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Leasing in low-cost carriers

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Abstract

The aim of this paper is to explore the use of aircraft leasing as a financing instrument in the low-cost carriers' sector. These airlines have been showing a huge growth in the customers' preferences, while aircraft leasing plays a relevant role in the financing options of airlines. In this study we determined that lease future commitments represent on average 80% of other debt commitments in low-cost carriers. Furthermore, we discovered that the leasing rate in low-cost airlines (49%) is superior to the global average (39%), partly explained by the lower capital requirements that a lease offers comparing to a purchase. We found a high negative correlation between average fleet age and use of leasing. The reason is that leases allow the airlines to renew the fleet more easily and get younger aircraft (in fact, 67% of the leased aircraft are newly-manufactured, something unlikely to happen with purchases). Negative correlations were also found between use of leasing and the variables of fleet size, on-time performance, profit margin and debt ratio, but without statistical evidence. Use of leasing is best explained by average fleet age and fleet size, meaning that variables related to the constitution of the fleet are better in explaining the use of leasing by low-cost carriers than performance or financial measures.

Keywords: aircraft leasing, financing instruments, airlines, low-cost carriers

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List of abbreviations

LCC – Low-cost carriers

FSC – Full service carriers

RPK – Revenue Passenger-Kilometers

ASK – Available Seat-Kilometers

LIBOR – London Interbank Offered Rate

AAII – Ascend Aircraft Investment Index

CHAPTER 1: INTRODUCTION

The aim of this paper is to explore the topic of aircraft leasing in low-cost carriers, hereafter referred to as LCC. Leasing embodies the alternative that airlines have to the typical aircraft purchasing option. Decisions concerning aircraft asset management are within the most crucial ones that airlines need to make, representing a huge relevance in the definition of their strategy.

Aircraft leasing has become an important tool for the airline industry. There are several reasons that explain airlines' preference for this alternative source of financing. Firstly, lease gives them a higher flexibility to adapt the fleet to market demand. To have the possibility of changing size and composition of the fleet is something that attracts airlines and the more owned airplanes they have the harder this becomes. Secondly, leases allow airline companies to save money that otherwise would need to be invested in the acquisition of airplanes. This is particularly relevant, as a purchase demands high capital requirements that LCCs cannot afford. Thirdly, because this kind of leasing is an asset based financing, the airlines are able to generate cash flows from the business operations and asset exploitation (asset turnover), allowing them to afford the lease payments. These are three important benefits that lease offers, but more are going to be explored throughout the paper.

With all these advantages it is not hard to understand why aircraft leasing penetration rate is nowadays 39% (according to Ascend, a leading provider of expert advisory and valuations services to the global aviation industry), meaning that, on average, airlines fully own 61% of their fleet. However, the same source reveals that the leasing rate has never been this high. For example, back to the early 1980s only 2% of the global fleet was leased.

The air transport has been evolving and its numbers show a remarkable evolution. (See Appendix I) World's revenue passenger-kilometers (RPK) have exponentially grown since 1950. For flying to become a more regular activity a whole set of historical developments in the airline industry had to happen.

Liberalization of air transport and signing of multilateral agreements contributed to the removal of administrative barriers that have been blocking

the development of air transport. The airline deregulation began in the U.S. in 1978, with the Airline Deregulation Act, and spread across other regions of the world. In 1993 the European aviation market was deregulated and more recently, in 2009, ten members of ASEAN (Association of Southeast Asian Nations) approved a multilateral open sky agreement.

As a goal of liberalization there were no more restrictions for founding companies, the airlines were free to establish new routes and free pricing. The recently-founded LCCs adopted the point-to-point system and started their operation with a unique business model (Cento, 2009). The liberalized market allowed LCCs to pick up the price-sensitive market share offering cheaper tickets (Pels, 2008). Therefore these deregulations encouraged the creation of new carriers, particularly those following a low cost strategy.

The LCC concept was pioneered by Pacific South West and copied in 1973 by Southwest Airlines, becoming this way the oldest LCC still in activity and consequently a business model followed by dozens of new airlines. In 1995, the LCC concept arrived to Europe with the adoption of that model by Ryanair (Decker, 2004).

With the generalization of flying, more and more passengers prefer LCCs over others in order to save considerable amounts of money. Flying low-cost is not restricted to the leisure sector, since even businessmen are targeted (Mason, 2001). It is in this context that LCCs are playing a growing influence in the airline industry.

As we will see later, Southwest Airlines, Ryanair, JetBlue Airways, easyJet and Gol lead the ranking of the most successful LCCs. Together with other big LCCs, they are nowadays crucial in the airline industry, and their success indicates that customers seem to be happy with their existence. For instance, the leaders of both domestic and international travels by number of passengers are LCCs.

In that sense, this paper deals with a current hot topic and is surely relevant as part of the study of this phenomenon of success which are the LCCs. The paper will let us understand what strategies are being taken by LCCs' managers towards aircraft leasing.

Further, the use of aircraft leasing throughout the 125 existing LCCs will be analyzed. We will observe which variables show higher correlation with use of leasing and which ones explain it more accurately. Variables such as fleet size, average fleet age, on-time performance, profit margin and debt ratio will be analyzed. Comparisons with full service carriers (FSC) industry will be made throughout the paper.

The upcoming section is destined to literature review on the important topics to this paper. Here, concepts will be explored and the hypotheses for our research will be shown. Methodologies and ways of conducting the research are describing in the following section. Afterwards, chapter 4 is where the results on the research topic will be displayed, together with an analysis on them. This section also includes an overview as well as forecasts for the leasing market, which are followed by the concluding thoughts.

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Low-cost carriers' features

Sometimes common knowledge misunderstands the concept of LCC, connecting an airline that offers cheap flights to an LCC. This point of view is only one-sided thus it is important to explore the whole concept.

Gábor (2010) provides a thorough description of the LCC concept. The LCC is defined as an airline designed to have a competitive advantage in terms of costs over the FSC. An LCC relies on a simple firm organization and logistic principles. In contrast to traditional carriers, LCCs offer connections from secondary airports, i.e., smaller airports which are less expensive in terms of landing tax and handling fee. In addition, LCCs avoid airport congestion, which causes costly delays at hubs. By choosing secondary airports, LCCs can achieve fast turnarounds (20-30 minutes) and pay less for leasing airport facilities. Low airport lease rates and gate costs also contribute to the lower cost structure of LCCs. The fleet generally includes one type of aircraft that operates more hours a day comparing to FSCs in order to maximize the utilization on a daily basis. Furthermore, the LCC product is much less differentiated (extra services, when available, are charged) and distribution is as simple as possible, by making use of electronic tickets and Internet direct sales. This option was something impossible in the past, so Internet represented a catalyst for the spread of LCCs. The lower cost structure can be quantified by aggregating the cost savings of point-to-point networks, savings from not providing numerous add-on services and wage savings (LCCs have less employees per ASK - Available Seat Kilometer - and these have lower wages).

Dobruszkes (2006) gives a summary about how LCCs operate. These companies have the strategy to increase output and productivity. Besides the lower costs stated above, LCCs achieve density economies by maximizing flying time. In 2004, Ryanair, easyJet or Norwegian airplanes have flown 11 hours/day on average, against 9.2 for British Airways or 7.7 for Brussels Airlines. Also, LCCs show better occupation rates: the low prices ensure good load factors to the airlines which make the most of a demand-adapted network. Another aspect referring to the working methods are the incremental

revenues: LCCs have set up reservation centers via Premium Rate Services from which the airlines profit. They offer direct or indirect services such as car rentals or hotel reservation. Finally, they rent advertising possibilities on board or on Internet sites.

Doganis (2006), after deducting all the cost reductions that an LCC achieves relatively to an FSC, estimated that unit costs for LCCs are 51% below that of FSCs. Higher seating density clearly represents the most relevant of all the cost advantages that LCCs possess. (See Appendix II)

Trubbach (2013) studied that leading LCCs with enough funds to cover the acquisition costs of newly built aircraft mostly are using their aircraft for a few years before selling them again given they originally got major discounts by the manufacturers. This allows them to operate at the lowest possible operating costs. Most LCCs do not have the financial resources though and are often not yet able to execute a similar fleet strategy when they start-up. They have to buy or lease second-hand aircraft. This obviously generally leads to higher operation costs compared with carriers with brand-new fleets. In some exceptional circumstances, airlines with older fleets can operate more efficiently than those with newer fleets because of average sector lengths and fleet utilization. But these carriers often are more hybrid and leisure carrier than LCCs. As the LCC sector continues to grow, smaller carriers with older fleets will be at a disadvantage. The competition, which gets tougher and tougher each year, will squeeze smaller carriers out of the markets. According to the author, large LCCs like Ryanair will dominate the market, which in addition to their cost savings in aircraft costs also have other cost advantages (larger and unique fleet allows lower training and maintenance costs as well as purchasing aircraft in bulk). Still it will be no death warrant to be a small carrier, but the times where the world had many small LCCs are definitely over, in the author's opinion.

Recently, with the economic crisis, Vidovic, Štimac, and Vince (2013) studied whether LCCs changed their business model, becoming hybrid carriers and concluded that these airlines started moving towards that direction. They started offering seat reservation, audio and video entertainment, loyalty programs or transfer flights, among others. Other aspects like transportation of passengers and cargo on the same flight,

introduction of long-haul flights or cooperation with travel agencies also help support this argument. In addition, the study considers that differences between original LCCs and FSCs will become smaller and smaller.

A survey by Sarker, Hossan, and Zaman (2012) found out that industry specialists and consumers both believe that LCCs have benefited the industry by providing low fares and made air travel affordable. Industry specialists believe therefore that LCCs should revolve around the LCC basic model rather than transforming into FSC. The research also recommends that LCCs should formulate cost differentiation strategy for future growth and sustainability as well as identifying new sources of ancillary revenue or setting up innovative student promotional offers for student customers as they extensively use LCCs owing to their budget control issues.

2.2. Low-cost carriers' performance

Air transport has always been considered as a very special sector in the international context. It has been a dominant factor in the process of globalization. Market deregulation and open skies agreement contributed for its growth. In particular, deregulation nurtured the growth of LCCs in the domestic market (Hannon, 2009).

CAPA Centre for Aviation displays the exact data about LCC penetration, measured by seat capacity. (See Appendix III) LCCs now account for around 26.2% of global capacity. In 2001 the penetration was only 8% but a continuous growth of 227% in only 11 years' time gave relevance to the low-cost sector within the global airline industry. The same source also provides the share of LCC in different geographies. (See Appendix IV) It is observable two different types of influence of LCCs. In West Europe, South-East Asia, Latin America and North America, the influence is high (30% to 38%), while in Africa, Middle East, North-East Asia and East Europe, the influence is low (3% to 12%). Consequently there are plenty of opportunities for LCCs to grow their influence in the last group. On the other hand, West Europe represents the biggest increase since 2001 and is now the region with the highest share.

Now we will look at the biggest LCCs and observe their capacity growth between 2011 and 2012. In order to measure the size of the airlines Available Seat Kilometers (ASK) per week will be used:

ASK = Available seats x Kilometers flown by the seat

The ranking provided by CAPA Centre for Aviation (source: Innovata) determines the 25 biggest LCCs in terms of ASK. (See Appendix V) On the top of the table comes the reference airline of the sector, Southwest Airlines, which remains comfortable in the lead of the ranking with 1.8 billion ASK ahead of their pursuer, the Irish-based airline Ryanair. Southwest Airlines accounted for an annual growth of 7.3% in 2012, while Ryanair shows a similar, but negative change. The latter sees its position threatened by both JetBlue Airways and easyJet that show a slight increase and come in third and fourth places respectively. The Brazilian airline GOL saw its capacity decrease 9.3%, but still enough to retain the fifth position. The two following places are occupied by two LCC that showed relevant progresses on their ASK: the Indonesian Lion Air and the Australian-based Jetstar, overtaking AirTran Airways and Westjet. Other annual growths above 10% come a bit from everywhere: United States, Mexico, India, Malaysia, United Arab Emirates, Spain and Norway.

