

# Ratio Analysis: A comparison of the financial effects of the Covid-19 crisis on Airbus and Boeing

A Master's Thesis submitted for the degree of  
"Master of Science"

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# Affidavit

I, **CHRISTOPH NEUBÖCK, BSC**, hereby declare

1. that I am the sole author of the present Master's Thesis, "RATIO ANALYSIS: A COMPARISON OF THE FINANCIAL EFFECTS OF THE COVID-19 CRISIS ON AIRBUS AND BOEING", 83 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
2. that I have not prior to this date submitted the topic of this Master's Thesis or parts of it in any form for assessment as an examination paper, either in Austria or abroad.

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# Abstract

This thesis's objective is to conduct a ratio analysis of Airbus' and Boeing's financial results over three years, from 2019 to 2021. During this time, COVID-19 had a significant impact on the sector. The two companies' financial reports are compared and contrasted, so that trends and patterns in terms of financial performance can be identified and the financial position of both companies after 2021 can be determined. The research is conducted using a ratio analysis of the financial statements of Airbus and Boeing over three years, including a quantitative and qualitative analysis of their performances and corresponding notes. The significance of this thesis is that it provides a comprehensive analysis of the financial performance of two major players in the aerospace industry, Airbus and Boeing, which can be helpful for investors, industry analysts, and other stakeholders.

The ratio analysis demonstrates that both businesses were having trouble during the crisis. Due to the COVID-19 outbreak, both companies encountered significant difficulties in 2020 as demand for air travel and, by extension, airplanes, in general, was drastically declining. Both were aiming for high liquidity and short-term solvency to settle their short-term liabilities. Due to rising revenues and cost-cutting measures in 2021, both businesses were able to stabilize their financial results more or less once more. However, both firms had to incur more outstanding long-term debts to repay the funds, which were needed for short-term solvency in 2020.

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# 1 Introduction

This chapter provides information on the motivation for this research topic, the goals of the thesis, as well as an outline of research questions that are to be answered as part of this research

## 1.1 Motivation

The outbreak of COVID-19 around the world in 2020 was shocking for almost all nations and industries across the globe. One industry, the aerospace sector, was challenged in many different ways due to this crisis, mainly because the worldwide demand for air travel decreased significantly due to national and international travel restrictions.

For the aerospace industry, the impacts included the financial stability of operators, airlines, lessors, and suppliers; the commercial aircraft market; the demand for air travel; and commercial air traffic. Because of this, airlines have cut back on flights, temporarily grounded large parts of their fleets, and sought new ways to save money and ensure their financial stability, as reported by Airbus. The company was further expecting that consequences for the company and its order book and other effects of related proceedings may also result from the fact that some airlines are attempting to reach creditor arrangements, reorganizing, or filing for bankruptcy or insolvency protection. (Airbus SE, 2021, p.15)

In the same way, Boeing, short for The Boeing Company, reported that the COVID-19 pandemic had caused an unprecedented drop in the number of people who want to fly, which could lead to a big problem for their clients, their company, and the aerospace

manufacturing and services industry as a whole. In 2020, Boeing predicted it would take three years for travel to return to 2019 levels and a few more years after that for the industry to return to long-term trend growth. (Boeing, 2020, p.68)

This thesis compares the financial performances of Airbus and Boeing from 2019 (before the COVID-19 outbreak) to 2020 and 2021 (when the virus is expected to impact the companies' financials significantly). The research questions, which are required to understand the impact on the companies, are further outlined in chapter 1.2.

## **1.2 Goals and research questions**

The purpose of this thesis is to compare and contrast the financial results of Airbus and Boeing, two of the biggest aerospace firms in the world, for the fiscal years 2019, 2020, and 2021 to assess the impact COVID-19 had on both companies. Ratio analysis is used to evaluate the financial health of the companies and to spot any potential trends or patterns during those three financial years. Therefore, the thesis's main objective is to thoroughly analyze these companies' financial performance and identify which is better positioned for future success after 2021.

### **1.2.1 Goals**

- To perform a ratio analysis of Airbus and Boeing's three-year financial performance.
- To compare the two companies financial results and look for any potential trends or patterns.

- To determine which company is better positioned for future success in 2021

### 1.2.2 Research Questions

- **Research question 1**

What are the key financial ratios commonly used to evaluate the financial health of aerospace companies?

- **Research question 2**

When comparing the ratios of each company before (in 2019) and after (in 2021) the crisis, what have been the impacts of COVID-19 on both Airbus and Boeing in the following areas:

- Liquidity / Short-Term Solvency
- Financial Leverage / Long-Term Solvency
- Profitability
- Operating Cycle & Cash Conversion Cycle

- **Research question 3**

Considering the financial state of Airbus and Boeing both before (in 2019) and following (in 2021) COVID-19, which company performed better and why?

- **Research question 4**

According to the analysis, which of the two companies, Airbus or Boeing, is better positioned for future success at the end of the fiscal year 2021?

### 1.3 Structure of the thesis

There are four more chapters in the thesis after the introduction. The theoretical groundwork for using a company's balance sheet and income statement numbers to conduct a financial analysis is laid out in chapter 2. This includes, in particular, the theoretical foundation for performing a financial ratio analysis. Hereafter, the research methodologies for conducting the analysis presented in this thesis are detailed in chapter 3. Chapter 4 then presents the ratio analysis's findings on Airbus and Boeing separately over the three years. Chapter 5 concludes with the answers to the research questions raised in the introductory chapter.

## 2 Financial Analysis

### 2.1 Financial Statement Analysis

For a financial manager to make thoughtful decisions that align with the company's goals, analytical tools are needed. The business and external capital sources like creditors and investors both analyze a company's financial health based on financial statements. Depending on the partitic interests, several types of financial statement analysis are used. (Wachowicz & Van Horne, 2008, 128)

Babalola and Abiola define a financial statement analysis as *“the application of analytical tools and techniques to general-purpose financial statements and related data to derive estimates and inferences useful in business analysis.”* (Babalola & Abiola, 2013, 133) Additionally, they claim that conducting a financial statement analysis lessens the dependence on assumptions, conjectures, and intuition when making business choices. According to them, it makes the business analysis less unpredictable and gives it a systematic and solid foundation rather than decreasing the need for expert opinions. Good business analysis requires accurate information analysis and interpretation. This is why it is essential to analyze the financial statements of a business. By performing this type of analysis, an analyst will be better equipped to comprehend and evaluate qualitative and quantitative financial information, enabling them to make trustworthy deductions about the prospects and hazards facing the organization's financial health. (Babalola & Abiola, 2013, 133)

The parties interested in the corporate and with the need to apply financial analysis could be the following, among others:

- **Trade Creditors**

Also known as suppliers, to whom a company owes money for goods and services, are most concerned about a company's liquidity. The company owes these trade creditors money. Because they have claims due in a relatively short time, analyzing the company's liquidity ratios is one of the most straightforward methods for determining whether it can pay these claims promptly. (Wachowicz & Van Horne, 2008, 128)

- **Bondholders**

On the other hand, bondholders have claims that extend over more than one year. Consequently, bondholders are becoming increasingly concerned about the company's ability to service its long-term debt through its cash flow. They could evaluate this capability by looking at the company's capital structure, the primary sources, uses of funding, the profitability of the company over time, as well as profitability projections. (Wachowicz & Van Horne, 2008, 128)

- **Investors**

Investors in a company's common stock place a high level of importance on the consistency of a company's profits along a trend line, as well as the company's current earnings and projections for the company's future earnings. The analysis of a company's profitability is a topic that investors frequently prioritize. They would also be concerned about the company's financial health because of its potential impact on its ability to maintain its dividend payments and avoid insolvency. (Wachowicz & Van Horne, 2008, 128)

- **Internal Management**

By analyzing financial statements, managers can gain insight into potential changes in operational strategy regarding investing and financing business operations. Managers frequently examine competing businesses' operations and financial reports to evaluate the potential for profit and the risk associated with a particular competition. This study enables performance benchmarking and inter-firm comparisons for assessing relative strengths and shortcomings. (Babalola & Abiola, 2013, 134)

## 2.2 Financial Statements

A complete financial statement typically consists of two primary documents: an income statement and a balance sheet. The income statement, on the one hand, provides a summary of the company's profits or losses for the reporting period. On the other hand, the balance sheet provides information about the company's financial situation as of the date of closure. There is a chance that the report will also include a discussion regarding the company's cash flow, an analysis of the variations in capital and surplus, and various other statements and schedules. (Graham et al., 1964, Chapter I) The cash flow statement is derived from the income statement and balance sheet, however the following provides definitions for both the balance sheet and the income statement:

- **Balance Sheet**

The following structure constitutes the balance sheet:

$$\text{Assets} = \text{Liabilities} + (\text{Owner's}) \text{Equity} \quad (1)$$



Consider the company's assets, which are listed on the left-hand side of the equation, to be everything that the company possesses. These assets can be tangible, such as equipment, inventories, and cash, or intangible, such as patents and trademarks. On the right-hand side is a list of everything the company is currently responsible for paying. A straightforward way to translate the equation is as follows (Riggs, 2007, 1):

$$\textit{Owns} = \textit{Owes} \quad (2)$$

- **Income Statement**

The income statement provides a more comprehensive picture of the company's profitability over a more extended time than the balance sheet, which only presents the company's financial standing at one particular point in time. (Wachowicz & Van Horne, 2008, 128)

Ross et al. give the equation for the income statement as follows (Ross et al., 2002, 60):

$$\textit{Income} = \textit{Revenues} - \textit{Expenses} \quad (3)$$

- **Derivative Statements**

These two statements, the Balance Sheet and the Income Statement, can be used to create different derivative statements. Some examples of these statements include a statement of cash flows, a statement of sources and uses of money, and a statement of retained earnings. (Wachowicz & Van Horne, 2008, 128) All of them are out of the scope of this thesis and are not further discussed.

## 2.3 Ratio Analysis

To evaluate a company's financial condition and performance, a financial analyst must conduct checks on various aspects of the company's financial health. A financial ratio, also known as an index, is a valuable tool frequently utilized during these checkups. The result of dividing one accounting number by another yield this index, which is used in accounting to relate two different numbers. (Wachowicz & Van Horne, 2008, 135)

The calculation of a ratio is a straightforward arithmetic operation. However, understanding and interpreting the ratio can be quite challenging. For a ratio to have any significance, it needs to refer to a relationship relevant to the economy. (Babalola & Abiola, 2013, 134)

The Institute of Chartered Accountants of India is adding to their definition that a *“ratio analysis is not just comparing different numbers from the balance sheet, income statement, and cash flow statement. It is comparing the number against previous years, other companies, the industry, or even the economy in general for the purpose of financial analysis.”* (The Institute of Chartered Accountants of India, 2017, 3.3)

In other words, financial ratios are used to assess a company's operating, investment, and financing strategies. The study can be done on a company throughout time, or it can be done on a company compared to another firm or industry data at a particular moment. (Eliot, 2015, Chapter 3)

Furthermore, the calculation of financial ratios serves the purpose of providing all relevant parties with the ability to conclude the following aspects of a company's financial health: the company's financial performance, as well as its strengths and

weaknesses. The ultimate goal is to make decisions concerning the company. (The Institute of Chartered Accountants of India, 2017, 3.3)

The two distinct approaches to conducting financial ratio analysis, either to compare the financial statements internally or over a time period with other companies or industries, are further described below:

- **Internal Comparisons**

Analysts can tell if the company's finances and performance got better or worse over time by looking at how they compare to themselves. Additionally, projected statements usually referred to as "pro forma statements," can generate and compare financial ratios to current and historical ratios. When doing this study, they are more interested in the ratio's general trend throughout time than in a specific ratio at a particular moment. (Wachowicz & Van Horne, 2008, 136)

- **External Comparisons**

The second comparison strategy is to contrast one business' ratios with those of another business operating in the same sector or with the averages for that sector simultaneously. Using such a comparison makes it possible to better comprehend the company's comparable financial state and performance. It also helps to spot any significant differences from any relevant industry average. (Wachowicz & Van Horne, 2008, 136)

### **2.3.1 Ratio Types**

The most common financial ratios can be broken down into two categories: Balance Sheet Ratios and Income Statement Ratios. (Wachowicz & Van Horne, 2008,

136) Both are further explained in the following chapters and illustrated in Figure 1 below.

