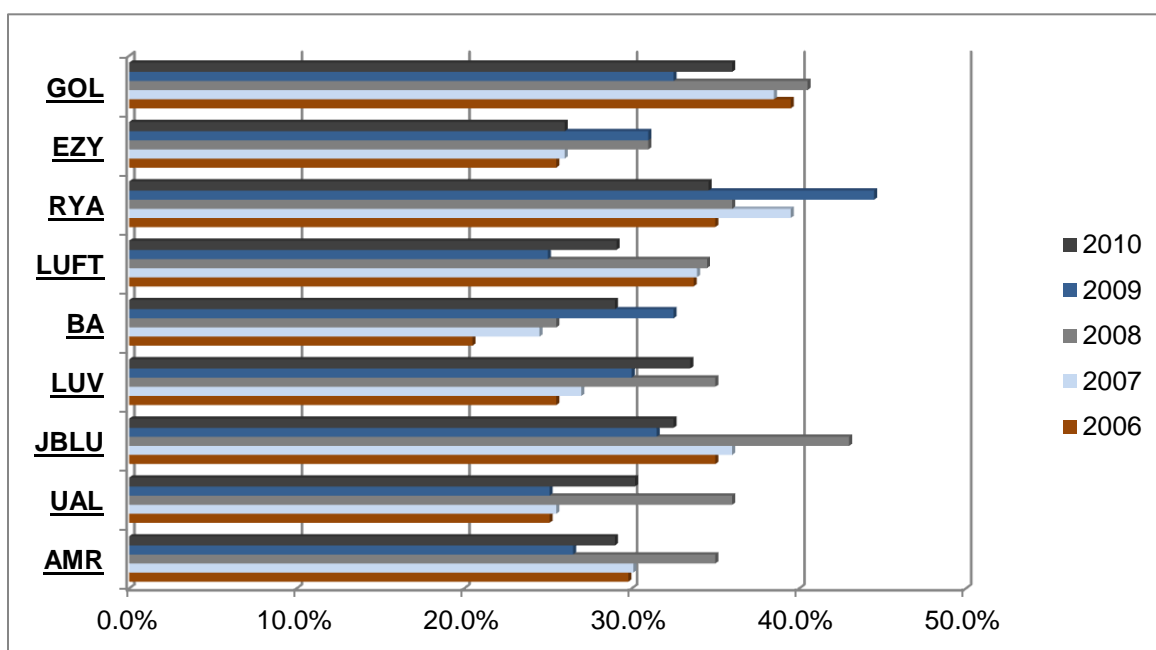
Airlines have many factors that affect their profit margins and in turn affect the price of their stock. Factors such as oil prices, consumer confidence, natural disasters, economic downturns, and international conflicts can all affect the stock price. These factors can be both of direct (fuel prices, salaries, landing fees, etc.) and indirect (hotels, restaurants, etc.) economic impact to the air carrier.

At the same time, LCCs seem to outperform conventional or traditional airlines during harsh economic times. In 2001, one of the worst years for US airlines due to the attacks of September 11<sup>th</sup>, only three airlines turned a profit, JetBlue, Southwest, and AirTran (Flouris & Walker, 2005). All of these airlines are LCCs.

There have been studies that demonstrate how some of the factors may affect more the stock price than others. Oil price for example, seems to have a strong inverse effect on the stock price for the airlines. When oil prices rises, the share price of airlines fall and when oil price falls the share price of airlines rises (Unnikrishnan, 2011). This happens to be because fuel price is usually around 30% of the total operational cost of airlines. Some years this could be as high as 43% of their total costs. On a recent research, it was stated that investors look forward into the oil prices because airlines like Cathay Pacific that posted great numbers, still saw their share price decline (Tarry, 2011).

Figure 2.1 shows the percentage of the airline's total operating cost that goes towards fuel for the airlines in this study. As shown in the table, the five low cost carriers (JetBlue (JBLU), Southwest (LUV), Ryanair (RYA), EasyJet (EZY), and Gol (GOL)) show a higher ratio on fuel cost than the other carriers. So much so that in 2009, RYA's fuel cost was 43% of total operating cost. This seemed to be this way because LCCs do not have the huge operating costs that legacy carriers have. LCCs for example use point-to-point travel instead of the legacy carrier's hub-and-spoke system that increases delays and operating costs (Flouris & Walker, 2005). LLCs also have a fleet of aircraft with one or two efficient models instead of operating various different models that create and increase in operating, maintenance and training cost to airlines. It might be seemed easy to understand why LCCs are highly affected by increase in oil price and fuel costs.

Figure 2.1 Fuel Cost to Operating Expenses Ratio (Data from 10-K Reports)



