A Work Project, presented as part of the requirements for the Award of a Master Degree in Finance from the NOVA – School of Business and Economics.

Lufthansa Flying Low

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A Project carried out on the Master in Finance Program, under the supervision of:

Rosário André

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Abstract

The purpose of this report is to determine, within a reasonable margin of error, a target price for Deutsch Lufthansa AG and to provide an investment recommendation. To this end, I conducted a thorough analysis of the company in order to best forecast future cash flows. The methodology followed to value the company was the DCF method. It was accompanied by a multiples analysis and a sensitivity analysis. I reached a hold recommendation and I expect Lufthansa's stock to be worth 15.87€ in 31st December 2020.

Keywords: Target-price, DCF, multiples analysis, sensitivity analysis

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DEUTSCHE LUFTHANSA AG

COMPANY REPORT

AVIATION INDUSTRY

3 JANUARY 2019

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Lufthansa Flying Low

European price war squeezes profits

- After a careful evaluation, our investment recommendation for Lufthansa AG is **HOLD**, with a **target price of 15.87€.** The stock currently trades at **16.256€.** The predominant recommendation in the market is HOLD.
- The FY20 price target was based on a DCF valuation. It implies a capital gain of **-2.38%** and a total shareholder gain of **3.66%.**
- The market environment is very tough for European Network Carriers. The industry is dealing with **persistent overcapacity** coming from low cost carriers and consumers are becoming increasingly more price sensitive. **Fuel costs outlook is favourable**, however Lufthansa has been struggling with continuous strikes. Negotiations with workers 'unions have been largely unsuccessful.
- Lufthansa will scrap long-haul flights from Eurowings giving this segment a clearer strategic focus. The segment is expected to reach breakeven by 2021.
- Cargo transportation is benefiting from strong economic growth in the Asia Pacific region. MRO continues to perform well thanks to strong demand for aircraft. Lufthansa is planning to sell its Catering segment.

Recommendation:	**Hold**
Price Target FY20:	**15.87 €**
Price (as of 2-Jan-20)	**16.256 €**

Bloomberg: LHA:GR

52-week range (€)	12.58-23.66
Market Cap (€m)	7842
Outstanding Shares (m)	478.194257
EPS (TTM)	2.91

Source: Bloomberg

Source: Yahoo Finance

Company description

Lufthansa AG is the biggest aviation company operating in Europe in terms of revenues. It operates in passenger transportation, cargo transportation, MRO, Catering and other aviation services. Its passenger airline group is divided into two separate business segments: Network Airlines and Eurowings. Europe accounts for over half the group's revenue. Lufthansa is headquartered in Cologne, Germany and is part of the DAX 30 index.

(Values in € millions)	2018	2019E	2020F
Revenues	35844	36464	37346
EBITDA	5005	4181	4203
Net Profit	2196	1612	1567
EPS	4.58	3.37	3.28
Dividend Yield (%)	4.1	4.88	5.04

Source: Company data; Analyst estimates; Bloomberg

Table of Contents

Exhibit 1: European Airlines - key information (2018)

Source: Company Data

Companies	Revenue in m	# of employees	RPK in m
IAG	24,406	63,531	270,565
SAS	4,436	10,445	39,383
Ryanair	7,697	15,938	109,988
Lufthansa	35,844	135,534	284,484
Easyjet	7,224	14,751	106,191
Air France KLM	26,515	84,714	283,947

Exhibit 2: Revenue distribution per business segment (2018)

Source: Company Data

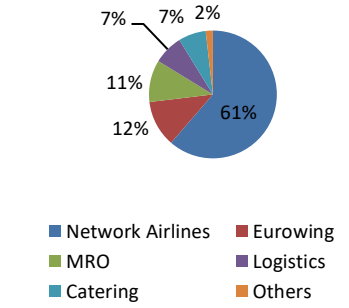


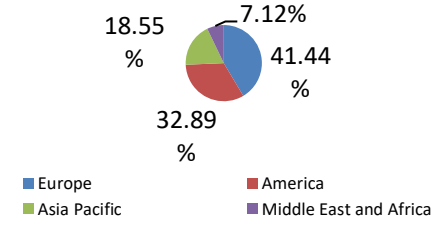
Exhibit 3: Yields per Airline (2018)

Source: Company Data

Companies	Yield
IAG	9.020
SAS	11.263
Ryanair	6.998
Lufthansa	12.600
Easyjet	6.803
Air France KLM	9.338

Exhibit 4: Network Airlines revenue geographic distribution (2018)

Source: Company Data



Company overview

Company description

Originally founded in 1926, Deutsche Lufthansa AG was forced to cease operations after the end of World War II. In 1953, the now known Deutsche Lufthansa AG was reformed and later assumed the name of its predecessor[1]. In 1977, Lufthansa became one of the founding members of Star Alliance, the world's largest airline alliance with 21.9% of total scheduled flights in 2018 (in RPKs)[2]. Headquartered in Cologne, Germany LUFTHANSA is as of 2018, the largest airline in Europe in terms of revenue, employees and RPK[3] (Exhibit 1).

As part of the Lufthansa group in addition to its own businesses it owns a myriad of other airlines and aviation-related companies the most important of which being Lufthansa Technik (MRO segment) and LSG Sky Chefs (Catering segment).

LUFTHANSA[4] operations are divided into 5 main business segments. They are Network Airlines, Eurowings, Logistics, MRO and Catering.

Despite the group's highly segmented nature its core activity is quite clearly passenger transportation. It is comprised by the Network Airlines and Eurowings segments. Altogether they represent 73% of Lufthansa total external revenues (Exhibit 2).

Business Segments

Network Airlines

The largest share of revenues (61%) is generated by Network Airlines (Exhibit 2). This segment includes Lufthansa German Airlines, SWISS International Air Line and Austrian Airlines. The segment positions itself as more of a premium service[5]. According to a consumer's survey conducted by Skytrax[6], Lufthansa German Airlines, Swiss International Air Line and Austrian Airlines are the top 3 European Airlines. Moreover, in total these 3 companies deliver a comprehensive route network comprised of 287 destinations in 86 countries at its peak during the summer season. This means, they serve passengers in routes with less

[1] In 1953 Deutsche Lufthansa AG was known as Luftag.
[2] According to Star Alliance.
[3] A revenue passenger kilometer (RPK) denotes number of passengers flown per kilometer.
[4] LUFHANSA when written in capital letters refers to the Lufthansa's group
[5] Starting from 28.11.19 Lufthansa has cut its on-board catering offerings in its economy and premium economy class. This may have an impacting its premium alignment in the mind of consumers and impact its Skytrax ranking in 2020.
[6] Skytrax is a consumer's survey. Its questions are related to three topics: Cabin service, Ground/Airport and Onboard Product

Exhibit 4: Eurowings Short-haul and Long-haul split

Source: Company Data

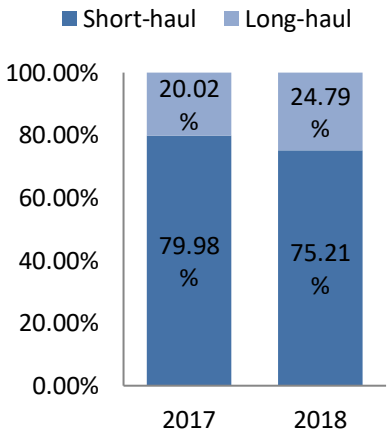


Exhibit 5: Eurowings growth spurt following Air Berlin acquisition

Source: Company Data

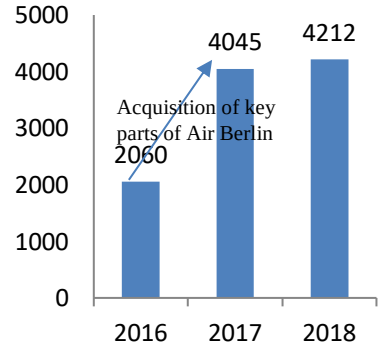
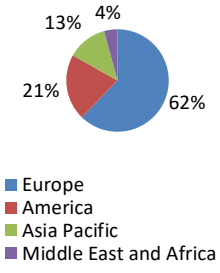


Exhibit 6: Eurowings revenue geographic distribution (2018)

Source: Company Data, Bloomberg



competitors. For these reasons, Network Airlines benefits from higher yield[7] than its competitors (Exhibit 3).

Network Airlines follows a multi-hub strategy. This means, passengers are bypassed from their desired destination to a central hub whereupon they are then redirected to their final destination. By operating in this way Network Airlines can greatly reduce its operating costs because it can use its aircraft capacity more efficiently. On the first flight where there is lower demand, it can use smaller aircraft and, on the flights from the central hub it can use bigger more cost-efficient aircraft. This strategy allows Network Airlines to operate in routes that would be otherwise unprofitable. This strategy is the most commonly used in Europe and it is the one followed by most legacy carriers.

As of 2018, most of its revenues are concentrated in Europe and America, 41.44% and 32.89% respectively (Exhibit 4). During the year it flew 232244m RPK and 284740m ASK[8] with a corresponding 81.6% load factor[9].

Eurowings

The Eurowings segment[10], includes the airlines Eurowings, Germanwings, Eurowings Europe and Brussels Airlines. It also includes an equity investment in Sun Express, a Turkish airline. Eurowings' concept is based on greater efficiency and competitive pricing, targeting price sensitive travellers. This is a clearly distinct consumer target from Network Airlines and thus they follow a completely different business strategy from Network Airlines.

As opposed to Network Airlines, Eurowings operates in the high traffic routes and follows a point to point strategy, meaning it delivers direct flights. As opposed to Network Airlines, Eurowings' model is based on larger economies of scale, thus it relies on higher air traffic volume and higher load rates per flight. It uses smaller aircraft (which are generally less efficient) and benefits from lower yields. This model is the one commonly used by LCCs[11].

This segment is divided between short-haul and long-haul flights, on a 75% and 25% basis (Exhibit 4). As a rule, yields go down with distance due to unit costs but the current trend in the market is a decrease in yields in the short-haul[12] market and an increase in the long-haul[13] market due to overcapacity in the short-haul segment. With Eurowings' new strategy defined in 2019 being to scrap all long-

[7] Yield is the average fare per passenger per kilometer.
[8] Available seat kilometer (ASK) denotes number of available seats flown per kilometer.
[9] Load factor denotes the percentage of available seats flown occupied. It is the ratio between RPK and ASK.
[10] The Eurowings segment (not the Airline) was formerly known as Point to Point. It was renamed in 2018.
[11] A Low-Cost Carrier (LCC) is an airline that is operated with a high emphasis on minimizing operating costs.
[12] Short-haul denotes flights with a duration bellow 6 hours.
[13] Long-haul denotes flights with a duration above 6 hours.