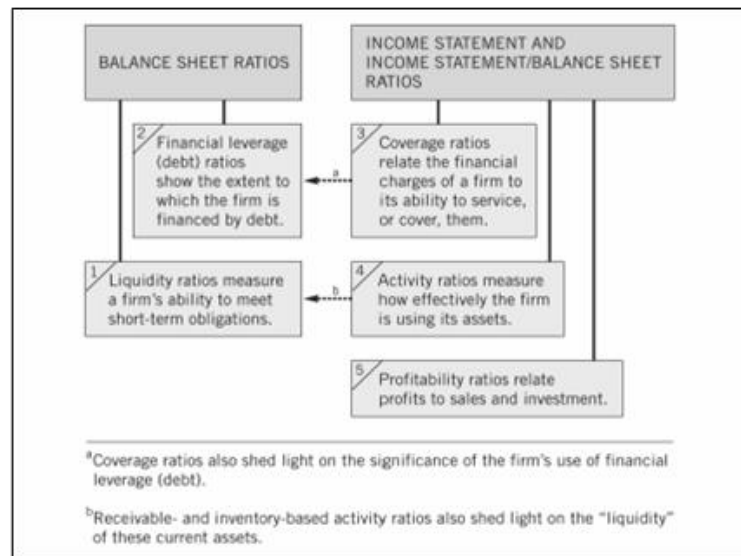


Fig. 1: Overview of ratios (Ross et al., 2002, 138)

### 2.3.2 Balance Sheet Ratios

A balance sheet ratio lists a particular aspect of the business's financial standing when the balance sheet was created. Each ratio is known as a balance sheet ratio because the numerator and denominator are taken directly from the balance sheet. With the help of these ratios, an analyst can examine a company's liquidity (using liquidity ratios, also known as short-term-solvency ratios) or the extent to which it is financed by debt (using financial leverage ratios, also known as debt ratios or long-term-solvency ratios). (Wachowicz & Van Horne, 2008, 163)

#### 2.3.2.1 Liquidity Ratios / Short-term Solvency Ratios

The phrases "short-term solvency" and "liquidity" can be used interchangeably in most contexts. The capacity of an organization to satisfy its short-term (less than 1

year) financial commitments is referred to as its liquidity. This concept is also frequently referred to as short-term solvency. If it can't meet its short-term obligations, it will lose credibility and have its credit rating go down. If the firm consistently needs to catch up on its payments as scheduled, it will soon have no choice but to file for bankruptcy. A circumstance such as this commercial bankruptcy may cause the company to get sick and eventually leave the business. The company's short-term lenders and creditors are interested in learning about its liquidity since they have a financial investment. In the long run, insufficient or too much cash can hurt the company's operations. (The Institute of Chartered Accountants of India, 2017, 3.4)

The following ratios are those that fall under the category of liquidity ratios:

- **Current Ratio**

The current ratio can be calculated as follows:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}} \quad (4)$$

A company's balance sheet can be used to calculate and assess both its current assets and current liabilities, two critical financial parameters used for the calculation of the current ratio. *“Because current assets and liabilities are, in principle, converted to cash over the following 12 months, the current ratio is a measure of short-term liquidity.”*

(Ross et al., 2002, 63)

- **Quick Ratio / Acid-Test**

The quick ratio, which is also known as the Acid-Test, is an additional metric that can be used to assess a company's ability to remain solvent in the near future. It is generally considered more conservative than the current ratio, as the inventories, the

least liquid element of a company's current assets, are subtracted from the current assets. (Wachowicz & Van Horne, 2008, 139) Its equation is:

$$\text{Quick Ratio} = \frac{\text{Current assets} - \text{Inventories}}{\text{Current Liabilities}} \quad (5)$$

The Balance Sheet contains all of these different financial parameters for analysis

### 2.3.2.2 Financial Leverage Ratios / Debt Ratios / Long-term Solvency Ratios

Financial leverage ratios, or simply leverage ratios, are used to measure a company's overall financial leverage or, more specifically, its ability to meet its obligations over the long term. Therefore, these are sometimes referred to as "long-term solvency ratios." (Ross et al., 2002, 65) These ratios indicate the proportion of funds that were provided by the owners as well as the lenders. This ensures that the owners and lenders will receive long-term funding in the form of periodic interest payments throughout the term of the loan and the repayment of the principal amount at maturity. (The Institute of Chartered Accountants of India, 2017, 3.7)

The ratios listed below are considered examples of financial leverage ratios:

- **Debt-to-Equity Ratio**

The relationship between capital provided by creditors and capital provided by stockholders is shown by the debt-to-equity ratio, an option to the total debts ratio. It gauges the level of security that a company's creditors experience. The ratio shows the amount of additional borrowing capacity the company will have. (Eliot, 2015, Chapter 3)

It is calculated in the manner indicated by the name as follows:

$$\text{Debt to Equity Ratio} = \frac{\text{Total debt}}{\text{Total equity}} \quad (6)$$

All of these various financial parameters are included in the balance sheet for analysis.

- **Debt-to-Total-Assets Ratio**

The name of it suggests how it is calculated:

$$\text{Debt to Total Assets} = \frac{\text{Total debt}}{\text{Total assets}} \quad (7)$$

Like the debt-to-equity ratio, this ratio has a similar function. By showing what percentage of the company's assets are supported by debt financing, it exemplifies the relative importance of debt financing to the business. (Wachowicz & Van Horne, 2008, 140)

### **2.3.3 Income Statement Ratios and Income Statement/Balance Sheet Ratios**

The coverage, activity, and profitability ratios are covered in this chapter. They all use data that is either derived solely from the income statement or both the income statement and the balance sheet. The difference compared to the balance sheet ratios is that those ratios are not just considering relationships that derive from the balance sheet. (Wachowicz & Van Horne, 2008, 141)

#### **2.3.3.1 Coverage Ratios**

Coverage Ratios are defined as “*Ratios that relate the financial charges of a firm to its ability to service, or cover, them.*” (Wachowicz & Van Horne, 2008, 141)

The following ratio is regarded as an illustration of a financial coverage ratio:

- **Interest Coverage Ratio / Time Interest Earned (TIE) Ratio**

As the name suggests, this ratio measures how well a company has its interest obligations covered. In other words, “*an indicator of the company’s ability to cover the payment of interest to holders of interest-bearing obligations.*” (Eliot, 2015, Chapter 3) It is also a measure of long-term solvency (Ross et al., 2002, 67) as “*the number of times interest charges are earned is calculated in order to determine the degree of safety to long-term creditors.*” (Eliot, 2015, Chapter 3) This ratio can be represented by the equation:

$$\text{Interest Coverage Ratio} = \frac{\text{Earnings before Interest and Taxes (EBIT)}}{\text{Interest Expense}} \quad (8)$$

The income statement contains all of these different financial factors, which are required for analysis

### **2.3.3.2 Activity Ratios**

“*Activity ratios,*” as defined by Eliot, “[...] *measure the effectiveness of a company’s asset management. [They are] also known as asset utilization ratios, asset management ratios, or just utilization ratios.*” (Eliot, 2015, Chapter 3)

The emphasis is being placed on the efficient management of total assets in general and, more specifically, the management of the two asset groups, known as receivables and inventories. (Wachowicz & Van Horne, 2008, 142) In addition, each of the particular ratios that are brought up in this chapter can be construed as a different measurement of turnover. The purpose of these ratios is to describe how effectively or extensively a company makes use of its resources in order to generate sales. (Ross et al., 2002, 67)

The ratios listed below are examples of financial activity ratios.



- **Inventory Turnover Ratio**

The relationship between the cost of goods sold and the period's ending inventory is reflected in the inventory turnover ratio. The inventory turnover ratio gauges the effectiveness with which the total inventory is sold. (Eliot, 2015, Chapter 3)

This formula is used to calculate the inventory turnover ratio:

$$\text{Inventory Turnover Ratio} = \frac{\text{Cost of Goods Sold (COGS)}}{\text{Inventory}} \quad (9)$$

Inventory is included in the balance sheet, while the cost of goods sold (COGS) is included in the income statement.

- **Receivables Turnover Ratio**

The (accounts) receivable turnover ratio is a helpful metric for learning more about the caliber of the company's receivables and how successful the company is at collecting those receivables. The amount of times that accounts receivable have been converted into cash over the year is indicated by this ratio. (Wachowicz & Van Horne, 2008, 142)

The equation for the Receivables Turnover Ratio is the following:

$$\text{Receivables Turnover Ratio} = \frac{\text{Net Sales}}{\text{Receivables}} \quad (10)$$

Annual net sales are included in the income statement, whereas receivables are included in the balance sheet.

- **Operating Cycle**

Calculating the operating cycle requires one to use both the inventory period, which is also known as inventory turnover in days and the receivables period, which is also known as receivables turnover in days. Both of these metrics are used in the calculation. Wachowicz and Van Horne define the operating cycle as “*the length of time*

from the commitment of cash for purchases until the collection of receivables resulting from the sale of goods or services” (Wachowicz & Van Horne, 2008, 146).

The equation for the operating cycle calculation is as follows:

$$\text{Operating Cycle} = \text{Inventory period} + \text{Receivables period} \quad (11)$$

- **Payables Turnover Ratio**

A further variant of the Receivables Turnover Ratio is known as the Payables Turnover Ratio. The ratio determines not how many times a business can collect its receivables in a year but how many times it pays its bills. (Ross et al., 2002, 101)

The equation for the ratio is as follows:

$$\text{Payables Turnover Ratio} = \frac{\text{Cost of Goods Sold}}{\text{Payables}} \quad (12)$$

- **Cash (Conversion) Cycle**

As defined by Wachowicz & Van Horne, aside from the operating cycle the cash (conversion) cycle is another important parameter “*in determining a firm’s current asset needs*” (Wachowicz & Van Horne, 2008, 146) They are defining the cash cycle, also referred to cash conversion cycle, as “*the length of time from the actual outlay of cash for purchases until the collection of receivables resulting from the sale of goods or services*”(Wachowicz & Van Horne, 2008, 146).