Source: U.S. Security and Exchange Commission. Edgar System

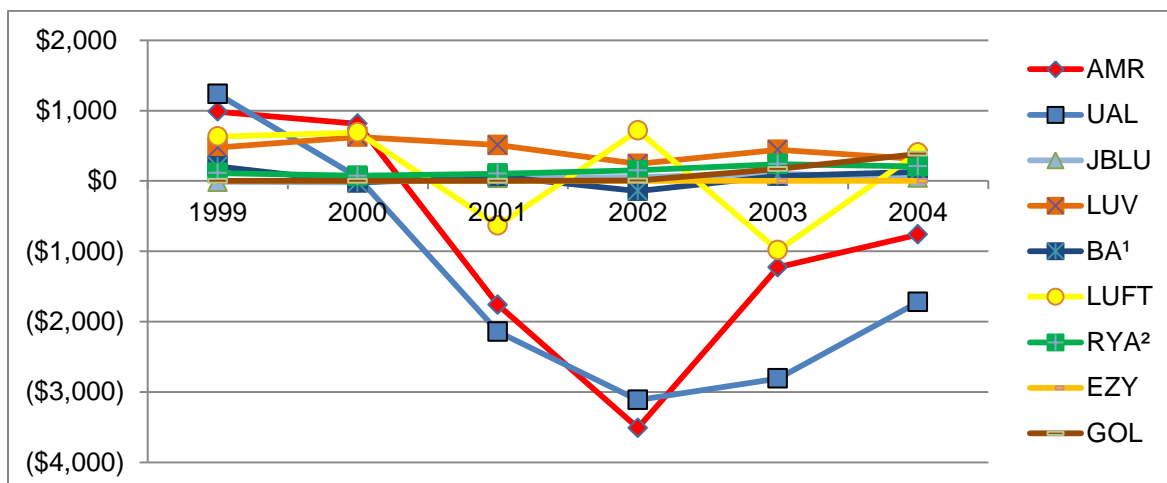
The costs affect the legacy carriers just as much as the LCC. When these high fuel costs are added to the high labor costs that airlines incur, it is clear how changes in oil prices can affect the stock price of the airline.

According to a dissertation on airline finance, the US airline industry has suffered three significant financial events throughout its history (Sturm, 2005). These include the enactment of the Civil Aeronautics Act in 1938, which began regulating routes and fares, the ADA which overturned the CAA and made prices be set by supply and demand, and the terrorist events of September 11<sup>th</sup>, 2001.

Figure 2.2 shows the operating margins of the airlines in this study around the years of September 11<sup>th</sup> attacks. It shows the sharp decrease in price for some of the carriers in the study around that time. It is estimated that the top ten carriers had a loss of \$7.6 Billion in 2001, \$11.3 in 2002, and \$6.4 in 2003 (Sturm, 2005). With all the new security costs incurred post 9/11, airlines had to figure new ways to increase their revenues. This is when the ancillary fees start to rise.

Finally on a study about confidence on airline performance (Flouris & Walker, 2005), the author concluded that investors have been treating LCCs stocks as growth stocks. For traditional carriers, investors have taken a more cyclical approach to them, showing that investors are more confident on the performance of LCCs.

Figure 2.2 Operating margins in years surrounding 9/11 attacks



Source: U.S. Security and Exchange Commission: Edgar System

## 2.6 Future of ancillary revenue

Even though consumers might be protesting the onslaught of fees by traditional airlines that did not used to have that type of business model, they can expect to continue to pay for these fees as it seemed they will continue for a while. Especially when airlines have found out how much revenues these fees are generating, revenue that had been lost with the increase in competition and increased costs like fuel and labor. Furthermore, passengers would rather pay extra fees than risk having a very unpleasant travel experience.

On a 2007 report from the Idea Works Company, an organization that works with airlines to study consumer expectations and has done ground breaking research on ancillary revenue, 63% of the surveyed worldwide airline executives said charging for services instead of a complete ticket will become more prevalent (Idea Works , 2007). Even though these fees seem to annoy passengers recently, with the inclusion of a baggage fee for checked bags, airlines have been unbundling their services for some

time. As the report shows, in 2007 52% of the carriers surveyed were already charging a fee for reservations made through their call center, and 29% were already charging for pre-assigned and premium seats. However, only 8% of the airlines were charging for checked baggage back then. This number has greatly increased now, and since the charge for checking a bag is done directly to the customer at check in, it is easier to spot than the call center fee which the customer would not have noticed when booking online, or the premium seat if the passenger did not bother with getting a seat prior to check in. Furthermore, the profits that the airlines are receiving from the baggage fees are not taxed by the government (Geldis, 2011). This lets airlines manage their airfares or get back some of the revenue lost from increases in operating costs, and in the bottom line may affect somehow the airlines stock price.

A recent study about how Southwest may lag in their stock price when compared to its peers directly tackles the problem Southwest will face with their free baggage policy (Levine-Weinberg, 2011) and how it will negatively affect their stock price. Since the airline does not charge for baggage fees, they are in a disadvantage when compared to other airlines who do, and who face similar operational costs. Southwest still has to pay their employees that handle their bags in the airport, just as American and United, but American and United are receiving a profit from their baggage fee. This profit is what this study is trying to find how it affects stock price.

The 2010 Yearbook of Ancillary Revenue Results (Sorensen, 2011) reports how some airlines increased their ancillary revenue greatly when compared to 2009. Two of the airlines studied in this investigation, American and United, reported increases in this type of revenue. American had a slight increase of 5% going from USD\$1,855 Million to

USD\$1,954 Million (8.8% of their total revenue), and United with its purchase of Continental Airlines increased their ancillary revenue by 62% from USD\$1,879 Million to USD\$5,000 Million (14.7% of their total revenue). Granted that this ancillary revenue includes revenues from products like frequent flyer programs and commissions from sales on of hotels and cars through the airlines website, the airlines fees on services like checked in bags and food have helped greatly. During this period (2010) both airlines increased their baggage fee charge.

The report shows how American and United have transformed from traditional legacy carriers to a sort of hybrid carrier that still offers luxury products like their business and first class options with bundled and high end services, with an economy class that operates like LCCs have for some time. These LCCs like EasyJet and Ryanair have operated for some time with 'a la carte' service fees and have been successful at it. In 2010, EasyJet had ancillary revenue of €655 Million, making for 19.2% of the airline's total revenue (Sorensen, 2011). This translated to €13.42 per passenger. In a per seat basis, the ancillary revenue was €0.91 per seat, where all but €0.19 came from fees charged to passengers.

