

Evolution of Low-Cost Airlines in Different Global Regions

by

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B.S. Aerospace Engineering, Embry-Riddle Aeronautical University
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Submitted to the Department of Civil and Environmental Engineering in
partial fulfillment of the requirements for the degree of

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ABSTRACT

Low-cost air carriers have been growing aggressively in many regions around the world and today offer a significant proportion of the available flight and seat capacity in the markets where they operate. This thesis studies the airline capacity evolution of low-cost carriers (LCCs) between 2009 and 2018 in several different types of market regions, both long and short-haul as well as mature versus emerging air travel markets.

Between 2009 and 2018, domestic India and domestic China had the fastest growth in total airline capacity, growing at a CAGR of 12.0% and 11.1% respectively. The more mature markets saw much slower growth – the intra-Europe region grew at a 5.6% CAGR while both the domestic US and domestic Australia regions grew at a CAGR less than 3% during the 10-year period. The domestic India region had the highest gain in low-cost carrier share of capacity, which grew by 26 points – from 43% of domestic capacity in 2009 to 69% in 2018. The growth of low-cost carrier capacity share was much smaller or even negative in other regions: 10 points in intra-Europe (from 40% to 50%), 9 points in domestic China (from 3% to 12%), 9 points in domestic US (31% to 40%), 7 points in the transatlantic region (2% to 9%) and -22 points in domestic Australia (50% to 28%).

In the mature markets analyzed (except Australia), much of the growth in the low-cost carrier sector has come from ultra-low-cost carriers adding capacity as traditional LCCs are now moving upmarket due to increasing costs. While total capacities in the emerging markets grew rapidly, the growth has come from different sources. LCCs in India have grown significantly, primarily due to the very large demand for low-fare air travel in the country. On the other hand, much of the growth in China has come from legacy carriers; the slower growth in the Chinese LCC sector is explained by unsupportive government regulations and a lack of low-cost airport infrastructure. LCCs operating in the transatlantic region have also seen slow growth due to the various difficulties of operating low-cost in long haul sectors, with many LCCs going bankrupt and ceasing operations.

Thesis Supervisor: Peter Belobaba

Title: Principal Research Scientist of Aeronautics and Astronautics

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Chapter 1: Introduction

Section 1.1: Background and Motivation

In many airline market regions around the world, low-cost carriers have grown significantly over the past few decades, making up substantial portions of airline traffic and capacity. In 2018 alone, ICAO (2018) claims that low-cost carriers around the world carried about 1.3 billion passengers, or 31% of the year's total scheduled passengers. This is a significant jump from three years prior (i.e. 2015) when low-cost airlines carried 984 million passengers, or 28% of that year's total passenger traffic. The capacity side also shows significant gains, with low-cost carriers in 2018 accounting for 33% of intra-regional seat capacity and 13% of inter-region capacity, compared to just 25% and 6% in 2009 respectively (CAPA, 2019).

Low-cost airlines have also been growing at faster rates than both the global average as well as their legacy counterparts, in both emerging and mature air travel markets; between 2009 and 2018, global LCC capacity grew by roughly 108% while full-service carriers grew only by 41% over the same time period (CAPA, 2019). Note that these statistics are based on classifications of airlines (between full-service and low-cost carriers) conducted by ICAO and CAPA respectively, hence may not exactly match the results of the thesis – more on this classification issue is presented below.

The rapid expansion of LCCs has had many direct effects on global air travel markets. Most significantly, markets that low-cost carriers enter typically see average fares decrease and traffic increase, as observed with the 'Southwest effect' in domestic US markets. Given their no-frill products and lower cost structures, low-cost carriers can offer significantly lower fares (compared to their legacy counterparts) in the markets they enter, which in turn stimulates demand. The increased traffic stimulation results in more competition between airlines in the market, resulting in an overall decrease in fare levels (Weisskopf & Schlumberger, 2014).

In an effort to maintain market share and remain competitive, legacy carriers have taken a variety of steps to address the growing challenge from LCCs. Most legacy carriers reduce their coach fares to match those of LCCs, increasing their dependence on premium cabin revenues (CAPA, 2009). While many full-service carriers have done so while maintaining their high cost structures, others have chosen to improve operational efficiency to help lower costs, adopting measures such as

investing in more fuel-efficient aircraft or increasing direct sales to reduce GDS costs (CAPA, 2018). In addition, many legacy carriers have begun offering products with decoupled ancillary services (such as the Basic Economy, with fares matched to those of the LCC in the market) in the hopes to use ancillary revenues to make up for the lost revenue from fare reductions (Singh, n.d.).

The result of LCC's entering and consequently lowering fare levels in a market also has an indirect effect on factors such as tourism and migration. A study by Donzelli (2010) illustrates that not only has the entry of low-cost carriers increased tourism numbers, but also that LCCs have helped reduced seasonality in the tourism business. This is made possible due to the flexibility of LCC schedules (which are more leisure/family focused compared to legacy carrier schedules) in addition to the lower fares, allowing consumers to afford more trips in a year (Weisskopf & Schlumberger, 2014). Another study highlights how the entry of LCCs in a market can induce relocation since it lowers the overall cost of international labor migration (Button & Vega, 2008).

Given their rapid expansion and its subsequent effects, this thesis examines the evolution of these low-cost carriers over the past decade across several air travel market regions. These regions include both long and short-haul markets and represent different levels of air travel market maturity. The goal of the thesis is to examine how low-cost carriers have emerged into each region, how they have grown over the past decade in this region and how they have shifted the region's market dynamics. While most of the literature focuses on low-cost carrier emergence and growth in one particular region, this thesis documents how these emergence and growth characteristics differ between geographies, particularly between long versus short-haul operations as well as mature versus emerging air travel markets.

Section 1.2: Low-Cost Carrier Business Model Evolution

Across many regions around the world, deregulation of the airline industry has enabled low-cost carriers to emerge, creating demand for low-fare air travel in the process (ICAO, n.d.). By definition, a low-cost carrier is a type of airline that puts a high emphasis on efficient operations, reduced costs and service quality, offering passengers the opportunity to travel at much lower fares compared to tickets sold by more traditional, full-service airlines.

According to Belobaba et. al (2016), several characteristics are commonly found in the business models of low-cost carriers around the world, all of which are primarily aimed at reducing costs

in order to compete on price. For example, one common element among low-cost carriers is fleet commonality (same airplane type across fleet) which significantly reduces maintenance costs and crew training. On the operational side, low-cost carriers typically operate point-to-point flights (from one airport to another) to keep aircraft utilization and employ productivity high, and typically operate out of smaller, secondary airports to keep airport costs low. On the passenger experience side, most LCCs offer a no-frills experience with on-board amenities such as food or a blanket available for a fee.

The business model of low-cost carriers has evolved significantly over the last few decades. It has become more difficult to define or characterize LCC – some even claim that the term ‘low-cost carrier’ is one of the most over-used term in the aviation industry (Tarry, 2010). As such, there is no single model for low-cost carriers to follow, even though best practices may be similar between low-cost airlines across the globe (Weisskopf & Schlumberger, 2014).

In the recent past, several categories of low-cost carriers have emerged. Many low-cost carriers today see operating costs start to creep up with many difficulties faced to keep operations as efficient as in the past (when the airline was new). As these airlines get older, their airplanes also get older, leading to higher maintenance costs and lower utilizations. In turn, the airline’s staff also gain more years of tenure and seniority, eventually leading to higher labor costs. Furthermore, many low-cost carriers deviate from the traditional low-cost airline characteristics, such as providing complimentary frills on board or having a premium cabin. Southwest Airlines is the perfect example of this – while the airline started out as a traditional low-cost carrier, it today has many older aircraft and an aging staff. The airline has also added amenities for passengers, including 2 free checked bags and complimentary snacks/drinks on board. As a result, Southwest is unable to keep their costs as low as it did before and thus, the airline can be better classified as part of the hybrid LCC category. This category implies that the airline slowly moves upmarket as it loses its cost competitiveness, creating a hybrid between full-service carriers and traditional LCCs (Bachwich, 2017).

At the same time, an ultra-low-cost carrier category is also emerging globally – compared to the hybrid low-cost carriers, which are no longer as cost-efficient, ultra-low-cost carriers are said to follow the purist model (Weisskopf & Schlumberger, 2014). An airline of this category keeps operating costs as low as possible through a variety of efficiency measures such as using secondary

airports and a single fleet type. An example of this category is Ryanair, which is strictly adherent to the traditional LCC business model, particularly through their no-frills product, in the pursuit of maintaining their lower operating costs.

Given the evolution of the low-cost carrier model and the emergence of new categories over the past few decades, it has become more complicated to classify an airline as an LCC or otherwise. Many external sources such as ICAO and CAPA use different approaches, including analyzing the airline's cost data relative to other airlines or studying the airline's business model, to determine the airline's type. Occasionally, classifications from multiple sources do not coincide with each other's, given the evolving model of LCCs today and different methods used. The classifications used in this thesis adopted ICAO and CAPA classifications of airlines but also utilized analysis of the respective airline's business model to help classify an airline's type between a low-cost carrier or a full-service carrier.

Section 1.3: Thesis Outline and Structure

This thesis consists of six main chapters, each one covering one of the six market regions analyzed in this thesis. Chapter 2 focuses on the US domestic region, which serves as one of the mature short-haul markets analyzed and as a benchmark for other regions studied in this thesis. This chapter covers the emergence of the low-cost carrier model in the US as a result of airline deregulation, the shift of traditional LCCs into the hybrid category as well as the more recent emergence of ultra-low-cost carriers in the region.

Chapter 3 focuses on the intra-Europe region, which also serves an example of a short-haul mature air travel market for this thesis and as a benchmark when analyzing other emerging regions. The chapter explores the differences between European and American low-cost carrier evolution, mainly highlighting the strength of the intra-Europe ULCC sector due to Ryanair's rapid growth.

Chapter 4 explores the evolution of low-cost carriers in the domestic Australia region, highlighting the transformation of Virgin Australia from an LCC to a full-service carrier, as well as the effect this transformation had on the overall Australian LCC sector. The chapter also discusses the consolidated nature of the region and the ownership structure of the Australian low-cost carriers, exploring the low-cost subsidiary/carrier-within-carrier model.

Chapters 5 and 6 cover the emerging air travel markets of domestic India and domestic China, respectively. Both chapters study the growth of LCCs in these emerging markets and benchmark this evolution to that seen in mature air travel regions. Furthermore, these chapters explore various aspects of the Chinese and Indian aviation ecosystems and their subsequent effects on the growth of low-cost carriers in each region.

Chapter 7 investigates the more recent growth of low-cost carrier business model in the long-haul sector by analyzing the growth of LCCs in the transatlantic region. This chapter explores the differences in low-cost carrier business models and their corresponding growth characteristics in short versus long haul sectors in addition to identifying the causes behind slow low-cost airline growth and multiple LCC failures in this region.

Finally, Chapter 8 summarizes the analysis in this thesis and discusses the differences in low-cost carrier growth characteristics between regions, specifically focusing on long versus short-haul as well as mature versus emerging markets.

For each region studied in this thesis, several factors were studied to understand the effect of low-cost carrier growth in that market from a capacity standpoint. The metrics analyzed for each region include the overall capacity evolution (ASMs, seats, flights, stage length), split of capacity by airplane type, split of capacity by airline type (full-service versus low-cost) as well as coverage levels (city-pair markets served by full-service and low-cost carriers). All data was obtained from the Innovata airline schedule database which was accessed through DiioMi. Note that both scheduled and charter operations were considered in the analysis, given that many leisure markets across analysis regions are served extensively by charter airlines.

Several analyses are presented in this thesis which show the coverage level of both low-cost carriers and legacy carriers in terms of markets served in each region. Unless otherwise specified, all analysis of this type refers to city-pair markets - to conduct analysis on 'market catchment' level, airports in same city/area were grouped. IATA's classification of 'city codes' was adopted to help combine the several airports serving a given metropolitan area, with additional metropolitan areas added. Table 1.1.1 below highlights all the city pair groupings used for the analysis in this thesis.

Table 1.1.1 – Metropolitan Area Airport Groupings (city pair markets)

<u>Region</u>	<u>Metropolitan Area Airport Grouping</u>
Domestic US	Chicago (CHI): ORD, MDW, RFD Dallas (DFW): DFW, DAL Detroit (DTT): DTW, DET, YIP Houston (HOU): IAH, HOU Los Angeles (LAX): LAX, ONT, LGB, SNA, BUR Miami (QMI): MIA, FLL New York City (NYC): JFK, LGA, EWR, HPN San Francisco (SFO): SFO, OAK, SJC Washington DC (WAS): IAD, DCA, BWI
Intra-Europe	Berlin (BER): BER, TXL, SXF Bucharest (BUH): OTP, BBU Brussels (BRU): BRU, CRL London (LON): LCY, LGW, LTN, LHR, STN Milan (MIL): MXP, BGY, LIN, PMF Moscow (MOW): SVO, DME, VKO Oslo (OSL): OSL, TRF, RYG Paris (PAR): CDG, ORY Reykjavik (REK): KEF, RKV Rome (ROM): FCO, CIA Stockholm (STO): ARN, NYO, BMA, VST Tenerife (TCI): TFN, TFS
Domestic Australia	N/A
Domestic India	N/A
Domestic China	Beijing (BJS): PEK, NAY Shanghai (SHA): SHA, PVG
Transatlantic	N/A (no additional from Domestic US and intra-Europe)

Chapter 2: Domestic US Market Region

The domestic US region was the first air travel market studied in this thesis and is the largest domestic airline market in the world, making up 14.1% of all global revenue passenger kilometers (RPKs) in 2018 according to IATA (2019). The region is also home to the first low-cost airline in the world, Pacific Southwest Airlines, which started operating intrastate flights between Southern and Northern California in 1949 (Sheth et. al, 2007). In the years since then, several low-cost carriers have emerged in the region and grown substantially, making up a significant portion of domestic capacity and traffic in the country today. This chapter evaluates the emergence and growth of low-cost carriers in the region and serves as a benchmark for other regions considered in this thesis.

Section 2.1: Background and Literature Review

The American commercial aviation industry saw a huge boost post the 1940s, given the steady development of aircraft and aviation technologies during World War II. This was succeeded by another period of growth credited to the development and introduction of widebody or jumbo-jet aircraft into domestic airline fleets. During these times of growth, the federal Civil Aviation Board (CAB) regulated all domestic commercial aviation as a public utility – as such, they were able to control the setting of fares, routes, and schedules (Smithsonian, n.d.-a).

However, the CAB only regulated airlines flying across state lines and had no control over carriers operating exclusively within a state. As a result, in 1949, Pacific Southwest Airlines (PSA) was launched as an intra-state low-cost airline operating in California. Since the CAB only regulated inter-state airlines, PSA was regulated by the California Public Utilities Commission who provided the airline greater operating freedom. Therefore, the airline had more freedom to select the markets it would operate in (compared to carriers regulated by CAB), and hence could offer fares that were 50% lower than other major airlines (Sheth et. al, 2007). Inspired by the success of PSA, Southwest Airlines was founded in Texas and was based on the same business model of intra-state operations to avoid being regulated by the CAB. Southwest, which was a very small airline then, operated flights solely within Texas and was regulated by the Texas Aeronautical Commission which provided the airline a lot of flexibility in terms of pricing and operations (Sheth et. al, 2007).

In the 1970s, the US Congress was under pressure from consumers since the regulated system meant that airlines were charging passengers escalating fares – fares were regulated but were still increasing to help guarantee profits to the airlines in the rising cost environment (Cook, 1996). As such, the Airline Deregulation Act was passed by Congress in 1978 with the goal of promoting free competition in the industry – thus, airlines became free to control their own fares, routes and, schedules (Smithsonian, n.d.-b).

With the industry deregulated, several new players emerged in the domestic market due to the lower barriers of entry and less regulation to start operations (Cook, 1996). Among these new players were the existing low-cost carriers, such Southwest and PSA, which developed innovative operating models to help cut costs and started serving inter-state markets, offering cheaper fares to consumers (Sheth et. al, 2007).

Several new low-cost carriers emerged in the domestic US region post-deregulation, particularly during the 1980s and 1990s. People's Express was one such example, launched from an abandoned terminal at Newark Airport to help keep costs low. After initial success, the airline faced many financial struggles and was eventually sold to Texas Air Corp in 1987 (Heppenheimer, 1995). In addition to People's Express, several other low-cost carriers such as Frontier, ValueJet, and JetBlue were launched during the late 1990s and early 2000s (Chowdhury, 2007). As a result, the low-cost airline entrants greatly lowered average fares in the US domestic market and had a great impact on both the airline industry's pricing policies in addition to the consumer's expectation of low-priced air travel (Belobaba et. al, 2016).

The early 2000s saw a significant downturn in the domestic air travel market, with several airlines going through bankruptcy-related restructuring. During the high profitability years of the 1990s, legacy airlines had fast-rising costs, particularly associated with higher wages. Thus, due to the economic slowdown and decline in demand post 9/11, many legacy carriers fell into massive debts as a result of their rising costs (Belobaba et. al, 2016). While the economic slowdown and decline in demand also affected low-cost carriers, these airlines were able to better adjust to the situation due to their lower cost structures. As a result, the low-cost carriers put significant revenue pressure on legacy carriers (legacy carriers could no longer charge premium fares), leading to many airlines facing financial hardships and filing for bankruptcy under Chapter 11 (Sheth et. al, 2007).

As part of the post-bankruptcy restructuring efforts, airlines focused on downsizing their operations, improving productivity, and reducing costs - primarily reducing labor expenditures (Belobaba et. al, 2016). More recently, the 2008 global recession and an increase in oil prices created financial troubles for US airlines once again. Given the higher fuel prices, both legacy and low-cost carriers saw their operating costs significantly rise during this time period even after various cost-cutting efforts were already in motion (Belobaba et. al, 2016).

Along with rising fuel costs, the more established low-cost carriers (such as Southwest) also saw labor and maintenance costs rising due to the airlines' growing age. As a result, the industry saw a period of cost convergence between the operating costs of both legacy and low-cost carriers (Tsoukalas et. al, 2008). At the same time, some newer low-cost carriers, such as JetBlue, started offering more attractive products, with amenities such as leather seats and seat-back IFE monitors, leading to higher costs compared to a traditional LCC (Sheth et. al, 2007). As these airlines moved upmarket as a result of increasing costs, they used the hybrid carrier business model, which consists of characteristics from both legacy carriers and traditional LCCs (Bachwich, 2017).

Given the shift of many traditional low-cost carriers toward the hybrid model, new players such as Spirit and Frontier entered the ultra-low-cost carrier (ULCC) category in the time after the global recession. These ULCCs followed many operating characteristics of a pure LCC but placed a greater focus on ancillary revenues from checked baggage and onboard amenities. As a result, these airlines fulfilled the space left behind in the region by traditional LCCs that had moved away from the baseline model due to rising costs (Bachwich, 2017).

In order to conduct an analysis and study the impact of low-cost carriers in the US domestic market over the past 10 years, it was necessary to classify all major US airlines (that operated during the entire time period) as either legacy carriers, hybrid/LCCs or ULCCs. 15 airlines were chosen for the classification process, as they offered ~ 98.5% of cumulative 2009-2018 seat capacity in the US domestic market. In order to get to 100% of cumulative seat capacity would have required adding 82 more airlines to the classification process with much more sparse data over the 10-year period. The main classification was conducted by analyzing business models of each of the 15 airlines and matching them with one of the categories. In addition, since all airlines to be classified are US based, substantial unit cost data was available through the DOT's Form 41 database (accessed through the MIT Airline Data Project) to support or validate the business model analysis.

For the unit cost analysis, two main metrics were analyzed. First, the relationship between system cost per available seat miles (CASM) (ex-transport), and average stage length for each of the airlines considered, as seen in Figure 2.1.1. Second, the system stage length adjusted CASM (ex-transport), or in other words, the cost per equivalent seat mile (CESM) for each of the airlines considered, illustrated in Figure 2.1.2. The cost data was analyzed on a stage length perspective to account for the economies of scale, since airlines typically see lower unit costs on a longer stage length flight (since the fixed operating costs are spread over longer unit distances).

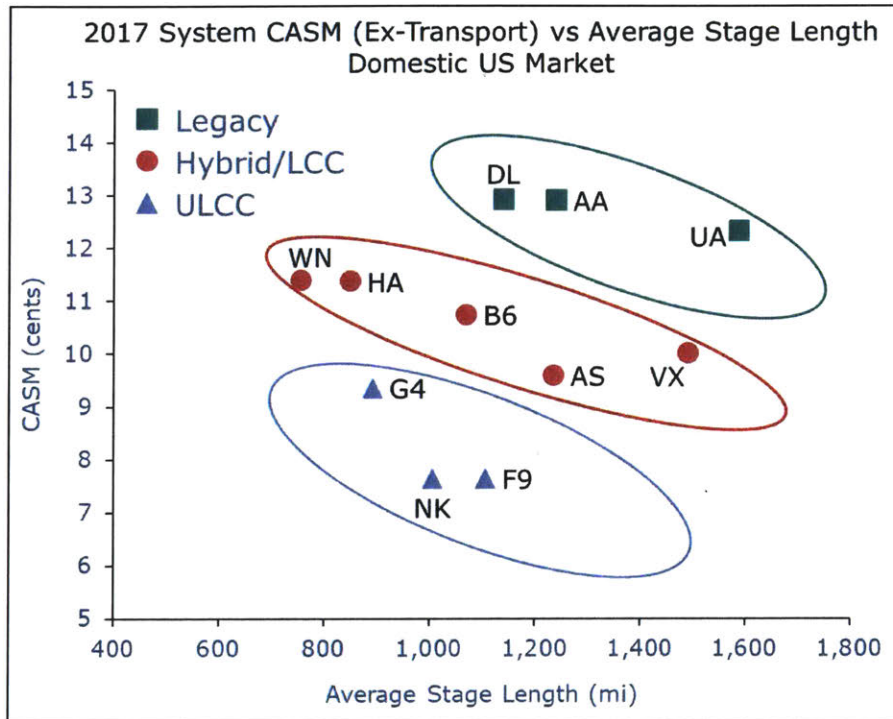


Figure 2.1.1 – US Domestic CASM vs Stage Length (2017)

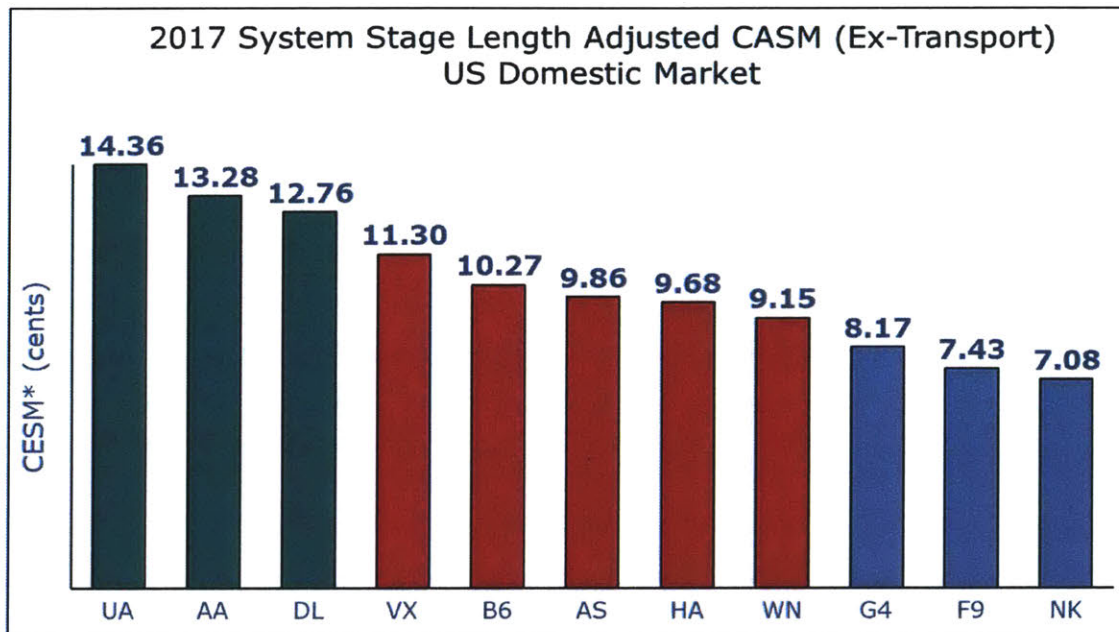


Figure 2.1.2 – US Domestic Stage Length Adjusted CASM (2017)

American (AA), Delta (DL) and United (UA) were classified as full-service carriers as their business models match several characteristics which were described by Gillen and Morrison (2003) as being commonly associated with legacy carriers. All three airlines operate the hub and spoke network model, with multiple hubs set up across the country, connecting thousands of origin-destination pairs. They mainly run their operation by feeding passengers into their hubs and connecting them on flights to their final destinations. In addition, these airlines typically provide higher quality service to passengers, often offering a premium product (business or first class) across their network in addition to the standard economy product. American, Delta and United are also all thought to have better cabin services compared to many low-cost carriers and may offer complimentary amenities, such as food/beverage as well as IFE screens, onboard.

Furthermore, these airlines all have a wider range of fleet options to match demand with supply in their operations – regional jets and turboprops for smaller regional cities in addition to narrow and wide-bodies for larger demand destinations. Lastly, these airlines typically fly to primary airports instead of secondary airports, thus paying more expensive airport fees. This classification can also be verified with the CASM analysis – these three airlines fly longer distances on average, have a higher CASM in addition to a higher CESM – all characteristics of a legacy carrier. US Airways

(US), Northwest (NA) and Continental (CO) were also all classified in the legacy category due to their business models featuring the above-mentioned characteristics.

Next, Southwest (WN) and JetBlue (B6) were classified as hybrid/low-cost carriers. Given that both airlines have been operating for a significant period of time, they have started losing some of their cost advantages, hence fitting into the hybrid/LCC bucket. Hybrids are mainly known to have a lower unit cost and stage length compared to legacy carriers, but higher unit cost and stage length compared to ULCCs – this holds true for these two airlines, as per Figures 2.1.1 and 2.1.2. In addition, these hybrid/LCCs typically have fewer amenities offered onboard compared to legacy carriers, but more compared to ULCCs.

These two hybrid/LCCs have also mainly operated a single aircraft type (737s for WN, A320 family for B6) in order to keep costs low by utilizing the fleet commonality advantage. Having said that, JetBlue also has a significant number of regional jets in the fleet, given that they have now transitioned into this hybrid low-cost carrier stage (i.e. following a few characteristics of legacy carriers also). These airlines don't mainly operate hubs and typically fly point-to-point between origins and destinations of high demand. AirTran (FL) and Virgin America (VX) were also classified as hybrid/LCCs due to similar characteristics in their business models. Alaska (AS) and Hawaiian (HA) were also classified as hybrid/LCCs; while both these airlines offer a more attractive product compared to the likes of Southwest, in addition to featuring many other legacy carrier characteristics, they are able to maintain a much lower unit cost as seen in Figures 2.1.1 and 2.1.2 – hence fitting into this hybrid category.

Finally, Frontier (F9), Spirit (NK) and Allegiant (G4) were classified as ULCCs. These airlines have significantly lower costs than both legacy and hybrids, as well as shorter average stage lengths, as seen in Figures 2.1.1 and 2.1.2. Another key characteristic that justifies this classification is that these airlines make up a significant portion of their revenue from selling unbundled ancillaries, such as a seat assignment or carry-on bag fee. Their product is the least premium compared to other legacy and LCC players in the market. These airlines also have a single fleet type focus to keep costs low in addition to flying to many smaller airports in order to benefit from the lower landing/navigation/parking costs.

Table 2.1.1 below summarizes the classification of these 15 airlines across the 3 airline type categories.

Table 2.1.1 – Classification of Top 15 US Domestic Airlines

Legacy Carriers	American (AA), Delta (DL), United (UA), Continental (CO), Northwest (NWA) and US Airways (US)
Hybrid/LCCs	Southwest (WN), AirTran (FL), JetBlue (B6), Hawaiian (HA), Alaska (AS) and Virgin America (VX)
Ultra Low-Cost Carriers	Frontier (F9), Spirit (NK) and Allegiant (G4)

Section 2.2: Capacity Trends

Airline capacity in the US domestic market has seen significant growth from 2009 to 2018, with ASMs growing at a 2.9% CAGR over this time period as shown in Figure 2.2.1. Even with this overall growth, the region’s capacity evolution has gone through different phases over the analysis time period. According to Swelbar (2014), the US airline industry went through a phase of capacity rationalization between 2007 and 2009 where domestic capacity was reduced as a result of the macroeconomic shocks to the industry in addition to higher fuel prices. This was followed by a period of capacity discipline until 2014, where airlines restricted capacity growth while traffic continued to increase. The capacity rationalization and discipline phases can be observed in Figure 2.2.1, where year-on-year ASM growth in the region was either negative or very small between 2007 and 2014. However, starting in 2015, capacity has been growing much faster – hence the market entered a capacity regeneration period, where airlines were regenerating capacity to higher than pre-recession levels.

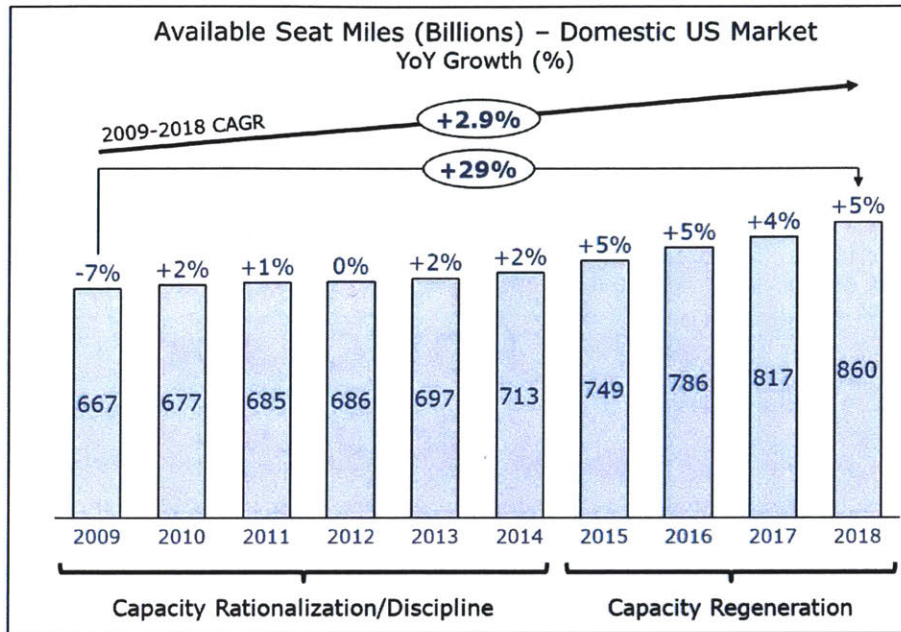


Figure 2.2.1 – Domestic US Available Seat Miles (2009-2018)

Figures 2.2.2 and 2.2.3 display the progression of the number of flights and seats in the US domestic sector, both with the overall growth rate as well as CAGRs. While overall ASM capacity has grown, the number of flights in the domestic market has decreased comparing 2018 to 2009. On the other hand, however, the number of seat departures in the sector has grown significantly in this same time period. This suggests that while capacity is being added, US airlines are shifting toward larger planes (i.e. more seats per departure) during this time period, explaining the decrease of flight capacity and the increase of seat capacity in the region.

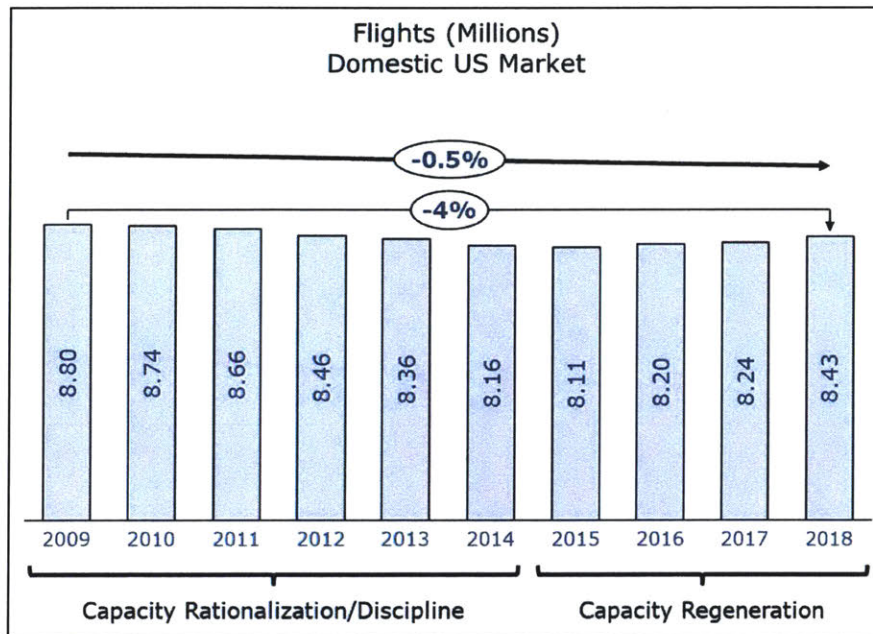


Figure 2.2.2 – Domestic US Flight Operations (2009-2018)

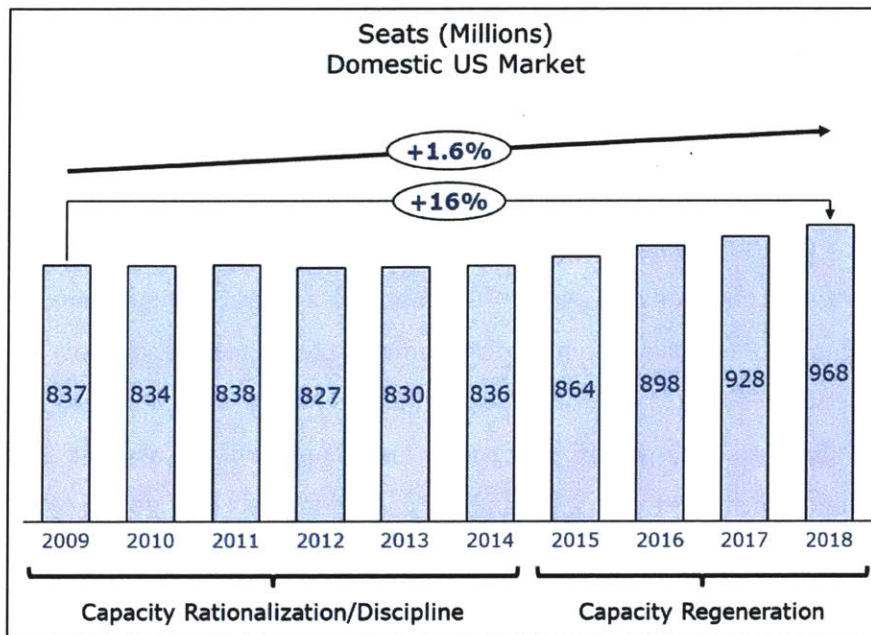


Figure 2.2.3 – Domestic US Seats (2009-2018)

Since ASM capacity grew at a faster rate compared to seat capacity in this time period, it can be said that US airlines flew more long-distance flight legs (and/or fewer short distance flight), resulting in a growing average stage length. Figure 2.2.4 shows the progression of average stage

length in this market, which grew at a slightly faster rate than the seat capacity in the sector, but still slower than overall ASM growth – this confirms that the increase in ASM capacity over the past 10 years is a function of both an increased number of seats as well as growing average stage length.

