Equity Research Report
Deutsche Lufthansa AG

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Universidade do Minho
Escola de Economia e Gestão

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Master's Project
Master in finance

Work supervised by
Professor Doctor Artur Rodrigues

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Contents

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Acknowledgments

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Despacho RT - 31 /2019 - Anexo 3

DIREITOS DE AUTOR E CONDIÇÕES DE UTILIZAÇÃO DO TRABALHO POR TERCEIROS

Despacho RT - 31 /2019 - Anexo 4

STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

Resumo

O objetivo deste projeto, que é um relatório de avaliação da empresa Lufthansa, é aconselhar os investidores a comprar, vender ou manter suas ações da empresa. O estudo inclui os principais segmentos de negócios da empresa, bem como uma análise das perspetivas industrial e nível de concorrência do setor de aviação. Depois disso, avaliamos a empresa usando diferentes abordagens de avaliação para determinar os riscos de investimento aos quais a empresa está exposta.

Palavras-Chaves: Avaliação, Aviação, Companhia Aérea, Investimento, Lufthansa, Recomendação

Abstract

The purpose of this study, which is an equity research report on Lufthansa, is to advise investors whether to buy, sell, or hold onto their business stock. The study includes the company's key business segments as well as an analysis of the aviation sector's outlook and level of competition. After that, we will assess our company using different valuation approaches to determine the investment risks to which our company is exposed.

Keywords: Airline, Aviation, Investment, Lufthansa, Recommendation, Valuation

Research Snapshot

Deutsche Lufthansa AG is a German flight carrier founded in January 1953 and began its operations in April 1955.The company is headquartered in Cologne and its hubs are Frankfurt and Munich Airport. The company flies over 220 destinations around the world with a fleet of 277 aircraft. The company shares are traded on German Stock Exchange DAX since 1966, despite the company being a state-owned company until 1994.The company operates in the airline industry.

The company value at the end of 2023 is €30,3 Billion, an implied share price of €22,60 from the DCF Valuation (Appendices 9.2&9.3), and an implied share price of €2,16 from the relative valuation (Appendix 10). We set 75% for the DCF Firm valuation and 25% for the multiple valuation (Appendices 9 & 10). We issue a **buy** recommendation due to the target price being higher than the stock of the day of April 28,2023.

Recommendation	*BUY*
Target Price	€17,49
Market Capitalization	€11627,35 million
Shares Outstanding	1195 million
Benchmark	DAX
Upside	80%
Stock Price (April 28,2023 17:35 CET)	€9,73

In 2022, Kuehne and BlackRock are the major shareholders of the company with 15% and 6% respectively, followed by Goldman Sachs Assets Management and Amundi Asset Management both with almost 3% (Figure 1).

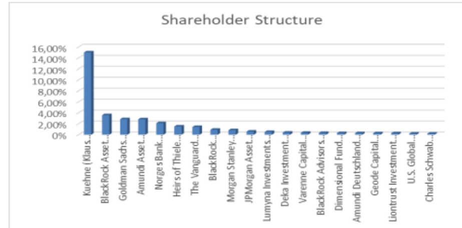

Figure 1 Shareholder Structure in 2022

The Lufthansa Group is vulnerable to financial risks such as interest rate concerns, currency risk, and operational risks. These risks include currency rate fluctuations, interest rate risk, and gasoline price volatility. Exchange rate fluctuations affect the global sale of airline tickets, fuel, aircraft, and replacement parts. Negotiating interest rate swaps with fixed rates on financial debt and leasing liabilities in euros includes exposure to interest rate risk. Crude oil price hedging reduces fuel price risk. For up to 24 months, up to 4% of exposure is hedged monthly (Figure 2).

Operational risks are operational hazards to which airlines are subject during operations. Staff and pilot shortages, airport capacity issues, climate change, uncertainties about business travel, aircraft safety and regulation, and disruptive passengers are among them. Staff shortages are driven by a faster-than-expected post-covid bounce, low wages, and an increase in the cost of living. Pilot shortages have existed since pre-covid times and are expected to intensify over time. Due to a labor shortage, airport capacity difficulties are a concern, resulting in significant delays in the processing of passengers and aircraft (Figure 2).

FINANCIAL RISKS	**OPERATIONAL RISKS**
EXCHANGE RATE MOVEMENTS	STAFF SHORTAGE
INTEREST RATE	PILOT SHORTAGE
FUEL PRICE	AIRPORT CAPACITY ISSUE
	CLIMATE CHANGE
	UNCERTAINTY ABOUT BUISNESS TRAVEL
	AIRCRAFT SAFETY & REGULATION
	UNRULY PASSENGER

Figure 2 Investments Risks

Business Segments

Our business segment estimates are based on the historical data average for each business segment.

Passengers will make up 65.4% of business categories in 2023, while maintenance, repair, and overhaul (MRO) will make up 21%. Logistics will account for 14.3% of the company's business sectors in 2023, with catering accounting for 8.1% and supplementary business and group services accounting for the remaining 2.7% (Appendix 2 & Figure 3).

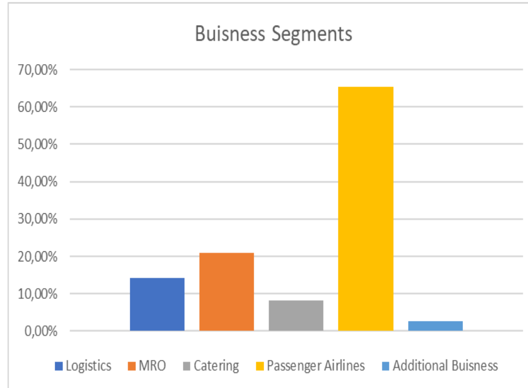

Figure 3 Business Segments of the company for 2023

Passengers Airlines

Lufthansa, Swiss, Austrian, and Brussels Airlines provide premium services to their consumers with high-quality products, whereas Eurowings focuses on point-to-point flights. Aside from Lufthansa, the international network of Lufthansa enterprises includes the following airlines: Austrian, Brussels Airlines, and Swiss. This network provides customers with good in-flight services and a variety of hubs, providing greater travel options. At the regional level, its network includes not only its regional affiliate, CityLine, but also the firms Air Dolomiti, Edelweiss Air, and Germanwings, which later discontinued operations. The group planned to start Eurowings Discover, a new company dedicated entirely to seasonal flights, in June 2021.

The Eurowings business segment includes flying operations for Eurowings and Eurowings Europe, as well as an equity holding in SunExpress. The company caters to business clients and concentrates on point-to-point flights throughout Europe; nevertheless, it also offers low-cost flights, providing customers with service flexibility.

Logistics

In addition to its freight arm, Lufthansa Cargo AG, the logistics sector includes the Jettainer group and the time:maters subsidiary, which specializes in extremely big shipments. The sector in question also includes the Heyworld subsidiary that specializes in e-commerce solutions and an investment in the freight business AeroLogic.

MRO

The company operates a maintenance service through its subsidiary, Lufthansa Technik. Its maintenance arm is a global leader in commercial aircraft maintenance, repair, and overhaul. The subsidiary serves over 800 customers worldwide, ranging from leasing businesses to airlines.

Catering

In terms of catering, the company, through its subsidiaries LSG Group and LSG Sky Chefs, provides a comprehensive range of products and services linked to on-board service, meeting the requirements of airlines according to strict sanitary standards.

Geographical Business Segments

Our 2023 projections are based on the historical average for each location. Germany will account for 26% of the geographical business categories in 2023, with the rest of Europe accounting for 33%. The United States and Asia/Pacific account for 21% and 10%, respectively. Finally, the American continent, excluding the United States, accounts for 2.4% and 2.7%, respectively, while the Middle East and African continents account for 2.2% and 1.7%, respectively. (Appendix 1 and Figure 4).

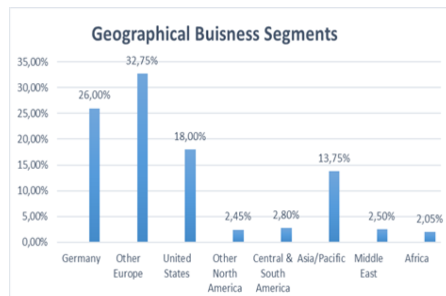

Figure 4 Geographical Business Segments

Expenses

Revenue will account for more than half of the company's operational expenses by 2023. The labor expenditures related to the company's staff costs exceed 25% of the company's annual expenses. Administrative, selling, and general expenses make for only about 3% of the airline's annual expenses. (Appendix 4 and Figure 5).

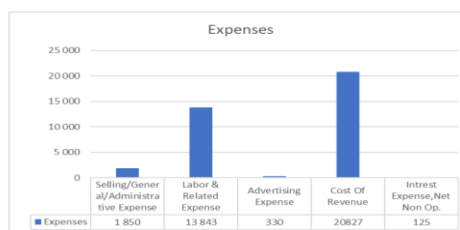

Figure 5 Drivers of Expenses

Industry Overview and Competitive Positioning

The airline industry in Europe has changed dramatically in recent years because of new entrants, increased competition, and technological advancements.

