

# Changes in company's value during Covid-19.

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## **Abstract**

This project's objective is to analyse the effect that the Covid-19 pandemic has had on different airlines. To do so, two different methods will be applied, the discounted cash-flow method and the multiples. Moreover, the study of the value of the companies will also be accompanied by a separate study of each of them together with a comparison of the results. The main valuation methods are also presented together with a brief report of each one which includes the formulas, ideal ways and moments to use them. Finally, the different possibilities that appear to analyse the companies whenever a high level of uncertainty appears are also shown.

## **Resum**

L'objectiu d'aquest projecte és analitzar l'efecte que el Covid-19 ha tingut en diferents companyies aèries. Per fer-ho s'aplicaran dos mètodes diferents, el mètode de descompte de fluxos i els múltiples. A més, l'estudi del valor de les empreses va acompanyat d'un anàlisi per separat de cadascuna d'elles, juntament amb una comparació dels resultats. També es presenten els principals mètodes de valoració juntament amb un breu informe de cadascun d'ells. En aquest s'inclou les fórmules, els moments en el que cadascun s'ha d'utilitzar i les maneres ideals de com fer-ho. Finalment, en aquest mateix apartat també s'inclou una petita conclusió de diverses possibilitats de com valorar les empreses en moments d'alta incertesa.

## **Resumen**

El objetivo de este proyecto es analizar el efecto que el Covid-19 ha tenido en distintas compañías aéreas. Para ello se aplicarán dos métodos distintos, el método de descuento de flujos y los múltiplos. Además, el estudio del valor de las empresas va acompañado de un análisis por separado de cada una de ellas, junto a una comparación de los resultados. También se presentan los principales métodos de valoración además de un breve informe de cada uno de ellos. En éste se incluyen las fórmulas, los momentos en los que cada uno debe utilizarse y las maneras ideales de cómo hacerlo. Por último, en este mismo apartado también se incluye una pequeña conclusión de diversas posibilidades de cómo valorar las empresas en momentos de alta incertidumbre.

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## **1. INTRODUCTION**

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In this study different valuation methods are carried to analyse how the value of airlines evolve from 2017 to 2021, years with high uncertainty levels, a pandemic occurring and constant changes in sales, and annual reports in general.

It is divided into three clear parts, the first one where the valuation methods are presented together with an explanation of each of them. The second consists of the creation of hypotheses with the data previously acquired and the knowledge obtained which, in the end will link it to the third part. This one includes using different valuation methods previously presented so that, once after analysing the annual reports of each company, which include the balance sheet and income statement, the value of the company each year can be extracted, compared, and analysed separately to have a clear picture of how the pandemic has affected them

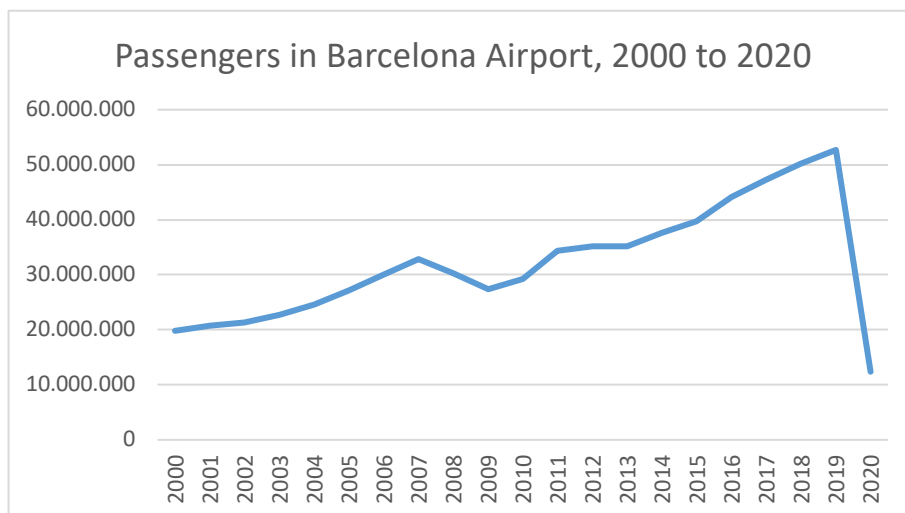
## **2. RELEVANCE OF THE TOPIC**

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Having worked for 3 months in a travel agency in Mataró, phrases such as “flights are more expensive now than ever before” and, “people are paying almost any price to go on a trip”, I could not stop thinking about people’s huge desire to go abroad again, visit new countries, experience new cultures...

Keeping this in mind, the biggest human nature came up, being curious. Doing brief research, impact stunning numbers appeared, just in Barcelona’s airport, the number of passengers went down by a 75% during 2020 with respect to 2019 (Aena, 2021) making us have incredible and never seen before images of empty gates, shops, almost no planes on the landing track... It wasn’t since 1996 that such a few passengers were seen.

Graph 1 - Numbers of passengers in the Barcelona Airport



Source: Aena, 2021

Fining out the relation that this shocking data could have with respect to the context of financial management was key to develop the project. Personally, taking the topic from the point of view of the airlines' owners, the idea of seeing how the valuation of its own companies changed during these almost two years came up. So, financial management's subject was the main interest area.

In addition, talking about the relevance of the topic, (Sharma & Nicolau, 2020) suggests that applying some parameters inside a Chow breakdown test such as infections, declarations and mortality, airlines will experience a drastic decrease in its post-pandemic valuation which will not only impact the short-term but also the long-term. But, not only affecting the airlines, but also the whole tourism industry which additionally includes hotels and apartments, car rentals and cruises.

So, all in all, having a clearer view on the effects that Covid has had on airlines can also help understanding how the effects can be in this other three industries and the consequences that it is having nowadays.

Moreover, (Mohanty & Mishra, 2021) highlight that the effects of Covid on the valuation of companies will affect mostly the civil aviation sector as well as the retail one rather than automobilist, exhibitions, hotels, or other industries related to the tourism sector. Furthermore, it is pointed out how these effects will be significant depending on the structure of costs and debt together with the working capital investment of each airline or company in general.

Looking at airlines from a different point of view, being more focused on how the pandemic has affected not the financial position of the firms in the sector, but the processes and methodologies of the firms. (Vinod, 2021) Shows how a static and rigid sector where flights couldn't be re-scheduled once they were already announced, will have to change completely to survive. Covid-19 has made airlines adapt to those new market conditions that we have nowadays, making incremental planning a key factor on the scheduling, pricing, and revenue management. Moreover, in terms of cash-flow liquidity, new innovative solutions are a must seek for chief financial officers. In resume, Covid has made airlines change, enabling them to have a rapid decision-making process and being less sensitive to changes.

### **3. THEORETICAL FRAMEWORK**

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#### 3.1. Covid-19

Once Covid appeared in 2019 nobody expected that it would change our daily lives as much as it has. While everybody thought it was going to end up as a regional disease in China it suddenly become a worldwide pandemic. Social distance, lockdowns, and face masks have been one of the most listened words in the last 2 years.

By December 2021 more than 88.000 people have passed away while 5.25 million cases have been diagnosed (Our World in Data, 2021). However, is not daring to say that little by little we are overcoming this pandemic, governments are starting to dimmish the measures imposed, more and more people are conscious of the importance of the situation we are all living and last, but probably most important, people are getting the vaccine, almost 80% of the people living in Spain has already been vaccinated (Our World in Data, 2021).

One of the sectors that have been most impacted by the pandemic is tourism. Being in a globalized world where connection among countries is easier than ever, just taking a flight and within the same day you can be elsewhere in the world, the expansion of Covid-19 due to people "transporting" it all over the planet was a real fear. It can easily be seen by the new variants that Covid has evolved to. Delta was the first one and within a few days, it was detected in most of the countries. Furthermore, another case is seen with the Omicron variant as it has arrived all over from the south of Africa to the hole Europe just within a few weeks. Therefore, governments, one of the first things that do when a

new strain is detected is to close airports, causing huge problems to people trying to get back to their home country.

Heavy measures were imposed by March 2020, and it wasn't until June that no prohibitive restrictions were imposed. However, people distrust and difficulties among procedures to go abroad made air traffic ridiculously low.

### 3.2. Why value firms?

Once the company is in the market, the laws of offer and demand converge, for that reason, when willing to merge, acquire, fusion... another company first you must know the value of that company (Parra Barrios, 2013).

Valuation of a firm can be done for so many different purposes (Amat, 2019; Freraut, 2008):

- Purchase and sell actions: here we have the first difference in value depending on who does it. For the seller, the valuation shows the minimum price to charge when selling the company, however, for the buyer, it shows the maximum price to pay for it.
- Value of companies in the stock market: Comparing the value that results from your calculations with the current stock market's price. Also, setting the price that you are going to offer the stocks when entering the stock market.
- Strategic planning and decisions: to know which products, clients, or countries keep in your company and at the same time, know which to abandon. Furthermore, internal decisions such as keeping the firm, selling it, merging...
- Calculate the salary of the directives whenever it depends on the evolution of the value of the firm.
- Calculate the value of the actions so that the tax statement can be done.

### 3.3. What is company valuation?

Company valuation has been defined a huge number of times, here there are some of the most accepted and understandable at the same time:

Business valuation is a tool that gives owners, stakeholders, or potential buyers the possibility to know how much the company is worth (Steiger, 2008).

A business valuation is a general process of determining the economic value of a whole business or company unit (Investopedia, 2021).

A business valuation is how the story of a company, its history, brand, products, and markets, is translated into dollars and cents. Business valuation can be described as the process or result of determining the economic value of a company (The Balance, 2021).

### 3.4. Valuation methods

There are lots of possible methods that can be used to value a firm, however, it's important to keep in mind that the value of a company is relative. This theory, created by Francisco López in 2014, tells that whenever two different people value the same firm, two different results will appear. Why is that? It can be due to the purpose the firm is being valued for. It's not the same to value to buy the firm than to sell it, neither it is the same to value the firm so that it can be liquidated or maintained in at long term. Moreover, to extend this theory, and have a clearer picture, the value is relative because it is based on future expectations so, when discussing a sell, what is done is discussing future expectations that can be unknown or uncertain at that moment (López, 2014).

As said above, there are different methods to value a firm that can be classified within six different groups:

1. Balance sheet methods:

a. Book value:

Book value refers to the equity of the company, which means, the difference between assets and liabilities. This is a very simple way that usually is not equivalent to the market value (Freraut, 2008).

$$\textit{Book value} = \textit{Assets} - \textit{Liabilities}$$

b. Adjusted book value:

Adjusting the errors that accounting can cause by providing fake data such as a different fix assets value than an expert quote, including bad debt or not discounting no longer used inventories can lead to a different and more real equity (higher or lower) (Freraut, 2008).

$$\textit{Adjusted Book Value} = \textit{Adjusted Assets} - \textit{Adjusted Liabilities}$$

c. Liquidation value:

As the name says, it is the value of a company in the case that liquidation is done in that precise moment. How is it calculated? By subtracting the liquidation costs such as redundancy payments to workers and other expenses to the adjusted equity. With this method, the value that is calculated is the smallest possible as any company operating



has a greater value than when it is closing, as the expectations of future value are higher (Freraut, 2008).

$$\text{Liquidation value} = \text{Adjusted equity} - \text{Liquidation costs}$$

d. Substantial value:

The price that you'll have to pay to create a company equal to the one that is being valued. Only using those assets that are being used for the operations (Freraut, 2008).

$$\text{Substantial value} = \text{Operational Assets}$$

2. Income statement methods (multiples of comparable companies):

Multiples consist of comparing the company studied, which usually is your own, to the other companies in the sector. To do so, it is assumed that the valued company will have ratios close to the average of the industry.