The cash cycle can be determined by using the following equation:

$$\text{Cash Cycle} = \text{Operating Cycle} - \text{Payables Period} \quad (13)$$

Following figure demonstrates the difference between the operating cycle, which was defined previously in this chapter, and the cash cycle:

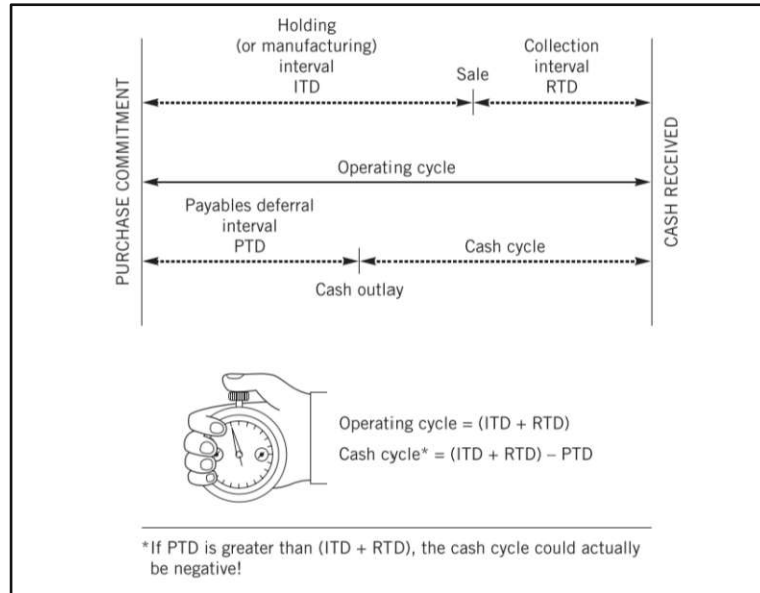


Fig. 2: Operating Cycle vs. Cash Cycle (Wachowicz & Van Horne, 2008, 146)

- **Total Asset / Capital Turnover Ratio**

Total asset turnover, also referred to as capital turnover, is determined by dividing net sales by total assets. It reveals the relative effectiveness with which a company uses all of its resources to produce sales. (Wachowicz & Van Horne, 2008, 148)

$$\text{Total Asset Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total assets}} \quad (14)$$

While net sales are included in the income statement, total assets are included in the balance sheet.

### 2.3.3.3 Profitability Ratios

Profitability Ratios “are intended to measure how efficiently the firm uses its assets and how efficiently the firm manages its operations. The focus in this group is on the bottom line, net income.” (Ross et al., 2002, 70) In other words, these ratios reflect how business operations turned out. For this reason, these ratios are among the most frequently cited and closely followed. To increase a firm’s value, the management aims to maximize these ratios. (The Institute of Chartered Accountants of India, 2017, 3.15) Depending on the concept of investment, sales and investment-related ratios are two categories for profitability ratios. (Wachowicz & Van Horne, 2008, 148) Examples of financial profitability ratios that are thought to be accurate representations of the ratios are provided below:

- **Gross Profit Ratio / Gross Profit Margin** (sales-related)

This gross profit ratio, also called gross profit margin, reveals the company's profit in relation to sales after subtracting the cost of producing the goods. It serves as a gauge for the effectiveness of the business's operations and a guide for product pricing.

(Wachowicz & Van Horne, 2008, 148) To put it another way, the gross profit margin is established based on the relationship between price, sales volume, and total costs.

(The Institute of Chartered Accountants of India, 2017, 3.16)

$$\text{Gross Profit Ratio} = \frac{\text{Gross Profit}}{\text{Net sales}} \quad (15)$$

The income statement breaks down and looks at all these different parts of financial performance.

- **Return on Sales (ROS) Ratio / Net Profit Margin** (sales-related)

A financial ratio called return on sales, also referred to as net profit margin, is used to determine the proportion of profit an organization generates from its total revenue. It expresses in percentage the amount of net profit a business makes for every dollar of revenue earned. (Corporate Finance Institute, 2022, 10)

$$\text{Return on Sales} = \frac{\text{Net Income}}{\text{Net sales}} \quad (16)$$

The income statement deconstructs and analyzes each of these various components of financial performance.

- **Return on Assets (ROA) Ratio** (investment-related)

“The return on assets ratio measures the management’s ability to earn a return on the use of the firm’s assets.” (Eliot, 2015, Chapter 3) This profitability ratio is determined by analyzing the relationship between the company's net profits and the assets that were invested and used to earn those profits. This ratio determines how profitable an organization is relative to the assets that are being used by that organization. (The Institute of Chartered Accountants of India, 2017, 3.19) Therefore, the ROA is calculated as shown below:

$$\text{Return on Assets} = \frac{\text{Net income}}{\text{Total assets}} \quad (17)$$

Total assets are included in the balance sheet as opposed to net income, which is included in the income statement.

- **Return on Equity (ROE) Ratio** (investment-related)

The profitability of the capital contributed to the company by its stakeholders is indicated by the return on equity ratio. (Eliot, 2015, Chapter 3) It “*measures a firm's*

*productivity of equity and therefore indicates its ability to attract a form of capital that provides an important cushion for the debtholders.” (Fridson & Alvarez, 2022, Chapter 13) The return on equity of a company is one of the most important indicators of its profitability and potential for future expansion. Businesses with a low or nonexistent debt load and a high return on equity can expand without significant investments in new capital. This allows the company owners to take cash out of the company and put it to use in other ways. (The Institute of Chartered Accountants of India, 2017, 3.20)*

The ROE's equation is the following:

$$\text{Return on Equity} = \frac{\text{Net income}}{\text{Total equity}} \quad (18)$$

On the income statement, the net income is written down, but on the balance sheet, the total amount of equity is written down.

## 3 Methodological approach

Based on the theoretical foundation needed for the research described in the previous chapter 2, this chapter gives an overview of the approaches taken to address the research questions mentioned in chapter 1.2.

### 3.1 Quantitative analysis - Ratio analysis per company

Quantitative analysis is a research method that uses numerical data to understand a particular phenomenon or question. The data collected for this study is numerical in nature and is used to compare the financial performance of Airbus and Boeing over the three fiscal years of interest for this study: 2019, 2020, and 2021. Therefore, the data has been collected from the financial statements of both companies, obtained from the companies' websites and annual reports. The financial reports include the Income Statement, the Balance Sheet, and notes on their financial performance. The data from the financial reports for the respective companies' fiscal years being considered have been compiled in an Excel spreadsheet, organized, and chartered to make the ratio analysis easier to perform. The charts were then used to calculate the ratios required for the analysis and to identify trends and patterns in the data. The thesis' appendix includes all the calculations performed for the purpose of the research.

### 3.2 Qualitative analysis - Interpretation of ratios per company

A qualitative analysis, on the other hand, is a research method that uses non-numerical data such as observations, interviews, and text to understand a particular

phenomenon or question. This method can provide a more in-depth understanding of the context of a situation and the underlying reasons why certain events occurred. In this study, a qualitative analysis is used to determine what the quantitative analysis results mean. This is done by looking at the notes to the financial statements to figure out how the COVID-19 pandemic affected the performance of the companies and what might be causing the differences in performance between the two companies.

For that purpose, both are evaluated independently over the three years before any comparisons are made. This facilitates comprehension of the circumstances and actions taken by each company during this period.

Chapter 4.1 examines Airbus, while chapter 4.2 examines Boeing. This method makes it possible to validate or challenge the conclusions of the quantitative analysis and use the findings to direct the collection and analysis of the qualitative data.

Overall, the mixed methods approach allows for a comprehensive understanding of the financial performance of Airbus and Boeing from 2019 to 2021. The quantitative data provided an overview of the performance, while the qualitative data provided insight into the reasons for the differences in performance.



## 4 Analysis Results

This chapter provides additional insight into the notes provided by the companies' financial statements regarding the outcomes of the ratios under examination. The results of the quantitative analysis, which can be found in the appendix, are in the focus of this chapter's discussion.

### 4.1 Airbus - Ratio analysis

#### 4.1.1 Airbus - Overview of the Company

Airbus SE, in short Airbus, is a European multinational aerospace corporation that designs, manufactures, and sells commercial and military aerospace products worldwide. It is the largest aeronautics and space company in Europe and one of the largest in the world. The company was founded in 1970 as a consortium of European aerospace companies, and it has since grown to become a global leader in the industry.

Airbus designs and manufactures various products, including commercial aircraft, military transport aircraft, helicopters, and satellites. Its commercial aircraft product line includes the A220, A320, A330, A350, and A380. These aircraft are used by airlines worldwide for passenger and cargo transportation. The company also manufactures military transport aircraft, such as the A400M, as well as helicopters for both civilian and military use.

In addition to its manufacturing operations, Airbus also provides a range of services to customers, including maintenance, repair, and overhaul services, training, and

engineering services. The company has a global customer base, with customers in more than 150 countries.

Airbus is headquartered in Toulouse, France, and has additional facilities in several countries worldwide, including Germany, Spain, the United Kingdom, and the United States. The company employs around 135,000 people worldwide. (Airbus SE, 2022)

#### 4.1.2 Airbus - Balance Sheet Ratios

The following chapter demonstrates and analyzes the ratios, all of which are based on the balance sheet of Airbus financial reports. The corresponding calculations can be found in the appendix, and they are derived from the data presented in the Airbus Financial reports for the years 2019 (Airbus SE, 2020), 2020 (Airbus SE, 2021), and 2021 (Airbus SE, 2022) respectively and reorganized for comparison with other companies by Morningstar. (Morningstar, 2023)

##### 4.1.2.1 Airbus - Liquidity Ratios / Short-term Solvency Ratios

- **Current Ratio**

**Table 1: Airbus Current Ratios**

			2021	2020	2019
<b>Current Ratio</b>	<i>Num</i>	<i>Current assets</i>	€55,800.00	€58,400.00	€56,723.00
	<i>Den</i>	<i>Current liabilities</i>	€47,807.00	€49,771.00	€62,374.00
			<b>1.17</b>	<b>1.17</b>	<b>0.91</b>

The company's current assets remained relatively unchanged from 2019 to 2021, with a 3% rise from 2019 to 2020, followed by a 4% fall from 2020 to 2021. Overall, the company's current assets remained relatively stable during this period.

On the other hand, the current liabilities were not as stable as the current assets, which, as can be seen, decreased by 20% from 2019 to 2020 and then again by 4% from 2020 to 2021.

When these two metrics are compared with the current ratio, it reveals an increase in liquidity or short-term solvency from 2019 to 2020, but it remained stable when comparing 2020 to 2021.

To evaluate the current ratio, the most important change that has happened over the three years in consideration is a 20% drop in current liabilities from 2019 to 2020, especially due to the shift in trade liabilities which had the greatest impact. The significant shift in this number, -41 % from 2019 to 2020, is the result of an adaptation plan for production that was developed in response to the COVID-19 pandemic, which was supported by unemployment schemes supported by governmental partners, in order to allow the planned reduction of workforce. (Airbus SE, 2021)

Having made these choices, the company had the financial resources necessary to meet any future cash needs that may arise, such as the increased costs associated with the revised production rates, as reported by the company in its financial statements. (Airbus SE, 2021)

- Quick Ratio / Acid-Test

**Table 2: Airbus Quick Ratios / Acid-Test**

			2021	2020	2019
<b>Quick Ratio</b>	<i>Num</i>	<i>Current assets-inventories</i>	\$ 30,634.00	\$ 31,114.00	\$ 28,813.00
	<i>Den</i>	<i>Current liabilities</i>	\$ 47,807.00	\$ 49,771.00	\$ 62,374.00
			<b>0.64</b>	<b>0.63</b>	<b>0.46</b>

The current ratio has already described the continuity of the company's decrease in current assets and the significant reduction in its current liabilities from 2019 to 2020. The inventory drop, which is also needed to figure out the quick ratio, was 2% between 2019 and 2020 and 8% between 2020 and 2021. This is why the quick ratio behaved similarly to the current ratio from 2019 to 2021. The amount of stored aircraft peaked in 2020, despite a significant decline in production, primarily brought on by the production adaptation plan and the ramp-down of the A380, as evidenced by a nine percent drop in work-in-process from 2019 to 2020 and a further six percent drop due to a reduction in wide-body aircraft production from 2020 to 2021 (Airbus SE, 2022). This reflects how COVID-19 affected the sector, as customers asked for delivery delays among other related issues. (Airbus SE, 2021) When added together, both had a negative two percent and eight percent impact on the total inventory from 2019 to 2020 and from 2020 to 2021, respectively.