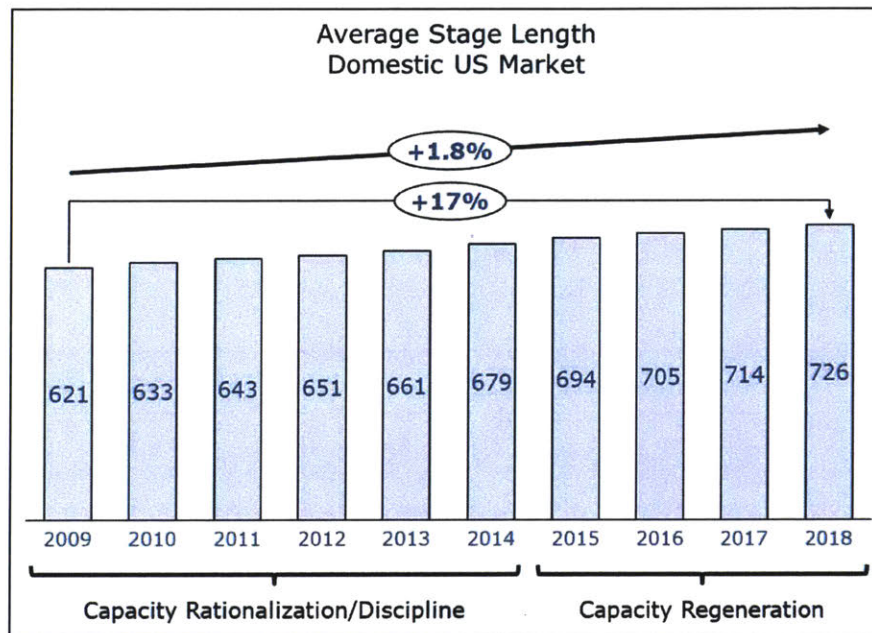


Figure 2.2.4 – Domestic US Average Stage Length (2009-2018)

The split of US domestic flight capacity across different airplane categories was also studied, in addition to how this split evolved over the 10-year period, as illustrated in Figure 2.2.5. While the overall number of flights is decreasing, narrow-bodies make up a larger share of flight capacity in 2018 (63%) versus in 2009 (51%). Subsequently, the of regional jet and turboprop shares of flight capacity have decreased over the 10-year period; this trend is in line with the growing average seats per departure metric between 2009 and 2018. Regional jets operated 33% of US domestic flights in 2009 versus 29% in 2018 while turbo-props operated 15% of domestic flights in 2009 compared to just 8% in 2018. Wide-body operations also exist in the US domestic sector; however, these represent a small proportion over this time period, making up between 0.7% to 1% of yearly flight operations. In summary, US airlines flew longer flights with higher seat capacities on average in 2018 compared to 2009.

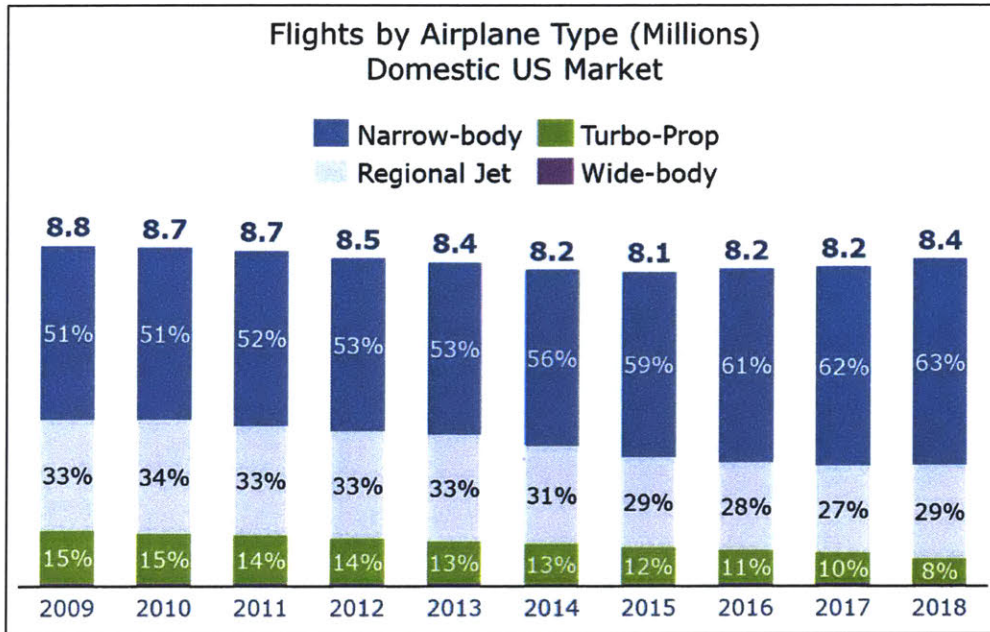


Figure 2.2.5 – Domestic US Flights by Airplane Type (2009-2018)

Figure 2.2.6 breaks down domestic US ASM capacity by marketing carrier. The domestic US is more consolidated in 2018 compared to 2009 – the top 10 airlines by ASM capacity made up 98% of domestic capacity in 2018 compared to 93% in 2009. This is a result of several airline mergers that occurred in the region over the decade, including Delta-Northwest, Southwest-AirTran, United-Continental, and American-US Airways. As a result of the mergers, American, Delta, Southwest, and United each make up a larger portion of ASM capacity in 2018 compared to their capacity shares in 2009. In addition, Alaska and JetBlue have larger ASM shares in 2018 versus 2009, from 4% in 2009 to 7% in 2018 for Alaska and from 4% to 6% from JetBlue, since they have expanded substantially during the decade.

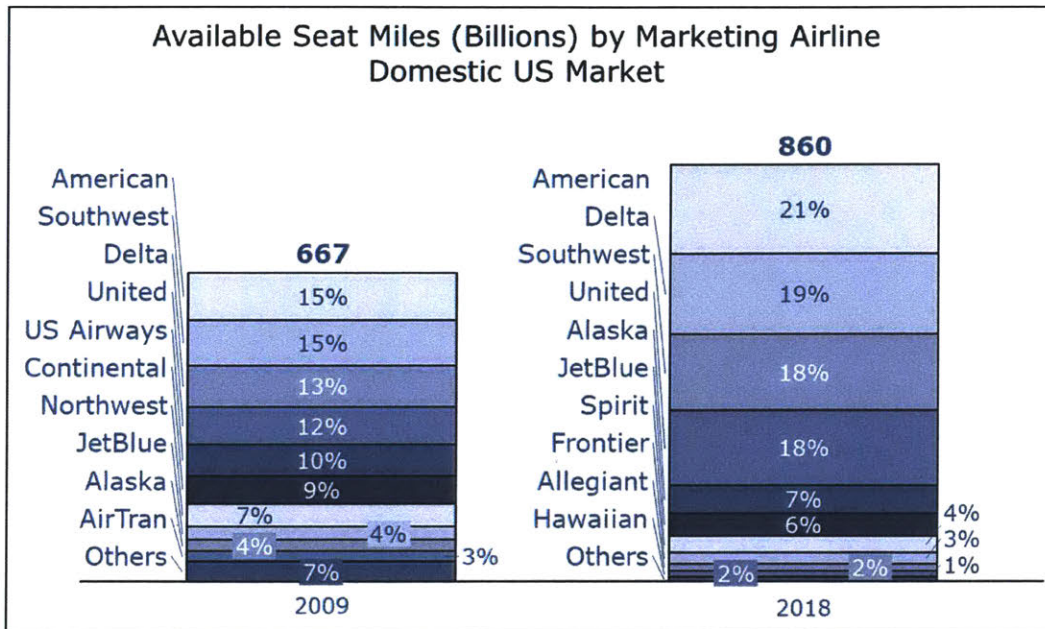


Figure 2.2.6 – Domestic US ASMs by Marketing Airline (2009-2018)

Figure 2.2.7 illustrates the split of domestic US capacity by airline type, namely legacy carriers, hybrid/LCCs and ULCCs. While legacy carriers continue to dominate ASM capacity in this region, both hybrid/LCCs and ULCCs see increasing shares of capacity between 2009 and 2018. LCCs make up 32% of domestic ASM capacity in 2018, a substantial increase from 28% in 2009. Similarly, ULCCs make up only 3% of ASM capacity in 2009 but as much as 8% in 2018. This significant gain in ULCC share of capacity can be attributed to the fast growth of American ULCC capacity between 2009 and 2018, particularly Spirit which grew capacity by ~450% across the 10-year period. As a result of LCC and ULCC share growth, legacy airlines make up a much smaller portion of domestic capacity in 2018 (59%) versus in 2009 (68%).

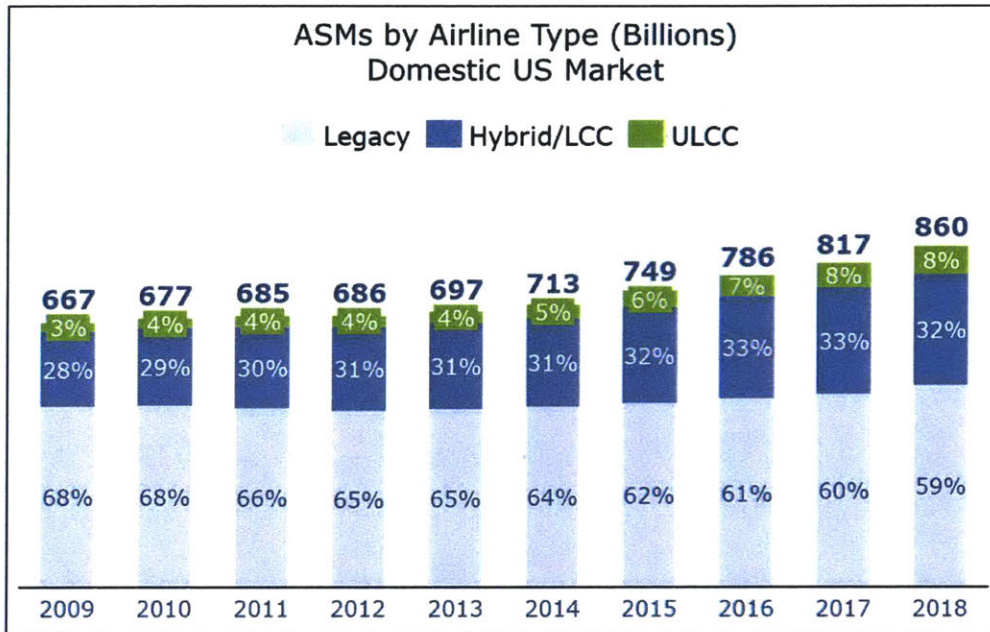


Figure 2.2.7 – Domestic US ASMs by Airline Type (2009-2018)

Figures 2.2.8 and 2.2.9 display the split of flight operations by airplane type for legacy airlines and low-cost carriers (hybrid/LCCs and ULCCs combined) respectively. While legacy carrier flights are operated by a combination of narrow-bodies, regional jets, and turbo-props, low-cost carrier operations are served entirely by narrow-bodies starting in 2012. Similarly, Figure 2.8.10 shows the average stage length evolution for both legacy and low-cost carriers (hybrid/LCCs and ULCCs combined) over the past 10 years. As observed, legacy carriers operate significantly longer stage lengths on average compared to their low-cost carrier counterparts in the domestic US region. Both factors (difference in fleet mix and difference in average stage length between airline types) can be explained by the business models of low-cost carriers versus that of legacy carriers. Legacy airlines typically operate the hub model, hence use more turboprops or regional jets than low-cost carriers to feed passengers from regional cities into/out of their hubs – a wider fleet mix helps allocate the right capacity to each of the spoke cities, since they may vary in demand. In addition, legacy carriers fly longer distances on average (compared to low-cost carriers) in the domestic market since they fly more transcontinental operations (to connect their hubs with many more cities) and frequently outsource a significant chunk of their regional/short-distance operations to regional carriers. On the other hand, low-cost carriers tend to fly point-to-point in only high demand markets, thus mainly require narrow-bodies (versus turbo-props or regional jets) to

accommodate the large demand. The single fleet type also helps low-cost carriers keep their operating costs lower. Given the fewer transcontinental operations in addition to not outsourcing to regional carriers, LCCs and ULCCs typically have shorter average stage lengths.

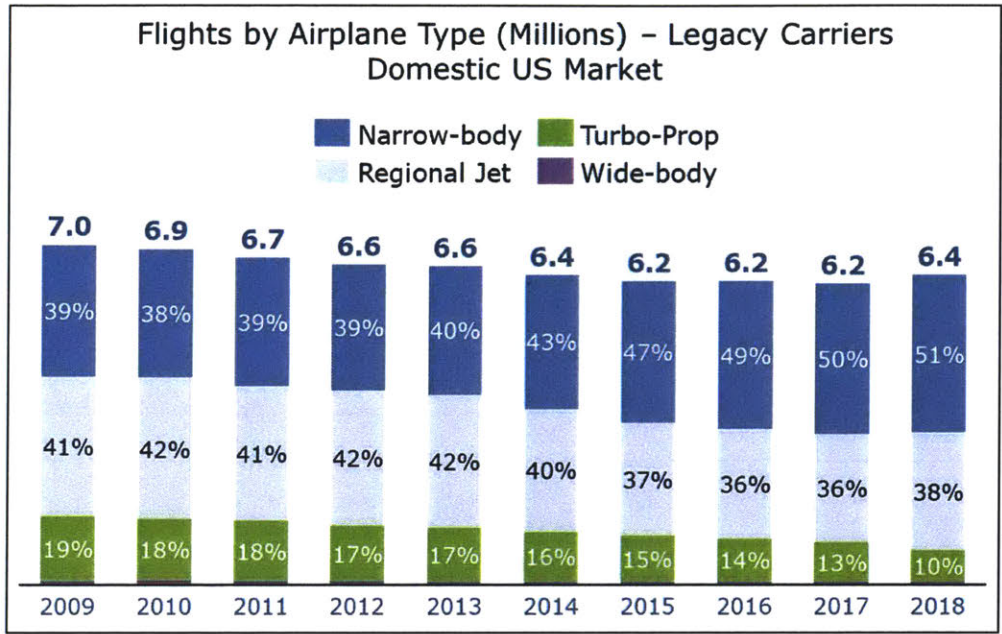


Figure 2.2.8 – Domestic US Legacy Carrier Flights by Airplane Type (2009-2018)

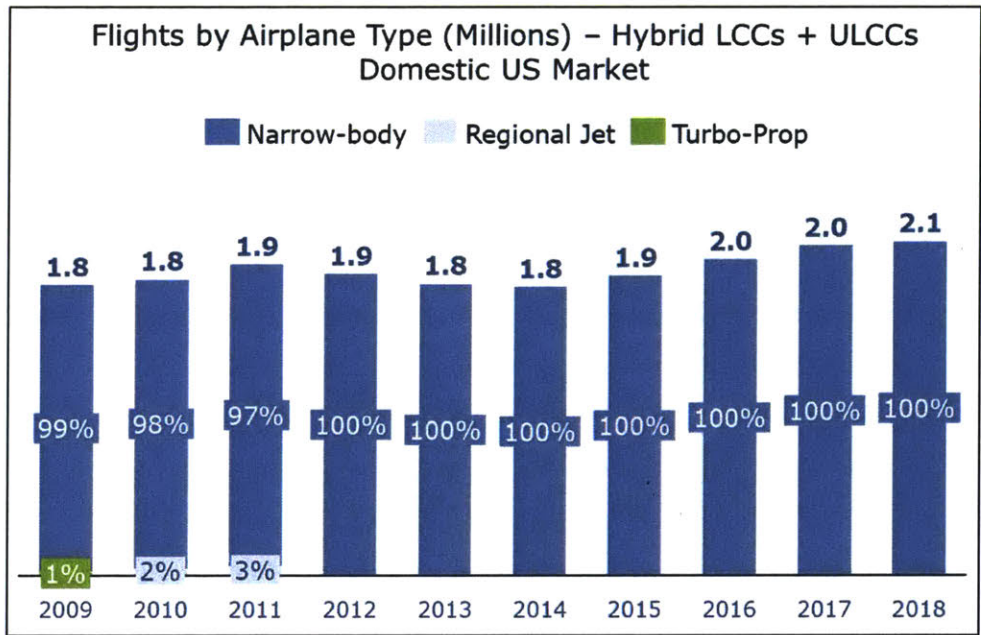


Figure 2.2.9 – Domestic US Low-Cost Carrier Flights by Airplane Type (2009-2018)

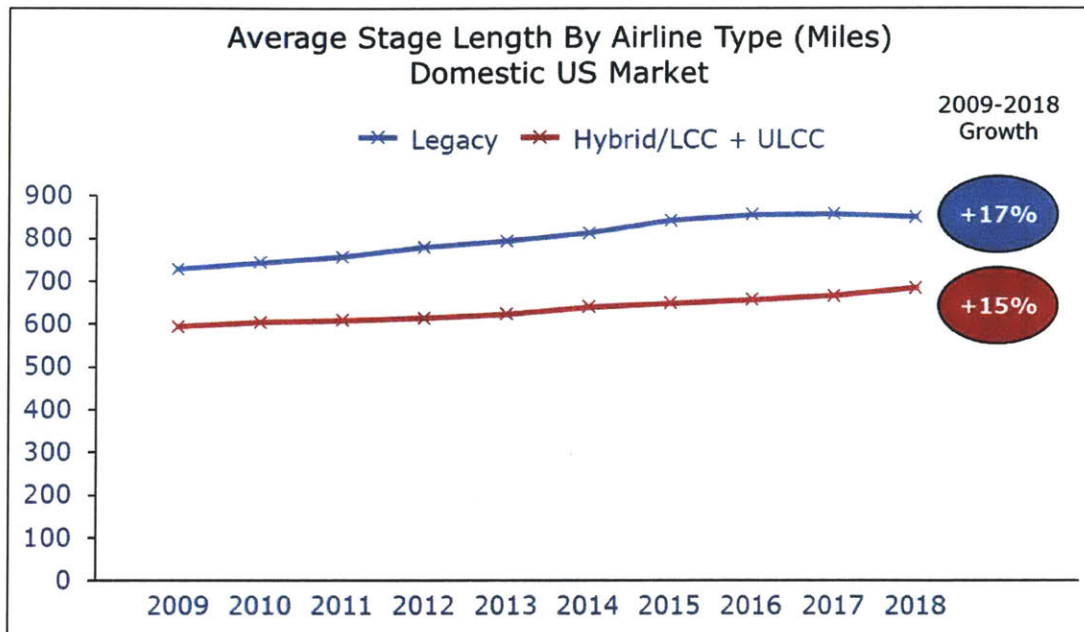


Figure 2.2.10 – Domestic US Average Stage Length by Airline Type (2009-2018)

Next, the airport and city pair coverage level by airline type was also investigated with the goal of identifying what portion of airport and city pairs are served by some low-cost carrier, as shown in Figures 2.2.11 and 2.2.12. As observed, ULCCs serve a significantly larger share of airport and city pairs in 2018 versus in 2009. On the airport pair level, ULCCs served only 7% of airport pairs in 2009 but as much as 27% of airport pairs in 2018. Similarly, ULCCs served 31% of city pairs in 2018, a substantial increase compared to ULCCs serving just 8% in 2009. A similar trend is seen with the hybrid/LCC category, albeit starting a much higher base and growing at a much slower rate than ULCCs. Interestingly, in 2018, ULCCs served more domestic city pairs than hybrid/LCCs while hybrid/LCCs served more airport pairs – this may suggest that while ULCCs enter to serve a market, they typically tend to do so from fewer airport pairs than when hybrid/LCCs do. In contrast, while the overall number of airport and city pairs has grown, both the number of and percentage of total pairs served by legacy airlines has decreased substantially comparing 2009 and 2018.

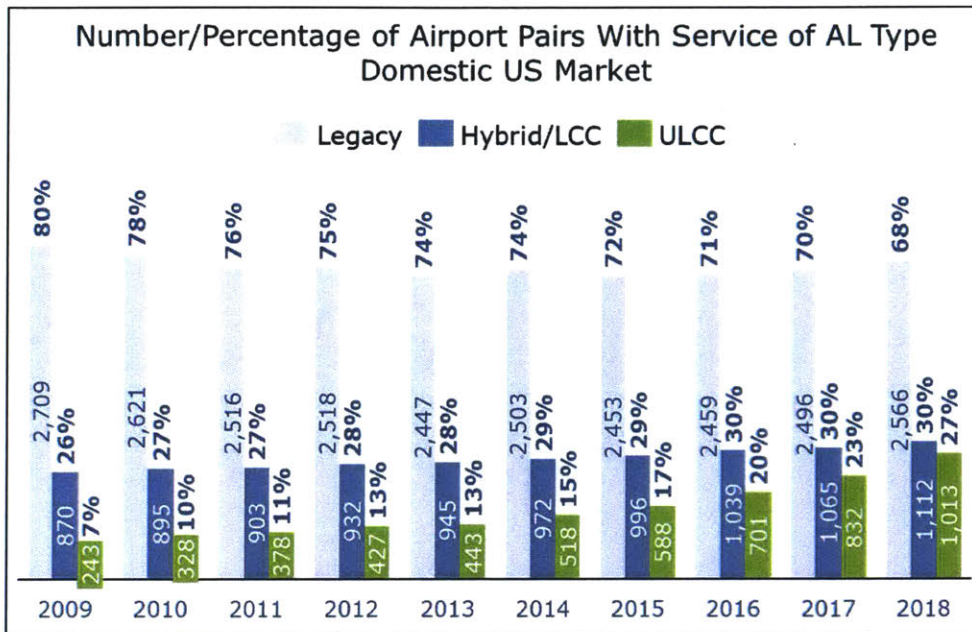


Figure 2.2.11 – Domestic US Airport Pairs by Coverage of Airline Type (2009-2018)

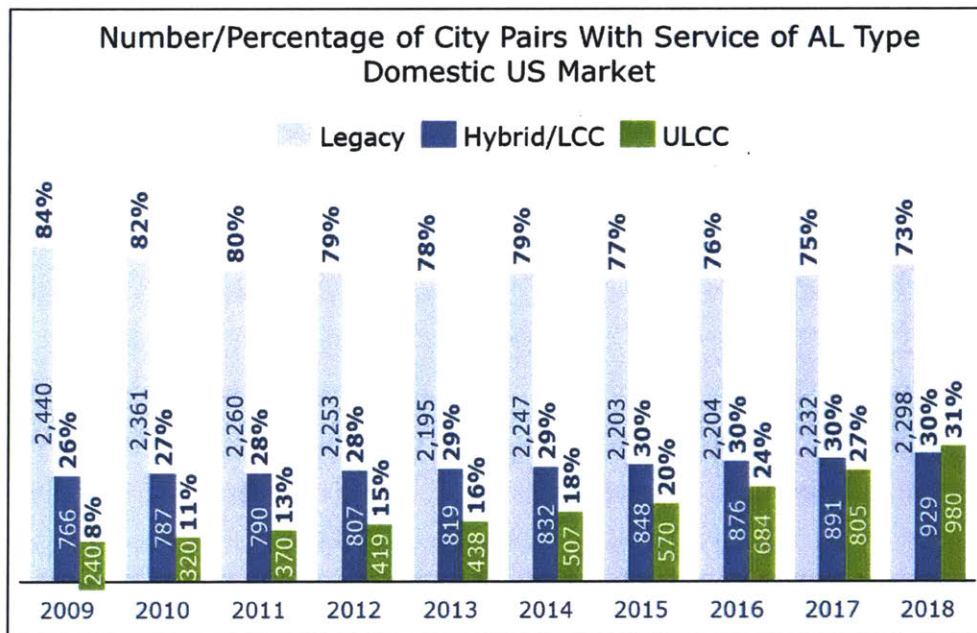


Figure 2.2.12 – Domestic US City Pairs by Coverage of Airline Type (2009-2018)

Furthermore, given that there are 3 types of airlines in the domestic market, it is possible to classify a given city or airport pair within five distinct categories, as illustrated in Table 2.2.1 below.

Table 2.2.1 – Service Types of US Domestic Airport and City Pairs

ULCC Only	Served by one or more ultra-low-cost carriers only
LCC Only	Served by one or more hybrid/low-cost carriers only
Legacy Only	Served by one or more legacy carriers only
LCC+ULCC	Served by at least one ultra-low-cost carrier and at least one hybrid/low-cost carrier
Legacy + LCC and/or ULCC (Legacy + Low-Cost)	Served by at least one legacy carrier in addition to at least one low-cost carrier (hybrid LCC, ULCC or both)

Given these service types, it was possible to split yearly airport and city pairs into one of these five service type buckets – this analysis is presented in Figures 2.2.13 and 2.2.14, respectively. From the analysis, it can be noted that the ULCC Only category has grown significantly while the Legacy Only category has shrunk, both in absolute values and percentage of total pairs served. Having said that, although lessening, the Legacy Only category is still the most dominant – half of the airport and city pairs in 2018 fall within this category. Related to this is the significant growth of the Legacy + Low Cost category, which makes up 17% and 24% of active airport and city pairs respectively. To summarize, between 2009 and 2018, while the overall number of airport and city pairs has grown, the number of pairs served by legacy carriers only has shrunk. Some of these lost pairs may have either moved to the Legacy + Low-Cost category (due to a LCC or ULCC adding service in that pair) or could have also moved to the one of the low-cost carrier categories (due to a LCC or ULCC adding service in that pair, and legacy carrier exiting due to competitive nature).

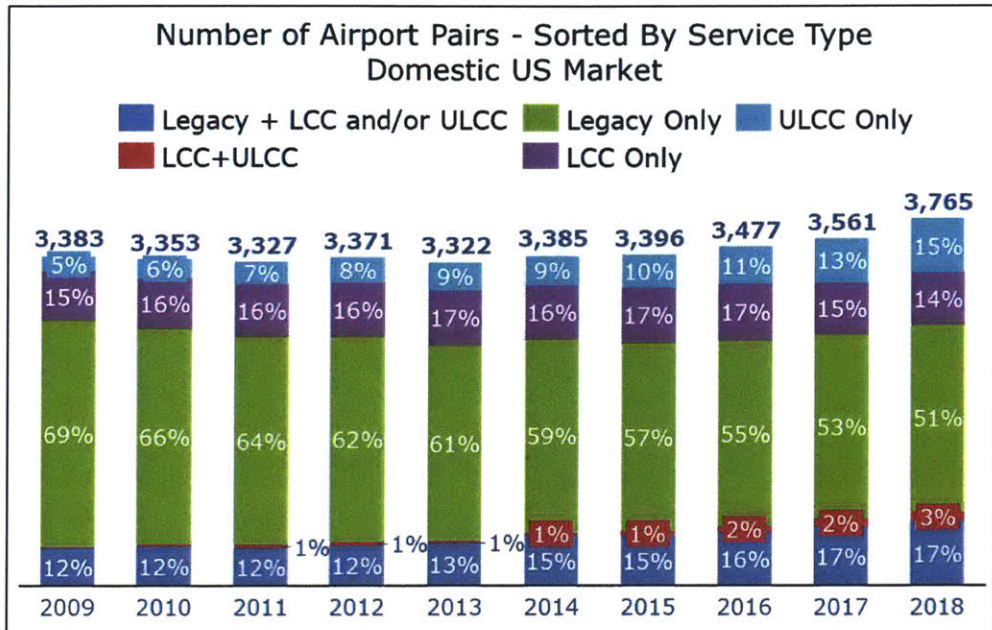


Figure 2.2.13 – Domestic US Airport Pairs by Service Type (2009-2018)

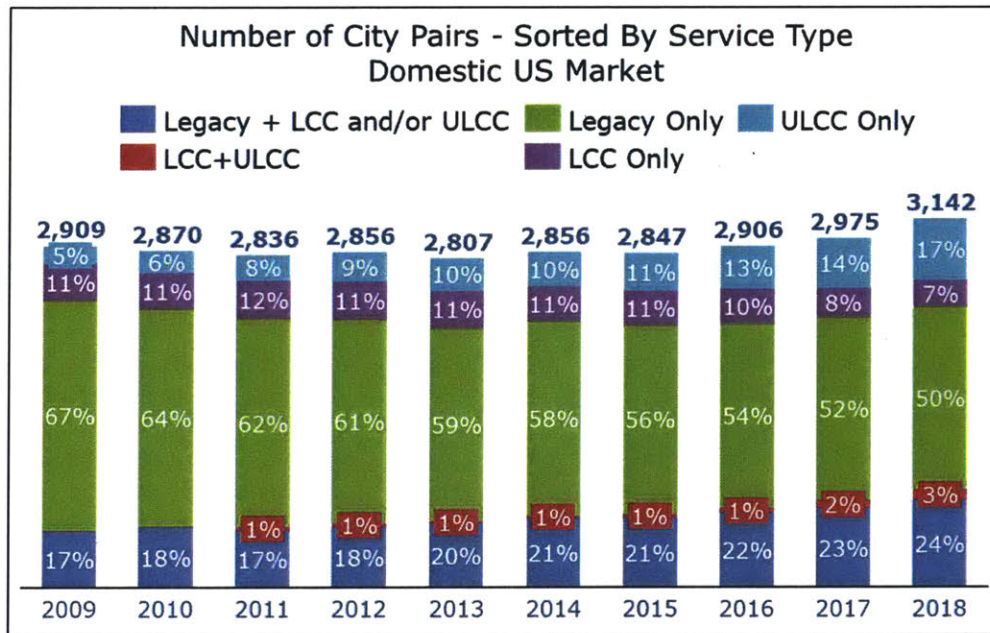


Figure 2.2.14 – Domestic US City Pairs by Service Type (2009-2018)

In summary, the Domestic US region grew at a 2.9% CAGR between 2009 and 2018. For the initial part of the 10-year analysis period, the market went through a capacity rationalization and discipline phase in an effort to combat the effects of the economic slowdown and higher fuel prices.

However, the region then entered into a growth phase starting in 2015 where domestic airlines tried to regenerate the capacity that was cut down during the capacity rationalization phase. Low-cost carriers (hybrid/LCCs and ULCCs combined) in the region have also grown substantially during this time and make up a combined 40% of domestic ASM capacity in 2018, a substantial increase from 30% in 2009. In addition, low-cost carriers serve a greater portion of airport and city pairs across the 10-year period; in 2018, low-cost carriers (hybrid/ LCCs and ULCCs combined) serve 50% of city pairs, up from just 33% in 2009.

Chapter 3: Intra-Europe Market Region

The intra-Europe region was the second of three mature markets studied in this thesis and serves as a benchmark when analyzing other emerging air travel markets. Low-cost carriers have been present in this region since the emergence of Ryanair in 1991 (ICAO, 2003) and today make up a significant portion of both traffic and capacity in the region. This chapter explores the emergence and evolution of low-cost carriers in the region while emphasizing on the growth of Ryanair and its effect on the region's LCC sector.

Section 3.1: Background and Literature Review

Low-cost carriers in Europe emerged following the deregulation of the region's commercial airline market in the 1990s (De Groote, 2005). Originally, airlines in Europe were heavily regulated by governments, with the goal of keeping the public safe as well as use air transportation as a tool for national developments. However, in the 1980s, Britain was the first country to implement some form of deregulation with the main aim of increasing competition among carriers and benefit consumers since many high demand routes were dominated by one or two carriers at that time. Eventually, in the late 1980s and early 1990s, the European Community followed along with this liberalization process all over the region (Pinkham, 1999).

As a result of this deregulation in Europe, 80 new airlines emerged in various parts of the continent by 1993, with many new low-cost carriers being launched to compete with existing legacy players (Pinkham, 1999). The first low-cost carrier in the region was Irish airline Ryanair, which transformed itself from a conventional regional airline to a low-cost carrier with the hopes of emulating the Southwest Airlines model in Europe. The airline initially focused on serving the leisure market between Ireland and the UK and later launched many more intra-EU routes in the years to come (ICAO, 2003). Ryanair is an example of an ultra-low-cost-carrier operating in the Europe region; while the airline has been around since the 1990s, it still has almost all the characteristics of the pure low-cost carrier business model and is heavily focused on operational efficiency (Belobaba et. al, 2016). For example, Ryanair primarily serves secondary or abandoned airports in destinations to help keep airport costs low, sometimes even convincing local governments to convert unused military bases into low-cost airports (Lavery, n.d.).

In the recent past, several low-cost airlines in the region have been facing financial pressures, particularly with the increase in fuel prices post 2008, with many of them eventually ceasing operations. Bankruptcies in the intra-Europe region have been most common with low-cost carriers when airlines were unable to secure additional funding after losses due to higher fuel prices and increasing labor costs due to their workforce getting older (Spero, 2019). In 2017 alone, 3 large European airlines declared bankruptcy, including Monarch, Air Berlin, and Alitalia, with the first two ceasing operations. More recently, airlines such as Wow Air and Monarch declared themselves bankrupt and have gone defunct (Lund & Darlak, 2019).

Similar to the US domestic region, airlines operating in the European region were classified in this study into the 3 airline type categories: legacy carriers, hybrid/LCCs and ULCCs. Given limited or no published availability of cost data and differences in tax/accounting structures across different airlines in the is region (airlines based out of different locations/countries, etc.), previous classifications from external sources, supported by analysis of an airline's business models when required, were used for the classification process. The classifications conducted by the International Civil Aviation Organization (ICAO) as well as that by the Center for Aviation (CAPA) were utilized as a reference. Note that the ICAO classification indicates only whether an airline appears on the ICAO LCC List or not, hence the classification identifies LCCs versus all other types of carriers.

For the classification process, a total of 84 airlines were chosen, which comprise the top ~96% of the cumulative 2009-2018 intra-Europe seat capacity. Accounting for a 100% cumulative seat capacity would require classifying an additional 56 airlines, many of which are relatively lesser known/unknown airlines. The airlines that were not classified (i.e. remaining 56 airlines) were assigned to the legacy category by default. Table 3.1.1 shows the categorization by both ICAO and CAPA for each of the 84 airlines, along with the final categorization made for further analysis in this thesis. Note that charter and regional airlines (which made up a relatively very small portion of intra-Europe flight capacity) were classified as legacy carriers since they do not meet characteristics of a traditional low-cost carrier.

Two carriers (Flybmi and Strategic Airlines Luxembourg) that appear in the list of 84 airlines were not listed on the CAPA database nor the ICAO LCC list. Given that Strategic Airlines Luxembourg is a small charter airline while Flybmi is a regional carrier, both were classified in the legacy

category as defaults. There were instances where the classification of carriers was different between the ICAO and CAPA categorization. These airlines included Condor, Germania, NIKI, Smart Wings, SunExpress and SunExpress Deutschland - in these cases, CAPA classified these airlines as full-service carriers or charter airlines while ICAO categorized them as LCCs. On the other hand, airBaltic is classified as a low-cost carrier by CAPA but not by ICAO. Upon review of their business models, we observed that all these seven airlines mainly focused on scheduled operations to leisure destinations around Europe. Furthermore, they are much smaller than and have a different business model compared to traditional legacy/network carriers. On the other hand, some of these airlines do not feature the traditional traits seen in other LCCs, such as a heavy ancillary revenue focus, point-to-point services or secondary airport-based operation to help keep costs low. As a result, they were all classified in the hybrid/LCC category since they appear to be 'hybrids' between the traditional legacy and LCC model. Note that these airlines accounted for less than 3% of the total 2009-2018 seat capacity in the intra-Europe region, hence their classification does not affect the aggregate trends/results for this analysis significantly.

A few classifications were changed/refined from the ICAO and CAPA categorization, again based on business model analysis of these particular airlines. Specifically, while Air Berlin was classified as a full-service carrier by both CAPA and ICAO, its business model suggests a better fit with the hybrid/LCC category. While Air Berlin does have many traits of a legacy carrier, such as flying to primary airports instead of secondary, it does have a significant cost advantage due to its younger fleet (of the same airplane type) and lower labor costs due to relatively less senior staff. As a result, Air Berlin's final classification was deemed to be hybrid/LCC for analysis in this thesis.