This method has two main stages, first one is calculating each company as unique, not considering any other. However, in the second stage comes the time to compare them among others. To do so, the averages PER, DY, SPP, and PBV are divided by their corresponding variable (earnings per share, dividends per share...). Straightaway, all these four indexes are put together so that if the share market price of the studied company is between the lowest and highest result, as well as close to the average of the four indexes, is recommendable to invest in there (Fernández, 2004).

a. PER (Price Earning Rate):

PER is one of the most useful multiples for stakeholders and future ones. This index, as its name suggests, calculates the price to earnings ratio, which means that the variables used are price per share with respect to its benefit (Fernández, 2004).

$$PER = \frac{\text{Price per share}}{\text{Earnings per share}}$$

All in all, when calculating our PER, it is needed the average price of a stock in the companies we are comparing with, as well as the average earnings per share. So, when having the average PER of the other companies, everything, our company's PER, price per share or earnings per share can be calculated and compared.

b. DY (Dividends Yield):

Dividends are the part of the earnings that are paid to each shareholder. So, knowing this, it is assumed that the value of each share is equal to the dividend paid to the shareholders for each share (Fernández, 2004).

Having defined what dividends are, a valuation method follows this same path with the following formula:

$$DY = \frac{\textit{Dividends per share}}{\textit{Price per share}}$$

The same steps as in the PER are followed, first of all, the average of the industry of each variable is calculated so when acquiring the average DY and our company's one we can then calculate the P0 to compare with the share price.

c. SPP (Sales per Price):

This method consists of calculating the value of the company with respect to its sales. To do it, the next formula is used (Fernández, 2004):

$$SPP = \frac{\textit{Sales per share}}{\textit{Price per share}}$$

Once again, the same steps are followed as before, calculating both the average of the industry and our own company and then move on to the comparison with the market share price by using the average SPP of the industry with our Sales per share numbers.

d. PBV (Price to Book Value):

Lastly, we have the PBV. In this case, we are dividing the price per share by the book to value per share that comes from dividing the equity between the number of shares (Fernández, 2004):

$$PBV = \frac{\textit{Price per share}}{\textit{Book to value per share}}$$

3. Goodwill method:

Goodwill is the value that the company has higher than its book or adjusted book value. This happens because of the addition of intangible assets such as customer portfolio, brands, position in the market... The problem arises when giving value to these assets as there's no unanimity (Fernández, 2004).

To calculate the value of the company the goodwill is added to the net assets.

$$\textit{Value} = \textit{Book value} + \textit{Goodwill}$$

#### 4. Discounted cash-flow:

Discounted cash flow is the most used method currently. This is due to its comprehension of the company as a cash-flow generator, which is the nature of all firms. To do so, it predicts the future annual statements of the 5 next years from the day it is valued. This step is usually where the main differences come from as it can be subjective in some ways, depending on if a brighter future is predicted, using the same scale of sales growth year by year... Usually, different scenarios are set, one with a more optimistic point of view regarding sales, another with a regular increase or decrease depending on the last years results, and lasty one with a pessimistic view of the next five years. However, to avoid most of the problems happening due to subjectivity, the average of the sector regarding expenses as well as the percentage of lasts years expenditure with respect to sales is used to have a clearer overview (Amat, 2019; Janiszewski, 2011).

Moving to the process of calculating the discounted cash-flow of a company there are several rates that must be considered. As it can be seen in the formula below we have different variables that have to be done before calculating the actual value of the company:

$$V = \frac{CFS_1}{1 + K} + \frac{CFS_2}{(1 + K)^2} + \frac{CFS_3}{(1 + K)^3} + \dots + \frac{CFS_n + P}{(1 + K)^n}$$

##### I. Cash flow of shareholders (CFS):

Once having done the estimation of the five-year time annual statements it is time to calculate the CFS. For this purpose, we have the following formula:

$$CF_{Shareholders} = Net\ Income \pm Variation\ of\ Net\ Assets \pm Variation\ of\ Debt$$

As it can be seen is it stands out that is similar to the EBIT, but the difference recalls on only using the operational assets.

##### II. Perpetuity (P):

Perpetuity is calculated at the end of the fifth-year assumption. This concept can be defined in two different ways. In both the point of view is optimistic, it takes for granted that the company will last forever.

On the one hand we have the assumption that through all those years after the fifth year, when valuation is done, the generated wealth will remain the same until the infinite. To calculate this assumption, we use the following formula:

$$P = CFS_n/k$$

Where: k = Discount rate

On the other hand, the second assumption is still more optimistic as it takes for granted that the company will grow constantly all the years. To calculate it we use the next formula:

$$P = \frac{CFS(1 + g)}{k - g}$$

Where: k = Discount rate and g = growth rate.

To calculate the growth rate the companies tend to use the last years' average GDP of the country as a reference value. This method is more commonly used in comparison with the previous one as it's little realistic that a company will remain its wealth constant each year.

### III. Discount rate (K):

By discount rate we understand the cost that the money has to the investor. Being more specific, it takes into the inflation, risk and preference of liquidity to assure transactions or solve unforeseen circumstances. However, if having to calculate it, this method is incredibly subjective. To avoid falling into this non-objective method we can calculate the discount rate by the WACC (Weighted Average Cost of Capital) or the CAPM (Capital Asset Pricing Model):

a) WACC: To calculate the WACC there's following formula:

$$WACC = Ke * \frac{E}{E + D + PS} + Kd * \frac{D}{E + D + PS} + Kps * \frac{PS}{E + D + PS}$$

Where: Ke = cost of equity; Kd = cost of debt; Kps = cost of preferred shares;

E = equity; D = debt; PS = Preferred shares

The WACC is the average of the cost of the own funds and debt considering the weight that each one has inside the balance of the company (Amat, 2019).

b) CAPM: On the other hand, to calculate CAPM the formula used is the one below:

$$CAPM = K = R_f + \beta[MRP]$$

Where: K = expected return; Rf = Risk-free rate of return;  $\beta$  = Beta of the investment;

MRP = Market Risk Premium

This method calculates the risk premium of investing in a company from the general market risk premium multiplying it for the beta coefficient of the risk of the company.

Beta is one of the main aspects to take into account when calculating the CAPM. To calculate it several statistical methods are used, and the result tends to be between 0,5 and 1,5. Being a number below 1 a non-volatile company, which means low risks, numbers over 1 a volatile company so, high risks, and 1 same risk as in the market. As

an example, if a company has a beta of 0,75 and the market is increasing a 5%, the stock price goes up a 3,75% (0,75 x 5%) (Amat, 2019).

All in all, to use the discounted cash-flow method, 7 main steps must be followed (Amat, 2019; Boar, 2020):

- I. Elaborate annual reports' forecast
- II. Calculate Cash flow of shareholders:
- III. Calculate perpetuity
- IV. Determine the discount rate: It can be done in two different ways, using WACC (Weighted Average Cost of Capital) or CAPM (Capital Asset Pricing Model).
- V. Calculate the company's value by adding all the discounted cash-flows.
- VI. Once having calculated the value of the company, some other factors may make it vary. First of all non-operational assets can be found such as financial investments. These are the ones that are not used on operations so, in consequence, they do not appear in the CFS calculated before. These assets should be later added to the value. Secondly, contingencies regarding expected trials or fines can be expected. These should be either added or subtracted to the final value of the firm as well. Lastly, the financial position must be calculated. This includes factors that, together with the non-operational assets were not used to calculate the CFS. In here financial liabilities are subtracted to the financial assets resulting on the financial position.
- VII. Calculate the share price:

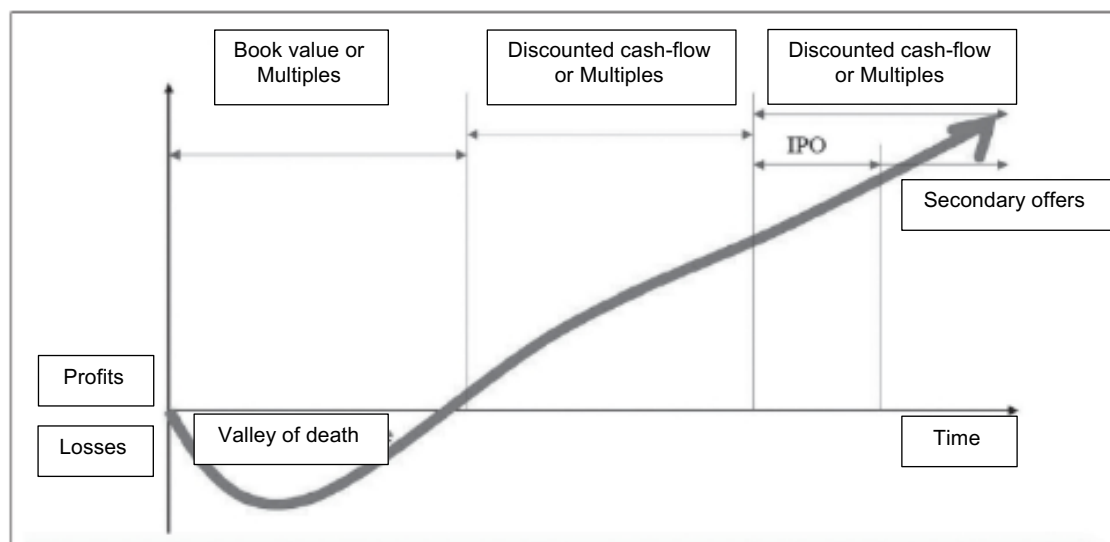
$$\frac{(Value\ of\ the\ firm + Nonoperational\ assets \pm Contingencies \pm Financial\ position)}{Number\ of\ shares}$$

Problems arising from the discounted cash-flows will also be visible. This method has one main problem recalling on  $k$ , the discount rate. This appears as with just one number; two parameters are being defined. One the one hand we have the time value of money, how the value of money to invest will change among time. And, on the other hand we have the non-predictable future of cash-flows, which is completely changing over time and subject to enormous external factors such as pandemics (Cifuentes, 2016).

Finally, once having analyzed most of the different methods that can be used to carry out a firm valuation choosing the precise one is key depending on the time available and the objective of it. So, starting with the discounted cash-flow, which, as said before, is the most common one, this method will be used whenever the person doing it is focused

on the ability of the company valued to generate future wealth but, at the same time, has time to do so. Second, multiples, instead are used when having few time available as they are a rapid method to use, also, together with the book value method, are the ones that most new companies use. Finally, the adjusted book value goes along to the objective of wanting to know the wealth of a company (Amat, 2019).

Figure 1 – Valuation method used depending on the stage of the company



Source: (Amat, 2019)

### 3.5. Valuation in pandemic years

Covid has varied the annual reports of all companies, both in a positive way, the case of pharmaceuticals and online shops such as Amazon, and in a negative way, which is the case of our target sample, airlines. Due to this change, depending on the method used to calculate the valuation of the company the results will be completely different.

Taking a deeper look at the two most used methods, we can see why each one will usually result in a distinctive value than the others (Alia Tasaciones, 2021).

- I. Discounted cash-flow: Future expectations are measured in this method. Therefore, the result won't be so different from the actual ones as the Covid-19 shouldn't be affecting the 5-year time annual income, assets, etc. Covid should have been predicted 5 years ago (almost impossible) so that it could have had an impact on the valuation of the company.
- II. Income statement methods or multiples: Comparing with companies from the same sector and close in terms of size, this method shouldn't only focus on the EBITDA during the pandemic years if wanting to achieve a reasonable result. "EBITDAC" (Earnings Before Interests Taxes Depreciation Amortization and

Coronavirus) should also be considered so that we can have a real reference not tainted by these last years of Covid.

