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Did the Covid-19 Crisis Damage Airlines with Aggressive Growth Strategies More?

- *exploring the 2020 recession*

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Abstract

This thesis aims to explore how aggressive strategies affected airline companies in the covid-19 pandemic. Using the sustainable growth model, the thesis assesses which business decisions that affect companies' performance in the time of crisis. The thesis also sets out to research warning signs that can help predict how companies will perform during situations of financial distress. The difference between failed and recovered airline companies became visible in the assessment of the four growth levers Profit Margin, Earnings Retention Ratio, Asset Turnover and Financial Leverage. The results indicate that airlines with a more aggressive strategy have a harder time recovering from the covid-19 pandemic if they recover at all. The analysis revealed that airlines with more conservative strategies and a stronger focus on stability led to a lower Earnings Retention Ratio and stronger Profit Margins. For the failed airlines a high Earnings Retention Ratio was a common denominator which told us that their focus was on expansion and growth of the airline. These airlines would benefit from building a more solid base before focusing on growth.

Preface

The authors of this theses have over the last years studied various subjects concerning economics and business administration and we have had many different subjects in mind for our thesis. As we have a combination of international business and finance as our specializations, we wanted to find a subject that ticked off for both of us. The airline industry became an early topic of discussion because of its vital role in today's world economy, the competitive environment, and the recent impact of the pandemic on the industry. We landed on this topic after we found a study on how the different business strategies of banks played out during the financial crisis in 2008 and we got the idea to see how different strategies in the airline industry has played out in the recent recession. The industry has been pushing their prices and destinations for several years and the airlines are now taking a financial hit that might be harder than it should have been.

We feel the need to mention that the case of Norwegian Air Shuttle also has been a part of the motivation as the company has been involuntary in the medias spotlight over the last couple of years due to their financial situation and excessive expansion plans. This case and others made us particularly interested in the competitiveness in the airline industry, why it has become the way it has and how various historical incidents have shaped the industry into what it is today.

All of this made us think that the competitiveness in the industry has reached a level which might be unhealthy and promotes aggressive strategies. If such measures are necessary in order to survive, it outcompetes the companies with a sound business model and a healthy balance sheet. When the crisis eventually hits, they often end up needing a "bailout" to avoid bankruptcy**.** This creates a somewhat "evil circle" that promotes an unhealthy business model.

Based on this the question we wanted to investigate in detail became: *"Did airlines with aggressive growth strategies get hit harder by the covid crisis? - exploring the 2020 recession."*

There has been an extensive amount of studies done of the airline industry as it is one of the most globalized, most exposed and important industries in the world. Therefore, we are building the thesis on earlier studies.

Working on the thesis has been a demanding, time consuming and educational process. We have learned a lot regarding the airline industry and crisis management. This is an experience we will take with us in future work.

We want to thank our advisor Aysil Emirmahmutoglu, who has served as a source of knowledge and critic.

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Introduction

Bubbles, recessions and booms have been part of in the economy for centuries and we have since the first recession tried to predict how companies will perform and searched for warning signs. This thesis is aiming to do the same, the study is researching if there is a correlation between aggressive growth strategies and how companies perform during a time of financial distress, more specifically the airline industry and the coronavirus pandemic.

This thesis does builds on a previous study performed by Maoyong Zheng, Cesar L. Escalante and Carmina E. Taylor; "Did Aggressive Business Growth Strategies Lead to Bank Failures?" A study where they apply the sustainable growth paradigm to isolate different components of the companies operating strategies under either aggressive or conservative growth stance. This is done to bring focus to which business decisions that can lead to either failure or survival in times of economic crisis.

This thesis aims to apply these methods to the airline industry instead of the banking industry to research if the methods can be applied to different industries. Furthermore, to see if there are ways to predict the winners and losers of an industry that could be defined as more volatile than the banking industry. The study also wants to look at the competitiveness of the industry and how that impacts the strategy decisions of the companies. The airline industry is highly competitive, and this study use the Herfindahl-Hirschman Index in combination with the Zheng et al. study to research if the level of competition has an impact on the strategy decisions of the companies.

In this thesis, a dataset consisting of the worlds publicly traded airlines and airline groups have been created and utilized. Compared to the Zheng et al. study, not many companies have gone bankrupt, leading us to defining failed airline companies by the recovery of their stock price since the outbreak of the pandemic. The results indicate that airlines with a more conservative stance on growth and more focus on stability, shown through the airlines earnings retention ratio, profit margin and financial leverage, are performing better in the time span after the coronavirus pandemic.

1 Background

1.1 Overview of the Airline Industry

To provide a clearer picture of the content and background for this thesis the first part presents the airline industry and the development of the market observed today. To understand the reason for this study it is important to have an overview of the how the industry arrived at the situation it is in today. The first part will present an historical overview of how the airline industry has developed over the last 50 years and zoom in on a few important and defining moments for the industry. Finally, the last part of the background will provide an overview of the situation as it stands today.

1.1.1 Historical perspective of the airline industry

The commercial airline industry had its infancy in the early 20th century and grew slowly until after World War 2 when the technological advancements allowed for a rapid growth. Deregulations in the 70s changed the structure of the airline industry, and in the 70s the competition exploded, and it was the start of the forming of the market seen today. (Morrison, S., & Winston, C,1995)

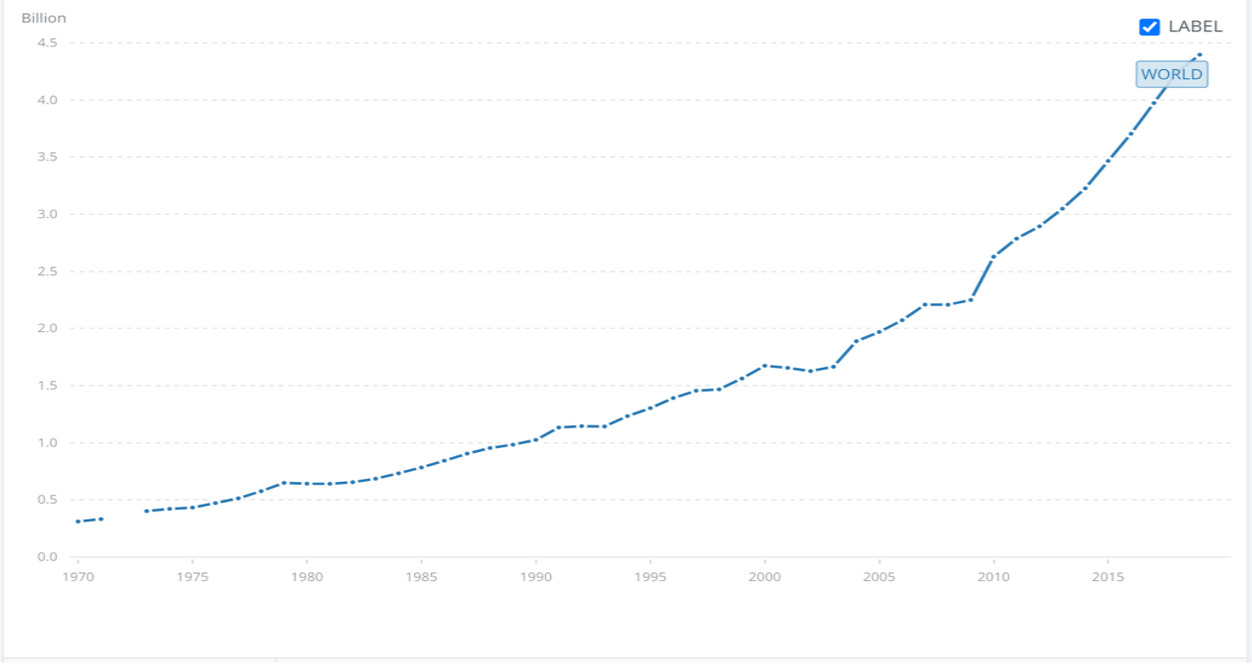

Figure 1.1 shows the development of passengers in commercial airline from 1970 until 2019 (Data.Worldbank, 2021).

There has been a steady and rapid growth in passengers traveling by air since the 1970´s and there is no secret that the American market has been the leading force. From the figure it can be drawn out two specific incidents which have a connection with the American market one way or another. On September 11th, 2001 the terrorist attacks at the world trade center occurred, and in 2008 the American banking system caused a major financial recession. Both these incidents affected the travelling pattern of passengers and the terrorist attacks changed the industry forever. (Nolan, J. F., et. Al, 2004).

Even though there has been a rapid and steady growth of passengers in the past decades the airline industry´s profitability has been going in cycles. Some observers estimate this cycle to consist of about 4–6 years of reasonable profitability, followed almost immediately by 3–4 years of minimal profits or outright losses, and back again. In the USA, the only intracontinental market that is clearly contestable, this cycle coincides with expansion or exit of firms in the industry (Nolan, J. F., et. Al, 2004). The purpose of this thesis is not to explain these cycles, but it is noted that they have an impact on the competitiveness of the industry. They can to some extent be explained through the natural downturns in the world economy but also unstable fuel prices and general over capacity in the industry impact the profitability to a large extent even in prosperous times. (Nolan, J. F., et. Al, 2004).