Finally, some low-cost carriers needed to be put in a different category due to their significantly lower costs compared to other LCCs. Given that the Europe market is quite mature in terms of LCCs, similar to the US domestic market, it can be said that a third airline type category has emerged, namely ultra-low-cost carriers (ULCCs). Both ICAO and CAPA categorize airlines into only two categories – full service (legacy) or low-cost. The distinction between whether an airline was categorized as a hybrid/LCC or ULCC was made by analyzing recent unit cost and stage length relationships for European Carriers. As shown in Figure 3.1.1, three airlines (Pegasus, Ryanair, and Wizz Air) stand out in the bottom left corner - very low on the unit cost and stage

length relationship chart – as a result, these carriers are assigned to the ultra-low-cost carrier category in the intra-Europe market.

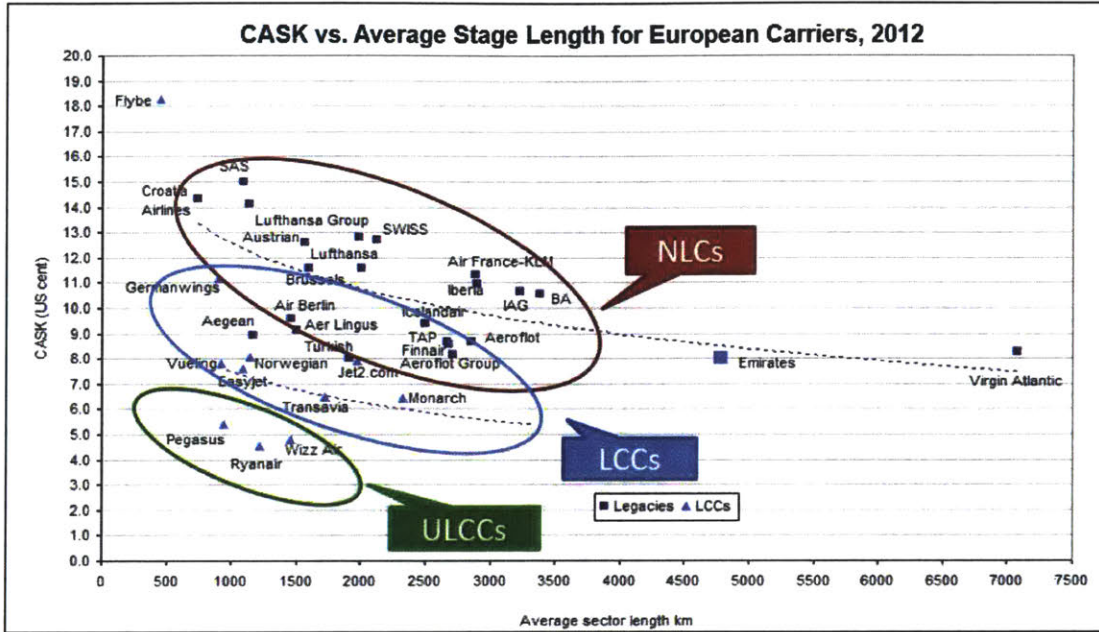


Figure 3.1.1 – Unit-Cost and Stage Length Relationship for European Carriers (CAPA, 2014)

Table 3.1.1 – Classification of Top 84 Intra-Europe Region Airlines By 2009-2018 Seat Capacity

Marketing Airline	CAPA Classification	ICAO LCC Classification?	Final Classification
Adria Airways	Regional	NO	Legacy
Aegean Airlines	Full Service	NO	Legacy
Aer Lingus	Full Service	NO	Legacy
Aeroflot	Full Service	NO	Legacy
Aerosvit Airlines	Full Service	NO	Legacy
Air Baltic	LCC	NO	Hybrid/LCC
Air Belgium	Charter	NO	Legacy
Air Corsica	Regional	NO	Legacy
Air Europa	Full Service	NO	Legacy
Air France	Full Service	NO	Legacy
Air Italy	Full Service	NO	Legacy
Air Malta	Full Service	NO	Legacy
Air Moldova	Full Service	NO	Legacy
Air Serbia	Full Service	NO	Legacy
Air Berlin	Full Service	NO	Legacy

Alba Star	Charter	NO	Legacy
Alitalia	Full Service	NO	Legacy
Atlasglobal	Full Service	NO	Legacy
Austrian	Full Service	NO	Legacy
Belavia	Regional	NO	Legacy
Binter Canarias	Regional	NO	Legacy
Blue Air	LCC	YES	Hybrid/LCC
Blue Panorama Airlines	Full Service	NO	Legacy
Braathens Regional Aviation	Regional	NO	Legacy
British Airways	Full Service	NO	Legacy
Brussels Airlines	Full Service	NO	Legacy
Bulgaria Air	Full Service	NO	Legacy
Cimber Air	Charter	NO	Legacy
Condor	Full Service	YES	Legacy
Croatia Airlines	Full Service	NO	Legacy
Cyprus Airways	Full Service	NO	Legacy
Czech Airlines	Full Service	NO	Legacy
easyJet	LCC	YES	Hybrid/LCC
easyjet Switzerland	LCC	YES	Hybrid/LCC
Eurowings	LCC	YES	Hybrid/LCC
Finnair	Full Service	NO	Legacy
FlyBE	LCC	YES	Hybrid/LCC
Flybmi	N/A	N/A	Legacy
Germania	Full Service	YES	Hybrid/LCC
Germanwings	LCC	YES	Hybrid/LCC
HOP!	Full Service	NO	Legacy
Iberia	Full Service	NO	Legacy
Icelandair	Full Service	NO	Legacy
Jet2.com	LCC	YES	Hybrid/LCC
KLM Royal Dutch Airlines	Full Service	NO	Legacy
LOT - Polish Airlines	Full Service	NO	Legacy
Lufthansa	Full Service	NO	Legacy
Luxair	Regional	NO	Legacy
Malev Hungarian Airlines	Full Service	NO	Legacy
Monarch Airlines	LCC	YES	Hybrid/LCC
NIKI	Full Service	YES	Hybrid/LCC
Nordavia	Regional	NO	Legacy
Norwegian	LCC	YES	Hybrid/LCC
Olympic Air	Full Service	NO	Legacy
Onur Air	LCC	YES	Hybrid/LCC
Pegasus	LCC	YES	ULCC
Pobeda	LCC	YES	Hybrid/LCC
Rossiya Airlines	Full Service	NO	Legacy

Ryanair	LCC	YES	ULCC
S7 Airlines	Full Service	NO	Legacy
Scandinavian Airlines System	Full Service	NO	Legacy
Smart Wings	Full Service	YES	Hybrid/LCC
Strategic Airlines Luxembourg	N/A	NO	Legacy
SunExpress	Full Service	YES	Hybrid/LCC
SunExpress Deutschland	Full Service	YES	Hybrid/LCC
SWISS	Full Service	NO	Legacy
TAP Portugal	Full Service	NO	Legacy
TAROM	Full Service	NO	Legacy
Thomas Cook Airlines	Charter	NO	Legacy
Transaero	Full Service	NO	Legacy
Transavia Airlines	LCC	YES	Hybrid/LCC
Transavia France	LCC	YES	Hybrid/LCC
TUI (Group)	LCC	YES	Hybrid/LCC
Turkish Airlines	Full Service	NO	Legacy
Ukraine International Airlines	Full Service	NO	Legacy
Ural Airlines	Full Service	NO	Legacy
Utair Aviation	Full Service	NO	Legacy
Volotea	LCC	YES	Hybrid/LCC
Vueling	LCC	YES	Hybrid/LCC
Wideroe	Regional	NO	Legacy
Wind Jet	LCC	YES	Hybrid/LCC
Wizz Air	LCC	YES	ULCC
WOW Air	LCC	YES	Hybrid/LCC

Section 3.2: Capacity Trends

ASM Capacity in the intra-Europe market region has increased significantly in the last 10 years, growing by about 5.6% CAGR between 2009 to 2018, as shown in Figure 3.2.1 The growth in ASM capacity has also been driven by more flights but more dominantly by larger airplanes. Figures 3.2.2 and 3.2.3 show the evolution of flights and seats in this market region over the same time period. Similar to the US domestic market, the number of seats is growing significantly faster than flights for the intra-Europe region, illustrating that airlines operating in this sector are operating larger planes (higher average seats per departure). Compared to the domestic US region, ASM capacity growth in the intra-Europe region is much faster; the domestic US market grew at a 2.9% CAGR between 2009 and 2018, the intra-Europe region grew at almost twice that rate. While the domestic US region went through periods of decline and growth in the past 10 years

(capacity rationalization/discipline followed by capacity regeneration), capacity in the intra-Europe region has been growing positively every year in the analysis time period.

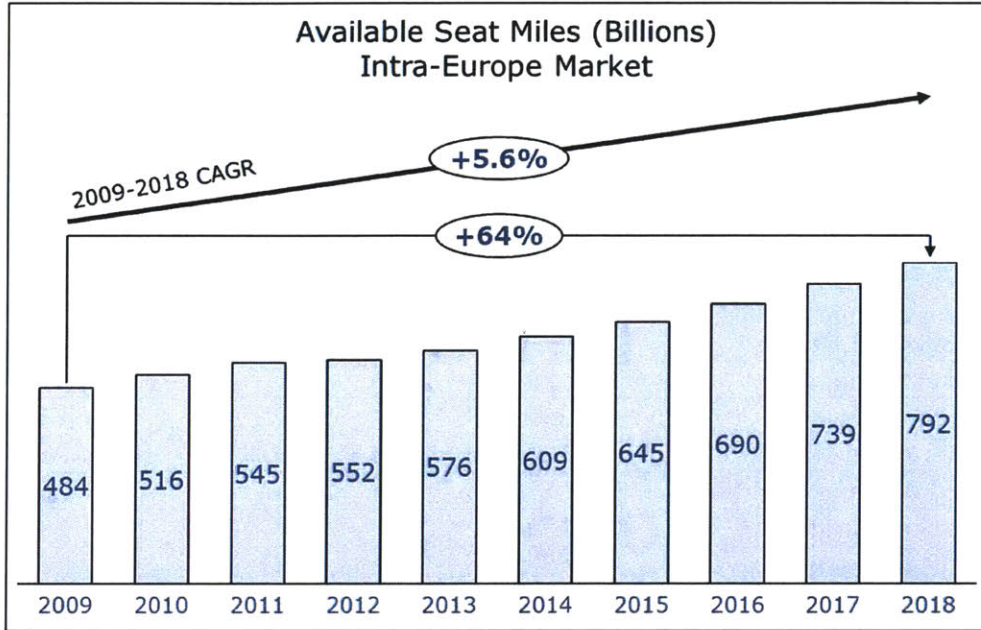


Figure 3.2.1 – Intra-Europe Available Seat Miles (2009-2018)

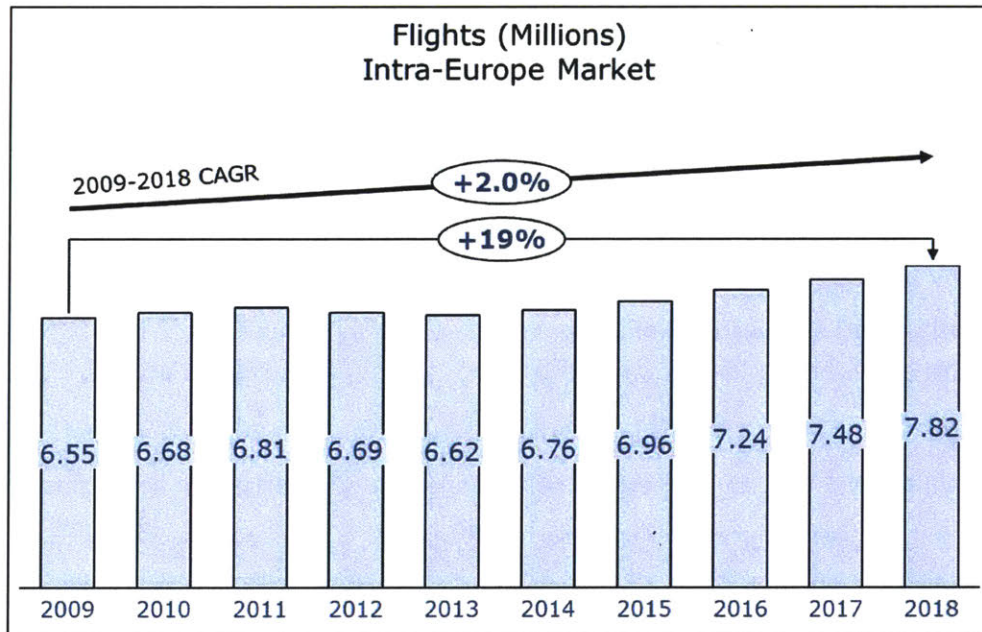


Figure 3.2.2 – Intra-Europe Flight Operations (2009-2018)

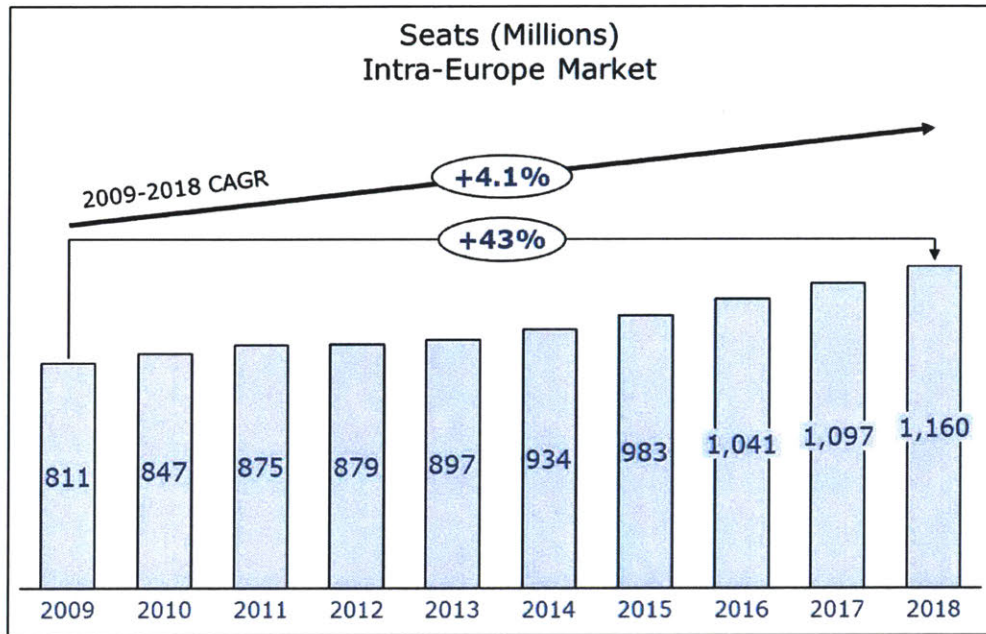


Figure 3.2.3 – Intra-Europe Seats (2009-2018)

Airlines operating in the region have also been flying larger distances on average in 2018 compared to 2009. Figure 3.2.4 shows the growth of average stage length over the past 10 years, illustrating that it increased by 18%. This is the result of European airlines (particularly those in Western Europe) flying farther out to the eastern ends of Europe, as far as Cyprus and Turkey.

Looking at the aggregate fleet mix in this market region, as shown in Figure 3.2.5, a clear trend of more narrow-bodies with a narrowing (year-on-year) share of turboprops and regional jets can be observed. Due to the growing market size, many European airlines have either moved pre-existing operations or started new operations with narrow-bodies to take advantage of the growing traffic in the sector. Comparing these results to those in the US domestic section (Figure 2.2.6), narrow-bodies are used on a much larger share of the intra-European flight capacity versus the American flight capacity – in 2018, narrow-bodies served only 63% of domestic US operations, compared to 82% in the intra-Europe region. In addition, European airlines operate turbo-props more (13% in Europe versus 8% in US for 2018) and regional jets less (5% in Europe versus 29% in US for 2018) compared to their American counterparts.

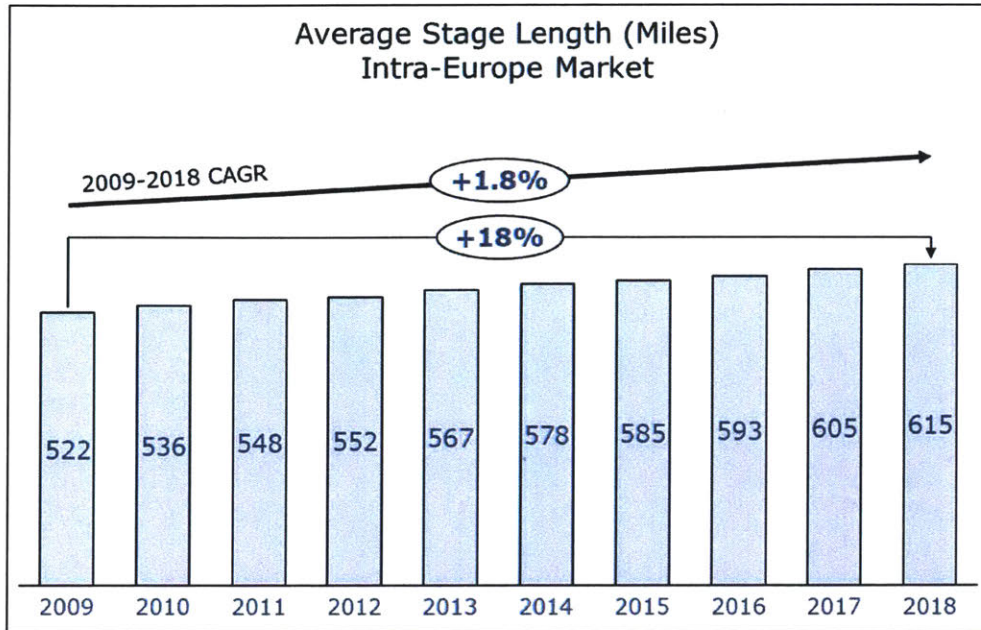


Figure 3.2.4 – Intra-Europe Average Stage Length (2009-2018)

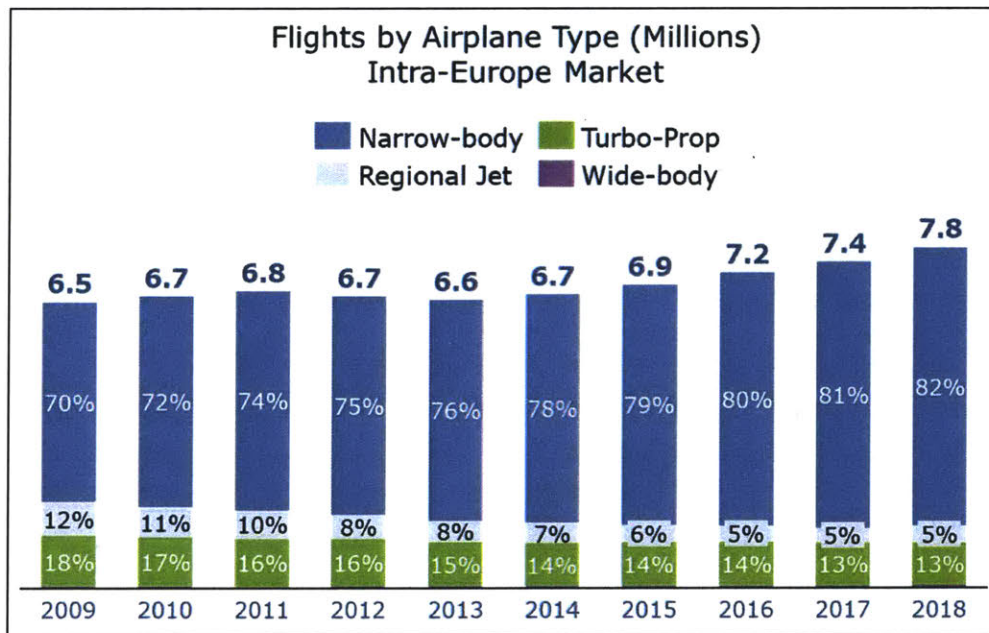


Figure 3.2.5 – Intra-Europe Flights by Airplane Type (2009-2018)

The intra-European market region has remained fragmented over the past 10 years, with many new airlines entering as well as several others leaving. Figure 3.2.6 illustrates the breakdown by marketing airline (Top 10) of intra-European ASM capacity in both 2009 and 2018. Several

airlines grew their shares of the market, such as Ryanair, easyJet and Turkish Airlines. On the other hand, several airlines have seen shrinking shares of the total market even though their capacity increased in absolute terms. One such example is Lufthansa, which while increasing its capacity over the past 10 years has seen a declining share of the overall intra-Europe capacity since 2009. There are some entries into and exits from the top 10 list, mainly due to new carriers emerging or other airlines going out of business. Wizz Air and Vueling Airlines entered the top 10 list due to their recent growth, while Air Berlin fell out of the list due to the airline going out of business. Most importantly, only about half the ASM capacity in the intra-Europe region is serviced by the top 10 airlines operating in the sector, illustrating the fragmented nature of airline services in this region; the remaining half is shared among many small carriers represented in the “Others” segment. The domestic US market is far more consolidated than the intra-Europe region; in 2018, the top 10 airlines in the domestic US region make up 98% of ASM capacity, compared to 51% in the intra-Europe region.

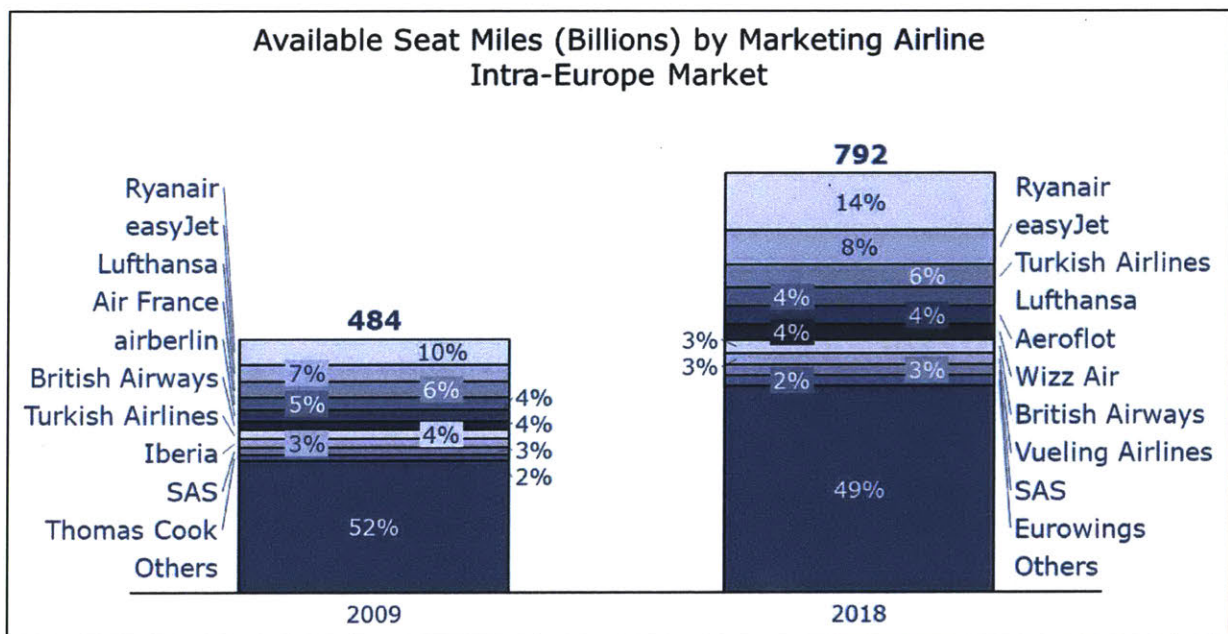


Figure 3.2.6 – Intra-Europe ASMs by Marketing Airline (2009-2018)

Low-cost carriers, particularly ULCCs, are rapidly growing in the intra-Europe market region, providing larger shares of the total ASM capacity year after year. Figure 3.2.7 illustrates the breakdown of ASM capacity in this market region by airline type (legacy, hybrid/LCC and ULCC). As expected, the capacity share of legacy carriers is decreasing while those of hybrid/LCCs and

ULCCs is growing rapidly. Low-cost carriers had a 40% share of the capacity in 2009 (split between 29% for hybrid/LCCs and 11% for ULCCs) versus 50% in 2018 (30% for hybrid/LCCs and 20% for ULCCs). ULCCs in the region saw their capacity share nearly double during this 10-year period and this is largely due to the continued growth of Ryanair. When compared to the domestic US market region, ULCCs have a larger share of the intra-Europe capacity than of the domestic US market – in 2018, ULCCs make up only 8% of domestic ASM capacity in the US, compared to 20% in intra-Europe. In addition, legacy carriers in Europe have a smaller share of the intra-Europe capacity versus American legacy carriers in their domestic market – in 2018, legacy carriers make up 59% of domestic ASM capacity in America, compared to 51% in Europe. This can be explained by Ryanair’s dominance in the European market – while the American ULCCs are relatively small, Ryanair is the largest airline in Europe, leading to a high share of capacity for the ULCC category in the region.

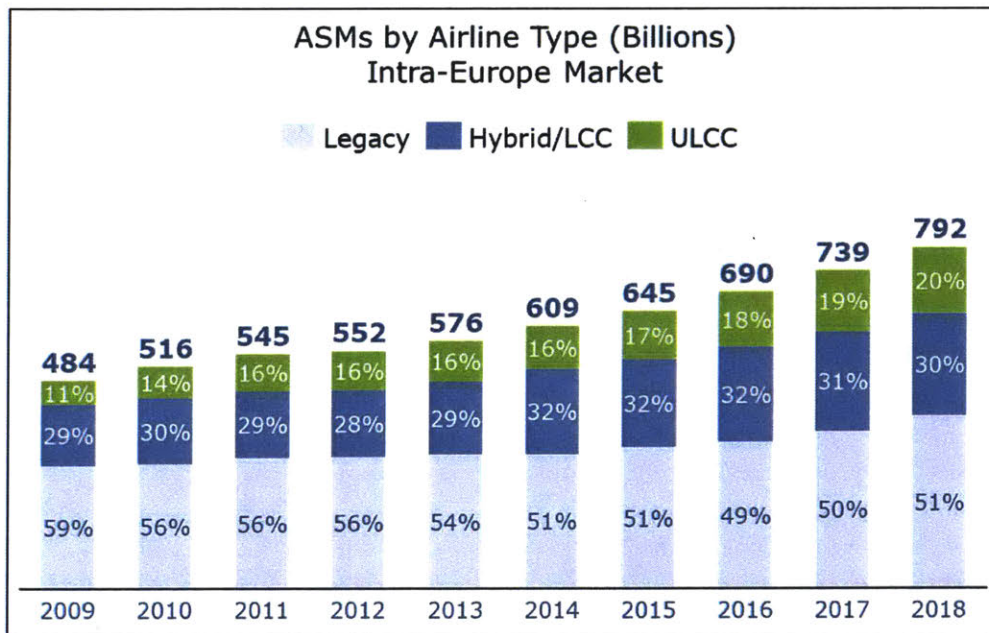


Figure 3.2.7 – Intra-Europe ASMs by Airline Type (2009-2018)

Figures 3.2.8 and 3.2.9 show the split of intra-Europe flights by airplane type for legacy and low-cost (hybrid/LCCs and ULCCs combined) respectively. Low-cost carriers operate a greater share of their operations with narrow-bodies more compared to their legacy counterparts; for instance, in 2018, 90% of low-cost carrier operations were completed by narrow-bodies compared to 76%

for legacy carriers. Legacy carriers operating in this market also still use regional jets (albeit a shrinking share) while low-cost carriers have almost no regional jet operations.

The average stage length of operations in the sector as shown in Figure 3.2.10 for ULCCs, hybrid/LCCs, and legacy carriers. Contrary to the domestic US market, ULCCs in the intra-Europe region have the highest average stage length followed by hybrid/LCCs and then legacy carriers. As such, in this region, it can be said that ULCCs typically fly point-to-point with larger aircraft over longer distances on in city pair markets with high demands. On the other hand, given their hub-and-spoke business models, legacy carriers operate many shorter distance flights with smaller airplanes to help feed passengers into their hub from neighboring airports, lowering their average stage length.

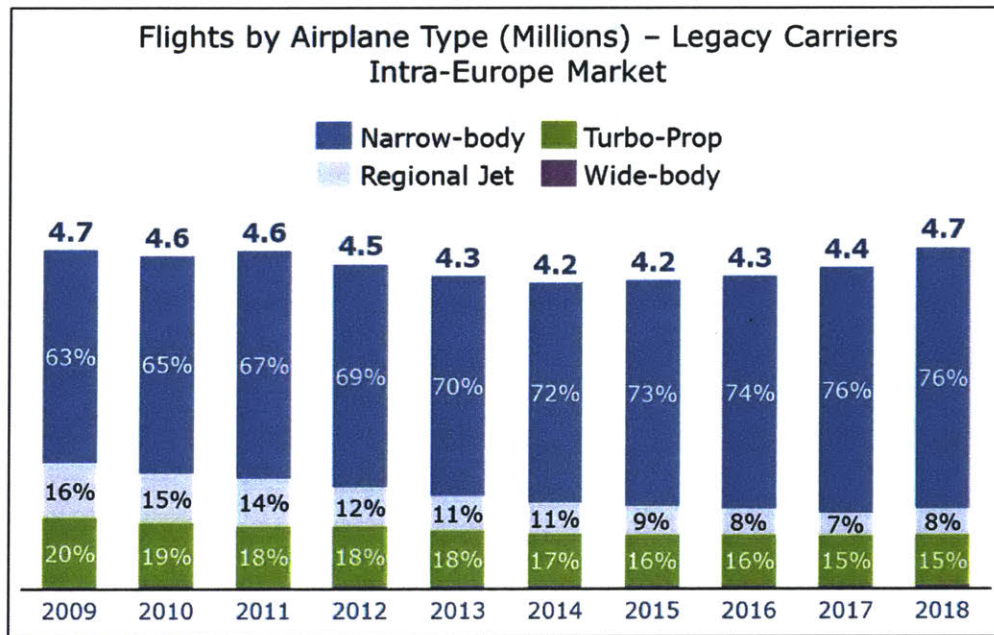


Figure 3.2.8 – Intra-Europe Legacy Carrier Flights by Airplane Type (2009-2018)

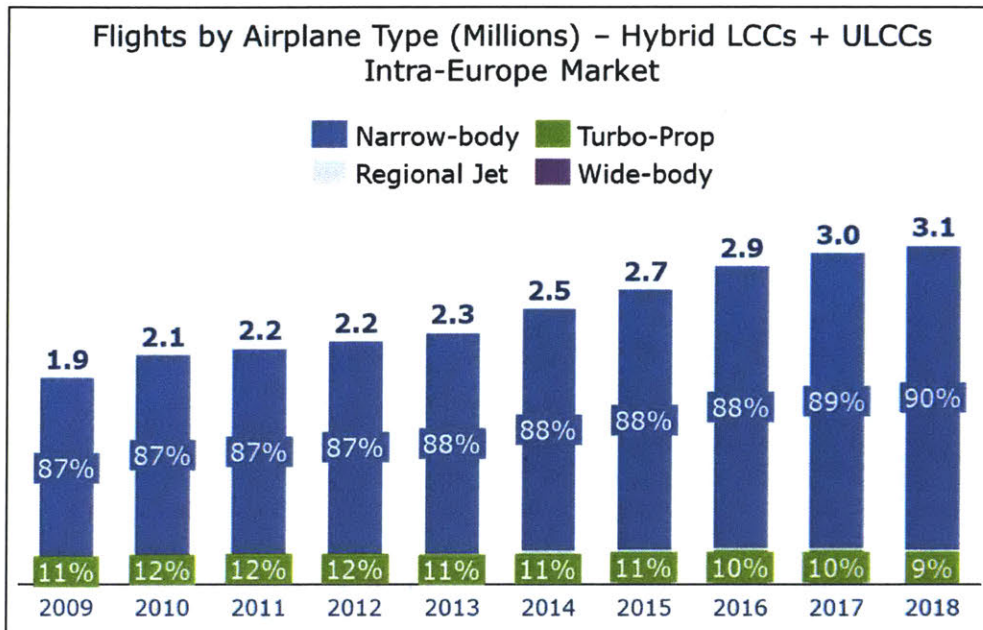


Figure 3.2.9 – Intra-Europe Low-Cost Carrier Flights by Airplane Type (2009-2018)

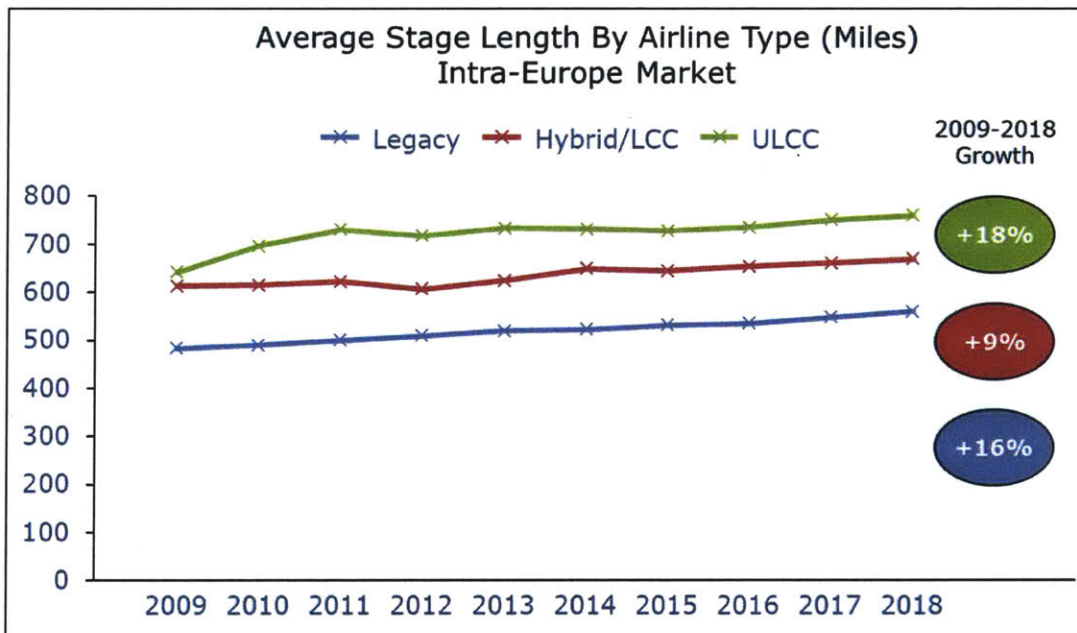


Figure 3.2.10 – Intra-Europe Average Stage Length by Airline Type (2009-2018)

The airport and city pair coverage level for legacy and low-cost carriers (hybrid/LCC and ULCC combined) was also analyzed, as shown in Figures 3.2.11 and 3.2.12. Several trends can be drawn from this analysis. First off, comparing 2009 and 2018, while the absolute number of airport/city

pairs served by legacy carriers has increased, the percentage of airport/city pairs with legacy service has decreased (due to the overall number of pairs growing faster than those with legacy carrier service).

This is different than what was seen in the domestic US market, where both the number of airport/city pairs served by legacy carriers along with the percentage of legacy served pairs relative to total number of pairs decreased over the 10-year timeframe. On the ULCC side, however, both the absolute number and relative percentage increased over the 10-year period in the intra-Europe market region, similar to what was seen in the domestic US market region. In 2018, the 3 ULCCs in the region alone serve 25% and 27% of active airport and city pairs in that year – this is mainly due to Ryanair’s vast network around Europe.