#### 4.1.2.2 Airbus - Financial Leverage Ratios / Debt Ratios / Long-term Solvency

##### Ratios

- Debt-to-Equity Ratio

**Table 3: Airbus Debt-to-Equity Ratios**

		2021	2020	2019
<b>Debt-to-Equity ratio</b>	<i>Num Total Debt</i>	\$ 20,093.00	\$ 20,479.00	\$ 15,857.00
	<i>Den Total Equity</i>	\$ 9,486.00	\$ 6,456.00	\$ 5,990.00
		<b>2.12</b>	<b>3.17</b>	<b>2.65</b>

By calculating the debt-to-equity ratio for Airbus, one can see on the one hand that Airbus increased its total debt from 2019 to 2020 by 29 percent while increasing its total equity by eight percent respectively. The increase in total debt mainly results from the 34 percent increase in non-current financial liabilities, partly by issuing bonds and USPP (Underwritten Secondary Public Offering) issuances (Airbus SE, 2022), compared to a 14 percent increase in current financial liabilities.

On the other hand, Airbus increased its total equity by eight and 47 percent, respectively. Secondly, the rise of equity was achieved by a major increase of net income “for the period of € +4,213 million and a decrease in other comprehensive income, principally related to the mark to market revaluation of the hedge portfolio of € - 3,710 million partly offset by a change in actuarial gains and losses of € +2,363 million.” (Airbus SE, 2022) As stated in the financial reports, this number mainly reflects higher aircraft deliveries as well as the retained earnings in 2021, which could stay above zero, partly due to the “withdrawal of 2019 dividend proposal with cash value of €1.4 billion”. (Airbus SE, 2022)

Due to that, Airbus improved the Debt-to-Equity Ratio from 2019 to 2021, indicating that Airbus is borrowing less money to finance its operations.

- **Debt-to-Total-Assets Ratio**

**Table 4: Airbus Debt-to-Total-Assets Ratios**

		2021	2020	2019
<b>Debt-to-Total Asset Ratio</b>	<i>Num Total Debt</i>	€20,093.00	€20,479.00	€15,857.00
	<i>Den Total Assets</i>	€107,047.00	€110,095.00	€114,409.00
		<b>0.19</b>	<b>0.19</b>	<b>0.14</b>

Airbus' total debt increased in 2020 compared to 2019, as discussed in the previous chapter, and it could maintain this amount in 2021. Both fiscal years saw an increase in the total assets, which is also necessary to calculate the debt-to-total-assets ratio.

When compared to 2019, the total assets decreased by four percent in 2020 and another three percent when compared to 2020 in 2021.

Although current assets were growing by 3% in 2020, the decline in total assets was caused by a reduction of 10% in non-current assets. Although Airbus made significant investments in non-current derivatives and hedging assets to offset the negative effects of long-term investments, among other things, it was still unable to preserve or increase the value of the total assets fully. A higher debt-to-total-assets ratio was observed in 2020 due to rising total debts and falling total assets.

The debt-to-current-assets ratio also fell for Airbus in 2021 as a result of a further decline in total assets. The company was primarily able to maintain its non-current assets this year but not its current assets.

The rise in Airbus' debt-to-total-assets ratio from 2019 to 2021 indicates that a greater proportion of its assets are financed by debt rather than its equity.

### 4.1.3 Airbus - Income Statement Ratios and Income Statement/Balance Sheet

#### Ratios

The following chapter demonstrates and analyzes the ratios, all of which are based on the income statement and balance sheet of Airbus SE. The corresponding calculations can be found in the appendix, and they are derived from the data presented in the Airbus financial reports for the years 2019 (Airbus SE, 2020), 2020 (Airbus SE, 2021), and 2021 (Airbus SE, 2022) respectively and reorganized for comparison with other companies by Morningstar. (Morningstar, 2023)

#### 4.1.3.1 Airbus - Coverage Ratios

- Interest Coverage Ratio / Time Interest Earned (TIE) Ratio

**Table 5: Airbus Interest Coverage / Time Interest Earned Ratios**

		2021	2020	2019
<b>Interest Coverage Ratio</b>	<i>Num EBIT</i>	\$ 4,833.00	\$ 664.00	\$ 1,022.00
	<i>Den Interest Expense</i>	\$ 265.00	\$ 296.00	\$ 157.00
		<b>18.24</b>	<b>2.24</b>	<b>6.51</b>

Airbus' EBIT, calculated by subtracting the operating expenses from the gross profit, fell by 35% in 2020 but reached a high in 2021 when the company reported an increase of 373% from 2019.

Significantly lower sales in 2020, which resulted in a 46% decrease in gross profit, were the main cause of the decline in EBIT. Despite a 47% reduction in operating costs, particularly in administrative costs as a result of "*final agreements [being] reached in 2019 with the French Parquet National Financier (PNF), the U.K. Serious Fraud Office (SFO), and the US Department of State (DoS)*" (Airbus SE, 2021, p.29), the EBIT still fell by about a third compared to 2020.

While keeping operating expenses in line with 2020, which are held at a level that is half that of 2019, the extraordinary increase in EBIT in 2021 results from a significant increase in gross profit by 70%, reaching nearly the value of 2019 again.

In contrast to the substantial changes in the EBIT, the roughly constant maintenance of interest expenses from 2019 to 2020 to 2021 had little impact on the Interest Coverage Ratio.

Since Airbus increased its interest coverage ratio by a lot between 2019 and 2021, the company has more money to pay the interest on its debts. It is much less likely to go bankrupt in 2021 than in 2020 or even before COVID-19 in 2019, as the company can retain earnings without needing to pay them to shareholders as interests.



#### 4.1.3.2 Airbus - Activity Ratios

- Inventory Turnover Ratio

Table 6: Airbus Inventory Turnover Ratios

	2021	2020	2019
<b>Inventory Turnover Ratio</b> <i>Num COGS</i>	€42,518.00	€44,250.00	€59,973.00
<i>Den Inventory</i>	€25,166.00	€27,286.00	€27,910.00
	<b>1.69</b>	<b>1.62</b>	<b>2.15</b>
<b>Inventory Period (Days)</b>	<b>216</b>	<b>225</b>	<b>170</b>

Due to changes in production rates "*in response to the new COVID-19 market environment*" (Airbus SE, 2021, 15), Airbus' cost of goods sold (COGS) went down by 26% in 2020 compared to 2019 and by another 4% in 2021, even though the company's total revenue went up by 4% from 2020 to 2021.

Inventory fell during the same period by 2% between 2019 and 2020 and another 8% between 2021 and 2022. The reduction in inventories in 2020 "*reflects a decrease in work in progress in line with the production adaptation plan as well as A380 ramp down [...] as well as other factors related to the ongoing COVID-19 pandemic*" (Airbus SE, 2021, 41). In contrast, the reduction in 2021 was "*driven by the delivery of the last A380 aircraft and the reduction in the widebodies inventory*" (Airbus SE, 2022, 40).

The inventory turnover ratio shows that while Airbus was able to sell, replace, or use their inventory more than twice per year (every 170 days) in 2019, sales weakened in the following two years as the company was only able to turn the inventory 1,62 times (every 225 days) in 2020 and 1,69 times (every 216 days) in 2021.

- **Receivables Turnover Ratio**

**Table 7: Airbus Receivables Turnover Ratios**

		2021	2020	2019
<b>Receivables Turnover Ratio</b>	<i>Num Net Sales</i>	€52,149.00	€49,912.00	€70,478.00
	<i>Den Receivables</i>	€5,063.00	€5,132.00	€5,674.00
		<b>10.30</b>	<b>9.73</b>	<b>12.42</b>
<b>Receivables Period (Days)</b>		<b>35</b>	<b>38</b>	<b>29</b>

From 2019 to 2020, Airbus's net sales fell by 29%. "*Lower deliveries of 566 aircraft (in 2019: 863 aircraft) in line with the production adaptation plan set out in April 2020 in response to the COVID-19 pandemic*" (Airbus SE, 2021, 28) are the main cause of this drop in sales. The company increased the number of aircraft deliveries in 2021 over 2020 by 4%. But because 2021's net sales were still 26% lower than 2019's, it was impossible to reach the numbers before COVID-19.

Trade receivables decreased by 10% from 2019 to 2020 and another 1% from 2020 to 2021, but they remained roughly constant compared to Airbus's net sales figures.

The receivables turnover ratio shows that Airbus could convert receivables to cash about 12 times in 2019 but only about ten times in 2020 and 2021. Measured in days, Airbus could convert receivables to cash every 30 days in 2019, but efficiency declined in 2020 and 2021, when it took 38 and 35 days, respectively.

- **Operating Cycle**

**Table 8: Airbus Operating Cycle**

		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Operating Cycle</b>	<i>Sum IP + RP (days)</i>	251	263	199

Summing up the inventory period and the receivables period, which both increased from 2019 to 2020 and decreased again in 2021 due to the reasons explained in this chapter's point on inventory ratio and receivables ratio, is visible on the operating cycle. From 2019 to 2021, the operating cycle increased by 52 days.

- **Payables Turnover Ratio**

**Table 9: Airbus Payable Turnover Ratios**

		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Payables Turnover Ratio</b>	<i>Num COGS</i>	€42,518.00	€44,250.00	€59,973.00
	<i>Den Payables</i>	€11,701.00	€10,912.00	€18,361.00
		<b>3.63</b>	<b>4.06</b>	<b>3.27</b>
<b>Payables Period (Days)</b>		<b>100</b>	<b>90</b>	<b>112</b>

From 2019 to 2020 Airbus' payables ratio turnover increased as the COGS decreased more than the payables. From 2020 to 2021, the COGS decreased while the payables increased again, resulting in a falling payables turnover ratio.

Multiple actions influenced both COGS and payables in 2020. COGS were falling due to the production adaptation plan. Payables were decreasing as well, as the company didn't have that much need for products from suppliers on the one hand and the ramp-down of the workforce on the other hand, which led to fewer accounts/trade payables.

In case Airbus wouldn't have paid suppliers in advance (Airbus SE, 2022, 40), it can be assumed that the payables would have decreased even further, and the payables period would have been shorter.

- **Cash Conversion Cycle**

**Table 10: Airbus Payable Turnover Ratios**

	2021	2020	2019
<b>Cash (Conversion) Cycle</b> <i>Sub OPC - PP (days)</i>	151	173	88

Airbus's cash conversion cycle, calculated by subtracting the payables period from the operating cycle, increased by 85 days from 2019 to 2020. Although the payables period was falling in this timeframe, the operating cycle was far more increasing in absolute numbers.

In conclusion, Airbus needed short-term financing for 85 days more in 2020 due to the decision required to absorb COVID-19's impact on the company, as well as indirectly on its suppliers and customers, compared to 2019.

- **Total Asset / Capital Turnover Ratio**

**Table 11: Airbus Total Asset / Capital Turnover Ratios**

	2021	2020	2019
<b>Total Asset Turnover Ratio</b> <i>Num Net Sales</i>	\$ 52,149.00	\$ 49,912.00	\$ 70,478.00
<i>Den Total Assets</i>	\$ 107,047.00	\$ 110,095.00	\$ 114,409.00
	<b>0.49</b>	<b>0.45</b>	<b>0.62</b>

This chapter's section on the receivables turnover ratio describes why and how net sales decreased in 2020 and increased in 2021.

Aside from that, total assets decreased twice: by 3% in 2021 and 4% in 2020. This was primarily due to a 10% decline in non-current assets in 2020 due to the substantially lower investments in non-current financial assets, in Airbus' case, non-current securities (Airbus SE, 2021, 62).