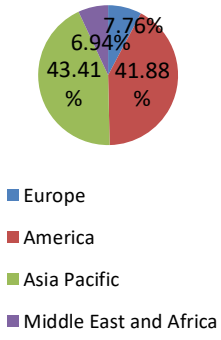
haul flights due to its larger than expected losses, the change in yield in the short-haul market will be key for Eurowings' profitability in the future. Scrapping the long-haul flights from Eurowings was also motivated by the fact the segment was losing its clear identity and becoming complex in its nature: it was targeting price sensitive consumers in the short-haul essentially competing with other LCCs but on the long-haul it was not quite low cost like in short-haul nor quite premium like Network Airlines. In 2017, Eurowings took over key parts of Air Berlin one of its former rivals leading up to a growth spurt in this segment (Exhibit 5). These included several of its aircraft and slots at several airports mainly in Germany, Austria and Switzerland. Taking these slots away from the competition mainly the Low-Cost Carriers was a key strategic reasoning for this operation. However, the company is having difficulties with reducing changes to flight timetables, flight cancellations, delays and other operational instability problems that came with it. Lufthansa's acquisition of Air Berlin was a failure with both segments generating losses mainly in the long-haul segment which the company decided to eliminate. Still, only by 2021 it is expected to reach breakeven. In June 2019, Lufthansa issued a profit warning downgrading its expected profit margins from 6.5%-8% to 5.5%-6.5%. This downgrade was attributed to the weak performance from Eurowings following the intense price competition in Europe from LCCs which are contributing to overcapacity in the market. This has been affecting several other European airlines as well.

In 2018, it generated EUR 4212m in revenues, a 12% share in the group's revenues. During the year it flew 64748m ASK and 52609m RPK, with a corresponding 81.3% load factor. As with Network Airlines, its revenues are concentrated in Europe and America. In total they account for over 85% of revenues (Exhibit 6).

Logistics

Exhibit 7: Logistics revenue geographic distribution

Source: Company Data



Lufthansa Cargo makes up the logistics segment. In 2018, it generated EUR 2713mn in cargo transportation revenue, 7% of total revenue, with a 9.1% operating margin. Together with Network Airlines and Eurowings it represents the group's total external traffic revenues. Lufthansa Cargo's revenues are concentrated on Europe and America (Exhibit 7).

As of 2018 year-end Lufthansa Cargo's fleet consisted of five Boeing 777F and twelve Boeing MD-11F aircraft. However, it occasionally belies up high capacity aircrafts from Network Airlines and Long-Haul Eurowings. The main driver for airfreight demand is world trade which is closely linked to GDP growth and a majority of ir comes from e-commerce (Exhibit 8). The ongoing trade dispute between the USA and China and its subsequent tarifs have been leading to an

decrease in RTK in the cargo transportation industry (Exhibit 9). In December 2019 both countries reached a deal to cut tariffs in phases and this was hailed as just a fist step in negotiations. However, the consensus among analysts is tensions are to endure for some time.

Exhibit 9: Air E-Commerce share forecast

Source: ICAO

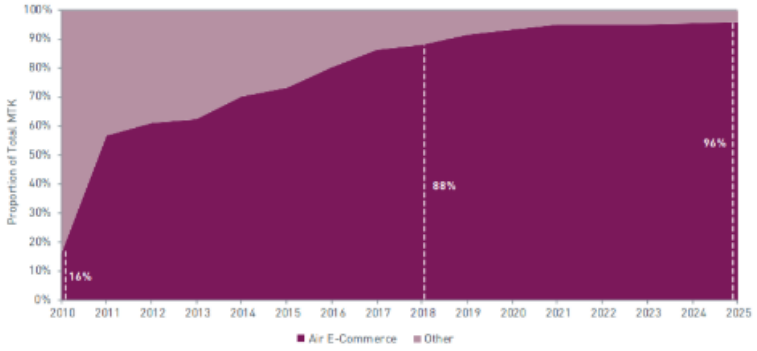


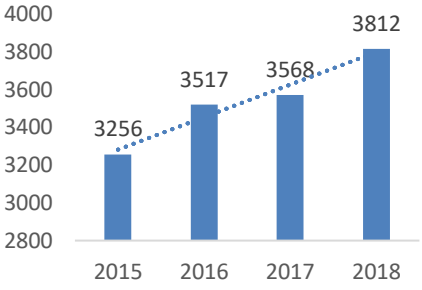
Exhibit 8: World trade growth rate

Source: Netherlands CPB

MRO

Exhibit 10: MRO Historical Revenue

Source: Company Data



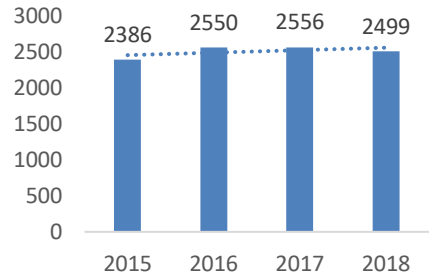
The MRO segment is comprised by Lufthansa Technik, a world leading company in maintenance, repair and overhaul services on civilian aircraft.

Technik's range of services comprises eight divisions: aircraft maintenance, aircraft overhaul, engine maintenance, component maintenance, aircraft systems, development and manufacture of cabin products, development of digital products, and initial equipment and servicing of VIP aircraft. Furthermore, all airlines within Network Airlines and Eurowings employ Lufthansa Technik for their MRO operations amounting to over EUR 2106m in internal revenue.

This segment has been showing a very strong performance generating EUR 3812m in 2018, a 10.8% increase compared to 2017 (Exhibit 10).

Exhibit 11: Catering Historical Revenue

Source: Company Data



Catering

The catering segment, LSG Group employs 35512 and represents 7% of total revenue. It is a leading global provider of airline Catering services. Last year alone, according to Lufthansa, it served around 700 million meals worldwide.

At the time of this writing, Lufthansa is preparing to sell LSG's European catering businesses to Gategroup, a world leading Swiss catering group. The deal extends to the retail convenience food Evertaste, the SPIRIANT equipment business and operation of the Ringeltaube brand. The concerned businesses generated 1.1bn EUR in 2018 about a third of the LSG group's total revenue.

The decision to sell is part of the Lufthansa's group current strategy of focusing on the airline business. It was considered LSG Sky Chefs does not have sufficient synergies to justify being part of the Lufthansa group. Furthermore, the company has been struggling to generate revenue growth for the past few years.

However, this potential sale is yet subject to approval by antitrust authorities and the company is facing strong resistance from the German service workers union Verdi over the sale. Considering the operation hasn't yet been confirmed and no financial details have yet been announced I carried out our valuation as is.

LSG Group employs 28.63% of total employees in Lufthansa's group but accounts for only 7% of total revenues

The emergence of low fares in the industry is a big threat for catering because food is one of the first costs cut by airlines in order to reduce fares (as it was the case of Lufthansa itself). A key aspect of LSG Sky Chefs is that food preparation has less automation than its competitors and is made with fresh ingredients. This makes it production more reliant on manual labour and less productive per employee (Exhibit 12).

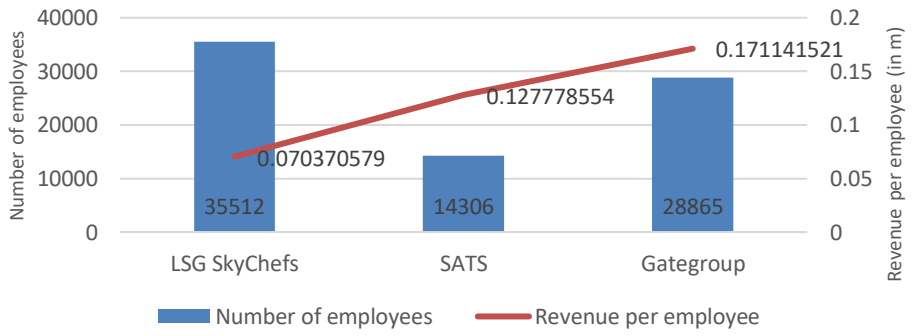
As of 2018 year-end LSG Sky Chefs is market leader with a 30% market share. Its revenues show a 4 year CAGR of 1% (Exhibit 11).

The remaining 2% of revenues derive from other aviation services and IT services.

Compared to 2017 total revenues increased by just 0.74%. MRO, Eurowings and Logistics revenue increase of 6.84%, 4.13% and 7.37% was almost completely offset by a drop in 2.88% in Network Airlines revenue. This reflects the extreme importance of Network Airlines for the group (it generates 61% of LUFTHANSA revenues).

Exhibit 12: LSG and main competitors – number of employees and revenue per employee

Source: Company Data



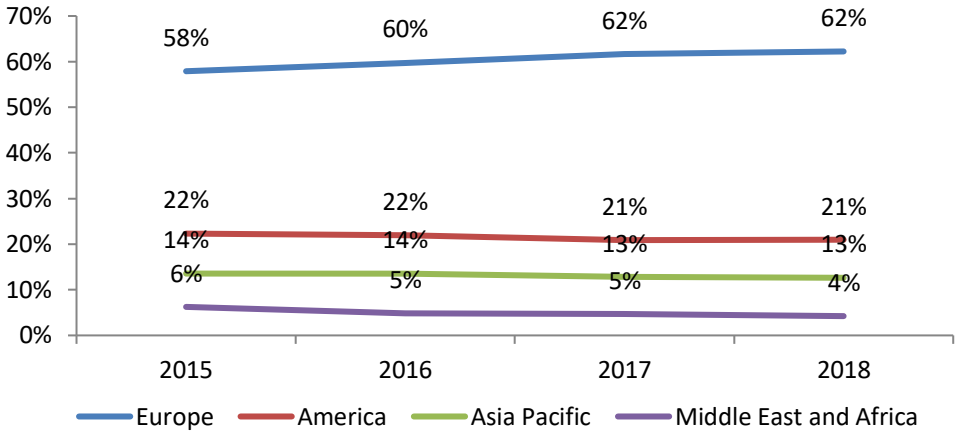
Geographic Distribution

Lufthansa operates in 4 geographic regions (Exhibit 13): Europe, America, Asia Pacific and Middle East and Africa. As of 2018, the Europe's region is the most important representing 62% total revenue followed by America (21%) and Asia Pacific (13%). Middle East and Africa contributes the smallest with 4%.