Similarly Ryanair, the 'a la carte' service fee pioneer has an ancillary revenue of 22.1% of its total revenue generating €802 Million, up from €664 Million in 2009 and €625 Million in 2008 (Amadeus/ Idea Works, 2010). Ryanair seems to be one of the more aggressive airlines when it comes to ancillary fees, charging for almost every service that the passengers uses during a trip. On the Fees section of their website there are fees for not just bags, but excess baggage at an outrageous £20 per kilo, administration fees, booking fees, and excess carry-on baggage fee among others. On

another report prior to this one, from 2003 to 2007, Ryanair had an average annual increase in ancillary revenue of 34% (Idea Works, 2007). The report also demonstrates how Ryanair has successfully taken e-commerce to another level in the airline industry, offering products through their website as diverse and varied as airline tickets, online gaming, life insurance, and even scratch and win cards.

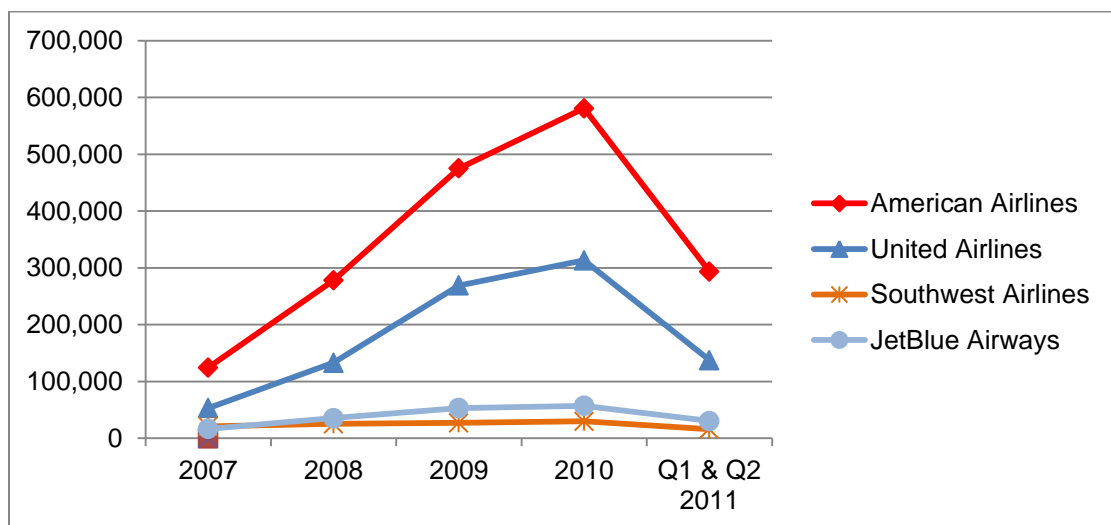
Ryanair seems to charge for every single service the passenger may have during the trip from online booking, to a credit card surcharge, luggage fee, to a seat selection fee. The company even went as far as considering charging for the in-flight use of the aircrafts lavatory. This fee did not materialize, but they are now planning on taking two to three lavatories out of their aircraft and leaving just one for everyone on board to share, and replacing these lavatories with seats which will generate more revenue (Hough, 2011). Ryanair's revenue from ancillary fees in 2009 amounts to 20.3% of the company's total revenue without including baggage fees (Klophaus, 2010).

On the other side of the LCC spectrum, Southwest has been clear and firm on its no baggage fee policy. On 2010, the airline had ancillary revenue of \$490 Million (4.3% of total revenue). None of this revenue is from checking first or second bag, as their policy for checked bags starts at the third bag. Their only other 'a la carte' services are checking in early and selecting a seat prior to boarding.

In the second quarter of 2011, airlines posted 5.1 percent profit margin due to revenues received from ancillary fees (Dooley, 2011). In that quarter, the airlines received \$887 million from baggage fees and \$612 million from reservation change fees. The following figure shows the revenue US airlines in this study had from 2007 to the second quarter of 2011. The figure clearly shows the increasing trend in the amount

received. Even Southwest, who does not charge baggage fee for checked bags, gets some revenue from oversized bags.

Figure 2.3 Baggage fee revenue (000) for US airlines



Source: Bureau of Transportation Statistics

Figure 2.3 shows the large increase in baggage fees revenue that American and United had once they started charging for checked bags. The figure does include revenue from oversized baggage fee as well, but the high increase in revenue shows that most of the new revenue is from the new fees and not the oversized bag fees. With these amounts being made in ancillary fees, it is highly unlikely airlines will drop these pricing policies and return to the one price packages they had before.

A recent article draws attention to how the government has intervened because consumers are having a hard time finding the fees they are required to pay when booking online (Yu, 2011). The DOT has planned a new rule for 2012 which requires airlines to change their websites to allow passengers to pay for 'a la carte' fees online, rather than having to visit the counter at the airport. If airlines are doing the



technological and logistical investment they will be required, it must be because they have no intent on eliminating ancillary fees like baggage and priority boarding.

## **2.7 Efficient Market Hypothesis**

The Efficient Market Hypothesis (EMH) was developed by Eugene Fama in 1964. Basically, the theory states that in the stock market, prices must fully reflect all known information, and therefore all future price movements can only result from future information which is not currently known (Howden, 2009). Following this pattern, it would seem impossible to beat the market price, given all information is known and incorporated in stock prices.

There are three forms of the EMH which are weak form, semi strong form, and strong form. The weak form establishes that all past market prices are fully reflected in stock prices; the semi-strong form states that all public available information is included in stock prices; the strong form states that all information (public and private) is reflected on stock prices, so even insider information will make no difference to beat the market (Sarno & Thornton, 2004).