Industry Overview

The European Union (EU) recorded 665 million air passengers in the first nine months of 2022, a 64% increase over 2021 (Eurostat,2023). The growing demand for air travel in Europe can be attributed to airlines' flexible pricing plans, numerous routes, and ease of travel. However, the breakout of the COVID-19 pandemic in 2020 had a huge impact on the sector, resulting in reduced passenger numbers, grounded fleets, and fleet retirements. As a result, the industry is aggressively reorganizing, with airlines investing in new business models such as low-cost carriers and hybrid airlines to remain competitive.

Competitive Positioning

Legacy carriers like as Air France-KLM, Lufthansa, and British Airways dominate the European airline market with extensive route networks and premium services. However, the emergence of low-cost carriers such as Ryanair and easyJet has upset traditional airlines' market position. Low-cost airlines are distinguished by their low fares, point-to-point flights, and simpler services, which make them appeal to budget-conscious customers. Legacy airlines, on the other hand, have embraced technology to improve customer satisfaction and operational efficiency. For example, British Airways has biometric boarding gates and self-service luggage drop-off systems in place, while Air France-KLM has a smartphone app that allows consumers to track their flights and buy in-flight services.

Market share, operational expenses, and profitability all have an impact on an airline's competitive position in the industry. Low-cost airlines in Europe have a market share of roughly 32.5% in the first three quarters of 2022 (Eurocontrol,2022), demonstrating their growing popularity among passengers. Legacy airlines have responded to this competition by using cost-cutting techniques to reduce operational expenditures while keeping prices cheap. Lufthansa, for example, has introduced economy light rates that eliminate luggage and seat selection, while Air France-KLM has formed a new low-cost airline, Transavia France, to fly on leisure routes. Fuel prices, exchange rates, and regulatory requirements all have an impact on airline profitability.

Finally, the European aviation sector is undergoing significant changes because of increased competitiveness and the COVID-19 outbreak. Low-cost carriers are putting large airlines out of business, compelling them to adopt new business models and cost-cutting methods. The competitive stance of airlines is influenced by market share, operating expenses, and profitability. As the industry recovers from the epidemic, airlines must find innovative ways to meet evolving consumer expectations while remaining competitive in the market.

Porter Five Forces Model

The Porter's Five Forces Model is a technique for analyzing the amount of competition in an industry or market. This principle is used to Lufthansa in the following study:

Threat of New Entrants

Due to the significant financial and resource needs, there may be an entry barrier for new enterprises in the aviation industry. Airlines must also manage the complex regulatory structure, safety standards, and government instructions. As a result, Lufthansa has little competition.

Bargaining Power of Suppliers

Because Lufthansa is a large airline, it has negotiating power with vendors. However, the aviation industry's reliance on fuel suppliers may have an impact on profitability. Furthermore, providers of aircraft and replacement components are formidable negotiators, particularly for more current types of aircraft. As a result, Lufthansa's suppliers have minimal bargaining power.

Bargaining Power of Buyers

Customers in the airline industry, particularly in the leisure market, wield considerable bargaining power. Customers have numerous options, and it is simple to evaluate pricing and services. Lufthansa has responded by broadening its range, including low-cost options, to cater to various market segments. As a result, purchasers have significant bargaining power over Lufthansa.

Thereat Of Substitutes

The emergence of other modes of transportation, such as trains, buses, and ride-sharing services, has increased the risk of airline replacements. However, for many travelers, particularly those traveling long distances, plane travel remains the quickest and most convenient option. As a result, Lufthansa confronts a minor threat of competition.

Competitive Rivalry

With so many companies offering similar services, the airline industry is tremendously competitive. Low-cost airlines such as Ryanair and EasyJet compete with Lufthansa, as do other significant airlines such as British Airways, Air France-KLM, and Emirates. Lufthansa faces fierce competition in the market.

Conclusion

Lufthansa faces little competition in the aviation business due to its high financial and resource requirements, regulatory framework, safety standards, and governmental directives. Suppliers have limited bargaining power, whereas customers have substantial bargaining leverage against Lufthansa. Substitutes have increased the risk of replacements, but for many tourists, air travel remains the quickest and most convenient alternative. Lufthansa competes strongly in the market with other large airlines such as British Airways, Air France-KLM, and Emirates, as well as low-cost carriers such as Ryanair and EasyJet.

Valuation

DCF Valuation

The gap between our yearly income and our entire operating expenses will serve as our earnings before interest and tax. To begin with, we must project revenue, and we assume that it will increase at a rate consistent with historical averages. The three types of expenses—labor, marketing, and finally selling general and administrative—that make up overall expenses will all be represented as a percentage of revenue for the purposes of our assumptions, and the projected expenses will be calculated using the historical average percentage of revenue (Appendix 5).

The capital expenditure and depreciation assumptions will be stated as a percentage of the baseline PP&E. The predicted D&A and CAPEX will be an average of the previous past data of the percentage of the beginning PP&E for each of them (Appendix 4).

To calculate the change in working capital, we must first compute net working capital, which is the difference between current assets (accounts receivable, inventory goods, and current assets) and current liabilities (accounts payable and other current liabilities) (Appendix 3).

The number of days sales are outstanding is determined by the ratio of receivable accounts to yearly revenue multiplied by the number of opening days, or 360 days. The inventory days outstanding are determined by multiplying the goods inventory to the yearly cost of sales by the opening days, or 360 days. Days payable outstanding will be determined as the ratio of payable accounts to annual cost of revenue multiplied by 360 days. For the sake of consistency, the other current assets and liabilities will be represented as a percentage of revenue. Our net working capital predictions will be based on an average of the preceding period data, with assumptions made for outstanding days as well as other current assets and liabilities (Appendix 3). The difference between the actual current assets and liabilities and the prior one shows the change in working capital.

Bottom-Up Beta

For the bottom-up beta, we'll collect numerous leveraged betas from various airlines and lever them based on their individual debt/equity ratio received from the internet and the nation tax rate obtained from the Damodaran website. In the following phase, the medians of equivalent levered beta, the debt/equity ratio, and, lastly, the tax rate will be calculated. The median unlevered beta is our unlevered beta, which is used in the CAPM formula to calculate our cost of equity (Appendix 8).

WACC

The company's unlevered beta is calculated by comparing our airline's unlevered beta to that of other airlines using their levered beta (Appendix 8). Our risk-free rate is based on a 10-year German Treasury Bond, and our default spread is the rated bond from our company, which is a BB+ corporation according to S&P (Lufthansa Investors Relations, Credit Ratings). Our risk premium and default spread are obtained from the Damodaran website; the default spread is chosen based on the previously mentioned rating. The CAPM formula will be used to compute the cost of equity. The cost of debt is the sum of the risk-free rate and the default spread (Figure 6).

WACC	
Beta Levered	1,14
Beta Unlevered	0,35
Equity Risk Premium	5,94%
Risk Free Rate	2,31%
Default Spread	2,42%
Tax Rate (%)	30,00%
Cost Of Equity	11,51%
Cost Of Debt	4,73%
After Tax Cost of Debt	3,31%
D/(D+E)	76,29%
E/(D+E)	23,71%
WACC	5,26%

Figure 6 Weighted Average Cost of Capital

Firm Value & Equity Value

To compute the firm value, add the discounted terminal value and the FCFFs (Appendix 9.2). For this DCF assessment, we use our weighted average cost of capital as the discount rate (Figure 6), and our risk-free rate as our growth rate. The use of the risk-free rate as the growth rate in the terminal value calculation is based on the concept of a company's long-term sustainable growth rate. It is used as a benchmark to gauge the return on riskier investments and is frequently utilized as a proxy for the whole market's predicted return. The justification for choosing the risk-free rate as the growth rate is that when a company matures and achieves stability, its growth rate will align with that of the broader economy, which is generally approximated by the risk-free rate. Our terminal value is calculated as the product of the next FCFF, which correspond to the 2027 FCFF multiplied by one plus the growth rate, divided by the difference between the cost of capital and our perpetual growth rate, with a value of €47 billion (Appendix 9.2) and €26,7 billion discounted at the cost of capital (Appendix 9.2 & Figure 6). Our company is worth €36,4 billion (Appendix 9.2).

The equity value is determined by adding the company's worth, cash and equivalents, and the difference between total debt and minority interest (Appendices 5 & 9.2). Divide the equity by the number of outstanding shares to get the share price, which is 1195 million (Appendix 6). The share price is calculated by dividing the equity value by the number of outstanding shares. The equity value is €27 billion, and the share price is €22,60 (Appendix 9.3).

Multiple Valuation

The underlying principle behind multiple valuation research is that companies with similar features should have comparable valuation ratios, such as price-to-earnings (P/E), price-to-sales (P/S), or enterprise value-to-EBITDA (EV/EBITDA). A realistic value range for the target firm can be determined by analyzing the multiples of comparable companies.