Even though the top-25 LCCs achieved a relevant ASK growth of 5.9% last year, the truth is that the low-cost sector decreased 0.3%. These figures show the existing disparity within LCCs, where bigger carriers are doing well in general (from the top-25 only 6 showed negative annual change), while smaller carriers seem to be struggling. Therefore smaller carriers are pulling the LCCs' performance downwards, especially when we compare to the average growth from all the aviation industry (3.6%).

Furthermore, only 8 LCCs perform amongst the world's top-50 airlines, measured by ASK, and only 2 amongst the top-25. This shows that, despite of the several advancements done in the low-cost sector, the airline industry still offers good opportunities for LCCs to grow and to steal customers from FSCs.

As LCCs operate generally operate short-haul flights, it is important to take a look at another ranking, this time measured by number of passengers carried. (See Appendix VI) Here, LCCs occupy the leading positions in both domestic and international travel: Southwest for domestic flights and Ryanair for international flights, the American LCC being the overall leader with more than 110 million passengers carried during 2012. These rankings demonstrate the importance of LCCs nowadays and again show that even though the sector

is not homogeneous concerning success, there are a few airlines doing very well.

Finally, Hüschelrath and Müller (2011) found that FSCs and LCCs each entered about 1,200 non-stop routes between 1996 and 2009. While entry activity of FSCs was much more pronounced between 1996 and 2003, LCCs have entered more markets per year since 2004. On the other hand, exit activity is much more pronounced for FSCs with in sum about 2,250 route exits, compared to only 391 exits on the side of the LCCs.

2.3. Operating and finance lease

International Accounting Standard (IAS) 17 dating from 2010 states that "a lease is an agreement whereby the lessor conveys to the lessee, in return for a payment or series of payments, the right to use an asset for an agreed period of time". Leasing agreements can be divided into two major categories, finance leases and operating leases. Finance lease is defined by the IAS 17 as "a lease that transfers substantially all the risks and rewards incidental to ownership of an asset. Title may or may not eventually be transferred". Ownership risks and costs include accountability for loss, wear and tear, and obsolescence, whereas ownership benefits encompasses the right of use, gains from asset value appreciation and possession of the property title. On the contrary, as lessors retain ownership, operating leases separate the legal ownership of an asset from its economic use and so the asset is an inherent form of collateral in that type of contracts (Graham, Lemmon, and Schallheim, 1998; Sharpe and Nguyen, 1995).

There is another important difference between these two types of leasing, which is the fact that operating lease is not capitalized by the lessee, meaning that it does not appear on the balance sheet of the companies, i.e., off-balance sheet financing (though the finance obligations associated continue to be present). For this reason, and according to Gritta, Lippman, and Chow (1994), between 1969 and 1991 the percentage of operating leases in total leases in the US increased from 13% to 82%. Other benefits such as no residual value risk or lower financial outlay requirements help explain this growth.

2.4. Leasing as debt substitute or complement

Hypothesis 1: Leasing is negatively correlated with debt ratio

The relationship between lease and debt has generated a lot of discussion. Many authors go against the traditional finance theory and raised the argument that leases complement debt, which is the case of Eisfeldt and Rampini (2009) who proved that, due to the ability to repossess the asset, the debt capacity of leasing is higher than the capacity of security lending.

Likewise, Lewis and Schallheim (1992) show that leasing can increase a firm's debt capacity by selling excess non-debt tax shields. They conclude that leasing and borrowing can be complementary within the firm's optimal capital structure.

Consistent with these predictions, Ang and Peterson (1984) find leasing to be positively related to the firm's debt ratio: lessee firms used more long-term debt than did non-leasing firms.

Yan (2006) presents a model to incorporate different theories on the substitutability and complementarity between leases and debt. The findings suggest that leases and debt are substitutes instead of complements. The paper also investigates the variation in the substitutability between leases and debt, and finds that in those firms with more growth options or larger marginal tax rates, or in those firms paying no dividends, the substitutability is more pronounced, i.e., the cost of new debt increases to a larger degree with extra leases.

Oum, Zhang, and Zhang (2000) concluded that the debt capacity of the firm is not increased by operating leases, thus in such cases debt and leasing seem to be substitutes. Marston and Harris (1988) also found empirical evidence of substitutability between leases and debt by focusing on changes in lease ratios rather than on levels. Results from Deloof, Lagaert, and Verschueren (2007) too provide strong support for the substitution hypothesis: more debt is associated with fewer leases.

Beattie, Goodacre, and Thomson (2000) determined that leasing and debt are partial substitutes, with £1 of leasing displacing approximately £0.23

of non-lease debt, on average, consistent with the argument that lessors bear some risks which are not inherent in debt contracts.

Erickson and Trevino (1994), this time through an exclusive analysis of the airline industry, achieved results indicating that leasing is significantly and negatively related to the current debt to asset ratio. In other words, leases and debt are substitutes.

It is difficult to decide for one of the sides since both arguments seem reasonable but one aspect is true for any case: as operating lease hides future obligations, companies present lower leverage ratios, which usually leads to an increase in the share price. The traditional finance theory and the last paper (since it studied about the airline sector) were taken into account. This way, we are going to test the hypothesis of substitutability between leasing and debt. According to the literature, we are going to observe the effect of leasing on the debt ratio of an airline.

2.5. Aircraft leasing

Regarding the topic of aircraft leasing, which is central in this paper, there is relevant literature describing its patterns.

Gritta and Lippman (2010) give an historical perspective of the evolution of the aircraft leasing since 1960s. Back then, many carriers employed finance lease as an alternative source of funds to acquire aircraft. It had a major advantage over purchasing the aircraft, since it was off-balance sheet financing: the obligations under this type of lease appeared only in the footnotes to carrier balance sheets. Little use was made of short-term lease agreements during this period. The situation has changed radically over the past three decades. Since 1976 finance lease are required to be reported as both a leasehold asset and a long-term liability. In response, the carriers substantially altered the way they finance airplanes. Airlines began to use more shorter-term operating leases, which are not reported on companies' balance sheets. By strategically violating the criteria for capital leases, the airlines once again pushed the leases off the balance sheet.

Mancilla (2010) reviews aircraft asset management strategies and programs implemented by airlines in today's difficult business environment. Aircraft asset management tools could be an important factor to be taken into

account as part of the airline strategy and management decisions, notably during downturns. Indeed, empirical data suggests that airlines changed their approach during the recent economic crisis. The author found a decrease in demand for leased aircraft which supports the idea that operating leases are a key management tool during market downturn because it permits airlines to decrease capacity without bearing the aircraft asset value risk. This decrease was more notorious in the most affected regions by economic crisis such as Europe and North America. Conversely, in emerging markets such as Asia Pacific (notably China) and Latin America airlines fleet grew and the number of aircraft under operating lease either increased or did not change.

Oum, Zhang, and Zhang (2000) performed a study about the optimal demand for operating lease of aircraft, an instrument which gives the airlines flexibility in capacity management. However, airlines pay a risk premium to the leasing companies for bearing part of the risks. Thus, the airlines face a trade-off between flexibility of capacity and higher costs. This paper develops a model for the airlines to determine their optimal mix of leased and owned capacity, taking into consideration that the demand for air transportation is uncertain and cyclical. Empirical results based on the model suggested that the optimal demand by 23 major airlines in the world would range between 40% and 60% of their total fleet, for the reasonable range of premiums of operating lease. For leasing companies, this indicates huge potential of the market given strong forecast for the growth of air transportation in the next decade.

Clark (2007) explains a relevant advantage of aircraft lease against a loan. Under a loan structure the repayments are made with constant principal and declining interest, whereas under a lease structure the repayments are of a mortgage style, with constant payments. The disadvantage of the loan structure is that it places a burden on the airline cash flow in the early years, thus the constant payment stream of the lease structure is often the preferred option.

Gavazza (2010) empirically analyzed how the liquidity of the asset - in this case, aircraft - affects whether or not carriers lease the aircraft they operate, the optimal maturity of lease contracts and the markups of lease rates over aircraft prices. The evidence suggests that more-liquid aircraft are

more likely to be leased, particularly through operating leases; have shorter operating leases; have longer capital leases; and command lower markups of operating lease rates.

In a different paper, Gavazza (2010) constructed a dynamic model of transactions in used capital to understand the role of leasing when trading is subject to frictions. The model determined that leased assets trade more frequently and produce more output than owned assets, for two reasons. First, high-volatility firms are more likely to lease than low-volatility firms, since they expect to adjust their capacity more frequently. Second, ownership's larger transaction costs widen owners' inaction bands relative to lessees'. The author also found that leased aircraft have holding durations 38% shorter and fly 6.5% more hours than owned aircraft.

Gilligan (2004) found an inverse relationship between depreciation and trading volume for less reliable brands of used business aircraft. Conversely, the author found an increase in the direct relationship between depreciation and trading volume for aircraft models with relatively high lease rates. Together these findings suggest that adverse selection is a prominent feature of the market for contemporary used business aircraft and that leasing mitigates the consequences of asymmetric information about the quality of used durable goods.

Hypothesis 2: Leasing is negatively correlated with fleet size

Erickson and Trevino (1994) used the airline industry in order to examine what determines the importance of leasing in a company. The paper found that operating leases are used by smaller firms, non-tax paying firms and firms experiencing more rapid sales growth.

Eisfeldt and Rampini (2009) came to the conclusion that the fraction of capital that firms lease is significantly related to firm size, decreasing from 46% for small firms to 11% for large firms.

Sharpe and Nguyen (1995) also found that the use of operating leases is negatively related to firm size, since firm size is likely correlated with financial, but also other, factors that influence the lease-versus-buy decision. The authors, who took turnover as measure of size, claimed that more asymmetric information lies between the firms and its debt holders in case of smaller than

do larger firms. Resulting in asset substitution problem for smaller firms more than larger firms and ultimately tends the smaller firms to lease more assets.

Adams and Hardwick (1998) further added that smaller firms may use certain assets only partially and may find these assets un-useful in future and therefore leasing could compensate the acquiring and disposing costs of those assets for smaller firms. Investigation explored a controversial relationship of leasing and size of firm as a deterministic variable.

Lasfer and Levis (1998) too reported a negative relationship between firm size and leasing while suggesting that smaller firms are much more in need for leasing than do larger firms.

All these papers head towards the same direction, leading us to test a negative correlation between use of leasing and airline size, measured by total fleet. In our tests it is going to be determined how the size of the airline affects its use of leasing.

Hypothesis 3: Leasing is negatively correlated with average fleet age

Gilligan (2004) analyzed the relationship between leasing percentage and age of aircraft and observed that the leasing percentage is fairly constant in the data over the age of aircraft.

Later on, Gavazza (2010) empirically showed that leased aircraft are, on average, about 1.5 years younger than owned aircraft.

This way, it is going to be tested whether airlines with older fleets own a bigger proportion of their aircraft than airlines with younger fleet. The rationale is that leasing activity is more pronounced in young aircraft, i.e., the decision between owning or leasing an airplane is explained by its age. We hypothesize that airlines with older aircraft either own them for a long time, without being active in the leasing market recently, or purchase old, second-hand aircraft at much lower rates. On the other hand, airlines with younger fleet are thought to be more active concerning aircraft replacements, thus making a higher number of leasing agreements.

2.6. Financial performance

A good financial performance is sought by every airline. Although this industry does not historically give the highest returns, this is always the goal of a company, and aircraft leasing should be adjusted in order to meet that target. Below some literature is presented concerning airlines' financial performance.

Feng and Wang (2000) show the importance of using financial ratios to make a complete, unbiased performance evaluation of an airline. The study divided total performance into three major departments of an airline: production, marketing and management. The conclusions revealed that transportation indicators are more suitable to measure the production efficiency than financial ratios and mixed indicators, and the execution efficiency is best measured by financial ratios.