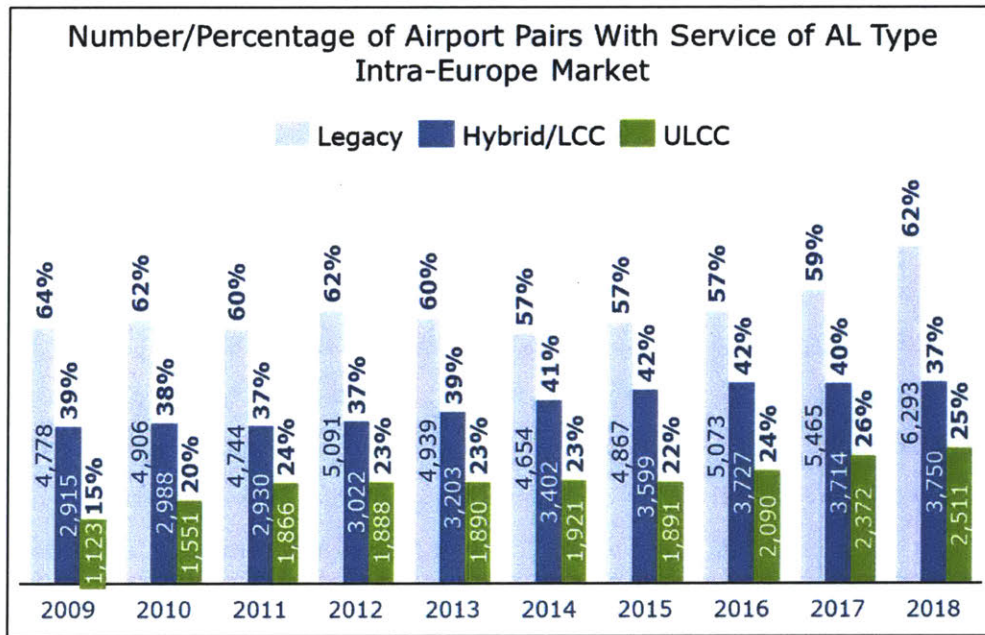


Figure 3.2.11 – Intra-Europe Airport Pairs by Coverage of Airline Type (2009-2018)

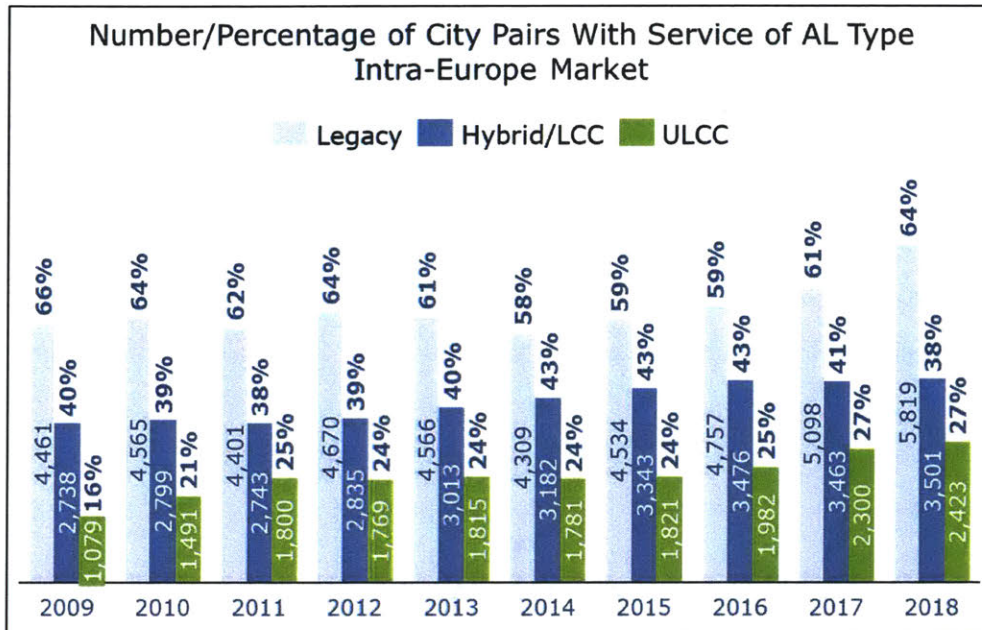


Figure 3.2.12 – Intra-Europe City Pairs by Coverage of Airline Type (2009-2018)

Finally, a service type analysis was conducted to categorize each airport and city pair into one of five distinct categories, as illustrated in Figures 3.2.13 and 3.2.14. The possible categories are the same as the analysis conducted for the domestic US market region and can be found in Table 2.2.1. As expected, most airport/city pairs are of the Legacy Only category, indicating that they are only serviced by one or more legacy carriers – however, this trend is slowly decreasing. For instance, in the city pair analysis, 47% of city active city pairs in the intra-Europe region were served by legacies only compared to 42% in 2018. Comparing regions, the percentage of airport/city pairs in the Legacy Only category is larger for the US domestic region compared to the intra-Europe market region – for 2018, 50% of city pairs in the domestic US were of the Legacy Only type, compared to 42% in Europe. There has also been a significant increase in the percent of city pairs served by ULCCs Only, from 12% in 2009 to 16% in 2018, as an effect of Ryanair’s expansion into new markets over the past decade.

Similar to the US domestic market, the LCC+ULCC category remains small, even on the city pair level, implying that LCCs and ULCCs do not both enter the same market and compete with each other. There has also been slight growth in the Legacy + LCC and/or ULCC category, growing from 19% of city pairs in 2009 to 21% in 2018 – this could perhaps be a function of a low-cost

carrier (hybrid/LCC or ULCC) adding service to a city pair previously only served by a legacy carrier.

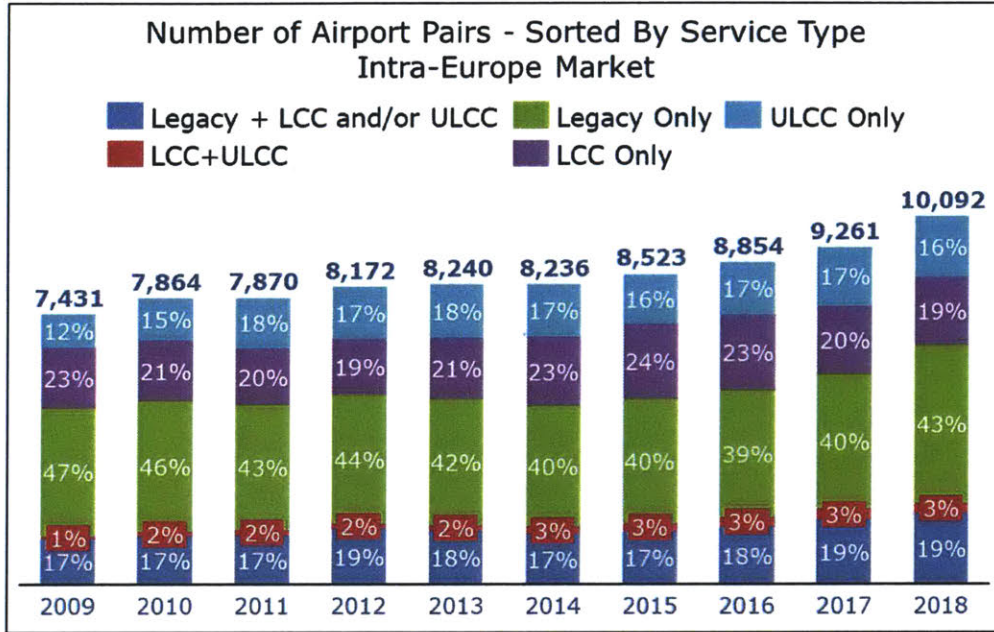


Figure 3.2.13 – Intra-Europe Airport Pairs by Service Type (2009-2018)

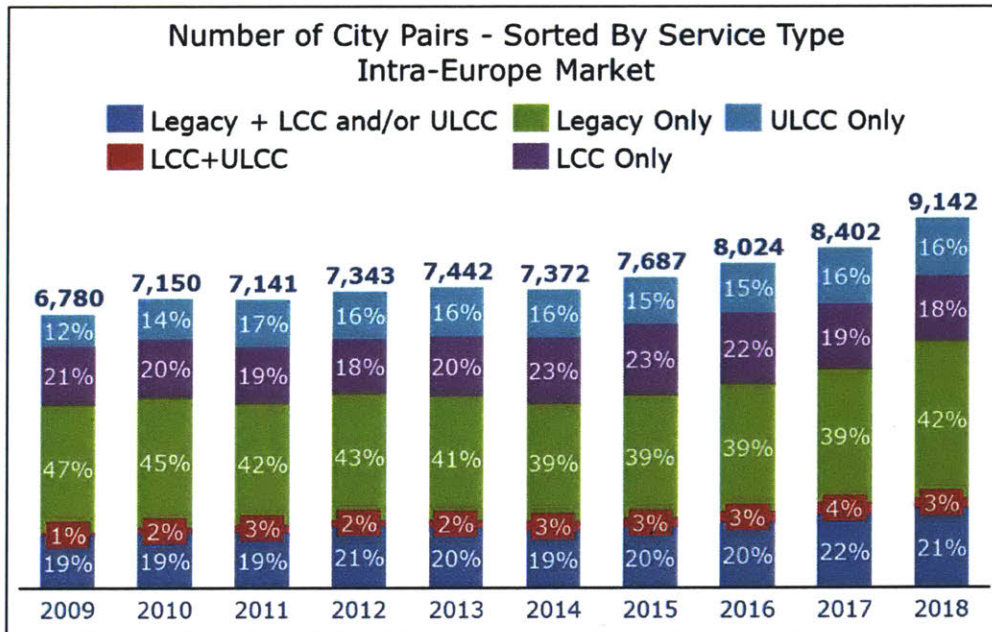


Figure 3.2.14 – Intra-Europe City Pairs by Service Type (2009-2018)

In summary, ASM capacity in the intra-Europe region has grown at a 5.6% CAGR between 2009 and 2018, much faster than the growth rate seen in the domestic US region (another mature air travel market). Low-cost carrier growth has contributed significantly to this overall capacity growth in the region, where low-cost carriers (hybrid/LCCs and ULCCs combined) make up as much as 50% of the region's ASM capacity in 2018, compared to 40% in 2009. Furthermore, low-cost carriers serve 58% of city pairs in 2018, compared to 53% in 2009. Much of the growth in the low-cost carrier sector has come from ULCCs, primarily Ryanair, which is the largest airline in the region by ASM capacity in both 2009 and 2018 and continues to add more low-cost capacity in the region.

Chapter 4: Domestic Australia Market Region

The domestic Australia region is another example of a mature air travel market studied in this thesis, albeit much smaller than the domestic US and intra-Europe regions; according to IATA (2019), the domestic Australian market made up only 0.9% of worldwide revenue passenger kilometers (RPKs), compared to 14.1% for the domestic US market. Furthermore, both traffic and capacity in the domestic Australian region have stagnated in the recent past, particularly due to the country's weak economic growth (IATA, 2019). Low-cost carriers operating in this region are significantly smaller compared to American/European counterparts, making up very small portions of domestic capacity and traffic, particularly due to Virgin Australia's transformation from an LCC to a full-service carrier in 2011. The chapter studies the evolution of low-cost carriers in this region and their young nature has impacted growth in domestic capacity.

Section 4.1: Background and Literature Review

Like in many other regions, such as the intra-Europe region, the emergence of low-cost carriers in Australia was a result of the deregulation of the country's civil aviation industry. Prior to deregulation, only two airlines (Australian Airlines and Ansett) were permitted to operate flights on trunk domestic routes under the Two Airline Policy of 1952 (Rhoades, 2016). Under this policy and subsequent acts authorized by the Rationalization Committee, such as the Airlines Equipment Act of 1958, the government-controlled many aspects of the two airlines' operations on these trunk routes, including fleet sizes/types, fares, capacity and scheduling (Rhoades, 2016). Apart from these two airlines, several smaller players operated routes involving regional destinations and smaller airports, but these carriers were not allowed to operate any of the country's domestic trunk routes.

Between the establishment of the Two Airline Policy in 1952 and a full deregulation of the industry in 1990, several small relaxation measures of the original policy took place to respond to the heavy criticism the various regulatory acts faced. These included the establishment of the Holcroft committee in 1981 to recommend a better pricing policy for the two airlines as well as permit discounting of fares in order to better foster competition (Finger & Button, 1991). However, despite these measures, the Two Airline Policy created a system of higher costs and lower productivity; this led to consumer discontent with the regulations due to the perception that the higher costs associated with the policy had led to higher fares, especially compared to the now

deregulated market in the US (Kirby, 1979). As a result, in 1987, the Australian government decided to fully deregulate the domestic airline industry starting from November 1990, giving the incumbent two players a three-year notice of the changes taking place (Srisaeng et al., 2014).

Post deregulation, LCCs emerged in the domestic Australian market in three distinct phases (Srisaeng et al., 2014). Immediately after the deregulation process in late 1990, a newly formed LCC, Compass Airlines, commenced operations, kicking off the first wave of LCC presence in the domestic Australian market. Compass offered a single class product and fares significantly lower than the incumbents, forcing Ansett and Australian to retaliate with price cuts and sales promotions (Quiggin, 1997). However, Compass faced heavy losses due to multiple reasons, including not getting access to airport slots/facilities as well as facing heavy competition/price wars from the two incumbent carriers (with their capacity increases and fare reductions); as a result, Compass succumbed to financial pressure and ceased operations the following year (Quiggin, 1997). Post the collapse, another LCC, using the same name (Compass), commenced operations in 1992 but also failed within the first year (Srisaeng et al., 2014).

Between the collapse of the second Compass Airlines and the start of the second phase of domestic Australian LCCs in 2000, standard economy and premium fares rose by ~10% in real terms compared to fares before deregulation. In addition, while discount fares also rose after Compass' collapse, they did not return to pre-deregulation levels (Quiggin, 1997). The second LCC wave was kicked off in 2000 when a small regional airline Impulse Airlines acquired Boeing 717 aircraft to begin scheduled service on major trunk routes including Brisbane-Melbourne-Sydney (Forsyth, 2003). Impulse's business model revolved around serving highly competitive routes to effectively compete as well as offering fully unrestricted and flexible fares that were 50% lower than the incumbents (Srisaeng et al., 2014). However, due to liquidity problems, Impulse started leasing aircraft to Qantas in April 2001 and was eventually acquired by the airline later that year (Forsyth, 2003).

During the same phase, a new LCC named Virgin Blue was also introduced to the domestic market in Australia, shortly after the rise of Impulse Airlines in 2000. Virgin Blue commenced operations in August 2000 as part of the global Virgin Group conglomerate by serving the Brisbane-Sydney market (Srisaeng et al., 2014). One of the main reasons why Virgin was able to grow so rapidly and be successful was the timely fall of Ansett Airlines which ceased operations in September

2001, just a year after Virgin's launch. This, coupled with the airline's strong brand reputation (due to the Virgin name), enabled it to take over a good portion of the flight capacity and airport facilities leftover by Ansett (Forsyth, 2003).

Shortly afterward, Qantas launched a low fare airline Jetstar Airways in order to compete with the growing Virgin presence in the market, using the operations and fleet of the acquired Impulse Airlines as the base for the new LCC. This is an example of the low-cost subsidiary strategy adopted by many legacy airlines in the world which helps them compete with growing LCCs through an in-house low-cost product/brand. Jetstar's business model originally focused on leisure markets, connecting big cities to leisure destinations; however, as the airline evolved, it has increased focus on connecting large cities/metropolitan areas with one another. Since the launch and growth of Jetstar, Virgin made several changes to their operation, introducing features that LCCs typically avoid, in order to better compete with the new LCC. Some include operating several airport lounges starting in 2003 along with the introduction of a frequent flier program in 2005 (Srisaeng et al., 2014).

The third phase of LCCs in Australia kicked off in 2006 and was characterized by the entry of Tiger Airways Australia along with significant changes in the business models of the two incumbent LCCs. In 2006, the Qantas group decided to enter the Australian low-cost long-haul by launching Jetstar International, with the focus of serving key Asian and Pacific destinations from Australia. Jetstar's international expansion focused on destinations 6 to 10 hours from Australian cities with operations provided with a two-class service (Srisaeng et al., 2014).

During the same time, Virgin continued adding non-LCC like features to its operation, launching a premium economy cabin to help attain more high-yield customers. The biggest change for Virgin came in 2011 when the airline went through a significant rebranding campaign to eventually adopt a full-service carrier model. Virgin Blue rebranded itself as Virgin Australia, launching a new international airline V-Australia and Pacific Blue (Srisaeng et al., 2014). Virgin also expanded into smaller regional markets, added more premium class seating, signed codeshare agreements with global players, grew its use of the hub-and-spoke model in addition to increasing fleet types to operate a mixed fleet (Whyte et al., 2012).

Tiger Airways Australia was also launched during this phase as a subsidiary of Singapore based Tiger Airways group, owned by Singapore Airlines. Even with a small fleet, Tiger Airways was

able to create a significant impact on the low-cost carrier market in Australia, forcing Qantas to replace their full-service product with the low-fare Jetstar service on many markets where Tiger entered into (Srisaeng et al., 2014). Given their adoption of the full-service carrier business model, Virgin acquired 60% of Tiger Airways Australia in 2012 and the remaining 40% in 2015 while taking on the carrier's losses (Freed, 2014). This was another example of the low-cost subsidiary strategy seen in this region which helped Virgin remain an effective player in the low-cost segment of the domestic Australian market. Rebranded as Tigerair, this acquisition allowed Virgin Australia Holdings to compete with Jetstar in addition to using the mainline Virgin Australia product to compete with Qantas. Today, the Qantas Group and Virgin Australia Holdings dominate the Australian market, both in the full-service carrier space, through Qantas and Virgin Australia, as well as in the low-cost carrier space, through Jetstar and Tigerair.

Similar to the analysis of the intra-Europe region, the categorization of airlines operating in the domestic Australia region was also conducted using external sources, namely classifications conducted by ICAO and CAPA. Low-cost carriers operating in the region today are much younger than those operating in the domestic US or intra-Europe regions, hence they have not yet seen cost increases commonly associated with older LCCs. As such, airlines operating in this market were classified in one of two categories: legacy carriers or LCC; the Australian LCC market is not mature enough yet for an ultra-low-cost carrier category to emerge.

A total of 7 airlines were classified, comprising ~99% of the total 2009-2018 seat capacity in the domestic Australian market. Accounting for a 100% cumulative seat capacity would require the classification of an additional 40 airlines, many of which are small and relatively unknown or those that are only present in the market for an extremely short period. The airlines that were not classified (i.e. remaining 40 airlines) were assigned to the legacy category by default. Table 4.1.1 shows the categorization by both ICAO and CAPA for each of the 7 airlines, along with the final categorization made for further analysis in this thesis.

Among these 7 airlines, all but Virgin Australia have matching CAPA and ICAO classifications. In the case of Virgin Australia, while CAPA classifies the carrier as full-service, ICAO lists the airline as a low-cost carrier. This discrepancy can perhaps be explained by the change in Virgin Australia's business model in late 2011 from an LCC to full-service carrier, as previously

mentioned. In order to account for this business model change, Virgin Australia was classified in this thesis as a low-cost carrier until (and including) 2011, and as a full-service airline post-2011.

Table 4.1.1 – Classification of Top 7 Domestic Australia Airlines By 2009-2018 Seat Capacity

Marketing Airline	CAPA Classification	ICAO LCC Classification?	Final Classification
AirNorth	Regional	NO	Legacy
Alliance Airlines	Charter	NO	Legacy
Jetstar Airways	LCC	YES	LCC
Qantas Airways	Full Service	NO	Legacy
Regional Express	Regional	NO	Legacy
Tigerair Australia	LCC	YES	LCC
Virgin Australia	Full Service	YES	LCC until 2011 Legacy post 2011

Section 4.2: Capacity Analysis

Capacity in the domestic Australia region has seen steady growth since deregulation but has slowed in the recent past. Figures 4.2.1, 4.2.2 and 4.2.3 show the 10-year evolution of domestic Australian ASMs, number of flights and number of seats respectively. Albeit off a smaller base, domestic Australian ASMs are growing at a similar rate (2.8% CAGR) to that of the domestic US (2.9% CAGR) market over this 10-year period. As previously mentioned, this significant slowdown in capacity growth can be attributed to rising concerns around the country’s economic situation (IATA, 2019). While the domestic US region went through periods of decline and growth (due to capacity discipline and regeneration by US airlines) in this 10-year timeframe, ASM capacity in the domestic Australian market has been almost stagnant since 2014 – this further suggests that the Australian market has reached a point of saturation. Like the domestic US and intra-Europe markets, the number of seats in this market is growing much faster than the number of flights in the region, indicating more operations with larger airplanes and an increasing average seats per departure metric.

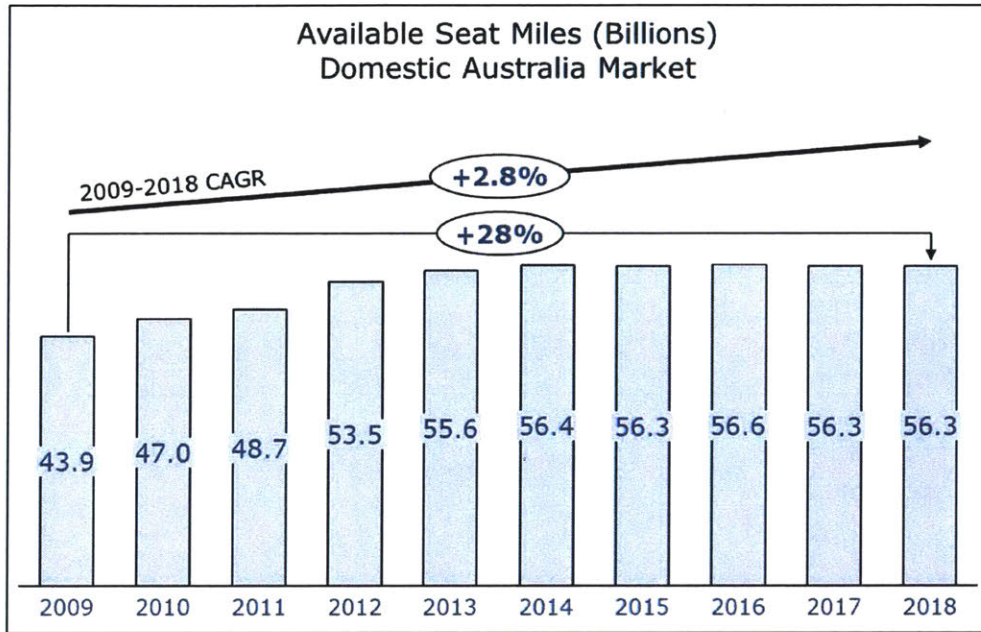


Figure 4.2.1 – Domestic Australia Available Seat Miles (2009-2018)

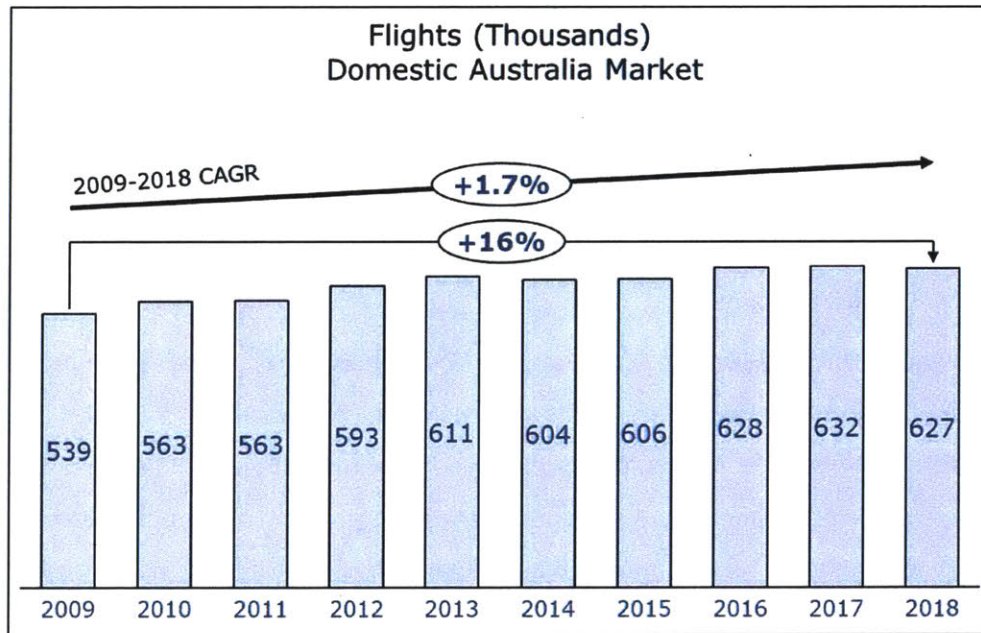


Figure 4.2.2 – Domestic Australia Flight Operations (2009-2018)

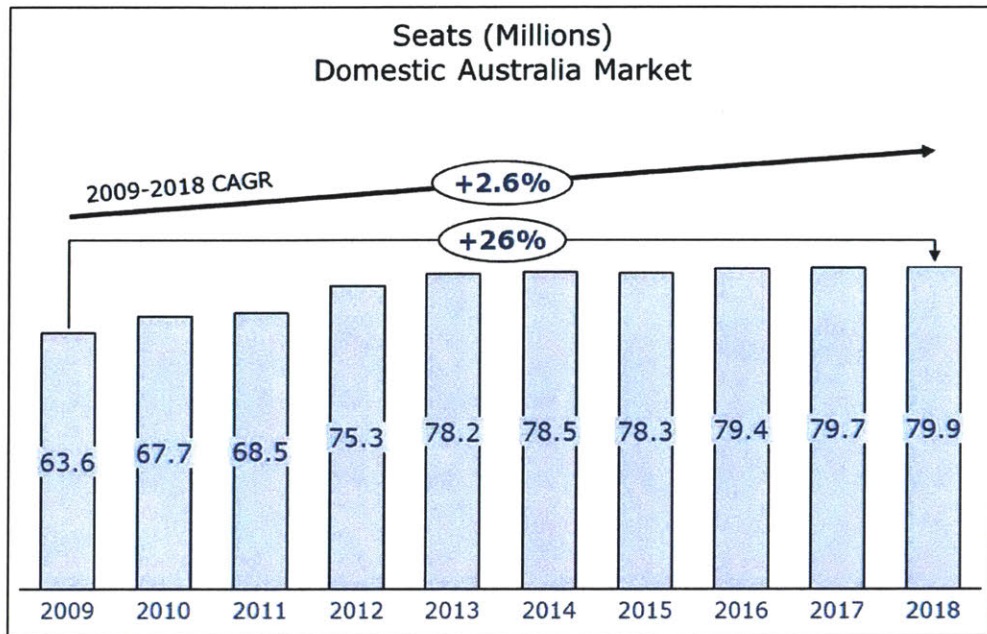


Figure 4.2.3 – Domestic Australia Seats (2009-2018)

Studying the split of flights by airplane type, as illustrated in Figure 4.2.4, narrow-body operations continue to dominate the market, with the share of yearly flights operated by narrow-bodies increasing initially but recently remaining stable. Having said that, the percentage of operations (relative to all operations in the market) operated by narrow-bodies is much smaller than that in the intra-Europe region but similar to that in the domestic US market. For instance, in 2018, 62% of domestic Australian operations were operated by narrow-bodies while 82% of intra-Europe and 63% of domestic US operations utilized narrow-body aircraft. The recent stagnation in domestic Australian capacity growth could explain why the share of flights operated by narrow-bodies has not grown over the past few years, while it has in other mature markets. In addition, the domestic Australian market has a larger percentage of flights operated by wide-bodies compared to the same for the domestic US and intra-Europe markets, where wide-bodies typically make up less than 1% of flights. However, wide-body operated flights still make up a very small portion (3% in 2018) of total flight capacity in Australia (much smaller than narrow-body and turbo-prop) and this share has also been gradually shrinking since 2009 (where it was 7%).

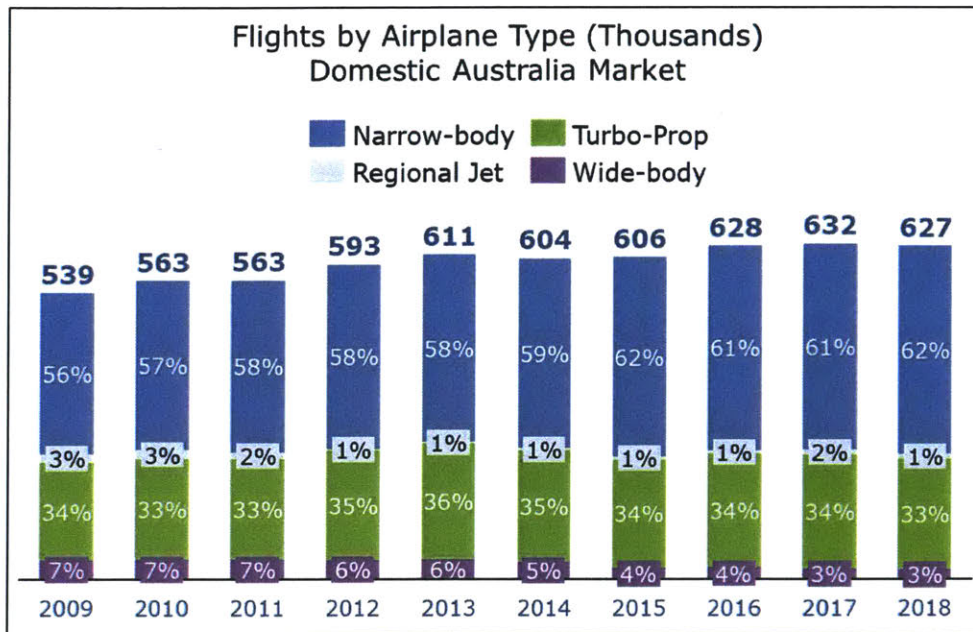


Figure 4.2.4 – Domestic Australia Flights by Airplane Type (2009-2018)

The split of ASM capacity in this market by airline and holding entity was also investigated, as seen in Figures 4.2.5 and 4.2.6. Across the 10-year period, the domestic Australian market has remained very consolidated - the top 4 airlines provide almost the entire ASM capacity with the few other airlines making up the remaining 1-2%. While Qantas' capacity grew slightly (3%) from 2009 to 2018 in absolute terms, the airline offers a smaller share (while still the most dominant) of the Australian market capacity in 2018 than in 2009 – the airline made up 48% of domestic capacity in 2009 but just 39% in 2018. On the other hand, Virgin Australia, Jetstar, and Tigerair all makeup larger shares of the domestic ASM capacity in 2018 versus 2009, in addition to their increased absolute capacity over the 10-year period. Tigerair saw the biggest capacity growth in the 10-year period, with its ASM capacity growing by ~116% from 2009 to 2018 – this significant capacity increase led to Tigerair's share of the domestic Australian capacity growing from 4% in 2009 to 7% in 2018.

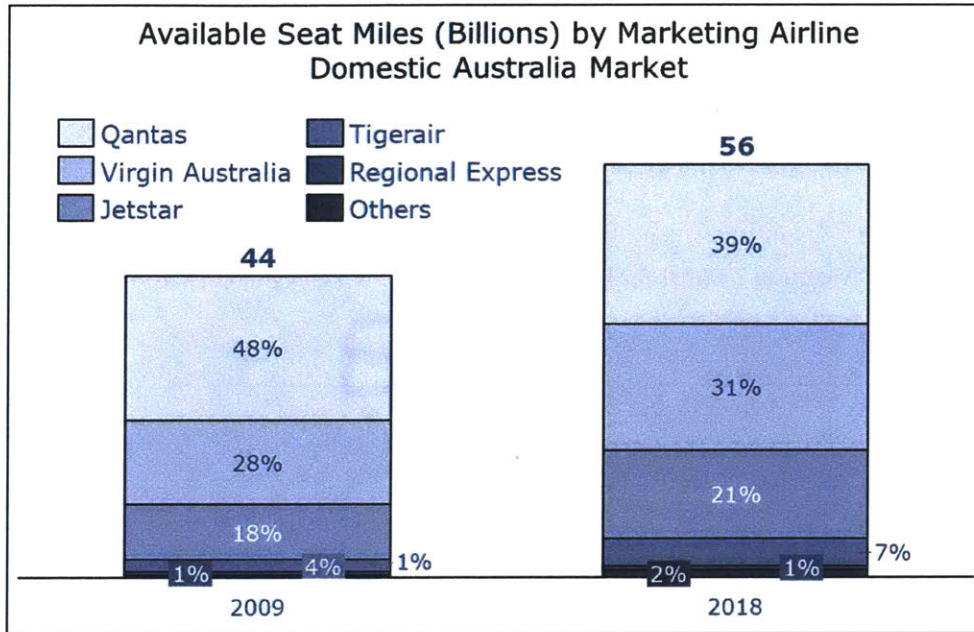


Figure 4.2.5 – Domestic Australia ASMs by Marketing Airline (2009-2018)

The domestic Australia region is more consolidated when analyzing by holding/ownership entity than by marketing airline. The market is almost entirely made up of two airline ownership entities, namely Qantas Group (which owns Qantas Airways and Jetstar) and Virgin Australia Holdings (which owns Virgin Australia and Tigerair), with other entities (including Regional Express Holdings) making up the remaining 2-3% of the 2018 ASM capacity. While Qantas Group’s absolute ASM capacity increased between 2009 and 2018, mainly due to Jetstar’s capacity growth, the group’s share of the total market decreased a result of Virgin Australia Holding’s share growing (which grew as a result of capacity increases for both Virgin Australia as well as Tigerair). Note that in 2015, Tigerair was acquired by Virgin Australia Holdings – hence Tigerair’s capacity in 2018 is part of Virgin Australia Holdings in 2018 but not in 2009.

The domestic Australian region is more consolidated than both the American and European markets, even more so at the holding/ownership level. While the top 4 airlines in Australia make up 95% and 97% of domestic capacity in 2009 and 2018 respectively, the top 4 carriers in the domestic US market make up only 55% and 78% of 2009 and 2018 capacity respectively. The intra-Europe region is even more fragmented in comparison where the top 4 carriers make up only 28% and 32% of 2009 and 2018 capacity respectively. This can be explained by the several acquisitions that have taken place in Australia (Impulse acquired by Qantas, Tigerair by Virgin,

etc.) in addition to many airlines going out of business, leading to just 4 airlines (or 2 holding entities) being present in the market. On the other hand, most airlines in the US and Europe each have different ownership entities, leading to a greater degree of fragmentation compared to Australia, where the due to the carrier-within-carrier business model is commonly seen. While most low-cost carriers in the domestic US and intra-Europe regions are run independently, this is not the case in Australia, with both low-cost carriers owned by the two large legacy players operating in the market.