If we take a deeper look at the discounted cash-flow and more particularly to the WACC, we will see that the higher the WACC is during the pandemic years, the lower the values of the companies will be. Why does this happen? Companies with a higher WACC use more debt and financing to run its operations, however, with a lower WACC it would mean that company is getting more resources while using less external funding. Moreover, a decrease in sales, which took place in the airlines sector during the pandemic years, does also have a direct impact on the decrease on a firm's value, not as much as a direct increase in WACC but it also means a significant decrease in company's value (Kumail et al., 2020).

New techniques are also looked for and (Takács et al., 2020) shows a new method named reverse discounted cash-flow. This method differs from the actual cash-flow explained before by being focused on pricing instead of valuation leaving a simpler process focused on identifying those pricing errors (the difference between critical and actual cash-flow ratios). What it is achieved is a lower degree of uncertainty as it is using the market capitalization rather than the intrinsic value of companies which is fairly more subjective and can change from valuator to valuator. Furthermore, apart from explaining the method, evidence is also showed within the 2008 crisis where, using this method, firms' valuation decreased significantly, and negative average pricing errors appeared. However, lastly, it is pointed out the two-year time correction to solve this decrease in value, which could be also applied to the airlines sector that will be studied.

### 3.6. Conclusions

All in all, company valuation is a tool that can help everyone, from owners to clients touching also possible future shareholders or even the current ones. However, there's not only just one possible way to calculate it but several methods are also presented to us so that each one chooses the one that fits best its goals, position, or depending on to whom it's going to be presented. Moreover, more than just one value will result from the same valuation whenever it's done by two different people due to the subjectivity of some of the areas studied.

Relating it to the current times when Covid is changing everything day by day, valuation has not escaped from those fluctuations. The methods explained above must undergo

some alterations so that the final results are not deceptive. Moreover, a decrease on the value of most of the companies studied is expected as either sales will decrease as shown just starting this article, and/or the WACC of companies will increase.

#### **4. RESEARCH QUESTIONS**

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The aim of this project, which means that the main research question is coming from here, is to see how the pandemic years have affected the valuation of the airlines. So, all in all, to settle on a precise research question would be the following:

- "How has Covid affected the valuation of the companies in the airlines' sector?"

Once having defined the topic to be researched and relating it to the theoretical framework above, some hypothesis and sub-hypothesis show up which are the following:  
H.1. - "Using the discounted cash-flow method will mean a decrease on the value of companies during the pandemic years and a slow recuperation until arriving to the post-pandemic years levels within 2 years' time"

Corresponding to this hypothesis, a sub-hypothesis is also defined to explain the main one:

- I. WACC of the airlines will increase substantially as well as the total sales during this period will decrease.

H.2. - "The valuation of the airlines studied will vary a lot depending on the method used".  
As this hypothesis is written in general terms, some sub-hypotheses are also defined so that the main hypothesis can be explained:

- I. Valuation done according to the discounted cash-flow method won't see itself lowered as it's dependent on future expectations and it seems that in 5-year time everything will come back to normal.
- II. If the valuation is done by the income statement methods / multiples, it will reduce a lot the value regarding the last years when pandemic didn't exist as it is done with year-to-year data.

With these hypotheses and sub-hypotheses, it is aimed to answer the main question regarding how the value of the airlines has changed in comparison with the pre-pandemic years.



## **5. METHODOLOGY**

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To start with the empirical part, data collection will be the first process. This study gathers data from the years pre-pandemic until pandemic years so that a full analysis can be done and differences, if any, can be easily seen through the study of each different year. Regarding the necessary data, financial statements (balance sheet, profit & loss, and cash-flow) of the airlines that will be the sample of the study.

In this case the sample will be formed by four companies which will be analysed that are the following ones:

- IAG (International Airlines Group): IAG is a group which is formed by 5 different airlines (Aer Lingus, British Airways, Iberia, Vueling and Level) which came up after the fusion of British Airways and Iberia.
- Air China: One of the main airlines in Asia and one of the most valued airlines in the world.
- Ryanair: The Irish airline popular for being one of the leaders in the low-cost sector.
- Lufthansa: The biggest German airline and also the one with the biggest aircraft fleet in Europe.

These four airlines have been chosen as each one of them represents a different type of company in the sector. First, IAG represents a company which is formed by different airlines, secondly, Air China will give a view of the Asiatic market which was the first affected by Covid. Ryanair will provide the results of a low-cost airline while Lufthansa, in the end, will give us the effects that Covid has had in more of a kind of ordinary airline.

To access the data, those financial statements that each company has uploaded on their official website will be used. As well, the predictions of future years to know the discounted cash-flow will come from "Marketscreener" and consulting companies such as "Goldman Sachs".

According to the previously established hypothesis and objectives, this methodology will be followed:

- Hypothesis 1: In order to solve the first hypothesis, the discounted cash-flow will be the method used to calculate the value of the three companies. To do so, the steps explained in the theoretical framework will be followed but, when having to choose how to calculate the discount rate, the Weighted Average Cost of Capital

will be the option chosen. Once calculating the WACC, the sub-hypothesis will be solved letting us know whether it has increased or not. Next, when finishing the method an end value will appear so, comparing the results to the other years value will end up solving our main first hypothesis as well as comparing the results within those three companies.

- Hypothesis 2: To get to know if the second hypothesis is correct, multiples will be the method to follow. As the discounted cash-flow will be already calculated to solve the first hypothesis, half of the work will be done, letting us know the result of the first sub-hypothesis. In order to solve the second one, the four remaining multiples (PER, PBV, SPP and DY) will be calculated following the formulas above. Calculating the multiples will let us see the differences between last years multiples so, all in all, a comparison between the changes of the multiples and the changes of the discounted cash-flows will be held.

## **6. RESULTS**

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Moving on to the results of the study, two clear parts can be distinguished. On the one hand, the discounted cash-flow method and, on the other hand, the multiples are found. In the next section, the outcomes of these two methods will be shown, compared, and analysed separately and among them.

### 6.1. Discounted cash-flow method

As explained in the previous sections, the discounted cash-flow works by predicting the future annual reports of the companies, both the income statement and the balance sheet. However, predicting the future balance sheets means having access to the future planned actions of the companies, which, in our case could represent an increase or decrease of the aircraft fleet, opening new destinations... To avoid these complicated assumptions that wouldn't be realistic at all, the study will be made in three-year periods going from 2017 to 2021, meaning a study comprising from 2017 to 2019, another one from 2018 to 2020 and, the last one from 2019 to 2021 to see the evolution of it. Moreover, no perpetuity is used as all the data gathered is real, there are no predictions, and the goal of the study is just to compare over years that have already passed.

#### 6.1.1. Ryanair

Starting with Ryanair, a peculiarity comes up when analysing the data (Ryanair Group, 2019, 2021, 2022). This singularity lies in the month when the annual reports close. In this case, the yearly report ends on March 31, for this reason, the ones from 2018 to 2022 are the chosen as they are mainly apportioning data from 9 months of the previous year. All in all, it can be concluded that the one ending in March of 2018 is mainly data from 2017 and respectively the following years.

Starting from 2018 to 2020, the following table shows the free cash-flows or cash-flows for shareholders of each year coming from the previous analysis and calculations extracted from the balance sheet.

Table 1 – Free cash-flow Ryanair from 2018 to 2020 (in millions of €)

CF FOR SHAREHOLDERS	2018	2019	2020
+ Net Income	1.450,20	885,00	648,70
± Variation of NA	-138,5	-79,2	-1.093
± Variation of Debt	92,6	-666,8	1.394
<b>CF shareholders</b>	<b>1404,3</b>	<b>139,00</b>	<b>949,10</b>

Source: Own Creation

Once the free cash-flows are done, determining the discount rate by using the WACC formula is the next step. In this case, the cost of debt and equity is needed so the averages of the industry are the ones considered which are obtained in Damodaran's database (Damodaran, 2022). Data from 2018 reflects a cost of equity and a cost of debt of 9,65% and 5,37% respectively, which, used in the formula, ends up giving a WACC of 7,37%. So, all in all, calculating each actual value of the cash-flows by using the discounted cash-flow formula it's obtained the following result:

$$VA = \frac{1404,30}{(1 + 0,0737)^1} + \frac{139}{(1 + 0,0737)^2} + \frac{949,10}{(1 + 0,0737)^3} = 2195,33$$

As a result, using the discounted cash-flow methods gives a result of 2.195,33 million euros as the value of the company which, divided by the number of shares in 2018 which is 1.133.395.000 ends up resulting that each share is worth 1,94€.

Moving on to the following years, the time span between 2019 to 2021 gives the following free cash-flows:

Table 2 – Free cash-flow Ryanair from 2019 to 2021 (in millions of €)

CF FOR SHAREHOLDERS	2019	2020	2021
+ Net Income	885,00	648,70	-1.015,10
± Variation of NA	-79,2	-1.093	88
± Variation of Debt	-666,8	1.394	180
<b>CF shareholders</b>	<b>139</b>	<b>949,10</b>	<b>-747,20</b>

Source: Own Creation

As it can be seen the 2019 and 2020 cash-flows remain the same while it is added a negative one resulting from 2021, the first year when Covid affected fully the sector and, as a result, made Ryanair close the year with losses, the main cause why the cash-flow is negative. These losses are compensated a little by the increase in net assets, the first year since the start of the study as well as an increase in the debt of the company.

Switching to the discount rate, the cost of equity in 2019 decreased to 8,69% as well as the cost of debt did down to 4,10%. This was key to end up with a lower discount rate than in 2018 by decreasing from 7,37% to 6,58% as the debt and equity decreased and increased respectively but in the same quantity. In this case, the formula resulting was the following:

$$VA = \frac{139}{(1 + 0,0658)^1} + \frac{949,10}{(1 + 0,0658)^2} + \frac{-747,20}{(1 + 0,0658)^3} = 348,77$$

The result of the value in 2019 was 348,77 million euros, a significant decrease with respect to last year's result. Moreover, the shares were 1.070.635.000 which means that the value per share was 0,33€ also a number substantially lower in comparison with 2018's one.

Finally, ending up with Ryanair, the period from 2020 to 2022 has the next cash-flows for shareholders:

Table 3 – Free cash-flow Ryanair from 2020 to 2022 (in millions of €)

CF FOR SHAREHOLDERS	2020	2021	2022
+ Net Income	648,70	-1.015,10	-240,80
± Variation of NA	-1093	88	-412
± Variation of Debt	1394	180	-486
<b>CF shareholders</b>	<b>949,1</b>	<b>-747,20</b>	<b>-1.139,50</b>

Source: Own Creation

Losses for the period concerning from March of 2021 to 2022 result in losses too however, the decrease in net assets and debt is the responsible for having an even lower cash-flow in 2022. Talking about the Weighted Average Cost of Capital, it remains quite constant by being 6,44% in 2020 but, in this case, this is because, despite increasing the cost of equity, the cost of debt has decreased similarly.

$$VA = \frac{949,10}{(1 + 0,0644)^1} + \frac{-747,20}{(1 + 0,0644)^2} + \frac{-1139,50}{(1 + 0,0644)^3} = -712,82$$

Having a look at the formula we can see how the value of Ryanair sees itself lowered to -712,82 million euros mainly due to both negative free cash-flows. If we consider the 1.127.657.000 number of shares it ends up giving us a value of -0,63€ per share.

All in all, the value of Ryanair has seen itself lowered as the years of the pandemic were considered. It went from having a value of 2.195,33 million to -712,82 million within 3

years. However, this value is supposed to increase whenever more years are considered so, if 2023 was studied, by having an increase in net income it would increase.

### 6.1.2. IAG (International Airlines Group)

The second company studied is the IAG group (IAG Group, 2017, 2018, 2019, 2021). In this case, the effects that Covid has had on this type of company are reflected in 2020 and 2021. In comparison with Ryanair's annual reports, the data refers to the natural year ending on December 31 as it will do with the next two companies too.