As a theory and a strategy in stock market investments, the EMH can come into action when analyzing the price of the airlines' shares. When investigating if ancillary fees have had an impact on airline stocks, we would have to think that consumer sentiment would affect the share price of an airline. Since consumer sentiment has financial reactions on the part of the airlines, it also has an impact on the share price because by EMH the price will reflect the current situation of the airline or the industry. If consumers are upset at the amount of fees airlines are adding to tickets on services

that were previously free, and they decide to either travel with another airline or find another means of transportation, the chain reaction it causes can affect the share price.

On a study made in 2002, right after the aftermath of September 11, the financial market was analyzed to see whether the EMH theory or rational market theory as it also known, worked to have a significant change in the share price of various US airlines (Carter & Simkins, 2002). According to the study, almost all of the airlines studied showed abnormal returns and it is suggested that the event of September 11<sup>th</sup> had a significant impact on the share price of the airlines (Carter and Simkins, 2002; Glaser and Weber, 2005). It has been demonstrated that the attacks of September 11<sup>th</sup> were a significant event on the airline industry and the reactions to it, financially and psychologically were significant, but it serves as evidence of the EMH theory regarding airline stock pricing.

## **2.8 Summary**

This chapter presented a brief narrative on legacy carriers and low cost carriers and a review on studies on how their business models work. Studies on the sentiment consumers have towards airlines imposing fees, and the future of these and other fees on the airline industry were also discussed. Also a literature review of the relationship between load factor and stock price of the airlines, and a review on how the stock prices of airlines behave was presented. The chapter serves to provide the main framework with the evidence that can be used with the data analyzed and researched in future chapters.

## Chapter 3: Methodology

### 3.1 Introduction

This chapter presents the methodology used to test the main objective of this study; if the new pricing policy and ancillary fees in airlines have affected the airline's stock price in any way. The following sections will discuss the regression analysis and will define the variables, time period, and the population used in the study.

### 3.2 Regression Analysis

Regression analysis is a method used in statistics to show the relationship between several variables. It is the appropriate method of analysis when the research involves a single metric dependent variable presumed to be related to one or more metric independent variables (Hair, Anderson, Tatham, & Black, 1995). The variables are usually quantitative values, except in some cases where the independent variable can be qualitative.

The general expression for a general multiple regression model is,

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_t X_t + \varepsilon$$

Where,

Y= dependent variable

X<sub>i</sub>= independent variables, those that help predict the dependent variable

β<sub>0</sub>= the intercept or constant term

β<sub>i</sub>= slope or coefficient

ε= regression residual.

The average variation of  $y$  for every value of  $x$  is defined by  $\beta_i$ . In other words, the parameter  $\beta_0$  gives us the value of  $y$  when  $x$  is 0, and  $\beta_1$  thru  $\beta_4$  lets us know how much  $y$  increases with every increase in  $x$ . In this study, the regression model used is,

$$\text{Stockprice} = \beta_0 + \beta_1 \text{LoadFactor} + \beta_2 \text{Oilprices} + \beta_3 \text{BaggageFee} + \beta_4 \text{TypeCarrier} + \varepsilon$$

where *Stock Price* ( $Y$ ) is the dependent variable, specifically the natural logarithm of stock price (to normalize the fluctuations in stock prices). The independent variables *Baggage Fee* and *Type of Carrier* are dummy variables that measure whether the airlines impose a baggage fee (1) and if airlines are low cost carriers (1).

Furthermore, a regression model will be estimated for those airlines that charge a baggage fee to evaluate if this action affects the airline stock price. The regression model will consider data in a window of (-24, 24) months within the baggage fee imposition. The aforementioned model looks as follows,

$$\text{Stockprice}_i = \beta_0 + \beta_1 \text{LoadFactor} + \beta_2 \text{Oilprices} + \beta_3 \text{TypeCarrier} + \varepsilon$$

### 3.3 Assumptions

For the regression model to be estimated the assumptions discussed below need to be satisfied. These assumptions will be verified either by visual examination of data (using a chart or a plot), or from the values of statistical tests that will be explained in the following pages.

#### 3.3.1 Linearity

The relationship between dependent and independent variables can be correctly estimated only if it is linear in nature. A violation of this assumption will cause predictions with serious error. To see if the model has linearity, a scatterplot with

Regression Standardized Residual values on one axis, and the dependent variable on the other axis should be done. The points should be symmetrically distributed around a diagonal line in the plot.

Also, there is a statistical test known as the lack of fit test (provided by SPSS) which provide information to determine whether the pattern between the variables is linear. The null hypothesis for this test is that a linear model is appropriate, while the alternate hypothesis states that a linear model is not appropriate. Failure to reject the null hypothesis satisfies the assumption of linearity.

### **3.3.2 Normality**

Another assumption behind the estimation of a regression model is that the variables have normal distribution. If the variation from the normal distribution is large enough, resulting tests would be invalid because it causes errors in the estimation of coefficients and calculation of confidence intervals (Hair, Anderson, Tatham, & Black, 1995).

There are several ways to test this assumption. First, the kurtosis and skewness of the data can be examined. Skewness refers to the "lean" of a distribution--a positive skew indicates a longer tail to the right than to the left, and a negative skew indicates a longer tail to the left than to the right. Kurtosis refers to how "flat" a distribution is. In general, if kurtosis and skewness are not between -2 and +2, the data is too far away from a normal distribution and needs to be corrected before applying tests that have assumptions of normality. To verify this assumption, graphically a Normal Probability Plot will be made with observed and expected probabilities in its axis.

### 3.3.3 Multicollinearity

Multicollinearity occurs when variables are so highly correlated with each other that it is difficult to come up with reliable estimates of their individual regression coefficients. When two variables are highly correlated, they are basically measuring the same phenomenon or are providing the same information.