It will take six flag-carriers to implement this valuation approach. For this valuation, we require market and financial data for each comparable airline as well as for our own (Appendix 10), as well as data for four multiples, two enterprise multiples, and two financial multiples. We also need to obtain the average and median for each multiple of comparable airlines. However, for this valuation method, we will use the median rather than the average since outliers are considered in the average, which is the opposite of the median (Figure 7).

	Valuation			
Company	EV/Revenue	EV/EBITDA	Price/Earnings	Price/Sales
Deutsche Lufthansa AG	0,64	7,53	20,86	0,32
International Consolidated Airlines Group SA	0,69	4,38	-28,70	0,30
Air France KLM SA	0,32	2,27	2,65	0,07
SAS AB	1,15	30,02	-0,44	0,04
Aegean Airlines	0,81	3,81	10,31	0,47
Delta Air Lines	0,74	4,82	7,24	0,40
American Airlines Group	0,69	4,82	6,23	0,16
Average	0,73	8,35	-0,45	0,24
Median	0,72	4,60	4,44	0,23

Figure 7 Multiple Valuation

For the enterprise multiples, the enterprise implied value is the market value of equity (Appendix 10) and the median corresponding to the multiple; from there, subtract net debt to obtain the implied market value; from there, divide by the number of outstanding shares to obtain the value per share corresponding to each multiple (Figure 8).

For the financial multiples, the implied market value is obtained by the product of the company's net income and the median corresponding to each multiple (Appendix 10). The implied value per share is the implied market value divided by the outstanding shares (Figure 8).

Lufthansa Valuation	EV/Revenue	EV/EBITDA	Price/Earnings	Price/Sales
Implied Enterprise Value	€ 26 913,96	€ 14 727,55		
Net Debt	€ 11 977,36	€ 11 977,36		
Implied Market Value	€ 14 936,60	€ 2 750,19	€ 2 585,39	€ 8 649,66
Shares Outstanding	1 195	1 195	1 195	1195
Implied Value Per Share	€ 12,49	€ 2,30	€ 2,16	€ 7,24

Figure 8 Lufthansa Multiple Valuation

Recommendation

Due to the limitations of the relative valuation method, we assigned 75% of the weight to the DCF firm methodology and 25% to the multiple methodology. The implied share price for the FCFF approach is €22,60 (Appendix 9.3), whereas the Price/Earnings multiple estimated share price is €2,16 (Appendix 10). The target price is €17,49, which is 80% more than the market price of €9,73 on April 28, 2023. We recommend that you **buy it**.

Financial Analysis

Quick Ratio

The quick ratio measures a company's ability to meet its obligations and suffers a significant decrease between 2019 and 2020, which can be explained by the interruption of activity caused by COVID-19, falling from 34,79% in 2019 to 11,73% in 2020, reaching a minimum in 2021, and increasing in 2022.For the anticipated period of 2023-2027, the ratio will be extremely near to one until 2026 and will approach one in 2027 (Appendix 12.1 & Figure 9).

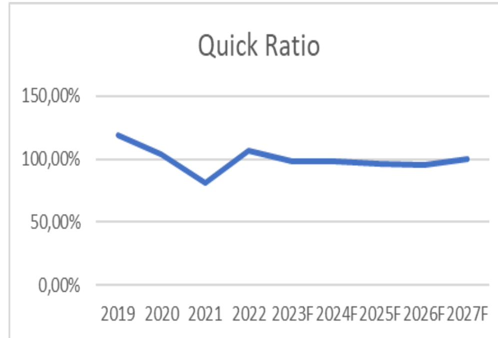

Figure 9 Quick Ratio

Current Ratio

The current ratio assesses a company's ability to meet its obligations in the short term. Between 2019 and 2022, the ratio declines until 2021, when it reaches its lowest point, and then climbs until it reaches one in 2022. For the next five years, the firm ratio anticipates to stay close to one (Appendix 12.1 & Figure 10).

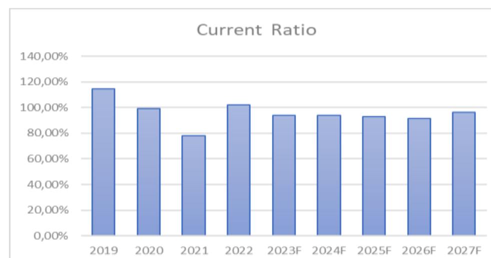

Figure 10 Current Ratio

Gross Profit Ratio

Regarding the 2019-2022 period, gross profit represents a proportion of the company's sales ranging between 39% and 47.5%, and gross profit is expected to constitute 44,55% of yearly revenue for the following five years (Appendix 12.2 & Figure 11).

Figure 11 Gross Profit Ratio

Operating Profit Ratio

The operating profit is the profit created by sales. The corporate profit created from sales represents 4,64% in 2019 and 3,76% in 2022 for the 2019-2022 period, and for the preceding period, which corresponds to the 2020 and 2021 years, the loss represents more than half of the sales in 2020 and increases in 2021 represent 13% this year. In the next five years, the company expects to create 2% of sales (Appendix 12.2 & Figure 12).

Figure 12 Operating Profit

Return On Capital

The return on capital, abbreviated as ROC, assesses the profitability of a corporation.From 2019 through 2022, the corporation has negative ROCs for two years in a row due to the pandemic, before recovering in 2022.The company's ROC will be damaged by the pandemic over the following five years, even if the company recovers well in 2022. The company's ROC in this time frame will be about 1% or slightly higher (Appendix 12.2 & Figure 13).

Figure 13 Return on Capital

Interest Coverage Ratio

The interest coverage ratio assesses a company's ability to repay its loan; if the ratio is less than one, it signifies that the company's profit is insufficient to meet its interest commitments. Between 2019 and 2022, the company shows ability to pay its debt because the ratio is far above one, except in 2020 due to interruption of activity, when the ratio is far below one, indicating that the company was very close to bankruptcy, and for the next five years it is expected that the company will be able to pay its debt (Appendix 12.3 & Figure 14).

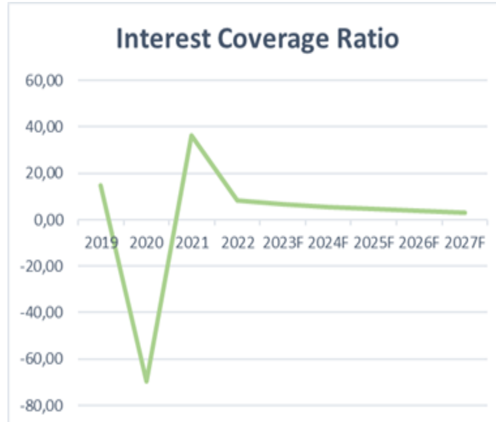

Figure 14 Interest Coverage Ratio

Inventory Turnover Days

For the 2019-2022 period, the company takes between 28 and 71 days to replace, implying that company sales were good; however, due to the pandemic, sales were divided by three in 2020 from 2019 and increased somewhat in 2021; the company took 71 days to replace its inventory in 2020. In the coming years, the company anticipates that it will take 16 days to replace its inventory and 8 days from 2023 to 2027 (Appendix 12.4 & Figure 15).

Figure 15 Turnover Days

Payable Turnover Days

Throughout the pandemic, the company took 126 days to pay their suppliers, but throughout the 2019-2022 period, excluding the epidemic, the company took 72 and 68 days, respectively, in 2019 and 2022.The company plans to pay their suppliers in 82 days for the anticipated period of March 23-27 (Appendix 12.4 & Figure 16).

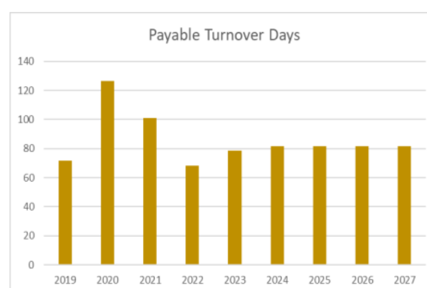

Figure 16 Payable Days

Receivable Turnover Days

For the 2019-2022 period, the corporation takes between 109 and 309 days to collect payments, with the number increasing from 2019 to 2020 due to COVID-19 and a lack of activity, and falling by nearly half from 2020. The corporation is likely to recoup its pre-covid collection days in the next years (Appendix 12.4 & Figure 17).

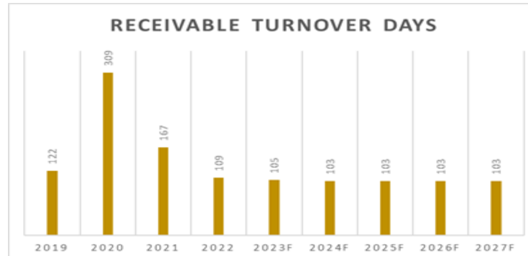

Figure 17 Receivable Days

Sensitivity Analysis

The equity risk premium and the total of the risk-free rate and the default spread are the inputs for this sensitivity analysis with a 0.5% variation. Our starting WACC is 5.26%. The company's worst WACC is 4,75%, which is 11% less than our base WACC, and its highest WACC is 5,76%, which is 9% higher than our base WACC. This indicates that if the equity risk premium and risk-free rate fall, so will our cost of capital (Appendix 11.1 & Figure 18).