The cash-flow for shareholders for the three periods studied provides the following results:

Table 4 – Free cash-flow IAG from 2017 to 2019 (in millions of €)

CF FOR SHAREHOLDERS	2017	2018	2019
+ Net Income	2.021	2.897	1.715
± Variation of NA	427	-582	-7.150
± Variation of Debt	-2.159	1.258	6.750
<b>CF shareholders</b>	<b>289</b>	<b>3.573</b>	<b>1.315</b>

Source: Own Creation

Table 5 – Free cash-flow IAG from 2018 to 2020 (in millions of €)

CF FOR SHAREHOLDERS	2018	2019	2020
+ Net Income	2.897	1.715	-6.935
± Variation of NA	-582	-7.150	3.669
± Variation of Debt	1258	6.750	1.841
<b>CF shareholders</b>	<b>3573</b>	<b>1.315</b>	<b>-1.425</b>

Source: Own Creation

Table 5 – Free cash-flow IAG from 2018 to 2020 (in millions of €)

CF FOR SHAREHOLDERS	2019	2020	2021
+ Net Income	1.715	-6.935	-2.933
± Variation of NA	-7150	3.669	-3.109
± Variation of Debt	6750	1.841	3.873
<b>CF shareholders</b>	<b>1315</b>	<b>-1.425</b>	<b>-2.169</b>

Source: Own Creation

As it can be seen, there are profits from 2017 to 2019, however, as in most companies, Covid made a huge impact in 2020 and 2021 leading to IAG having losses during those two years. This negatively affected the result of the free cash-flows as the variation of

debt and net assets tended to compensate each other. It can be seen in all years where, whenever one affects the result positively, the other tends to do it negatively. The only year when it does not happen is in 2020, which makes the free cash-flow not as negative as it would be if they were compensated. In this case, the cost of equity and cost of debt are the ones of 2017, which were still not used, 2018 and 2019. These two values in 2017 equal 8,15% and 4,61% which, substituted in the formula as well as the total equity and debt of the company gives us a discount rate of 5,76%. In 2018 and 2019, they are the same as in Ryanair's case, the difference recalls on the final discount rate which in the end is 6,60% in 2018 and 5,17% in 2019. All in all, with all the necessary data already isolated, the only missing thing is calculating the actual value of the company each year.

From the 2017 to 2019 period, it appears the following formula:

$$VA = \frac{289}{(1 + 0,0576)^1} + \frac{3573}{(1 + 0,0576)^2} + \frac{1315}{(1 + 0,0576)^3} = 4579,31$$

4.579,31 million euros is the value that IAG had in 2017. When calculating the value of the shares of the company, the result is divided by 2.057.989.294 shares which end up giving that the value of each share is 2,53€.

The next formula applies for the period concerning 2018, 2019 and 2020:

$$VA = \frac{3573}{(1 + 0,066)^1} + \frac{1315}{(1 + 0,066)^2} + \frac{-1425}{(1 + 0,066)^3} = 3332,59$$

In 2018, when the first year of Covid is studied a slight decrease in the value can be seen down to 3.332,59 million euros. Moreover, despite decreasing the number of shares of the company to 1.992.032.634, the value of these shares did also decrease to 1,67€ per share.

Finally, the last period studied ends up leaving with this result:

$$VA = \frac{1315}{(1 + 0,0517)^1} + \frac{-1425}{(1 + 0,0517)^2} + \frac{-2169}{(1 + 0,0517)^3} = -1902,48$$

This period shows how the two years when Covid affected the company, and the result makes it clear the huge impact that it had by leaving a negative value of 1902,48 million euros. The number of shares maintained the same so, all in all, the value of each share in IAG in 2019 decreased to -0,96€ per share.

### 6.1.3. Air China

Moving on, Air China is the next airline studied. This airline presents the annual reports in its own currency (Air China Group, 2017, 2019, 2021) so, the results are shown in yuan. The option chosen is to study the data in the official currency and, when finished, change the currency to euros to have a clearer picture.

The first period studied is the one that goes from 2017 to 2019. The following table shows its respective free cash-flows:

Table 7 – Free cash-flow Air China from 2017 to 2019 (in millions of ¥)

CF FOR SHAREHOLDERS	2017	2018	2019
+ Net Income	8.641,45	8.214,87	7.263,76
± Variation of NA	-7.413	-7.625	-41.745
± Variation of Debt	-11.049	1.986	40.914
<b>CF shareholders</b>	<b>-9.820,76</b>	<b>2.575,44</b>	<b>6.432,33</b>

Source: Own Creation

It stands out the negative free cash-flow resulting in 2017. Despite having profits during the year, the decrease in debt together with an increase in net assets has negatively affected the results. This increase in net assets is also seen in the other years, however, the difference recalls in the increase in debt. As said before, the averages of cost of equity and cost of debt remain the same as in IAG's case but, the change comes at the discount rate which increases to 6,29%.

$$VA = \frac{-9820,76}{(1 + 0,0629)^1} + \frac{2575,44}{(1 + 0,0629)^2} + \frac{6432,33}{(1 + 0,0629)^3} = -1603,6$$

As a result, the actual value of Air China in 2017 was -1603,60 million yuan which, translated to euros is -224,24 million. This result divided by the 14.524.815.000 amount of shares ends up giving that each share is valued as -0,02€.



In the next year, the first step of the valuation calculation done in 2018, which adds data from 2019 and 2020, provides the following results:

Table 8 – Free cash-flow Air China from 2018 to 2020 (in millions of ¥)

CF FOR SHAREHOLDERS	2018	2019	2020
+ Net Income	8.214,87	7.263,76	-15.816,13
± Variation of NA	-7.625	-41.745	3.879
± Variation of Debt	1.986	40.914	13.677
<b>CF shareholders</b>	<b>2.575,44</b>	<b>6.432,33</b>	<b>1.740,29</b>

Source: Own Creation

It comes up how 2020, despite having big losses, still has a positive cash-flow for shareholders. This is mainly due to the increase in debt that the company faced which, added to the decrease in net assets, compensated the losses of the year. This leads to three positive free cash-flows which, in the end, means a positive value of the company. This year's cost of equity and cost of debt is the same as it was in 2018 in Ryanair's case and all the following companies that will be studied. The only thing that changes is the discount rate which is 7,45%, just a bit higher than Ryanair because of the small differences recalling in total debt and total equity.

$$VA = \frac{2575,44}{(1 + 0,0745)^1} + \frac{6432,33}{(1 + 0,0745)^2} + \frac{1740,29}{(1 + 0,0745)^3} = 9371,65$$

9.371,65 yuan is the actual value of the company in 2018, which, in euros is 1.310,17 million. It is visible that, despite analyzing a year with losses due to the pandemic, the actual value is bigger than in 2017 as there are no outliers as there were due to that significant decrease in debt. Talking about the value per share, Air China had the same amount of shares than in 2017 (14.524.815.000), which means that the value of each share in 2018 increased to 0,09€.

To end up win Air China's case, 2019's discounted cash-flow method presents the following free cash-flows:

Table 9 – Free cash-flow Air China from 2019 to 2021 (in millions of ¥)

CF FOR SHAREHOLDERS	2019	2020	2021
+ Net Income	7.263,76	-15.816,13	-18.822,24
± Variation of NA	-41745,45	3.879	-4.015
± Variation of Debt	40914,02	13.677	21.957
<b>CF shareholders</b>	<b>6.432,33</b>	<b>1.740,29</b>	<b>-880,31</b>

Source: Own Creation

It can be seen how Covid affected the cash-flow in 2021 as the losses are even higher than in 2020 and, in this case, despite having an increment in debt that could compensate the losses, the variation in net assets ends up making the cash-flow negative by a slim margin. In case of the discount rate, using the same values for the cost of equity and debt than in Ryanair's case we have as a result a WACC of 5,97%.

$$VA = \frac{6432,33}{(1 + 0,0597)^1} + \frac{1740,29}{(1 + 0,0597)^2} + \frac{-880,31}{(1 + 0,0597)^3} = 6880,04$$

The value of the company is still positive despite having a negative cash-flow. Concretely is 6.880,04 million yuan, 961,84 million euros. In terms of shares, the same amount was still the number of shares, which leads to a value per share of 0,07€.

#### 6.1.4. Lufthansa

The last company studied is Lufthansa, the annual reports of the company (Lufthansa Group, 2017, 2019, 2021) follow the same structure as IAG. The statements end on December 31 as well as the currency used is the euro.

Setting it off, 2017 is the first year analysed, when Covid did not still account for in the cash-flows:

Table 10 – Free cash-flow Lufthansa from 2017 to 2019 (in millions of €)

CF FOR SHAREHOLDERS	2017	2018	2019
+ Net Income	2.455,00	339,00	595,00
± Variation of NA	-2.134,00	94	-311
± Variation of Debt	-134,00	-146	53
<b>CF shareholders</b>	<b>187,00</b>	<b>287,00</b>	<b>337,00</b>

Source: Own Creation

With the passing of the years, the cash-flow for shareholders increased. This is not related to the net profits as, in fact, they decreased substantially from 2017 to 2019. However, in 2017, the variation of net assets and debt negatively affected the final cash-flow while, in 2018 and 2019, despite also having a negative effect, it was much lower than before. As said, the cost of debt and equity remains the same as in the other companies as the average of the industry is the one considered, but, in this case, the final discount rate is 6,17%.

$$VA = \frac{187}{(1 + 0,0617)^1} + \frac{287}{(1 + 0,0617)^2} + \frac{337}{(1 + 0,0617)^3} = 712,33$$

The actual enterprise value in 2017 is 712,33 million euros. In terms of the total number of shares, Lufthansa had an amount of 471.300.000 shares, which gives each share a value of 1,51€.

Continuing with the second period analyzed, also the first one with the appearance of Covid, this were the free cash-flows:

Table 11 – Free cash-flow Lufthansa from 2018 to 2020 (in millions of €)

<b>CF FOR SHAREHOLDERS</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
+ Net Income	339,00	595,00	-780,00
± Variation of NA	94,00	-311	-3.643
± Variation of Debt	-146,00	53	4.117
<b>CF shareholders</b>	<b>287,00</b>	<b>337,00</b>	<b>-306,00</b>

Source: Own Creation

The effect of Covid is clearly reflected in 2020's cash-flow as the final losses of the period take crucial importance to understand why the final cash-flow for shareholders was negative. The discount rate ends up being 7,28%, similar to air China's and Ryanair's cases and, at the same time much higher than IAG's case.

$$VA = \frac{287}{(1 + 0,0728)^1} + \frac{337}{(1 + 0,0728)^2} + \frac{-306}{(1 + 0,0728)^3} = 312,5$$

The value of the company has seen itself decreased by more than a half in just a year. In this period, it has turned out to be 312,5 million euros and, as the shares also increased to 475.200.000, the value per share did also decrease to 66 cents.

Finally, the last period when the 2 pandemic years are considered present the following results:

Table 12 – Free cash-flow Lufthansa from 2019 to 2021 (in millions of €)

<b>CF FOR SHAREHOLDERS</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
+ Net Income	595,00	-780,00	-2.310,00
± Variation of NA	-311,00	-3.643	-3.048
± Variation of Debt	53,00	4.117	3.196
<b>CF shareholders</b>	<b>337,00</b>	<b>-306,00</b>	<b>-2.162,00</b>

Source: Own Creation

The company ended the year 2021 with even bigger losses than in 2020. This heavily impacted the final result, as, in 2020 both variations compensated itself by correcting the

negative effect that the net assets were producing. The WACC finally was 6,18% by using the average cost of equity and debt.