Multicollinearity inflates the variances of the parameter estimates. This may lead to lack of statistical significance of individual independent variables even though the overall model may be significant. *Variance inflation factors* (VIF) measure how much the variance of the estimated coefficients increased over the case of no correlation among the independent variables. If no two X variables are correlated, then all the VIFs will be one.

### 3.3.4 Homoscedasticity

This assumes that equal variance of the population error is critical to the proper application of linear regression so the variance of the error terms must appear constant over a range of predictor variables (Hair, Anderson, Tatham, & Black, 1995). In other words, the variance of errors is equal throughout the independent variables. This assumption is also known as homogeneity of variances. If this assumption is violated, there is heteroscedasticity which may lead to overestimating the goodness of fit of the model.

### 3.4 Data and Sample

To determine if airline stock prices have been affected by the new business models of charging for services, specifically baggage, a sample of airlines from United States, the European Union, and Brazil was studied. The sample includes both legacy and LCCs from the different geographical regions previously mentioned.

From the US, legacy carriers American Airlines and United Airlines were chosen for the study. Both companies are among the largest in the world in terms of revenue and passengers. At the beginning of the period under study were classified as the two largest airlines in the US and among the largest in the world. These airlines were also some of the legacy carriers to first implement baggage fees.

British Airways and Lufthansa were selected as the legacy carriers from the United Kingdom and Germany, respectively. These companies were chosen because other than being two of the oldest, largest, and most prestigious airlines in the European Union, they have code share agreements with other airlines analyzed in this research. British Airways shares codes with American under the OneWorld Alliance, and Lufthansa and United share codes under the Star Alliance brand.

As for low cost carriers (LCCs), Southwest and JetBlue were chosen from the US. Southwest became the first and most successful LCC during 1971, same year it was founded. The company started off offering passengers cheaper fares by taking out services that traditional (legacy) carriers offer. JetBlue, on the other hand, is one of the youngest carriers in the world and it has already proven to be successful. It follows the Southwest model, with low fares, good service, and many times flying to airports

that are not the main airport of the city, but are very close and easily accessible for the passenger, and cheaper to operate for the airline.

From the EU, Ryanair and EasyJet were selected as LCCs. Ryanair is Ireland's equivalent to Southwest, however, this LCC tends to go overboard with its ancillary fees when compared to other LCCs in the US and EU. EasyJet, although not as fee driven as Ryanair, still has a similar operating business model. For Brazil, low cost carrier Gol was selected. Gol is one of the newest carriers in the country and its low-cost model contributes to Brazil's legacy carrier Varig to go bankrupt. The LCCs used in this research are the five largest LCCs in the world (CAPA, 2011).

The variables analyzed in this research are defined in Table 3.1.

Table 3.1 Regression Analysis Variables

Variable	Symbol	Description
<b>Stock Price</b>	LnPrice	The natural logarithm of the monthly price of the airline's stock for the specific period point. This will be the dependent variable.
<b>Load Factor</b>	LoadFactor	Represents the monthly load factor for each airline during the period. Load factor is the percentage of seats filled by paying passengers.
<b>Oil Price</b>	OilPrice	Represent the dollar oil price during the period. US price was used for US and Brazil carriers, and EU price for the EU carriers.
<b>Baggage Fee</b>	BaggFee	Dummy variable that shows if the airline charged a baggage fee (1) or not (0) for the first piece of luggage.
<b>Airline Type</b>	TypeCarrier	Dummy variable that shows if the airline is a legacy (0) or a low-cost (1) carrier.



The data for the variables presented in Table 3.1 was collected from January 2006 to December 2011. The monthly historical data for stock prices was gathered from Yahoo! Finance, except for Gol's prices that were provided directly from the company. Stock prices are expressed in US dollars; appropriate conversion was applied to prices based on UK pounds or Euros. For Brazil, the company provided the prices in US dollars. Monthly oil prices were obtained from the Index Mundi website and load factors from airline reports and airline associations.

### **3.5 Expected Relationship among Variables**

When analyzing variables in a linear regression, it is expected that some of the variables would have positive relation, other negative relation. When an independent variable has a positive relation with an independent variable, the dependent variable would have a positive change. For example, if the independent variable, load factor has a positive relation to the dependent variable natural log of stock prices, when there is an increase in load factor, the stock price should increase as well.

For this research, it is expected that load factor and baggage fee will have a positive relation to stock price, while oil price is expected to have a negative relation to stock price. Other variables that are not currently being used but that affect stock price as well include unemployment rate, and purchasing power.

According to a study, the creation of ancillary fees on airlines does not always mean the airline will be profitable (Klophaus, 2010). Sometimes, the airline will have to increase the fare in order to make for the revenue lost when not everyone agrees to pay ancillary fees. In that study the author states that in the years prior to RYA's application

of baggage fee for checked bags, 80% of the travelers checked bags, while only 30% did so after the fee began.

### **3.6 Summary**

The purpose of this chapter was to describe the model that will be used in this research. It also presented the variables and data that will be used to estimate the model, and discusses the methodology that will be applied. The underlying assumptions for the regression model were discussed and the expected relationship between the variables was included.

## **Chapter 4: Results and Analysis**

### **4.1 Introduction**

This chapter presents the results from the estimated regression analysis to determine if the implementation of a baggage fee has affected the stock price of the sampled airlines. First, descriptive statistics for the data used in the regression are presented, and then the analysis and tests done on the data as explained on the previous chapter will be presented. Finally an interpretation of the model is included.