1.1.2 September 9/11

The terrorist attacks in 2001 had a two-sided impact on the airline industry. Firstly, it changed the travel experience through drastic security increases and routines. Travelling people are being watched closer than ever, and the rapid increase in surveillance of travelers accelerated after the attacks. This surveillance provided the airline companies with large amounts of information on travelling and passenger patterns which are useful for their marketing and business development. (Nolan, J. F., et. Al, 2004). Secondly, the attacks had an immediate and natural effect on traveler's willingness to travel which we can see from the graph. The American government immediately canceled a high number of flights in the following days which directly impacted airlines. (Harris, 2017) The relevance to this thesis is that this situation created an immediate halt to the airline traffic in a concentrated area, mimicking the situation which all airlines experienced in March of 2020.

1.1.3 The financial crisis 2008

After the crisis hit, airline stocks fell by 68% from January 2007 to March 2009. (Borko, S 2018). The travel sector in general suffered severely under the recession as travelling is considered a normal good were the demand sinks along with people´s purchasing power. This is not news, and it is more interesting to see what this recession did to the structure of the industry. Looking at how employment in the sector developed compared to the other travelling sectors, an interesting picture is forming. This is from the American market.

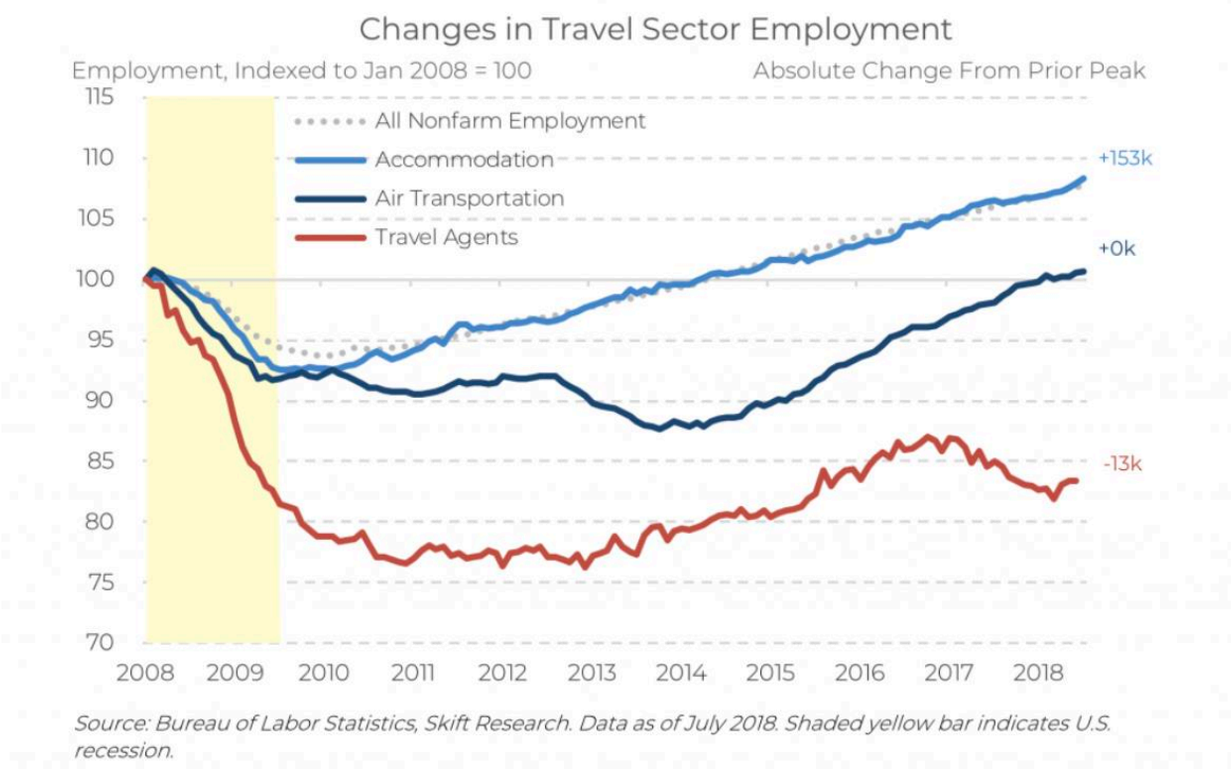

Figure 1.2 Shows the development in employment following the 2008 crisis.

By neglecting the travel agencies which have been a dying industry since the 90s the airline industry's number of employees had a more difficult time achieving pre-recession standards than the accommodation industry. This is the result of a restructuring of the industry due to a combination of record high oil prices, low-cost carrier competition and a slow recovery of travelers. (Borko, S 2018). So why is this relevant to this thesis? It shows how the airline industry recuperated after their last blow and finally started to gain notable profits again around 2017. It also provides us with a good picture of where the industry was before the pandemic hit in a historical perspective.

1.1.4 Covid-19 pandemic

As known, one of the bases for this thesis is the covid-19 pandemic and how it has hit the airline industry. In early March 2020, airlines had to shut down almost overnight and thousands of employees were temporarily laid off. As of May 2021, the situation is still unclear, but the world is beginning to see a small light at the end of the tunnel with vaccines being rolled out in big numbers around the world. Recent reliable numbers are hard to find, and the airlines have recently started releasing their numbers for 2020.

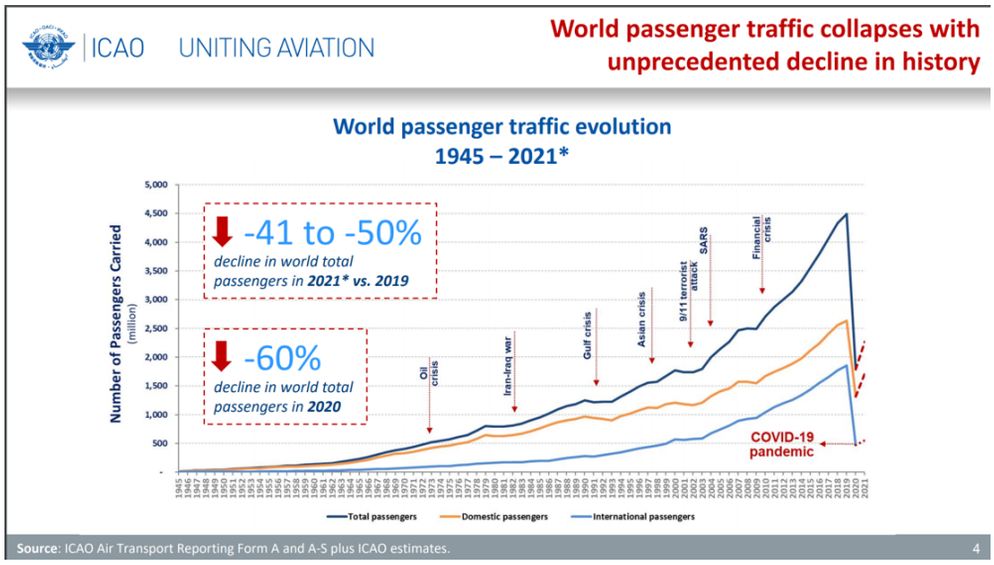

Figure 1.3 (ICAO, 2020). Shows the drop of passengers due to covid-19.

As see in figure 2.3 the industry has in total lost 60% of its passengers, a total loss of 2.6 billion seats. Imagined that everyone in the world has one seat each would that be 32% of the world's population, this gives a good picture on how important and large this industry is.

1.1.5 Impact of covid-19 on global traffic

The long-term impact from covid-19 on the air traffic is hard to predict because compared to the previous major events in the industry nothing has been as drastic and long lasting as the Covid-19 pandemic. It differs from earlier incidents in both duration and prevalence. If compared to the SARS pandemic of 2003 which is maybe the closest comparable event, figure 1.4 gives a good picture that the industry is in previously unchartered territory.

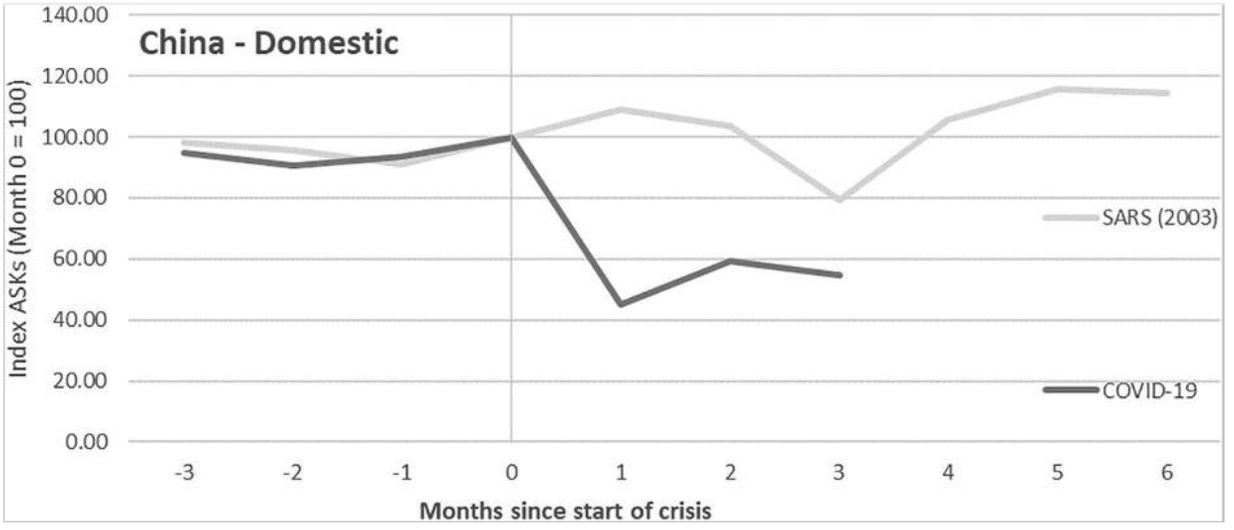

Figure 1.4 (Suau-Sanchez, 2020). Shows the difference between SARS and Covid-19 in terms of ASKs.