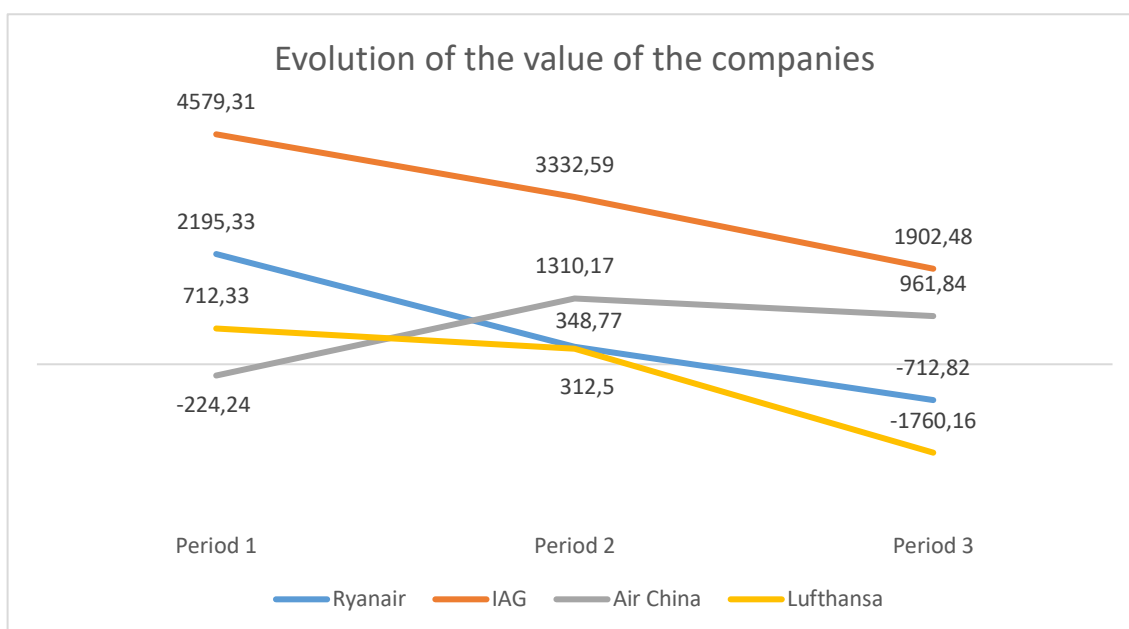
$$VA = \frac{337}{(1 + 0,0618)^1} + \frac{-306}{(1 + 0,0618)^2} + \frac{-2162}{(1 + 0,0618)^3} = -1760,16$$

The value turns out negative due to the two years with negative free cash-flows. By having a negative value of 1760,16 million euros, the value per share is also negative as each of the 478.200.000 shares is valued -3,68€.

### 6.1.5. Comparison of years/companies

To have a clearer view of the evolution of the value of the companies, a quick analysis where all the results are put together is next.

Graph 2 – Evolution of the enterprise value of the companies using the DCF method



Source: Own Creation

As it can be seen, despite the case of Air China which had in 2017 a year really affected by the variations of assets and debt, the other three companies have a clear downgrade in the value year by year. It also happens in Air China from the second to the third period studied but in a lower grade. So, in a general view, the value has gone down whenever the two years when Covid were studied, having those more power inside the valuation than the left one with regular statements (usually 2019).

In case of the differences regarding the type of company, no clear result can be extracted as the sample is little to judge. Moreover, all the companies have kind of the same

behaviour, the only conclusion that can be extracted could be that IAG, as it is a bigger company with several airlines inside, still has the highest value.

## 6.2. Multiples method

Two different ways will be used to analyze the evolution of the multiples at this point, the first one will consist of studying the evolution of each one separately and, the second one will consider the multiples together so that a complete analysis is done.

Multiples are composed of four different formulas, however, no data about the dividends that each company paid at the end of each year has been found. For that, the dividends yield is skipped in the study leaving it with the three remaining multiples which are the PER, PBV and, SPP. Multiples can be calculated just alone by using the data of the company but, in the end, the most reliable result and the one which will give the company and possible shareholders will be the one where the average of the industry is considered and all the multiples are put together.

In the next table the yearly averages of the industry are presented:

Table 13 – Multiples averages of the air transport sector

MULTIPLES	2017	2018	2019	2020	2021
PER	48,06	24,03	24,65	24,11	7,47
SPP	1,04	0,76	0,84	1,26	1,03
PBV	2,43	1,76	2	2,62	3,71

Source: (Damodaran, 2022)

### 6.2.1. Ryanair

Starting it off with the PER, the next table will show how much people would be willing to pay to acquire a stock of the company.

Table 14 – Price to Earning Rate Ryanair

	2017	2018	2019	2020	2021
Profits (M€)	1.450,20	885,00	648,70	-1.015,10	-240,80
Total shares (M)	1.171	1.133	1.070	1.127	1.134
Share price (€)	16,00	11,70	9,21	16,50	13,60
PER	12,93	14,98	15,20	-18,33	-64,07
Po	59,49	18,76	14,94	-21,70	-1,59

Source: Own Creation

Focusing on the Po, which is calculated by multiplying the profits per share by the average PER in the industry, it can be seen how a huge average PER in the industry in 2017 made it be way over the next 2 years. However, a clear decrease can also be seen from 2018 to 2019 due to the decrease in profits by 26% while the number of shares did only decrease by 5%, so, despite increasing the average PER the value stayed lower. Also, it can be seen how, in the years with negative profits, the Po turns to be negative. In 2021 we can see how it increases due to the lower losses and also lower average PER. All in all, the decreasing PER is showing that people are less and less interested in buying shares of the company.

Table 15 – Sales per Price Rate Ryanair

	2017	2018	2019	2020	2021
Sales (€)	7.151	7.697	8.494	1.635	4.800
Total shares (M)	1.171	1.133	1.070	1.127	1.134
Share price (€)	16,00	11,70	9,21	16,50	13,60
<b>SPP</b>	<b>0,38</b>	<b>0,58</b>	<b>0,86</b>	<b>0,09</b>	<b>0,31</b>
<b>Po</b>	<b>5,87</b>	<b>8,94</b>	<b>9,45</b>	<b>1,15</b>	<b>4,11</b>

Source: Own Creation

In this case, the Po is calculated by dividing the average SPP of the industry to the sales per share. It can be seen how the ratio increases over the years until 2020. This is due to the sales increasing and the total number of shares are decreasing. Also, the average ratio is stable over the years so the difference coming from the variations is not heavily affecting the overall results. In 2020 the ratio did decrease a lot as the sales, as expected, fell while the shares increased but, however, with the recovery of the industry and sales increasing again in 2021 the ratio went up again.

Table 16 – Price to Book Value Rate Ryanair

	2017	2018	2019	2020	2021
Equity (M€)	4.468	5.214	4.914	4.646	5.545
Total shares (M)	1.171	1.133	1.070	1.127	1.134
Share price (€)	16,00	11,70	9,21	16,50	13,60
<b>PBV</b>	<b>4,19</b>	<b>2,54</b>	<b>2,01</b>	<b>4,00</b>	<b>2,78</b>
<b>Po</b>	<b>9,27</b>	<b>8,10</b>	<b>9,18</b>	<b>10,80</b>	<b>18,13</b>

Source: Own Creation

This final multiple's Po is calculated by multiplying the equity per share by the average PBV. As it can be seen, the tendency is that it increases (except in 2018) as the average

ratio is also increasing. The equity and shares of the company do not vary in a way that clearly creates a tendency, as it can be seen in the company's PBV, so, the clear cause of this variation is the average Price to Book Value.

As said, the part where most of the conclusions can be extracted is whenever all the multiples are put together so that the average and range can be extracted and, at the end, compared with the company's market share price.

Table 16 – Multiples Rates Ryanair

	2017	2018	2019	2020	2021
Po PER	59,49	18,76	14,94	-21,70	-1,59
Po SPP	5,87	8,94	9,45	1,15	4,11
Po PBV	9,27	8,10	9,18	10,80	18,13
<b>Average</b>	<b>24,88</b>	<b>11,93</b>	<b>11,19</b>	<b>-3,25</b>	<b>6,88</b>
<b>Range</b>	<b>5,87 - 59,49</b>	<b>8,10 - 18,76</b>	<b>9,18 - 14,94</b>	<b>-21,7 - 10,8</b>	<b>-1,59 - 18,13</b>

Source: Own Creation

To analyse this table the data that must be considered is the average, the range and the share market price of the company. A good operation can be defined whenever the share price is lower than the average of the multiples and, at the same time, is inside the range defined. In Ryanair's case, 2017 was a year when it was a good option to invest in the company as the share market price (16€) was lower than the industry average (24,88) and, at the same time, the value is inside the range. Looking at the other years, it is shown how 2018 and 2019 were also good years for investing in the company. The difference comes in 2020 and 2021 when the average decreased a lot, being lower than the share market price so, at that moment it wasn't a good idea to invest in Ryanair.

### 6.2.2 IAG (International Airlines Group)

The PERs for IAG's case are the following:

Table 17 – Price to Earning Rate IAG

	2017	2018	2019	2020	2021
Profits (M€)	2.021	2.897	1.715	-6.935	-2.933
Total shares (M)	2.057	1.992	1.992	4.971	4.971
Share price (€)	0,50	0,50	0,50	0,10	0,10
<b>PER</b>	<b>0,51</b>	<b>0,34</b>	<b>0,58</b>	<b>-0,07</b>	<b>-0,17</b>
<b>Po</b>	<b>47,2</b>	<b>34,95</b>	<b>21,22</b>	<b>-33,63</b>	<b>-4,41</b>

Source: Own Creation

As it shows, the Po keeps decreasing over the years as it did in Ryanair's case. The reasons why this happens are quite similar between the cases. Both starts with a huge PER due to the average PER of the industry, in both cases there's a decreasing tendency, getting less steep in this case as profits increase from 2017 to 2018 but, still decreasing in 2019 as the profits get lowered again. Moreover, the similitudes continue as the effects of Covid make the ratio turns negative in 2020 but, at the same time a recuperation is seen in 2021.

Table 18 – Sales per Price Rate IAG

	2017	2018	2019	2020	2021
Sales (M€)	22.972	24.406	25.506	7.806	8.455
Total shares (M)	2.057	1.992	1.992	4.971	4.971
Share price (€)	0,50	0,50	0,50	0,10	0,10
<b>SPP</b>	<b>22,32</b>	<b>24,5</b>	<b>25,61</b>	<b>15,7</b>	<b>17,01</b>
<b>Po</b>	<b>10,73</b>	<b>16,12</b>	<b>15,24</b>	<b>1,25</b>	<b>1,65</b>

Source: Own Creation

In case of the share per price, the similitudes are not that big as, despite it increases from 2017 to 2018 as the sales are bigger, added to the lower number of shares and lower average SPP, it ends up decreasing in 2019. Despite increasing the total sales, the average SPP did also increase a 6% more than the sales, which leads to a slight decrease in the result. The effect that Covid had on sales is also visible in the table as, the lower sales in addition to the bigger number of shares and average SPP makes it much lower than its predecessors' years.

Table 19 – Price to Book Value Rate IAG

	2017	2018	2019	2020	2021
Equity (M€)	7.396	6.720	7.120	1.610	846
Total shares (M)	2.057	1.992	1.992	4.971	4.971
Share price (€)	0,50	0,50	0,50	0,10	0,10
<b>PBV</b>	<b>0,14</b>	<b>0,15</b>	<b>0,14</b>	<b>0,31</b>	<b>0,59</b>
<b>Po</b>	<b>8,73</b>	<b>5,94</b>	<b>7,15</b>	<b>0,85</b>	<b>0,63</b>

Source: Own Creation

The Price to Book Value has a particular tendency with ups and downs over the years. The reason is on the equity, in 2018 the decrease in equity, summed up with a decrease in the average PBV decreased the final value. The opposite happened in 2019 when equity increased as well as the average PBV. In 2020 and 2021, the company adopted



the measure to cut on equity so the final Price to Book Value was heavily affected by the decrease of almost 80%.