	Risk Free Rate+ Default Spread				
Equity Risk Premium	3,73%	4,23%	4,73%	5,23%	5,73%
6,94%	5,29%	5,41%	5,53%	5,64%	5,76%
6,44%	5,15%	5,27%	5,39%	5,51%	5,63%
5,94%	5,02%	5,14%	5,26%	5,37%	5,49%
5,44%	4,88%	5,00%	5,12%	5,24%	5,36%
4,94%	4,75%	4,87%	4,98%	5,10%	5,22%

Figure 18 WACC Sensitivity Analysis

In the recommendation area, we set 75% for the DCF valuation approach and 25% for the multiple valuation method as our target price. Our base price is €17,49. The lowest target price is 14,22€, which is 23% lower than our baseline goal price, while the best target price is 21,82€, which is 24,8% higher (Figure 19). This discrepancy can be explained by the fact that the lower the firm and equity values are, the lower the target price will be. The poorest firm and equity values are €33,8 and €21,8 billion, respectively, and the greatest firm and equity values are €45,9 and €33,9 billion (Appendices 11.5 & 11.6).

Target Price				
€ 18,00	€ 16,94	€ 15,97	€ 15,06	€ 14,22
€ 18,87	€ 17,74	€ 16,71	€ 15,75	€ 14,86
€ 19,79	€ 18,59	€ 17,49	€ 16,47	€ 15,54
€ 20,77	€ 19,49	€ 18,32	€ 17,24	€ 16,25
€ 21,82	€ 20,45	€ 19,20	€ 18,06	€ 17,00

Figure 19 Target Price Sensitivity Analysis

Investments Risks

Financial Risks

The corporation is vulnerable to financial risks like interest rate concerns, like the price of oil, and currency rate dangers. Aside from financial concerns, the corporation has operational risks such as a labor shortage in the airline industry, weather conditions, and geopolitical risks such as the current Russian-Ukrainian conflict. This section focuses on the financial dangers that our firm faces. Exchange rate, interest rate, and gasoline price threats are examples.

Exchange Rate Movements

The risk connected with currency rates develops during the global sale of airline tickets, as well as the purchase of fuel, aircraft, and spare parts. The risk connected with currency rates develops during the global sale of airline tickets, as well as the purchase of fuel, aircraft, and spare parts. In terms of the group, a net position is taken for each currency to obtain an advantage over natural hedging. Because of the Lufthansa Group's unique susceptibility, the company hedges about 20 different currencies.

Interest Rate Risk

The Lufthansa Group usually pays the interest on its liabilities in euros. Interest rate swaps with fixed rates on financial debt and lease liabilities in euros can be structured to accomplish this. Currency interest rate swaps are used to hedge financial liabilities denominated in foreign currencies.

Fuel Price Risk

Fuel price variations can have a significant impact on the company's profits; however, fuel price risk is addressed by crude oil price hedging. The size of the hedge and the risk's time horizon are decided by the company's business strategy. In general, up to 4% of exposure should be hedged monthly for up to 24 months utilizing option structures and other hedges. To capitalize on market opportunities, the Executive Board could grant approval to extend the hedging period and increase the monthly hedging volume.

Operational Risks

This section focuses on the operational risks that our organization faces during operations and that are beyond the control of airlines. We examine staff and pilot shortages, airport capacity issues, climate change, uncertainty about business travel, aircraft safety and regulation, and boisterous passengers in the operational risk segment.

Staff Shortage

The aviation industry's labor shortfall was most apparent in 2022, when demand outpaced projections, having a substantial impact on both passengers and carriers on a global scale. This labor shortage in the airline business can be attributed to a faster-than-expected post-covid recovery, which made recruitment harder. To this must be added the fact that many employees have decided not to work in this business any longer and have reoriented themselves, as well as the low wages and rise in the cost of living. Wage increases are one option for compensating for a lack of staff, but the airlines are now unable to provide this increase.

Pilot Shortage

This pilot shortage has existed since pre-covid times, notably in some parts of the world, and is expected to grow with time. Many pilots have lost their employment because of the pandemic's decline in activity.

Airport Capacity Issue

Due to a staffing shortage, the busiest airports are having difficulty sustaining capacity. This is an issue for the industry once it is out of the airline's control. This causes significant delays in the processing of passengers and planes.

Climate Change

Climate change is a popular topic in the news, and it will affect the airline industry in a variety of ways. The determination to reduce carbon emissions has led in modifications in aviation technology, as well as fuel and aircraft location. Aside from initiatives to reduce carbon emissions by airlines, the business is very exposed to the effects of climate change. Several flights have been cancelled in recent years due to inclement weather, which is a severe worry.

Uncertainty regarding business travels

The changes in travel patterns caused by the COVID-19 epidemic pose a significant risk to the operations of several airlines. Business travel after COVID is harder to recover from than pleasure travel. Uncertainties and constraints that alter as the epidemic progresses, as well as the dangers of enforced quarantines, are a stumbling obstacle for business clients. When it comes to business travel recovery, a lot of experts believe it will be different since more meetings can be held remotely, which has become increasingly common in organizations over the last two years because of travel disruption. Face-to-face interactions will continue, but their frequency will be reduced.

Aircraft Safety and Regulation

Aviation is a protected and highly regulated business that has and will continue to pose a risk to airlines. Throughout operations, airlines rely on aircraft limits, and security stays out of reach.

The Boeing 737 MAX is a great example of what was mentioned in the previous paragraph. Even though the 737 MAX is still in service, problems have developed with the MAX10 type. Even if it is not immediately certified, the necessary cockpit changes will have a substantial influence on airline sales.

Unruly Passengers

Passengers' misbehavior on board poses a threat to airlines, as the frequency of such incidents has increased in recent years. These accidents endanger the crew and other passengers, putting flight safety at risk. These disgruntled passengers' actions could have serious consequences for the firm, causing delays and diversions. Unfortunately, thanks to the generosity of international aviation legislation, numerous activities perpetrated by passengers that risk the flight's safety go unpunished.

Corporate Governance & Executive Compensation

Corporate Governance

Lufthansa is a German airline that operates by the principles of transparency, accountability, and responsibility. The corporation's board structure is two-tiered, with a management board and a supervisory board.

The management board is appointed by the supervisory board and oversees the company's day-to-day operations. Members of the management board are accountable to the supervisory board and must report on the company's performance and strategy on a regular basis.

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The formation of other committees, such as the audit and nominating committees, to oversee various aspects of the company's operations is also part of Lufthansa's corporate governance practices. Furthermore, the corporation has established a code of conduct and ethics for its employees that explains the organization's values and ideals.

Lufthansa has put systems in place to ensure that shareholders have a say in the company's decision-making processes. For example, the corporation holds annual general meetings at which shareholders can vote on significant issues such as the election of board members and the approval of financial statements. Overall, Lufthansa's corporate governance rules are meant to promote openness, accountability, and responsible making decisions, all of which are vital to the company's long-term success.

Executive Board Compensation

Lufthansa's corporate governance structure includes policies and procedures for board remuneration. The company's management and supervisory boards are compensated in accordance with German corporate governance legislation and best practices.

The salary of Lufthansa's executive board is set by the supervisory board based on the recommendations of the company's remuneration committee. The executive board's remuneration is meant to mirror the company's performance and consists of a set salary, a variable bonus, and long-term incentive awards.

The salary of the supervisory board is also determined by the firm's remuneration committee and is based on a predetermined amount plus additional fees for committee participation. The amount of remuneration is reviewed on a regular basis to ensure that it is competitive and in accordance with industry standards.

Lufthansa's remuneration policy also includes measures for clawing back executive board remuneration in the event of misbehavior or poor performance, as well as disclosure requirements for board remuneration in the company's annual report.

Overall, Lufthansa's corporate governance structure consists of board remuneration policies and practices designed to enhance openness, responsibility, and responsible decision-making. Lufthansa intends to ensure that its board members are motivated to act in the best interests of the company and its shareholders by linking executive and supervisory board remuneration to company performance.

Conclusion

Lufthansa is a German airline with a two-tiered board structure that includes a management board and a supervisory board. The management board oversees the business's daily operations and is obligated to report on its performance and strategy on a regular basis. The firm has established a code of conduct and ethics for its employees, as well as regulations to ensure shareholders have a say in decision-making processes. Lufthansa's corporate governance system includes board compensation rules and procedures designed to promote openness, responsibility, and responsible decision-making. The executive board's compensation is designed to reflect the company's performance and includes base pay, variable bonuses, and long-term incentive awards. The compensation of the supervisory board is based on a set amount plus bonuses.