Moreover, analysing the historical geographical revenue distribution we can observe the importance of Europe in the group's total revenues has been growing at the cost of all other regions. For now, though, Lufthansa is not completely reliant on its Europe presence.

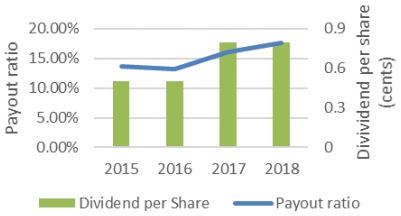
Exhibit 13: Revenue per region

Source: Company data



Dividend Policy

Exhibit 14: Dividend per share and payout ratio



For the past 4 years, Lufthansa has managed to pay dividends to its shareholders (Exhibit 14). Currently, dividend per share is set to 80 cents per share same as last year and it is expected for it to remain stable in the next few years. In recent years payout ratio has been increasing due to a combination of an increase in dividend per share and decreasing operating profits. In 2018, the dividend yield was 4.1%.

Fleet Strategy

As of the end of 2018 the Lufthansa group operates a total of 763 aircraft (Exhibit 15), 19 of which operated by Lufthansa Cargo. The average age of the aircraft is 11.9 years.

A major event for Lufthansa's fleet was the acquisition of parts of Air Berlin in 2017 and posterior absorption of part of its aircraft from LGW and Nikki[14] segments into Lufthansa's fleet. In total, 65 aircraft were either bought or leased into the fleet and a further 12 aircraft were taken in 2018.

[14] LGW and Nikki were subsidiaries of Air Berlin. The European Commission did not approve the acquisition of Nikki but agreed to some aircraft being transferred to LGW which were then incorporated into Lufthansa's fleet

As of the end of 2018 there are 195 on Lufthansa's fleet order to be delivered until 2025 (Exhibit 16), 32 of which are expected to be delivered in 2019. These models will replace the older less efficient models currently in the fleet. On average they are higher capacity which are more fuel efficient. The A320 neo which represents 68% of total orders by 2025 is a bigger capacity model over the previous generation and has a key focus on fuel efficiency.

Exhibit 13: Lufthansa's total fleet and aircraft on order/option

Source: Company Data

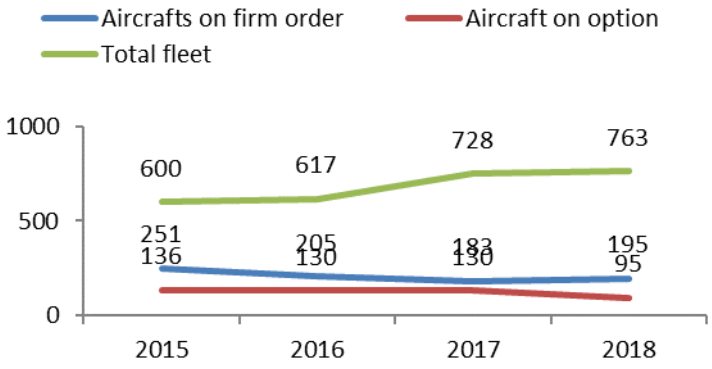


Exhibit 16: Fleet Orders

Source: Company Data

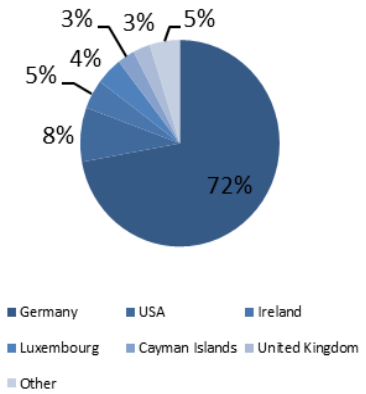
T013 FLEET ORDERS LUFTHANSA GROUP

	Deliveries
Long-haul fleet	
34 Boeing 777X	2020 to 2025
2 Boeing 777-300ER	2019
2 Boeing 777F	2019
13 Airbus A350	2019 to 2023
2 Airbus A330-300	2019
Short-haul fleet	
133 Airbus A320neo family	2019 to 2025
7 Airbus A320ceo	2019
2 Bombardier C Series	2019

Shareholder structure

Exhibit 17: Shareholder's structure by nationality (2018)

Source: Company Data



Deutsche Lufthansa AG was first listed in 1966 however a majority stake of the company remained state-owned. It was not until 1997 the company became fully privatized.

At 2018 year-end, 53% of the shares were held by institutional investors and 47% were held by private individuals. Furthermore, German investors held 72.1% of the shares followed by American investors which held 8.5%. This ensures compliance with the German Aviation Compliance Documentation Act which demands that a majority of Lufthansa's stock must be held by German investors.

Lansdowne Partners (4.91%), Janus Capital Management (4.01%) and DWS Investment GmbH (3.79%) are the top 3 stake holders in the company.

Acting CEO since 2014 Carlsten Spohr is also Chairman in the Executive Board as well as Chairman in the Supervisory Board for Lufthansa Technik AG.

Lufthansa has 478mn shares outstanding without any preferred stocks outstanding.

The Sector

Sector Analysis

Deutsche Lufthansa AG classifies in the Passenger Transportation - Consumer Discretionary sector, thereby competing in the global Airline Industry with passenger transportation being its main operating activity. Nonetheless, the group is also involved in other aviation activities as it was previously mentioned in Company Description section.

In the decades following the Deregulation Act of 1978 in the US and the single European Act of 1986 and others that followed across the globe, the airline industry changed drastically. Prior to this type of deregulation legislation, most nations heavily regulated which companies could operate in each route, establishing quasi-monopolies in certain city pairs therefore leading to higher fares. Furthermore, entering the market was much more difficult due to limitations imposed by regulation, in particular, imposing that the majority of each airline´s equity was state-owned.

Nowadays, the market is more fragmented and more competitive, and consumers have access to several price comparing websites which results in lot of bargaining power on the consumer's side.

These developments have contributed to the growing emergence of LCCs. In 2018, LCCs accounted for 31% of market's RPK almost doubling its market share in 12 years (Exhibit 20).

These airlines have very aggressive price strategies but rely on high volumes to generate revenue. To reduce costs, they cut unnecessary services such as food catering, extra baggage space, on flight services, etc. A deeper analysis of these airlines will be made in the competitor's section.

Key Value Drivers

Air traffic's share of world GDP is on a growing trend, representing roughly 1% in 2018. Ongoing globalization and increase in productivity in emergent countries as well has a growing percentage of GDP being spent in tourism in major countries has been leading to this development.

GDP in real terms is highly correlated with RPK (Exhibit 21) which makes it an important metric for any airline. As we have seen 62% of revenue is concentrated in Europe making it the most important region for Lufthansa's performance.

Exhibit 18: Number of passenger's growth since deregulation

Source: IATA

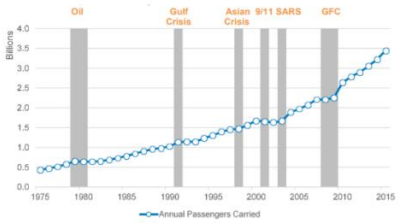


Exhibit 19: Domestics Passenger Yields for Japanese airlines and average U.S. domestic routes

Source: Companies' annual reports and Air Transport Association

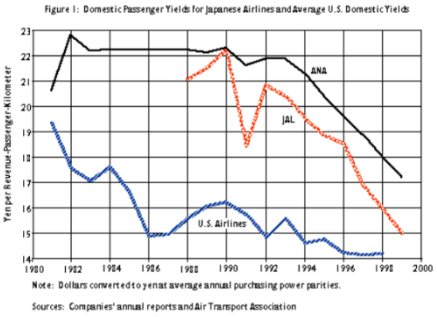


Exhibit 20: LCCs Market share

Source: Statista

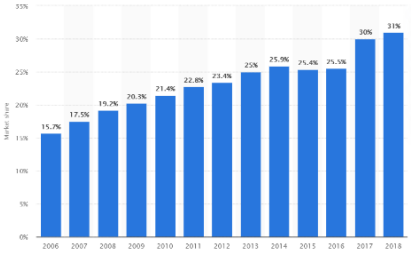
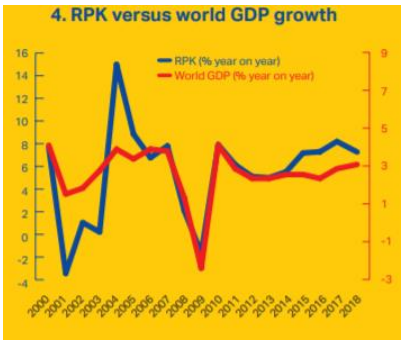


Exhibit 21: RPK and GDP growth correlation

Source: IATA



Looking at real GDP forecasts from World Bank (Exhibit 23), Europe (62% of revenue) is expected to grow below 2% per year similarly to North America (21% of revenue) while the Asia Pacific (13% of revenue) region is expected to grow at around 4% by 2022.

Regarding inflation IMF is predicting overall inflations to go down in 2019 and in the case of Europe and Middle East regions they are forecasted to become negative but go up afterwards and then plateau. Asia Pacific is the region with the highest expected inflation rate by 2024, just above 6% (Exhibit 22).