Dempsey (2008) researched on financial performance of the airline industry post-deregulation. Since then there has been more volatility, deeper troughs in the market cycle, prolonged losses and widespread bankruptcies. Industry net profit margins averaged 2.8% before deregulation and fell to a -0.6% under deregulation. Profitability and returns on investment have become both more volatile and significantly worse, since deregulation.

Hüschelrath and Müller (2011) analyzed the differences in financial performance between carriers in the U.S. Between 2000 and 2009, FSCs realized an operating loss of $35,418 million with only two years (2000 and 2007) displaying an operating profit. In the same time frame, LCCs earned in sum $8,038 million, with Southwest Airlines contributing the largest share of $5,570 million. Curiously, while none of the FSCs managed to realize a net operating profit in the period from 2000 to 2009, all LCCs can report such a net operating profit.

Hypothesis 4: Leasing is negatively correlated with profit margin

Ang and Peterson (1984), besides finding that leases and debt are complements, concluded that profitability is a significant negative explanatory factor for the level of leasing. This result is consistent with Kare and Herbst's (1990) survey evidence that more profitable firms, having easier access to low cost debt, prefer debt to leasing.

Likewise, empirical findings from Deloof, Lagaert, and Verschueren (2007) indicate that leasing is negatively correlated with profitability: firms with low profits and high growth need more external financing and will therefore have higher fixed-claim financing.

Within airline industry, Erickson and Trevino (1994) expected there would be negative correlation. The authors criticized that previous leasing literature ignores the effects of profitability on leasing which results in model misspecification. After performing the tests, lease ratios were found to be statistically unrelated to profitability.

Gritta and Lynagh (1973) show that airline companies that experience financial difficulties are the ones that show higher rates of aircraft leasing. For these companies, the paper suggests that leasing may be the solution today but it also may be tomorrow's problem. Airlines appear to be damaging their financial structure, by carrying long-term obligations of leasing arrangements which accounting authorizes to hide.

Taking these papers into account, we will confirm if less profitable airlines show higher indices of aircraft leasing, or in other words, if profitability explains use of leasing.

2.7. Service quality

Another aspect that this paper covers is the service quality provided by airlines. There is some interesting literature regarding this topic, which is extremely important for the airlines' success.

There are many models to evaluate service quality, being SERVQUAL one of the most used. This model has five main dimensions to measure service quality: tangibles, reliability, responsiveness, assurance, and empathy (Zeithaml, Berry, and Parasuraman, 1996). Many scholars have created other measures with various quality dimensions. Gourdin (1988) categorized airline service quality in terms of three items: safety, timelines and price. Truitt and Haynes (1994) used the processing of luggage, seat cleanliness, and the check-in process, the convenience of transit, timeliness, and handling of customer complaints as the standards of service quality.

Regardless of which model to use, Parasuraman, Zeithaml, and Berry (1988) showed that customer satisfaction with a service can be defined by comparing perception of service received with expectations of service desired. This can be particularly helpful to LCCs due to possible lower expectations of customers on them.

Bowen and Headley (2013) claim on-time performance to be the greatest determinant of service quality. For them this criterion is the most important followed by denied boarding, mishandled baggage and customer complaints. The report analyzed 14 U.S. airlines, and last year's top-3 is remarkably constituted only by LCCs, proving the idea that LCCs manage to outperform the traditional carriers in terms of service quality. The study also concluded that the industry performance for all four measurements improved substantially in 2008 and 2009, remaining stable since then.

Bhat (1995) considers that on-time performance is of significant concern to an airline traveler. The author did a multivariate analysis of airline flight delays and detected that the likelihood of a flight being delayed increases with airline size and operating revenue per employee, with statistical significance. The fact that this kind of airlines operates in congested airports seem to explain these findings. However, this is not an issue that LCCs face as they avoid such hubs.

Kim and Lee (2011) studied the Korean domestic LCC market and achieved results indicating that the significant dimensions of customer satisfaction are tangibles, defined as the physical facilities of the aircraft, and responsiveness, related to the willingness to help passengers solve service problems. In addition, the study confirms the significant consequences of customer satisfaction including word-of-mouth communication, purchase intentions, and complaining behavior. On-time performance was found to be an important factor for LCCs' customer satisfaction. It ranked fifth (after employee appearance, accuracy, helpfulness and courteousness), among 17 different factors.

Mazzeo (2003) provided another interesting analysis on service quality in U.S. airline industry, particularly its relation with competition. The author indicates that both the prevalence and duration of flight delays are

significantly greater on routes where only one airline provides direct service, thus additional competition brings better on-time performance.

Hypothesis 5: Leasing is negatively correlated with on-time performance

From the existing literature we conclude that on-time performance is a key measure to determine an airline service quality. It was not found any literature trying to relate the use of leasing with service quality, perhaps because these variables do not directly influence each other. Although we are going to test this correlation, we understand that it could be spurious since, in between leasing and service quality, profitability can be playing the determinant role. Continuous investment in service quality, which is not always cost-related, may result not only in direct improvements in service quality but also increase the company's profits through a competitive advantage (Reichheld and Sasser, 1990). This way, in our calculations we will test if airlines that provide better service quality show higher profitability levels, and consequently (according to hypothesis 4) make less use of leasing. This way we hypothesize that leasing shows a negative correlation with service quality, which in our study comes as on-time performance.

CHAPTER 3: METHODOLOGY

This chapter presents a detailed description of the methods used to gauge the main research question in the present study.

3.1. The industry

We will start by discussing the identification process of the LCCs. Although we use the LCC expression for a homogenous category researches verify that there is no consistent low-cost strategy (Pels, 2008). The business strategies used by LCCs differ from each other in what condition they were formed (Francis *et al.,* 2006).

Due to this, several variations of business models were set up inside the low-cost category. Five ways of developing the low-cost business model were identified (Francis *et al.,* 2006):

- Southwest Airlines copy-cats

This category consists of the airlines that were founded from scratch by independent entrepreneurs. These carriers stand closest to the Southwest model (Ryanair, easyJet).

- Subsidiaries

Typically those LCCs presenting this category, which are subsidiaries of national carriers, and they were established to gain market share from the already existing LCCs (Iberia with Iberia Express; Qantas with Jetstar Airways).

- Diversified charter carriers

These are low-cost subsidiaries founded by charter carriers to provide scheduled LCC flights (TUIfly).

- Cost cutters

These airlines are usually considered as hybrid carriers. The members of this group are such FSCs which are trying to imitate the LCCs by cutting the operational costs. They continue to operate to a hub-and-spoke system while attempting to rationalize their fleet and stop in-flight catering (Aer Lingus).

- State subsidized competing on price

Flights in this category can not be considered as real LCCs due to the fact that they can only maintain their low prices with state subsidy (Emirates).

This paper only considers the pure LCCs. Therefore only airlines belonging to the first three business models are taken into account. Cost cutters are airlines that usually represent a separate business strategy that is neither FSC nor LCC. These airlines are normally identified as the new hybrid carriers. In addition, some LCCs are also becoming hybrid carriers, as mentioned by Vidovic, Štimac, and Vince (2013). For that reason it was hard to determine whether an airline is a LCC or a hybrid career since the border between each model is very thin and there are many airlines having features from more than one.

After researching about the features of the airlines one by one, we came to a final list of LCCs, displayed in *Table 1*. According to our definition, as of October 31st, 2013 there are a total of 125 LCCs in the world.

Another issue that demanded detailed research was the fact that mergers, acquisitions, discontinuations and bankruptcies are a constant in the airline industry. Between 2007 and 2012, 136 airlines ceased operations and the industry witnessed three major airline bankruptcies and re-organizations with Japan Airlines, AMR and Kingfisher (Allen, 2013). It is likely therefore that tomorrow this list is not accurate, either by the appearance/disappearance of an LCC or by the change on its business model.

It is worth mentioning the reason why some airlines do not participate in the study. Airberlin comes in many studies, papers and databases as LCC or hybrid, however in its annual report, the German airline assumes a clear identity of FSC and for that reason will not join our study. Virgin Australia, after several years operating as an LCC, improved its services to become a (self-described) "New World Carrier": essentially a business model which offers the passenger the choice of purchasing a ticket with aspects of the "no frills" approach of LCCs or paying a little more to receive services more in line with FSCs. Airbrussels is an airline that operates as FSC, but started recently offering travels at a lower price, with fewer extras. Finally, Aer Lingus, whose characteristics are presented above and whose annual report clearly describes the carrier as hybrid, does not come in the paper either.

Table 1: List of LCCs

Europe	
Belle Air	ALBANIA
Intersky	AUSTRIA
NIKI	AUSTRIA
Jetairfly	BELGIUM
SmartWings	CZECH REP.
Flybe Finland	FINLAND
Transavia France	FRANCE
Germanwings	GERMANY
TUIfly	GERMANY
Astra Airlines	GREECE
Wizz Air	HUNGARY
WOW Air	ICELAND
Ryanair	IRELAND
Air One	ITALY
Belle Air Europe	ITALY
Blu-Express	ITALY
Meridiana	ITALY
AirBaltic	LATVIA
Corendon Dutch Airlines	NETHERLANDS
Transavia	NETHERLANDS
Norwegian Air Shuttle	NORWAY
Blue Air	ROMANIA
Iberia Express	SPAIN
Volotea	SPAIN
Vueling	SPAIN
easyJet Switzerland	SWITZERLAND
Helvetic Airways	SWITZERLAND
Wizz Air Ukraine	UKRAINE
EasyJet	UK
Flybe	UK
Jet2	UK
Monarch Airlines	UK
North America	
Air Transat	CANADA
Sunwing Airlines	CANADA
Westjet	CANADA
Interjet	MEXICO
Magnicharters	MEXICO
VivaAerobus	MEXICO
Volaris	MEXICO
AirTran Airways	UNITED STATES
Allegiant Air	UNITED STATES
Frontier Airlines	UNITED STATES
JetBlue Airways	UNITED STATES
Southwest Airlines	UNITED STATES
Spirit Airlines	UNITED STATES
Sun Country Airlines	UNITED STATES
Virgin America	UNITED STATES
South America	
Amaszonas	BOLIVIA
Azul Brazilian Airlines	BRAZIL
GOL	BRAZIL
PAL Airlines	CHILE
Sky Airline	CHILE
Easyfly	COLOMBIA
VivaColombia	COLOMBIA
Peruvian Airlines	PERU
Star Peru	PERU
Asia Pacific	
Jetstar Airways	AUSTRALIA
Tigerair Australia	AUSTRALIA
United Airways	BANGLADESH
Juneyao Airlines	CHINA
Lucky Air	CHINA
Spring Airlines	CHINA
Dragonair	HONG KONG
GoAir	INDIA
IndiGo	INDIA
JetKonnect	INDIA
SpiceJet	INDIA
Citilink	INDONESIA
Indonesia AirAsia	INDONESIA
Lion Air	INDONESIA
Tigerair Mandala	INDONESIA
Air Do	JAPAN
JAL Express	JAPAN
Jetstar Japan	JAPAN
Peach	JAPAN
Skymark Airlines	JAPAN
Solaseed Air	JAPAN
AirAsia	MALAYSIA
AirAsia X	MALAYSIA
Firefly	MALAYSIA
Malindo Air	MALAYSIA
Golden Myanmar	MYANMAR
AirAsia Zest	PHILIPPINES
Cebu Pacific Air	PHILIPPINES
PAL Express	PHILIPPINES
Philippines AirAsia	PHILIPPINES
Tigerair Philippines	PHILIPPINES
Jetstar Asia Airways	SINGAPORE
Scoot	SINGAPORE
Tigerair	SINGAPORE
Air Busan	SOUTH KOREA
Eastar Jet	SOUTH KOREA
Jeju Air	SOUTH KOREA
Jin Air	SOUTH KOREA
T'Way Air	SOUTH KOREA
Mihin Lanka	SRI LANKA
City Airways	THAILAND
Nok Air	THAILAND
Nok Mini	THAILAND
Orient Thai Airlines	THAILAND
Thai AirAsia	THAILAND
Jetstar Pacific	VIETNAM
VietJet Air	VIETNAM
Middle East	
Arkia	ISRAEL
Israir	ISRAEL
Jazeera Airways	KUWAIT
AirBlue	PAKISTAN
PIA	PAKISTAN
Nas Air	SAUDI ARABIA
Anadolu Jet	TURKEY
Corendon	TURKEY
Onur Air	TURKEY
Pegasus	TURKEY
SunExpress	TURKEY
Air Arabia	UAE
Flydubai	UAE
RAK Airways	UAE
Africa	
Air Arabia Egypt	EGYPT
Fly 540	KENYA
Air Arabia Maroc	MOROCCO
Dana Air	NIGERIA
Kulula.com	SOUTH AFRICA
Mango	SOUTH AFRICA
Fastjet	TANZANIA
Nouvelair	TUNISIA

3.2. Data collection

In order to collect the data it was used secondary research. Airlines' annual reports and online databases were the means through which information was collected. The most important online databases were PlaneSpotters and FlightStats.