Figure 1.4 shows available seat kilometers (ASKs) in the domestic chines market and is comparing the first months of the covid-19 pandemic to the SARS virus of 2003. Even though the exact numbers are not available, it can safely be noted that the sharp V-recovery seen in the SARS graph did not occur for the covid-19 graph. The relevance of this to the thesis is to show that even though airlines have been exposed to earlier incidents that have caused major problems they have always bounced back relatively quickly as exemplified by the SARS pandemic. Historical incidents did not incentivize airlines to apply strategies that prepare them for several years of downtime and recession of such extent as the covid-19 pandemic.

2 Theory

2.1 Introduction

The subject of how different business strategies affects companies in times of duress and crisis has been explored before in several studies, this study has chosen to expand on a particular study done by Maoyong Zheng, Cesar L. Escalante and Carmina E. Taylor; "Did Aggressive Business Growth Strategies Lead to Bank Failures?". The study investigates how banks with different strategies were affected by the financial crisis of 2008, and more specifically if one could use indicators to determine and predict which banks would survive and which banks would fail based on their strategy. They define the strategy of the different companies through using an application of Higgins Sustainable growth challenge model which this thesis will elaborate on later. The study´s results provide warnings and red flags that can be monitored by the researchers and banks themselves and could help banks to stay at a growth level where they are not as exposed to the risks of a crisis as they could be if their strategy is too aggressive.

This thesis contribution to the Zheng et. al. study would be to expand the method into other fields and industries, this thesis is applying the methods of the previous study to the airline industry instead of the banking industry to determine whether the conditions that apply to banks and aggressive strategies also are true for the airline industry and its companies. As observed over the last decades the airline industry is exposed to unexpected events from time to time. The 9/11 attacks caused a heavy impact to all air traffic in north America (Harris, 2017), volcano eruptions have impacted the air traffic and the latest and most acute example is the covid-19 pandemic. This thesis aims to provide an early warning sign or red flags for airline companies to help determine if the company could be in a dangerous position if a crisis or another unwanted and unexpected situation was to arise. This thesis also aims to prove that the methods can be applied to other industries than banking and to encourage other researchers to test the methods on other fields of industry.

Another important part of this study is the strategies and competitiveness of the airline industry and to see if there is a connection between the competitiveness of the industry and failed/struggling airlines. For this part the thesis will apply the results derived from applying the models of Zheng et al. and compare them to how competitive the industry is in different areas. This will be based on a combination of the Zheng et al. study and "*Market Share, the Number of Competitors and Concentration: An Empirical Application on the Airline Industry"*

a study by Mehmet Yasar and Kasim Kiraci from 2017. More specifically this thesis will use their measurements of the Herfindahl-Hirschman Index (HHI) of the world to look how the market has been developing the following years and as a basis for the analysis. The HHI is a measurement tool to measure concentration in a market or diversification within a portfolio, in this case it is used to measure the competitiveness of the airline industry.

This thesis also differs from Zheng et al. because very few of the companies that are a part of the dataset applied to this thesis has gone bankrupt or terminally failed. Most of the companies are still operating in a smaller scale and a high percentage are receiving large sums in bailout packages in various forms. This means that in this thesis another way to separate the companies that are performing better than others is necessary. A natural way to see how a company is performing is their market valuation (Carlson, 2019) and in a study by Zarah Puspitaningtyas she concludes that stock prices reflect the market valuation of the company's stock. (Puspitaningtyas, 2017). This study supports the decision of dividing the companies into different performing groups based on their stock price recovery.

2.2 Sustainable Growth Theory

A common misconception is that the higher the growth rate is the better the company. It is proven that too much growth can be bad for business and cause significant amounts of financial stress for not only the companies themselves but when it becomes an industry trend it can be bad for the whole industry. (Fonseka et. al., 2012). Too much growth, too fast can lead to loss of markets share, decrease in the business's general competitiveness and eventually bankruptcy. (Fonseka et. al., 2012).

Term explanation:

Sustainable Growth Theory: An overarching name for the different models and research done on the concept of sustainable growth.

Sustainable Growth Rate (SGR): Used to measure if the growth of a firm is sustainable, the term was introduced by Robert C. Higgins and he expresses the term as the percentage change in a firm's equity under the assumption that firm does not use external equity financing, such that an increase in equity can only be achieved through an increase in retained earnings. To understand the term in a clearer way a better definition is necessary, the authors of this thesis defines SGR as: *"Sustainable Growth Rate, SGR is the rate a firm can grow over a period of*

time without an unnatural increase in the company's financial leverage and avoiding problems such as a decrease in the business general competitiveness."

Sustainable Growth Challenge Model (SGC): There has been used a few models through the years. The one this thesis is applying is a model which has been proven through use both in research and as a useful tool for bankers assessing firms' creditworthiness. (Fonseka et. al., 2012). It is called the Higgins sustainable growth challenge model. (Zheng et. al., 2020). This is the model used in the study of Zheng et al. and it is explained under.

2.2.1 Sustainable Growth Challenge Model

The thesis builds on the study "Did Aggressive Business Growth Strategies Lead to Bank Failures?" by Maoyong Zheng, Cesar L. Escalante and Carmina E. Taylor as mentioned earlier. In the study they apply Higgins` SGC, which is taking the SGR one step further to gain a deeper insight into how businesses specific operating decisions affect their growth strategy. Even though the study is on banks, early test runs shows that the equations and definitions can be applied to the companies of the airline industry as well.

The goal of the SGC model is to define if a company has an aggressive growth strategy or rate. Zheng et. al. explains it further as: *"Higgins' SGC model is derived by initially defining a firm's sustainable growth rate"* (Zheng et. al., 2020).

With the firms SGR as the baseline for this thesis the equation that this thesis will base its analysis on is demonstrated here:

$$\mathbf{SGR} = \frac{\boldsymbol{\Delta Equity}}{\boldsymbol{Equity_{beg}}} = \frac{\boldsymbol{Equity_{end} - Equity_{beg}}}{\boldsymbol{Equity_{beg}}} = \frac{\boldsymbol{Net\ Income - Dividends}}{\boldsymbol{Equity_{beg}}}$$

From the last expression other factors can be extracted that represents different measurements of a company`s growth rate. After exploration, this thesis decided that the four different levers of growth Zheng et. al. chose in their study also gives the best expression of how the airline companies chose to allocate their resources. Therefore, the companies SGR is defined through profit margin, earnings retention ratio, asset turnover, and financial leverage.

$$\mathbf{SGR} = \left[\frac{\boldsymbol{Net\ Income}}{\boldsymbol{Revenue}}\right] * \left[\frac{\boldsymbol{Net\ Income - Dividends}}{\boldsymbol{Total\ Assets}}\right] * \left[\frac{\boldsymbol{Revenue}}{\boldsymbol{Total\ Assets}}\right] * \left[\frac{\boldsymbol{Assets}}{\boldsymbol{Equity_{beg}}}\right] = \boldsymbol{g_s}$$

$$\textbf{Profit Margin (PM)} = \frac{\boldsymbol{Net\ Income}}{\boldsymbol{Revenue}}$$

$$\textbf{Earnings Retention Ratio (ERR)} = \frac{\boldsymbol{Net\ Income - Dividends}}{\boldsymbol{Net\ Income}}$$

$$\textbf{Asset Turnover (ATO)} = \frac{\boldsymbol{Revenue}}{\boldsymbol{Total\ Assets}}$$

$$\textbf{Financial Leverage (LEV)} = \frac{\boldsymbol{Total\ Assets}}{\boldsymbol{Equity_{beg}}}$$

Profit margin: A firm's profit expressed as a percentage of its turnover or sales.

Earnings retention: The retention ratio (also known as the net income retention ratio) is the ratio of a company's retained income to its net income. The retention ratio measures the percentage of a company's profits that are reinvested into the company in some way, rather than being paid out to investors as dividends.

Asset turnover: Asset turnover is a comparison of sales to assets. The intent is to show the number of sales generated by investing in a certain amount of assets.

Financial leverage: Financial leverage is the use of debt to buy more assets. Leverage is employed to increase the return on equity.

Referring to the definition of SGR in chapter 2.2. To define a firms SGC It is necessary to look at the difference between their SGR and the firm's actual growth rate (AGR). The equation to define if a company has an aggressive growth strategy become as follows, where the first part of the equation is representing the AGR:

$$\textbf{SGC} = \boldsymbol{ln}\left[\frac{\boldsymbol{Revenue_t}}{\boldsymbol{Revenue_{t-1}}}\right] - \boldsymbol{g_s}$$

The SGC rate can be helpful for companies in a few ways, firstly if the SGC is positive it means that a company can be defined has having an aggressive growth strategy. As mentioned earlier can this lead to loss of markets share, decrease in the business's general competitiveness and eventually bankruptcy. (Fonseka et. al., 2012) On the other hand if the SGC is negative it can be an indicator of underutilization of the company`s resources and that the business is being run inefficiently. Accordingly, a company should strive to achieve an SGC ratio of zero. (Fonseka et. al., 2012).