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Appendices

Appendix 1: Geographic Business Segments and Forecasts

	Geographic Segments								
	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Germany	27%	25%	26%	26%	26,00%	26,00%	26,00%	26,00%	26,00%
Europe	34%	32%	32%	33%	32,75%	32,75%	32,75%	32,75%	32,75%
USA	17%	16%	19%	20%	18,00%	18,00%	18,00%	18,00%	18,00%
North America	2,60%	2,80%	2,00%	2,40%	2,45%	2,45%	2,45%	2,45%	2,45%
C&S America	3,00%	2,80%	2,60%	2,80%	2,80%	2,80%	2,80%	2,80%	2,80%
Asia/Pacific	12,00%	17,00%	15,00%	11,00%	13,75%	13,75%	13,75%	13,75%	13,75%
Middle East	2,50%	2,50%	2,60%	2,40%	2,50%	2,50%	2,50%	2,50%	2,50%
Africa	1,90%	2,20%	2,20%	1,90%	2,05%	2,05%	2,05%	2,05%	2,05%

Appendix 2: Business Segments and Forecasts

	Buisness Segments									
	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Logistics	7,6%	6,8%	20,0%	23,0%	14,0%	14,3%	14,3%	14,3%	14,3%	14,3%
MRO	17%	19%	28%	24%	17%	21,0%	21,0%	21,0%	21,0%	21,0%
Catering	9,0%	9,2%	9,6%	6,6%	6,0%	8,1%	8,1%	8,1%	8,1%	8,1%
Passenger Airlines	75%	75%	53%	55%	69%	65,4%	65,4%	65,4%	65,4%	65,4%
Additional Buisness	2,8%	2,2%	3,5%	2,8%	2,0%	2,7%	2,7%	2,7%	2,7%	2,7%
Total Buisness	111,6%	112,0%	114,2%	111,1%	108,0%	111,4%	111,4%	111,4%	111,4%	111,4%
Reconciliation	11,6%	12,0%	14,2%	11,1%	8,0%	11,4%	11,4%	11,4%	11,4%	11,4%
Total Consolidated	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Appendix 3: Net Working Capital

Net Working Capital									
Fiscal Year	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Accounts Receivables	4 139	1 719	2 579	3 333	4 650	5 329	6 108	7 000	8 023
Merchandise Inventory	980	726	675	812	1 352	1 550	1 776	2 036	2 333
Other Current Assets	1 099	1 260	1 444	1 655	2 434	2 790	3 539	3 819	4 139
Current Assets	**6 218**	**3 705**	**4 698**	**5 800**	**8 436**	**9 669**	**11 423**	**12 855**	**14 495**
Accounts Payable	3 722	2 087	2 881	4 041	5 174	5 929	6 796	7 788	8 926
Other Current Liabilities	1 716	1 651	3 130	1 648	3 803	4 359	5 530	6 232	6 158
Current Liabilities	**5 438**	**3 738**	**6 011**	**5 689**	**8 977**	**10 288**	**12 326**	**14 020**	**15 084**

Assumptions									
Fiscal Year	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Revenue	36 424	13 589	16 811	32 770	37 557	43 043	49 331	56 537	64 796
COR	19 142	8 278	8 837	18 280	20 827	23 870	27 356	31 353	35 933
Days Sales Outstanding (DSO)	40,9	45,5	55,2	36,6	44,6	44,6	44,6	44,6	44,6
Days Inventory Outstanding (DIO)	18,4	31,6	27,5	16,0	23,4	23,4	23,4	23,4	23,4
Days Payable Outstanding (DPO)	70,0	90,8	117,4	79,6	89,4	89,4	89,4	89,4	89,4
Other Current Assets as a % of Revenue	3,0%	9,3%	8,6%	5,0%	6,5%	6,5%	7,2%	6,8%	6,4%
Other Current Liabilities as a % of Revenue	4,7%	12,1%	18,6%	5,0%	10,1%	10,1%	11,2%	11,0%	9,5%

Appendix 4: Fixed Assets

Fixed Assets Schedule									
Fiscal Year	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Beginning PP&E	18 997	22 390	19 513	18 672	19 221	19 396	19 573	19 751	19 931
D&A	2 692	2 561	2 259	2 276	2 373	2 394	2 416	2 438	2 460
CapEx	6 085	-316	1 418	2 825	2 548	2 571	2 594	2 618	2 642
Ending PP&E	**22 390**	**19 513**	**18 672**	**19 221**	**19 396**	**19 573**	**19 751**	**19 931**	**20 112**

Assumptions									
Fiscal Year	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
D&A as a % of Beginning PP&E	14,2%	11,4%	11,6%	12,2%	12,3%	12,3%	12,3%	12,3%	12,3%
CapEx as a % of Beginning PP&E	32,0%	-1,4%	7,3%	15,1%	13,3%	13,3%	13,3%	13,3%	13,3%

Appendix 5: Income Statements and Forecasts

Fiscal Years	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Revenue	35 542	36 424	13 589	16 811	32 770	37557	43043	49331	56537	64796
Cost of Revenue	17 836	19 142	8 278	8 837	18 280	20827	23870	27356	31353	35933
Gross Profit	17 706	17 282	5 311	7 974	14 490	16730	19174	21975	25185	28864
Selling/General/Admin. Expenses, Total	11 787	11 937	8 167	7 900	10 091	16024	18364	21047	24121	27645
Selling/General/Administrative Expense	1 311	1 231	1 091	868	1 028	1850	2121	2431	2786	3193
Labor & Related Expense	10 037	10 322	6 948	6 896	8 831	13843	15865	18183	20839	23883
Advertising Expense	439	384	128	136	232	330	378	433	497	569
Depreciation/Amortization	2 181	2 692	2 561	2 259	2 276	2373	2394	2416	2438	2460
Depreciation	2 083	2 590	2 427	2 158	2 175					
Amortization of Intangibles	98	102	134	101	101					
Interest Exp.(Inc.),Net-Operating, Total	-24	-115	-102	64	-151	-125	-182	-268	-399	-598
Unusual Expense (Income)	-24	110	1 746	-240	259					
Restructuring Charge	--	--	--	--	35					
Litigation	--	--	--	--	6					
Impairment-Assets Held for Use	-4	66	1 785	21	209					
Impairment-Assets Held for Sale	13	23	--	--	--					
Loss(Gain) on Sale of Assets - Operating	-33	21	22	29	-31					
Other Unusual Expense (Income)	--	--	-61	-290	40					
Other Operating Expenses, Total	986	969	28	309	783					
Other Operating Expense	1 896	2 012	1 052	1 106	1 570					
Other, Net	-910	-1 043	-1 024	-797	-787					
Total Operating Expense	32 742	34 735	20 678	19 129	31 538	36725	42052	48136	55076	62980
Operating Income	2 800	1 689	-7 089	-2 318	1 232	832	991	1195	1462	1816
Operating Tax	840	507	-2 127	-695	370	250	297	359	438	545
Net Income	1 960	1 182	-4 962	-1 623	862	582	694	837	1 023	1 271

Assumptions:	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Revenue Growth	2,48%	-62,69%	23,71%	94,93%	14,61%	14,61%	14,61%	14,61%	14,61%
COR as % of Revenue	52,55%	60,92%	52,57%	55,78%	55,45%	55,45%	55,45%	55,45%	55,45%
Operating Expenses									
Labor as% or revenue	28,34%	51,13%	41,02%	26,95%	36,86%	36,86%	36,86%	36,86%	36,86%
Marketing as % of revenue	1,05%	0,94%	0,81%	0,71%	0,88%	0,88%	0,88%	0,88%	0,88%
SGA as % of revenue	3,38%	8,03%	5,16%	3,14%	4,93%	4,93%	4,93%	4,93%	4,93%
Other opearting Expense as % of Revenue	5,52%	7,74%	6,58%	4,79%	6,16%	6,16%	6,16%	6,16%	6,16%
Other,Net as % of Revenue	-2,86%	-7,54%	-4,74%	-2,40%	-4,39%	-4,39%	-4,39%	-4,39%	-4,39%
Interest rate in %	-1,37%	-0,80%	0,40%	-0,95%	-0,68%	-0,68%	-0,68%	-0,68%	-0,68%
Corporate Tax Rate	30%	30%	30%	30%	30%	30%	30%	30%	30%