All the information about the size of the fleet, age of the fleet, leased and owned aircraft, and on-time performance are updated as of October 31st, 2013. Remaining information was collected from the last available annual report of each airline company.

Unfortunately for research purposes, not all the airlines released annual reports. This fact limited the data collection in a way that sample size (N) became distinct between variables. In addition, another reason why N varies is because several annual reports consolidate the figures from more than one subsidiary (e.g. Air Arabia Group owns Air Arabia, Air Arabia Maroc and Air Arabia Egypt). This causes that in some variables subsidiaries are treated separately while in others are treated together. A final limitation was the case of those LCCs that are subsidiaries of an FSC or of an unrelated entity to aviation. For some of them individual financial data is not provided, which again imply a variation of N.

3.3. The measures

According to the hypotheses created, there is one variable that is present in every correlation test, which is use of leasing by LCCs. A total of five variables will be tested against use of leasing. Below, follows an explanation on these variables:

- Use of leasing

This measure gives the percentage of leased aircraft in the total fleet, in other words, it is the leasing penetration rate in each airline. Here, both operating and finance leases are included. Mention that neither stored aircraft nor ordered ones count. Moreover, aircraft sub-leased to another airline only count in the airline that act as lessee in order to avoid duplication. The data was collected from PlaneSpotters in accordance to official annual reports.

- Fleet size

The total number of aircraft that an LCC possesses gives an accurate measure in order to determine the size of the airlines. To compare the size of the airlines this is believed to be the most adequate way of doing it, since airlines belong to different countries and the use of different currencies would raise issues when performing comparisons. Mention that neither stored aircraft nor ordered ones count. Moreover, aircraft sub-leased to another airline only count in the airline that act as lessee in order to avoid duplication. The data was collected from PlaneSpotters in accordance to official annual reports.

- Average fleet age

This measure defines how old an airline fleet is, on average, and is also comparable between companies. This is the best way to assess the modernity of an airline. Mention that neither stored aircraft nor ordered ones count. Moreover, aircraft sub-leased to another airline only count in the airline that act as lessee in order to avoid duplication. The data was collected from PlaneSpotters in accordance to official annual reports.

- On-time performance

It determines the historical percentage of on-time arrivals of an airline. Literature shows this measurement is considered relevant as for the assessment of an airline service quality. The data was taken from FlightStats, an online database which provided results for 80% of the existing LCCs.

- Profit margin

This financial indicator is the ratio between net income and revenues. It can be interpreted as the percentage of selling price that turned into profit. Thus profit margin is an important measure of profitability which evaluates the financial performance of a company.

- Debt ratio

The debt ratio is defined as the ratio of total debt to total assets, expressed in percentage, i.e., the proportion of a company's assets that are provided via debt. This is a financial measurement that assesses the financial health of an airline, but also assesses its risk profile. Here it was used the accounting figures, where operating leasing commitments are not included.

After the correlations and regressions analyses this paper includes other unique findings about the leasing profile of LCC. Namely:

- Leasing penetration in LCCs and industry-wide

This statistic measures the average aircraft leasing rate in the LCC sector, which will be further compared to the aviation industry average, given by Ascend, a leading provider of expert advisory and valuations services to the global aviation industry.

- Leasing by regions

Here the leasing penetration will be split by regions and again a comparison between LCCs and the global aviation industry (given by Ascend) is going to be done. Regions are split as follows: Europe, North America, South America, Asia Pacific, Middle East and Africa.

- Proportion of newly manufactured leased aircraft

The aim is to find out, between all the airplanes leased by LCCs, the percentage of them that are new at the moment they join the lessee's fleet. The data was collected from PlaneSpotters in accordance to official annual reports.

- Proportion of operating and finance leases

According to the data available in LCCs' annual reports (and that explicitly mentions how many aircraft are being leased under each category), it will be done a calculation in order to determine the proportion of aircraft under operating and finance lease.

- Relevance of leasing commitments

Collected from the data available in LCCs' annual reports, this statistic assesses the exact relevance of financing through leasing in the airlines' financial structure. A comparison will be made between future lease commitments and other debt commitments. Mention that the lease commitments refer to both operating and finance leases, including also spare engines and simulators leasing. The remaining debt commitments are all the debt obligations net of leasing.

3.4. Data analysis

Data analysis was done by using SPSS statistical software. Once the data had been collected, the hypothesis testing began with Pearson's product-

moment correlation coefficients. A table has been created, allowing us to understand the direction and significance of each correlation between the six variables in the study. Afterwards, regressions were computed in accordance to literature review and hypotheses development, allowing us to understand how much use of lease is affected/affects the other five variables in analysis.

CHAPTER 4: RESULTS' ANALYSIS AND DISCUSSION

In this chapter the statistical results related to main research question will be presented as well as an analysis on them.

In our analysis six variables are included: use of leasing, fleet size, average fleet age, on-time performance, profit margin and debt ratio. According to the available information, we gathered data about LCCs for the six variables. (See Appendices VII and VIII)

The use of aircraft leasing in the LCC industry is the key variable in the study and this chapter is entirely destined to carefully explain its characteristics. Also in this chapter there will be a discussion about the evolution, features and challenges on the aircraft leasing market.

4.1. Descriptive statistics

Descriptive statistics, presented in *Table 2*, allow us to get an initial perception on each of the variables.

Table 2: Descriptive statistics

	Use of leasing	*Fleet size*	*Average fleet age*	*On-time performance*	*Profit margin*	*Debt ratio*
Mean	57%	35	9.7	75%	-6.2%	73.7%
St dev	33%	64	6.4	12%	47.5%	27.1%
Range	100%	574	28	51%	302.6%	109.2%
Max	100%	575	28.4	93%	37.0%	141.5%
Min	0%	1	0.4	42%	-265.6%	32.4%
N	125	125	125	100	33	30

In a brief analysis of the descriptive statistics we observe that there are LCCs whose fleet is entirely leased and others without any leased aircraft. Fleet size shows a high standard deviation. Its mean is 35 aircraft and its maximum is an impressive number of 575 aircraft from Southwest Airlines. Interestingly enough, the average fleet age varies as much as 28 years in our population, being its mean 9.7 years. On the other hand, on-time performance does not vary as much within the population. Its mean is 75% and its maximum of 93% belongs to TUIfly and Iberia Express. Relevant is the fact that the average profit margin is negative (-6.2%), meaning that on average LCCs experience loss at the end of the year. Here the range is impressively over 300%, being Air Asia the most profitable company. Regarding debt ratio,

Air Arabia presents the lowest and PIA the highest, with a range of 109.2% between both. On average, debt accounts for almost three fourths of the balance sheet (73.7%).

4.2. Pearson's product-moment correlation coefficients

In our five hypotheses there is a common variable which is the use of leasing in LCCs. We will test the correlation of this variable with five others: fleet size, average fleet age, on-time performance, profit margin and debt ratio. Yet all the correlations between the six variables will be displayed in order to make a full analysis and look for interesting results. That way, *Table 3* was computed.

Table 3: Pearson's product-moment correlation coefficients

Correlations

		Use of leasing	Fleet size	Average fleet age	On-time perform.	Profit margin	Debt ratio
Use of leasing	Pearson Correlation	1	-,141	-,321**	-,059	-,032	-,071
	Sig. (2-tailed)		,116	,000	,559	,862	,709
Fleet size	Pearson Correlation		1	-,127	,036	,132	-,109
	Sig. (2-tailed)			,157	,726	,463	,567
Average fleet age	Pearson Correlation			1	-,137	-,385*	,163
	Sig. (2-tailed)				,176	,027	,390
On-time performance	Pearson Correlation				1	,133	-,118
	Sig. (2-tailed)					,475	,551
Profit margin	Pearson Correlation					1	-,109
	Sig. (2-tailed)						,566
Debt ratio	Pearson Correlation						1
	Sig. (2-tailed)						

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlations table demonstrates negative correlations between use of leasing and all the other five variables, going in the same directions of the hypotheses created. However, only average fleet age has a significant level of correlation (-0.321), with significance at the 0.01 level. Therefore, only one of our hypotheses was confirmed: H3. This implies that LCCs with newer fleets tend to make more use of leasing. On the other hand, old fleets have more owned aircraft, either purchased a long time ago or more recently at low values. Through the use of leasing airlines are able to renew the fleet more

easily, allowing them to have a younger fleet and thus improving the image and quality of the airline.

Although no significance has been found in the correlation with use of leasing, the closest variable to that was the fleet size (-0.141), hinting that airlines with a bigger fleet lease fewer aircraft, which is consistent with H2, namely if we consider the fleet size to be a proxy for the firm size.

We found that airlines with higher leasing penetration rates show worse profit margins, consistently with H4, although this correlation is very weak (-0.032). Furthermore, airlines with higher leasing penetration rates have a smaller debt ratio. However, the low correlation coefficient (-0.071) does not allow us to statistically confirm that debt and lease are substitutes in the LCC sector, though the sign of the correlation is consistent with H1, as tested by the papers reviewed in Chapter 2.

Another important assumption this paper verifies is that lower service quality explains lower profitability, which leads to higher use of leasing, even though we do not find statistical significance on these two correlations. The direct correlation between use of leasing and on-time performance is not significant either (-0.059), though the sign is again consistent with H5.

Another statistically significant correlation was found between average fleet age and profit margin. The negative correlation proves that Trubbach (2013) was right when affirming that LCCs with older fleets have a clear disadvantage on their operating costs.

As a general idea, aircraft leasing seems to be associated with smaller airlines and airlines with lower performance and quality. In addition, start-up carriers often prefer leases because they lower the capital costs for market entry. The option of leasing comes therefore as an important rescue option to all these airlines. Many times, they are credit-squeezed being unable to afford purchasing an aircraft, thus leasing embodies the chance for them to keep operating.

4.3. Regressions

After the Pearson's correlations analysis we will proceed to the regression analysis. We are going to start with use of leasing as dependent

variable, since we aim to understand what causes its variations. This way, we suggest that the use of leasing by LCCs depends on the fleet size, the age of the fleet, quality of service (as measured by on time performance) and profitability of the firm. For this initial model, which can be found in *Table 4*, multicollinearity is not an issue in this case since we got relatively low correlations.

Table 4: Use of leasing as explained by Fleet Size and Age, On-time performance and profit margin

Dependent variable: Use of leasing N: 33 Adjusted R^2: 0.039 F: 1.305

Variable	Expected causality	Coefficient	p-value
(Constant)		0.997	0.022
Fleet size	(-)	-0.001	0.356
Average fleet age	(-)	-0.021	0.044
On-time performance	(-)	-0.248	0.628
Profit margin	(-)	-0.107	0.430

Keep in mind, that given the data availability on profit margin, we can only run this regression for 33 observations. This is likely the main reason for the low adjusted R^2, meaning that this model does not describe the profile of an airline in terms of leasing strategy accurately. It was fairly expected due to the low correlations between some variables and use of leasing found in the previous chapter.

Still, the variable that showed lower p-value was average fleet age (0.044), meaning that it described the use of leasing fine. The reasoning is that older fleets have fewer leased airplanes, while younger fleets make more aircraft replacements through leasing. The remaining variables, while showing the expected negative causality too, were not significant.