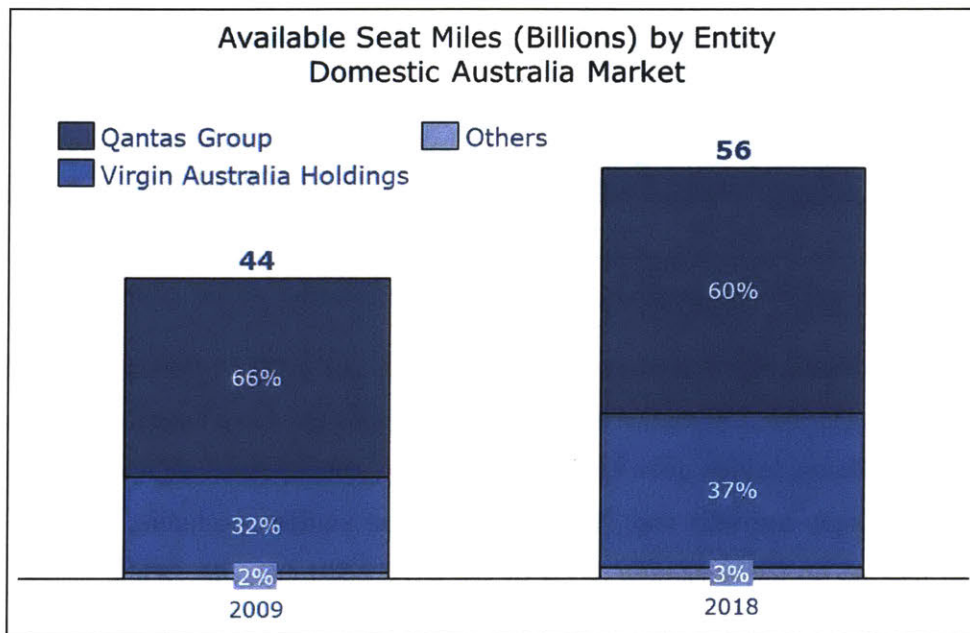


Figure 4.2.6 – Domestic Australia ASMs by Ownership Entity (2009-2018)

Figure 4.2.7 shows the split of domestic ASM capacity by airline type (LCC or legacy carrier). Similar to the domestic US and intra-Europe regions, legacy carriers in Australia dominate the domestic ASM capacity, at least in the recent past. The distinct drop in LCC capacity in the region between 2011 and 2012 can be credited to Virgin Australia’s change in business model (and classification) from a low-cost carrier to legacy carrier in late 2011. As a result, the share of capacity for LCCs in Australia decreased from 54% in 2011 to 24% in 2012. However, LCC capacity share has been increasing since then, where now 28% of domestic capacity was served by LCCs since 2016. Note that the split of domestic capacity between LCCs and legacy carriers has been consistent since 2016 in accord with the stagnant ASM capacity in this region – while capacity is not being increased, the split of capacity between airline types is not changing either.

Comparing across regions, low-cost carriers make up a much smaller portion of capacity in Australia versus in both the US domestic and intra-Europe markets. In 2018 alone, while LCCs made up 28% of capacity in Australia, low-cost carriers (both ULCCs and LCCs combined) made up 40% of domestic US capacity and 50% of intra-Europe capacity. The smaller low-cost carrier share in Australia (compared to other regions) can be explained by multiple factors, including the fewer number of LCCs (and total airlines) operating in Australia compared to other regions as well as the relatively recent Virgin Australia business model change. In addition, the slow growth or stagnation in Australia's domestic capacity is also contributing to this. In other regions (domestic US and intra-Europe), low-cost carriers have increased shares by taking advantage of the potential for capacity growth in the market. In these regions, growing LCC and ULCC capacities make up the region's capacity increases, while legacy carriers maintain their capacity on absolute terms. However, given the saturated domestic market in Australia (perhaps due to demand already being met by current capacity), LCCs operating in the region do not have any potential to grow further since the overall market is stagnant, leading to constantly small LCC share.

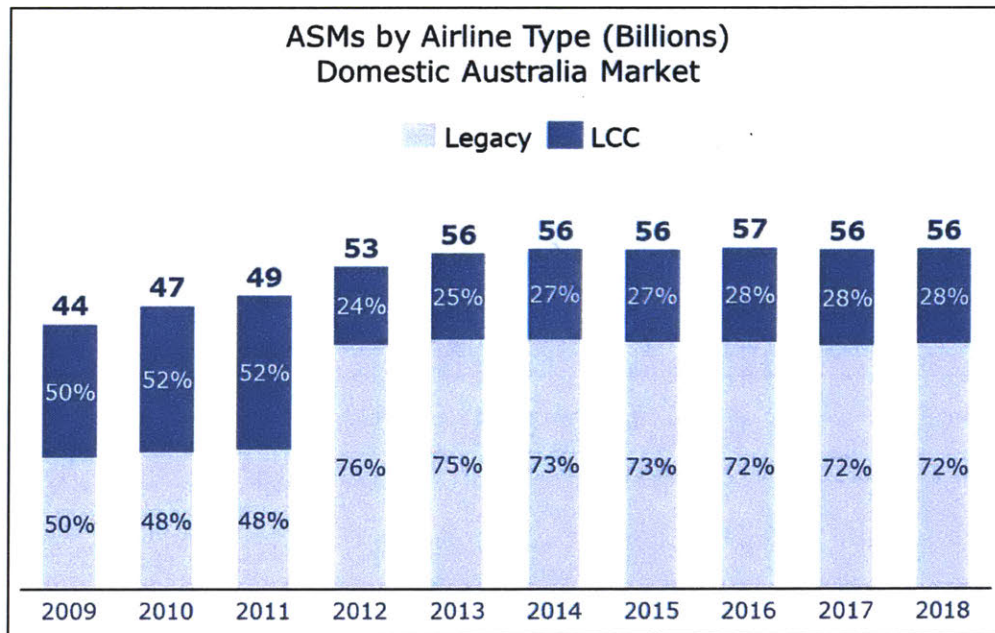


Figure 4.2.7 – Domestic Australia ASMs by Airline Type (2009-2018)

Figures 4.2.8 and 4.2.9 show the split of flight operations by airplane type of legacy carriers and low-cost carriers respectively. Again, given the change of business model (and classification) of Virgin Australia from LCC to legacy carrier in 2011, a distinct change in the split of flight

operations for both airline types can be observed. Between 2011 and 2012, the share of legacy carrier flights operated by narrow-bodies significantly increased, from 33% to 51%. This suggests that Virgin Australia has a greater share of narrow-body operations compared to other legacy carriers, mainly Qantas. Compared to the domestic US region, a significantly greater share of legacy carrier flights in Australia are operated by turbo-props (41% in Australia versus just 10% in the US, in 2018) while a much smaller share being operated by regional jets (2% in Australia versus 38% in the US). In addition, legacy carriers in Europe have a much larger share of their flights operated by narrow-bodies compared to in Australia – in 2018, 76% of intra-European legacy carrier flights were operated by narrow-body aircraft, versus just 54% in Australia.

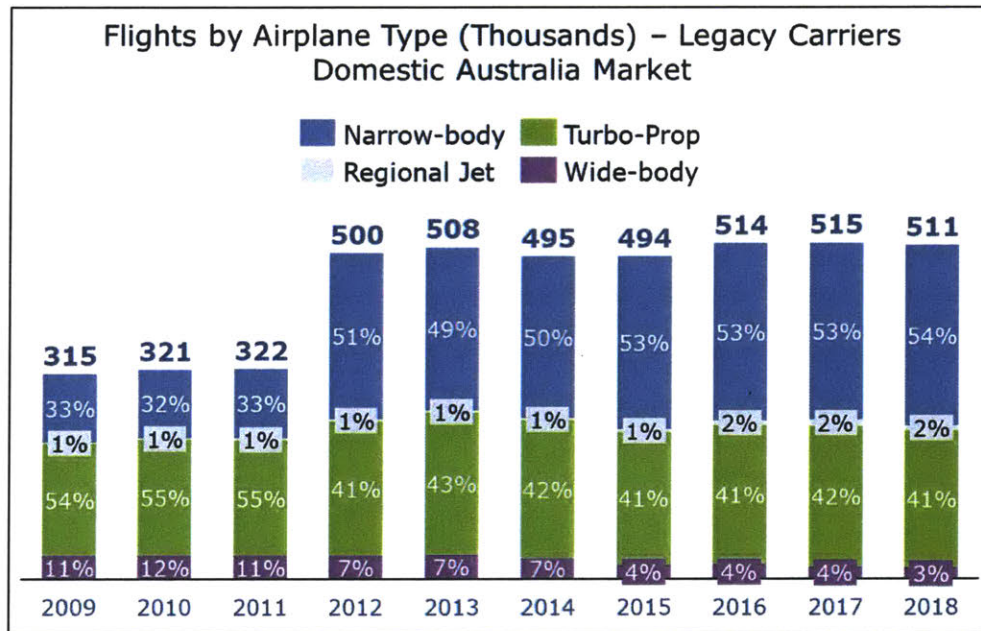


Figure 4.2.8 – Domestic Australia Legacy Carrier Flights by Airplane Type (2009-2018)

On the other hand, domestic LCC flights in Australia are entirely operated by narrow-body aircraft (similar to domestic US and intra-Europe regions), given the business model focus on connecting big population centers in addition to the lack of regional operations. The share of LCC flights operated by narrow-bodies also significantly increased (from 90% to 99%) with shares of flights operated by turbo-props and regional jets shrinking to zero. In an effort to transition into a full-service carrier, Virgin added more regional routes and destinations pre-2011, acquiring regional jets and turbo-prop aircraft to operate in these new markets. However, when Virgin Australia transitioned its entire business model to emulate that of a legacy carrier in 2011, no regional jets

or turbo-props were operating flights under the LCC category, leading to a zero share for both these airplane types.

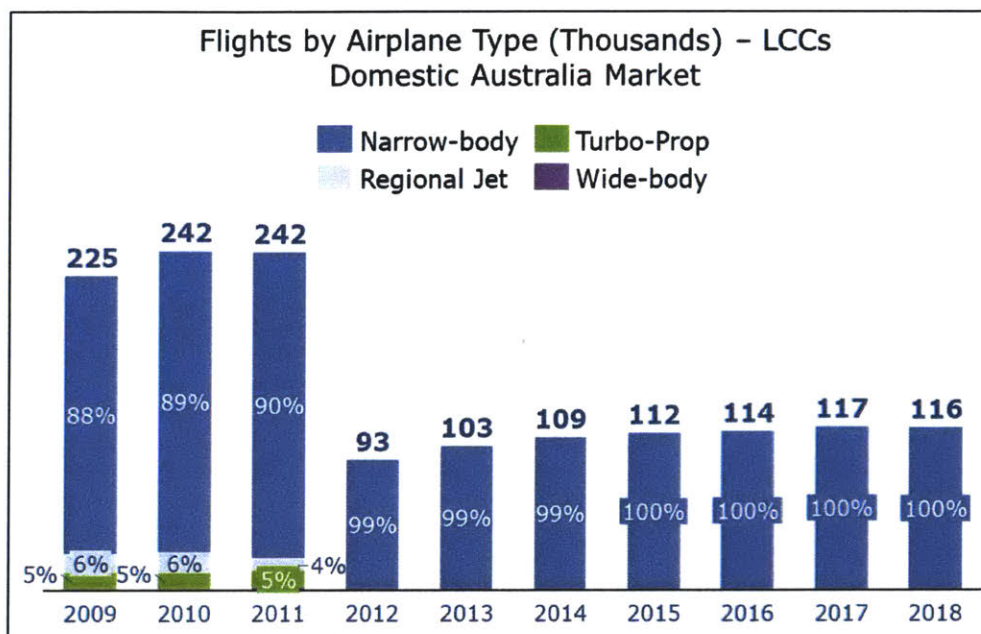


Figure 4.2.9 – Domestic Australia LCC Flights by Airplane Type (2009-2018)

Figure 4.2.10 illustrates the evolution of average stage length for both airline types over this 10-year period. Similar to the intra-Europe region but contrary to the domestic US region, LCCs operating in the domestic Australian region operate longer stage length flights than legacy carriers on average. While LCCs in Australia primarily serve flights between large tourist destinations or population centers, legacy carriers also operate in small destinations and on regional routes – hence justifying the longer ASLs for LCCs than for legacy airlines. While many tourist/popular routes for LCCs in Australia are transcontinental routes, note that many LCCs in the domestic US region do not operate transcontinental routes – this explains why LCCs have longer ASLs than legacy carriers in Australia but not in the domestic US region.

Again, a distinct change in average stage length for both airline types is evident between 2011 and 2012 due to Virgin’s business model transition in this time period. Average stage length of LCCs increased significantly (from 687 miles in 2011 to 759 in 2012) since Virgin Australia and its subsequent regional operations (shorter stage lengths usually) were no longer classified under the LCC category. On the other hand, the average stage length of the legacy carrier category also

increased between 2011 and 2012, suggesting that Virgin’s operated longer distances on average than Qantas and other legacy players.

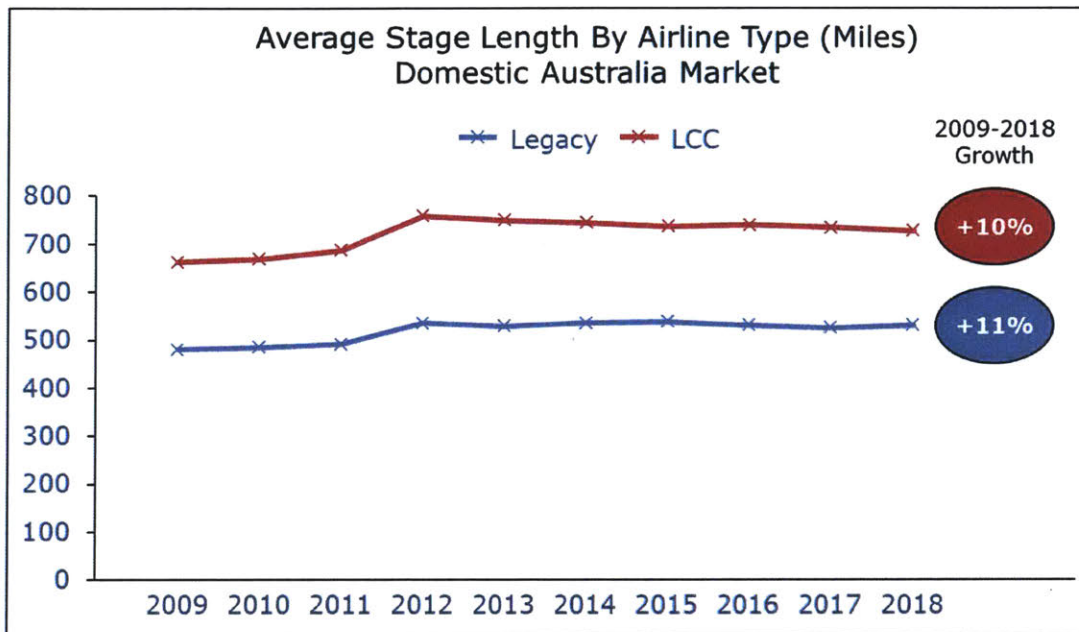


Figure 4.2.10 – Domestic Australia Average Stage Length by Airline Type (2009-2018)

Figures 4.2.11 illustrates the service levels of domestic Australian city pairs across the two airline categories. The analysis shows that while the number of city pairs served by legacy carriers has increased, the number of city pairs with LCC service has decreased over this 10-year period. While LCCs served 104 city pairs or 36% of the active city pairs in 2009, this number has reduced to 60 city pairs or just 17% of active city pairs in 2018. On the other hand, hybrid/LCCs and ULCCs combined serve between 50% and 58% of active city pairs in the intra-Europe and domestic US regions. Low-cost carriers serving a greater portion of domestic US and intra-Europe city pairs versus domestic Australia city pairs can be explained by low-cost carriers (hybrid/LCCs and ULCCs combined, where applicable) making up a much larger portion of ASM capacity in Europe (50%) and US (40%) compared to in Australia (28%)

Virgin Australia’s change in business model is a major contributor to this trend – as displayed, the number of LCC serviced city pairs decreased substantially between 2011 and 2012 due to Virgin’s reclassification as a legacy carrier. In addition, the number of legacy carrier served city pairs also

increases between 2011 and 2012 – this suggests that Virgin Australia’s network covered many city pairs that were not served by Qantas before.

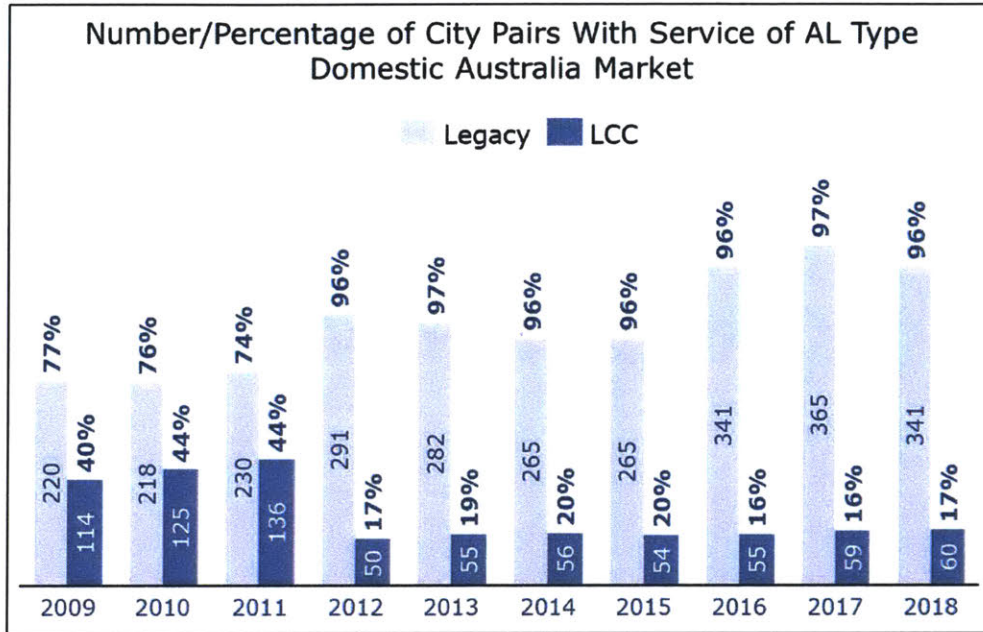


Figure 4.2.11 – Domestic Australian City Pairs by Coverage of Airline Type (2009-2018)

Lastly, Figure 4.2.12 shows the split of domestic Australian city pairs by the 3 service types in this region. Similar to both the intra-Europe and domestic US regions, a majority of city pairs in domestic Australia also fall under the Legacy Only category; however, this effect is much larger in Australia than in Europe or the US. For example, in 2018, while 83% of domestic Australian city pairs were served by legacy carriers only, only 42% intra-European and 50% domestic American city pairs were served by legacy carriers. Again, this can be credited to LCCs making up a much smaller portion of capacity in domestic Australia versus in domestic US or intra-Europe – as a result, a much smaller capacity share by LCCs in Australia has led to a larger portion of city pairs being served by legacy carriers. Consequently, both the intra-Europe and domestic US regions have a larger portion of city pairs served by low-cost carriers only (ULCCs and LCCs combined) than in the domestic Australia region. In 2018 alone, while 27% of domestic US and 37% of intra-European city pairs have are served by low-cost carriers exclusively (LCC, ULCC or both), only 4% of domestic Australian city pairs are served only by LCCs. As expected, Virgin Australia’s transition has also caused a significant decrease in the number of city pairs served by both LCCs and legacy carriers between 2011 and 2012 – while in 2011, 18% of city pairs had both

legacy and low-cost service, this was shrunk to 13% post-Virgin Australia’s transition and reclassification in 2012.

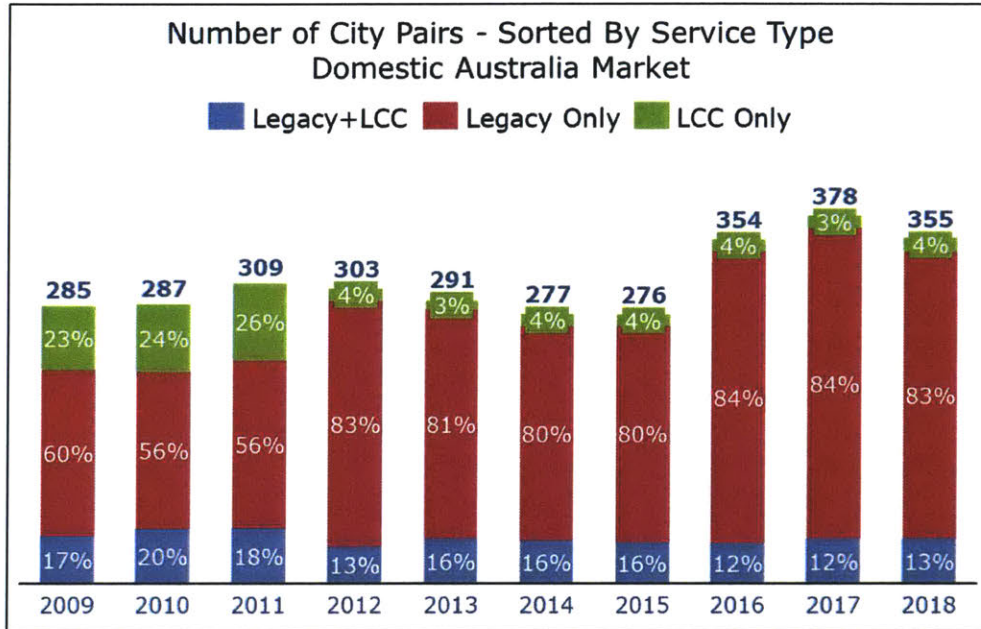


Figure 4.2.12 – Domestic Australian City Pairs by Service Type (2009-2018)

In summary, capacity in the domestic Australian region is growing at similar rates as in the domestic US region but has been relatively stagnant in the recent past. Low-cost carriers make up a much smaller share of domestic Australian capacity in 2018 (28%) versus in 2009 (50%). This is much lower compared to other mature markets where low-cost carriers in 2018 make much larger portions of capacity. In addition, LCCs served 40% of active domestic Australian city pairs in 2009 versus just 17% in 2018. One key reason for this decrease in LCC presence is the transition of Virgin Australia from an LCC to a full-service carrier in 2011, hence reducing LCC capacity in the Australian market that could not be fully replaced by the entry of Jetstar or Tigerair.

Chapter 5: Domestic India Market Region

The domestic India market region is one of the two short-haul emerging air travel markets studied in this thesis and made up 1.6% of the worldwide RPKs in 2018 (IATA, 2019). According to IATA (2018), India is also forecasted to be the third-largest air travel market in the world, measured as traffic to, from and within the country. Despite their young age, LCCs operating in this region have grown significantly over the past decade, making up the dominant share of domestic capacity today, and show prospects of further growth. This chapter investigates the capacity evolution of domestic Indian LCCs, focusing on their operations and rapid growth in the country.

Section 5.1: Background and Literature Review

Relative to other market regions studied in this thesis, the emergence of low-cost carriers in the domestic Indian sector is very recent. Prior to the 1990s, the Indian aviation market was heavily regulated with only two airlines operating in India; the government-owned Indian Airlines exercised a monopoly over all domestic routes in the country while Air India offered only international routes to/from India. In 1994, the government passed an act that allowed private domestic commercial airlines to start-up and operate scheduled flights within the domestic sector of India. This deregulation was a result of an effort to boost economic growth within the aviation sector, foster tourism in addition to providing more options to the growing population of domestic air travelers in the country (Mazumdar, 2009).

The first LCC to emerge in India was Air Deccan, launched in 2003 by a retired army officer with the primary goal of creating a low-fare airline that would allow more people to travel by air. Air Deccan pioneered the low-cost airline model in India, adopting various techniques commonly used by low-cost carriers that helped change traditional airline market dynamics. For example, even though air ticket booking in India was historically dominated by travel agents, Air Deccan sold most of its tickets through its own website to help keep distribution costs low. The airline attracted users to book on their website through large marketing campaigns and offered several promotions, such as early booking sales, to enable first-time travelers to travel by air instead of rail with similar levels of affordability (Gross & Luck, 2013).

Observing Air Deccan's rapid success and growth in the market, several new low-cost airline startups also emerged in India's domestic sector. Between 2005 and 2006, some of today's biggest

Indian LCCs emerged, namely SpiceJet, GoAir and IndiGo. They emulated Air Deccan's low-fare model to capture the growing demand for affordable air travel from India's population, who were willing to switch from rail to air transport. Over the years, India's LCCs have grown significantly and today provide most of the domestic market capacity (Gross & Luck, 2013).

The domestic Indian market has also seen many full-service carriers launch low-cost subsidiaries to help meet the growing low-fare demand in the country – launches were both organic as well as through acquisitions. National carrier Air India was the first legacy carrier to respond to the growing low-cost carriers in India and launched low-cost subsidiary Air India Express to offer low-fare tickets on primarily leisure routes. Jet Airways soon followed and acquired Air Sahara's operations in 2007 to help launch their own low-cost carrier, JetLite, which was later merged into JetKonnnect, Jet Airways' in-house low-cost brand (Gross & Luck, 2013).

Kingfisher Airlines was also an entrant in this space, launching a low-cost subsidiary called Kingfisher Red. Kingfisher was originally perceived as a premium carrier during its initial launch due to several in-flight amenities such as fine dining and personal entertainment systems. The rapid growth in low-fare, no-frills demand for air travel in the domestic India sector led Kingfisher to acquire Air Deccan's operation to create their own LCC brand, later named Kingfisher Red (Rhoades, 2016). However, the newly created LCC operated under Kingfisher's code, used Kingfisher's IT system and was run by the same management team to suggest that the LCC was meant to be a part of the overall Kingfisher brand instead of a standalone airline (Singhal, 2008).

Business models of Indian LCCs differ significantly from those seen in mature markets, like the domestic US and intra-Europe regions, with many of these variations causing significant cost disadvantages for Indian LCCs. Firstly, while international LCCs typically fly to secondary/smaller airports in a metropolitan area to help reduce airport charges, Indian LCCs do not. This is because most major cities today are only served by one primary airport that caters to both LCCs and legacy carriers. As a result, Indian LCCs cannot avail some of the savings on airport costs that other Western LCCs may be able to take advantage of. Secondly, most major airports in India are heavily congested and thus require longer turnaround times, meaning that LCCs in India are not able to match aircraft utilization levels of other LCCs around the world (who operate from smaller, less congested airports) – thus a financial disadvantage for Indian based low-cost carriers. Finally, Indian LCCs typically offer more frills and amenities (compared to Western

LCCs), such as complimentary meals and drinks, to help better compete with rail services, thus leading to a higher operating cost (Chowdhury & Gupta, 2013).

Similar to other regions studied in this thesis, airline type classifications conducted by ICAO and CAPA were used to categorize Indian domestic airlines as either LCCs or legacy carriers. Like the domestic Australian market, low-cost carriers in the domestic Indian market are also relatively young and have not yet seen the typical operating cost increases (maintenance, labor, etc.) that are usually experienced as LCCs get older. Thus, a third ultra-low-cost carrier category has not emerged yet, hence this study classifies Indian domestic airlines as either LCCs or legacy carriers.

A total of 11 Indian airlines were categorized under this process, making up for ~100% of the total 2009-2018 domestic seat capacity in India. The airlines that were not classified (i.e. remaining 13 airlines, all of which make up extremely small portions of domestic capacity) were assigned to the legacy category by default. Table 5.1.1 shows the categorization by both ICAO and CAPA for each of the 11 airlines, along with the final categorization made for further analysis in this thesis. JetKonnnect (previously JetLite) was the only airline to have different classifications between the CAPA and ICAO sources; however, JetKonnnect’s business model was to be a low-cost subsidiary of parent Jet Airways, as previously mentioned in this chapter. Therefore, JetKonnnect was classified as an LCC for the purposes of this thesis. Note that since Kingfisher Red operated under Kingfisher’s mainline code and was marketed by the parent airline, all of Kingfisher’s operation were classified as legacy carrier operated in this thesis.

Table 5.1.1 – Classification of Top Domestic India Airlines By 2009-2018 Seat Capacity

Marketing Airline	CAPA Classification	ICAO LCC Classification?	Final Classification
Air Asia India	LCC	YES	LCC
Air India	Full Service	NO	Legacy
Air India Express	LCC	YES	LCC
GoAir	LCC	YES	LCC
Indian Airlines	N/A	NO	Legacy
IndiGo	LCC	YES	LCC
Jet Airways	Full Service	NO	Legacy
JetKonnnect	Full Service	YES	LCC
Kingfisher	Full Service	NO	Legacy
SpiceJet	LCC	YES	LCC
Vistara	Full Service	NO	Legacy

Section 5.2: Capacity Analysis

Airline capacity in the domestic India region has been growing significantly faster than in many mature markets around the globe, as shown in Figures 5.2.1 (ASMs), 5.2.2 (Flights) and 5.2.3 (Seats). Compared to a 2.9% CAGR in the domestic US region and 5.6% CAGR in the intra-Europe region between 2009 and 2018, ASM capacity in the domestic Indian market has grown by 12% CAGR during the same time period, gradually approaching the 100 billion ASMs mark. This aggressive growth compared to other mature markets (however off a much smaller base) is consistent with trends seen in emerging markets where airline capacity grows aggressively to match up with population levels and economic growth rates (both of which are high in India). While the US market went through periods of decline, steadiness and growth in this time period (capacity discipline and regeneration), India's air travel capacity has been on a constant increase in this 10-year time period, growing by 178% between 2009 and 2018.

One major difference observed between mature markets in this study and the domestic India region is the growth rate of flight capacity. While flight capacity (i.e. the number of flights) has remained constant or grown very slowly (relative to ASM growth) in mature markets such as intra-Europe (2% CAGR) or domestic US (-0.5% CAGR), flight capacity in domestic India has grown by 8.6% CAGR over the past 10 years. However, like both the domestic US and intra-Europe regions, the number of seats in domestic India is also growing faster than flights, suggesting an increasing airplane size/seats per departure. In these mature markets, much of the ASM capacity growth (where the growth rate is smaller than in emerging markets) is coming from operating significantly larger airplanes while relatively maintaining the number of flight operations. On the other hand, India's ASM growth, which is substantially larger, is both a function of more flight operations as well as larger airplanes.

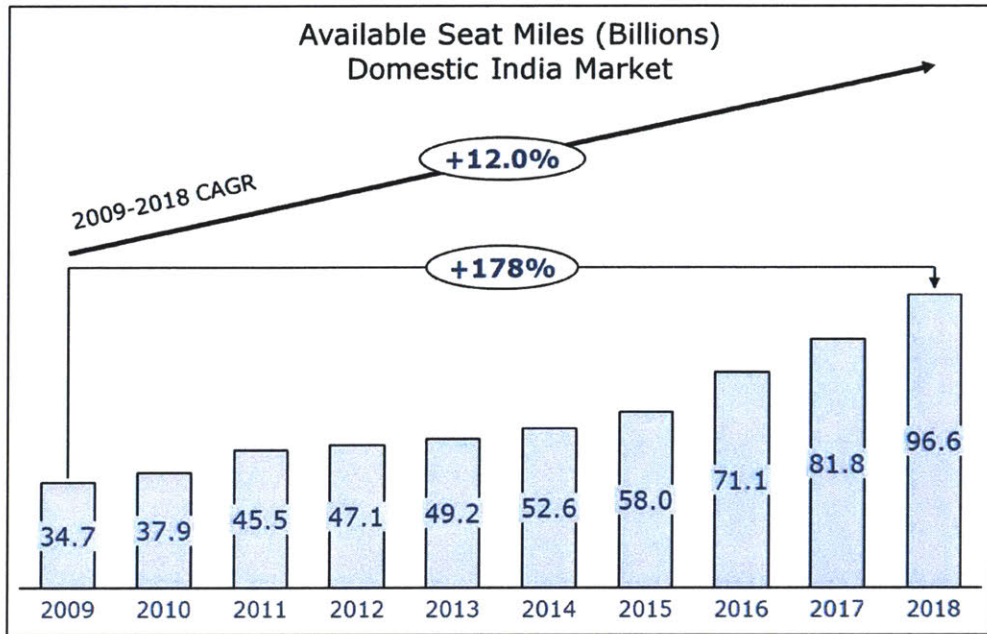


Figure 5.2.1 – Domestic India Available Seat Miles (2009-2018)

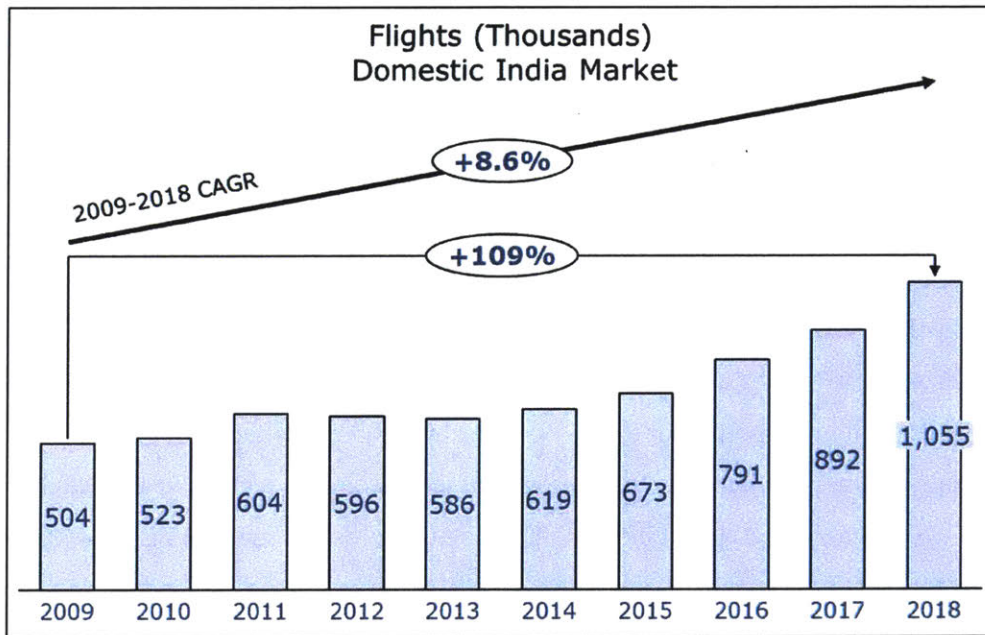


Figure 5.2.2 – Domestic India Flight Operations (2009-2018)

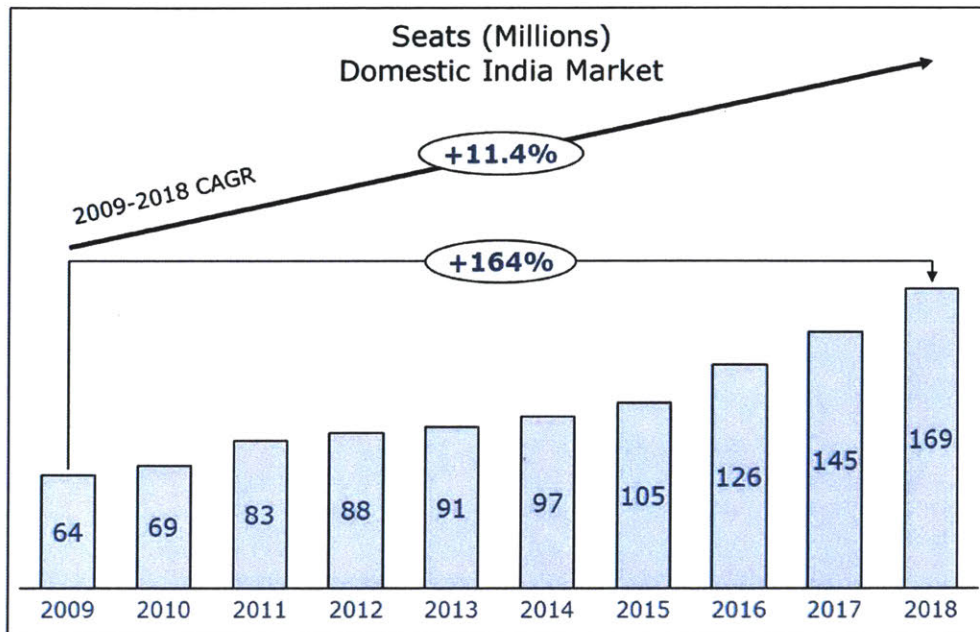


Figure 5.2.3 – Domestic India Seats (2009-2018)

Flights in domestic India are primarily operated by narrow-bodies, as shown in Figure 5.2.4. The share of flights operated by narrow-body aircraft has increased substantially from 73% of flights in 2009 to 83% in 2018 – this growth in the share of narrow-bodies is consistent with trends seen in domestic US and intra-Europe where narrow-bodies are operating a greater portion of the capacity year-on-year. Having said that, narrow-body aircraft are utilized on a much larger percentage of domestic Indian operations versus domestic US operations. For example, in 2018, while 83% of domestic Indian flights were operated by narrow-bodies, only 63% of domestic US flights utilized narrow-body aircraft. In addition, compared to the domestic US, the domestic India market has a much lower portion of flights operated by turbo-props and almost no flights operated by regional jets. In 2018, turbo-prop and regional jet operations accounted for 8% and 29% of domestic US flights respectively, but just 0.2% and 16% of domestic India flights respectively.