Exhibit 22: Inflation forecasts per region (2018-2024)

Source: IMF

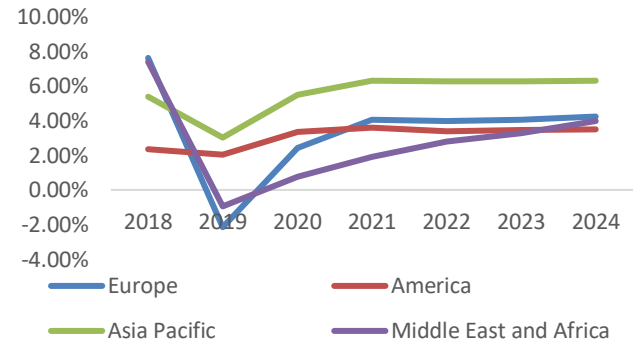
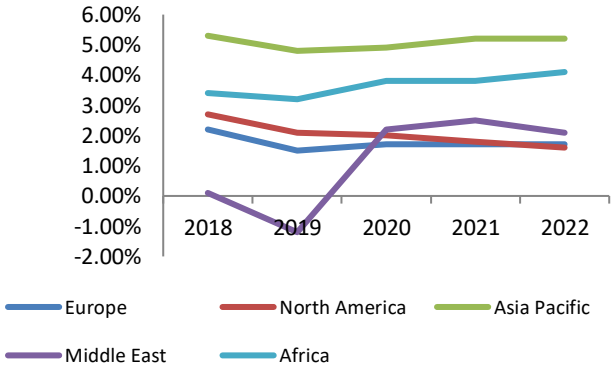


Exhibit 23: Real GDP growth forecast (2018-2022)

Source: World Bank



Air traffic measured in RTK within Europe and North America is expected to grow at a slower pace than the rest of the world, 3.60% and 3.10% respectively versus 4.6% (Exhibit 24). This performance is in line with past trends and is a result of these markets being the most mature in the world. Furthermore, according to IATA, plans for infrastructure in Europe aren't ambitious enough to support future demand. Thus, the region's growth is being hampered by capacity constraints. The implication is Lufthansa will likely focus on consolidation in Europe and competition for air slots in airports will become increasingly more important in the region.

Regarding cargo transportation, as seen in the previous section (Exhibit 7) most revenue come from the Asia Pacific region (43.41%) and the America region (41.88%). While growth rate within North America is just 2.3% (well below the 4.2% world average) cargo transportation from North America to Asia Pacific and within Asia Pacific (and within China in particular) is expected to grow at higher rates than world average (Exhibit 25).

Exhibit 24: RPK growth rate forecast (2019-2038)

Source: Boeing

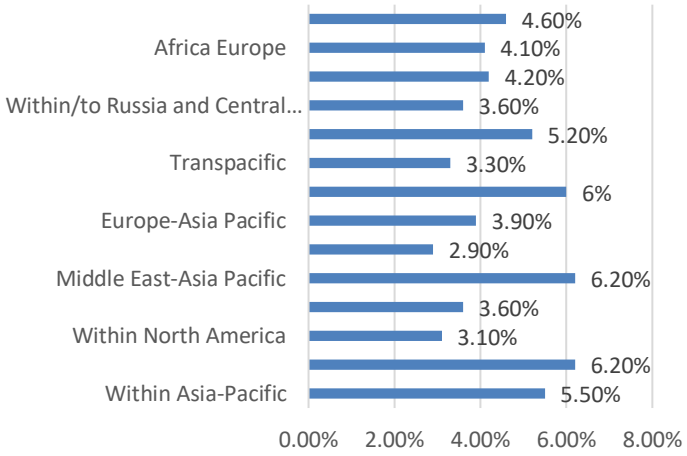


Exhibit 25: RTK growth rate forecast (2019-2038)

Source: Boeing

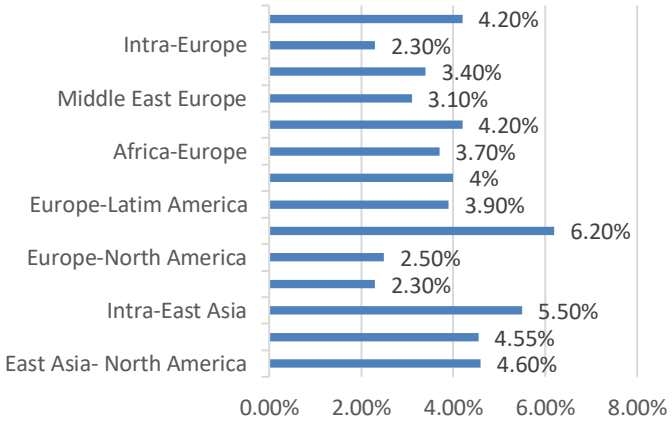
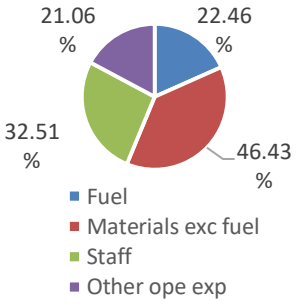


Exhibit 26: Operation Expenses

Source: Company data



A major challenge for the airline industry's profitability is oil prices. In 2018 oil costs represented 22.46% of Lufthansa's total operating costs (Exhibit 26).

Therefore, price variations in jet fuel can significantly impact Lufthansa's profitability. Unfortunately, jet fuel and crude oil the material from which the former is done is highly volatile. In fact, between in just the 4 years between 2013 and 2016, the market saw the drop from the highest recorded price per barrel 110.62$ to the lowest 26.21$.

This risk is mitigated by hedging crude oil. This commodity is cheaper to hedge than kerosene because it is more liquid in the market and since it is highly correlated to jet fuel prices it works as a good proxy (Exhibit 27). In fact, this is the standard of the industry. Lufthansa´s target hedging level is 85%

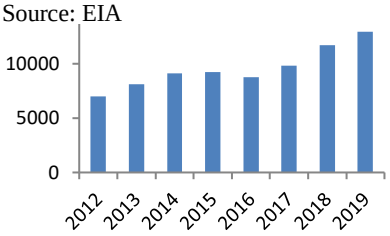
Exhibit 27: Historic relationship between Brent Crude Oil and Aviation Jet Fuel Price

Source: U.S. Energy Information Administration

Source: U.S. Energy Information Administration

Exhibit 28: USA Daily Oil production (in mn barrels)

Source: EIA



Since 2012, the USA has almost doubled their oil production to over 12 million daily barrels (Exhibit 28). It has become the biggest oil exporter in the world with 18% of global supply (Exhibit 29). As a response OPEC, responsible for around 30% of total production, has been continually cutting production in an effort to rise crude prices. To this end, in December 2019 OPEC has decided to cut an additional 500000 barrels a day, the equivalent of 0.5% of global output, through the end of March 2020. The recent IPO of Saudi Aramco was a major reason for OPEC's decision.

Nonetheless, by World Bank forecasts, on year average terms, oil prices in 2019 will be lower than in 2020 and they are expected to continue to decrease in 2020. Thereafter they will increase at a lower rate. On 2030 oil price per barrel is expected to be 70$ (Exhibit 30).

Exhibit 29: Share in world's production

Source: EIA

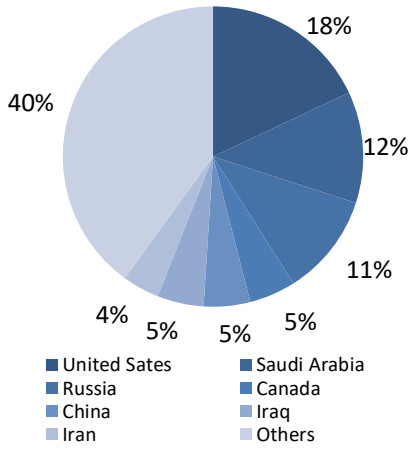
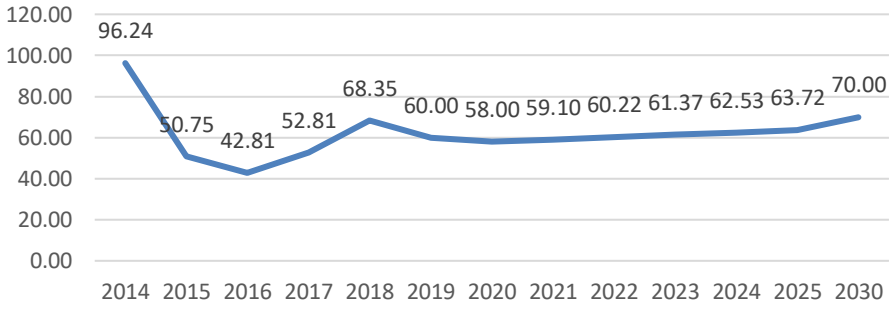


Exhibit 30: Brent Crude Oil average price per year forecast ($/bbl)

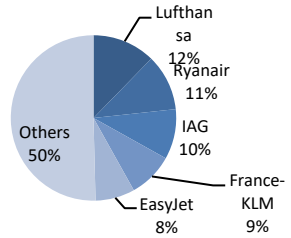
Source: World Bank



Market Share

Exhibit 31: Lufthansa's market share in Europe

Source: Aviator



Known as the Europe's big 5 IAG, Air France, Lufthansa, Ryanair and EasyJet represent half of the entire European Airline market. Lufthansa is market leader with a 12% market share (Exhibit 31).

Some of the main challenges in Europe include the reduction of yields, subpar economic growth in the region when compared to the rest of the world and congested airports and infrastructure handicapping future growth. Unsurprisingly, breakeven load factor in Europe is the highest of any region in the world.

Moreover, a key characteristic of the European market is that it is very fragmented and as a result very competitive. In fact, according to European Regions Airline Association (ERA) there are 195 airlines in Europe offering scheduled passenger services, compared to 98 in North America for example.

Consequently, there are a growing number of airline failures and takeovers from bigger competitors. This was the case of Air Berlin in 2017 being taken over by Lufthansa. More recently, in 2019, Adria Airways, Aigle Azur, WOW, Jet Airways

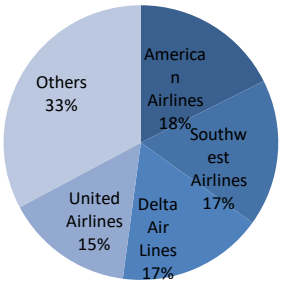
Exhibit 32: Top 5 Airline Bankruptcies

Source: Aerotime Hub

Top5 Airline Bankruptcies in 2019
1.Adria Airways
2.Aigle Azur
3.WOW
4.Jet Airways
5.Thomas Cook

Exhibit 33: Main Airlines in the US

Source: Statista



and Thomas Cook to mention a few (Exhibit 32) went bankrupt leaving routes open to be filled by the big 5.

Lufthansa's second biggest market in terms of passenger transportation revenue is North America. In this region, market is much more consolidated with 77% being captured by 4 airlines alone. Unlike in Lufthansa's home market, in North America Lufthansa is not a market leader (Exhibit 33).

Competitors

Lufthansa main competitors are the network carriers International Consolidated Airlines (IAG), Air France KLM and Scandinavian Airlines (SAS) and the low-cost carriers Ryanair and EasyJet.