Next, due to the sample size varying so much according to the different variables, we are going to test limited versions of the original regression, i.e., sets of variables will be tested alone against use of leasing.

Table 5: Use of leasing as explained by Fleet Size and Age, and On-time performance

Dependent variable: Use of leasing N: 100 Adjusted R^2: 0.120 F: 5.497

Variable	Expected causality	Coefficient	p-value
(Constant)		1.005	0.000
Fleet size	(-)	-0.001	0.057
Average fleet age	(-)	-.0.018	0.000
On-time performance	(-)	-0.284	0.289

Table 5 presents a higher N and a higher adjusted R^2. In this model, fleet size and age as well as on-time performance confirmed the negative expected causality. Fleet size and age demonstrate high significance levels, thus small and younger fleets are likely to show higher leasing penetration rates.

Table 6: Use of leasing as explained by Fleet Size and Age

Dependent variable: Use of leasing N: 125 Adjusted R^2: 0.122 F: 9.642

Variable	Expected causality	Coefficient	p-value
(Constant)		0.784	0.000
Fleet size	(-)	-0.001	0.031
Average fleet age	(-)	-0.018	0.000

By excluding on-time performance we are able to achieve the model, show in *Table 6*, with the highest possible N in our study, and a higher adjusted R^2. Again the negative expected causality is confirmed in the variables of fleet age and size. Both variables give p-values under 0.05, meaning that they are statistical significant in explaining use of leasing by LCCs.

A final regression is the one that contains debt ratio as dependent variable and use of leasing as independent, as it comes in *Table 7*. Literature review and hypotheses development lead us to test the substitutability between debt and lease, or in other words, by using leases airlines need less debt in their capital structure.

Table 7: Debt ratio as explained by Use of Leasing

Dependent variable: Debt ratio N: 30 Adjusted R^2: -0.083 F: 0.257

Variable	Coefficient	p-value
(Constant)	0.0793	0.000
Use of leasing	-0.075	0.651
Fleet size	0.000	0.586
Profit Margin	-0.056	0.621

Use of leasing is found to make a negative contribution of debt ratio, yet with lack of statistical significance. Once more, explanatory power is potentially explained by the small N. These results suggest substitutability between lease and debt but we are unable to confirm this hypothesis. Notice we are limiting ourselves to a small set of three independent variables, because of data availability.[1]

Regression results go according with those from Pearson's correlation section, which showed that the two strongest explaining variables of use of leasing are fleet size and average fleet age, with the latter demonstrating higher significance. From the multiple regression analysis we are able to conclude that variables related to the constitution of the fleet are better in explaining the use of leasing by LCCs than performance or financial measures.

4.4. Characteristics of leasing in low-cost carriers

Still in the area of aircraft leasing there are other statistics that this paper covers and that are important on the analysis of the LCC industry.

A crucial statistic is the one that presents the average of leased airplanes from the 125 LCCs existing in the study: leased aircraft represent

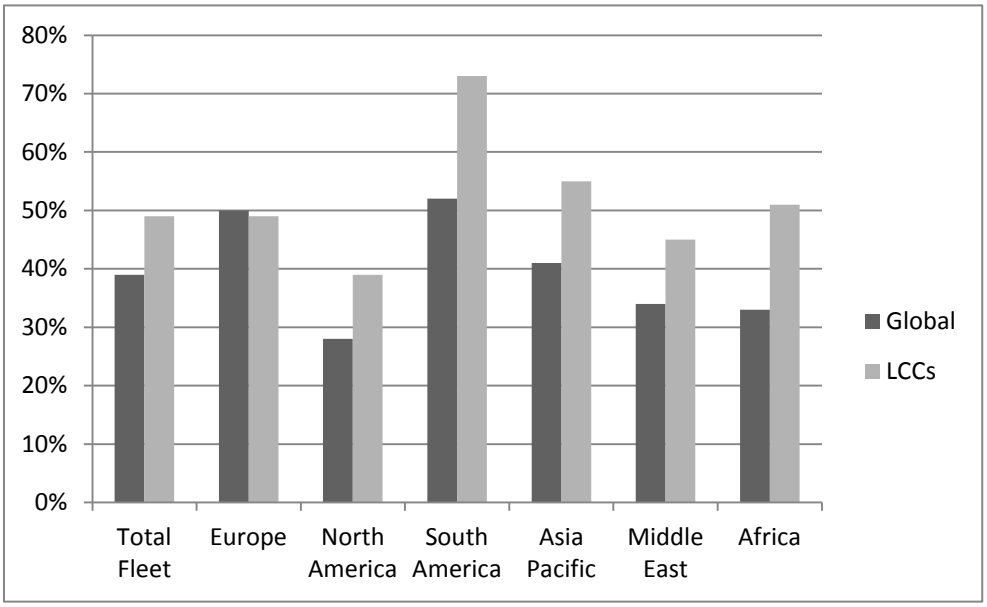
[1] Many authors reviewed in the Chapter 2 on this issue suggest numerous other variables in this regression. Yan (2006) regress the debt ratio against the use of leasing and market-to-book ratio, employment, no-dividend, marginal tax rate, abnormal earnings, operating income, total assets and PPE; Deloof, Lagaert, and Verschueren (2007) add profitability, variability, log of total assets, growth, current assets and financial assets to the use of leasing; Beattie, Goodacre, and Thomson (2000): expected growth, liquidity, size, tax rate, profitability, total asset growth and fixed asset proportion; and Erickson and Trevino (1994): profitability, marginal tax rate, non-debt tax shields, earnings volatility and probability of financial distress. The only paper that just uses debt ratio against use of leasing is Marston and Harris (1988). For data availability and time constraint we are restricting ourselves to the most simple regression with the available data.

48.8% of the total fleet concerning LCCs. This figure is close to half of the fleet which attests the importance of leasing nowadays.

We aim to compare this result with the aviation sector's average. Ascend, a leading provider of expert advisory and valuations services to the global aviation industry, provides the current average of leased aircraft from every airline in the world. The advisory service estimates it to be 39%, meaning that LCCs make a more intensive use of leasing as a way of financing aircraft. This disparity of about 10% in aircraft leasing penetration rates shows that there is a key difference in the business strategies between LCCs and FSCs.

Figure 1 gives a regional comparison on this statistic. Again, Ascend was the source for the global industry data, which is going to be compared to our results. Concerning LCCs only, we observe lease rates above 50% in South America (the leading region), Asia Pacific and Africa. North America, on the other hand, registers the lowest percentage. Interestingly enough, North America maintains the lowest lease rate when we refer to all the airlines, while South America also continues to be the leading region. This shows the different relevance that managers give to aircraft leasing in the two hemispheres of the continent. Europe registers values close to 50% in both indices.

Figure 1: Leasing penetration rate by regions



From all the 2,114 leased aircraft by LCCs, around two thirds are newly manufactured when they join the airlines' fleet, more precisely 67%. (See Appendix IX) In this statistic there is a trend indicating that bigger airlines, due to their higher standards and financial capabilities, lease a higher proportion of new airplanes than the others. In the data we can find both single and mixed strategies, i.e., airlines that opt to lease only new aircraft, only used ones, or a mix between both. This relatively high percentage shows one of the biggest advantages of leasing over aircraft purchasing which is the possibility of obtaining better aircraft, improving the general airline quality.

This paper also provides findings about the different types of leases in LCCs. We observe that operating lease is more prevalent than finance lease. (See Appendix X) Taking into account the available information provided in annual reports, operating leases represent 85% of all the leased aircraft, while finance lease account for the remaining 15%. This is good for LCC as their airplanes perform higher rates of take-off and landing, which is extremely demanding for the equipment. In the case of operating leasing, most of the times the lessee will not keep the over-used aircraft at the end of the contract, returning it to the lessor, which will receive equipment with a real residual value likely to be shorter than the accounting one. Besides no residual value risk there are other benefits for the lessee when choosing for operating leasing, such as, enhanced flexibility for the introduction of new routes or aircraft, lower financial outlay requirements, and naturally, the off-balance sheet financing entry.

In order to assess the exact relevance of financing through leasing in the airlines' financial structure, another variable needs to be calculated. This way, a comparison was made between future lease commitments and other debt commitments. (See Appendix XI) Mention that the lease commitments refer to both operating and finance leases, including also spare engines and simulators leasing. The remaining debt commitments are all the debt obligations net of leasing. The average ratio achieved was 79.6%. This means that future lease commitments are smaller than other debt, but this difference is not very substantial. The variance in this variable is considerable, since there are airlines showing a ratio as little as 5.4% and others with as much as 326.4%. It is important to observe that this statistic allows us to comprehend the relevance of leasing as a way of financing, not its dimension.

Lease rates applied by lessors depend on the aircraft type, age and specification, type of lease, lease term, interest rates, tax liabilities, credit quality of the lessee, value of the aircraft at lease inception and forecasted residual value at lease termination. Very often airlines make their orders in packages, either when they purchase or lease aircraft. As carriers order a large number of aircraft, they get significant volume discounts, representing a great business opportunity that LCCs are taking advantage from.

From the information available in the LCCs' annual reports, we observe that, in most of the cases, airlines opt for floating interest rates when they make finance lease contracts with the lessors. These obligations bear interest partly at a variable rate, linked to LIBOR which is the most commonly used interest rate, and partly at a spread (risk premium).

The biggest proportion of lease terms varies between 5 and 12 years. Some examples of lease contract durations in LCCs are given by Allegiant (9 to 11 years), Azul (5 to 12), easyJet (5 to 10), Norwegian (3 to 12), Ryanair (7 to 13) and Tigerair (6 to 12). In many cases, carriers have the option to extend the lease contracts.

4.5. Discussion on the evolution of aircraft leasing

This section intends to give an overview of the aircraft leasing market, its evolution as well as projections for the future.

Firstly, we will look from a lessors' perspective. The industry of aircraft leasing is clearly dominated by two lessors. They are GECAS (General Electric Capital Aviation Services) and ILFC (International Lease Finance Corporation). *Table 8* presents the 20 largest lessors as measured by total fleet value.

Recently, a number of companies in the emerging markets of Asia Pacific and Middle East have recently expanded into aircraft leasing. The most are remarkable is the growth of Chinese regional banks, like BOC, CDB and ICBC. But, despite the recent activity, leasing market remains fragmented and a large difference continues to exist between the portfolio sizes of the two largest lessors and the other ones.