Finally, to close the IAGs' chapter, the averages of each multiple are shown:

Table 20 – Multiples Rates IAG

	2017	2018	2019	2020	2021
Po PER	47,20	34,95	21,22	-33,63	-4,41
Po SPP	10,73	16,12	15,24	1,25	1,65
Po PBV	8,73	5,94	7,15	0,85	0,63
<b>Average</b>	<b>22,22</b>	<b>19,00</b>	<b>14,54</b>	<b>-10,51</b>	<b>-0,71</b>
<b>Range</b>	<b>8,73 - 47,20</b>	<b>5,94 - 34,95</b>	<b>7,15 - 21,22</b>	<b>-33,63 - 1,25</b>	<b>-4,41 - 1,65</b>

Source: Own Creation

Continuing the same theory than before, the market share price of the company is so low in the 5 years studied. For this reason, despite being lower than the average in 2017, 2018 and 2019, as it's also outside the range, it wouldn't be a good option to invest in the company. The same outcome results from analyzing 2020 and 2021 but, in this case, despite being inside the range, the average Po is lower than the share market price.

### 6.2.3. Air China

To calculate Air China's case, the end of the year results' currency was changed before calculating the multiples so that a clearer point was made, and it was easier to compare alongside the other companies.

Table 21 – Price to Earning Rate Air China

	2017	2018	2019	2020	2021
Profits (M€)	1.203	1.144	1.011	-2.202	-2.621
Total shares (M)	14.524	14.524	14.524	14.524	14.524
Share price (€)	1,10	0,83	0,98	0,71	0,62
<b>PER</b>	<b>13,27</b>	<b>10,54</b>	<b>14,07</b>	<b>-4,68</b>	<b>-3,44</b>
<b>Po</b>	<b>3,98</b>	<b>1,89</b>	<b>1,72</b>	<b>-3,66</b>	<b>-1,35</b>

Source: Own Creation

In this case, the same pattern is also followed, 2017 is the year with a higher PER and, with the pass of the years, this value decreases. The reasons are the same than in the other companies, a high average PER in 2017 followed by a decrease in this same average in 2018 added to a decrease in profits in 2018, 2019 and losses in the next two years.

Table 22 – Sales per Price Rate Air China

	2017	2018	2019	2020	2021
Sales (M€)	17.274	19.622	19.533	10.287	10.948
Total shares (M)	14.524	14.524	14.524	14.524	14.524
Share price (€)	1,10	0,83	0,98	0,71	0,62
<b>SPP</b>	<b>1,08</b>	<b>1,63</b>	<b>1,37</b>	<b>1,00</b>	<b>1,22</b>
<b>Po</b>	<b>1,14</b>	<b>1,78</b>	<b>1,60</b>	<b>0,56</b>	<b>0,73</b>

Source: Own Creation

The Sales per Price ratio present results that are close every year, there are no huge differences. This is because of the stability in total shares in the whole 5 years together with the decrease in the average SPP in 2018 and 2019 that compensate the increase in sales of those 2 years. In terms of 2020 and 2021, the value goes down a bit as sales decrease almost to the half but, this decrease is slightly compensated by the increase in the average SPP In both years.

Table 23 – Price to Book Value Rate Air China

	2017	2018	2019	2020	2021
Equity (M€)	13.212	13.997	14.113	11.668	9.169
Total shares (M)	14.524	14.524	14.524	14.524	14.524
Share price (€)	1,10	0,83	0,98	0,71	0,62
<b>PBV</b>	<b>1,21</b>	<b>0,86</b>	<b>1,01</b>	<b>0,88</b>	<b>0,98</b>
<b>Po</b>	<b>2,21</b>	<b>1,70</b>	<b>1,94</b>	<b>2,1</b>	<b>2,34</b>

Source: Own Creation

This table shows how covid did not have an impact at all on the Price to Book Value as the results are so close through the years. Despite decreasing the equity in 2020 and 2021, the average PBV was the highest during those periods so that the decrease in equity can be compensated.

Finally, comparing the averages of all the multiples, the following table appears:

Table 24 – Multiples Rates Air China

	2017	2018	2019	2020	2021
Po PER	3,98	1,89	1,72	-3,66	-1,35
Po SPP	1,14	1,78	1,60	0,56	0,73
Po PBV	2,21	1,70	1,94	2,10	2,34
<b>Average</b>	<b>2,44</b>	<b>1,79</b>	<b>1,75</b>	<b>-0,33</b>	<b>0,57</b>
<b>Range</b>	<b>1,14 - 3,98</b>	<b>1,70 - 1,89</b>	<b>1,60 - 1,94</b>	<b>-3,66 - 2,10</b>	<b>-1,35 - 2,34</b>

Source: Own Creation

Making a global analysis of the chart, 2017 could be the only year when it would be a good opportunity to invest. It would not be 100% recommendable as the share market price is lower than the average, however, the value is just 0,04 points below so an exception could be done. From 2018 to 2021 investing in the company wouldn't be a good operation at all. On the one hand, the case of 2018 and 2019 is quite clear as the value is outside the range by far. On the other hand 2020 and 2021 are years where the share market price can be considered as valid as it is inside the range, however, the same case than in IAG appears as this price is higher than the average Po.

#### 6.2.4. Lufthansa

The same structure will be followed for Lufthansa's case so, the PER of each year is the following:

Table 25 – Price to Earning Rate Lufthansa

	2017	2018	2019	2020	2021
Profits (M€)	2.455	339	595	-780	-2.310
Total shares (M)	471	475	478	597	1.195
Share price (€)	30,72	19,7	16,41	10,82	6,18
<b>PER</b>	<b>5,90</b>	<b>27,61</b>	<b>13,19</b>	<b>-8,29</b>	<b>-3,20</b>
<b>Po</b>	<b>250,34</b>	<b>17,14</b>	<b>30,67</b>	<b>-31,46</b>	<b>-14,43</b>

Source: Own Creation

Year 2017 end up with a PER of 250,34 which is the highest value of all the PERs studied. The fact that the profits are five times the total shares in addition to the average PER of the industry leads to this result. The following years come back to normality with lower values which increase in 2019 with respect to 2018 as the profits are higher too. The Covid years end up with negative PERs but, it is not 2021 the one with a lower value despite having bigger losses as the number of shares is higher and the average PER of the industry is lower.

Table 26 – Sales per Price Rate Lufthansa

	2017	2018	2019	2020	2021
Sales (M€)	16.184	16.083	16.273	4.280	5.164
Total shares (M)	471	475	478	597	1.195
Share price (€)	30,72	19,70	16,41	10,82	6,18
<b>SPP</b>	<b>1,12</b>	<b>1,72</b>	<b>2,07</b>	<b>0,66</b>	<b>0,70</b>
<b>Po</b>	<b>33,02</b>	<b>44,53</b>	<b>40,51</b>	<b>5,68</b>	<b>4,19</b>

Source: Own Creation

As the number of shares and total sales stays constant during the three first years studied, it is assumed that the difference in the final SPP is the average value of the industry. The table does also show how the final value decreases in 2020 and 2021 as the sales went down those years. Despite selling more in 2021, the increase in the number of shares is key to understand why the value is lower than in 2020.

Table 27 – Price to Book Value Rate Lufthansa

	2017	2018	2019	2020	2021
Equity (M€)	7.790	7.842	8.100	7.626	7.478
Total shares (M)	471	475	478	597	1.195
Share price (€)	30,72	19,70	16,41	10,82	6,18
<b>PBV</b>	<b>1,86</b>	<b>1,19</b>	<b>0,97</b>	<b>0,85</b>	<b>0,99</b>
<b>Po</b>	<b>40,16</b>	<b>29,04</b>	<b>33,88</b>	<b>33,43</b>	<b>23,21</b>

Source: Own Creation

The Price to Book Value has not a clear tendency. The main differences between 2017 and 2019 come from the change in the average PBV each year as, whenever the average PBV goes down, which is 2018, the end value of Lufthansa does also go down while, when the average PBV goes up with respect to last's years, the Lufthansa's value goes up. The equity is so close one to another to make a difference. In 2020 and 2021 the pattern changes, it is not the average value the cause of the effect anymore, it is the change in total shares the main cause. By doubling the shares in 2021, the final value goes down as the equity per share is much lower than before. The increase in the average PBV of the industry increases but, however, still makes the final value lower.

Table 28 – Multiples Rates Lufthansa

	2017	2018	2019	2020	2021
Po PER	250,34	17,14	30,67	-31,46	-14,43
Po SPP	33,02	44,53	40,51	5,68	4,19
Po PBV	40,16	29,04	33,88	33,43	23,21
<b>Average</b>	<b>107,84</b>	<b>30,24</b>	<b>35,02</b>	<b>2,55</b>	<b>4,32</b>
<b>Range</b>	<b>33,02 - 250,34</b>	<b>17,14 - 44,53</b>	<b>30,67 - 40,51</b>	<b>-31,46 - 33,43</b>	<b>-14,43 - 23,21</b>

Source: Own Creation

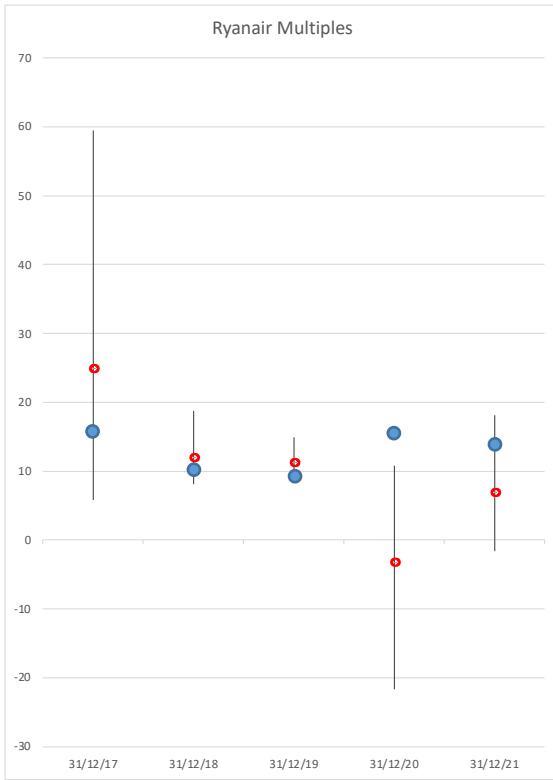
Analyzing the table year by year to understand when a good option was to invest in Lufthansa, 2017 and 2019 show up to have a bigger average than the share market price, however, the range does not include the share market price, in both cases it's lower than the lowest. 2018 is a different case, in this year it was optimal to make an

investment as the share market price was between the highest and lowest ends and, at the same time, it was lower than the average of all multiples. Finally, 2020 and 2021 were years when it was not a good option to invest at all as the average was much lower than the share market price.

#### 6.2.5. Comparison of years/companies

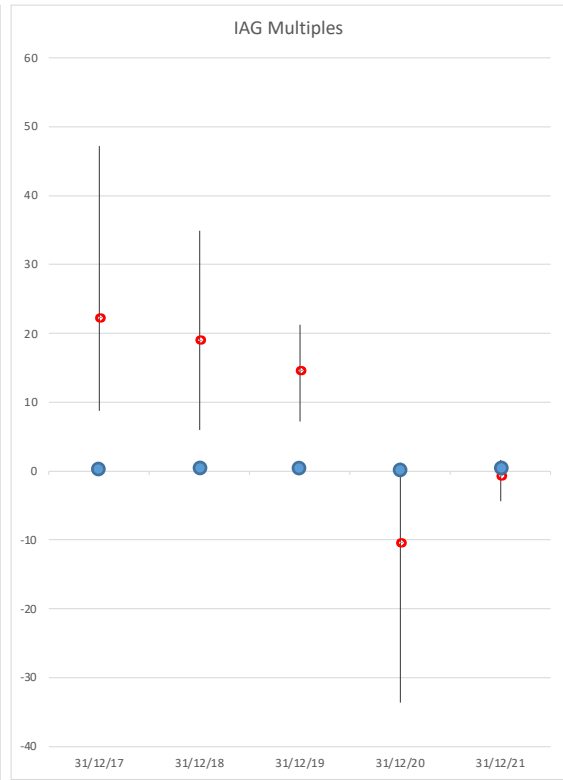
To analyze the previous data, four graphs, one for each company, which shows the range, average (red) and the share market price (blue). A more visual picture is the goal so, despite not being scaled, looking at the numbers a clearer idea can be made up of how the values evolves through the years in the companies and, at the same time compare if the tendencies are seen in the four graphs.