The lower numbers in 2020 and 2021 compared to 2019 suggest that Airbus has lost efficiency in utilizing its total assets to generate sales in these fiscal years, according to the total asset turnover ratio used to compare net sales to total assets.

#### 4.1.3.3 Airbus - Profitability Ratios

- **Gross Profit Ratio / Gross Profit Margin** (sales-related)

**Table 12: Airbus Gross Profit Ratios**

		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Gross Profit Ratio</b>	<i>Num Gross Profit</i>	€9,631.00	€5,662.00	€10,505.00
	<i>Den Net Sales</i>	€52,149.00	€49,912.00	€70,478.00
		<b>18%</b>	<b>11%</b>	<b>15%</b>

From 2019 to 2020, Airbus' gross profit decreased by 46% as a result of higher decreasing net sales than COGS. In the following year, 2021, the company's gross profit could increase again as the net sales rise by 4% and COGS could further fall by 4%.

This relation can also be seen in the gross profit ratio, showing that in 2020 the ratio fell due to a higher decrease in net sales and an increasing gross profit ratio in 2021 when the net sales were rising as COGS were further falling.

Overall, the ratio shows Airbus could retain 3% more of the profit in 2021 compared to 2019 for every euro generated by sales.

- **Return on Sales (ROS) Ratio / Net Profit Margin** (sales-related)

**Table 13: Airbus Return on Sales Ratios**

		2021	2020	2019
<b>Return on Sales</b>	<i>Num Net Income</i>	€4,213.00	-€1,133.00	-€1,362.00
	<i>Den Net Sales</i>	€52,149.00	€49,912.00	€70,478.00
		<b>8%</b>	<b>-2%</b>	<b>-2%</b>

Airbus' net income (before extraordinary items and discontinued operations) decreased from 2019 to 2020 by 17% and afterward increased from 2020 to 2021 by 472%.

The decrease of 12% in 2020 is the result of a 206% decrease in pretax income, which was significantly impacted by non-operating expenses as well as the 35% decrease in total operating profit, and a 98% increase in income tax provisions, which "*corresponds to an effective income tax rate of -3,5% driven by the negative pre-tax result in 2020 offset by deferred tax impairments and tax-free revaluation of certain equity investments*" (Airbus SE, 2021, 31).

Net sales decreased in 2020 and increased in 2021, as described in the receivables turnover ratio section of chapter 4.1.3.2.

The 472% increase in net income in 2021 was made possible by a 545% increase in pretax income, reflecting a 70% increase in gross profit over the previous year, which was brought on by both higher net sales and lower cost of goods sold. (Airbus SE, 2022, 27)

According to the data regarding the gross ROS, the company had to invest an additional \$0,02 to produce sales in 2020 for every dollar generated by net sales. In

2021, the company could once more keep \$0,08 for every dollar of net sales generated while deducting \$0,92 for the cost of goods sold. Given that it was already at minus 2% in 2019, Airbus improved the ratio in 2021 compared to 2019.

- **Return on Assets (ROA) Ratio** (investment-related)

**Table 14: Airbus Return on Assets Ratios**

		2021	2020	2019
<b>Return on Assets</b>	<i>Num Net Income</i>	\$ 4,213.00	\$ -1,133.00	\$ -1,362.00
	<i>Den Total Assets</i>	\$ 107,047.00	\$ 110,095.00	\$ 114,409.00
		<b>4%</b>	<b>-1%</b>	<b>-1%</b>

According to the discussion in the section of this chapter titled Gross Profit Margin / Gross Profit Ratio, net income increased in 2020 and 2021. Contrarily, as noted in the Total Asset / Capital Turnover Ratio section of chapter 4.1.3.2, total assets decreased in 2020 and 2021.

The company was using its assets as effectively in 2020 as it was in 2019, and it could become even more effective in 2021 compared to both 2019 and 2020, according to the return on assets ratio, which provides insight into how successfully the company was using its assets for the creation of net income.

- **Return on Equity (ROE) Ratio** (investment-related)

**Table 15: Airbus Return on Equity Ratios**

		2021	2020	2019
<b>Return on Equity</b>	<i>Num Net Income</i>	\$ 4,213.00	\$ -1,133.00	\$ -1,362.00
	<i>Den Total Equity</i>	\$ 9,486.00	\$ 6,456.00	\$ 5,990.00
		<b>44%</b>	<b>-18%</b>	<b>-23%</b>

Net income increased in 2020 and 2021, in accordance with the analysis in the chapter's section on gross profit margin and gross profit ratio. Similarly to this, total equity increased in both 2020 and 2021, as noted in the debt-to-equity ratio section of chapter 4.1.2.2.

Increasing numbers for net income and total equity in 2020 and again in 2021 saw a rise in Airbus' ROE from -0,23 to 0,44. This rise indicates more efficiency in how Airbus converts its equity financing into profits.

#### **4.1.4 Airbus – Overview of financial ratios**

The following tables demonstrate an overview of all the calculate financial ratios of Airbus:



**Table 16: Airbus Balance Sheet Ratios**

<b>Balance sheet ratios</b>				
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Current Ratio</b>	<i>Num Current assets</i>	€55,800.00	€58,400.00	€56,723.00
	<i>Den Current liabilities</i>	€47,807.00	€49,771.00	€62,374.00
		<b>1.17</b>	<b>1.17</b>	<b>0.91</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Quick Ratio</b>	<i>Num Current assets-inventories</i>	€30,634.00	€31,114.00	€28,813.00
	<i>Den Current liabilities</i>	€47,807.00	€49,771.00	€62,374.00
		<b>0.64</b>	<b>0.63</b>	<b>0.46</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Debt-to-Equity ratio</b>	<i>Num Total Debt</i>	€20,093.00	€20,479.00	€15,857.00
	<i>Den Total Equity</i>	€9,486.00	€6,456.00	€5,990.00
		<b>2.12</b>	<b>3.17</b>	<b>2.65</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Debt-to-Total Asset Ratio</b>	<i>Num Total Debt</i>	€20,093.00	€20,479.00	€15,857.00
	<i>Den Total Assets</i>	€107,047.00	€110,095.00	€114,409.00
		<b>0.19</b>	<b>0.19</b>	<b>0.14</b>

**Table 17: Airbus Income Statement Ratios and Income Statement/Balance Sheet Ratios – Part 1**

<b>Income Statement Ratios and Income Statement/Balance Sheet Ratios</b>				
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Interest Coverage Ratio</b>	<i>Num EBIT</i>	€4,833.00	€664.00	€1,022.00
	<i>Den Interest Expense</i>	€265.00	€296.00	€157.00
		<b>18.24</b>	<b>2.24</b>	<b>6.51</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Inventory Turnover Ratio</b>	<i>Num COGS</i>	€42,518.00	€44,250.00	€59,973.00
	<i>Den Inventory</i>	€25,166.00	€27,286.00	€27,910.00
		<b>1.69</b>	<b>1.62</b>	<b>2.15</b>
<b>Inventory Period (Days)</b>		<b>216</b>	<b>225</b>	<b>170</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Receivables Turnover Ratio</b>	<i>Num Net Sales</i>	€52,149.00	€49,912.00	€70,478.00
	<i>Den Receivables</i>	€5,063.00	€5,132.00	€5,674.00
		<b>10.30</b>	<b>9.73</b>	<b>12.42</b>
<b>Receivables Period (Days)</b>		<b>35</b>	<b>38</b>	<b>29</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Operating Cycle</b>	<i>Sum IP + RP (days)</i>	251	263	199
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Payables Turnover Ratio</b>	<i>Num COGS</i>	€42,518.00	€44,250.00	€59,973.00
	<i>Den Payables</i>	€11,701.00	€10,912.00	€18,361.00
		<b>3.63</b>	<b>4.06</b>	<b>3.27</b>
<b>Payables Period (Days)</b>		<b>100</b>	<b>90</b>	<b>112</b>

**Table 18: Airbus Income Statement Ratios and Income Statement/Balance Sheet Ratios – Part 2**

<b>Income Statement Ratios and Income Statement/Balance Sheet Ratios</b>					
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Cash (Conversion) Cycle</b>	Sub <i>OPC - PP (days)</i>	151	173	88	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Total Asset Turnover Ratio</b>	Num <i>Net Sales</i>	€52,149.00	€49,912.00	€70,478.00	
	Den <i>Total Assets</i>	€107,047.00	€110,095.00	€114,409.00	
		<b>0.49</b>	<b>0.45</b>	<b>0.62</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Sales</b>	Num <i>Net Income</i>	€4,213.00	-€1,133.00	-€1,362.00	
	Den <i>Net Sales</i>	€52,149.00	€49,912.00	€70,478.00	
		<b>8%</b>	<b>-2%</b>	<b>-2%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Assets</b>	Num <i>Net Income</i>	€4,213.00	-€1,133.00	-€1,362.00	
	Den <i>Total Assets</i>	€107,047.00	€110,095.00	€114,409.00	
		<b>4%</b>	<b>-1%</b>	<b>-1%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Equity</b>	Num <i>Net Income</i>	€4,213.00	-€1,133.00	-€1,362.00	
	Den <i>Total Equity</i>	€9,486.00	€6,456.00	€5,990.00	
		<b>44%</b>	<b>-18%</b>	<b>-23%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Gross Profit Ratio</b>	Num <i>Gross Profit</i>	€9,631.00	€5,662.00	€10,505.00	
	Den <i>Net Sales</i>	€52,149.00	€49,912.00	€70,478.00	
		<b>18%</b>	<b>11%</b>	<b>15%</b>	

## 4.2 Boeing - Ratio analysis

### 4.2.1 Boeing - Overview of the company

The Boeing Company, in short Boeing, is a multinational corporation based in the United States that designs, manufactures, and sells airplanes, helicopters, rockets, satellites, and missiles around the world. It is one of the largest aerospace manufacturers in the world and the largest exporter in the United States. The company was founded in 1916 and has since become a major player in the aerospace industry.

Boeing creates various products, including commercial airplanes, military aircraft, satellites, and missiles. Its commercial airplane product line includes the 737, 747, 767, 777, and 787. Airlines all over the world use these planes to transport passengers and cargo. Military aircraft such as the F-15 and F/A-18 fighter jets, as well as the CH-47 Chinook helicopter, are also produced by the company.

In addition to manufacturing, Boeing offers various services to customers, such as maintenance, repair, overhaul services, training, and engineering services. The company has a global customer base, with customers in more than 150 countries.