Ryanair, EasyJet and SAS[15] only generate revenue from passenger transportation while Air France operates in the same segments Lufthansa does – Passenger, Cargo, MRO and Catering. IAG operates in passenger transportation and cargo only.

Lufthansa is the biggest airline amongst its peers either by total revenue generated, RPK and number of employees. However, by RPK, Lufthansa is only slightly above Air France KLM and IAG. At the same time, its load factor is one of the lowest among its peers (only above Scandinavian Airlines) while Ryanair and EasyJet have highest load factor rates (Exhibit 34).

Regarding cargo transportation revenue Lufthansa competes with Air France KLM and IAG as the market leader. It also enjoys higher yield and revenue cargo tonne kilometre (Exhibit 35).

Exhibit 34: Key figures of Lufthansa and main competitors

Source: Company data, Bloomberg

Companies	Revenue in m	from which cargo revenue	# of employees	RPK in m	Load factor
IAG	24,406	1,173	63,531	270,565	83%
SAS	4,436	34	10,445	39,383	75%
Ryanair	7,697	—	15,938	109,988	96%
Lufthansa	35,844	2,713	135,534	284,484	81%
Easyjet	7,224	—	14,751	106,191	92%
Air France KLM	26,515	2,288	84,714	283,947	88%

Observing Exhibit 36 another key difference between service orientated providers and low-cost carriers becomes clearly noticeable. The latter operate with a much lower number of employees per aircraft. As it was previously said they focus on

[15] Even though SAS does generate cargo transportation revenue this amount is trivial

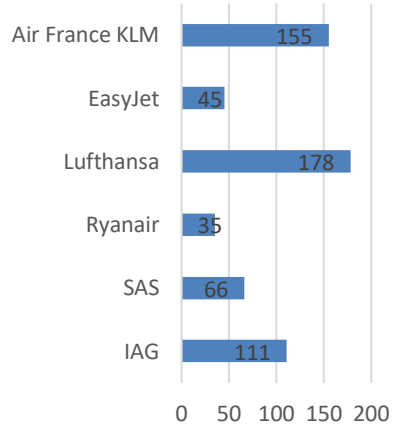
Exhibit 35: Cargo Metrics Comparison

Source: Company Data

Companies	Revenue Cargo Tonne Kilometers	Cargo Yield	Cargo Revenue
IAG	5713	21	1173
Lufthansa	10907	25	2713
Air France KLM	8657	14	2288

Exhibit 36: Comparison on number of employees per aircraft between Lufthansa and its main competitors

Source: Company data



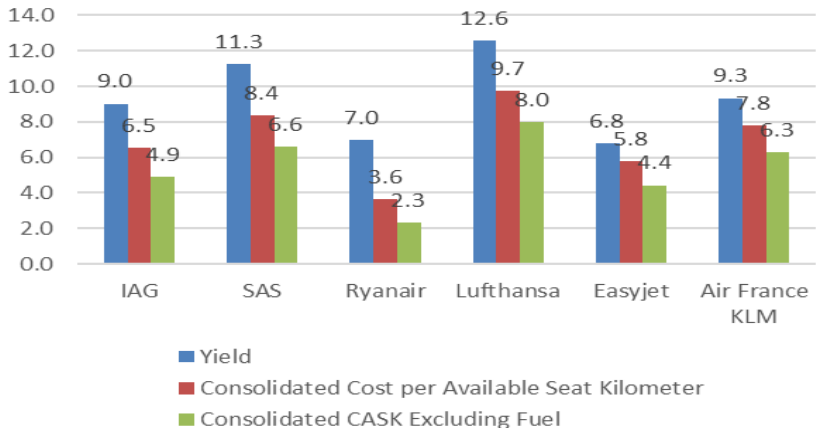
volume rather than on yield to be profitable. For this end, they provide passengers with as much a basic package as possible in terms of service. For example, LCCs do not usually provide meals on board and passengers cannot carry as much baggage weigh. Instead these services and others like priority embarking are provided at an extra cost for the passenger[16]. These extra revenues are called ancillary revenues.

In fact, yield is usually higher on network airlines because they charge every passenger for those extra services they provide, in other words they are imbued in the total price of the ticket regardless if the passenger wishes to use them or not. On the other hand, load factors are usually higher in LCCs because most passengers are very price sensitive and prefer to fly in LCCs.

Moreover, Lufthansa generates a higher yield than its peers (Exhibit 37) but it also struggles with higher CASK[17]. It has a cost per ASK of 9.7 cents while the average is 7 cents. The low-cost carriers have the lowest CASK since they provide only basic services and thus need less employees (driving the average down). Ignoring costs of fuel, we arrive at the same conclusion.

Exhibit 37: Comparison of yield and CASK between Lufthansa and main competitors

Source: Company data, Bloomberg



For Lufthansa a quarter of all operating expenses comes from staff making it the most important operating cost, followed by fuel costs which account for 17% (Exhibit 38). These two costs are the most significant between all network carriers in our peer group. Air France KLM's staff costs account for almost a third of total operating costs and a fifth comes from fuel expenses. In the case of SAS, staff

[16] Revenue derived from goods and services other than the flight itself is called ancillary revenue
[17] CASK denotes cost per available seat kilometre

costs are also the most important costs (22%) followed by fuel (19%) while for IAG fuel costs account for more than staff costs, 24% vs 20%.

In the case of Ryanair and EasyJet, Staff costs are much less significant for the reasons mentioned previously. In the case of Ryanair fuel prices are clearly the main portion of operating costs (36%) followed by Airport and Handling Charges (16%) and finally staff costs (15%). In the case of EasyJet, Airport and Handling Charges account for 30% of total operating expenses while fuel and staff account for 22% and 14% respectively. In sum, in Low Cost Carriers Airport and Handling charges are more significant than in network airlines and fuel costs also account for a larger portion of total operating costs compensating a lower weight of staff costs.

Exhibit 38: Lufthansa and its competitors cost structure

Source: Company Data

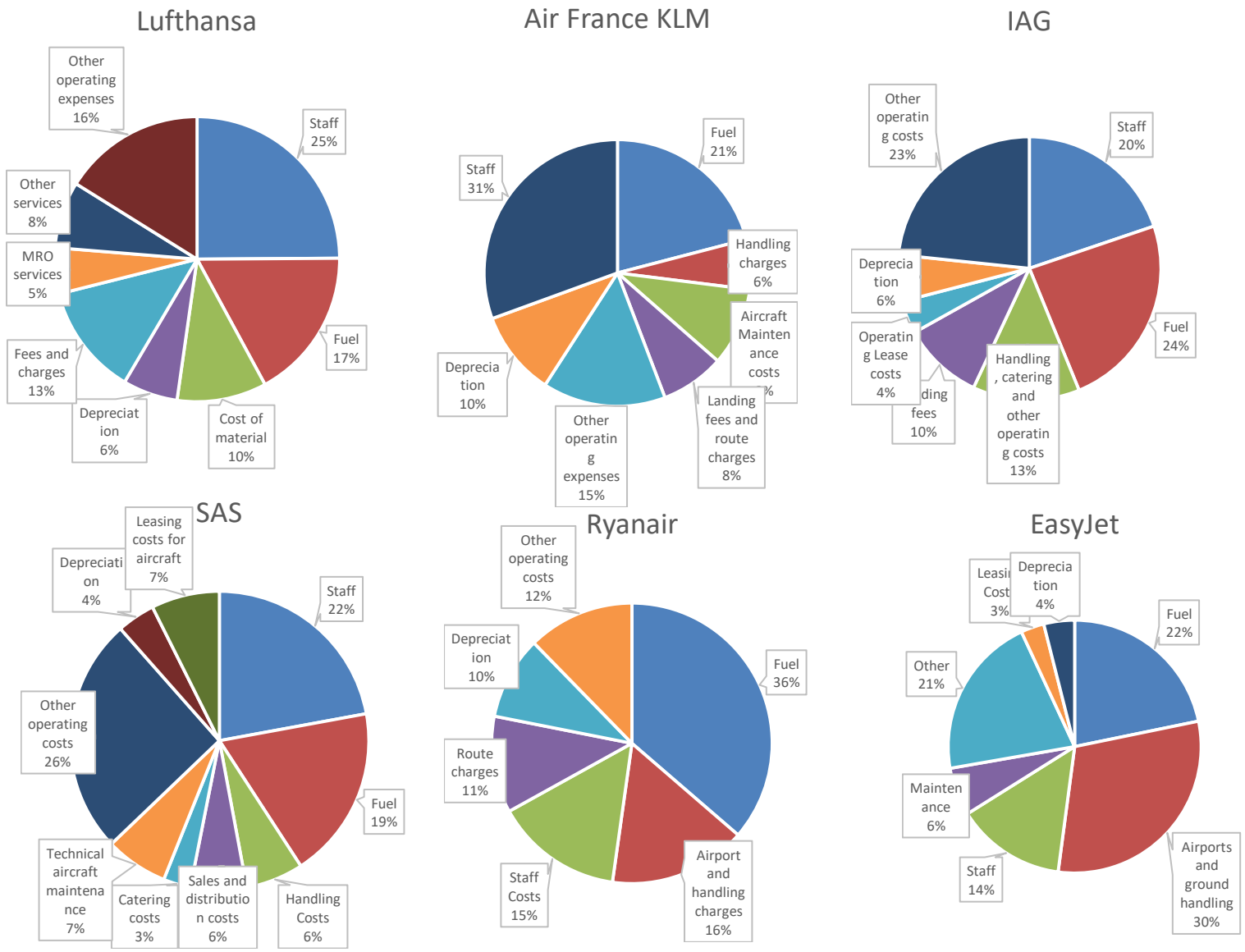


Exhibit 39: Fuel expenses per ASK

Source: Company data

Companies	Fuel Expenses	ASK	Fuel cost per ASK
IAG	5283	324808	0.016
SAS	918	52371	0.018
Ryanair	2427	114571	0.021
Lufthansa	6087	349489	0.017
Easyjet	1602	116056	0.014
Air France KLM	4958	323034	0.015

Regarding fuel efficiency, fuel costs per ASK are dependent on prices which are an external factor and airline's hedging policy. Depending on market conditions a hedging policy might increase or decrease oil prices. In 2018, Ryanair had the highest fuel cost per ASK in the peer group (21 cents per ASK) and EasyJet the lowest with 14 cents per ASK (Exhibit 39). Lufthansa had a cost of 1.7 cents per ASK which is in line with the average.