Graph 3 – Ryanair Multiples' comparison



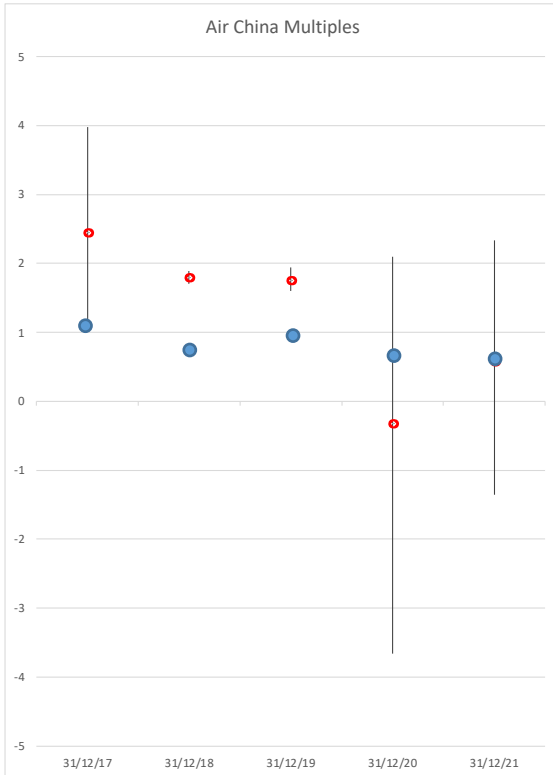
Source: Own Creation

Graph 4 – IAG Multiples' comparison



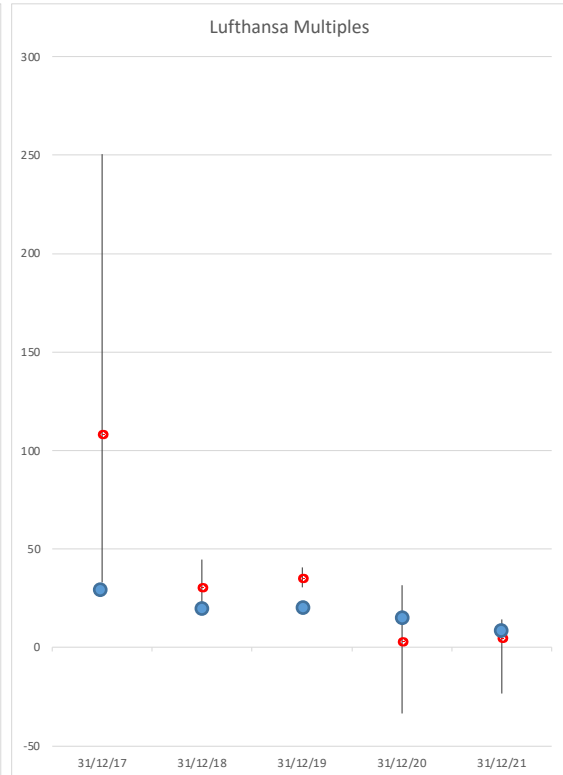
Source: Own Creation

Graph 5 – Air China Multiples' comparison



Source: Own Creation

Graph 6 – Lufthansa Multiples' comparison



Source: Own Creation

Looking at the patterns that the graphs present more than the actual numerical results, a sequence shows up. It consists of the decrease in the size of the range as well as the biggest point goes down while the lowest goes up from 2017 to 2019. A decrease in the average is also experienced during those years. Once we arrive to the pandemic affected years, the range becomes bigger again with a negative end value by the lower part and a close to 0 one by the upper part. Finally in 2021, the range assumes a smaller shape as the average goes up again.

In terms of when was the optimal year to invest in the companies, 2018 leads with two out of four of the companies with optimal values to invest (Ryanair and Lufthansa). It is followed by 2017 with Ryanair's case and, Lufthansa and Air China, which, despite not being inside the parameters could still be considered. 2019 was also a year when investing in Ryanair was a good opportunity but, from then on, no other investing opportunities appeared until 2021.

To finish with the comparisons, taking a look at each company separately, Ryanair is the one where most of the years there was an optimal value to invest in, three out of five could be considered. Lufthansa follows with one ideal year to invest and another one which could also be thought of and, finally, Air China and IAG does not present numbers that indicate that investing in the company would be a good operation.

## **7. CONCLUSIONS**

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All in all, Covid has had a huge effect on people's daily lives, it has changed a lot of ways of doing, acting and it has not been less for companies. In this project, the airlines have been the industry studied, one of the most affected sectors during the pandemic.

The results of the study show how this effect was clearly plausible. When using the discounted cash-flow method, the result turns out to decrease whenever 2020 and 2021 (2021 and 2022 in Ryanair's case) are studied. So, referring to the first hypothesis and sub-hypothesis previously mentioned, it is true that the value decreased when the results of the years with Covid appeared but, however, the recuperation couldn't be studied as the predictions of the balance sheets and income statements couldn't be carried. Continuing, on the one hand, the sales of each year did decrease substantially from 2020 on but, despite the losses most of the companies showed a slight recovery later from 2020 to 2021. On the other hand, in case of the WACC, there was an increase from 2017 to 2018 but then it usually came back down to the 2017 levels in 2019. During the pandemic years, finally no useful information would it provide to the study as the years when the discount rate was useful were the first ones of each period studied which means 2017, 2018, and 2019.

Secondly, moving on to the next hypothesis formulated, the final result of the valuations did not change much despite changing the method used, being multiples or the discounted cash-flow. This method, in the end, did see itself lowered a lot as only three years were considered in each case. A future field of study, whenever data of the upcoming years is ready to be used, could be a study with a 5 year-time period that analyses the recuperation of the value of the company in the future years. Multiples methods' results have also seen themselves lowered both if analysed individually (not the case of PBV) or using the averages of the three of them. The optimal range of investing in a company has been lowered and diminished a lot, as well as the average Po has decreased, leaving less room for investing opportunities. Having a clearer picture, the next table shows the percentages of how the value have changed in comparison to the previous years studied using both methods:



Table 29 – Methods' growth rate with respect to last year's results

	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Multiples</b>	-59,99%	-0,73%	-118,46%	195,84%
<b>DCF</b>	-26,97%	-164,36%		

Source: Own Creation

By taking the average results of each year's multiples and discounted cash-flow methods, it can be seen how the tendency of the first two years is to decrease the value. These results can be seen in two different ways, the first one means that we will compare 2018's discounted cash-flow method result with 2020's multiples one and 2019 DCF's result with 2021's multiples results as we are using just one Covid year and two Covid years respectively. All in all, by using this method, it can be seen how the pattern indicates a clear decrease using both methods, a bit lower in the case of the Discounted Cash-flow one. However, if we compare year-by-year results, the decrease in the value using the multiples is much lower than the one using the DCF so, comparing the results of each method will end up being related to the perspective taken when analysing them.

#### 7.1. Limitations and further research

The study, however, needs a bigger sample of companies so that the conclusions do really connect to the real cases. An idea of the effect that Covid has had can be made with more companies studied so that stronger conclusions can be taken. Also, as said above, making this same study in a few years, when normality has been reached again, could help understand the recovery of those years with losses, studying the cases applying a 5-year period...

Despite the companies studied having lowered their value during Covid years, the multiples method encourages shareholders, owners, and everyone interested to keep track of the evolution. From 2020, the first year of Covid to 2021, the last year studied and when Covid affected utterly, a small recovery was registered. It was not big and a hundred percent convincing, because still the operations during the year were not the usual, however, the value recovered a bit. So, future expectations are that, whenever sales come back to normality, that could be this same 2022, the value of the four companies will grow again to the past levels.

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## 9. ANNEXES

### Annex 1 – Ryanair's annual reports

<b>P&amp;L</b> (millions of euros)	2018	2019	2020	2021	2022
<b>Sales</b>	7151,00	<b>7697,40</b>	<b>8494,80</b>	<b>1635,80</b>	<b>4800,90</b>
COGS	3625,50	4317,90	4676,60	1023,80	3064
<b>Gross Margin</b>	<b>3525,50</b>	<b>3379,50</b>	<b>3818,20</b>	<b>612,00</b>	<b>1736,90</b>
Salaries	738,50	984,00	1106,90	472,20	690,10
Overhead	558,70	738,20	835,20	408,20	667
<b>EBITDA</b>	<b>2228,30</b>	<b>1657,30</b>	<b>1876,10</b>	<b>-268,40</b>	<b>379,80</b>
Depreciation	561,00	640,50	748,70	571,00	719,4
<b>EBIT</b>	<b>1667,30</b>	<b>1016,80</b>	<b>1127,40</b>	<b>-839,40</b>	<b>-339,60</b>
Financial expenses	56,00	68,70	457,10	269,30	90,20
<b>EBT</b>	<b>1611,30</b>	<b>948,10</b>	<b>670,30</b>	<b>-1108,70</b>	<b>-429,80</b>
Taxes	161,10	63,10	21,60	93,60	189,00
<b>Net Income</b>	<b>1450,20</b>	<b>885,00</b>	<b>648,70</b>	<b>-1015,10</b>	<b>-240,80</b>

<b>BALANCE SHEET</b> (millions of euros)	2018	2019	2020	2021	2022
<b>ASSETS</b>					
Cash	3680,10	3194,90	3808,00	3150,30	3625,8
Receivables	57,60	59,50	67,50	18,60	43,50
Inventory	3,70	2,90	3,30	3,60	4,30
Financial instruments	212,10	308,70	293,20	106,00	1400,40
Other assets	235,50	238,00	321,90	179,80	401,10
<b>Current assets</b>	<b>4189,00</b>	<b>3804,00</b>	<b>4493,90</b>	<b>3458,30</b>	<b>5475,10</b>
Fixed Assets net	8172,80	9446,70	10253,30	8869,70	9674,70
<b>Total assets</b>	<b>12361,80</b>	<b>13250,70</b>	<b>14747,20</b>	<b>12328,00</b>	<b>15149,80</b>

<b>LIAB. + EQUITY</b>	2018	2019	2020	2021	2022
Payables	249,60	573,80	1368,20	336,00	1029,00
Current debt	434,60	309,40	457,30	1778,40	1281,40
Expenses accr.	2502,20	2992,10	2632,70	1285,20	3002,00
Taxes accr.	36,00	31,60	0,00	48,10	47,70
Financial instruments	190,50	189,70	1050,00	79,20	38,60
<b>Current liabilities</b>	<b>3412,90</b>	<b>4096,60</b>	<b>5508,20</b>	<b>3526,90</b>	<b>5398,70</b>
Loan	4480,00	3939,20	4324,50	4154,50	4205,80
Equity + reserves	4468,90	5214,90	4914,50	4646,60	5545,30
<b>Total Liab.+ Equity</b>	<b>12361,80</b>	<b>13250,70</b>	<b>14747,20</b>	<b>12328,00</b>	<b>15149,80</b>