Appendix 6: Balance Sheet Statement and Forecasts

	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Assets (€ Millions)											
Cash and Short Term Investments	3 948	3 235	3 385	5 460	7 666	8 301	9728	11149	12777	14644	16783
Cash & Equivalents	1 218	1 434	1 415	1 806	2 307	1 790	3034	3477	3985	4568	5235
Short Term Investments	2 730	1 801	1 970	3 654	5 359	6 511	6694	7671	8792	10076	11548
Accounts Receivable - Trade, Net	3 985	4 246	4 139	1 719	2 579	3 333	4617	5292	6065	6951	7966
Total Receivables, Net	5 371	5 868	5 847	3 267	4 114	4 675	5110	5857	6712	7693	8817
Receivables - Other	1 386	1 622	1 708	1 548	1 535	1 342	493	565	648	742	851
Total Inventory	907	968	980	726	675	812	719	823	944	1082	1240
Inventories - Raw Materials	663	813	888	650	618	724					
Inventories - Other	244	155	92	76	57	88					
Prepaid Expenses	197	217	245	193	208	287	365	418	479	549	629
Other Current Assets, Total	606	366	828	394	812	1 180	1 099	1 260	1 444	1 655	1 896
Discountinued Operations - Current Asset	6	9	369	134	270	319					
Other Current Assets	600	357	459	260	542	861					
Total Current Assets	11 029	10 654	11 285	10 040	13 475	15 255	17 020	19 507	22 356	25 622	29 365
Property/Plant/Equipment, Total - Gross	36 249	38 581	42 601	41 273	41 629	43 245	38617	38969	39323	39681	40043
Land/Improvements - Gross	2 648	2 717	4 715	4 703	4 667	4 814					
Machinery/Equipment - Gross	32 025	34 213	36 292	35 012	35 432	36 911					
Other Property/Plant/Equipment - Gross	1 576	1 651	1 594	1 558	1 530	1 520					
Property/Plant/Equipment, Total - Net	17 519	18 997	22 390	19 513	18 672	19 221	19 396	19 573	19 751	19 931	20 112
Accumulated Depreciation, Total	-18 730	-19 584	-20 211	-21 760	-22 957	-24 024	-19221	-19396	-19573	-19751	-19931
Goodwill, Net	713	736	736	510	511	356	531	636	762	913	1 093
Goodwill - Gross	1 027	1 050	1 044	1 038	1 037	1 039	1349	1616	1936	2319	2779
Accumulated Goodwill Amortization	-314	-314	-308	-528	-526	-683	-818	-980	-1174	-1407	-1685
Intangibles, Net	1 122	1 157	1 206	1 128	1 097	1 072	1046	1013	973	924	866
Intangibles - Gross	2 109	2 239	2 355	2 390	2 474	2 559	2660	2765	2875	2989	3107
Accumulated Intangible Amortization	-987	-1 082	-1 149	-1 262	-1 377	-1 487	-1614	-1752	-1902	-2065	-2241
Long Term Investments	838	937	981	709	717	665	648	633	619	606	594
LT Investment - Affiliate Companies	585	650	672	403	434	392	370	350	331	313	295
LT Investments - Other	253	287	309	306	283	273	278	283	288	293	299
Note Receivable - Long Term	487	522	501	474	590	596	624	653	683	715	748
Other Long Term Assets, Total	4 070	5 210	5 560	7 110	7 476	6 170	7258	8997	12599	22086	50960
Deferred Charges	9	118	116	91	74	88	297	1003	3387	11434	38603
Defered Income Tax - Long Term Asset	1 661	2 131	2 268	4 833	4 661	2 928	3555	4316	5241	6363	7726
Other Long Term Assets	2 400	2 961	3 176	2 186	2 741	3 154	3406	3678	3971	4288	4631
Total Assets	35 778	38 213	42 659	39 484	42 538	43 335	67496	69821	74027	84140	113668
Liabilities (€ Millions)											
Accounts Payable	3 431	3 912	3 722	2 087	2 881	4 041	5053	5791	6636	7606	8717
Accrued Expenses	1 033	434	425	1 335	685	39	1232	1412	1619	1855	2126
Notes Payable/Short Term Debt	0	0	0	0	0	0	0	0	0	0	0
Current Port. of LT Debt/Capital Leases	690	1 716	1 651	3 130	1 648	1 902	2673	3755	5276	7414	10417
Other Current liabilities, Total	7 484	10 153	10 188	8 107	9 468	11 726	15646	17932	20551	23553	26994
Customer Advances	--	2 316	2 675	2 977	2 609	2 759					
Income Taxes Payable	838	783	402	689	705	545					
Other Payables	233	269	260	316	292	327					
Discontinued Operations - Curr Liability	--	--	540	0	63	0					
Other Current Liabilities	6 413	6 785	6 311	4 125	5 799	8 095					
Total Current Liabilities	12 638	16 215	15 986	14 659	14 682	17 708	24603	28890	34083	40428	48254
Total Long Term Debt	6 142	5 008	8 396	12 252	15 041	13 270	19033	27948	41673	62742	95030
Long Term Debt	2 886	1 909	6 012	10 069	13 079	11 229	17165	26238	40108	61310	93719
Capital Lease Obligations	3 256	3 099	2 384	2 183	1 962	2 041	1868	1709	1564	1432	1310
Total Debt	6 832	6 724	10 047	15 382	16 689	15 172	21705	31703	46949	70156	105447
Deferred Income Tax	449	583	611	485	529	517					
Deferred Income Tax - LT Liability	449	583	611	485	529	517					
Minority Interest	103	110	109	40	40	69	71	73	75	78	80
Other Liabilities, Total	7 439	6 834	7 410	10 701	7 796	3 366	15646	17932	20551	23553	26994
Reserves	456	387	331	389	543	600					
Pension Benefits - Underfunded	5 261	6 015	6 818	9 700	6 836	2 226					
Other Long Term Liabilities	1 722	432	261	612	417	540					
Total Liabilities	26 771	28 750	32 512	38 137	38 088	34 930	40250	46821	54634	63981	75248
Shareholders Equity (€ Millions)											
Common Stock, Total	1 206	1 217	1 224	1 530	3 060	3 060	3834	4804	6019	7542	9450
Common Stock	1 206	1 217	1 224	1 530	3 060	3 060	3834	4804	6019	7542	9450
Additional Paid-In Capital	263	343	378	378	956	252	312	387	480	595	738
Retained Earnings (Accumulated Deficit)	6 390	7 042	7 182	-1 498	-1 337	3 205	262	21	2	0	0
Unrealized Gain (Loss)	884	473	860	541	1 182	1 149	1411	1732	2127	2612	3207
Other Equity, Total	264	388	503	396	589	739	927	1167	1470	1851	2330
Translation Adjustment	264	388	503	396	589	739	927	1167	1470	1851	2330
Total Equity	9 007	9 463	10 147	1 347	4 450	8 405	6747	8112	10098	12600	15725
Total Liabilities & Shareholders' Equity	35 778	38 213	42 659	39 484	42 538	43 335	46996	54934	64732	76581	90973
Total Common Shares Outstanding	470	666	670	838	1 195	1 195	1 195	1 195	1 195	1 195	1 195

Assumptions										
Fiscal Year	2018	2019	2020	2021	2022	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**
Revenue	35 542	36 424	13 589	16 811	32 770	37 557	43 043	49 331	56 537	64 796
COR	17 836	19 142	8 278	8 837	18 280	20 827	23 870	27 356	31 353	35 933
Days Sales Outstanding (DSO)	43,0	40,9	45,5	55,2	36,6	44,3	44,3	44,3	44,3	44,3
Days Inventory Outstanding (DIO)	9,8	9,7	19,2	14,5	8,9	12,4	12,4	12,4	12,4	12,4
Days Payable Outstanding (DPO)	79,0	70,0	90,8	117,4	79,6	87,3	87,3	87,3	87,3	87,3
Cash & Equivalents as % Of Revenue	4,03%	3,88%	13,29%	13,72%	5,46%	8,08%	8,08%	8,08%	8,08%	8,08%
Other Current Assets as a % of Revenue	1,0%	2,3%	2,9%	4,8%	3,6%	2,9%	2,9%	2,9%	2,9%	2,9%
Other Current Liabilities as a % of Revenue	28,6%	28,0%	59,7%	56,3%	35,8%	41,7%	41,7%	41,7%	41,7%	41,7%
Short Term Equivalents as % of Revenue	5,07%	5,41%	26,89%	31,88%	19,87%	17,8%	17,8%	17,8%	17,8%	17,8%
Prepaid Expenses as % of COR	1,22%	1,28%	2,33%	2,35%	1,57%	1,8%	1,8%	1,8%	1,8%	1,8%
Accured Expenses as % of revenue	1,22%	1,17%	9,82%	4,07%	0,12%	3,3%	3,3%	3,3%	3,3%	3,3%
Curr Port. Of LT Debt change in %	148,70%	-3,79%	89,58%	-47,35%	15,41%	40,5%	40,5%	40,5%	40,5%	40,5%
LT Debt % change	-33,85%	214,93%	67,48%	29,89%	-14,14%	52,9%	52,9%	52,9%	52,9%	52,9%
Capital Lease Obligations	-4,82%	-23,07%	-8,43%	-10,12%	4,03%	-8,5%	-8,5%	-8,5%	-8,5%	-8,5%
Retained Earnings as % change	10,20%	1,99%	-120,86%	-10,75%	-339,72%	-91,8%	-91,8%	-91,8%	-91,8%	-91,8%
Other Equity % change	46,97%	29,64%	-21,27%	48,74%	25,47%	25,9%	25,9%	25,9%	25,9%	25,9%
Comon Stock % Change	0,91%	0,58%	25,00%	100,00%	0,00%	25,3%	25,3%	25,3%	25,3%	25,3%
Additional Paid-in capital % change	30,42%	10,20%	0,00%	152,91%	-73,64%	24,0%	24,0%	24,0%	24,0%	24,0%
Unrealized Gain % change	-46,49%	81,82%	-37,09%	118,48%	-2,79%	22,8%	22,8%	22,8%	22,8%	22,8%
Minority Interest % Change	6,80%	-0,91%	-63,30%	0,00%	72,50%	3,0%	3,0%	3,0%	3,0%	3,0%
Goodwill change in %	2,24%	-0,57%	-0,57%	-0,10%	0,19%	0,2%	0,2%	0,2%	0,2%	0,2%
Accumulated Goodwill in % change	0,00%	-1,91%	71,43%	-0,38%	29,85%	19,8%	19,8%	19,8%	19,8%	19,8%
Intagilble Gross % change	6,16%	5,18%	1,49%	3,51%	3,44%	4,0%	4,0%	4,0%	4,0%	4,0%
Accumulated Intangibles in % change	9,63%	6,19%	9,83%	9,11%	7,99%	8,6%	8,6%	8,6%	8,6%	8,6%
LT Investments Affiliate Companies	11%	3%	-40%	8%	-10%	-5,5%	-5,5%	-5,5%	-5,5%	-5,5%
LT Investments Other	13%	8%	-1%	-8%	-4%	1,8%	1,8%	1,8%	1,8%	1,8%
Note Recivable LT	7,19%	-4,02%	-5,39%	24,47%	1,02%	4,7%	4,7%	4,7%	4,7%	4,7%
Deffered Charges % Change	1211,11%	-1,69%	-21,55%	-18,68%	18,92%	237,6%	237,6%	237,6%	237,6%	237,6%
Deffered Income Tax % Change	28,30%	6,43%	113,10%	-3,56%	-37,18%	21,4%	21,4%	21,4%	21,4%	21,4%
Other LT Liabilities	23,38%	7,26%	-31,17%	25,39%	15,07%	8,0%	8,0%	8,0%	8,0%	8,0%