Both these trends can be explained by the differences in business models of Indian airlines versus those of US airlines. In India, much of the airline capacity consists of operations between two large population centers (such as Mumbai-Delhi) – these city pairs are relatively large in size and demand, hence are operated with larger aircraft such as narrow-bodies instead of turbo-props and regional jets. As such, domestic Indian city pairs connecting regional cities and towns with one another or with bigger cities are relatively fewer in number. On the other hand, many US airlines,

in addition to city pairs connecting large metropolitan areas, operate many regional routes as well as part of their hub-and-spoke model – hence explaining why there are greater portions of turbo-prop and regional jet in the domestic US versus in domestic India.

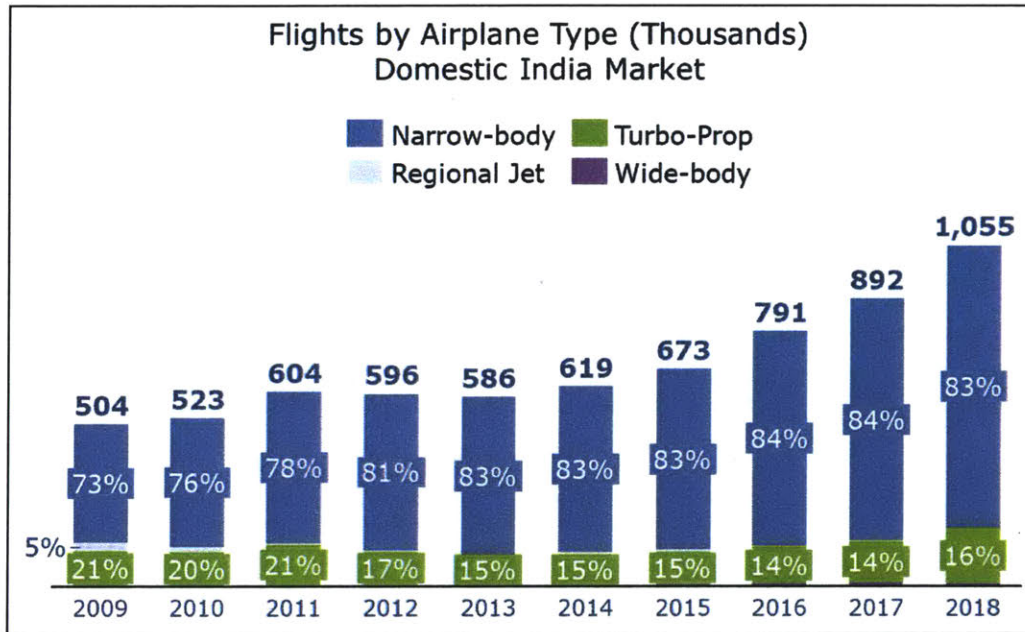


Figure 5.2.4 – Domestic India Flights by Airplane Type (2009-2018)

Figure 5.2.5 shows the split of domestic Indian capacity by marketing airline. Among the top 5 airlines by ASM capacity in 2009 and 2018, few changes appear. First, while Kingfisher is the top airline by capacity in 2009, the airline ceased operations in late 2012, hence not appearing in the top 5 list for 2018. IndiGo has significantly grown its share of the domestic Indian market, from just 15% in 2009 to become the top airline in 2018, with a 41% share of the market. In addition, Indian Airlines appears in 2009 but is replaced by Air India in 2018, following completion of the merger between the two airlines in early 2011. Compared to the domestic US and intra-Europe regions, the domestic Indian region is far more consolidated, with the level of consolidation in the Indian market increasing over the past 10 years. While the top 5 airlines in India accounted for 82% and 88% of ASM capacity in 2009 and 2018, respectively. On the other hand, in 2018, the top 5 airlines in the domestic US and intra-Europe region accounted for only 83% and 36% of ASM capacity in those regions, respectively.

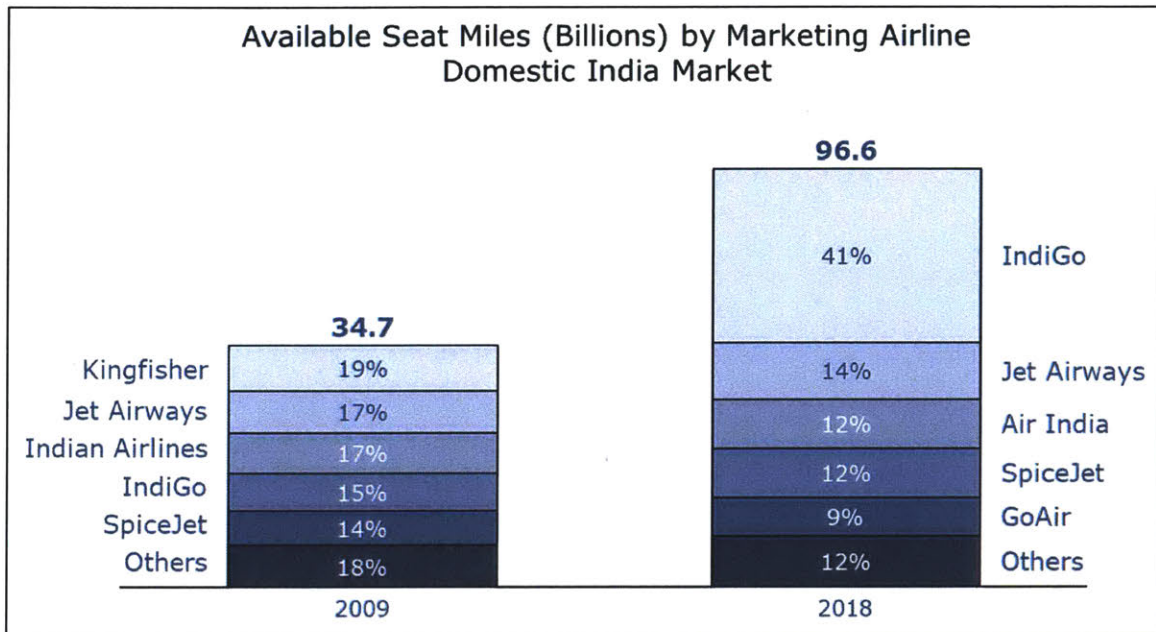


Figure 5.2.5 – Domestic India ASMs by Marketing Airline (2009-2018)

Figure 5.2.6 illustrates the split of domestic Indian ASM capacity by the two airline types in this region, LCC and legacy carriers. LCCs in India have seen increasing shares of the market since 2009 and make up the dominant portion of the market since 2011. The share of low-cost carriers has grown from 43% in 2009 to 69% in 2018; a majority of this share growth can be credited to the rise of IndiGo as the dominant player in the Indian market today (41% domestic capacity share). In addition, many existing LCCs such as SpiceJet as well as new low-cost entrants such as Go Air have also strengthened their position and grown their capacity significantly over the 10-year period. On the other hand, while legacy carriers have also grown their capacities in absolute terms, their share of the overall market has reduced due to the LCC category growing much faster.

Compared to mature markets, LCCs in India have a significantly higher market share; in 2018, LCCs made up 69% of domestic Indian ASM capacity while low-cost carriers (ULCCs and LCCs combined) 40% of domestic US and 50% of intra-Europe ASM capacity. While LCCs in India face many unique challenges, such as a lack of low-cost secondary airports, the high capacity share for LCCs can be primarily attributed for the greater demand of low-cost travel and less demand for premium travel in India versus in the US or Europe, which is a result of the difference in GDP per capita and spending power. In addition, average travel distances across India are significantly shorter than other mature markets, particularly domestic US – in 2018, average stage length in

India 540 miles, compared to 726 miles in the domestic US region. Transcontinental routes in the US, which have one of the highest demands and capacities in the domestic US region, are much longer in distances/travel time than some of the high-demand/coast-to-coast routes in the domestic Indian region. As a result, travelers in domestic India are more likely to accept a low-cost carrier’s travel product due to the shorter travel times and distances, especially compared with the rail alternatives which are significantly more time-consuming. Hence, LCCs have significantly increased their capacity in the domestic India region to meet the growing demand.

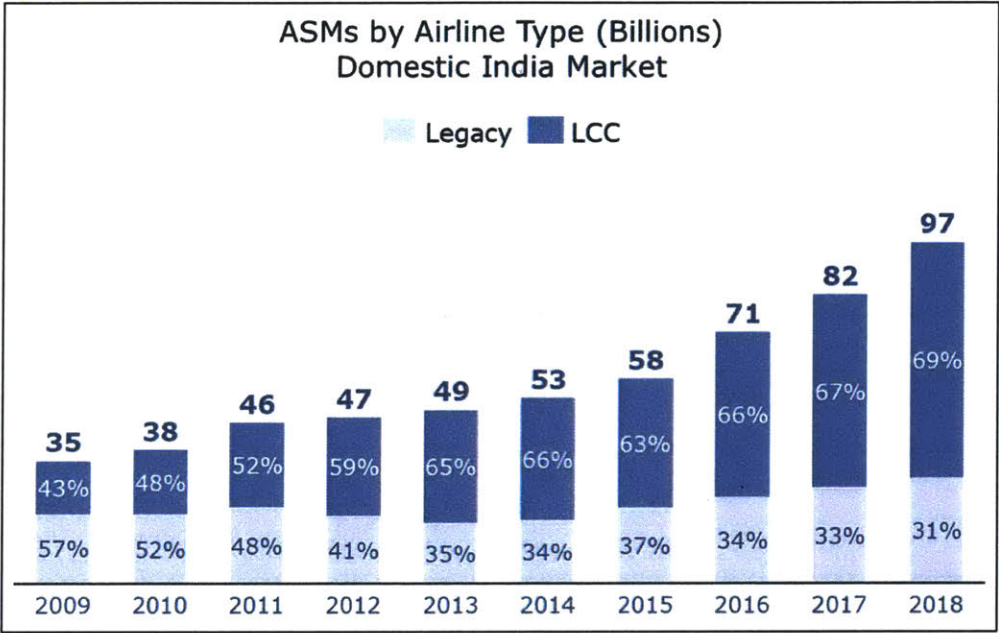


Figure 5.2.6 – Domestic India ASMs by Airline Type (2009-2018)

Figure 5.2.7 shows the average stage lengths for legacy and LCC operations over the past 10 years in the domestic Indian region. Contrary to the domestic US market but similar to the intra-Europe region, LCCs operating in India fly longer distances on average compared to Indian legacy carriers. However, while this difference is more sizeable and constant in the intra-Europe region (as seen in Figure 3.2.11), legacy carrier and LCCs in India are slowly approaching similar average stage lengths – in 2018, legacy carriers are operating longer distances while LCCs operating shorter distances on average compared to 2009. This convergence can be explained by the nature of the market in the domestic India region. Most of the routes in India today serve large population centers, leading to relatively fewer regional routes in the country compared to other mature

markets. Since both types of carriers are serving similar types of routes, the average stage length of both carriers has gradually been converging.

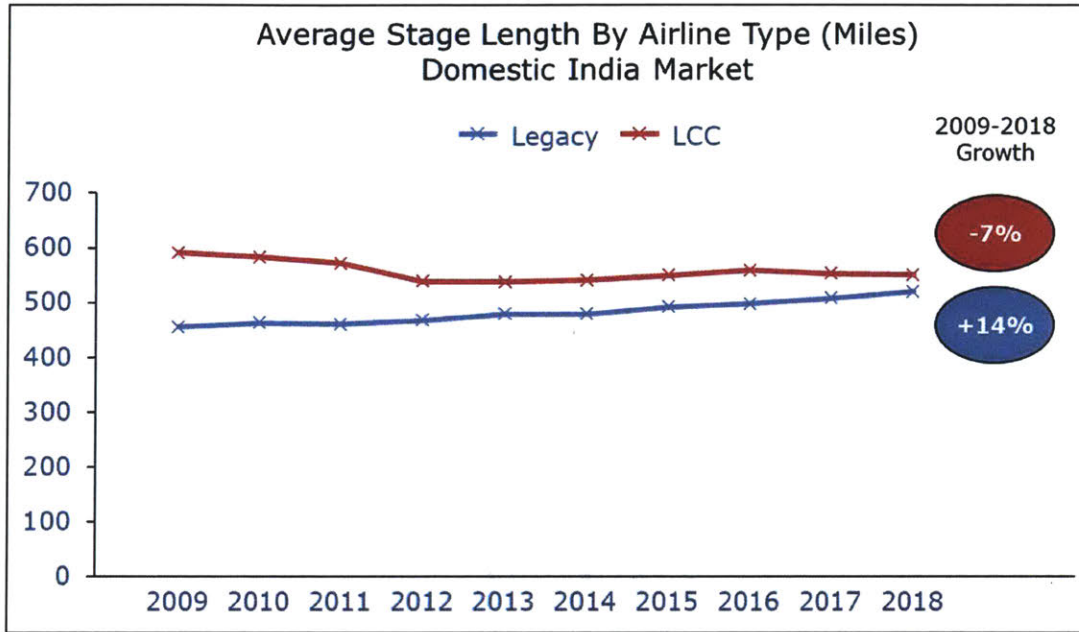


Figure 5.2.7 – Domestic India Average Stage Length by Airline Type (2009-2018)

The coverage levels of LCCs and legacy carriers in the domestic Indian region were also studied, as shown in Figure 5.2.8. Both LCCs and legacy carriers have served a similar portion of active city pairs each year, even though the capacity shares of both these airline types differ greatly. While legacy carriers have a smaller share of the market, they still serve almost as many (or even more, in some years) city pairs as LCCs in India; in 2018, while legacy carriers only make up only 31% of the ASM capacity, they operate in 64% of the city pairs. LCCs, on the other hand, made up more than double the ASM capacity (69% of the market) in 2018 but served only a few more city pairs than legacy carriers, operating in 77% of active city pairs in that year. This is in contrast to the domestic US market in 2018 where legacy carriers serve the highest percentage of active city pairs but also have the highest capacity share in the market.

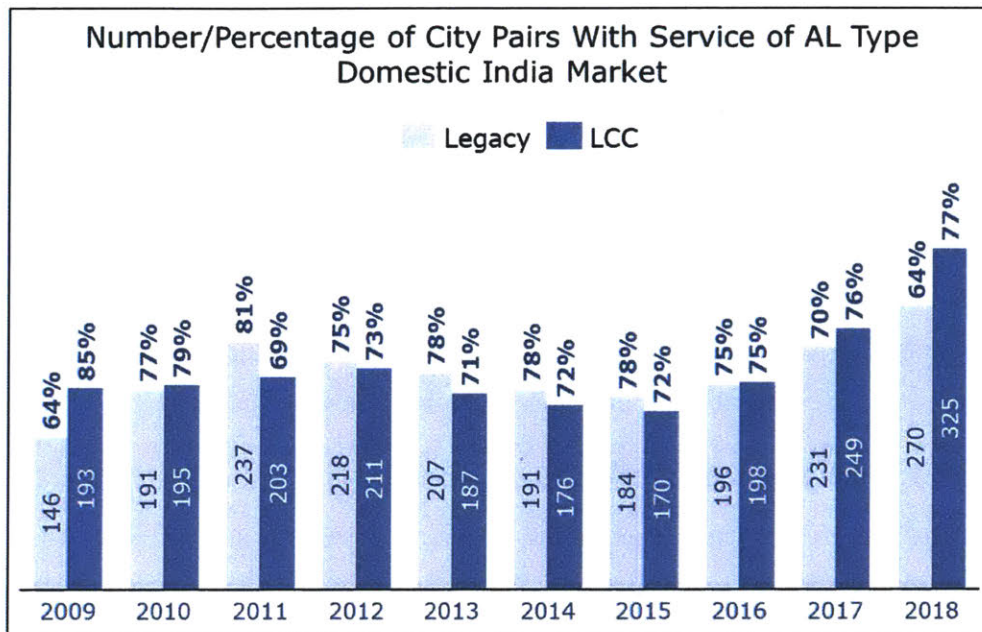


Figure 5.2.8 – Domestic India City Pairs by Coverage of Airline Type (2009-2018)

In summary, the domestic India region is a fast-emerging air travel market where ASM capacity grew at 12% CAGR between 2009 and 2018, much faster than the mature regions studied in this thesis. Indian low-cost carriers dominate the domestic capacity, making up 69% of the domestic ASMs in 2018, compared to 43% in 2009; as such, low-cost carrier share of capacity is much larger in India than in the other markets analyzed (40% in the domestic US and 50% in intra-Europe). In addition, Indian LCCs cover a greater portion of city-pairs in the region compared to LCCs in other regions; in 2018, Indian LCCs served 77% of domestic India city pairs while intra-European low-cost carriers (Hybrid/LCCs+ULCCs combined) served only 58% of intra-European city pairs. LCCs operating in India face some unique challenges, such as a lack of secondary airports and a heavily congested airspace, leading to lower aircraft utilization and higher operating. However, LCCs are still the strongest airline type in the region, particularly due to the high demand for low-cost travel (attributed to lower income and spending power) compared to more mature air travel markets.

Chapter 6: Domestic China Market Region

According to IATA forecasts (2018), China will become the largest aviation market (defined by traffic to, from and within the country) in the world by the mid-2020s, replacing the US at the top spot. The emergence and rapid growth of domestic operations in China play a massive part in the growth country's aviation market. However, despite reforms by the Civil Aviation Administration of China (CAAC) to promote budget airlines in the country, low-cost carriers make up a small but gradually growing portion of domestic capacity. This chapter studies the growth of low-cost carriers operating in the domestic China market and their impact on capacity.

Section 6.1: Background and Literature Review

Similar to Indian LCCs, the emergence of low-cost carriers operating in the domestic China market region has been very recent, much later compared to the rise of LCCs in more mature markets such as intra-Europe or domestic US. The Chinese airline industry was heavily regulated until the late 1900s and early 2000s when several restrictions were lifted to encourage the growth of the aviation market to better meet the country's growing demand. Between 2002 and 2005, several new policies were enacted to enable foreign and local private investors to invest in China's civil aviation activities, encouraging the establishment of private airlines, particularly low-cost carriers (Yang, Zhang, & Wang, 2018).

The CAAC, while uncertain about the future of the LCC business model, was itself very interested to explore LCC growth in China as a pilot project; hence, the CAAC approved applications of several small LCCs that emerged due to relaxations in the investment regulations and worked with these airlines to further build the LCC model in the country (Zhan, 2015). Spring Airlines, launched in May of 2004, was the first low-cost carrier to be introduced to the Chinese market. From its inception, Spring Airlines has been working with the CAAC to create a template for future Chinese LCCs. For example, to reduce costs of running the airline, CAAC advised the carrier not to enroll in a particular ticket distribution system that at the time was being used by all the other Chinese carriers. CAAC also permitted Spring Airlines to offer differentiated services compared to other Chinese carriers, such as not providing free in-flight meals or complimentary checked baggage allowance (Zhan, 2015).

Even with the CAAC being involved so closely with the development of the LCC model in China, Spring Airlines remained the only LCC operating in China until early 2014 when several other players such as 9 Air emerged (Fu, Lei, Wang & Yan, 2015). This was also coincidental with the time where the CAAC published a guideline document about developing low-cost airlines in China. The document focused on multiple aspects relating to the starting-up LCCs, such as fleet acquisition, route allocation, slot management, and financing. Among these guidelines and steps taken, the CAAC in 2013 abolished the minimum aviation pricing requirements which proved to be critical for LCCs to emerge in China. Under these guidelines, the CAAC developed plans to introduce low-cost carrier terminals at airports as well as reduce airport fees to foster further LCC growth (Zhan, 2015).

Despite the many efforts made by the Chinese government to promote LCC growth in the domestic sector, low-cost carriers still make up very small portions of the region's capacity and traffic. Many experts believe this is due to these reforms not being strong/focused enough to foster low-cost carrier growth in the country. Most importantly, a continued lack of low-cost aviation facilities, particularly in the central and western regions of the country, have hampered expansion of LCCs in these areas. Chinese LCCs primarily rely on cost-cutting relating to sales, general and administrative expenses, but have aircraft ownership, fuel and airport costs that are similar to legacy carriers in the country. Given current policies, experts such as Zhenghua (founder of Spring Airlines) claim that Chinese LCCs have 80-85% similar costs to full-service carriers in the country – resulting in a very small cost differential between the two airline types (Zhan, 2015).

Lower aircraft utilization is a big factor that has played into the slow growth of LCCs in the region, particularly due to the closure of a significant portion (68%) of Chinese airspace for military use. While the daily average aircraft utilization of Chinese LCCs is roughly 20% higher than domestic legacy carriers, no access to most of the airspace means that Chinese LCCs may not be able to use aircraft as efficiently as other LCCs around the world, thus impacting their growth (Badarch, 2018). In addition, several legacy carriers in China have adopted many low-cost practices, reducing the cost advantage of LCCs and thus affecting their growth (Chen, 2016). Competition from other transport modes also plays a part in the lower penetration by LCCs in China. Between second and third-tier cities within 1200km in particular, the development of high-speed rail

services also hinders LCC growth since the new rail services offer a similar quality of service in terms of price and travel time (Badarch, 2018).

Compared to LCCs in other regions, Chinese LCCs are more fragmented and geographically focused. Most of the low-cost carriers operating in China serve only a regional network, specifically focusing on a province or part of the country (some LCCs are even partially-owned by a regional government) and have a fleet smaller than 30 aircraft on average (Chen, 2016). Furthermore, Chinese LCCs collect far lower revenues from ancillary services compared to their low-cost peers around the world. Between 2011 and 2015, China's premier LCC Spring Airlines generated only 3.5-5.2% of its revenue from ancillaries, compared to a 19% average for other Southeast Asian budget carriers and a 23% average for Ryanair (Chen, 2016). These factors combined have resulted in a much lower capacity and market share for LCCs in the domestic Chinese region.

Classifications of airline type conducted by ICAO and CAPA were used to categorize airlines operating in the domestic Chinese market region. Like other regions, the relatively young age of low-cost carriers in the country (first one being launched as late as mid-2004) means that a ULCC category has not yet formed in this region. As a result, Chinese airlines were classified between two categories, either as legacy carriers or LCCs. A total of 35 airlines were categorized following the same process, making up ~100% of the total 2009-2018 Chinese domestic seat capacity. Table 6.1.1 shows the categorization by both ICAO and CAPA for each of the 11 airlines, along with the final categorization made for further analysis in this thesis. Three airlines have categorizations that do not match across the two sources; the business models of these carriers were further analyzed to help assign a final classification.

Beijing Capital was formed (from Deer Air, a Hainan Airlines subsidiary) as a joint venture between the Beijing municipal government and Hainan group with the focus of providing low-cost air services from Beijing. This model was similar to other Hainan low-cost subsidiaries (such as Lucky Air), where Hainan partnered with local governments to foster the growth of airline services in a particular region (Lei, 2010a) (Lei, 2010b). Likewise, Urumqi Air was also emerged as a joint venture low-cost airline between Hainan and Urumqi Urban Construction Investment, with the latter partner being eventually replaced by the Xinjiang government. Urumqi Airlines is also part of the U-Fly Alliance, a low-cost airline alliance in Asia (CAPA, n.d.). The business models of

both these carriers have several low-cost elements; one of these is fleet commonality to help keep operating costs low. For example, Urumqi Airlines primarily operates only Boeing 737s while Beijing Capital operates only Airbus A320s and A330; this contrasts with their legacy airline parent, Hainan Airlines, which operates several types of both Airbus and Boeing airplanes, as per the FlightGlobal fleet database.

On the other hand, China United Airlines, which was originally started as a full-service carrier, was transformed to a low-cost ‘budget’ carrier in 2014 by its parent, China Eastern Airlines (Yan & Qing, 2014). As part of the transformation, China United devised plans to increase ancillary revenue, increase direct sales (to reduce sales/GDS costs) while adopting a single class configuration in their airplanes, although not in an extra-high density configuration to allow for ancillary sales through extra-legroom seats (Zhan, 2015). As such, given that all three airlines have characteristics that are common with other Chinese LCCs, the three airlines were classified as LCCs for the purposes of this thesis. Note that China United was classified as an LCC starting 2014 and as a legacy carrier before that.

Table 6.1.1 – Classification of Top 35 Domestic Chinese Airlines By 2009-2018 Seat Capacity

Marketing Airline	CAPA Classification	ICAO LCC Classification?	Final Classification
China Southern Airlines	Full Service	NO	Legacy
China Eastern Airlines	Full Service	NO	Legacy
Air China Limited	Full Service	NO	Legacy
Hainan Airlines	Full Service	NO	Legacy
Shenzhen Airlines	Full Service	NO	Legacy
Xiamen Airlines	Full Service	NO	Legacy
Sichuan Airlines	Full Service	NO	Legacy
Shandong Airlines	Full Service	NO	Legacy
Shanghai Airlines	Full Service	NO	Legacy
TianJin Airlines Co. Ltd.	Full Service	NO	Legacy
Beijing Capital Airlines Co. Ltd.	LCC	NO	LCC
Juneyao Airlines Co. Ltd.	Full Service	NO	Legacy
Spring Airlines Limited	LCC	YES	LCC
Lucky Air Co. Ltd.	LCC	YES	LCC
China United Airlines	LCC	NO	Legacy until 2013 LCC post 2013
China West Air Co. Ltd.	LCC	YES	LCC
Okay Airways Company Limited	Full Service	NO	Legacy

Chengdu Airlines	LCC	YES	LCC
China Express Airlines	Regional/Commuter	NO	Legacy
Kunming Airlines	Full Service	NO	Legacy
Chongqing Airlines Co. Ltd	Full Service	NO	Legacy
Hebei Airlines Co. Ltd.	Regional/Commuter	NO	Legacy
Zhejiang Loong Airlines Co. Ltd	Full Service	NO	Legacy
Tibet Airlines	Full Service	NO	Legacy
Donghai Airlines	Full Service	NO	Legacy
Fuzhou Airlines Co. Ltd.	Full Service	NO	Legacy
Guangxi Beibu Gulf Airlines	Full Service	NO	Legacy
Qingdao Airlines Co Ltd	Full Service	NO	Legacy
Ruili Airlines	Full Service	YES	Legacy
9 Air Co Ltd.	LCC	YES	LCC
Urumqi Airlines Co. Ltd	LCC	NO	LCC
Grand China Air	Full Service	NO	Legacy
Changan Airlines	Full Service	NO	Legacy
Suparna Airlines	Full Service	NO	Legacy
Joy Air	Regional/Commuter	NO	Legacy

Section 6.2: Capacity Analysis

The capacity of scheduled airline service in Domestic China has been growing at record rates over the past few decades, consistent with the projection that China will soon become the largest aviation market in the world. Figures 6.2.1, 6.2.2 and 6.2.3 provide a look at the evolution of domestic Chinese airline capacity over the past decade, showing the progression of ASMs, number of flights and number of seats respectively. The growth of airline capacity in China has also been consistent with the rapid growth of the country's economy which has fostered the need for increased air connectivity. Domestic Chinese ASMs have grown by 158% or 11.1% CAGR between 2009 and 2018, compared to much smaller growth in mature market regions such as domestic US at 2.9% CAGR and intra-Europe at 5.6% CAGR over the same time period. ASM capacity in the domestic Chinese region also crossed the 500 billion ASM mark in 2018, gradually approaching the ASM capacities of many mature markets around the world.

Compared to other emerging regions, while the growth in domestic Chinese capacity (11.1% CAGR) has been slightly slower than that in the domestic Indian market (12% CAGR), the domestic Chinese region heavily dominates in absolute size and is more than five times the size of the domestic Indian market in 2018. Contrary to several spurts of growth and decline in mature

markets such as domestic US, capacity in the Chinese market has grown every year in the analysis time period. Similar to the domestic Indian market, flight capacity in China has also grown substantially (by 8.7% CAGR, compared to 8.6% CAGR in India) over the past 10 years. As mentioned in the previous chapter, this is in contrast to flight capacity in mature markets which has remained relatively constant over the same time period (2.0% CAGR in intra-Europe and -0.5% CAGR in domestic US). However, like all other regions analyzed thus far, seat capacity is growing at a faster rate than flight capacity in the domestic Chinese market as well, illustrating a shift toward larger airplanes in this region too.

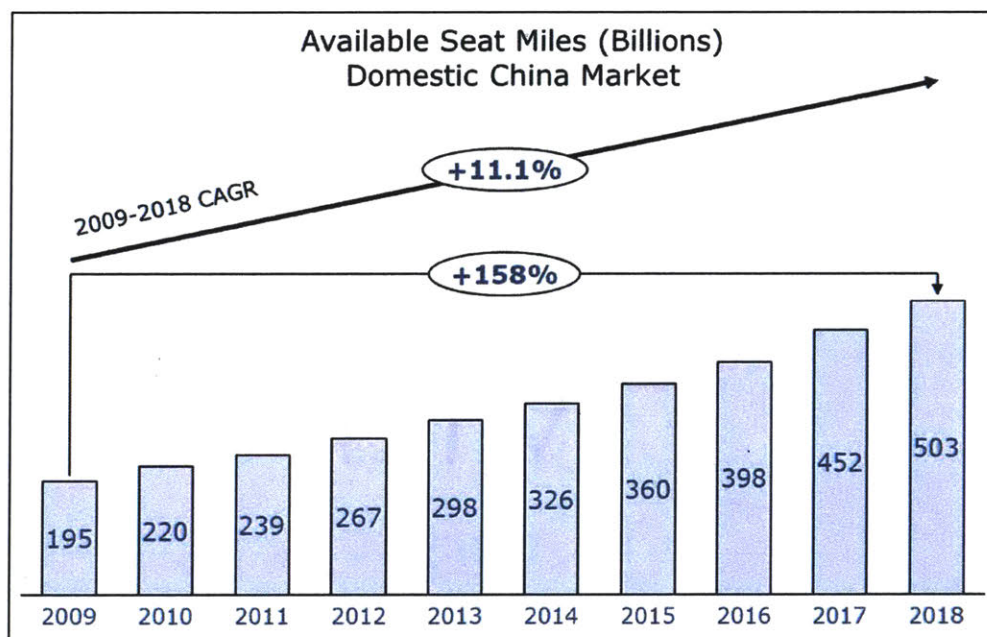


Figure 6.2.1 – Domestic China Available Seat Miles (2009-2018)

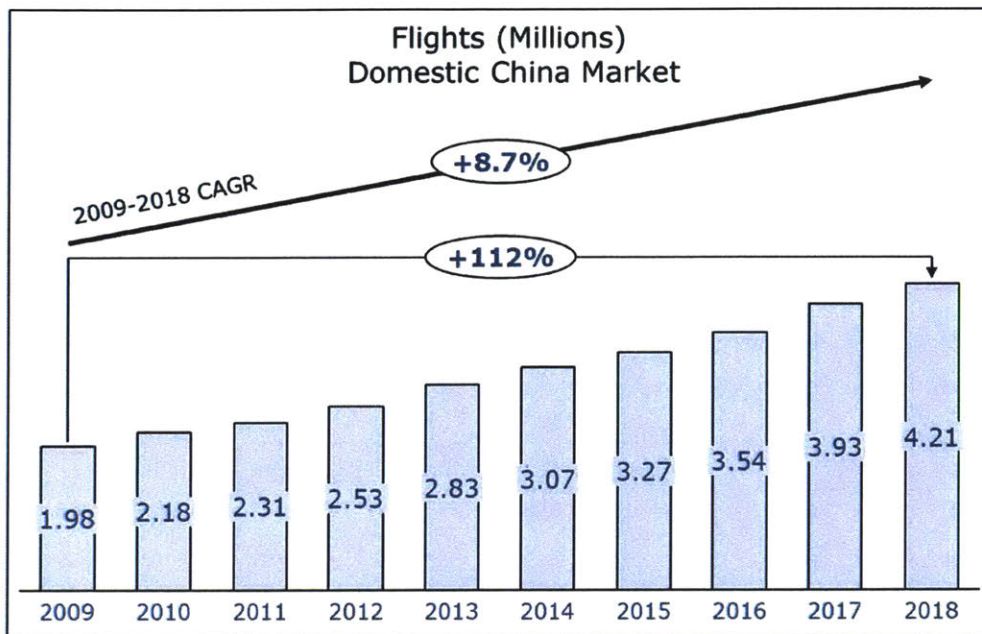


Figure 6.2.2 – Domestic China Flight Operations (2009-2018)

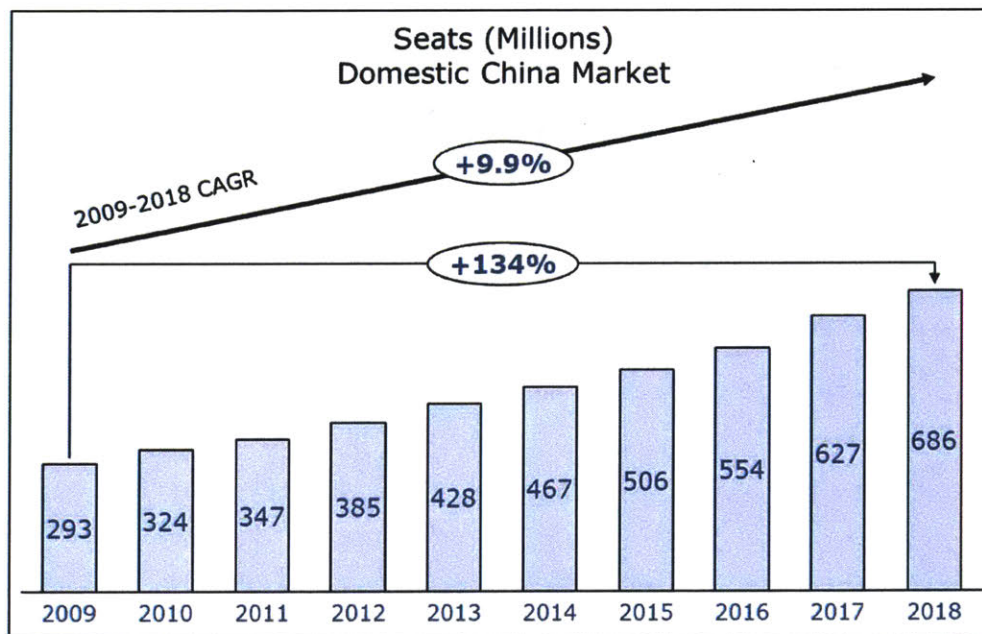


Figure 6.2.3 – Domestic China Seats (2009-2018)

Flights in this region have been almost entirely operated by narrow-body aircraft during this 10-year time period, with the remaining (very small) share of operations being served by wide-bodies, as shown in Figure 6.2.4. This is similar to what was observed in the domestic India market, but

at a much higher level – in 2018, narrow-bodies accounted for 83% of domestic India operations but 95% of domestic China operations. This trend of high narrow-body usage in emerging markets contrasts with mature markets such as domestic US and intra-Europe where while narrow-bodies operate most of the region’s capacity, other airplane types (particularly regional jets and turboprops) have sizeable operations.