In terms of profitability ratios, IAG and Ryanair have much higher EBIT, EBITDA and Profit margins compared to their competitors (Exhibit 40). Lufthansa, EasyJet and Air France KLM have similar EBIT Margins (8%, 7% and 5% respectively) and EBITDA Margins (14%, 15% and 16%). However, in terms of profit margins Air France KLM shows a very low profit margin of 2% while Lufthansa and EasyJet have profit margins of 6% and 5% respectively. SAS shows ratios well below its peers in terms of EBIT, EBITDA and profit margins with 1%, 5% and 1% respectively. Overall, Lufthansa has trouble to compete with Ryanair and IAG since they benefit from significantly better profit margins, but it is in a favourable position against other network carriers.

Regarding return on equity with the exception of IAG which shows a much higher rate than its peers leading to a higher average (21%), Lufthansa with a rate of 23% shows the highest return on equity among its peers. It is followed by Air France KLM and Ryanair with 19% and 18% respectively. In terms of ROA IAG is also the airline with highest rate with 10%, followed by Ryanair with 7%. Lufthansa has a return on assets of 6% which puts it slightly above the average of 5%. Air France has the lowest rate, 1%. In terms of ROIC Lufthansa is on par with IAG as market leaders in this metric with 14% and 15% respectively. Ignoring the market outlier IAG, Lufthansa on par with Ryanair show the best financial ratios.

Exhibit 40: Key Financial Ratios of Lufthansa and competitors

Source: Company data

Companies	EBIT Margin	EBITDA Margin	Profit Margin	ROE	ROA	ROIC
IAG	15%	21%	12%	43%	10%	15%
SAS	1%	5%	1%	12%	2%	3%
Ryanair	13%	22%	11%	18%	7%	11%
Lufthansa	8%	14%	6%	23%	6%	14%
Easyjet	7%	15%	5%	11%	5%	0%
Air France KLM	5%	16%	2%	19%	1%	6%

Forecasting of key captions

Revenue

Revenue was forecasted on a per segment basis and for the traffic revenue segments (Network Airlines, Eurowings and Logistics) an analysis per region was conducted as well as well.

Revenue in Network Airlines and Eurowings is equal to the product between Yield and RPK. RPK is determined by the product between ASK (available seat kilometers).

Revenue in Logistics is calculated on a similar way but using RTK instead. RTK is a similar metric to RPK but used for cargo instead of passengers. It is measured in tonne of cargo transported rather than in passengers..

Network Airlines

As part of the group overall strategy, Network Airlines is buying new generation aircraft such as the A320 neo which is up to 5% more fuel efficient than the previous model which is still present in Lufthansa's fleet. At the same time Lufthansa is reducing the number of aircraft models in its fleet. These measures are expected to lead to higher cost efficiency.

To forecast future capacity the approach followed was to estimate the future number of aircrafts per model in the segment's fleet and compute total capacity following the numbers in the annual report regarding the number of seats available for each aircraft model.

To this end, I looked into Lufthansa's fleet order list up to 2025. Unfortunately, Lufthansa does not make public which aircraft are to be allocated for each segment but we can infer based on the models currently present in the fleet. In the case of the A320 neo even thought there are no aircraft of this type currently in the fleet there is the older model (A320 ceo).

Additionally, it was considered a percentage of aircraft that each year due to obsoslescence are terminated or sold. A 1.55% rate was observed in the previous year. An historical average was not used instead due to the acquisition of Air Berlin in 2017 impacting this metric and making that year atypical.

During the year some new orders were made and thus the fleet order was updated. However, it is expected new orders will continue to be made for the same timeframe as in it was made in 2019 (2023-2027). Consequently, forecasting capacity basing on fleet orders for 2023 and 2024 would lead underestimations. In

fact, implied ASK growth in 2023 and 2024 would be lower than in the previous years which seems to confirm this hypothesis. Instead it was assumed ASK in 2023 and in 2024 would grow at the same rate as it is forecasted in 2023.

Both load factors and yield are expected to continue to converge with the rest of the industry.

The emergence of Low Cost Carriers is driving yields in the industry down not by just competing with lower prices but also by contributing to overcapacity in the market. It is the consensus in the industry that LCCs will continue to grow and become even more ubiquitous in the airline industry. However, its penetration in the market should eventually plateau.

Eurowings

Eurowings' current strategy is to focus on the short-haul where yields are higher (as a rule yields go down with distance due to unit costs and economy of scale). No long-haul aircraft is being ordered to Eurowings at the moment. Thus, capacity on the long-haul should decrease every year by 1.55%. Capacity on the short-haul is expected to increase.

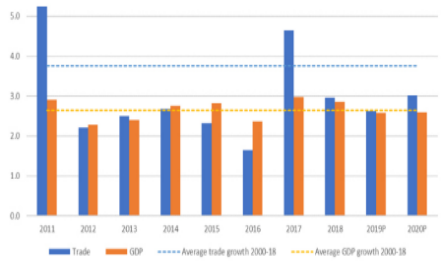
Between 2017 and 2018 yields have dropped almost 20% in the short-haul and rose 2.82% in the long-haul. The load factor rose over 2% but it is still bellow its main competitors in the short-haul Ryanair and EasyJet. So it is expected this trend to continue (2% growth in 2020). Regarding yield in the short-haul, since Eurowings operates mostly in Europe (a very mature market) where there is no perpective of yields rising with inflation, I assumed it to change at the same rate as Network Airlines in the Europe region.

Logistics

During spring 2019, 2 new aircraft (the 2 Boeing 777F present in the fleet order). Another aircraft was delivered to AeroLogic during the year and it was announced 2 MD-11F will be retired at the year-end. After 2019 there are no more orders for the segment however I do not find reasonable to believe no orders won't be made in the future. In fact, since the fleet is very small there is little incentive to do volume orders in advance and instead the company does opportunistic purchases. This makes it harder to forecast ATK growth. Moreover, aircrafts from Network Airlines and Eurowings are often used to belly up Lufthansa's cargo capacity. Therefore, it was choosen a different approach on forecasting RTK for this segment.

Exhibit 41: Trade and GDP growth Comparison

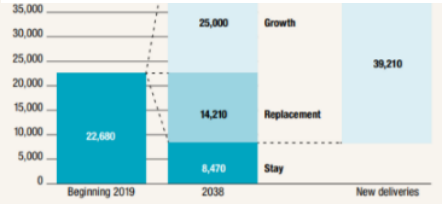
Source: WTO and Unctad



The approach followed was to forecast RTK per region directly without basing on ATK[18] and Load Factor. Real GDP growth was used as an proxy to predict demand for freight since the degree of correlation between the 2 is very high. Regarding yield, according to IATA, air cargo yields only increased by 0.4% between January 2018 and January 2019. With this in mind and despite quite volatile historical data due to USA and China's trade tensions Lufthansa's yield will remain fairly constant.

Exhibit 42: Airbus Deliveries 2019-2038 Forecast

Source: Airbus



MRO

Revenues from maintenance, repairing and overhaul are dependent on the number and size of aircrafts in operation worldwide making it a good proxy.

A study by Airbus predicts world commercial aircraft fleet to more than double in the next 20 years at roughly 4% per year CAGR. Revenues from this segment in the past have been growing at the same rate so I used past CAGR to forecast MRO revenue.

Catering

As mentioned previously, LSG's will initiate the selling of its European businesses in 2020 pending anti thrust authorities' aproval. These businesses generated about one third of LSG's revenue. In 2020, Lufthansa intends to sell the rest of the group.

The valuation was conducted without this in line since the operation is yet to be confirmed as of this writing.

The Airline Catering Segment is facing the increasing challenge of a highly price sensitive market in Europe which is driving airlines to cut costs in food catering in particular. A growth rate according to the past trend was assumed (1.2%).

Operating Costs

Aircraft Fuel and Lubrificants

In October 2016, the 39th Session of ICAO's Assembly reached an agreement refered as Carbon Offsetting and reduction Scheme for International Aviation (CORSIA). Lufthansa will voluntarily follow this agreement and has pledged reduce fuel consumption per revenue tonne/killometer by 1.5% per year. I assumed this will be respected and computed future fuel costs accordingly. 85% of fuel price variations are hedged as per Lufthansa's hedging policy.

Staff

I assumed the number of employees depends on RPK, meaning the higher air traffic demand the more employees will be employed. Regarding costs per employee I

[18] ATK (available tonne kilometre) denotes tonnes of cargo able to transport per kilometre

assumed it will grow at a 1% rate. In the past 4 years it has been decreasing however this is not reasonable in the long term. Several strikes have been being announced over 2019 and Lufthansa has entered negotiations multiple times with worker's unions. However, these have been unsucessful. Most recently, strikes were announced for the Christmas Holiday season.

OUTLOOK

Real GDP forecasts for Europe are below 2% and well under other regions while USA and China trade tensions and other geo-political risks remain a concern adversely impacting both passenger and cargo transportation segments. Nonetheless, long term forecasts for RPK and RTK are more favourable with growth rates above 4%.

Additionally, Lufthansa is locked in a dispute with three workers' unions: UFO[19], Verdi and CU over pay conditions. On a positive note fuel price forecasts are stable. A key concern for Lufthansa, is the fact that there is overcapacity in Europe's airline market. This is motivating a price war in air fares which is severely impacting several European airlines profitability.

Valuation

The target value for December 31st, 2020 is EUR 15.87. It was calculated based on the discount cash flow model. The operating result was calculated separately from the non-operating segment. Revenue was calculated per segment, but other operating income and operating expenses were forecasted together.

WACC

Lufthansa's weighted average cost of capital was determined after estimating each of its inputs by specific methodologies.

I assumed Lufthansa is headed towards fixed net debt/enterprise value and towards an equity/enterprise Value ratio in market terms. I assumed a target net debt to equity ratio is 70%. It corresponds to the median between its peers.

The cost of equity was calculated with the help of the Capital Asset Pricing Model. For the risk-free rate, a long-term government bond denominated in the same currency as the company's statements is the best approach. In the case of Lufthansa, a 10-year German bund was originally considered. However, the current yield is negative, and I do not believe this rate reflects the true risk-free rate. The

[19] UFO's legal recognition of its union status is a matter of dispute with Lufthansa

main reason for such a low current yield is the uncertainty in Europe's economy in conjunction with the fact that Germany has been running budget surpluses which limits the supply of AAA Bonds in the European market.