Appendix 7: Cash Flow Statement and Forecasts

	2017	2018	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Cash Flow-Operating Activities (€ Millions)											
Net Income/Starting Line	3 158,0	2 784,0	1 860,0	(8 631,0)	(2 606,0)	1 050,0	582	694	837	1023	1271
Depreciation/Depletion	2 300,0	2 178,0	2 738,0	4 393,0	2 288,0	2 472,0	2373	2394	2416	2438	2460
Non-Cash Items	(665,0)	(317,0)	132,0	978,0	(48,0)	(162,0)	-67	-29	-14	-7	-4
Unusual Items	(37,0)	(34,0)	20,0	9,0	30,0	(30,0)	-19	-12	-7	-5	-3
Equity in Net Earnings (Loss)	(157,0)	(174,0)	(168,0)	264,0	(2,0)	1,0	0	0	0	0	0
Other Non-Cash Items	(471,0)	(109,0)	280,0	705,0	(76,0)	(133,0)	-48	-18	-6	-2	-1
Changes in Working Capital	575,0	(536,0)	(716,0)	932,0	765,0	1 808,0	-541	-620	-903	-1165	-589
Other Assets & Liabilities, Net	960,0	134,0	309,0	851,0	866,0	2 096,0					
Cash from Operating Activities	5 368,0	4 109,0	4 014,0	(2 328,0)	399,0	5 168,0	2347	2439	2336	2289	3139
Cash Flow-Investing Activities (€ Millions)											
Capital Expenditures	(3 338,0)	(3 709,0)	(3 486,0)	(1 249,0)	(1 318,0)	(2 365,0)	-2548	-2571	-2594	-2618	-2642
Purchase of Fixed Assets	(3 338,0)	(3 709,0)	(3 486,0)	(1 249,0)	(1 318,0)	(2 365,0)	-2548	-2571	-2594	-2618	-2642
Other Investing Cash Flow Items, Total	(1 668,0)	440,0	(381,0)	(1 093,0)	(1 487,0)	(1 076,0)	-1163	-1345	-1528	-1694	-1817
Sale of Fixed Assets	142,0	146,0	132,0	166,0	190,0	154,0	270	309	355	406	466
Sale/Maturity of Investment	1 103,0	3 885,0	4 574,0	9 301,0	7 681,0	5 678,0	7438	9743	12762	16717	21897
Investment, Net	--	--	--	--	2,0	(4,0)	0	0	0	0	0
Purchase of Investments	(2 851,0)	(3 397,0)	(5 169,0)	(10 959,0)	(9 405,0)	(6 868,0)	-8821	-11329	-14550	-18688	-24002
Other Investing Cash Flow	(62,0)	(194,0)	82,0	399,0	45,0	(36,0)	-50	-68	-94	-129	-178
Cash from Investing Activities	(5 006,0)	(3 269,0)	(3 867,0)	(2 342,0)	(2 805,0)	(3 441,0)	-3710	-3916	-4122	-4312	-4459

Assumptions										
Fiscal Year	2018A	2019A	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Revenue	35542	36424	13589	16811	32770	37557	43043	49331	56537	64796
Unusual Items % change	-8,11%	-158,82%	-55,00%	233,33%	-200,00%	-37,72%	-37,72%	-37,72%	-37,72%	-37,72%
Equity In Net earnings % change	10,83%	-3,45%	-257,14%	-100,76%	-150,00%	-100,10%	-100,10%	-100,10%	-100,10%	-100,10%
Other Non-Cash Items	-76,86%	-356,88%	151,79%	-110,78%	75,00%	-63,55%	-63,55%	-63,55%	-63,55%	-63,55%
Sales Of Fixed Assets as % of Revenue	0,41%	0,36%	1,22%	1,13%	0,47%	0,72%	0,72%	0,72%	0,72%	0,72%
Sale/Maturity of Investment as % of revenue	10,93%	12,56%	68,45%	45,69%	17,33%	30,99%	30,99%	30,99%	30,99%	30,99%
Purchase of Investment as % Change	19,15%	52,16%	112,01%	-14,18%	-26,98%	28,43%	28,43%	28,43%	28,43%	28,43%
Other Investing Cash Flow	212,90%	-142,27%	386,59%	-88,72%	-180,00%	37,70%	37,70%	37,70%	37,70%	37,70%

Appendix 8: Bottom-Up Beta

Company	Beta Levered	Equity Value	Debt Value	Enterprise Value	D/E	Tax Rate	Unlevered Beta
International Consolidated Airlines Group SA	1,44	€ 8 235,80	€ 10 945,00	€ 19 180,80	132,90%	25%	0,72
Air France KLM SA	0,66	€ 1 945,83	€ 7 414,00	€ 9 359,83	381,02%	25%	0,17
SAS AB	0,26	€ 145,32	€ 3 938,00	€ 4 083,32	2709,88%	20,60%	0,01
Aegean Airlines	1,07	€ 721,36	€ 531,00	€ 1 252,36	73,61%	22%	0,68
Delta Airlines	1,36	€ 20 135,43	€ 17 515,00	€ 37 650,43	86,99%	25%	0,82
American Airlines	0,89	€ 7 881,71	€ 25 198,00	€ 33 079,71	319,70%	25%	0,26
Average	0,95				617,35%	23,77%	0,17
Median	0,95				226,30%	25,00%	0,35

Appendix 9: Discounted Cash Flow Valuation

Appendix 9.1: Free Cash Flow to Firm (2023F-2027F)

FCFF	2022	2023F	2024F	2026F	2026F	2027F
EBIT	€ 1 232,00	€ 831,70	€ 991,12	€ 1 195,25	€ 1 461,61	€ 1 815,98
Capital Expenditures	€ 2 825,00	€ 2 547,58	€ 2 570,77	€ 2 594,18	€ 2 617,79	€ 2 641,62
Depreciation	€ 2 276,00	€ 2 372,60	€ 2 394,20	€ 2 415,99	€ 2 437,99	€ 2 460,18
Change In Working Capital		€ 1 423,90	-€ 651,26	-€ 78,97	-€ 283,12	-€ 262,68
Net Working Capital	-€ 1 313,24	€ 110,67	-€ 540,59	-€ 619,56	-€ 902,68	-€ 1 165,37
Current Assets	€ 4 697,76	€ 5 799,67	€ 8 436,50	€ 9 668,89	€ 11 423,05	€ 12 854,69
Current Liabilities	€ 6 011,00	€ 5 689,00	€ 8 977,09	€ 10 288,46	€ 12 325,73	€ 14 020,06
Corporate Tax Rate	30%	30%	30%	30%	30%	30%
FCFF		-€ 1 016,70	€ 1 168,47	€ 737,46	€ 1 126,44	€ 1 352,43
PV of FCFF		-€ 965,94	€ 1 054,70	€ 632,43	€ 917,77	€ 1 046,88

Appendix 9.2: Sum of the Present Values of FCFF, Terminal Value and Firm Value

Terminal Value	€ 46 981,38
PV of Terminal Value	€ 36 367,15
Sum of PV of FCFF	€ 2 685,85
Enterprise Value	**€ 39 052,99**
Growth Rate	2,31%
WACC	5,26%