<b>SHORT BALANCE SHEET</b>	2018	2019	2020	2021	2022
NFO or net current assets	1.401	207	493	1.789	1.396
FA fixed assets	8.173	9.447	10.253	8.870	9.675
NA net assets	9.574	9.653	10.746	10.659	11.071
Debt short & long	5.105	4.438	5.832	6.012	5.526
Equity	4.469	5.215	4.915	4.647	5.545
Total financing	9.574	9.653	10.746	10.659	11.071

## Annex 2 – IAG's annual reports

<b>P&amp;L</b> (millions of euros)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Sales</b>	<b>22.972</b>	<b>24.406</b>	<b>25.506</b>	<b>7.806</b>	<b>8.455</b>
COGS	9.475	10.225	11.145	6.891	4.547
<b>Gross Margin</b>	<b>13.497</b>	<b>14.181</b>	<b>14.361</b>	<b>915</b>	<b>3.908</b>
Salaries	4.988	4.352	5.634	3.585	3.013
Overhead	4.598	4.897	4.003	1.826	1.728
<b>EBITDA</b>	<b>3.911</b>	<b>4.932</b>	<b>4.724</b>	<b>-4.496</b>	<b>-833</b>
Depreciation	1.184	1.254	2.111	2.955	1.932
<b>EBIT</b>	<b>2.727</b>	<b>3.678</b>	<b>2.613</b>	<b>-7.451</b>	<b>-2.765</b>
Financial expenses	234	191	338	376	742
<b>EBT</b>	<b>2.493</b>	<b>3.487</b>	<b>2.275</b>	<b>-7.827</b>	<b>-3.507</b>
Taxes	472	590	560	892	574
<b>Net Income</b>	<b>2.021</b>	<b>2.897</b>	<b>1.715</b>	<b>-6.935</b>	<b>-2.933</b>

<b>BALANCE SHEET</b> (millions of euros)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>ASSETS</b>					
Cash	3.292	3.837	4.062	5.774	7.892
Receivables	1.752	1.980	2.441	658	751
Inventory	432	509	565	351	334
Financial instruments	405	155	324	122	543
Other assets	4.342	3.612	3.935	935	1.031
<b>Current assets</b>	<b>10.223</b>	<b>10.093</b>	<b>11.327</b>	<b>7.840</b>	<b>10.551</b>
Fixed Assets net	17.038	17.941	24.341	22.476	23.855
<b>Total assets</b>	<b>27.261</b>	<b>28.034</b>	<b>35.668</b>	<b>30.316</b>	<b>34.406</b>

<b>LIAB. + EQUITY</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Payables	3.766	3.959	4.344	2.810	3.712
Current debt	5.089	5.711	7.329	6.872	8.687
Expenses accr.	547	559	631	626	732
Taxes accr.	179	165	192	48	21
Financial instruments	111	656	252	1.160	126
<b>Current liabilities</b>	<b>9.692</b>	<b>11.050</b>	<b>12.748</b>	<b>11.516</b>	<b>13.278</b>
Loan	10.173	10.264	15.800	17.190	20.282
Equity + reserves	7.396	6.720	7.120	1.610	846
<b>Total Liab.+ Equity</b>	<b>27.261</b>	<b>28.034</b>	<b>35.668</b>	<b>30.316</b>	<b>34.406</b>

<b>SHORT BALANCE SHEET</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
NFO or net current assets	5.731	5.410	6.160	4.356	6.086
FA fixed assets	17.038	17.941	24.341	22.476	23.855
NA net assets	22.769	23.351	30.501	26.832	29.941
Debt short & long	15.373	16.631	23.381	25.222	29.095
Equity	7.396	6.720	7.120	1.610	846
Total financing	22.769	23.351	30.501	26.832	29.941

**Annex 3 – Air China's annual reports**

<b>P&amp;L</b> (millions of CNY)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Sales</b>	<b>124.026,20</b>	<b>140.883,10</b>	<b>140.239,88</b>	<b>73.860,70</b>	<b>78.602,43</b>
COGS	55.456,35	67.042,71	64.624,42	31.531,83	38.510,19
<b>Gross Margin</b>	<b>68.569,85</b>	<b>73.840,39</b>	<b>75.615,46</b>	<b>42.328,87</b>	<b>40.092,24</b>
Salaries	22.392,36	24.450,25	25.473,90	22.012,83	24.230,07
Overhead	20.825,46	20.540,13	14.220,56	11.076,54	11.789,84
<b>EBITDA</b>	<b>25.352,03</b>	<b>28.850,01</b>	<b>35.921,00</b>	<b>9.239,50</b>	<b>4.072,33</b>
Depreciation	13.596,32	14.503,68	21.279,08	20.408,32	20.934,50
<b>EBIT</b>	<b>11.755,71</b>	<b>14.346,33</b>	<b>14.641,92</b>	<b>-11.168,82</b>	<b>-16.862,17</b>
Financial expenses	269,48	4.369,31	5.521,66	7.297,59	4.963,36
<b>EBT</b>	<b>11.486,23</b>	<b>9.977,02</b>	<b>9.120,26</b>	<b>-18.466,41</b>	<b>-21.825,53</b>
Taxes	2.844,78	1.762,15	1.856,50	2.650,28	3.003,29
<b>Net Income</b>	<b>8.641,45</b>	<b>8.214,87</b>	<b>7.263,76</b>	<b>-15.816,13</b>	<b>-18.822,24</b>

<b>BALANCE SHEET</b> (millions of CNY)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>ASSETS</b>					
Cash	5.562,91	6.763,18	8.935,28	5.837,99	15.934,71
Receivables	8.613,29	9.594,42	9.722,52	6.861,86	6.626,15
Inventory	1.535,77	1.877,49	2.098,67	1.853,99	2.050,28
Financial instruments	717,11	1.044,39	728,38	737,25	779,11
Other assets	4.330,86	4.446,63	3.332,00	4.444,81	5.006,47
<b>Current assets</b>	<b>20.759,94</b>	<b>23.726,11</b>	<b>24.816,85</b>	<b>19.735,90</b>	<b>30.396,72</b>
Fixed Assets net	214.884,64	219.931,00	269.389,52	264.293,71	267.984,46
<b>Total assets</b>	<b>235.644,58</b>	<b>243.657,11</b>	<b>294.206,37</b>	<b>284.029,61</b>	<b>298.381,18</b>

<b>LIAB. + EQUITY</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Payables	32.828,36	32.685,56	42.417,11	37.409,94	47.016,29
Current debt	7.405,76	8.886,27	9.980,30	2.002,65	2.116,03
Expenses accr.	1.418,05	2.749,21	1.906,68	1.509,61	2.280,95
Taxes accr.	1.825,06	1.023,94	938,73	45,61	4,57
Financial instruments	28.654,60	27.194,90	22.729,99	39.630,37	40.201,88
<b>Current liabilities</b>	<b>72.131,83</b>	<b>72.539,88</b>	<b>77.972,81</b>	<b>80.598,18</b>	<b>91.619,72</b>
Loan	68.654,15	70.619,20	114.904,10	119.658,39	140.930,35
Equity + reserves	94.858,60	100.498,03	101.329,46	83.773,04	65.831,11
<b>Total Liab.+ Equity</b>	<b>235.644,58</b>	<b>243.657,11</b>	<b>294.206,37</b>	<b>284.029,61</b>	<b>298.381,18</b>

<b>SHORT BALANCE SHEET</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
NFO or net current assets	-15.312	-12.733	-20.446	-19.229	-18.905
FA fixed assets	214.885	219.931	269.390	264.294	267.984
NA net assets	199.573	207.198	248.944	245.064	249.079
Debt short & long	104.715	106.700	147.614	161.291	183.248
Equity	94.859	100.498	101.329	83.773	65.831
Total financing	199.573	207.198	248.944	245.064	249.079



## Annex 4 – Lufthansa's annual reports

<b>P&amp;L</b> (million €)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Sales</b>	<b>16.184,00</b>	<b>16.083,00</b>	<b>16.273,00</b>	<b>4.280,00</b>	<b>5.164,00</b>
Operating income	1.521,00	1.158,00	1.663,00	6.825,00	875,00
COGS	10.289,00	10.002,00	10.762,00	5.071,00	4.776,00
<b>Gross Margin</b>	<b>7.416,00</b>	<b>7.239,00</b>	<b>7.174,00</b>	<b>6.034,00</b>	<b>1.263,00</b>
Salaries	2.818,00	3.134,00	3.049,00	2.217,00	2.408,00
Overhead	2.995,00	2.812,00	2.985,00	2.342,00	1.780,00
<b>EBITDA</b>	<b>1.603,00</b>	<b>1.293,00</b>	<b>1.140,00</b>	<b>1.475,00</b>	<b>-2.925,00</b>
Depreciation	482,00	534,00	594,00	1.135,00	398,00
<b>EBIT</b>	<b>1.121,00</b>	<b>759,00</b>	<b>546,00</b>	<b>340,00</b>	<b>-3.323,00</b>
Financial profit	1.845,00	942,00	476,00	0,00	1.008,00
Financial expenses	166,00	1.379,00	397,00	2.115,00	657,00
<b>EBT</b>	<b>2.800,00</b>	<b>322,00</b>	<b>625,00</b>	<b>-1.775,00</b>	<b>-2.972,00</b>
Taxes	345,00	17,00	30,00	995,00	662,00
<b>Net Income</b>	<b>2.455,00</b>	<b>339,00</b>	<b>595,00</b>	<b>-780,00</b>	<b>-2.310,00</b>

<b>BALANCE SHEET</b> (million €)	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>ASSETS</b>					
Cash	763,00	755,00	897,00	788,00	1.479,00
Receivables	2.799,00	2.319,00	2.367,00	1.401,00	1.754,00
Inventory	67,00	78,00	108,00	111,00	114,00
Financial instruments	685,00	0,00	41,00	3.655,00	5.084,00
Other assets	2.368,00	1.882,00	2.209,00	3.280,00	3.992,00
<b>Current assets</b>	<b>6.682,00</b>	<b>5.034,00</b>	<b>5.622,00</b>	<b>9.235,00</b>	<b>12.423,00</b>
Fixed Assets net	21.789,00	22.429,00	23.510,00	23.037,00	22.357,00
<b>Total assets</b>	<b>28.471,00</b>	<b>27.463,00</b>	<b>29.132,00</b>	<b>32.272,00</b>	<b>34.780,00</b>

<b>LIAB. + EQUITY</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
Payables	6.359,00	5.512,00	6.094,00	4.659,00	4.641,00
Current debt	1.000,00	1.000,00	1.098,00	2.827,00	6.804,00
Other liabilities	4.440,00	4.373,00	5.149,00	6.081,00	5.559,00
Financial instruments	2.024,00	1.967,00	2.089,00	4.215,00	1.813,00
<b>Current liabilities</b>	<b>13.823,00</b>	<b>12.852,00</b>	<b>14.430,00</b>	<b>17.782,00</b>	<b>18.817,00</b>
Loan	6.858,00	6.769,00	6.602,00	6.864,00	8.485,00
Equity + reserves	7.790,00	7.842,00	8.100,00	7.626,00	7.478,00
<b>Total Liab.+ Equity</b>	<b>28.471,00</b>	<b>27.463,00</b>	<b>29.132,00</b>	<b>32.272,00</b>	<b>34.780,00</b>

<b>SHORT BALANCE SHEET</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
NFO or net current assets	-4.117	-4.851	-5.621	-1.505	2.223
FA fixed assets	21.789	22.429	23.510	23.037	22.357
NA net assets	17.672	17.578	17.889	21.532	24.580

Debt short & long	9.882	9.736	9.789	13.906	17.102
Equity	7.790	7.842	8.100	7.626	7.478
<b>Total financing</b>	<b>17.672</b>	<b>17.578</b>	<b>17.889</b>	<b>21.532</b>	<b>24.580</b>