2.3 Seemingly Unrelated Regression

The Seemingly Unrelated Regression Model (SUR) a model that is asymptotically more efficient than a regular single-equation least square model. This efficiency can grow large when contemporaneous error terms in different equations are highly correlated and when independent variables in different equations are not highly correlated (Zellner & Huang, 1962).

The model is applying a generalized-least square (GLS) algorithm that reviles heteroscedasticity and autocorrelations between the equations by using an efficient GLS-estimator. The model was developed to allow for non-zero covariance between the error terms of different equations. (Zheng et. al., 2020)

The model is described using the following equations:

$$\boldsymbol{Estimator} = \boldsymbol{E}(\boldsymbol{\varepsilon_{it}}, \boldsymbol{\varepsilon_{js}}) = \begin{cases} \boldsymbol{\sigma_{ij}}, & \boldsymbol{t = s} \\ \boldsymbol{0}, & \boldsymbol{t \neq s} \end{cases}$$

$$\boldsymbol{SUR\ model} = \boldsymbol{y_{ij}} = \boldsymbol{X_{ij}\beta_j} + \boldsymbol{\varepsilon_{ij}}, \quad \boldsymbol{where\ i} = \boldsymbol{1}, \dots, \boldsymbol{N}; \boldsymbol{j} = \boldsymbol{1}, \dots, \boldsymbol{M}$$

2.3.1 Breusch-Pagan Test

To see if any given dataset is allegeable for the implementation of the SUR model one must test the dataset for heteroscedasticity. This can be done through a Breusch-Pagan test. The test has a null hypothesis stating that homoscedasticity is present, meaning that the residuals are distributed with equal variance. The alternative hypothesis is stating that heteroscedasticity is present, meaning that the residuals are not distributed with equal variance (Z, 2020).

$$\boldsymbol{H_0} = \boldsymbol{Homoscedastisity\ is\ present}$$

$$\boldsymbol{H_A} = \boldsymbol{Heteroscedasticity\ is\ present}$$

If the result of the test turns out significant at a <5% level, one can reject the null hypothesis, H_0, and apply the alternative hypothesis, H_A.

2.4 Herfindahl-Hirschman Index

The Herfindahl-Hirschman Index (HHI) was introduced by Albert Hirschman in 1945 and Orris Herfindahl in 1950. It is one of the most popular tools used to measure the competitiveness of industries in terms of the market concentration. (Bondarenko, P. 2021). It is based on the following formula:

$$\mathbf{HHI} = S_1^2 + S_2^2 + \ldots S_n^2$$

Where *n* is the number of firms in the industry and *s* is the market shares of the firms denoted in percentages of market share. The index moves on a scale from 0 to 10000 and the number tells us about the competitiveness of the industry. For example, if a company has 100% market share the HHI would equal 10000 (100^2) and indicates that the industry is a complete monopoly. The lower the index score is the higher is the competitiveness of the industry a score of 0 would equal a perfectly competitive market. (The Economic Times, 2021)

When using the HHI it is also necessary to establish classifications for the different scores from the index. In the study the of Yasar et al. they use classifications which is as follows:

- $0 \leq \text{HHI} < 2000 \rightarrow$ Low Concentration,
- $2000 \leq \text{HHI} < 4000 \rightarrow$ Medium Concentration,
- $4000 \leq \text{HHI} \leq 10000 \rightarrow$ High Concentration, (Yasar, 2017)

There are a couple of variations in classifications of the HHI. The Department of Justice Antitrust Division does for example use a little bit different classification of the index in their evaluation of market concentration. They use the HHI to evaluate and assess how mergers and aquations effect the market and the competitiveness. On their homepage they state, "*The agencies generally consider markets in which the HHI is between 1,500 and 2,500 points to be moderately concentrated and consider markets in which the HHI is in excess of 2,500 points to be highly concentrated. Transactions that increase the HHI by more than 200 points in highly concentrated markets are presumed likely to enhance market power under the Horizontal Merger Guidelines issued by the Department of Justice and the Federal Trade Commission." (DOJ,2021).* From this it can be noted that the classifications differ a bit. This thesis is using the first classification because the thesis is assessing the same market in the same way as Yasar et al. and it gives a good basis to compare.

The interest in the HHI is to apply the index in a way that would help us give indicators on whether there is a correlation between high competitiveness and failing airline companies. In this scenario it would be necessary to divide the airline industry into different markets to see how the competitiveness differs around the world. For this the thesis will use the article by Yasar et al. as a baseline in how the world market has developed and to set up the HHI analysis.

2.5 Defining if a Company is "Failing"

Since almost none of the companies in the dataset has failed or gone bankrupt yet due to various forms of bailout packages, another way to separate the companies was necessary. Since a company's market valuation is reflected in their stock price (Puspitaningtyas, 2017) and all of the companies within the dataset were publicly listed, the stock price could be used as a determinant for how the company has been performing since the crisis. Looking at the various stocks in the dataset and in general the data shows that recovery below 75% of the original stock price of the company before the Covid-19 pandemic could be defined as a failing airline company.

3 Methodology and Empirical Data

3.1 Data Sample

The dataset created and collected by the authors is the basis of this thesis findings, it is therefore important to include a guideline to which selections and assumptions that were made.

The Orbis database was used as the starting point, to find all publicly traded airline companies active to date. The segmentation done by Orbis was not sufficient as it included different airport-stocks and a couple of cargo companies that are not relevant to this thesis, and in turn was removed. Although the Orbis database easily provided a list of the different companies needed, they did not provide the necessary data for the key indicators of the airline companies. Looking elsewhere we found that the database DataStream had all the inputs that was necessary. This included data across most of the global markets and includes several decades of historical data. As this database is accessible through NHH, and highly compatible with Excel. It makes it easy to make a sufficient spreadsheet that can be used for further analysis.

Using the list of companies provided by Orbis, DataStream was used to provide the data needed for these companies. A few companies were removed as they were not within the DataStream database. The financial data extracted form DataStream was Total Assets as Reported, Total Shareholder Equity, Net Sales or Revenues, Net Income Before Preferred Dividend, Cash Dividends Paid. Adjusted average stock prices (adjusting for paid dividends and stock splits/mergers) from January 2020 and April 2021, were gathered from DataStream and used for segmenting the airline companies into two groups.

When DataStream was connected to Excel, this formula was used to extract data for the different variables for each company:

$$= @DSGRID(\boldsymbol{COMTIC}; \mathrm{X}(\mathbf{VARCODE})\sim\mathbf{U\$}; 2010; 2019; \mathrm{Y}";"Transpose = true; LatestFirstValue = true")$$

Where “COMTIC” is the Company ticker within the DataStream database, and “VARCODE” is the code of any given variable within DataStream. “U$” is used to convert all airline companies’ local currency to United States Dollar (USD). The exchange rates used is the rates within DataStream on May 12th 2021.

The only two publicly listed airline companies that went bankrupt the past couple of years were Flybe and Virgin Australia. These were included in the dataset. Together with the refined list from Orbis of publicly listed companies still active, this makes the dataset containing 95 airline companies. The data is collected from the period 2010 to 2019 and all numbers extracted were denoted in 1000'$. There are some missing datapoints for a few companies which can be explained by possible mergers and acquisitions, bankruptcies or companies being born later than 2010. The chosen time-period should be sufficient to capture the fluctuations within each company's economy. The purpose is of this thesis is to see if any of the chosen variables can help explain why an airline company has "Failed" or "Recovered". In this thesis an airline company is defined as "Failed" if the average adjusted stock price (AASP) of April 2021 is below 75% of the AASP of January 2020. To be defined as "Recovered" the AASP of April 2021 must be above 75% of the AASP of January 2020. As described in the formulas below:

$$\textbf{Failed if } \frac{\boldsymbol{AASP\ April\ 2021}}{\boldsymbol{AASP\ January\ 2020}} < \mathbf{75\%}$$

$$\textbf{Recovered if } \frac{\boldsymbol{AASP\ April\ 2021}}{\boldsymbol{AASP\ January\ 2020}} > \mathbf{75\%}$$

The reason for choosing the 75% level as a divider is that it is necessary to divide the dataset into two different performing groups with enough airlines in each group. This level of AASP recovery provides 43 airlines as "Failed" and 52 airlines as "Recovered". The segmentation process would be a lot easier if it could be separated between "bankrupt airlines" and "survived airlines", but since there have been very few bankruptcies, another method of performance-based segmentation had to be defined and used. Although a 75% recovery might seem like a strong recovery keeping in mind that a crisis is still playing out, most markets and indexes are close to all-time highs, meaning that a 75% recovery is not very impressive at all. The stock prices from January 2020 were chosen because very few, if any, of the airline companies were affected by the coming recession at this time.

3.1.1 Criticism of the Dataset

Having only 95 airline companies in the dataset, it is arguably a small sample size. Then again separating these companies into two even smaller groups of 43 "Failed" and 52 "Recovered" airlines, makes it even smaller. Small sample sizes like this could make the results less robust, as individual companies might affect the whole result significantly.

The dataset consists of airline companies from all over the world, and many of them are operating in their own currencies. When extracting data from DataStream, internal exchange rates for all numbers are being used, meaning that there might be a slight difference between DataStream's exchange rate, and the exchange rate that each individual company was exposed to. Accounting practices also differ between continents. Having tried to take this into account when choosing the variables and checking what DataStream adjusts for in their database, the differences should be mostly eliminated, but there are still some uncertainties that needs to be considered.