In China, the wide-body share of total flight capacity is larger than other regions (4% in China versus 1% in domestic India, intra-Europe and domestic US for 2018) while turbo-prop and regional jet shares of total capacity are much smaller than other regions. Like the domestic India region, this trend of heavy narrow-body usage in China indicates that most operations in the domestic sector are point-to-point, primarily connecting two large population centers directly. This contrasts with several airline business models seen in developed markets where there are many flights connecting smaller cities and towns with larger ones (as part of the hub-and-spoke model), hence requiring smaller planes such as turbo-probs and regional jets to do so more efficiently.

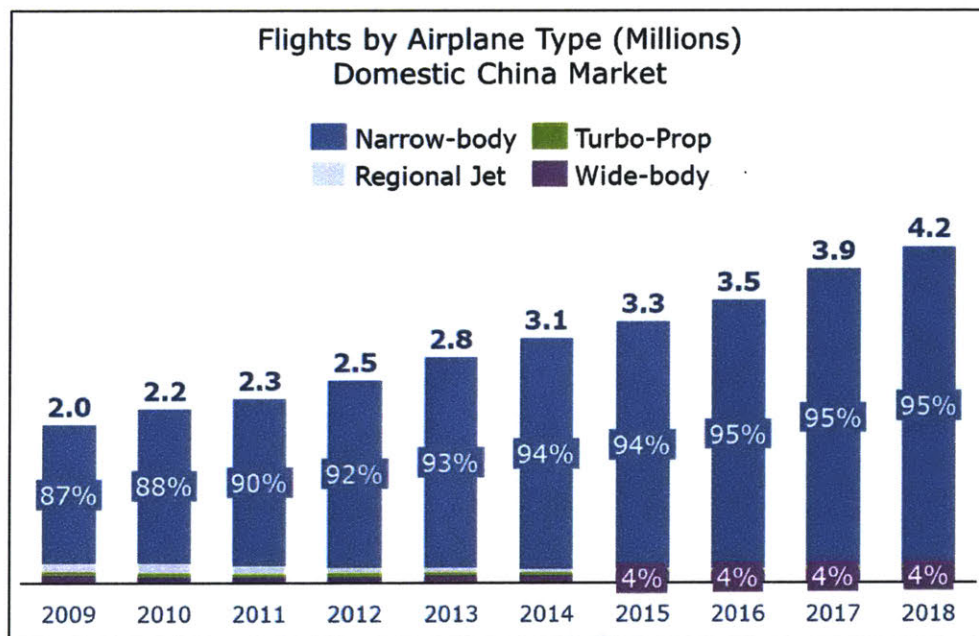


Figure 6.2.4 – Domestic China Flights by Airplane Type (2009-2018)

The split of domestic Chinese capacity by marketing carrier can be seen in Figure 6.2.5. During the analysis time period, China’s Big 3 (China Southern, China Eastern, and Air China) continue to dominate the market but at a much lesser extent in 2018 versus in 2009. Over the past 10 years,

while these airlines (among other prominent players) have all increased absolute capacities in the region, the larger players have seen declining shares due to the overall growing market and emergence (and faster growth) of smaller players such as Xiamen and Shandong. This trend of emerging smaller/newer players in the domestic Chinese market can also be seen in the growth of the ‘Other’ category (all airlines except top 10) in Figure 6.2.5 – the top 10 domestic airlines accounted for 94% of ASM capacity in 2009 but only 78% in 2018 (hence a much larger ‘Other’ category in 2018).

The domestic Chinese market became a lot more fragmented between 2009 and 2018, with the small and new players accounting for the majority of the region’s capacity growth. Compared to other regions, the Chinese market is more fragmented than the domestic US and India regions (where the top 10 airlines make up 4% and 12% of the region’s 2018 ASM capacity, respectively), but less fragmented to the intra-Europe region (where top 10 airlines only make up 56% of 2018 ASM capacity). This fragmented nature of the Chinese market is coincidental to the business models of many Chinese airlines, particularly low-cost airlines, which are usually partially funded by regional governments to primarily serve a particular region and foster air service growth in that area. As a result, several small airlines have emerged in China, each of which primarily only serve one region or province, thus leading to a more fragmented market.

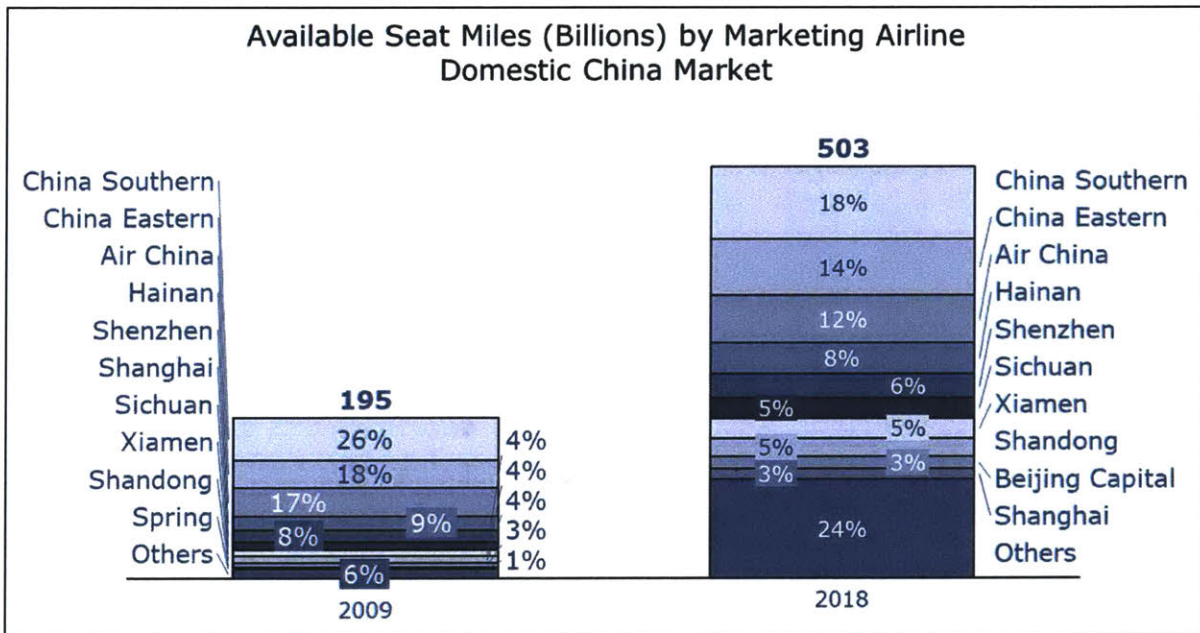


Figure 6.2.5 – Domestic China ASMs by Marketing Airline (2009-2018)

LCCs operating in the domestic Chinese region have substantially lower shares of ASM capacity compared to low-cost carriers in all other regions studied so far. Figure 6.2.6 illustrates the split of domestic Chinese ASM capacity by the airline types in the region, namely LCCs and legacy carriers. Chinese LCCs make up 12% of domestic ASM capacity in 2018, up from just 3% in 2009. However, the LCC share of 2018 ASM capacity in China is smaller than that in other markets (LCCs and ULCCs combined, where applicable) such as domestic US (39%), intra-Europe (50%) and domestic India (69%). Apart from the absolute shares, the increase in LCC share of capacity has also been much lower in China – while LCC share in China grew by 8 points (4% to 12%) between 2009 and 2018, the same growth was as high as 26 points in domestic India and 10 points in intra-Europe.

The low LCC capacity shares in China are representative of the state of LCCs in China – while several LCCs have emerged in the country, a lack of low-cost facilities coupled with several government restrictions as well as competition from high-speed rail operators (as mentioned in Section 6.1) have hampered LCC growth in the country. In addition, legacy players in China have also grown steadily over these past 10 years, directly competing with LCCs in several markets and implementing many low-cost measures (such as removing complimentary ancillaries for domestic flights) to maintain their market share.

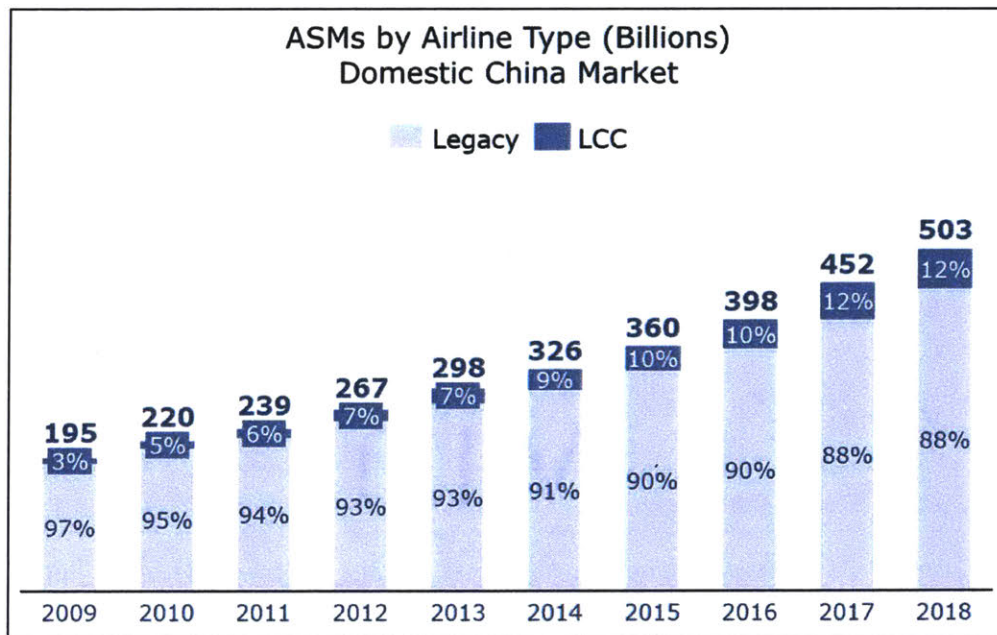


Figure 6.2.6 – Domestic China ASMs by Airline Type (2009-2018)

Figure 6.2.7 shows the differences in coverage levels of both legacy carriers and LCCs operating in China. An important observation is that LCCs serve a much higher share of total domestic Chinese city pairs than their share of the total domestic capacity (which is very low). For example, in 2018, while LCCs only make up 11% of total domestic ASM capacity in the region, they serve 29% of active city pairs in the same year. Having said that, compared to other regions, the smaller size of Chinese LCCs meant that they served a smaller portion of domestic city pairs - only 29% of 2018 city pairs. For 2018, low-cost carriers (both ULCCs and LCCs, where applicable) served 50% of domestic US city pairs, 58% of intra-Europe city pairs and 77% of domestic Indian city pairs.

This trend of Chinese LCCs serving smaller parts of the market compared to other regions can again be explained by the relatively low penetration of low-cost carriers in the Chinese domestic sector. Given that most Chinese LCCs are smaller (particularly in terms of fleet size) than global counterparts, they can only focus on specific high demand routes, instead of also serving low and medium demand routes like Chinese legacies and LCCs in other regions do. This leads to a lower LCC coverage levels in China, compared to LCCs in different mature and developing regions.

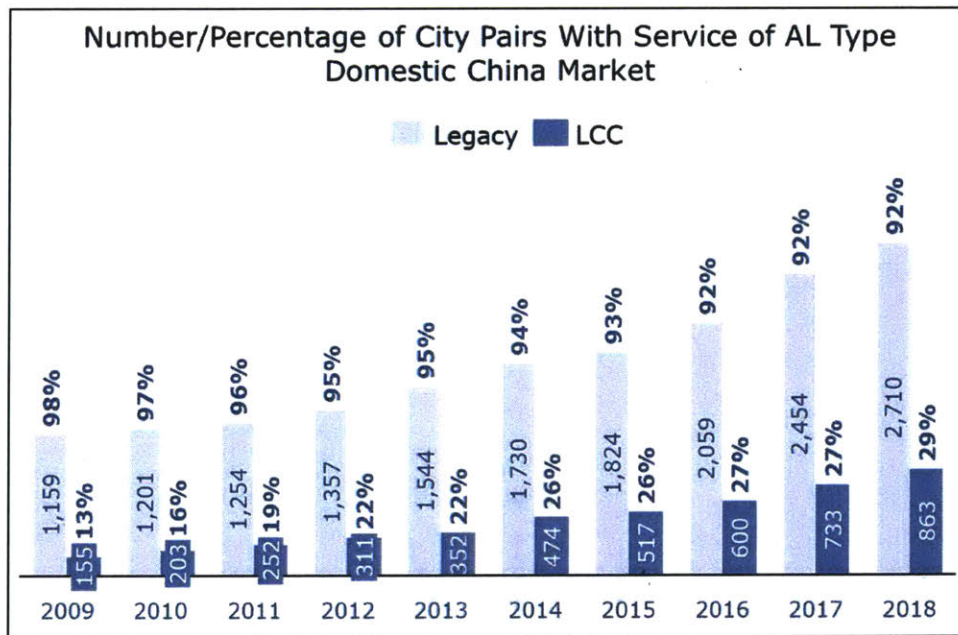


Figure 6.2.7 – Domestic China City Pairs by Coverage of Airline Type (2009-2018)

While Chinese LCCs serve a much larger portion of domestic city pairs compared to their size in terms of total region capacity, most of the city pairs served by Chinese LCCs are also served by legacy carriers. Figure 6.2.8 also shows coverage levels by carrier type in the domestic Chinese region but split by the number of city pairs served by either legacy carriers only, LCCs only or both. As illustrated, while the majority of city pairs are serviced by legacy carriers alone, very few city pairs have LCC only service. Thus, Chinese LCCs compete with legacy counterparts in most of the markets they enter.

Over the past 10 years, there has also been a reduction in the share of total city pairs served by legacies only, from 87% of total city pairs in 2009 to 71% in 2018. This reduction is complemented by a growth in the share of city pairs served by both types of carriers, from 12% in 2009 to 21% in 2018. Furthermore, while remaining the smallest service type, the share of city pairs served by LCCs only has also grown in the past 10 years, from only 1% of domestic city pairs being served by LCCs only in 2009 to 8% of city pairs in 2018. As LCCs further penetrate the Chinese domestic sector, they are primarily growing into markets that are already served by legacy carriers, but in some cases also expanding into brand new markets that were previously unserved by any carrier.

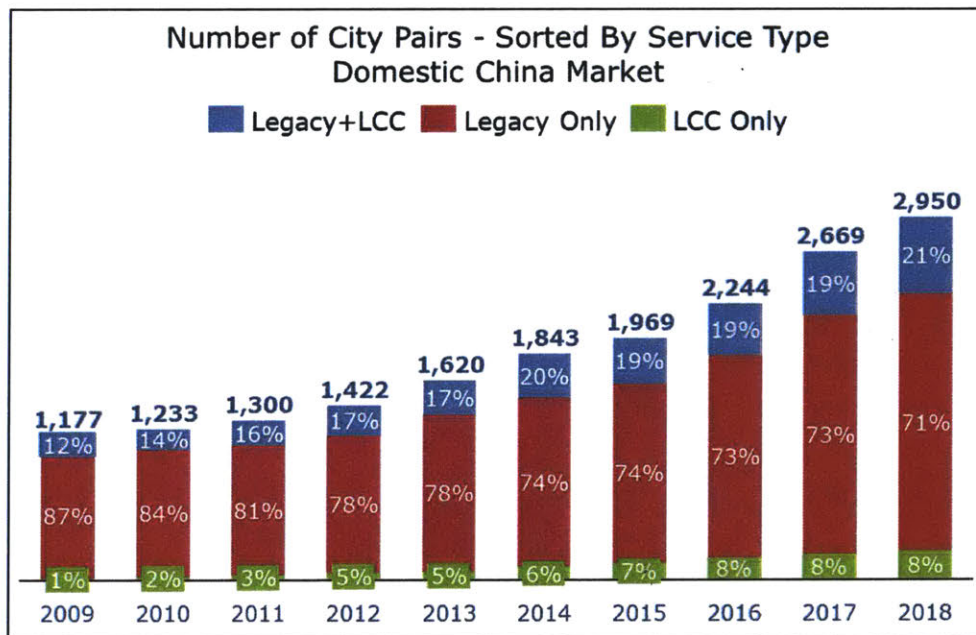


Figure 6.2.8 – Domestic China City Pairs by Service Type (2009-2018)

To summarize, while capacity in the domestic China region has grown rapidly over the past 10 years, low-cost carriers still make up only a small portion of total capacity. Chinese domestic ASM capacity has grown by as much as 5.6% CAGR from 2009 to 2018, but LCCs only make up 12% of this capacity in 2018, compared to 4% in 2009. LCC penetration in China is much lower than all other regions analyzed – LCCs in 2018 make up as much as 39% in the domestic US region, 50% in the intra-Europe region and as high as 69% in the domestic Indian region, but only 12% in domestic China as previously mentioned. Similar trends can be seen on the demand side - analyzing 2016's market share by passenger traffic in China, low-cost airlines only carried 9% of total passengers versus an average of 56% in ASEAN countries, 40% in western Europe and 32% in domestic US (Chen, 2016). Several reasons explain the relatively smaller presence of LCCs in China, including the lack of enough low-cost airport facilities, certain government regulations as well as heavy competition from high-speed rail operators along with legacy carriers.

Chapter 7: Transatlantic Market Region

The transatlantic region is among the first long-haul sectors to have scheduled low-cost carrier service. The past decade has seen a substantial amount of new low-cost carrier capacity on transatlantic routes, particularly with the rapid expansion of Norwegian. However, the transatlantic region, along with many other long-haul sectors around the globe, is still heavily dominated by legacy carriers. This is in contrast to many other regions studied in this thesis, which are all short-haul and have had significant market shifts with the emergence/growth of low-cost carriers. According to OAG (2019), 80% of low-cost carrier flights around the world are below 1,000 nautical miles in distance, indicating that low-cost carriers are most present in domestic or regional sectors.

Like other long-haul regions, low-cost carriers operating on transatlantic routes face many challenges, such as more expensive widebody aircraft, lower aircraft utilization, higher airport costs and lack of premium passenger revenue (to offset higher operating costs), which are not seen in short-haul regions. As a result, the past few years have seen low-cost carriers operating in the sector face financial challenges, with several of them, such as WOW and Air Berlin, collapsing. This chapter explores the growth of low-cost carriers in the transatlantic region over the past decade, as a comparison between low-cost carrier evolution in long-haul regions compared to other short-haul regions covered in this thesis.

Section 7.1: Background and Literature Review

The first emergence of low-cost airlines operating in the transatlantic sector dates back to 1948 when Loftleidir (which later became Icelandair) launched flights between Reykjavik and New York, becoming the first low-cost carrier to operate in a long-haul market. While Loftleidir originally also operated on domestic routes within Iceland, the airline made the decision to solely focus on the transatlantic sector starting in 1952, citing competitive pressures and regulatory effects. Given their location, Loftleidir adopted the one-stop transatlantic flight model, offering service from New York to multiple destinations in Europe such as Hamburg or Luxembourg, with a stop in Reykjavik along the way (Loftleidir Icelandic, n.d.).

A few decades later, another player emerged in the low-cost long-haul business. Laker Airways, in 1977, launched Skytrain service between New York JFK and London Gatwick (Routier, 2019).

Their Skytrain model enabled passengers to travel without a prior booked ticket and take the first available flight for roughly half the cost of competitor fares. Following this, the airline made multiple modifications to its fare structure over the next few years, firstly introducing unrestricted fares in 1979 to allow them to offer bookable seats and then in 1980 introducing Super Economy bookable fares that were half of competitor standard economy fares (Flight Global, 1980). The airline continued expanding over the next few years, with multiple daily services on many transatlantic routes, to eventually become the fifth largest player by capacity in the transatlantic regions (Annoh, 2006). However, the airline faced financial problems during the 1980s recession due to large debts, caused by the inability to fill its flights during the off-season. In addition, the airline faced heavy competition when competitors reduced fares on the routes where Laker operated the Skytrain service (Braswell, 2017). The airline succumbed to the financial pressure, going bankrupt and ceased operations in early 1982 (Braswell, 2017).

A few more low-cost airlines entered the transatlantic market over the next few decades. Air Berlin started weekly scheduled service between Berlin and Orlando in the early 1980s when it still operated as a charter airline, but the airline eventually started operating regular scheduled service in the transatlantic region few years later (Air Berlin, n.d.). In mid-1983, People Express Airlines (which was originally a domestic US low-cost carrier) started service on the Newark-London route with fares as low as \$149 each way. Like many other low-cost carriers, People Express also offered a no-frill experience on all their routes, charging passengers for many additional services such as meals onboard or checked baggage. However, People Express also faced financial challenges and the airline was eventually taken over, with both their domestic and international operations merged with Continental Airlines (Airways, 2017).

In Canada, Zoom Airlines was launched in May 2002 as a transatlantic low-cost carrier; the airline was originally started as a charter airline but later also introducing scheduled service in 2003 after a successful first winter. As part of the transition, the airline acquired wide-body aircraft in addition to serving more destinations both in Europe and Canada (Zoom Airlines, 2003). In 2006, the founders of the airline also launched Zoom Airlines UK, a sister company based out of London Gatwick, to primarily enter the UK-USA air travel market (Zoom Airlines, n.d.). Zoom also faced financial challenges and ceased operations in 2008, mainly citing the high fuel price and economic slowdown in both continents as reasons for going out of business (BBC, 2008).

In the recent past, several new low-cost carriers operating in the region have emerged and grown rapidly. The largest new LCC has been Norwegian, which launched their transatlantic operations in 2013 with scheduled service between Stockholm and New York; this route was originally operated by a wet-leased Airbus A340 but eventually replaced by Boeing 787s delivered in late 2013 (NTB, 2013). Their biggest foray into the region was the launch of three new routes from London Gatwick to New York, Fort Lauderdale and Los Angeles, becoming part of one of the largest travel markets (UK-USA) in the transatlantic sector. The airline has continued growing rapidly ever since, adding destinations both in Europe as well as in the Americas. In late 2017, Norwegian started facing heavy losses and ate into its cash reserve as a result of the rapid expansion in the previous years. Given these losses, the airline made plans to return to profitability in 2018 while continue their growth, with plans to increase capacity at ~40% during the year (Dagenborg, 2018). This plan did not eliminate their losses but reduced them by ~19% (while revenue also grew); the losses in 2018 were attributed to heavy competition and high jet fuel prices, in addition to engine issues on their 787 aircraft. In an effort to reduce losses further, the airline plans to continue decreasing growth and investment while focusing on returning to profitability by making operations more efficient (Davies, 2019).

Apart from Norwegian, several other LCCs also grew rapidly in the transatlantic region, but many of them have gone bankrupt and ceased operations recently. Icelandic carrier WOW Air introduced service to Boston and Baltimore from Iceland in mid-2015, and to several Canadian destinations just a few months later; the service additions were attributed to the strong OD demand to Icelandic destinations, in addition to the various connections available across Europe to meet relevant demand (Muztabagh, 2015). Primera Air, another European low-cost carrier offering charter and scheduled service, started operating several transatlantic routes in mid-2018, serving several points in Europe and the US with A321neos, further intensifying low-cost competition in the region (Liu, 2017). However, both these airlines shut down operations over the past few months. Primera filed bankruptcy in October 2018, citing that they ran out of cash due to issues such as aircraft maintenance problems, late deliveries of ordered airplanes, higher fuel prices in addition to lower yield in the market (Primera, 2018). WOW went bankrupt in March 2019 after a failed attempt to raise money from investors or merge with Icelandair; leading up to the bankruptcy, the airline claimed that they deviated from the traditional low-cost model which led to their financial

situation, with the airline operating multiple fleet types and introducing premium products which all increased costs significantly (Zhang, 2019).

A common theme among low-cost carriers in this region is that many of them go bankrupt after a few years of operation. Francis et. al (2007) lists several reasons affecting low-cost carrier profitability in long-haul sectors, and these low profitability/loss-making characteristics can be attributed to the financial situation of these airlines. Firstly, LCCs cannot gain the higher (compared to legacy carriers) utilization advantage that is possible in short-haul sectors. With flights between 7-10 hours in the transatlantic region, many overnight, time-zone constraints and maintenance requirements make it impossible to increase utilization significantly. With demand being more geographically dispersed for long-haul markets, many LCCs have to adopt characteristics of the hub-and-spoke model to fill up airplanes (instead of flying point-to-point) – further leading to lower aircraft utilization and higher costs.

It is also difficult for LCCs to eliminate frills altogether in long-haul sectors since many (catering, baggage, etc.) are somewhat a necessity for passengers on longer flights, even if it means that passengers are charged for these services – in any case, LCCs must invest more in the infrastructure and handling for these services, leading to much higher costs. Airport costs are also much higher for LCCs in the long-haul sectors since many secondary airports are too remote for demand or just do not have the infrastructure to support long-haul/international flights. On the revenue side, legacy carriers can offer competitive fares on long-haul sectors in general, due to a lower seat-mile cost compared to short-haul markets – this makes it harder for low-cost carriers to gain a strong foothold. In addition, the lack of a premium cabin means that LCCs cannot attract high-margin consumers to offset the higher costs of operation, especially since there is a larger demand for a premium product on long-haul flights compared to short-haul ones.

Like the previous regions studied, ICAO and CAPA classifications of airlines were used in the categorization process of transatlantic carriers. Airlines operating in this region were classified as either legacy carriers or low-cost carriers – given the relatively recent emergence of low-cost carriers operating in the region in addition to the complexities of operating low-cost in the long-haul sector, a ULCC category has not yet emerged in this region. A total of 48 airlines were classified during this process, making up ~99% of total 2009-2018 seat capacity; the remaining 62 airlines were classified as legacy carriers by default, given their small size and minor prominence.

Table 7.1.1 shows the ICAO, CAPA and final classifications made for the 48 airlines in consideration. As mentioned in the intra-Europe chapter, while CAPA and ICAO do not classify Air Berlin as a low-cost carrier, the final classification for the airline in this thesis is as an LCC, given that the carrier has a lot of characteristics common with LCCs. Next, Condor and TUI were classified as charter airlines by CAPA, but as LCCs by ICAO. However, given that their business model of serving leisure destinations as budget carriers with a no-frills experience, they were classified as LCCs for this thesis. Finally, on a similar note, Corsair and Thomas Cook were classified as charter airlines by CAPA, but not as LCCs by ICAO. While these airlines also serve leisure destinations, they both offer many complimentary ancillaries as well as a premium class offering – hence they were classified in the legacy category for the purposes of this thesis. These two airlines only make up 0.78% of the total 2009-2018 seat capacity, hence their classification does not affect the aggregate trends/results for this analysis significantly.

Table 7.1.1 – Classification of Top 48 Transatlantic Airlines By 2009-2018 Seat Capacity

Marketing Airline	CAPA Classification	ICAO LCC Classification?	Final Classification
Aer Lingus	Full Service	NO	Legacy
Aeroflot	Full Service	NO	Legacy
Aeromexico	Full Service	NO	Legacy
Air Canada	Full Service	NO	Legacy
Air Europa	Full Service	NO	Legacy
Air France	Full Service	NO	Legacy
Air Greenland	Regional/Commuter	NO	Legacy
Air India Limited	Full Service	NO	Legacy
Air New Zealand	Full Service	NO	Legacy
Air Tahiti Nui	Full Service	NO	Legacy
Air Transat	Full Service	NO	Legacy
airberlin	Full Service	NO	LCC
Alitalia	Full Service	NO	Legacy
American Airlines	Full Service	NO	Legacy
Austrian	Full Service	NO	Legacy
British Airways	Full Service	NO	Legacy
Brussels Airlines	Full Service	NO	Legacy
Transaero	Full Service	NO	Legacy
Condor Flugdienst	Charter	YES	LCC
Continental	Full Service	NO	Legacy
CORSAIR	Charter	NO	Legacy
Delta Air Lines	Full Service	NO	Legacy

Emirates	Full Service	NO	Legacy
Eurowings	LCC	YES	LCC
Finnair	Full Service	NO	Legacy
Iberia	Full Service	NO	Legacy
Icelandair	Full Service	NO	Legacy
Jet Airways	Full Service	NO	Legacy
KLM	Full Service	NO	Legacy
LOT Polish Airlines	Full Service	NO	Legacy
Lufthansa	Full Service	NO	Legacy
Northwest Airlines	Full Service	NO	Legacy
Norwegian	LCC	YES	LCC
US Airways	Full Service	NO	Legacy
SATA (Azores)	Full Service	NO	Legacy
SAS	Full Service	NO	Legacy
Singapore Airlines	Full Service	NO	Legacy
Swiss	Full Service	NO	Legacy
TAP Portugal	Full Service	NO	Legacy
Thomas Cook Airlines	Charter	NO	Legacy
TUI	Charter	YES	LCC
Turkish Airlines	Full Service	NO	Legacy
Ukraine International	Full Service	NO	Legacy
United Airlines	Full Service	NO	Legacy
Virgin Atlantic	Full Service	NO	Legacy
WestJet	LCC	YES	LCC
WOW Air	LCC	YES	LCC
XL Airways France	Full Service	NO	Legacy

Section 7.2: Capacity Analysis

Figures 7.2.1, 7.2.2 and 7.2.3 illustrate the evolution of transatlantic capacity (ASMs, flights, and seats respectively) over the 10-year analysis period. Total ASM capacity in this market region has grown by ~50% over the past 10 years; capacity has grown year-on-year across this time period except for a minor decline between 2011 and 2012. This steady growth in the transatlantic sector has been not only by more flights but also by larger aircraft on average, as depicted by the faster growth of seats than flights in the market. Having said that, the growth in capacity (ASMs) has been much slower in this market region compared to other market regions studied in this thesis. The transatlantic market region only saw a 4.5% CAGR, compared to 5.6% in intra-Europe, 12.0% in domestic India and 11.1% in domestic China.

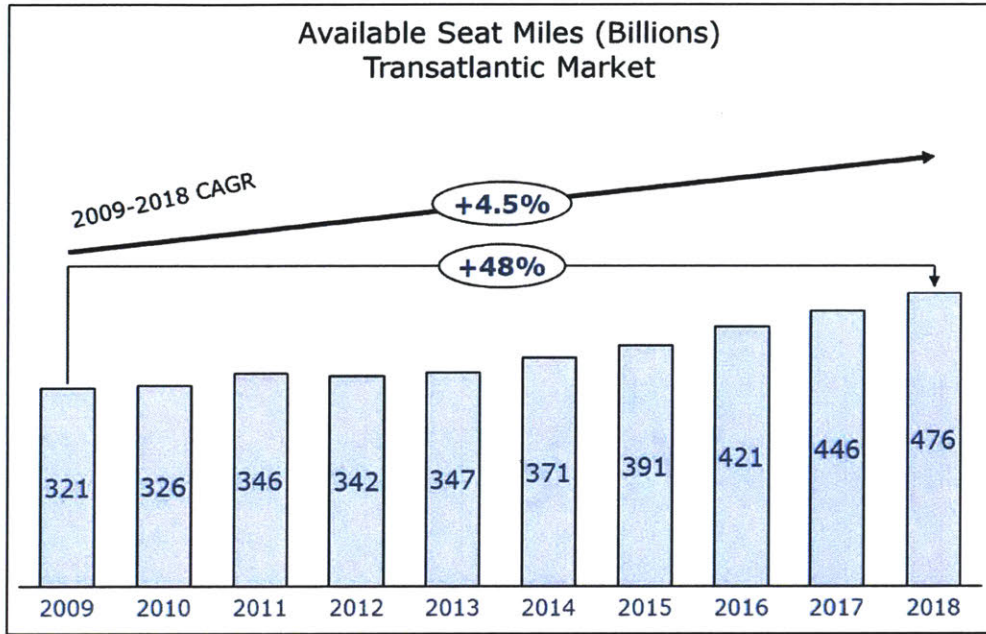


Figure 7.2.1 – Transatlantic Available Seat Miles (2009-2018)

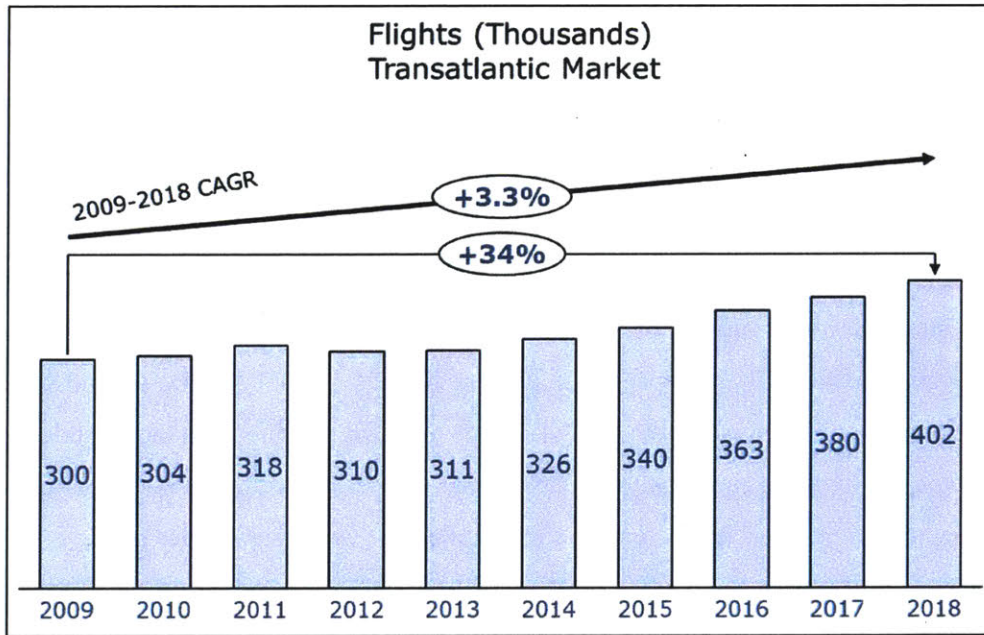


Figure 7.2.2 – Transatlantic Flight Operations (2009-2018)

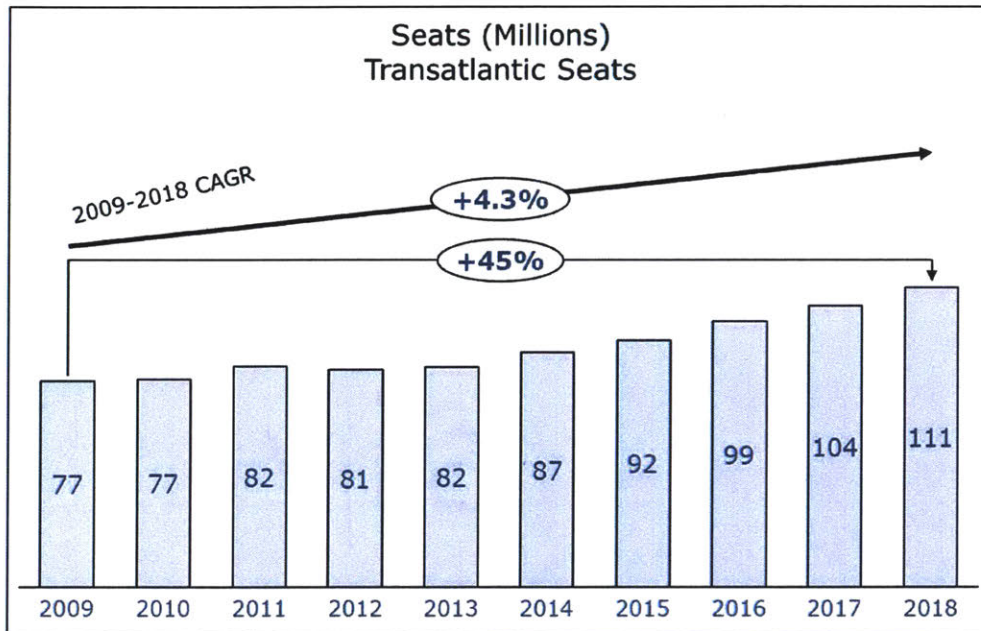


Figure 7.2.3 – Transatlantic Seats (2009-2018)

The split of Transatlantic capacity by marketing carrier is shown in Figure 7.2.4. During the decade, the large legacy carriers continue to dominate transatlantic capacity, further made possible by the various joint-ventures in the region and airline consolidation. While all carriers in 2009’s Top 10 have remained the list in 2018 (Continental merged with United), there is a new entrant in the list for 2018, namely low-cost carrier Norwegian. As previously mentioned, Norwegian’s rapid expansion has led to the airline becoming the 8th largest carrier in the region making up 5% of the capacity, surpassing the capacity of Virgin Atlantic and KLM in 2018. Furthermore, the top 10 airlines accounted for 70% of capacity in 2009 as well as in 2018. While several new players emerged in the circuit, many of them being LCCs to meet the growing demand of budget travelers in the sector, the legacy airlines (who all have joint ventures and codeshares in this market) were able to maintain their capacity shares. As such, while the overall market has grown significantly, much of the growth has come from existing players who have increased their capacity quite significantly.