Appendix 9.3: Equity Value and share price

Enterprise Value	€ 39 052,99
Cash&Equivalents(+)	€ 9 727,79
Debt(-)	€ 21 705,15
Minority Intrest(-)	€ 71,08
Equity Value	€ 27 004,55
Shares Outstanding (in millions)	1195
Share Price	**€ 22,60**

Appendix 10: Multiple Valuation

	Market Data					Financials			Valuation			
Company	Stock Price	Shares Outstanding	Equity Value	Net Debt	Enterprise Value	Revenue	EBITDA	Net Income	EV/Revenue	EV/EBITDA	Price/Earnings	Price/Sales
Deutsche Lufthansa AG	€ 10,16	1 195	€ 12 146,13	€ 11 977,36	€ 24 123,50	€ 37 557,01	€ 3 204,30	€ 582,19	0,64	7,53	20,86	0,32
International Consolidated Airlines Group SA	€ 1,66	4 961	€ 8 235,80	€ 10 945,00	€ 19 180,80	€ 27 809,00	€ 4 384,00	-€ 287,00	0,69	4,38	-28,70	0,30
Air France KLM SA	€ 1,53	1 272	€ 1 945,83	€ 7 414,00	€ 9 359,83	€ 29 452,00	€ 4 120,00	€ 734,00	0,32	2,27	2,65	0,07
SAS AB	€ 0,02	7 266	€ 145,32	€ 3 938,00	€ 4 083,32	€ 3 564,00	€ 136,00	-€ 331,00	1,15	30,02	-0,44	0,04
Aegean Airlines	€ 8,00	90	€ 721,36	€ 531,00	€ 1 252,36	€ 1 547,00	€ 329,00	€ 70,00	0,81	3,81	10,31	0,47
Delta Air Lines	€ 30,93	651	€ 20 135,43	€ 17 515,00	€ 37 650,43	€ 50 674,00	€ 7 810,00	€ 2 780,00	0,74	4,82	7,24	0,40
American Airlines Group	€ 12,07	653	€ 7 881,71	€ 25 198,00	€ 33 079,71	€ 47 925,00	€ 6 867,00	€ 1 265,00	0,69	4,82	6,23	0,16
Average									0,73	8,35	-0,45	0,24
Median									0,72	4,60	4,44	0,23

Lufthansa Valuation	EV/Revenue	EV/EBITDA	Price/Earnings	Price/Sales
Implied Enterprise Value	€ 26 913,96	€ 14 727,55		
Net Debt	€ 11 977,36	€ 11 977,36		
Implied Market Value	€ 14 936,60	€ 2 750,19	€ 2 585,39	€ 8 649,66
Shares Outstanding	1 195	1 195	1 195	1195
Implied Value Per Share	€ 12,49	€ 2,30	€ 2,16	€ 7,24

Appendix 11: Sensitivity Analysis

Appendix 11.1: Sensitivity Analysis of the WACC

	Risk Free Rate+ Default Spread				
Equity Risk Premium	3,73%	4,23%	4,73%	5,23%	5,73%
6,94%	5,29%	5,41%	5,53%	5,64%	5,76%
6,44%	5,15%	5,27%	5,39%	5,51%	5,63%
5,94%	5,02%	5,14%	5,26%	5,37%	5,49%
5,44%	4,88%	5,00%	5,12%	5,24%	5,36%
4,94%	4,75%	4,87%	4,98%	5,10%	5,22%

Appendix 11.2: Sensitivity Analysis of the Terminal Value of the firm

Growth Rate	Terminal Value of the firm				
2,41%	€ 48 113,21	€ 46 210,00	€ 44 451,64	€ 42 822,18	€ 41 307,96
2,36%	€ 49 558,66	€ 47 540,83	€ 45 680,89	€ 43 961,01	€ 42 365,93
2,31%	€ 51 095,20	€ 48 952,01	€ 46 981,38	€ 45 163,27	€ 43 480,63
2,26%	€ 52 731,72	€ 50 451,04	€ 48 359,47	€ 46 434,41	€ 44 656,75
2,21%	€ 54 478,30	€ 52 046,39	€ 49 822,31	€ 47 780,53	€ 45 899,51

Appendix 11.3: Sensitivity Analysis of the sum of the Present Values of the FCFF

Present value of FCFF				
€ 2 682,04	€ 2 668,65	€ 2 655,33	€ 2 642,09	€ 2 628,93
€ 2 697,43	€ 2 683,94	€ 2 670,54	€ 2 657,21	€ 2 643,96
€ 2 712,92	€ 2 699,34	€ 2 685,85	€ 2 672,43	€ 2 659,09
€ 2 728,51	€ 2 714,84	€ 2 701,26	€ 2 687,75	€ 2 674,32
€ 2 744,20	€ 2 730,45	€ 2 716,77	€ 2 703,17	€ 2 689,65

Appendix 11.4: Sensitivity Analysis of the Present Value of the Terminal Value

Present value of terminal value				
€ 37 184,01	€ 35 512,73	€ 33 969,93	€ 32 541,49	€ 31 215,25
€ 38 548,21	€ 36 770,91	€ 35 134,03	€ 33 621,69	€ 32 220,33
€ 40 000,10	€ 38 106,70	€ 36 367,15	€ 34 763,56	€ 33 280,73
€ 41 548,26	€ 39 527,35	€ 37 675,46	€ 35 972,39	€ 34 401,03
€ 43 202,41	€ 41 041,06	€ 39 065,93	€ 37 254,13	€ 35 586,34

Appendix 11.5: Sensitivity Analysis of the Firm Value

Firm Value				
€ 39 866,05	€ 38 181,37	€ 36 625,26	€ 35 183,58	€ 33 844,18
€ 41 245,63	€ 39 454,86	€ 37 804,57	€ 36 278,90	€ 34 864,29
€ 42 713,01	€ 40 806,04	€ 39 052,99	€ 37 435,98	€ 35 939,82
€ 44 276,77	€ 42 242,20	€ 40 376,72	€ 38 660,14	€ 37 075,35
€ 45 946,62	€ 43 771,51	€ 41 782,70	€ 39 957,30	€ 38 276,00

Appendix 11.6: Sensitivity Analysis of the Equity Value

Equity Value				
€ 27 817,61	€ 26 132,93	€ 24 576,82	€ 23 135,14	€ 21 795,73
€ 29 197,19	€ 27 406,41	€ 25 756,13	€ 24 230,46	€ 22 815,84
€ 30 664,57	€ 28 757,60	€ 27 004,55	€ 25 387,54	€ 23 891,37
€ 32 228,32	€ 30 193,75	€ 28 328,27	€ 26 611,69	€ 25 026,91
€ 33 898,17	€ 31 723,06	€ 29 734,26	€ 27 908,86	€ 26 227,55

Appendix 11.7: Sensitivity Analysis of the Target Price

Target Price				
€ 18,00	€ 16,94	€ 15,97	€ 15,06	€ 14,22
€ 18,87	€ 17,74	€ 16,71	€ 15,75	€ 14,86
€ 19,79	€ 18,59	€ 17,49	€ 16,47	€ 15,54
€ 20,77	€ 19,49	€ 18,32	€ 17,24	€ 16,25
€ 21,82	€ 20,45	€ 19,20	€ 18,06	€ 17,00

Appendix 12: Financial Ratios

Appendix12.1: Liquidity Ratios

Liqudity Ratios									
	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Quick Ratio	118,85%	104,27%	81,61%	106,99%	98,04%	98,04%	96,56%	95,60%	100,27%
Current Ratio	114,35%	99,11%	78,15%	101,95%	93,98%	93,98%	92,68%	91,69%	96,10%

Appendix 12.2: Profitability Ratios

Profitability Ratios									
	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Gross Profit Ratio	47,45%	39,08%	47,43%	44,22%	44,55%	44,55%	44,55%	44,55%	44,55%
Operating Profit Ratio	4,64%	-52,17%	-13,79%	3,76%	2,21%	2,30%	2,42%	2,59%	2,80%
Return On Capital	7,21%	-38,95%	-9,62%	4,37%	1,32%	1,40%	1,38%	1,21%	0,93%

Appendix 12.3: Solvency Ratios

Solvency Ratio									
	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Interest Coverage	14,69	-69,50	36,22	8,16	6,63	5,45	4,47	3,67	3,04

Appendix 12.4: Turnover Ratios

Turnover Ratio									
	2019	2020	2021	2022	2023F	2024F	2025F	2026F	2027F
Inventory Turnover Days	31	71	63	28	16	8	8	8	8
Payable Turnover Days	72	126	101	68	79	82	82	82	82
Receivable Turnover Days	122	309	167	109	105	103	103	103	103
Average Inventory	1665	1628	1542	1439	918	529	606	695	796
Average Payable	3817	2905	2484	3461	4547	5422	6214	7121	8161
Average Receivable	5858	4557	3691	4395	4893	5484	6285	7203	8255