Boeing is headquartered in Chicago, Illinois, and operates in several countries worldwide, including the United States, the United Kingdom, Australia, and China. The company employs approximately 160,000 people worldwide. (Boeing, 2022)

### 4.2.2 Boeing - Balance Sheet Ratios

The ratios are based on Boeing's balance sheet and are demonstrated and analyzed in the following chapter. The corresponding calculations, which are included in

the appendix, were made using the information provided in Boeing's financial reports for the years 2019 (Boeing, 2020), 2020 (Boeing, 2021), and 2021 (Boeing, 2022), respectively and reorganized for comparison with other companies by Morningstar. (Morningstar, 2023)

#### 4.2.2.1 Boeing - Liquidity Ratios / Short-term Solvency Ratios

- **Current Ratio**

**Table 19: Boeing Current Ratios**

			<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Current Ratio</b>	<i>Num</i>	<i>Current assets</i>	\$ 108,666.00	\$ 121,642.00	\$ 102,229.00
	<i>Den</i>	<i>Current liabilities</i>	\$ 81,992.00	\$ 87,280.00	\$ 97,312.00
			<b>1.33</b>	<b>1.39</b>	<b>1.05</b>

Between 2019 and 2020, Boeing's current assets grew by 14%. The increase in this number results from a sharp rise in short-term investments, particularly time deposits (Boeing, 2021), as well as a further 14% increase in finished goods and merchandise inventories, while work-in-process inventories have remained stable over time. The reduction of current debt and capital lease obligations by 73 percent from 2019 to 2020 has the most significant impact on the decrease of current liabilities, while trade/accounts payable decreased by 17%, partly due to workforce reductions required for adapting the company to the market, which was impacted highly by COVID-19. These figures cause a rise in liquidity for the current ratio from 2019 to 2020. In contrast to the increase from 2019 to 2020, the current ratio remained relatively stable from 2020 to 2021. (Boeing, 2022)

- Quick Ratio / Acid-Test

**Table 20: Boeing Quick Ratios / Acid-Test**

			2021	2020	2019
<b>Quick Ratio</b>	<i>Num</i>	<i>Current assets-inventories</i>	\$ 29,843.00	\$ 39,927.00	\$ 25,607.00
	<i>Den</i>	<i>Current liabilities</i>	\$ 81,992.00	\$ 87,280.00	\$ 97,312.00
			<b>0.36</b>	<b>0.46</b>	<b>0.26</b>

Boeing's quick ratio exhibits similar behavior to its current ratio, increasing from 2019 to 2020 and declining from 2020 to 2021. The inventories, which determine the difference between the current and quick ratio calculations, increased by 7% in 2020 compared to 2019 and decreased by 4% in 2021. The COVID-19-related market uncertainties and the 737 MAX's required grounding-related delays or cancellations are the causes of this change, which results in higher inventories of finished goods and merchandise. Aside from these two factors, Boeing was "*producing at abnormally low production rates in 2020 and 2021*" (Boeing, 2021, 56), which caused a production slowdown and higher work-in-process inventories.

To counteract this, Boeing invested in time deposits, which allowed the numerator to grow from 2019 to 2021 while the liabilities decreased, as discussed in this section's previous point. (Boeing, 2021) Summed up, these changes result in an overall increase in the quick ratio, suggesting higher liquidity and short-term solvency.

#### 4.2.2.2 Boeing - Financial Leverage Ratios / Debt Ratios / Long-term Solvency

##### Ratios

- Debt-to-Total-Equity Ratio

Table 21: Boeing Debt-to-Total-Equity Ratios

			2021	2020	2019
<b>Debt-to-Equity Ratio</b>	<i>Num</i>	<i>Total Debt</i>	\$ 60,384.00	\$ 65,764.00	\$ 28,983.00
	<i>Den</i>	<i>Total Equity</i>	\$ -14,846.00	\$ -18,075.00	\$ -8,300.00
			<b>-4.07</b>	<b>-3.64</b>	<b>-3.49</b>

According to comparisons of financial data from 2019, 2020, and 2021, Boeing's total debt, the sum of current and non-current liabilities, increased by 127% from 2019 to 2020 and decreased by 8% compared to 2020. The peak in 2020 is primarily the result of an increase in long-term debts of 214% from 2019 to 2020, fully utilizing a "*two-year delayed draw term loan credit agreement*" (Boeing, 2021, 68), valued at \$13,825, and issuing a number of fixed rate senior notes with an aggregate face value of \$25 billion and maturities ranging from 2023 to 2060. (Boeing, 2021, 68) Boeing took these decision to anticipate "*negative operating cash flows in future quarters until commercial deliveries ramp up*" once more due to the "*global COVID-19 outbreak and the grounding of the 737 MAX airplanes.*" (Boeing, 2021, 68)

In contrast to the total debt, the total equity increased by 18% from 2020 to 2021 after falling by 118% from 2019 to 2020. Again, the highest point of these numbers was in 2020. This was mostly because of the operating loss, which led to a 24% drop in retained earnings, which is calculated by taking the retained earnings at the beginning and subtracting the net income (profit or loss) from the net income (profit or loss) minus

dividends, which were zero in 2020 as the board of directors were suspending the payments of dividends to shareholders in 2020. (Boeing, 2021, 23)

According to the financial data, Boeing maintained its debt-to-total-equity ratio despite the fact that total equity was drastically declining as a result of the effects of Covid-19 and the grounding of the 737 MAX aircraft. The reason for this behavior is the company's decision to draw long-term debts, which primarily increased the company's total debts and thus gave more ownership of the company to creditors.

- **Debt-to-Total-Assets Ratio**

**Table 22: Boeing Debt-to-Total-Assets Ratios**

		2021	2020	2019
<b>Debt-to-Total Assets Ratio</b>	<i>Num Total Debt</i>	\$ 60,384.00	\$ 65,764.00	\$ 28,983.00
	<i>Den Total Assets</i>	\$ 138,552.00	\$ 152,136.00	\$ 133,625.00
		<b>0.44</b>	<b>0.43</b>	<b>0.22</b>

According to the company's financial statements, Boeing's total debts increased by more than twice as much in 2020 compared to 2019 and decreased once more in 2021 compared to 2020.

However, Boeing was able to grow its total assets by 14% in 2020, largely due to a 19% increase in current assets, primarily brought on by short-term investments in time deposits. (Boeing, 2021, 78)

The ratio of the company's debt to its total assets was nearly twice as high in 2020 as in 2019, indicating that its assets continued to be dependent on debt financing.

The comparison shows that the number did not significantly shift from 2020 to 2021.



### 4.2.3 Boeing - Income Statement Ratios and Income Statement/Balance Sheet Ratios

The ratios are based on Boeing's income statement and balance sheet. They are demonstrated and analyzed in the following chapter. The corresponding calculations, which are included in the appendix, were made using the information provided in Boeing's financial reports for the years 2019 (Boeing, 2020), 2020 (Boeing, 2021), and 2021 (Boeing, 2022), respectively and reorganized for comparison with other companies by Morningstar. (Morningstar, 2023)

#### 4.2.3.1 Boeing - Coverage Ratios

- Interest Coverage Ratio / Time Interest Earned (TIE) Ratio

**Table 23: Boeing Interest Coverage Ratio / Time Interest Earned (TIE) Ratios**

	2021	2020	2019
<b>Interest Coverage Ratio</b> <i>Num EBIT</i>	\$ -3,389.00	\$ -12,978.00	\$ -2,662.00
<i>Den Interest Expense</i>	\$ 2,682.00	\$ 2,156.00	\$ 722.00
	<b>-1.26</b>	<b>-6.02</b>	<b>-3.69</b>

Boeing's EBIT drastically dropped from 2019 to 2020 by 388%. The total revenue was affected by the COVID-19 outbreak and the grounding of Boeing's aircraft, the 737 MAX, by 24%, but the cost of revenue only changed by 11% as in the same period, the operating costs increased by 2%.

The increase in interest expenses by roughly 200% as "*a result of higher debt balances*" (Boeing, 2021, 31) had an additional effect on the interest coverage ratio, dropping from minus 3,69 to minus 6,02 between 2019 and 2020.

EBIT increased in 2021 as a result of a 7% increase in revenue, a 7% increase in the cost of revenue, and a 12% reduction in operating expenses. This led to a rise in EBIT of 74% over 2020.

As the interest coverage ratio for each financial year under discussion is less than one, Boeing cannot pay its interest obligations with current revenues, causing a steady decline in retained earnings, which is reflected in the company's balance sheet.

#### 4.2.3.2 Boeing - Activity Ratios

- Inventory Turnover Ratio

**Table 24: Boeing Inventory Turnover Ratios**

		2021	2020	2019
<b>Inventory Turnover Ratio</b>	<i>Num COGS</i>	\$ 59,269.00	\$ 63,843.00	\$ 72,093.00
	<i>Den Inventory</i>	\$ 78,823.00	\$ 81,715.00	\$ 76,622.00
		<b>0.75</b>	<b>0.78</b>	<b>0.94</b>
<b>Inventory Period (Days)</b>		<b>485</b>	<b>467</b>	<b>388</b>

*“Related to the 777X program, COVID-19 impacts, KC-46A Tanker program, abnormal production costs at BCA and severance costs” (Boeing, 2021, p. 31) COGS decreased by 11% from 2019 to 2020. They further declined in 2021, “primarily due to higher earnings charges at BCA, BDS, and BGS in 2020, partially offset by higher costs as a result of higher revenues in 2021 and the reach-forward loss on the 787 program” (Boeing, 2022, p.30).*

However, the business experienced a 7% increase in inventory from 2019 to 2020, primarily as a result of the rapid expansion of commercial aircraft programs. According

to Boeing, there are "*approximately 425 undelivered 737 MAX aircraft and 80 undelivered 787 aircraft*" as a result of the 737 MAX being grounded, lower wide-body deliveries brought on by the COVID-19 pandemic, and production problems with the 787 as well as related rework (Boeing, 2021, 89).

The calculated inventory turnover ratio highlights the year-over-year decline in deliveries of the company's products. The ratio, which indicates how frequently the business can sell, use, or replace its inventory in a year, was at 0,94 in 2019 (every 399 days), but it fell to 0,78 in 2020 (every 480 days) and further fell to 0,75 in 2021 (every 488 days).

- **Receivables Turnover Ratio**

**Table 25: Boeing Receivables Turnover Ratios**

			2021	2020	2019
<b>Receivables Turnover Ratio</b>	<i>Num</i>	<i>Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00
	<i>Den</i>	<i>Receivables</i>	\$ 3,026.00	\$ 2,385.00	\$ 3,337.00
			<b>20.58</b>	<b>24.38</b>	<b>22.94</b>
<b>Receivables Period (Days)</b>			<b>18</b>	<b>15</b>	<b>16</b>

Due to the grounding of the 737 MAX and the global COVID-19 outbreak, Boeing was able to sell commercial aircraft for around half the amount in 2020, \$16,162, compared to 2019, when they sold commercial aircraft for \$32,255. (Boeing, 2021,67) The company predicted in 2021 that "*it will take approximately three years for travel to return to 2019 levels and a few years beyond that for the industry to return to long-term trend growth*" (Boeing, 2021, 68), which had a significant impact on Boeing's total net sales, which decreased by 24% from 2019 to 2020 and only increased by 7% from 2020 to 2021 again.

Boeing's receivables, which "arise when the Company recognizes revenue for amounts which cannot yet be billed under terms of the contract with the Customer" (Boeing, 2021, 72), decreased by 27% from 2019 to 2020. This decline was primarily attributable to a decrease in receivables in global services, a division of Boeing that "provides services to [...] commercial and defense customers worldwide." (Boeing, 2021, 2) The numbers increased once more from 2020 to 2021 by 27% as both accounts receivable from U.S. government contracts and commercial aircraft increased, while the number of global services remained at the levels of 2020.

Boeing was able to convert receivables into cash 23 times in 2019 (every 16 days), 24 times in 2020 (every 15 days), and 21 times in 2021 (every 19 days), according to the receivable turnover ratio, which uses both net sales and receivables to calculate how frequently a company can do so.

- **Operating Cycle**

**Table 26: Boeing Operating Cycle**

		2021	2020	2019
<b>Operating Cycle</b>	<i>Sum IP + RP (days)</i>	503	482	404

The operating cycle displays the cumulative effect of the lengthening of the inventory period and the receivables period from 2019 to 2021, as discussed in this chapter's discussion of the inventory ratio and the receivables ratio. The operating cycle increased by 99 days during this time period, indicating that the business needs more money to maintain operations.