Although the period between 2010-2019 is believed to be sufficient to capture the fluctuations within the economy of the individual companies, it does have some weaknesses. If for example a large company has had 30 great years, and an external shock made them struggle for several years within the given period, this dataset will only be considering the years of struggle. Combining this with the arguably small sample size, such a hypothetical case could affect the result. It is not probable that such a case is present in this analysis, but it could be argued as a possible weakness. The dataset also includes some N/A values and as discussed earlier there might be different reasons why these are apparent (bankruptcies, born later than 2010, mergers etc.). No matter the reason it is a weakness to the dataset as some variables holds fewer numbers of observation.

Finally, there are some observations where financial leverage turns out as a negative value. This is a result of companies having negative equity from time to time. Negative values cause a problem because a company might be heavily leveraged, but the dataset threats this as a low value - stating that the company is only slightly leveraged or not leveraged at all. It is difficult to know for sure what the best way of threating these values are, because removing them leaves fewer observations in total, and fixing their value to something else is not a perfect representation of their actual leveraged situation. Three test runs of the regression model with: including, excluding, and fixed values for these negative values, was performed. The significance did not change for any of the variables (only slight change in coefficients), it was therefore decided to leave the values untouched as that kept the most observation within the dataset.

To conclude, it is noted that there are several different weaknesses to the dataset. These weaknesses need to be kept in mind when concluding and analyzing the results.

3.2 Dataset Calculations

After extracting all needed data (see 3.1 for exact indicators) from DataStream, the next steps were to calculate the SGR, AGR and SGC for all companies and for each year between 2011 and 2019. Then the same was conducted for the four growth levers; PM, ERR, ATO and LEV (See 2.2.1 for exact equations). Furthermore, the HHI was calculated (See 2.4 for equation) for the same companies and for all the given years, but without segmentation for failed and recovered airlines. The variable for airline size (SIZE) was calculated as the logarithm of total assets to be used as an independent variable. This could give an indication of whether small or large airlines had a bigger or smaller chance of failing or recovering.

Furthermore, the AASP from April 2021 was divided by the AASP from January 2020. This calculation made it easy to divide the airline companies into the recovered and failed group, by looking at whether a company had recovered more or less than the 75% threshold.

By calculating an average value for each year for PM, EER, ATO, LEV and HHI within the two groups, the graphs presented in chapter 4, could be drawn.

Then the dataset was converted into a panel data for the regression analysis, meaning that each row in the dataset only contained one value for all the variables for each year. This implies that there must be 9 rows for each company when looking at a dataset containing values between 2011 and 2019.

3.3 Regression Model

The regression modelling was conducted using Stata. The five equations that have been regressed in this thesis are the following:

$$\boldsymbol{PM_t = \beta_{01} + \beta_{11} PM_{t-1} + \beta_{21} SGC_t + \beta_{31} SIZE_{t-1} + \varepsilon_1}$$

$$\boldsymbol{ERR_t = \beta_{02} + \beta_{12} ERR_{t-1} + \beta_{22} SGC_t + \varepsilon_2}$$

$$\boldsymbol{ATO_t = \beta_{03} + \beta_{13} ATO_{t-1} + \beta_{23} SGC_t + \beta_{33} SIZE_{t-1} + \varepsilon_3}$$

$$\boldsymbol{LEV_t = \beta_{04} + \beta_{14} LEV_{t-1} + \beta_{24} SGC_t + \beta_{34} SIZE_{t-1} + \varepsilon_4}$$

$$\boldsymbol{SGC_t = \beta_{05} + \beta_{15} \Delta PM_t + \beta_{25} \Delta ERR_t + \beta_{25} \Delta ATO_t + \beta_{25} \Delta LEV_t + \beta_{35} SIZE_{t-1} + \varepsilon_5}$$

The four first equations above are regressed against a lagged value of the dependent variable, SGC and SIZE. In the fifth equation, SGC is regressed against the year-to-year changes (denoted as Δ) in the four different growth levers, as well as the SIZE variable.

All variables were winsorized at a (5%, 95%) – level, in Stata. This was executed to make the extreme outlier values in the dataset fit better. Outlier values might not affect datasets with large amounts of observations to a severe degree, but in this case, it had a large impact on the dataset.

Furthermore, the Breusch-Pagan test of independence had to be applied to the five equations to reveal if heteroscedasticity was present within the equations. When seeing this test provided a significant output (Table 4.2), the implementation of the SUR Model was justified.

3.4 Hypothesis

The hypothesis of this thesis is that there will be a significant difference in growth strategies between the failed and recovered airline groups. These growth strategies are measured through the sustainable growth challenge model, and further defined by the four growth levers; PM,ERR,ATO and LEV

4 Analysis and Results

This section looks at the findings in the analysis of the airline companies, describing the statistics from the data sample and regressions. Findings are presented using visual means in the form of tables and graphs. Finally, the results are interpreted, and conclusions drawn based on the findings.

4.1 Descriptive Statistical Trends

In this thesis, a dataset consisting of 95 publicly listed airline companies has been used to analyze how different variables effect how the company performs during times of financial distress, in this case the covid-19 pandemic. The time horizon is between 2011 sand 2019 and all data is collected using DataStream and analyzed in excel and Stata.

In addition to graphs for the growth levers table 4.1 has been included to provide a deeper understanding behind the graphs as the graphs can misrepresent some of the levers. The table, together with the graphs provides a good picture of the differences and similarities of the two groups.

The development of the HHI has also been examined over the same period. This gives a picture of how the market environment has been over the last decade in the airline industry. This is not a complete representation of the airline industry, but it is a representation of the publicly traded airlines around the world.

VARIABLE	FAILED AIRLINES				RECOVERED AIRLINES:			
	Mean:	Standard Deviation:	Maximum:	Minimum:	Mean:	Standard Deviation:	Maximum:	Minimum:
PROFIT MARGIN	0,017	0,076	0,168	-0,177	0,050	0,064	0,159	-0,093
EARNINGS RETENTION RATIO	0,830	0,298	1,039	0,033	0,769	0,375	1,041	-0,387
ASSET TURNOVER	0,931	0,378	1,712	0,282	0,842	0,464	2,199	0,280
FINANCIAL LEVERAGE	5,505	5,331	20,919	-2,742	4,226	2,358	9,961	1,261
SUSTAINABLE GROWTH CHALLENGE	0,019	0,321	0,781	-0,697	-0,051	0,218	0,377	-0,520
AIRLINE SIZE	6,397	0,651	7,490	5,130	6,434	0,765	7,591	6,060
CHANGE IN PROFIT MARGIN	0,005	0,059	0,106	-0,138	0,003	0,048	0,101	-0,106
CHANGE IN EARNINGS RETENTION RATIO	0,005	0,236	0,599	-0,573	-0,002	0,384	1,128	-0,774
CHANGE IN ASSET TURNOVER	-0,012	0,121	0,209	-0,280	-0,022	0,122	0,210	-0,359
CHANGE IN FINANCIAL LEVERAGE	-0,058	3,498	8,355	-8,697	-0,100	1,266	2,719	-2,996

Table 4.1 Shows descriptive statistics for the Faild and Recovered airlines.