### **4.2 Descriptive Statistics**

For the study, a total of 647 monthly observations (72 months from January 2006 to December 2011 for each of the nine airlines except stock price data for UAL on January 2006) were used for each of the variables. The averages for these variables are shown in Table 4.1. All stock prices are presented in US dollars, the appropriate conversion was applied to those prices based on UK pounds or Euros. Stock prices for the Brazilian carrier were provided directly by the company and they were already expressed in US dollars. In the Baggage Fee column, the number represents the percentage of time during the studied 72 months that airlines were charging a baggage fee, only for one piece of luggage. For example, American Airlines charged a baggage fee during 59.72% of the time period analyzed.

As it is noted in Table 4.1, the airline with the highest stock price during the period was EasyJet, while JetBlue has the lowest stock price for the period. The same airline had the highest average LF during the period as well, meaning that they have the larger amount of paying seats during the analyzed period, as compared to the other airlines. Gol, at 68.15% seemed to have a relatively low LF when compared to the rest

of the airlines in the group.

Table 4.1 Descriptive Statistics: Airlines

<b>Airline</b>	<b>Stock Price</b>	<b>Load Factor</b>	<b>Baggage Fee</b>
<b>American Airlines</b>	13.0789	.8240	.5972
<b>United Airlines</b>	23.1504	.8304	.5278
<b>JetBlue</b>	7.2083	.8125	0
<b>Southwest</b>	12.3126	.7537	0
<b>British</b>	24.4261	.7772	0
<b>Lufthansa</b>	18.1410	.7853	0
<b>Ryanair</b>	36.0114	.8169	1
<b>EasyJet</b>	728.1865	.8536	.7361
<b>Gol</b>	17.0885	.6815	0

For all the airlines as a group, a descriptive statistics table was prepared as well. As Table 4.2 demonstrates, during the 72 month period of the study, the average stock price was \$97.73 with standard deviation of \$240.27. The high numbers in this SD relate to EasyJet having a very high stock price. The mean LF was 79.28% for the period and here the deviation among the group was noted as 6.8%. As it was explained before, the Oil Price variable included the price in US for the US carriers and the price in EU for the EU carriers. The mean value for these variables was \$78.97 in the US and \$81.12 in the EU, with a SD of \$20.14 and \$22.70 respectively. The type of carrier variable shows a value of .5564, meaning that approximately 56% of the airlines in the study are LCCs.

Table 4.2 Descriptive Statistics: Total Sample

Variable	Mean	Standard Deviation
Stock Price	97.734	240.27
Load Factor	.7928	.06767
Oil Prices (US)	78.972	20.142
Oil Prices (EU)	81.121	22.704
Type Carrier	.5564	.49719

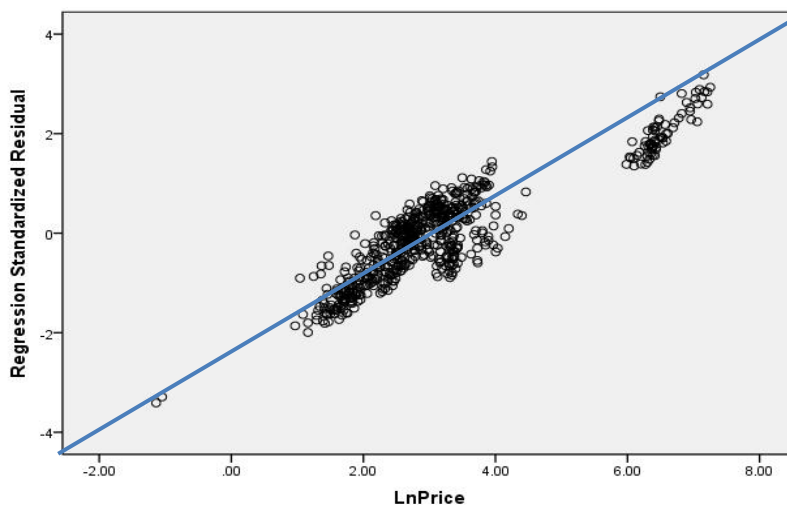
### 4.3 Analysis of Assumptions

The following section present the analysis of the underlying assumptions for the multiple regression model that were explained in Chapter 3

#### 4.3.1 Linearity validation

As mentioned in Chapter 3, a way to validate that the model has linearity is to analyze a scatterplot with Regression Standardized Residual on one axis and the dependent variable, in this case LnPrice on the other axis. If the point formed an oval around the diagonal line the model has linearity. Figure 4.1 provides the evidence necessary that the model achieves linearity in the regression. As illustrated in the chart, the points all fall around. The diagonal depicted in the chart form a sort of oval on the middle of the chart.

Figure 4.1 Scatterplot Dependent Variable



As shown in Table 4.3, in the lack of fit test, the probability of the F test statistic ( $F=1.247$ ) was  $p = .181$ , greater than the alpha level of significance of 0.01. As explained in chapter three, section 3.3.1 the null hypothesis that "a linear regression model is appropriate" is not rejected. The research hypothesis that "a linear regression model is not appropriate" is not supported by this test. Thus, the assumption of linearity is satisfied.