- **Payables Turnover Ratio**

**Table 27: Boeing Payables Turnover Ratios**

		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Payables Turnover Ratio</b>	<i>Num</i> COGS	\$ 59,269.00	\$ 63,843.00	\$ 72,093.00
	<i>Den</i> Payables	\$ 16,961.00	\$ 24,270.00	\$ 29,891.00
		<b>3.49</b>	<b>2.63</b>	<b>2.41</b>
<b>Payables Period (Days)</b>		<b>104</b>	<b>139</b>	<b>151</b>

From 2019 to 2020, Boeing's payables ratio turnover increased, as the COGS decreased more than the payables. From 2020 to 2021, the COGS were falling while the payables didn't drop as much, resulting in a higher payables turnover ratio.

Multiple actions influenced the decrease in COGS, as described in this chapter's section related to the inventory turnover ratio. Payables were decreasing as well in 2020 and 2021, as the company had to pay suppliers, while not being able to sell and deliver the products as in 2019, suggesting a negative cash flow.

- **Cash Conversion Cycle**

**Table 28: Boeing Cash (Conversion) Cycle**

		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Cash (Conversion) Cycle</b>	<i>Sub</i> OPC - PP (days)	399	343	253

Due to a longer operating cycle, as described in this chapter's section on the operating cycle, as well as a shorter payables period, as described in this chapter's section on the

payables period, Boeing's cash conversion cycle increased from 2019 to 2020, as well as from 2020 to 2021.

The fact that this period was highly increasing suggests that Boeing needed much more time in 2021 than it did in 2019 to generate money from its goods and services, requiring more cash to finance its operations.

- **Total Asset / Capital Turnover Ratio**

**Table 29: Boeing Total Asset / Capital Turnover Ratios**

		2021	2020	2019
<b>Total Asset Turnover Ratio</b>	<i>Num Net Sales</i>	\$ 52,149.00	\$ 49,912.00	\$ 70,478.00
	<i>Den Total Assets</i>	\$ 107,047.00	\$ 110,095.00	\$ 114,409.00
		<b>0.49</b>	<b>0.45</b>	<b>0.62</b>

The section of this chapter titled "Receivables Turnover Ratio" describes how the net sales for 2020 decreased while those for 2021 increased.

Despite a significant 24% decline in sales, Boeing's current assets increased by 19% between 2019 and 2020, which is remarkable regarding the company's overall assets. Boeing took several steps to expand its current assets, notably time deposits, which are short-term investments that are 3173% higher than those made in 2019 (Boeing, 2021, 94). This is because, according to Boeing's financial report, "*liquidity matters*" (Boeing, 2021, 68).

The increase in total assets was still insufficient to absorb the shock of the decline in net sales in 2020, which caused the ratio to drop from 0,57 to 0,38 in terms of total asset utilization for the creation of sales.

#### 4.2.3.3 Boeing - Profitability Ratios

- **Gross Profit Ratio / Gross Profit Margin** (sales-related)

**Table 30: Boeing Gross Profit Ratios**

		2021	2020	2019
<b>Gross Profit Ratio</b>	<i>Num Gross Profit</i>	\$ 3,017.00	\$ -5,685.00	\$ 4,466.00
	<i>Den Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00
		<b>5%</b>	<b>-10%</b>	<b>6%</b>

From 2019 to 2020 Boeing's gross profit has decreased by 227%, as a result of higher decreasing net sales than COGS (11%). In the following year 2021, the company's gross profit could increase again as the net sales were rising by 7% and COGS could further fall by 7%.

This relation can also be seen in the gross profit ratio, showing that in 2020 the ratio fell due to a higher decrease in net sales and an increasing gross profit ratio in 2021 when the net sales were rising as COGS were further falling.

Overall, the ratio shows that Boeing could retain 1% less profit in 2021 compared to 2019 for every dollar generated by sales. The ratio reached a low in 2020 when Boeing could not retain any money from net sales.

- **Return on Sales (ROS) Ratio / Net Profit Margin** (sales-related)

**Table 31: Boeing Return on Sales Ratios**

		2021	2020	2019
<b>Return on Sales</b>	<i>Num Net Income</i>	\$ 4,213.00	\$ -1,133.00	\$ -1,362.00
	<i>Den Net Sales</i>	\$ 52,149.00	\$ 49,912.00	\$ 70,478.00
		<b>8%</b>	<b>-2%</b>	<b>-2%</b>

According to Chapter 4.2.3.2's section on Receivables Turnover Ratio, Boeing's net sales decreased in 2020 and increased in 2021.

Boeing's net income followed a similar pattern, declining in 2020 compared to 2019 and then rising again. As a result of the grounding of the 737 MAX and lower aircraft sales due to the COVID-19 outbreak, operating profit has decreased, and non-operating expenses have significantly increased, leading to a decrease in net income in 2020. (Boeing, 2021)

These figures translate into the following ROS for the fiscal year 2020: Boeing had to pay \$0,19 more in the cost of goods sold for every dollar in sales due to a decline in net income of 1767% and a decrease in net sales of 24% when compared to 2019. As deliveries started to increase again in 2021, net income could also increase. This pushed the gross profit ratio up to -7%. Overall, Boeing needs to invest more than it did in 2019 to generate sales in 2021.



- **Return on Assets (ROA) Ratio** (investment-related)

**Table 32: Boeing Return on Assets Ratios**

		2021	2020	2019
<b>Return on Assets</b>	<i>Num Net Income</i>	\$ 4,213.00	\$ -1,133.00	\$ -1,362.00
	<i>Den Total Assets</i>	\$ 107,047.00	\$ 110,095.00	\$ 114,409.00
		<b>4%</b>	<b>-1%</b>	<b>-1%</b>

The discussion on the company's gross profit ratio in this chapter indicates that net income decreased in 2020 and increased in 2021. On the other hand, as mentioned in the Total Asset / Capital Turnover Ratio section of Chapter 4.2.3.2, total assets rose in 2020 and fell once more in 2021.

The return on assets ratio, which gives information about how successfully a company uses its assets to generate net income, shows that the company was using its assets less effectively in 2020 than in 2019, but that got closer back to the number of 2019 in 2021. After all, the utilization of the company's assets across all three years under review resulted in a loss for the business.

- **Return on Equity (ROE) Ratio** (investment-related)

**Table 33: Boeing Return on Equity Ratios**

		2021	2020	2019
<b>Return on Equity</b>	<i>Num Net Income</i>	\$ -4,202.00	\$ -11,873.00	\$ -636.00
	<i>Den Total Equity</i>	\$ -14,846.00	\$ -18,075.00	\$ -8,300.00
		<b>-28%</b>	<b>-66%</b>	<b>-8%</b>

According to the analysis in the chapter's section on gross profit margin and gross profit ratio, net income declined in 2020 before rising again in 2021. According to the information provided in the section of chapter 4.2.2.2 that discusses debt-to-equity ratios, total equity went down in 2020 but then up in 2021.

The return on equity is artificially high because both net income and total equity are in the red. This means that it cannot be compared to the positive ROE of any other company. In conclusion, the fact that the ROE was negative for each of the three years taken into consideration provides evidence that the company did not produce a profit for its shareholders during any of the fiscal years analyzed in this thesis.

#### 4.2.4 Boeing – Overview of financial ratios

The following tables demonstrate an overview of all the calculate financial ratios of Boeing:

**Table 34: Boeing Balance Sheet Ratios**

<b>Balance sheet ratios</b>				
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Current Ratio</b>	<i>Num Current assets</i>	\$ 108,666.00	\$ 121,642.00	\$ 102,229.00
	<i>Den Current liabilities</i>	\$ 81,992.00	\$ 87,280.00	\$ 97,312.00
		<b>1.33</b>	<b>1.39</b>	<b>1.05</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Quick Ratio</b>	<i>Current assets- Num inventories</i>	\$ 29,843.00	\$ 39,927.00	\$ 25,607.00
	<i>Den Current liabilities</i>	\$ 81,992.00	\$ 87,280.00	\$ 97,312.00
		<b>0.36</b>	<b>0.46</b>	<b>0.26</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Debt-to-Equity Ratio</b>	<i>Num Total Debt</i>	\$ 60,384.00	\$ 65,764.00	\$ 28,983.00
	<i>Den Total Equity</i>	\$ -14,846.00	\$ -18,075.00	\$ -8,300.00
		<b>-4.07</b>	<b>-3.64</b>	<b>-3.49</b>
		<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Debt-to-Total Assets Ratio</b>	<i>Num Total Debt</i>	\$ 60,384.00	\$ 65,764.00	\$ 28,983.00
	<i>Den Total Assets</i>	\$ 138,552.00	\$ 152,136.00	\$ 133,625.00
		<b>0.44</b>	<b>0.43</b>	<b>0.22</b>

**Table 35: Boeing Income Statement Ratios and Income Statement/Balance Sheet Ratios – Part 1**

<b>Income Statement Ratios and Income Statement/Balance Sheet Ratios</b>			
	<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Interest Coverage Ratio</b> Num <i>EBIT</i>	\$ -3,389.00	\$ -12,978.00	\$ -2,662.00
Den <i>Interest Expense</i>	\$ 2,682.00	\$ 2,156.00	\$ 722.00
	<b>-1.26</b>	<b>-6.02</b>	<b>-3.69</b>
	<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Inventory Turnover Ratio</b> Num <i>COGS</i>	\$ 59,269.00	\$ 63,843.00	\$ 72,093.00
Den <i>Inventory</i>	\$ 78,823.00	\$ 81,715.00	\$ 76,622.00
	<b>0.75</b>	<b>0.78</b>	<b>0.94</b>
<b>Inventory Period (Days)</b>	<b>485</b>	<b>467</b>	<b>388</b>
	<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Receivables Turnover Ratio</b> Num <i>Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00
Den <i>Receivables</i>	\$ 3,026.00	\$ 2,385.00	\$ 3,337.00
	<b>20.58</b>	<b>24.38</b>	<b>22.94</b>
<b>Receivables Period (Days)</b>	<b>18</b>	<b>15</b>	<b>16</b>
	<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Operating Cycle</b> Sum <i>IP + RP (days)</i>	503	482	404
	<b>2021</b>	<b>2020</b>	<b>2019</b>
<b>Payables Turnover Ratio</b> Num <i>COGS</i>	\$ 59,269.00	\$ 63,843.00	\$ 72,093.00
Den <i>Payables</i>	\$ 16,961.00	\$ 24,270.00	\$ 29,891.00
	<b>3.49</b>	<b>2.63</b>	<b>2.41</b>
<b>Payables Period (Days)</b>	<b>104</b>	<b>139</b>	<b>151</b>

**Table 36: Boeing Income Statement Ratios and Income Statement/Balance Sheet Ratios – Part 2**

<b>Income Statement Ratios and Income Statement/Balance Sheet Ratios</b>					
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Cash (Conversion) Cycle</b>	<i>Sub (days)</i>	399	343	253	
<i>OPC - PP</i>					
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Total Asset Turnover</b>	<i>Ratio</i>				
	<i>Num Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00	
	<i>Den Total Assets</i>	138,552.00	152,136.00	133,625.00	
		<b>0.45</b>	<b>0.38</b>	<b>0.57</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Sales</b>	<i>Ratio</i>				
	<i>Num Net Income</i>	\$ -4,202.00	\$ -11,873.00	\$ -636.00	
	<i>Den Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00	
		<b>-7%</b>	<b>-20%</b>	<b>-1%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Assets</b>	<i>Ratio</i>				
	<i>Num Net Income</i>	\$ -4,202.00	\$ -11,873.00	\$ -636.00	
	<i>Den Total Assets</i>	138,552.00	152,136.00	133,625.00	
		<b>-3%</b>	<b>-8%</b>	<b>0%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Return on Equity</b>	<i>Ratio</i>				
	<i>Num Net Income</i>	\$ -4,202.00	\$ -11,873.00	\$ -636.00	
	<i>Den Total Equity</i>	\$ -14,846.00	\$ -18,075.00	\$ -8,300.00	
		<b>-28%</b>	<b>-66%</b>	<b>-8%</b>	
		<b>2021</b>	<b>2020</b>	<b>2019</b>	
<b>Gross Profit Ratio</b>	<i>Ratio</i>				
	<i>Num Gross Profit</i>	\$ 3,017.00	\$ -5,685.00	\$ 4,466.00	
	<i>Den Net Sales</i>	\$ 62,286.00	\$ 58,158.00	\$ 76,559.00	
		<b>5%</b>	<b>-10%</b>	<b>6%</b>	

## 5 Conclusions

After analyzing each company's financial performance for the three fiscal years in consideration, this chapter aims to answer the research questions raised in the first chapter by using the theoretical research and the ratio analysis results.