4.1.2 Sustainable Growth Challenge

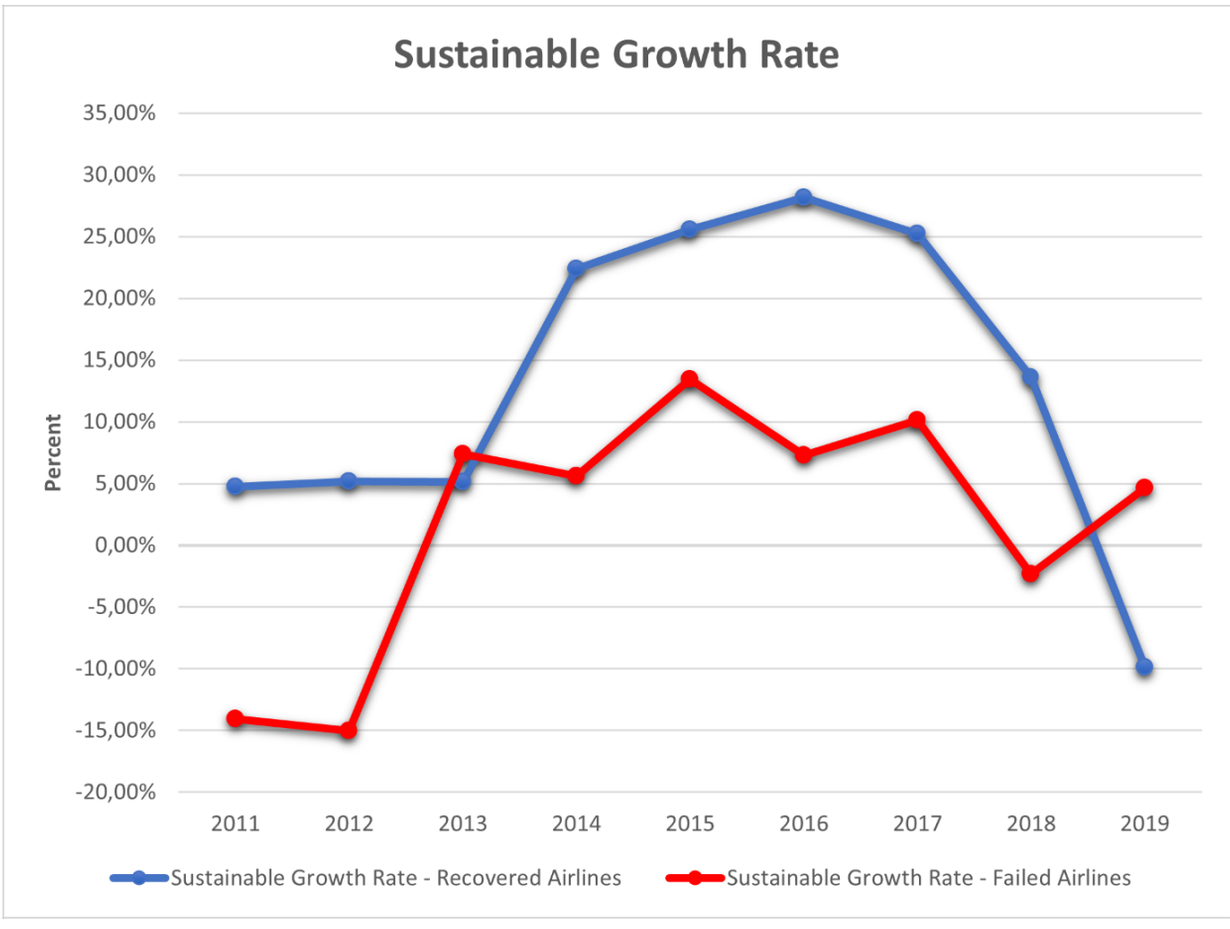

Figure 4.1 shows the development of SGR 2011-2019.

Figure 4.1 shows the contrast between recovered and failed airlines in the terms of their sustainable growth rate. Recovered airlines does consistently show a higher SGR than failed airlines for most of the period and especially between 2013 and 2017. This indicates that the recovered airlines have had a higher growth potential than the failed airlines.

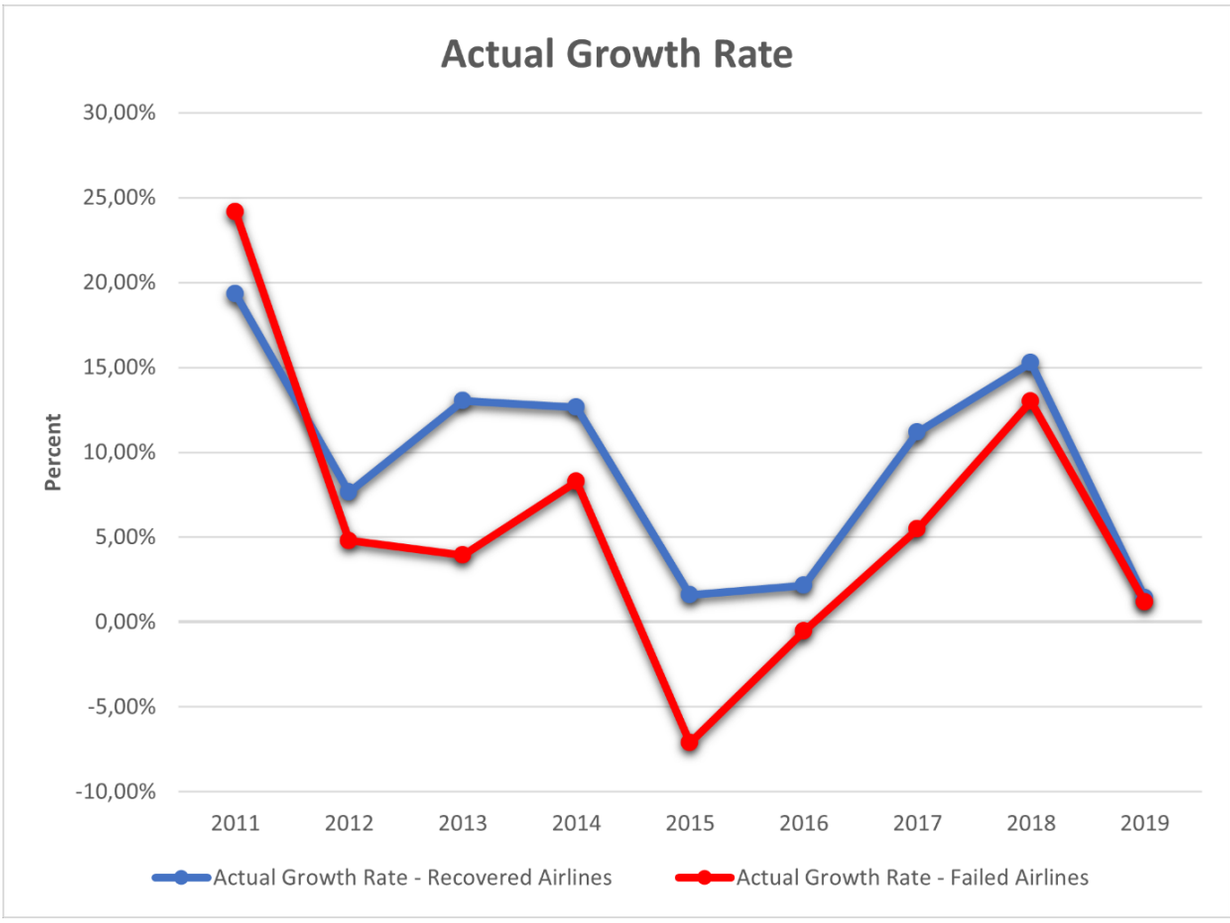

Figure 4.2 shows the development of AGR 2011-2019.

Figure 4.2 shows that the AGR of recovered airlines in general is lower than the one of failed Airlines. Interestingly, by itself this might contradict the assumption of how aggressive strategies have a negative impact on airlines in times of crisis. This graph needs to be read together with the SGR to give an idea if the companies acted within their means when it comes to expanding. Looking at figure 4.1 and 4.2 together it becomes clear that the recovered airlines in general are acting closer to their SGR than the failed airlines. It is also worth mentioning that especially in 2011 (40%) and 2018(15%) the SGR and AGR of failed airlines were far apart. This is better displayed in the SGC graph.

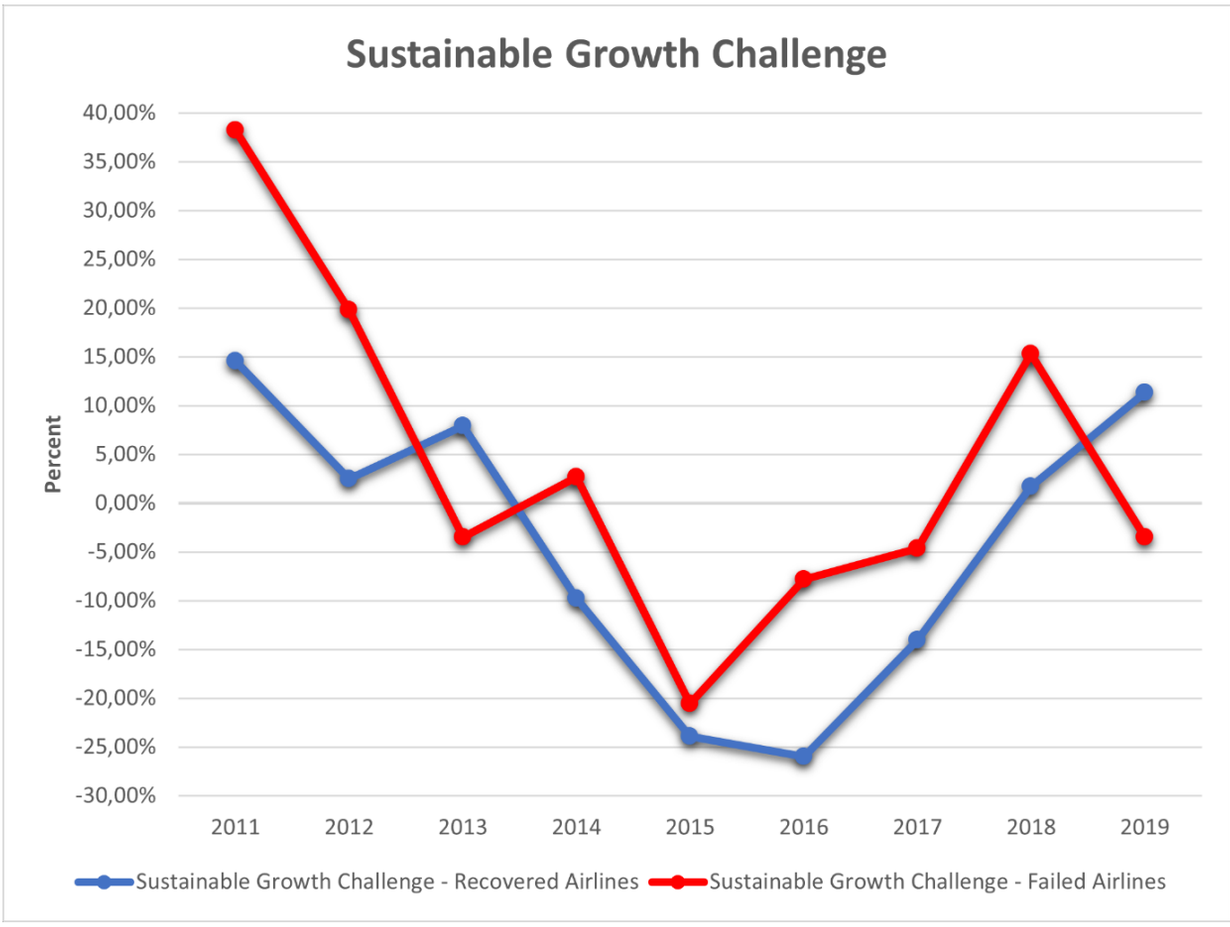

Figure 4.3 shows the development of SGC 2011-2019.