Table 4.3 Lack of Fit Tests (Dependent Variable: LnPrice)

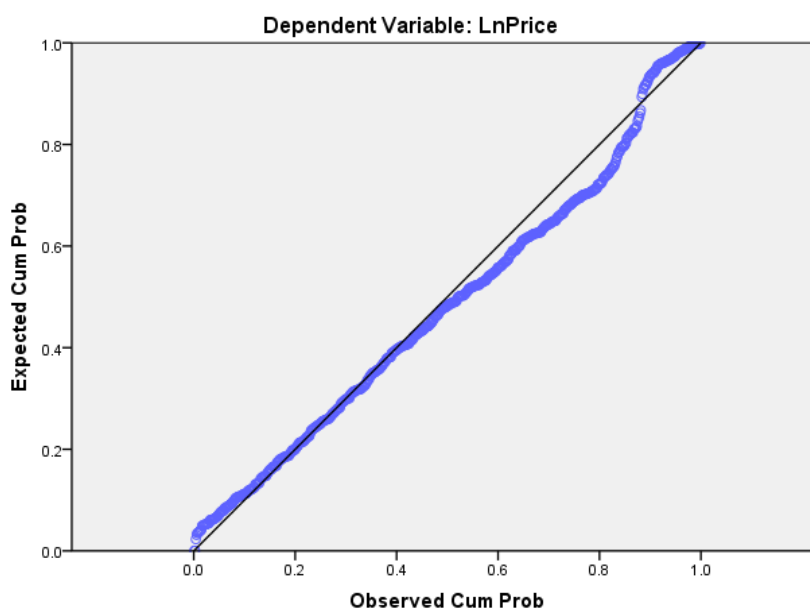
Source	Sum of Squares	Degrees of Freedom	Mean Square	F	Significance
Lack of Fit	950.947	597	1.593	1.247	.181
Pure Error	57.499	45	1.278		

### 4.3.2 Normality validation

To verify the assumption of normality a Normal Probability Plot was created. One of the axes of the plot has observed probabilities while the other axis has predicted probabilities. If normality were to be validated, data should fall around a diagonal line within the chart. Points on a straight diagonal line equal a good bell shape and normal distribution.

This assumption can be verified in Figure 4.2, which has a straight diagonal line in the chart. In just one small area of the chart it does not follow the straight line. Still the model is considered normally distributed.

Figure 4.2 Normal Probability Plot of Regression Standardized Residual



Additionally, we test both the skewness and kurtosis of the variables, and the statistics fall between the accepted range of -2 and 2, so it can be stated that our sample is normally distributed, as shown in Table 4.4.

Table 4.4 Skewness and Kurtosis

Variable	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
LoadFactor	648	-.868	.096	.956	.192
BaggFee	648	.784	.096	-1.390	.192
TypeCarrier	648	-.224	.096	-1.956	.192
LnPrice	647	1.361	.096	1.817	.192
Valid N (listwise)	647				

#### 4.3.3 Multicollinearity validation

The collinearity statistics shown on Table 4.5 gives insight to validate this assumption. Since there is no sharp drop in the partial and part values from the zero-order, then the variance in one variable is not explained by other variables. The Tolerance statistics also support the assumption because it is the percentage of the variance in the predictor that cannot be explained by other predictors. As shown the tolerances are pretty high. Finally a Variance Inflation Factor (VIF) value over 2 automatically considers the test problematic. The values here are not considered high so it means there is no multicollinearity.



Table 4.5 Correlations and Collinearity Statistics

Variables	Correlations			Collinearity Statistics	
	Zero-Order	Partial	Part	Tolerance	VIF
<b>Load Factor</b>	.297	.265	.247	.795	1.257
<b>Oil Price</b>	-.030	-.073	-.066	.989	1.011
<b>Baggage Fee</b>	.290	.290	.147	.818	1.223
<b>Type Carrier</b>	.226	.226	.251	.956	1.046

#### 4.3.4 Homoscedasticity validation

As with linearity, Figure 4.1 can demonstrate that the model has homoscedasticity by having all the points fall around the line in the chart. If the points fanned out or formed a bow, heteroscedasticity would be achieved.

#### 4.4 Analysis of Data

Table 4.6 presents the results of the estimation of the regression models. Column A showed the coefficients for the general model, which attempts to identify which variables, if any, might impact the airline stock prices. According to the model, all variables have a significant impact on stock price. The variables that impact the most the airlines' stock price are load factor, baggage fee and type of carrier. All these variables seemed to affect positively the stock price, and all were significant at the one percent level. In other words, an increase in the amount of paying passengers in airlines flights seems to increase the company's stock price. This analysis parallels research done previously where it has been concluded that an unpredicted improvement in load factor can improve stock price (Williams, Ramdas, Li and Lipson,,

2011). As expected, increases in oil price seemed to decrease airlines stock price (oil price coefficient is negative and significant). This relation was expected since increases in oil prices affect directly the operating profit of the airline as was mentioned in previous research (Unnikrishnan, 2011) (Tarry, 2011). Note, that according to our model, the imposition of a baggage fee seemed to impact positive and significantly the stock price.

To analyze whether the baggage fee imposition has any impact on the stock prices two additional models were estimated. Results are shown in Columns B and C. To obtain the estimates for Column B, the sample was restricted to evaluate only whether the dummy variable baggage fee was equal to 0, meaning there was no baggage fee at the time. Similarly, to the general model all variables seemed to affect significantly airlines' stock price, although a change in sign occurred for the dummy variable, type of carrier. At this time, the estimates showed that being a low cost carrier affects negatively the stock price. Both load factor and oil prices kept the same contribution to stock price, positive and negative, respectively.

When analyzing exclusively the sample where the baggage fee variable equals one (meaning there is a baggage fee in place), oil price does not longer impact the airline stock price, although it has a positive coefficient. As Column C shows both load factor and type of carrier contribute in a positive way to stock price behavior, having positive and significant coefficients. According to the coefficient of type of carrier, stock price would increase approximately 2.6 percent whenever the carrier is a LCC. This may occur due to the fact that LCCs are expected to have fees.

However, it can be argued whether the low significance in the After Baggage Fee Model is related to the fact that airlines can offset the amount of profit lost from the increased oil price with the imposition of the fee.