Table 8: Top 20 lessors

Rank			Total fleet value		Total
2012	(2011)	Company	$m	Change	fleet
1	(1)	GECAS	34,096	-1.4%	1,742
2	(2)	ILFC	26,123	-6.0%	1,033
3	(4)	BBAM	8,622	9.8%	332
4	(3)	AerCap	7,707	-8.8%	297
5	(6)	BOC Aviation	7,276	7.9%	198
6	(5)	CIT Aerospace	7,179	-4.2%	268
7	(8)	AWAS	6,131	18.6%	244
8	(7)	SMBC Aviation Capital	5,913	-11.6%	232
9	(12)	Air Lease Corporation	5,618	59.7%	151
10	(9)	Aviation Capital Group	5,582	16.7%	270
11	(13)	Doric	4,046	35.6%	35
12	(14)	CDB Leasing	3,795	32.1%	91
13	(10)	Aircastle Advisor	3,769	1.1%	158
14	(16)	MC Aviation Partners	3,529	25.0%	110
15	(23)	Avolon Aerospace Lsg	3,414	61.3%	89
16	(18)	Pembroke Group	3,395	33.8%	97
17	(11)	Macquarie AirFinance	3,179	-12.2%	149
18	(17)	ICBC Leasing Co	3,174	21.5%	82
19	(21)	Jackson Square Aviation	2,762	25.2%	65
20	(15)	Sumisho Acft Asset Mgt	2,621	-8.5%	86

Source: Ascend

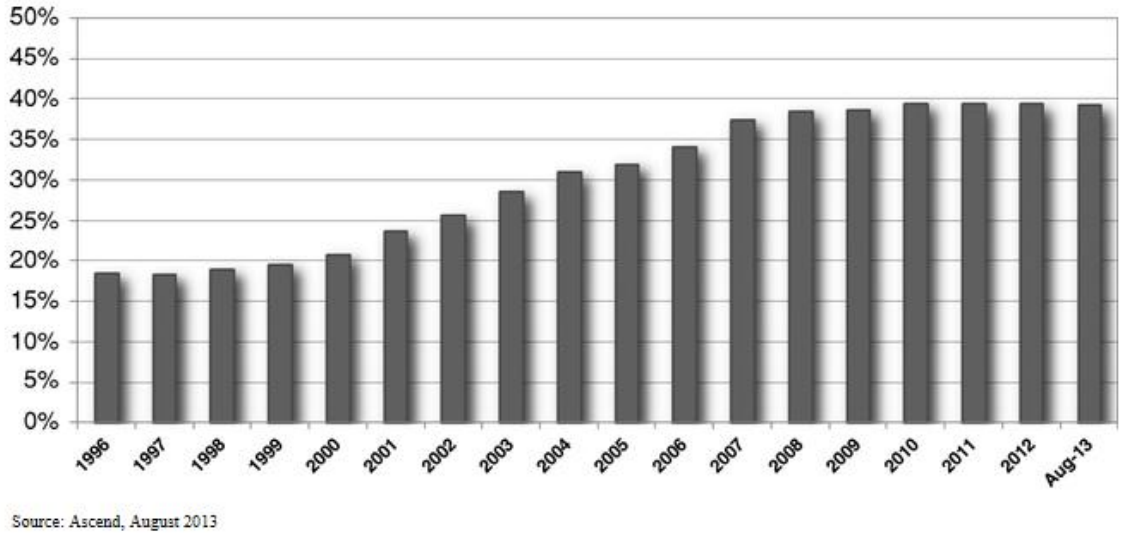
Lessors have seized on the opportunity of the big delivery bulge, using the relative strength of their balance sheets to move from just placing their own orders with Airbus and Boeing – and picking up aircraft in ones and twos – to much larger transactions that have made the lessors central to airlines' growth and survival (Cameron, 2013). In 2013 and 2014, Ascend expects aircraft leasing companies to purchase around 1,400 aircraft at a total value of approximately $80bn.

Ascend has developed the Aircraft Investment Index (AAII) specifically to benchmark the risks and rewards of aircraft leasing investments against those of other industries. The index suggests that on a risk reward basis, investment in aircraft has outperformed other asset classes, including shipping and precious metals.

As mentioned before, the current overall leasing penetration rate is 39%, according to estimations from Ascend. The same source reveals that

operating leases account for the biggest proportion within aircraft leasing, representing 34% of the total aircraft population.

Figure 2: Evolution of leasing penetration



Source: Ascend, August 2013

When we take a look at the evolution of use of leasing, displayed in *Figure 2*, we observe a notorious growth since 1996, the first year represented in the graph. Back then, leasing penetration rate was only 18%, meaning that, until today, the rate more than doubled. It represents a compounded annual growth rate of 8.5%, compared to fleet growth of 3.3% over the same period. Moreover, if we go back to the early 1980s, the growth becomes even more impressive as the leasing rate was only 2%.

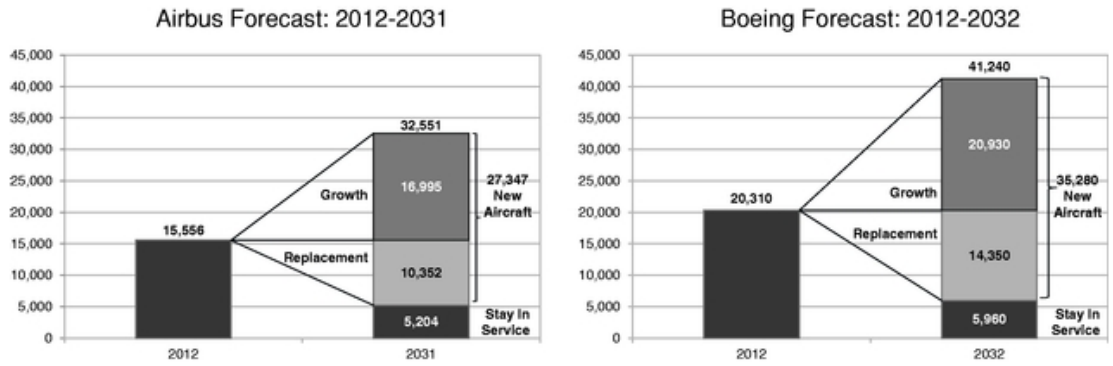
However, since the beginning of the economic crisis in 2008, leasing penetration rate remained at the level of 38-39%, putting a break to the continuous growth that had begun in 1997. Therefore leasing seems to be related to the state of the market. During the recent years of bear market the leasing rate remained stable after an 11-year growth. This analysis confirms Mancilla's (2010) findings, which show lower demand for leasing during market downturns. If this correlation holds, the leasing rate will again rise when the bull market begins.

This optimistic view is shared by Ascend and Boeing Capital, which forecast that leasing will represent about half of worldwide fleet by 2020. Vision Gain, an independent business information provider, is also optimistic

regarding the future of airplane leasing, forecasting a cumulative annual growth rate of 5.6% until 2021.

Good projections for leasing growth come from two perspectives. Besides the already mentioned forecasts for leasing penetration rates, the global market will grow in absolute terms. Airbus and Boeing, the two major aircraft manufacturers, expect the global fleet to more than double during the next 20 years, as demonstrated in *Figure 3*. These forecasts demonstrate the impressive growing opportunities for leasing companies as the aviation market seem to become stronger and stronger.

Figure 3: Projected Commercial Aircraft Growth



Note: Airbus forecast includes passenger aircraft of more than 100 seats and base year is beginning 2012;
Boeing forecast includes passenger and freighter jet aircraft and base year is end of 2012.

Source: Airbus Global Market Forecast, 2012; Boeing Market Outlook, 2013

Nevertheless, there are relevant issues that lessors are facing. These companies face challenges to finance aircraft with record backlogs and liquidity drying up. For instance, according to Ascend, backlog was 286 airplanes for GECAS and 225 for ILFC at the end of 2012. On the other hand, lessors witness a decrease on the demand of older aircraft as Airbus and Boeing launch new types of airplanes. Airlines prefer newer aircraft and scrapping age has been decreasing (Shaw-Smith, 2012). Furthermore, developing countries are a main second-hand market for mid-aged aircraft, but import restrictions placed by some of them create additional problems for lessors.

CHAPTER 5: CONCLUSION

This paper joins two major forces in the airline industry: LCCs and aircraft leasing. From one side, we deal with the sector of LCCs, which account for around 26% of global seat capacity nowadays, against only 8% in 2001. Moreover, the leaders as measured by carried passengers in both domestic and international travel are LCCs, Southwest and Ryanair respectively. From another side, aircraft leasing, whose share of the global fleet is 39% nowadays, while it used to be 23% in 2001.

Aircraft leasing is a key financing instrument for airlines. The advantages of leasing instead of purchasing are many and quite relevant. It demands much lower capital requirements than a purchase does; it gives higher flexibility to adapt the fleet to market demand; it allows the airlines to generate cash flows from asset exploitation and thus being able to afford lease payments; unlike a loan, lease payments are constant; it gives the possibility for airlines to get younger and better aircraft; and finally, it provides off-balance sheet financing (operating leases only).

We found that aircraft leasing is negative correlated to the average fleet age, with high statistical significance, confirming Gavazza (2010) and the hypothesis created. This means that leasing is the option used for those airlines that want to renew their fleet. We also discovered that aircraft leasing works as a salvation for smaller airlines. As they do not have sufficient cash flows to afford purchasing, leasing comes as the best alternative for these airlines to keep operating.

Though with no statistical significance, results hint at LCCs with better on-time performance show higher profit margin and consequently lower use of leasing. Furthermore, it was found a negative correlation between use of leasing and debt ratio, but the lack of statistical evidence does not allow us to confirm the substitutability between them.

Regression analysis showed that fleet size, average fleet age, on-time performance and profit margin have negative effects on use of leasing by an LCC. The best variables to explain use of leasing are use fleet size and average fleet age, being the latter the most statistically significant. It shows that variables related to the constitution of the fleet are better in explaining the use

of leasing by LCCs than performance or financial measures. Therefore, further research can be done in this topic in order to determine models that are able to explain use of leasing by LCCs better.

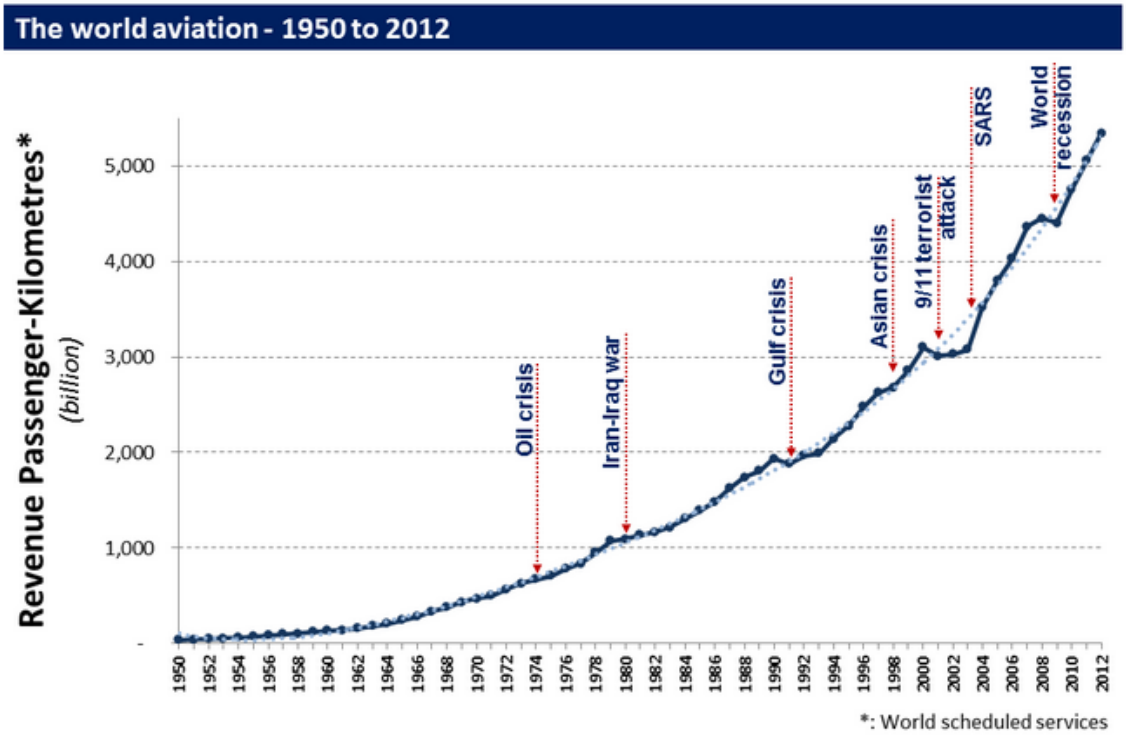
Aircraft leasing is more prevalent in LCCs than FSCs. The difference between 39% for LCCs and about 49% for the global industry shows that LCCs are the main customers concerning aircraft leasing, proving that leasing takes indeed a relevant position in the LCCs' strategy. We estimate that lease commitments represent around 80% of the size of other debt commitments. They are predominantly operating lease agreements, whose term varies mainly between 5 and 12 years. In addition, about two thirds of the airplanes by LCCs are newly-manufactured, which represents a major advantage of leasing that is the possibility of having a younger fleet.