The SGC is the difference between the SGR and AGR. Figure 4.1 shows that the failed airlines in general with a couple of exceptions is higher than the recovered airlines in the SGC. In the years leading up to the crisis it becomes apparent that the recovered airlines seem to have an underutilization of their resources scoring below -25% in 2016. While the recovered airlines regularly are far below the ideal of 0 score (Higgins). The failed airlines are a bit more all over the place ranging from 40% above in 2011 to -20% in 2015. Therefore, the graph is not giving a good enough visual representation of the differences in the two categories. More interestingly, table 4.1 tell that the mean of failed airlines SGC is 1,9% above zero while it is -5,1% for the recovered airlines. So, on average the recovered airlines are further apart from the ideal 0 and they are also underutilizing their resources opposed to the failed airlines which are slightly above the ideal 0 on average. This is an indication of the failed airlines applying more aggressive growth strategies at the same time it is showing that the recovered airlines are allocating their resources to other areas then growth and expansion.

4.1.4 Profit Margin and Earnings Retention Ratio

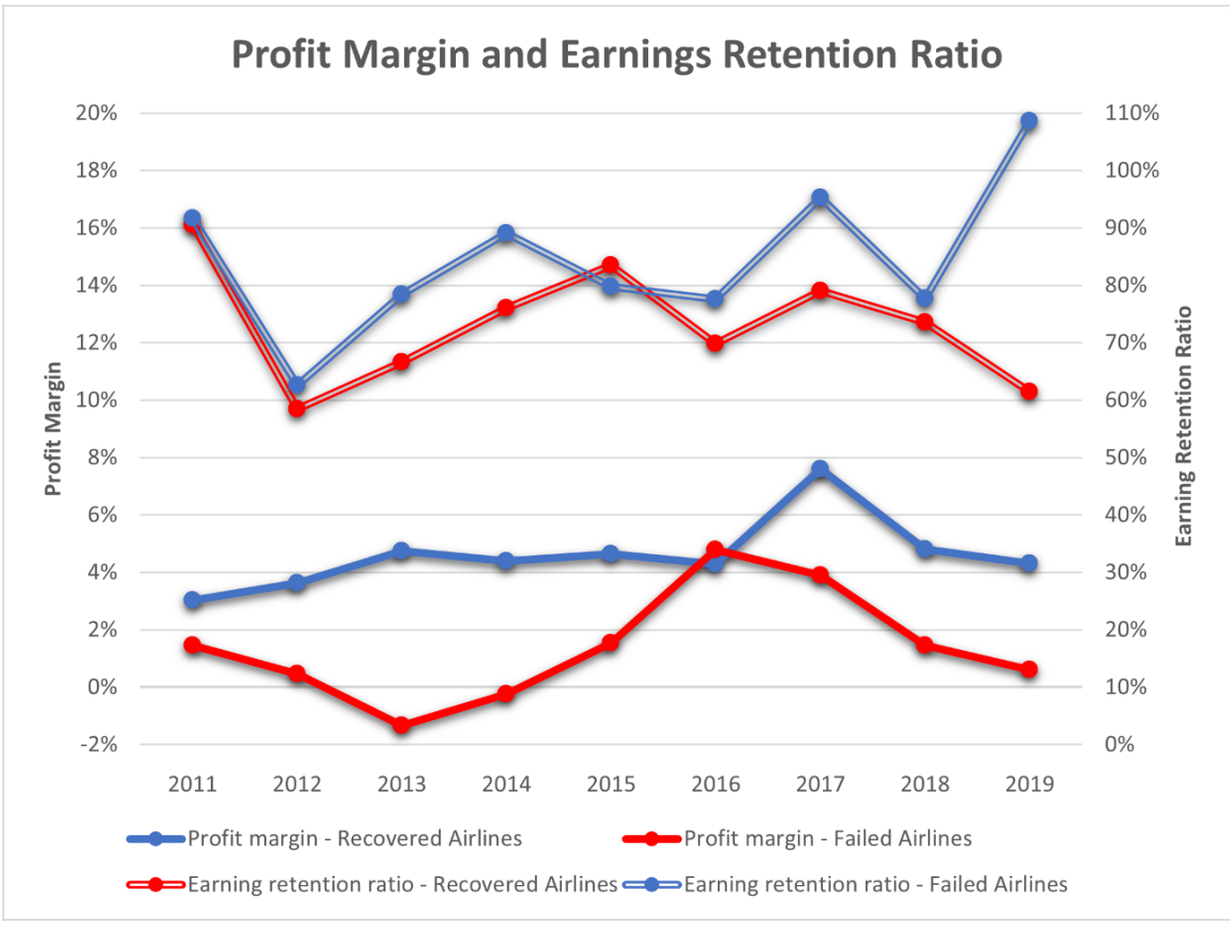

Figure 4.4 shows the development of profit margin and ERR 2011-2019.

Figure 4.4 shows that relative to failed airlines, recovered airlines register consistently higher PM with the exception of 2016. The recovered airlines also never dip below 3% between 2011 and 2019, while the failed airlines are much more unstable an varies from negative PM in 2014-2016 to 5% in in 2016. In addition, taking the average PM from table 4.1 in to consideration, it is noted that the recovered airlines have 5% compared to 1,7% for the failed airlines. For the ERR it is noted that recovered airlines score consistently lower except for 2015. This suggest that the failed airlines have invested a higher amount of their income into their company again, indicating more aggressive growth strategies on average. The recovered airlines are showing a lower ERR on average which suggest that more of their income is distributed to their shareholders. Looking closer it is noted that the failed airlines ERR surpasses 100% in 2019, this is only possible when the net income is negative, and the company still pays dividends, this is a very suboptimal situation.

One can also argue that the more profitable situations for the recovered airlines provide them with an opportunity to pay out a higher number of dividends to their owners again resulting in a lower ERR.

4.1.5 Asset Turnover and Size

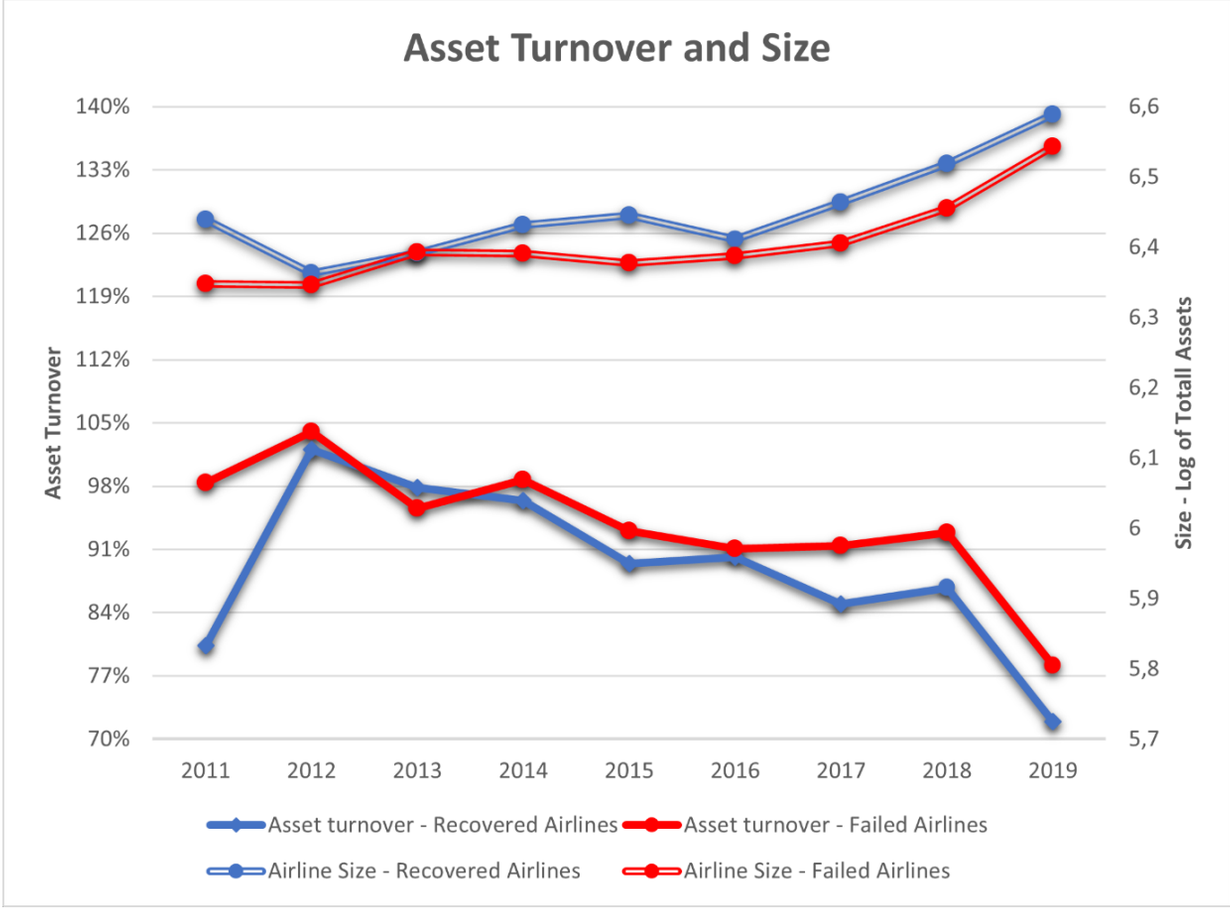

Figure 4.5 shows the development of asset turnover and size 2011-2019.