Instead, the 10Y Eurozone Central Government Bond yield as of 2018 was used and thus obtained a risk-free rate of 1.14%.

For the market risk premium, I relied on the estimation by Mckinsey & Company[20] of 5.5%. This estimation was based on a long-term historical average.

To get the beta I first calculated the rolling 3 years raw beta of the peer group: Lufthansa, Air France KLM, IAG and SAS. They were calculated doing a regression of each of the company's weekly returns in the last 3 years against the MSCI World Index.

To unlever each of the peer's betas, I computed the beta of debt and the debt to equity ratio of each peer (the beta of tax shields was assumed as equal to beta of the unlevered company).

Due to the lack of long term bonds for the peers (Lufthansa only had a convertible bond in the long term, Air France's bonds are not rated, IAG finances via CDS only and SAS has no active long term corporate bonds) I decided to estimate YTM for each peer basing on company's credit rating and following the Euro EU Compositive 15Y[21]. Then I just adjusted the cost of debt by its probability of default and loss given default[22].

After unlevering each beta (assuming beta of tax shields equal to beta unlevered) I calculated the average unlevered beta of the industry. Finally, I relevered the beta using Lufthansa's target net debt to equity ratio. This beta is between the upper and lower bounds of raw beta with a 95% confidence level. Thus, cost of equity is 7.82%.

The corporate tax rate for Lufthansa is 21.14%. We get an after-tax cost of debt of 2.68%.

This leads to a WACC of 5.49%.

Exhibit 49: Cost of debt calculations

Source: Bloomberg

	Lufthansa	Air France	IAG	SAS
Rating Moodys (actual or equivalent)	Baa3	Ba3	Baa3	B1
Equivalent Grade YTM Euro composite yield curve	BBB-	BB-	BBB-	B+
Classification	Investment Gra	Non-Investment G	Investment Grade	Highly Speculative
YTM Basing on EUR EU Composite 15Y	2.82%	5.45%	2.82%	5.46%
Prob of Default	0.25%	0.96%	0.25%	1.33%
Rank (assumed)	Sr. Unsec	Sr. Unsec	Sr. Unsec	Sr. Unsec
Loss given default	53.90%	53.90%	53.90%	53.90%
Rd	2.68%	4.93%	2.68%	4.75%
Beta d	0.28	0.69	0.28	0.66

Exhibit 50: WACC Calculations

Source: Author

WACC inputs	
rd	2.68%
tax rate	19.25%
rd after tax	2.17%
re	7.82%
Net Debt/Net Debt+Equity	0.41
Equity/Net Debt+Equity	0.59
WACC	**5.49%**

[20] "Valuation – Measuring & Managing the value of companies", 5th edition by Tim Koller, Mark Goedhart, David Wessels published by Wiley, page 237
[21] The Euro EU Composite 15Y gives the average yield to maturity of European bonds with a 15Y per credit rating
[22] Followed "Annual Default Study: Corporate Default and Recovery Rate 1920-2017", Moody's

DCF

The core free cash flows between 2021 and 2024 were computed. I used the WACC rate calculated previously and assumed a perpetual growth rate of **1.24%**[23] to compute core operating value and it by the non-core operations of the company mainly represented by pension costs. After deducting net debt and minority interests, I got an **equity value of 7588m EUR**. There isn't any equity issuance planned and there are no preferable shares, so I expect the number of shares outstanding to remain constant at **478.1943m**. This leads us to a **share price of EUR 15.87**. The **dividend yield is 6.05%** resulting in a **total shareholder gain per share of 3.66%.**

Company Group (in millions EUR)	**2021F**	**2022F**	**2023F**	**2024F**
Core Free Cash Flow	680	620	609	598
Discount Factor	0.948	0.899	0.852	0.808
Discounted Core Free Cash Flow	645	557	519	483
Terminal Value				14,324
Discounted Terminal Value				11,575
Core Value	**13,779**			
Non Core Invested Capital	-721			
Total Enterprise Value	13,059			
Net Debt	5,376			
Minority Interests	95			
Equity Value	**7,588**			
Shares outstanding	478.1943			
Price per share	**15.87**			
Expected Capital Gain	-2.38%			
Shareholder cash-in per share	**0.98**			
Dividend Yield	6.05%			
Total gain per share	**3.66%**			

	2015	**2016**	**2017**	**2018**	**2019F**	**2020F**	**2021F**	**2022F**	**2023F**	**2024F**
NOPLAT	1,369	1,760	2,361	2,208	1,504	1,458	1,447	1,466	1,484	1,503
Operating Invested Capital	13876	15751	15011	16328	17045	17879	18646	19492	20367	21272
Investment in Operating Investment Capital		1875	-741	1317	717	834	767	846	875	905
ROIC		11.17%	15.73%	13.52%	8.82%	8.16%	7.76%	7.52%	7.29%	7.06%
RONIC		20.84%	-81.15%	-11.58%	-98.30%	-5.41%	-1.54%	2.30%	2.07%	2.06%
RR		106.57%	-31.38%	59.66%	47.66%	57.22%	53.01%	57.74%	58.95%	60.20%
g		22.21%	25.46%	-6.91%	-46.85%	-3.09%	-0.82%	1.33%	1.22%	1.24%

[23] Assumed Lufthansa is headed towards the steady state considering ROIC, RR and g forecasts are stable. This value is well below the forecasts for the rest of the economy (World Bank 4.34% and Europe 4.24%). However, this value is deemed reasonable considering Lufthansa is a mature company in the European market where most of the growth is being captured by LCCs.

Sensitivity analysis

Exhibit 51: Sensitivity Analysis on Terminal growth rate and WACC

Source: Author

		Terminal growth rate				
		0.69%	0.74%	1.24%	1.74%	2.24%
WACC	6.47%	8.58	8.73	10.48	12.59	15.19
	5.97%	10.60	10.79	12.93	15.58	18.93
	5.47%	13.05	13.28	15.97	19.37	23.83
	4.97%	16.06	16.37	19.82	24.34	30.52
	4.47%	19.88	20.27	24.86	31.13	40.21

Exhibit 52: Sensitivity Analysis on Crude Oil Price

Source: Author

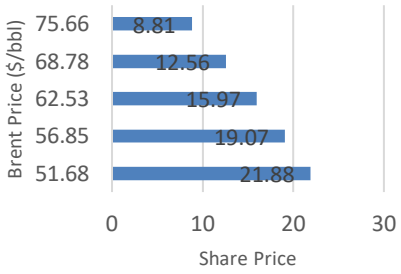


Exhibit 53: Sensitivity Analysis on Cost per Employee

Source: Author

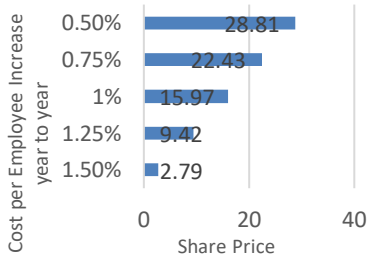


Exhibit 54: Sensitivity analysis on Yield and load factor in Europe

Source: Author

		Yield					
	15.97	-2.38%	-2.18%	-1.98%	-1.78%	-1.58%
Load Factor	0.58%	14.94	16.25	17.56	18.88	20.21
	0.38%	14.16	15.46	16.76	18.07	19.38
	0.18%	13.39	14.68	15.97	17.26	18.56
	-0.02%	12.63	13.90	15.18	16.47	17.76
	-0.22%	11.87	13.14	14.41	15.68	16.96

An analysis on the impact of the discount rate and terminal growth rate was conducted as well on some key value drivers mentioned in the Key Value Drivers section.

Exhibit 51 shows Lufthansa' share price in several scenarios of WACC and terminal growth rates. For each input we considered a variation of 0.5 p.p. As we can see Lufthansa' share price can fluctuate from 8.58 EUR to 40.21 EUR in these given scenarios which leads us to conclude share price is highly dependent upon these two inputs. This is because most of the value from Lufthansa comes from the perpetuity period.

An analysis of fuel price's impact on share price was also conducted. Despite crude oil being hedged up to 85% crude oil price still has a very significant impact on Lufthansa's stock price. This is because fuel costs account for 17% of total operating costs[24]. For example, if fuel price were to increase by 10% share price is expected to decrease by 3.41 EUR (Exhibit 52).

Next the impact of costs per employee on share price was considered. This test is especially relevant since it allows us to predict the impact on share price of possible developments in Lufthansa's negotiations with worker's unions. As we can see if costs per employee are to increase at a slightly higher rate than projected (1% per year) that would cause share price to plummet (Exhibit 53). In light of this fact, it is understandable the lack of success of several negotiations between Lufthansa and the worker's unions throughout 2019.

Finally, it was conducted one analysis on Lufthansa's sensibility to yield and load factor in its home market (Exhibit 54). In the base case load factor was increasing 0.18% per year in Europe and yield was dropping 1.98%. These two indicators are correlated: a higher load factor results in a lower yield. Fluctuations of 0.20 percentage points were considered for the analysis between each scenario. Between the best-case scenario and the worst-case scenario Lufthansa's share price oscillated between 20.21 and 11.87. Lufthansa's share price is particularly sensitive to variation in yield. In fact, if yield decreases 20 decimal points more than projected share price would drop 1.31 EUR.

[24] Mentioned in the Competitors section

Multiples Valuation

Lufthansa's main competitors are Ryanair, Air France KLM, IAG, SAS and EasyJet.

Even though Ryanair and EasyJet are main competitors of Lufthansa they have clearly different business models and different value drivers and for this reason cannot be considered comparable.

Despite Lufthansa having a low-cost airline segment in the form of the Eurowings[25] it only accounts for 12% of its revenues. Thus, it is more reasonable to compare Lufthansa with Air France KLM which owns Transavia or IAG which owns Vuelling, their respective low-cost carriers.

After rejecting low cost carriers, it was also decided to not consider gulf carriers for similar reasons. These carriers pay close to no taxes thanks to very low corporate rates and have access to subsidized funding and subsidized oil thus they follow different ratios. The most important gulf carriers are Turkish Airlines, Emirates, Qatar Airlines and Etihad.