The variable that identifies the type of carrier showed a high significance level in all three models and a positive relation in the All Sample and After Fee Model. The Before Fee Model showed a negative relation between type of carrier and stock price, meaning that when airlines did not have a baggage fee, being a low cost carrier would affect negatively the stock price.

Table 4.6 Regression Models Results

Variable	(A) All Sample	(B) Before Fee	(C) After Fee
<b>(Constant)</b>	-1.567 ** (.659)	1.297 ** (.605)	-4.165 *** (1.475)
<b>Load Factor</b>	5.689 *** (.817)	3.162 *** (.733)	7.275 *** 1.801
<b>Oil Price</b>	-.005 * (.002)	-.010 *** (.002)	.003 (.004)
<b>Type Carrier</b>	.717 *** (.101)	-.231 ** (.099)	2.593 *** (.173)
<b>Baggage Fee</b>	.483 *** (.117)		
<b># Observations</b>	647	206	441
<b>R squared</b>	.190	.096	.553
<b>Notes:</b> Standard errors are shown in parenthesis. ***, **, * equals significance at 1, 5, and 10% respectively.			

To further analyze whether airline stock prices were affected by the imposition of baggage fees, a similar analysis was performed on those airlines that charged a baggage fee. From the sample only American Airlines, United Airlines and EasyJet

Airlines were evaluated. For this, a window of 24 months (prior and after) the imposition of the fee was evaluated (except for EasyJet where prior data was only available for 19 months).

As shown in Table 4.7, it seems that before the baggage fee imposition (Panel A), only oil prices affect negative and significantly stock prices for all three airlines. The load factor seemed to affect positively the stock price of American and EasyJet, but the coefficients were not significant. After the fee imposition, load factor seemed to affect negatively the stock price of all airlines, but only has a significance on American and slight significance on EasyJet. Oil prices demonstrated to have a positive and significant impact on stock prices of United Airlines and EasyJet, as opposed to its behavior before the fee imposition.

Table 4.7 Regression Model Results per carrier

Variable	(A)			(B)		
	Before Baggage Fee			After Baggage Fee Model		
	American	United	EasyJet	American	United	EasyJet
<b>Constant</b>	4.554 *** (.599)	7.605 *** (1.590)	7.666 *** (1.301)	4.632 *** (1.260)	3.035 (2.627)	8.302 *** (1.481)
<b>Load Factor</b>	.279 (.720)	-2.922 * (1.952)	1.402 (2.092)	-4.056 *** (1.626)	-3.322 (3.368)	-2.794 * (1.791)
<b>Oil Price</b>	-.022 *** (.002)	-.022 * (.003)	-.031 ** (.016)	.008 *** .003	.031 *** (.009)	.006 *** (.003)
<b>R square</b>	.904	.716	.234	.006	.499	.200
<b>F</b>	98.569	26.505	2.440	.117	17.440	6.245
<b>Notes:</b> Standard errors are shown in parenthesis. ***, **, * equals significance at 1, 5, and 10% respectively. Based on a window of 24 Months prior and after fee Implementation.						

When considering the EMH with the results obtained, it can be argued that investors rely on news from oil prices to make decisions on their investments on airlines' stocks. Information is easily available, so it might direct to take an increase in oil price as a warning of a lower profit for the airlines, but being public information, market absorbs rapidly any changes, not providing a lot of margin for variation.

## Chapter 5: Conclusion and Recommendations

### 5.1 Conclusions

This research studied whether the implementation of a baggage fee by airlines has affected, positive or negatively, the airline's stock price. A regression analysis was conducted to study this objective (All Samples), and another regression was estimated to determine the impact of the fee on the airline's stock prices prior to (Before Fee) and after (After Fee) the implementation of the fee. Finally, a linear regression analyzed the impact of the baggage fee imposition for those airlines that had a period where the companies had no fee and when they started charging the fee during the study. The regression analysis included monthly data from January 2006 to December 2011 for legacy carriers and low cost carriers in the US, EU and Brazil.

Results of the regression analysis for the All Sample showed that all of the variables (load factor, oil price, type of carrier and baggage fee) used in the regression were significant to the model at various levels. However, before the imposition of the fee all the variables were significant to the model. For the After Fee Model, oil price was not a significant determinant of stock price, which was different from what was expected. It can be argued that for the market the fee was a better predictor of stock price rather than oil price. According to these regressions, the OilPrice variable seems to significantly affect stock prices only when the carrier does not have a baggage fee.

For those airlines that had a baggage fee during the period studied, results showed that oil prices affect negatively stock prices before the baggage fee. Contrasting to the general model, oil price seems to not affect adversely the stock price after the fee imposition, because oil price behavior significantly increases stock prices.

These results might interest airlines executives on how they determine the imposition of further fees, and how this action might impact the company's stock prices. Due to the nature of the industry, and the relevance that oil price behavior has on airlines operations, it is suggested that airlines develop strategies that align their profit expectations with consumer sentiment and market behavior.

## **5.2 Future Recommendations**

This research may offer some awareness of the effects these fees may ultimately have on the price of airline stocks. It was shown that baggage fee does have a positive effect on stock price through the regression analysis done. In order to analyze the outcome of the fees more accurately, future research should give focus to a bigger sample of airlines. Baggage and ancillary fees are relatively new subjects which have constant changes as more airlines continue to add them to their business models.

Future research should also include more variables that may affect the price of stocks. Economic variables like GDP and unemployment rate should be included as they affect the amount of people that travel by air. Furthermore, there are variables within the airlines that consist of fees other than baggage. Some of these that could be included are reservation fees and seat selection fees. Finally, the amount of data taken should go back to before 2001, when airlines were performing better financially.

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