Leasing penetration rate seems to fluctuate according to the economic conditions. Between 2008 and 2013, the leasing rate remained stable, coinciding with the bear market. Projections from Ascend and Boeing Capital for the leasing rate are that it will increase, and by 2020 about half of the global fleet is expected to be leased. Besides, the global fleet will rise to more than double over the next 20 years. Therefore, leasing companies have enormous growing opportunities. However, these companies are facing serious problems, such as record backlogs and lower demand for older aircraft.

More and more lessors are coming from the regions of Asia Pacific and Middle East. A suggestion of further research would be to perform a detailed study on these new sources of financing, namely the growth of Islamic banking and the extraordinary rise of regional banks in Asia Pacific into aviation market (especially Chinese banks, like BOC, CDB and ICBC). The aim would be to assess how they are changing the leasing market patterns, mainly its liquidity and competition.

APPENDICES

Appendix I



Source: ICAO (International Civil Aviation Organization)

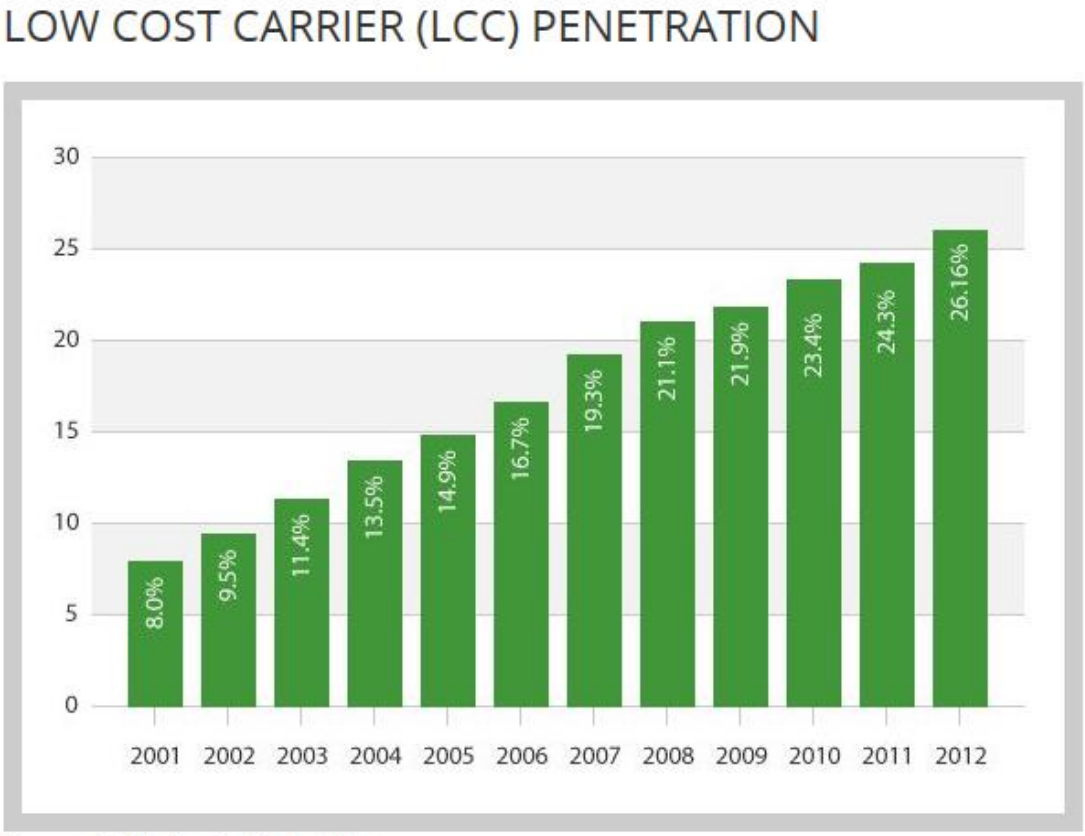
Appendix II

LCC's sources of cost advantage

			Cost reduction	Cost per seat
Traditional Carrier				100%
Low Cost Carrier				
	Operating advantages			
		Higher seating density	-16	84
		Higher aircraft utilization	-2	82
		Lower flight and cabin crew costs	-3	79
		Use cheaper secondary airports	-4	75
		Outsourcing maintenance/ single aircraft type	-2	73
	Product / service features			
		Minimal station costs and outsourced handling	-7	66
		No free in flight catering, fewer passenger services	-5	61
	Differences in distribution			
		No agents or GDS commissions	-6	55
		Reduces sales/reservation costs	-3	52
	Other advantages			
		Smaller administration and fewer staff/offices	-3	49
Low cost airlines compared to traditional carriers				49%

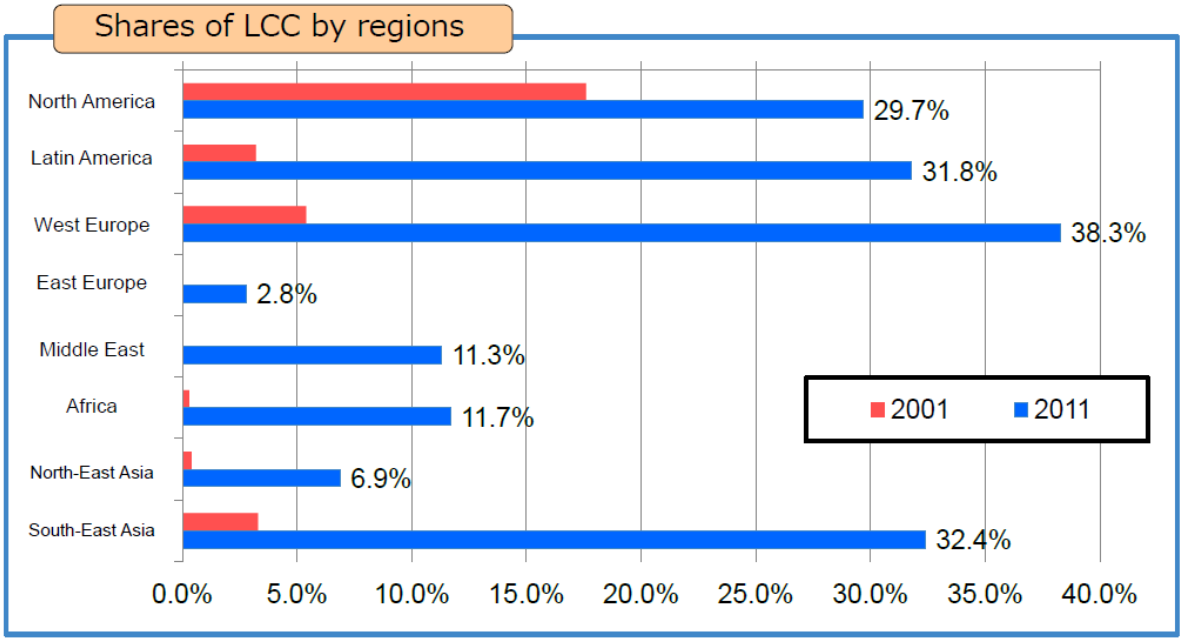
Source: Doganis, 2006

Appendix III



Source: CAPA Centre for Aviation

Appendix IV



Source : CAPA Centre for Aviation

Appendix V

Top 25 LCCs worldwide by capacity (ASKs per week)

Airline	Dec-11	Dec-12	% Change	Global rank Dec-11	Global rank Dec-12	Ranking Variance
Southwest Airlines	3,052,855,291	3,276,525,770	7.3%	1	1	-
Ryanair	1,590,511,473	1,476,213,184	-7.2%	2	2	-
JetBlue Airways	1,189,448,769	1,214,788,293	2.1%	3	3	-
easyJet	1,056,070,278	1,124,069,015	6.4%	4	4	-
Gol	1,007,352,569	913,465,718	-9.3%	5	5	-
Lion Airlines	602,332,879	810,548,478	34.6%	9	6	+3
Jetstar Airways	627,376,629	732,129,754	16.7%	8	7	+1
Westjet	677,374,415	703,526,653	3.9%	7	8	-1
AirTran Airways	704,027,357	593,301,841	-15.7%	6	9	-3
AirAsia	514,497,106	592,750,621	15.2%	10	10	-
Indigo	363,580,357	489,547,961	34.6%	14	11	+3
Norwegian	376,017,532	460,529,531	22.5%	12	12	-
Condor	408,981,174	400,293,763	-2.1%	11	13	-2
Virgin America	350,169,261	387,519,726	10.7%	16	14	+2
Spirit Airlines	297,900,830	373,126,368	25.3%	19	15	+4
Volaris	305,039,639	348,697,350	14.3%	18	16	+2
Frontier Airlines	363,405,399	330,101,798	-9.2%	15	17	-2
Wizz Air	314,854,410	330,075,746	4.8%	17	18	-1
SpiceJet	270,033,409	313,233,746	16.0%	20	19	+1
AirAsia X	367,668,226	306,214,544	-16.7%	13	20	-7
Cebu Pacific Air	262,579,589	285,040,540	8.6%	21	21	-
Air Arabia	247,294,792	275,508,189	11.4%	23	22	+1
Pegasus	247,563,308	268,113,218	8.3%	22	23	-1
Vueling Airlines	175,838,664	246,848,248	40.4%	24	24	-
Allegiant Air	173,834,741	217,749,960	25.3%	25	25	-
GRAND TOTAL	**15,546,608,096**	**16,469,920,012**	**5.9%**			

Source: Innovata
Representative sample week in December of each year

Appendix VI

The Ranking of Airlines in the World (2012)

International

	Airlines	Number of Passengers
1	Ryanair	76,422
2	Lufthansa	49,755
3	EasyJet	42,028
4	Emirates	32,730
5	Air France	32,597
6	British Airways	29,307
7	Air Berlin	25,825
8	KLM Royal Dutch	25,066

Domestic

	Airlines	Number of Passengers
1	Southwest	110,587
2	Delta	92,023
3	China Southern	74,648
4	American	65,303
5	US Airways	46,619
6	China Eastern	45,595
7	Air China	42,072
8	United	40,524

Source：World Air Transport Statistics 56th edition, IATA(International Air Transport Association)

Appendix VII

Table with use of leasing, fleet size, average fleet age and on-time performance

Airline	*Use of leasing*	*Fleet size*	*Average fleet age*	*On-time performance*
Air Arabia	32%	28	3	81%
Air Arabia Egypt	100%	1	6,5	n/a
Air Arabia Maroc	50%	4	3,8	68%
Air Busan	10%	10	14,5	90%
Air Do	57%	14	14,7	88%
Air One	100%	10	5,6	81%
Air Transat	65%	20	17,2	67%
AirAsia	0%	67	4,8	74%
AirAsia X	24%	17	6,6	68%
AirAsia Zest	58%	12	11,4	45%
airBaltic	88%	26	13	87%
AirBlue	38%	8	8,8	n/a
AirTran Airways	81%	124	9,4	73%
Allegiant Air	3%	71	22,1	70%
Amaszonas	0%	4	16,1	n/a
Anadolu Jet	18%	28	8,5	86%
Arkia	0%	8	12,6	66%
Astra Airlines	0%	3	21	n/a
Azul Brazilian Airlines	56%	138	5,3	83%
Belle Air	71%	7	11,2	72%
Belle Air Europe	100%	2	7,3	50%
Blue Air	33%	6	21,6	75%
Blu-Express	80%	5	19,6	52%
Cebu Pacific Air	85%	46	4,2	69%
Citilink	72%	29	6,7	n/a
City Airways	0%	4	22	n/a
Corendon	75%	8	14,1	n/a
Corendon Dutch Airlines	100%	3	10	n/a
Dana Air	0%	1	22,8	n/a
Dragonair	63%	41	11,6	50%
Eastar Jet	44%	9	12	76%
Easyfly	0%	3	18	n/a
easyJet	35%	195	5,1	89%
easyJet Switzerland	64%	22	6,4	n/a
Fastjet	100%	3	12,6	n/a
Firefly	7%	14	5	72%
Fly 540	40%	10	23,1	n/a
Flybe	91%	69	6,9	84%
Flybe Finland	100%	28	5,1	84%
Flydubai	38%	32	2,3	66%
Frontier Airlines	83%	53	7,9	70%