### Research question 1

What are the key financial ratios that are commonly used to evaluate the financial health of aerospace companies?

A thorough theoretical analysis of the ratios that can be used to assess a company's financial health is presented in chapter 2. The main categories of ratios are summarized and briefly described in the following points:

- **Liquidity Ratios:** These ratios measure a company's ability to pay off short-term debts, such as the current and quick ratios.
- **Solvency Ratios:** These ratios measure a company's ability to pay off long-term debts, such as debt-to-equity ratio and the debt-to-total-assets ratio.
- **Coverage Ratios:** These ratios measure a company's ability to service its debt obligations, such as the interest coverage ratios.
- **Activity Ratios:** These ratios measure a company's ability to manage its assets and liabilities, such as the inventory turnover ratio, accounts receivable turnover ratio, and the payables turnover ratio, which can be used to determine the operating cycle and cash conversion cycle

- Profitability Ratios: These ratios measure a company's ability to generate profits from its operations, such as the return on assets (ROA), return on equity (ROE), and the gross margin ratio.

## Research question 2

When comparing the ratios of each company before (in 2019) and after (in 2021) the crisis, what have been the impacts of COVID-19 on both Airbus and Boeing in the following areas:

- **Liquidity**

To assess the liquidity of each company, Airbus and Boeing, during the three fiscal years 2019, 2020 and 2021 both the current and the quick ratio have been used. The theory for the ratios can be found in chapter 2.3.2.1. The calculations for both companies' ratios can be found in chapter 4.1.2.1 and chapter 4.2.2.1.

Since the current ratio is more significant than one in both cases—except for Airbus current ratio of 0.91 in 2019—both businesses were able to have a positive net working capital. This means, that they had enough current assets to convert into cash and settle all liabilities if the worst case scenario materializes. The fact that the ratios are not much higher than one also suggests that cash is being used effectively—not too much of it is being held in reserve in the accounts.

To calculate the current ratio, the numerator includes all current assets. This means that the quick ratio, which shows how much of a company's assets are already cash or can be quickly turned into cash in an emergency, is enough to give a complete picture of its short-term liquidity.



Both companies have current ratios that are significantly lower than 1. Due to reductions in current liabilities, Airbus saw its current ratio rise from 0.46 in 2019 to 0.64 in 2021. The production as well as workforce adaptation plan and A380 ramp-down, which are discussed in greater detail in chapter 4.1.2.1, are primarily responsible for this decrease.

In contrast, Boeing increased it from 2019 to 2020, from 0,26 to 0,46, even though the company's inventories grew due to COVID-19 effects and the 737 MAX grounding. As mentioned in the section of chapter 4.2.2.1 devoted to the current ratio, this was made largely by the investments in time-deposits.

Even though both companies' net working capital is positive after COVID-19, the difference between their current and quick ratios suggests that both could have had trouble meeting their short-term obligations because they depended too much on inventories, which are the least liquid asset on their balance sheets. To sum up: Both businesses were resilient enough to survive COVID-19, but they both still had a quick ratio of less than one at the end of 2021.

- **Financial Leverage / Coverage**

In order to rate each company's long-term solvency, the debt-to-equity ratio, as well as the debt-to-total assets ratio, have been used. The theory for the ratios can be found in chapter 2.3.2.2. The calculations for both companies' ratios can be found in chapter 4.1.2.2 and chapter 4.2.2.2.

When comparing the three fiscal years under consideration, Airbus had a positive equity while Boeing had a negative equity.

Despite the COVID-19 crisis causing more outstanding debts than in 2019 due to higher non-financial current liabilities, Airbus was able to stabilize the debt-to-equity ratio. This was mainly possible because of increased aircraft deliveries, their production and workforce adaptation, and the withdrawal of dividends, which led to greater retained earnings. On the other hand, the company's debt-to-assets ratio increased as the non-current liabilities increased, as the company needed to increase liquidity and therefore took on credit loans, as well as decreasing assets suggesting higher leverage of the company in 2021 compared to 2019.

For Boeing, however, the Covid-19 breakout and the 737 MAX grounding on top, which subsequently led to a loss of reputation, had a more significant effect on the company's financials. Consequently, the company's revenues were falling, and their assets were rising, as the aircraft could not be delivered to customers as planned. Ultimately, due to smaller retained earnings, an equity decline was followed on the balance sheet and significantly rising long-term debts. The consequences of both COVID-19 plus the 737 MAX grounding had impacts on the debt-to-equity ratio, which was falling even further, as well as the debt-to-assets ratio, which was double as high in 2021 compared to 2019.

Overall, between 2019 and 2021, Airbus had the upper hand when compared to its main competitor, Boeing, in terms of long-term solvency, which is 25% more leveraged.

- **Profitability**

Each company's profitability has been rated by using the following ratios: Gross profit margin, Return on Sales, Return on Equity, and Return on Assets. The ratios'

theoretical foundations are laid out in chapter 2.3.3.3. Each of those ratios for both businesses can be determined by consulting chapter 4.1.3.3 and chapter 4.2.3.3.

Airbus comes out on top when looking at the two companies gross profit margins. Although both companies behave similarly, Boeing's 16% drop in gross profit margin from 2019 to 2020 is much more significant than Airbus' 4% drop in the same period.

The gross profit margin shows that the net sales drop caused by the COVID-19 pandemic was greater than the drop in COGS in both cases. However, the 737 MAX grounding had a multiplicative effect on Boeing's declining net sales. When comparing their 2019 and 2021 gross profit margin ratios, Airbus improved by three percentage points while Boeing reported a decrease of 1 percentage point.

The ROS exhibits similar behavior due to the global COVID-19 outbreak, while Airbus could benefit from Boeing's 737 MAX grounding.

Airbus has been more successful at making a profit from the owner's equity than Boeing, with a 44% ROE in 2021. It can be argued that Airbus was making new investments and managing its expenses more effectively than Boeing from 2019, when Airbus had a ROE of -23% and Boeing had a ROE of -8%, respectively, until 2021.

Comparing the ROA of the two companies shows that Airbus was making more money from used assets than Boeing in 2020 and 2021, despite Boeing having the advantage in the fiscal year prior.

Gross profit margin, return on equity and return on assets all point to Airbus outperforming Boeing in terms of profitability following the COVID-19 outbreak and Boeing's 737 MAX grounding.

- **Operating Cycle & Cash Conversion Cycle**

Both Airbus and Boeing's inventory and receivables periods were calculated to draw comparisons between the two companies' operating cycles, which are defined as the time it takes from the time a business first starts spending money on raw materials until it receives payment from its customers. Chapter 2.3.3.2 details the operating cycle equation and the two ratios, inventory turnover ratio, and receivables turnover ratio, needed to compute the inventory and receivables period. By consulting chapter 4.1.3.2 and chapter 4.2.3.2, one can find out each of those ratios for both businesses.

Airbus was unable to shorten the operating cycle between 2019 and 2021. From the time they purchase raw materials to the time they get paid by their clients, it took more time—from 199 to 251 days. The same behavior can be deduced from Boeing's financial data, as their operating cycle also increased from 404 to 503 days. The time it takes Airbus to receive inventory, turn it into products, sell those products, and then receive payment from customers for those products is roughly half that of Boeing. This suggests that Airbus is more operationally efficient than Boeing.

As the operating cycle did for both companies, also the cash conversion cycle increased for both from 2019 to 2021, showing no improvements in efficiency. Airbus needed to find short-term financing for 63 days more and Boeing for 146 days more in 2021 compared to 2019. This resulted in both situations because they had to significantly extend their inventory period and slightly extend their receivables period.

Both companies needed to lengthen their operating and cash conversion cycles, but Airbus' performance before and after COVID-19 was significantly better than Boeing's.

The two businesses did not notice any different advantages from COVID-19 over the other.

### **Research question 3**

Considering the financial state of Airbus and Boeing both prior to (in 2019) and following (in 2021) COVID-19, which company performed better and why?

Both Airbus and Boeing have experienced significant disruptions as a direct result of the COVID-19 pandemic. In 2019, prior to the outbreak of the pandemic, both businesses had positive financial performance. However, in 2021, following the pandemic, the financial performance of the two companies has diverged.

In the years following COVID-19, Airbus has demonstrated superior performance compared to Boeing. Multiple sources provide an explanation for this. First, Airbus was able to quickly adapt to the shifting market conditions brought on by the pandemic by lowering its production rate, which is a result of the production adaptation plan and cost cutting, partly by decreasing its workforce. This allowed the company to adjust quickly to the new market conditions. Because of this, Airbus maintained a strong cash position, which assisted the company in overcoming the challenges presented by the COVID-19 pandemic.

However, the pandemic has had a more significant impact on Boeing's financial state. The company's financial situation was already precarious before the pandemic hit when the FAA ordered the grounding of all 737 MAX aircraft over safety concerns. As a result of the pandemic's impact on air travel, Boeing's revenue has fallen even more as the company has seen a steep drop in orders for new planes. In addition, the pandemic's

increased costs forced the company to deal with rising expenses, which negatively impacted its financial performance.

#### **Research question 4**

According to the ratio analysis, which of the two companies, Airbus or Boeing, is better positioned for future success at the end of the fiscal year 2021?

Based on the ratio analysis, it is difficult to say definitively which of the two companies, Airbus or Boeing, is better positioned for future success at the end of the fiscal year 2021. The COVID-19 pandemic has impacted both companies, and their financial performance has been affected in different ways, as mentioned in the answers to research questions 2 and 3, which are further detailed in this chapter.

However, ratio analysis can provide a good indication of each company's financial health. Still, it is essential to consider other factors, such as industry trends (e.g., the lower demand for four-engine aircraft such as the A380), market conditions (e.g., the lower demand in air travel in 2021), and company-specific factors (e.g., the grounding of the B737 MAX aircraft), to get a comprehensive understanding of a company's prospects.

Additionally, it's important to note that the aerospace industry, Airbus and Boeing, among others, is heavily impacted by broader economic conditions and is highly dependent on government policies, geopolitical issues, and other factors that can cause significant fluctuations in demand for aircraft.

## 6 Discussion

The ratio analysis of Airbus and Boeing from 2019 to 2021, which was based on a quantitative and qualitative analysis of their financial reports, demonstrates that both businesses were having trouble during the crisis. Due to the COVID-19 outbreak, both businesses encountered significant difficulties in 2020 as demand for air travel and, by extension, airplanes in general, was drastically declining. To settle their short-term liabilities, both were aiming for high liquidity and short-term solvency. Due to rising revenues and cost-cutting measures in 2021, both businesses were able to stabilize their financial results more or less once more. However, both businesses had to incur greater long-term debts to repay the funds needed in 2020.

Future projections indicate that the aerospace sector will keep expanding due to the rising demand for air travel. However, the industry also has to contend with issues like escalating fuel prices and heightened competition from new players. To maintain their competitive advantage, it will be crucial for Airbus and Boeing to enforce efficiency and cost control in operation.

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