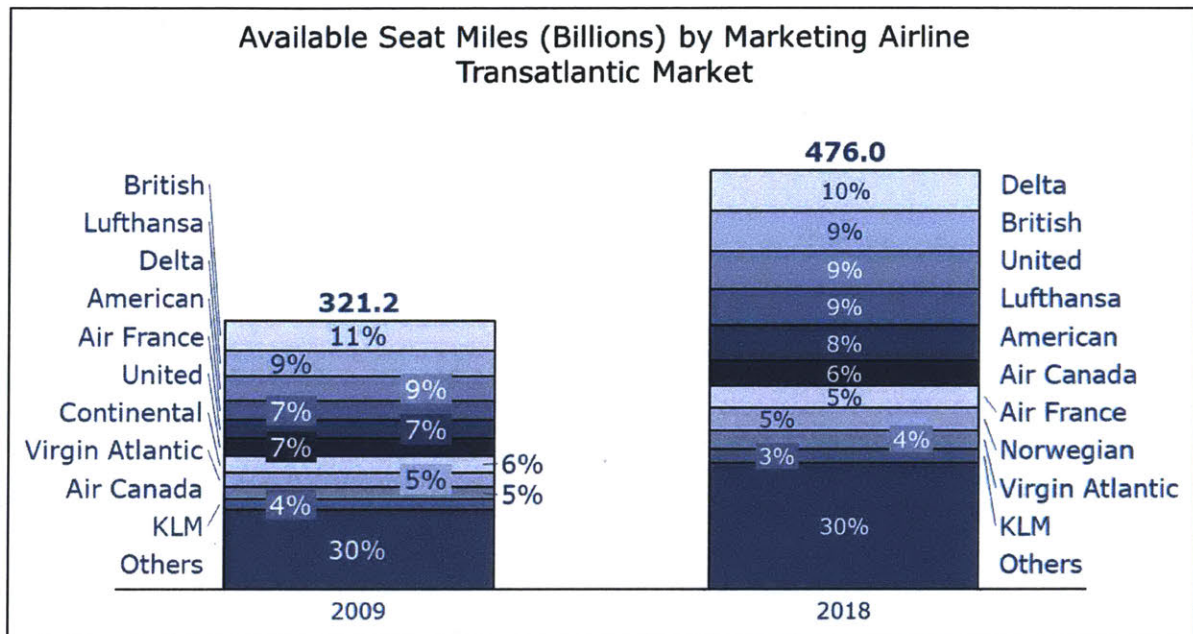


Figure 7.2.4 – Transatlantic ASMs by Marketing Airline (2009-2018)

While many low-cost carriers have emerged in the recent past and grown rapidly, LCCs still make up a very small portion of transatlantic capacity on the overall scale. As seen in Figure 7.2.5, LCC share of transatlantic capacity has grown from just 2% in 2009 to 9% in 2018; legacy carriers still heavily dominate the market. As mentioned previously in this chapter, LCCs face several difficulties operating in the long-haul sector that are not encountered in short-haul markets. As a result, LCCs have not grown as rapidly or become as dominant in this region versus the other regions studied in this thesis. The growth in the LCC share of capacity is much slower in the transatlantic region, compared to other mature regions such as domestic US or intra-Europe. From 2009 to 2018, low-cost carrier (LCC+ULCC, where applicable) share of capacity grew from 31% to 40% in domestic US, 40% to 49% in Europe, 3% to 12% in China and as high as 43% to 69% - but only from 2% to 9% in the transatlantic region.

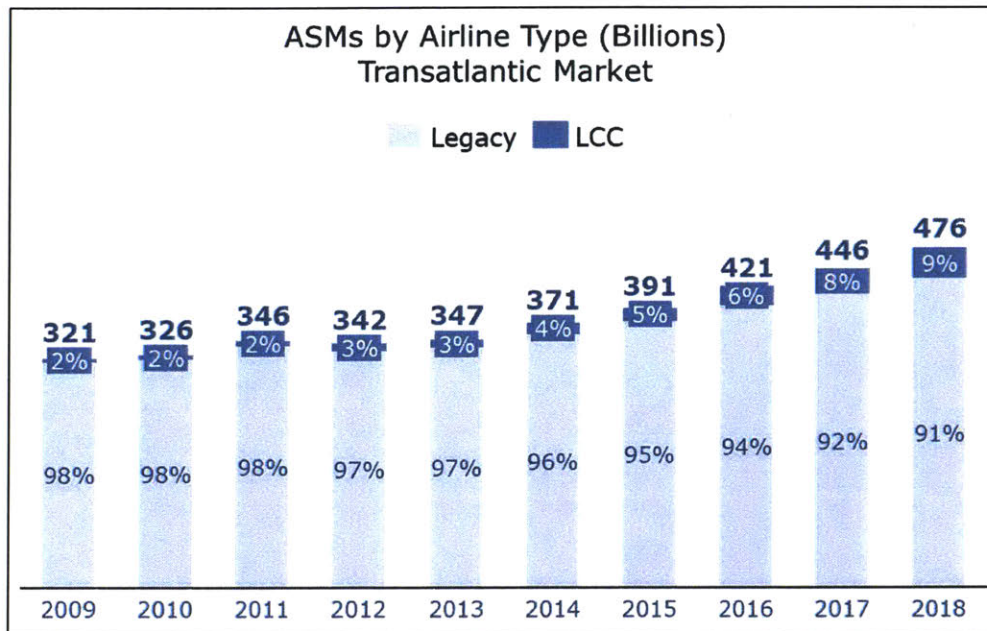


Figure 7.2.5 – Transatlantic ASMs by Airline Type (2009-2018)

Figures 7.2.6 and 7.2.7 show the split of transatlantic flight operations by airplane type for both legacy and low-cost carriers. Given that this region is long-haul, legacy carrier operations are heavily dominated by widebody aircraft, making up 92% of the flight capacity in 2018. Narrow-body aircraft have been making up smaller proportions of legacy carrier operations across the 10-year period, from 11% in 2009 to 8% in 2018. This trend would be consistent with the business models of legacy carriers, which operate between large hubs leading to more passengers, have premium classes and more amenities on board, hence requiring widebodies for their long-haul operation. On the LCC side, while widebodies still make up the dominant share of flight operations, the use of narrow-body aircraft is on the rise substantially. Narrow-body aircraft operated no LCC transatlantic operation until 2014 but are used 40% of the flight capacity in 2018. Again, this is consistent with the business models of low-cost carriers. Given that most LCCs fly point-to-point and do not operate any hubs, the demand (and thus seats required) on their flights is significantly lower than transatlantic flights for legacy carriers; furthermore, narrow-body aircraft are much cheaper to obtain, resulting in a growing number of LCCs using narrow-body aircraft on transatlantic routes.

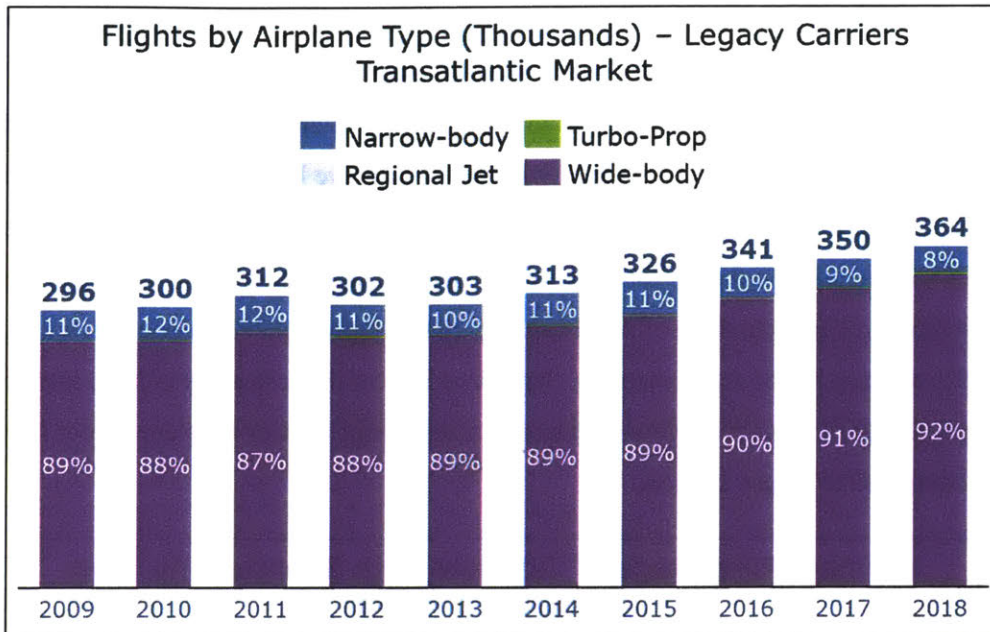


Figure 7.2.6 – Transatlantic Legacy Carrier Flights by Airplane Type (2009-2018)

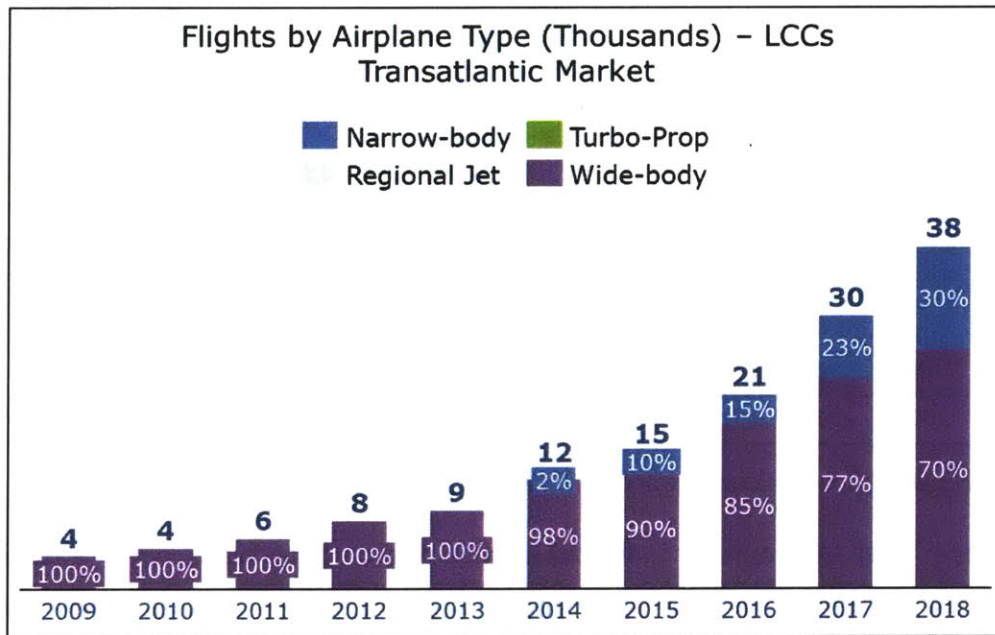


Figure 7.2.7 – Transatlantic LCC Flights by Airplane Type (2009-2018)

Finally, Figure 7.2.8 shows the differences in city pair coverage levels of both legacy carriers and LCCs operating in the region. With their growth over the analysis time period, LCCs have significantly increased the proportion of city pairs they serve; low-cost carriers served just 10% of

city pairs in 2009 but a third (31%) of city pairs in 2018. On the other hand, legacy carriers are served a lower percentage of city pairs across the 10-year period; legacy carriers served 94% of transatlantic city pairs in 2009 but this was lowered to 82% in 2018. One reason for this decrease in city pair coverage could be new competition by LCCs, where legacy carriers either do not enter into or are forced to leave city pairs in which transatlantic LCCs operate. Similar to the China region, LCCs operating in the transatlantic region serve a higher percentage of total transatlantic city pairs compared to their share of ASM capacity in the region. In 2018 alone, while LCCs make up only 9% of transatlantic ASM capacity, they serve 31% of the active city pairs in that year. This would indicate that low-cost carriers in this region serve much lower frequencies per city pair on average compared to legacy carriers.

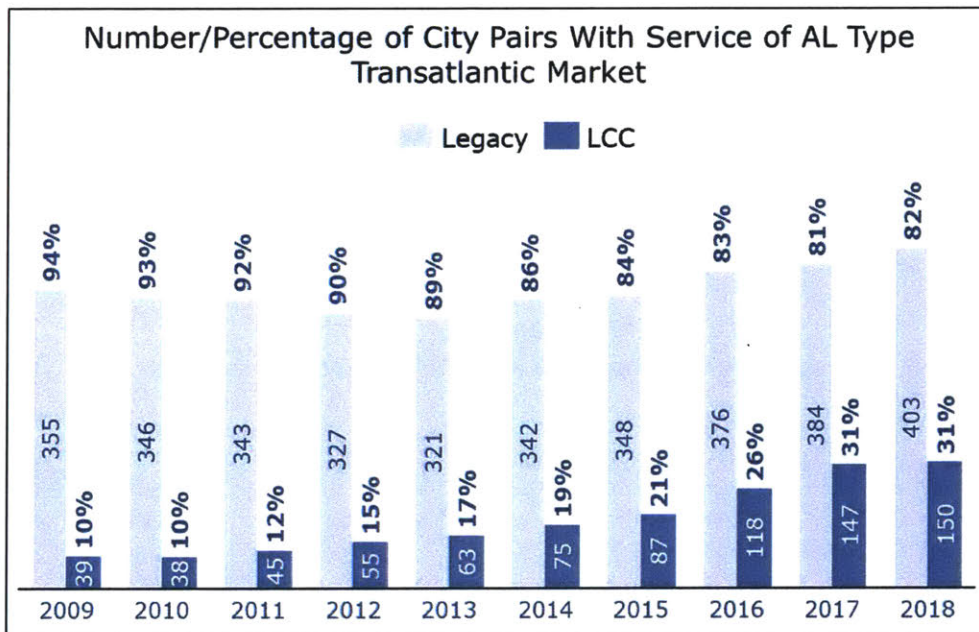


Figure 7.2.8 – Transatlantic City Pairs by Coverage of Airline Type (2009-2018)

In summary, total ASM capacity in the transatlantic market region has grown by a factor of 1.5 over the last 10 years, primarily by larger airplanes on average. Low-cost carriers have made up a growing but still non-dominant share of the capacity, accounting for 2% of 2009 capacity compared to 9% in 2018. The increase of the LCC share of ASM capacity in the transatlantic region across the 10-year period is much smaller than that in other regions, both mature and emerging, where LCCs make up as much as 50% and 69% of the capacity respectively. As such, it can be said that the success seen by LCCs in short-haul markets has not been replicated in long-

haul sectors such as the transatlantic region. Several reasons contribute to this, mainly driven by the low-cost advantages not being as prominent in long-haul markets; LCCs have only a 20% cost advantage on average for long-haul markets, compared to 50% on short-haul sectors (Frank et. al, 2007). These factors have caused multiple LCCs operating in the region to cease operations from running out of cash, hence further lowering/slowing growth of LCC capacity share in the region in the years to come.

Chapter 8: Conclusion

Section 8.1: Summary of Analysis and Findings

This thesis studied the evolution of air service capacity in several market regions across the globe, specifically focusing on the growth of low-cost carriers and how they have changed market dynamics in the past decade. The analysis was conducted on six different regions, namely domestic US, intra-Europe, domestic Australia, domestic India, domestic China and transatlantic – this selection of market regions allowed us to compare trends in mature versus emerging air travel markets in relation to low-cost carriers as well compare low-cost carrier evolution in long and short-haul markets.

Figure 8.1.1 shows the growth of aggregate ASM capacity in each region between 2009 and 2018, while Figure 8.1.2 shows the 2009-2018 compounded annual growth rate (CAGR) for each region's ASM capacity. Comparing all six regions studied, the two regions where low-cost carriers are most mature (domestic US and intra-Europe) are also the largest markets in terms of aggregate ASM capacity. The domestic US region saw a small gain of only 2.9% CAGR over the decade, particularly because the region went through a long phase of capacity discipline in the early 2010s. As such, most of the 2.9% CAGR in this region comes from the growth in the latter part of the analysis time period during which the region went through a capacity regeneration phase. The domestic Australia region also sees a relatively low CAGR of 2.8% over the analysis time period – most of the capacity growth in this region occurred in the early 2010s, with the capacity remaining almost stagnant 2014 onwards. This would indicate that the region has reached a level of saturation, relative to demand for air travel. As expected, ASM capacity in the emerging regions of domestic India and China is expanding the fastest, growing at 12% and 11.1% CAGR respectively. While they are both growing at similar rates, the domestic China region dominates the Indian market in overall capacity size.

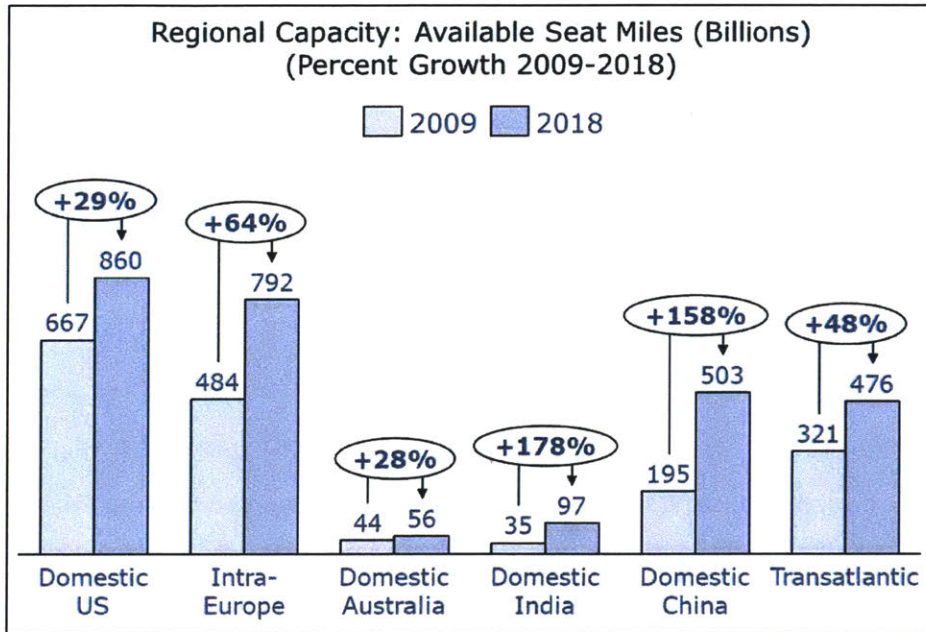


Figure 8.1.1 – Regional Available Seat Miles Evolution (2009/2018)

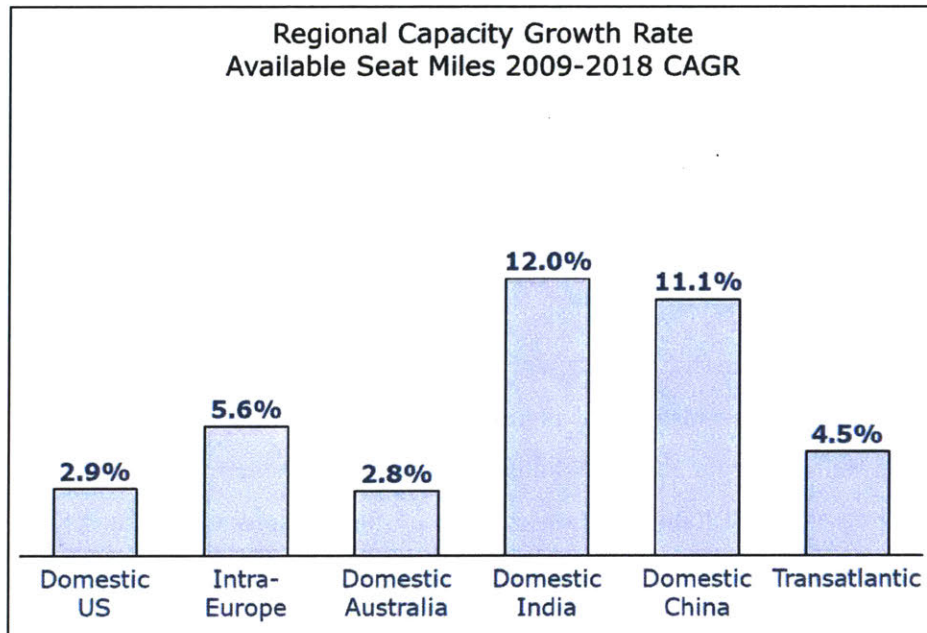


Figure 8.1.2 – Regional Available Seat Miles CAGR (2009/2018)

Figure 8.1.3 illustrates the evolution of low-cost carrier capacity share across these six regions, with the shares of hybrid/LCCs and ULCCs combined where relevant (i.e. domestic US and intra-Europe, where the third ULCC category exists). In addition, Figure 8.1.4 provides a deeper look

into the low-cost carrier capacity share in domestic US and intra-Europe, showing the split between the hybrid/tradition LCCs and the newly emerged ULCCs. While the domestic US and intra-Europe regions are mature in terms of low-cost carrier presence/development, they both see a significant gain in low-cost carrier capacity share across the 10-year period. Most of this growth comes from the rapid emergence of ULCCs (the gain in ULCC capacity share is larger than hybrid/LCC capacity share), such as Spirit and Ryanair, in both regions. This is particularly the case in Europe where Ryanair increased its capacity share by 4% (from 10% in 2009 to 14% in 2018) while remaining the largest airline in the region by ASM capacity.

The domestic Australia region also saw a substantial loss in low-cost carrier share, and this can primarily be attributed to the transition of Virgin Australia from an LCC to a full-service carrier in 2011. Between 2011 and 2012 alone (i.e. transition point), low-cost carrier capacity share in this region went from 52% in 2011 to just 24% in 2012. Following the transition, a new LCC, Tigerair Australia, entered the market and grew significantly; this coupled with the growth of Jetstar led to the gain of low-cost carrier capacity share from 24% to 28%.

Comparing India and China, while both are emerging markets in terms of low-cost carriers, India has a significantly higher low-cost carrier capacity share compared to China, in addition to a higher LCC share gain from 2009 to 2018. While low-cost carriers entered each region at a similar timeframe, several region-specific factors contribute to the difference in LCC capacity shares. First off, certain government regulations do not allow Chinese LCCs to compete as effectively as global counterparts. For example, many Chinese LCCs cannot use aircraft as efficiently in terms of utilization since flight times for same distances are longer in China due to airspace closures for the military. In addition, the availability of alternate transportation modes also plays a significant role – China has a well-defined high-speed rail network and infrastructure, especially between second and third tier cities, while India does not. As a result, Indian consumers often choose to use air travel instead of the much slower rail options, thus the greater demand plays a part in the role of growing LCCs in the country. Another important factor relates to the business model of Chinese LCCs, which appear to be more fragmented and regionally focused, compared to the ones in India. Since many Chinese LCCs are owned by state/province governments, they primarily only focus on air connectivity within a specific area of the country, thus hampering the growth of the overall LCC sector.

Finally, low-cost carriers in the transatlantic region only grew capacity share by a modest 7 points across the 10-year period. As mentioned in Chapter 7, this can primarily be attributed to the difficulties of adopting the LCC business model in a long-haul market compared to a short-haul one. Few examples include more expensive aircraft, lower aircraft utilization as well as higher airport costs (since secondary airports are either too remote for demand or don't have necessary long-haul infrastructure such as immigration or a long runway). Furthermore, given bankruptcies and shutdowns of several LCCs operating transatlantic routes in 2019, low-cost carrier capacity growth in this region may further slow-down in the next few years to come.

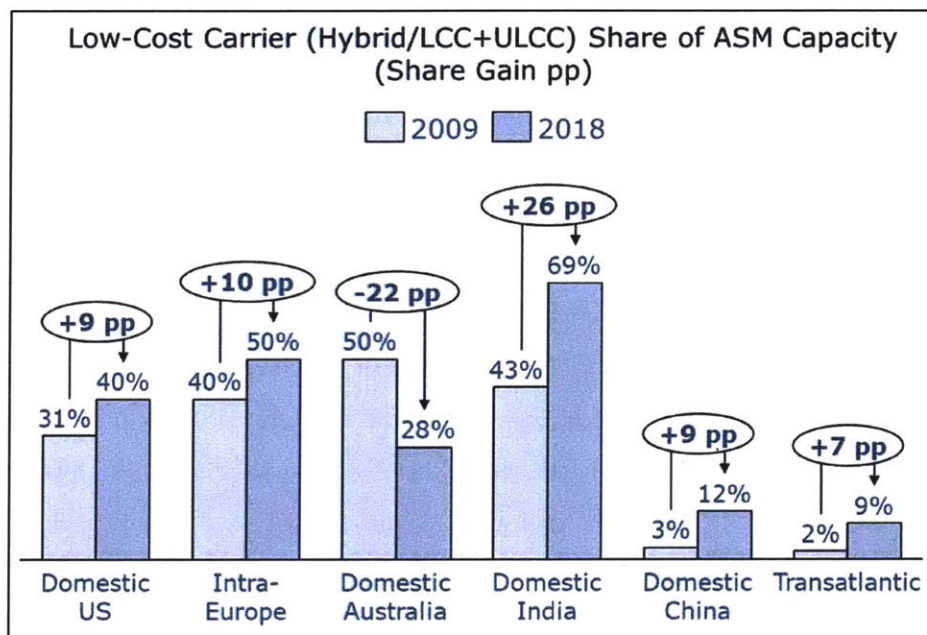


Figure 8.1.3 – Low-Cost Carrier Share of ASM Capacity (2009/2018)

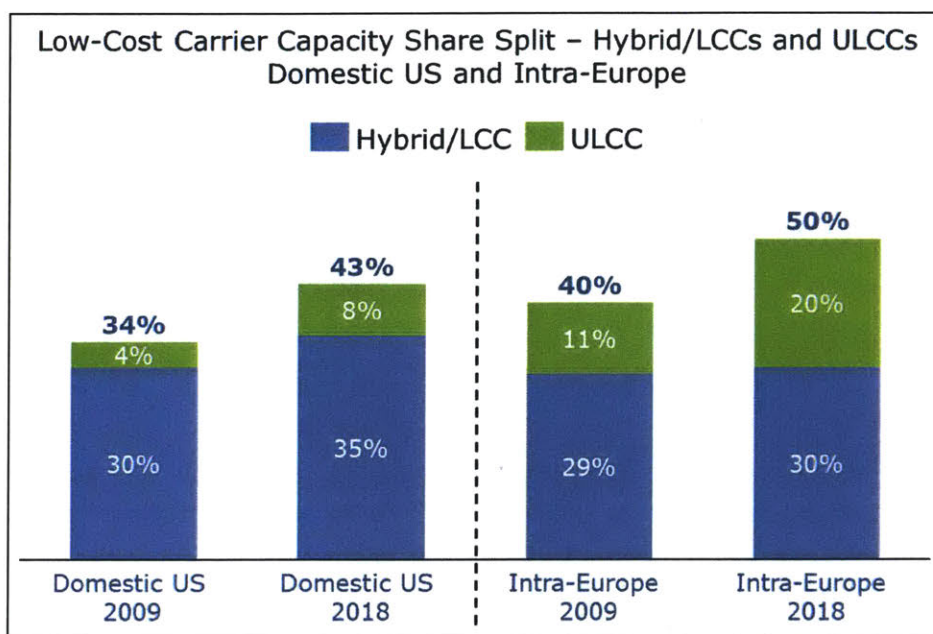


Figure 8.1.4 –LCC and ULCC Share of ASM Capacity (US and Europe 2009/2018)

Figure 8.1.5 shows the city pair coverage level of low-cost carriers in the six regions analyzed; note that city pairs served by Hybrid/LCCs and ULCCs have been combined here where applicable. Figure 8.1.6 provides a deeper look into the domestic US and intra-Europe regions, splitting the city pair service level metrics into hybrid/LCCs and ULCCs. While the number of city-pairs in the domestic US region has not grown significantly over the analysis time period, the rise in percent of city-pairs served by low-cost carriers indicates that these airlines, particularly ULCCs, have entered significantly into markets where legacy service already existed before.

On the other hand, in Europe, the rise in city-pair service level by ULCCs is coincidental with the overall rise in the number of active city pairs in the region –ULCCs, particularly Ryanair with its vast network, entered many new markets over the 10-year period. It can be seen that while city pair service levels have remained relatively constant for hybrid/LCCs, both American and European ULCCs have significantly increased the portion of active city pairs in their respective regions they serve.

In Australia, the business model transition of Virgin Australia led to a significant drop in the percent of city pairs served by Australian LCCs. While the new LCCs in Australia account for 28% of 2018 ASM capacity in the region, they only serve 17% of the active city pairs in the

country. Heavier capacity offered by LCCs on this small subset of Australian city pairs and that low-cost carriers in the region do not enter into most city pairs served by legacy carriers.

On the other hand, Chinese LCCs serve 29% of active city pairs in 2018, up from 13% in 2009. Using the same comparison, Chinese LCCs make up only 12% of ASM capacity in the region but serve as much as 29% of active city pairs in 2018. This is consistent with business models of Chinese LCCs which are typically owned by state/province governments to add air connectivity to a particular region of the country/state – hence many city pairs are served but with low levels of capacity per city pair.

Finally, transatlantic LCCs also serve a significantly higher percentage of city pairs in 2018 compared to 2009. Again, this is consistent with the business models of low-cost carriers operating in this sector which serve airports in remote areas to help keep airport/navigation costs low. An example of this is Norwegian Airlines, which until recently served Stewart and Providence – while these airports are not within the metropolitan areas of New York and Boston respectively, they are still close enough to these population centers to attract demand.

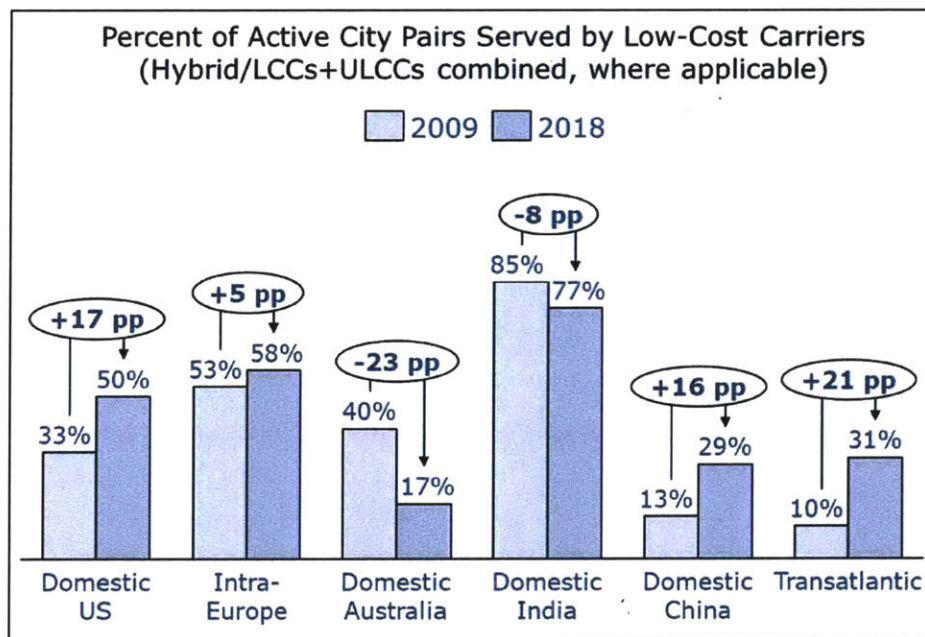


Figure 8.1.5 – Low-Cost Carrier City Pair Coverage Levels (2009/2018)

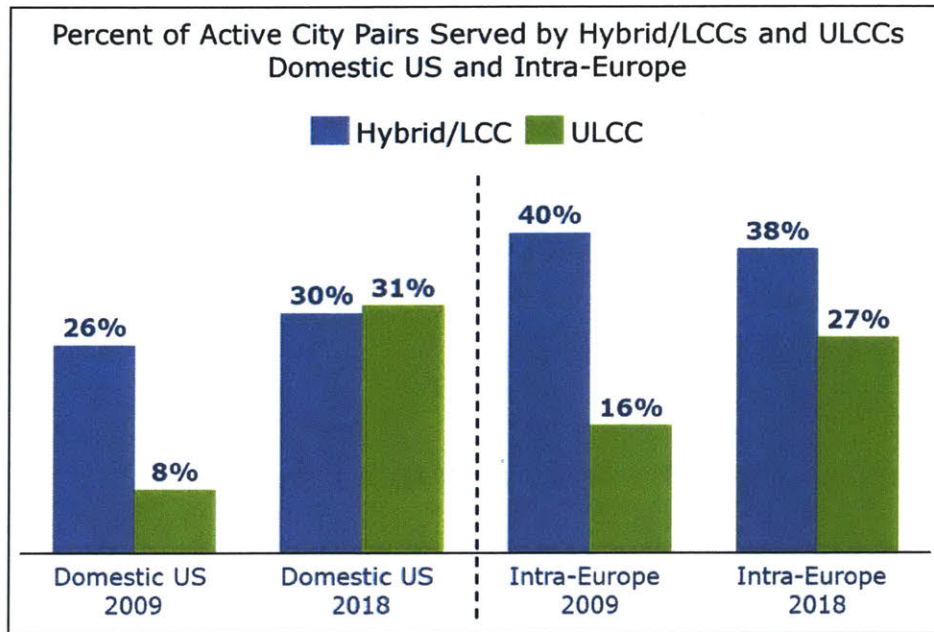


Figure 8.1.6 – LCC and ULCC City Pair Coverage Levels (US and Europe 2009/2018)

In conclusion, this thesis studied the evolution of the low-cost carriers across six different regions; domestic US, intra-Europe, domestic Australia, domestic India, domestic China and transatlantic. The goal of this thesis was to compare was to understand how low-cost carrier emergence and growth characteristics differ between regions, particularly between long and short-haul operations in addition to mature versus emerging markets. We found that low-cost carriers make up the greatest share of capacity in the domestic India market, contributing ~70% of the capacity in the region in 2018. On the other hand, LCCs operating in the domestic China and transatlantic regions make up only 12% and 9% of ASM capacity, much lower than LCC shares in India. Several reasons attribute to these differences in low-cost carrier characteristics across regions, including availability of low-cost airport infrastructure, government regulations and low-fare demand in the region.

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