Germanwings	31%	39	8,1	89%
GoAir	82%	17	3,2	68%
GOL	100%	136	7	84%
Golden Myanmar	100%	2	11,2	n/a
Helvetic Airways	14%	7	19,6	81%
Iberia Express	13%	16	9,8	93%
IndiGo	51%	72	2,4	87%
Indonesia AirAsia	39%	28	3,6	61%
Interjet	49%	41	6,4	73%
Intersky	0%	6	11,7	87%
Israir	0%	4	2,9	78%
JAL Express	64%	42	3,8	88%
Jazeera Airways	25%	8	4,7	92%
Jeju Air	77%	13	12,7	87%
Jet2	10%	50	22,2	82%
Jetairfly	76%	21	5,5	86%
JetBlue Airways	34%	191	8	67%
JetKonnect	88%	17	6,8	79%
Jetstar Airways	80%	74	5,3	75%
Jetstar Asia Airways	58%	19	3,3	88%
Jetstar Japan	44%	18	0,8	85%
Jetstar Pacific	80%	5	8,7	n/a
Jin Air	80%	10	13,2	77%
Juneyao Airlines	55%	33	3,1	42%
Kulula.com	50%	10	9,8	89%
Lion Air	15%	95	5	68%
Lucky Air	44%	18	6,3	54%
Magnicharters	14%	7	25,7	n/a
Malindo Air	0%	9	0,4	n/a
Mango	89%	9	13	n/a
Meridiana	59%	27	17,6	82%
Mihin Lanka	100%	3	8,2	74%
Monarch Airlines	46%	39	13,1	72%
Nas Air	88%	24	7	66%
NIKI	82%	22	4,2	84%
Nok Air	100%	18	12,2	90%
Nok Mini	100%	6	15,6	n/a
Norwegian Air Shuttle	56%	78	5	91%
Nouvelair	23%	13	12,8	n/a
Onur Air	92%	25	16	73%
Orient Thai Airlines	14%	21	23,1	66%
PAL Airlines	40%	5	25,1	n/a
PAL Express	57%	21	6,1	59%
Peach	100%	10	1,1	77%
Pegasus	29%	45	4,1	85%
Peruvian Airlines	42%	12	28,4	52%

Philippines AirAsia	100%	2	2,1	75%
PIA	30%	30	16,4	43%
RAK Airways	100%	2	7,1	n/a
Ryanair	28%	301	5,2	n/a
Scoot	0%	6	15,9	71%
Sky Airline	100%	17	11,8	78%
Skymark Airlines	100%	33	3,3	73%
SmartWings	86%	7	9,3	87%
Solaseed Air	100%	13	7,3	77%
Southwest Airlines	16%	575	11,2	74%
SpiceJet	63%	57	4,2	72%
Spirit Airlines	100%	52	5,2	57%
Spring Airlines	63%	38	3,9	42%
Star Peru	9%	11	24,7	67%
Sun Country Airlines	100%	17	11,6	74%
SunExpress	65%	43	8,5	90%
Sunwing Airlines	87%	15	6,9	56%
Thai AirAsia	50%	32	3,1	92%
Tigerair	58%	24	2,7	85%
Tigerair Australia	64%	11	5,3	66%
Tigerair Mandala	100%	9	1,1	69%
Tigerair Philippines	100%	5	2,7	66%
Transavia	40%	35	8,7	88%
Transavia France	100%	11	6,9	70%
TUIfly	24%	33	8,8	93%
T'Way Air	83%	6	10,8	83%
United Airways	64%	11	20,3	69%
VietJet Air	100%	10	3,5	n/a
Virgin America	77%	53	4,7	73%
VivaAerobus	55%	22	22,3	86%
VivaColombia	80%	5	12,2	n/a
Volaris	50%	44	4,2	87%
Volotea	100%	15	9,6	74%
Vueling	100%	70	7,8	78%
Westjet	43%	103	7,2	73%
Wizz Air	44%	41	4,2	89%
Wizz Air Ukraine	50%	4	2,9	90%
WOW Air	100%	3	5,2	90%

Appendix VIII

Table with use of leasing, fleet size, average fleet age, on-time performance, profit margin and debt ratio

Airline	*Use of leasing*	*Total fleet*	*Average fleet age*	*On-time performance*	*Profit Margin*	*Debt ratio*
Air Arabia*	36%	33	3,2	79%	14,4%	32,4%
Air Transat	65%	20	17,2	67%	-0,4%	68,5%
AirAsia*	23%	146	4,4	75%	37,0%	64,8%
airBaltic	88%	26	13	87%	-8,3%	n/a
Allegiant Air	3%	71	22,1	70%	8,6%	49,7%
Azul Brazilian Airlines	56%	138	5,3	83%	-7,0%	92,6%
Cebu Pacific Air	85%	46	4,2	69%	9,4%	63,9%
easyJet*	38%	217	5,2	89%	9,3%	54,3%
Fastjet*	54%	13	20,7	n/a	-265,6%	63,7%
Flybe*	94%	97	6,4	84%	-6,8%	88,1%
GOL	100%	136	7	84%	-18,7%	91,9%
Jazeera Airways	25%	8	4,7	92%	14,4%	87,9%
Jet2	10%	50	22,2	82%	3,6%	75,0%
JetBlue Airways	34%	191	8	67%	2,6%	73,3%
Jetstar*	76%	97	4,5	79%	5,6%	n/a
Jin Air	80%	10	13,2	77%	4,0%	81,0%
Meridiana	59%	27	17,6	82%	-32,8%	131,2%
Monarch Airlines	46%	39	13,1	72%	-3,2%	132,8%
Nok Air*	100%	24	13,1	90%	6,1%	60,6%
Norwegian Air Shuttle	56%	78	5	91%	3,4%	79,9%
PIA	30%	30	16,4	43%	-25,9%	141,5%
Ryanair	28%	301	5,2	n/a	11,7%	63,4%
Skymark Airlines	100%	33	3,3	73%	4,5%	36,9%
Southwest Airlines*	14%	699	10,9	74%	2,5%	62,4%
SpiceJet	63%	57	4,2	72%	-3,3%	107,3%
Spirit Airlines	100%	52	5,2	57%	8,2%	36,7%
Tigerair*	71%	49	3	76%	5,2%	81,1%
Transavia France	100%	11	6,9	70%	0,0%	74,6%
United Airways	64%	11	20,3	69%	13,7%	37,0%
Virgin America	77%	53	4,7	73%	-10,9%	n/a
Volaris	50%	44	4,2	87%	4,6%	51,1%
Vueling	100%	70	7,8	78%	2,6%	65,3%
Westjet	43%	103	7,2	73%	7,1%	60,7%

*Group includes more than one LCC

Appendix IX

Table with new leased aircraft

Airline	*Leased aircraft*	*New leased aircraft*
Air Arabia	9	100%
Air Arabia Egypt	1	0%
Air Arabia Maroc	2	100%
Air Busan	1	0%
Air Do	8	0%
Air One	10	80%
Air Transat	13	15%
AirAsia	0	-
AirAsia X	4	0%
AirAsia Zest	7	14%
AirBaltic	23	52%
AirBlue	3	0%
AirTran Airways	100	72%
Allegiant Air	2	0%
Amaszonas	0	-
Anadolu Jet	5	0%
Arkia	0	-
Astra Airlines	0	-
Azul Brazilian Airlines	77	69%
Belle Air	5	0%
Belle Air Europe	2	0%
Blue Air	2	0%
Blu-Express	4	0%
Cebu Pacific Air	39	100%
Citilink	21	67%
City Airways	0	-
Corendon	6	0%
Corendon Dutch Airlines	3	0%
Dana Air	0	-
Dragonair	26	69%
Eastar Jet	4	0%
Easyfly	0	-
easyJet	69	100%
easyJet Switzerland	14	36%
Fastjet	3	0%
Firefly	1	0%
Fly 540	4	0%
Flybe	63	100%
Flybe Finland	28	50%
Flydubai	12	100%
Frontier Airlines	44	82%
Germanwings	12	25%

GoAir	14	100%
GOL	136	72%
Golden Myanmar	2	0%
Helvetic Airways	1	0%
Iberia Express	2	50%
IndiGo	37	78%
Indonesia AirAsia	11	73%
Interjet	20	15%
Intersky	0	-
Israir	0	-
JAL Express	27	96%
Jazeera Airways	2	100%
Jeju Air	10	0%
Jet2	5	0%
Jetairfly	16	63%
JetBlue Airways	64	100%
JetKonnect	15	13%
Jetstar Airways	59	90%
Jetstar Asia Airways	11	82%
Jetstar Japan	8	100%
Jetstar Pacific	4	25%
Jin Air	8	0%
Juneyao Airlines	18	100%
Kulula.com	5	0%
Lion Air	14	64%
Lucky Air	8	0%
Magnicharters	1	0%
Malindo Air	0	-
Mango	8	0%
Meridiana	16	0%
Mihin Lanka	3	0%
Monarch Airlines	18	28%
Nas Air	21	52%
NIKI	18	100%
Nok Air	18	6%
Nok Mini	6	0%
Norwegian Air Shuttle	44	70%
Nouvelair	3	67%
Onur Air	23	0%
Orient Thai Airlines	3	0%
PAL Airlines	2	0%
PAL Express	12	0%
Peach	10	100%
Pegasus	13	46%
Peruvian Airlines	5	0%
Philippines AirAsia	2	100%

PIA	9	100%
RAK Airways	2	0%
Ryanair	85	100%
Scoot	0	-
Sky Airline	17	0%
Skymark Airlines	33	100%
SmartWings	6	0%
Solaseed Air	13	62%
Southwest Airlines	91	77%
SpiceJet	36	86%
Spirit Airlines	52	100%
Spring Airlines	24	79%
Star Peru	1	0%
Sun Country Airlines	17	29%
SunExpress	28	14%
Sunwing Airlines	13	23%
Thai AirAsia	16	100%
Tigerair	14	100%
Tigerair Australia	7	100%
Tigerair Mandala	9	100%
Tigerair Philippines	5	0%
Transavia	14	86%
Transavia France	11	73%
TUIfly	8	75%
T'Way Air	5	20%
United Airways	7	0%
VietJet Air	10	20%
Virgin America	41	90%
VivaAerobus	12	0%
VivaColombia	4	0%
Volaris	22	77%
Volotea	15	0%
Vueling	70	56%
Westjet	44	100%
Wizz Air	18	83%
Wizz Air Ukraine	2	100%
WOW Air	3	0%
	Average	67%

Appendix X

Table with operating and finance leases

Airline	*Operating*	*Finance*
Air Arabia*	3	12
Azul Brazilian Airlines	71	4
Cebu Pacific Air	11	27
Dragonair	26	1
easyJet*	72	11
Flybe*	88	2
GOL	96	45
Jet2	4	0
JetBlue Airways	60	4
Meridiana	25	1
Norwegian Air Shuttle	40	0
PIA	1	8
Ryanair	59	30
Southwest Airlines*	187	2
Spirit Airlines	45	0
Tigerair*	22	7
United Airways	0	7
Vueling	53	0
Westjet	44	0
	85%	15%

*Group includes more than one LCC

Appendix XI

Table with lease commitments/other debt commitments

Airline	*Lease/other debt*
Air Arabia*	139,6%
Air Transat	45,4%
AirAsia*	28,4%
Allegiant Air	31,9%
Azul Brazilian Airlines	90,3%
Cebu Pacific Air	67,7%
easyJet*	31,8%
Fastjet*	91,0%
Flybe*	130,8%
GOL	81,5%
Jet2	5,4%
JetBlue Airways	19,9%
Meridiana	30,1%
Monarch Airlines	9,1%
Norwegian Air Shuttle	158,9%
PIA	23,4%
Ryanair	26,6%
Southwest Airlines*	38,4%
SpiceJet	109,7%
Spirit Airlines	326,4%
Tigerair*	88,9%
United Airways	193,6%
Vueling	107,5%
Westjet	33,3%
Average	79,6%

*Group includes more than one LCC

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