The criteria followed were airlines with similar market capitalization, operating under similar market conditions and operating mostly in passenger transportation but which preferably also operate in also cargo transportation MRO operations and Catering.

Having selected our peers our first step was to calculate the multiples for each of our peers. EV/EBITDA, P/E[26], EV/EBIT, Price to book Value, EV/Revenue and EV/EBITDAR were the multiples considered. They were calculated using the most recent company data. Across all multiples Lufthansa is trading below the peer's average. The average implied share price is 17.02€.

Exhibit 55: Market Valuation of Lufthansa and its peer group

Source: Company Data

	EV/EBITDA	P/E	EV/EBIT	P/Book	EV/Revenue	EV/EBITDAR
AF FP Equity	2.81 X	-43.97 X	11.82 X	2.28 X	0.40 X	2.81 X
IAG LN Equity	3.84 X	6.62 X	6.27 X	2.16 X	0.76 X	3.14 X
SAS SS Equity	3.08 X	9.38 X	8.83 X	1.11 X	0.20 X	3.72 X
LHA AG Equity	3.05 X	5.40 X	8.67 X	0.83 X	0.37 X	2.93 X
Mean	**3.20 X**	**7.13 X**	**8.90 X**	**1.60 X**	**0.43 X**	**3.15 X**

[25] Eurowings competes with Ryanair and Easyjet in short-haul segment but in the long-haul competes with other leisure airlines. This lack of strategic focus was one of the reasons that lead to the decision to start reducing the long-haul segment.

[26] AF KLM P/E was not considered because earnings were negative.

Financial Statements

Income Statement

Company Group in Millions of EUR	2018	2019F	2020F	2021F	2022F	2023F	2024F
Network Airlines							
Traffic Revenue Europe	9,113	9,299	9,520	9,780	10,058	10,345	10,640
Traffic Revenue America	7,234	7,279	7,391	7,555	7,742	7,934	8,131
Traffic Revenue Asia Pacific	4,079	4,156	4,258	4,383	4,518	4,658	4,803
Traffic Revenue Middle East	1,566	1,551	1,564	1,594	1,633	1,672	1,712
Network Airlines Revenue	21,992	22,286	22,733	23,311	23,951	24,609	25,285
Eurowings							
Traffic Revenue Short Haul	3,168	3,174	3,264	3,367	3,475	3,581	3,685
Traffic Revenue Long Haul	1,044	1,038	1,032	1,026	1,020	1,015	1,009
Eurowings Revenue	4,212	4,211	4,296	4,393	4,495	4,596	4,694
MRO Revenue	3,812	3,965	4,125	4,290	4,463	4,642	4,829
Logistics							
Europe Cargo Revenue	208	215	222	229	237	245	252
America Cargo Revenue	1123	1168	1213	1258	1302	1348	1396
Asia Pacific Cargo Revenue	1,164	1,252	1,348	1,455	1,571	1,696	1,831
Middle East Cargo Revenue	186	185	191	197	203	209	216
Logistics Revenue	2,681	2,820	2,974	3,140	3,313	3,497	3,695
Catering revenue	2,499	2,528	2,557	2,587	2,617	2,648	2,679
Other Revenue	648	654	661	668	674	681	688
Total Revenue	35,844	36,464	37,346	38,389	39,514	40,673	41,870
Other Operating Income	1,818	2,480	2,540	2,611	2,687	2,766	2,847
Total Operating Income	37,662	38,944	39,885	41,000	42,201	43,439	44,717
Changes in inventories and work performed by entity	531	332	340	350	360	371	382
Aircraft Fuel and Lubrificants	6,087	6,077	6,142	6,249	6,351	6,453	6,557
Other than Aircraft Fuel and Lubrificants	12,582	13,626	13,956	14,345	14,766	15,199	15,646
Total Cost of materials and services	18,669	19,703	20,098	20,595	21,116	21,652	22,202
Staff Costs	8,811	9,188	9,571	9,956	10,345	10,748	11,165
Total operating expenses	32,657	34,763	35,682	36,732	37,824	38,949	40,110
EBITDA	5,005	4,181	4,203	4,267	4,377	4,490	4,607
Total depreciation, amortization and impairment	2,205	2,274	2,354	2,433	2,518	2,608	2,701
EBIT	2,800	1,907	1,849	1,834	1,859	1,882	1,906
NOPLAT	2,208	1,504	1,458	1,447	1,466	1,484	1,503
Non Core							
Interest income	68	126	126	101	95	90	85
Total Result of equity Investments	174	133	133	133	133	133	133
Other financial items	-46	180	180	180	180	180	180
Non Core Result before Taxes	196	439	439	414	408	402	397
Non Core Taxes	49	110	110	104	102	101	99
Non Core Profit	147	329	329	311	306	302	298
Financials							
Interest Expenses	-212	-294	-294	-237	-222	-210	-198
Financial Result before Taxes	-212	-294	-294	-237	-222	-210	-198
Tax Shield	53	74	74	59	55	52	49
Financial Result after taxes	-159	-221	-221	-178	-166	-157	-148
Financials Result	-641	-221	-221	-178	-166	-157	-148
Net profit (loss)	**2,196**	**1,612**	**1,567**	**1,580**	**1,605**	**1,629**	**1,652**

Balance Sheet

Company Group in Millions of EUR	2018	2019F	2020F	2021F	2022F	2023F	2024F
Operating Cash	717	729	747	768	790	813	837
Intangible Assets	1,893	1,737	1,835	1,893	2,012	2,098	2,179
Aircraft and reserve engines and repairable parts	18,909	19,502	20,199	20,896	21,620	22,404	23,220
PPE	2,221	2,376	2,434	2,502	2,575	2,650	2,728
Contract Assets	234	234	234	234	234	234	234
Inventories	968	1,022	1,042	1,068	1,095	1,123	1,151
Accounts Receivable	5,576	5,673	5,810	5,972	6,147	6,327	6,513
Loans and Receivables	512	546	560	575	592	609	627
Derivative Financial Instruments	570	1,189	1,218	1,252	1,289	1,327	1,366
Deferred Expenses	335	238	243	250	257	265	273
Other deferred tax asset	-200	182	287	397	512	633	759
Core Assets	**31,735**	**33,428**	**34,608**	**35,806**	**37,124**	**38,484**	**39,888**
Contract Liabilities	2,338	2,378	2,436	2,504	2,577	2,653	2,731
Deferred Tax Liability	583	488	499	513	528	544	560
Income Tax	715	487	472	468	475	481	487
Accounts Payable	5,901	5,752	5,867	6,012	6,164	6,321	6,481
Other Provisions	1,462	1,687	1,727	1,776	1,828	1,881	1,937
Deferred Income	439	1,916	1,962	2,017	2,076	2,137	2,200
Liabilities from unused flight documents	3,969	3,676	3,765	3,871	3,984	4,101	4,221
Core Liabilities	**15,407**	**16,383**	**16,729**	**17,160**	**17,632**	**18,117**	**18,616**
Core Invested Capital	**16,328**	**17,045**	**17,879**	**18,646**	**19,492**	**20,367**	**21,272**
Pensions Provisions and respective deferred tax asset	3,534	3,816	3,816	3,816	3,816	3,816	3,816
Securities	1,776	2,268	2,268	2,268	2,268	2,268	2,268
Equity Investments	896	788	788	788	788	788	788
Assets held for sale	9	39	39	39	39	39	39
Non Core Invested Capital	**-853**	**-721**	**-721**	**-721**	**-721**	**-721**	**-721**
Total Invested Capital	**15,475**	**16,324**	**17,158**	**17,925**	**18,771**	**19,646**	**20,551**
Excess Cash	783	-1,047	0	0	0	0	0
Financial Debt	6,685	6,685	6,685	5,376	5,037	4,759	4,494
Newly issued debt	0	0	-1,309	-339	-277	-265	-252
Total Debt	6,685	6,685	5,376	5,037	4,759	4,494	4,242
Net Financial Assets	**-5,902**	**-5,638**	**-5,376**	**-5,037**	**-4,759**	**-4,494**	**-4,242**

Cash Flow Statement

Company Group in Millions of EUR	2018	2019E	2020E	2021E	2022E	2023E	2024E
Core Business							
NOPLAT	2,208	1,504	1,458	1,447	1,466	1,484	1,503
Depreciation	2,181	2,249	2,329	2,407	2,492	2,581	2,673
Operational Cash Flow	4,389	3,753	3,787	3,854	3,958	4,065	4,176
Invested Capital - Fixed Assets	23,023	23,615	24,467	25,290	26,208	27,153	28,127
Gross CAPEX	-1,911	-592	-852	-823	-917	-945	-975
Net Capex	-4,092	-2,841	-3,181	-3,230	-3,409	-3,526	-3,648
NWC	1,360	1,672	1,732	1,796	1,868	1,943	2,021
Other Investments	-8,055	-8,242	-8,320	-8,440	-8,583	-8,729	-8,876
Δ NWC	80	-312	-60	-64	-72	-75	-78
Δ Other Investments	514	187	78	120	143	145	148
Investment Cash Flow	-3,498	-2,966	-3,163	-3,174	-3,338	-3,456	-3,578
Core Free Cash Flow	**891**	**787**	**624**	**680**	**620**	**609**	**598**
Non Core Business							
Non Operational Cash Flow	147	329	329	311	306	302	298
Invested Capital	-853	-721	-721	-721	-721	-721	-721
Investment Cash Flow	1,081	-132	0	0	0	0	0
Non Core Free Cash Flow	1,228	197	329	311	306	302	298
Free Cash Flow	**2,119**	**984**	**953**	**990**	**925**	**911**	**896**
Financial							
Financial Result	-159	-221	-221	-178	-166	-157	-148
Change in Net Financial assets	-227	-264	-262	-339	-277	-265	-252
Net change in Equity	-1,843	-594	-565	-569	-576	-583	-590
Minority Interests	110	95	95	95	95	95	95
Financing Cash Flow	**-2,119**	**-984**	**-953**	**-990**	**-925**	**-911**	**-896**

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Buy	Expected total return (including expected capital gains and expected dividend yield) of more than 10% over a 12-month period.
Hold	Expected total return (including expected capital gains and expected dividend yield) between 0% and 10% over a 12-month period.
Sell	Expected negative total return (including expected capital gains and expected dividend yield) over a 12-month period.

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