From figure 4.5 it is shown that the recovered airlines have a lower asset ATO ratio compared to the failed airlines in 9 out of 10 years. This indicates that the failed airlines are more efficient at using the assets they have, to generate revenue. It can also be observed that the size of the failed companies seems to be smaller in general than the recovered, although this difference is minor for the entire period.

4.1.6 Financial Leverage

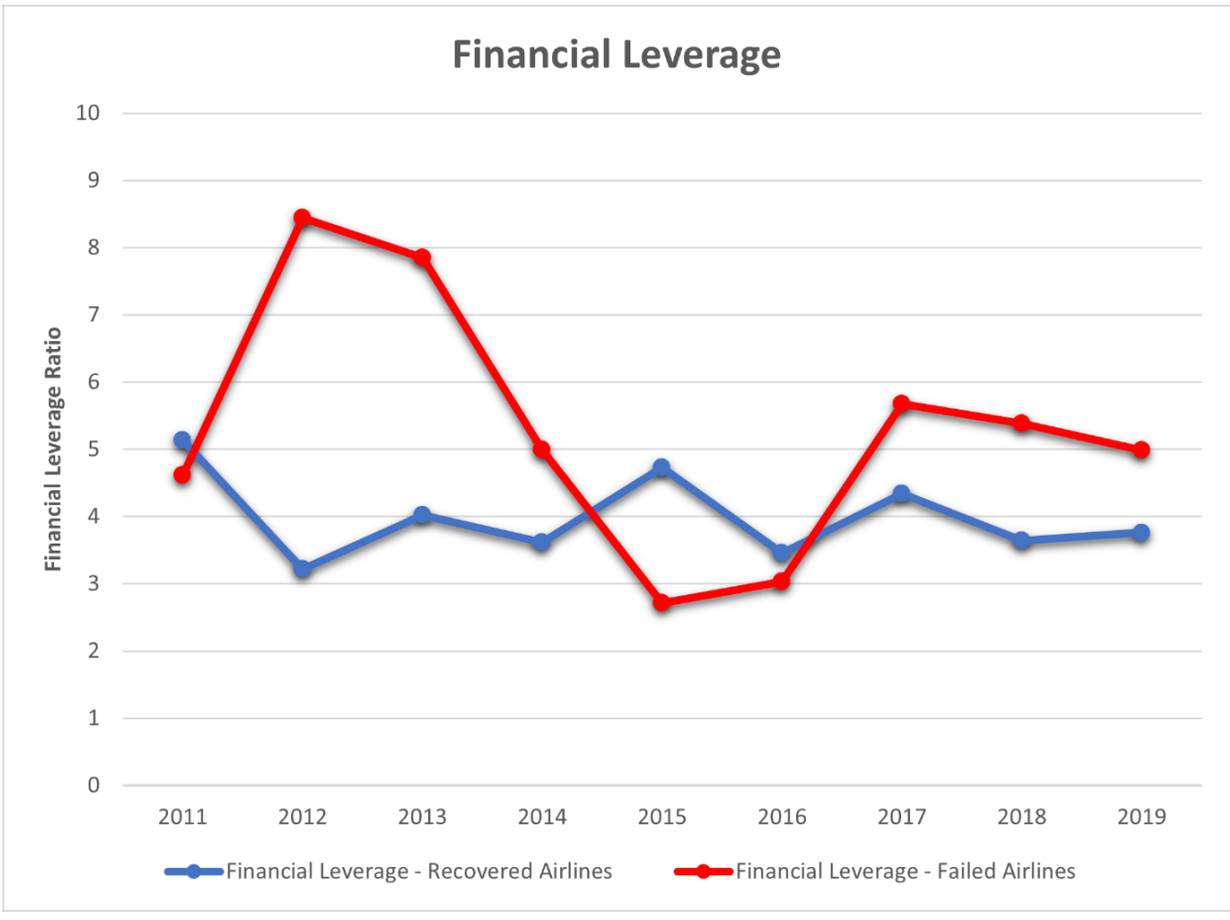

Figure 4.6 shows the development of financial leverage 2011-2019.

From figure 4.6 it is interpreted that the LEV ratio of recovered airlines is generally below the ratio of the failed airlines except for 2015-2016. The recovered airline also has a more stable trend than the failed airline companies. In the stock market companies with a high LEV ratio generally indicates that they are a riskier investment (Investopedia, 2021).

4.1.7 Herfindahl-Hirschman Index

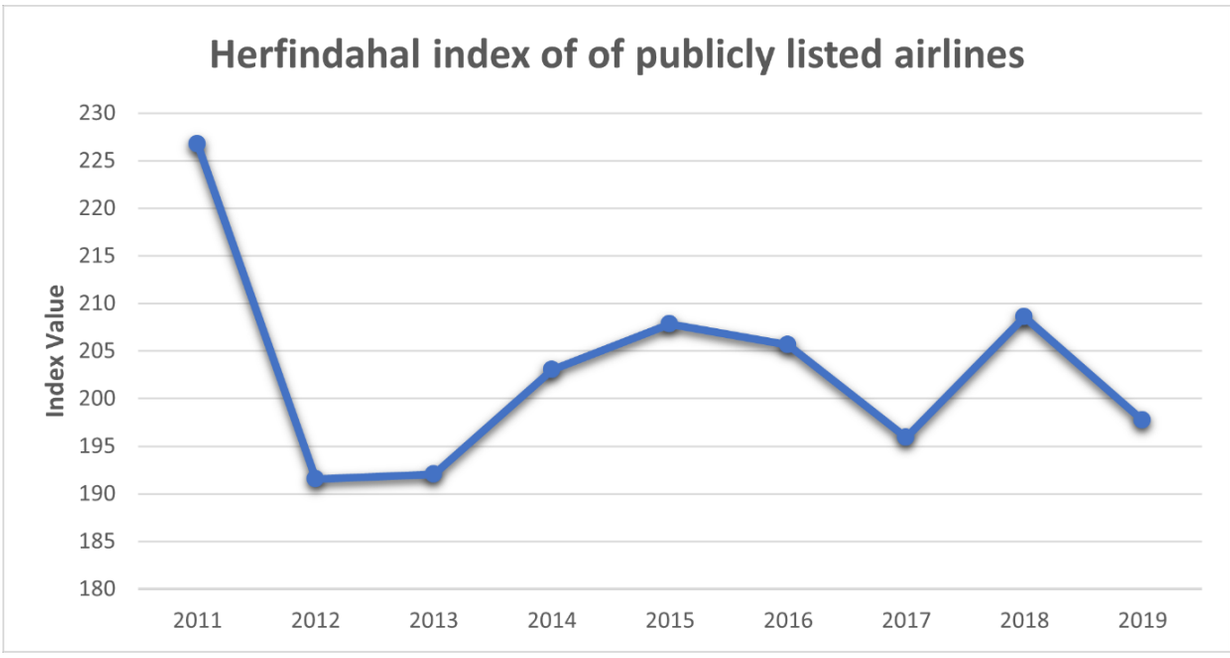

Figure 4.7 shows the development of Herfindahl-Hirschman Index 2011-2019.

Figure 4.6 shows that throughout the period there are small fluctuations in the HHI but no major changes for the companies in the dataset. The changes seen can be attributed to mergers and acquisitions. It is recognized that the index in the low 200s which gives us an indicator of how competitive the market and industry is. As mentioned before, a score below 2000 is a highly competitive market, even though this is only measuring the publicly listed airlines, and that the score would be somewhat higher if private companies were included. it can safely be stated that the competition in the industry is fierce. This highly competitive market could be an indication of why so many players in the airline market can be viewed as aggressive.

4.2 Analysis

4.2.1 Discussion of statistical findings

The results from analyzing four levers of growth and the SGC show some interesting findings. First, it is imperative to read the graphs together with table 4.1 to make sure the results are interpreted correctly, and the visual representation does not always reflect the reality of the numbers. An example of this is figure 4.5 which shows the difference in ATO and size of the airlines. While figure 4.5 show that the difference is relatively small, it is quite substantial if looking at airline size. The average difference is approx. 220 million dollars between failed and recovered airlines ($(10^{6,434}\text{-}10^{6,397}) * 1000\$$), showing that failed airlines are on average smaller than recovered airlines.

For the ATO, table 4.1 shows that the average is 8,9% higher for failed airlines compared to recovered. This means that the failed airlines are more effective in creating revenue from their assets compared to the recovered airlines. This could have a connection with the size, and that smaller airlines are more dependent on being more effective with the assets they control.

When looking at the HHI it can be observed that the market for the publicly traded companies analyzed, classifies as highly competitive with a score around 200 through the time period. As touched upon earlier, a very competitive market has strong correlation with aggressive strategies, but this is not a new finding. It is apparent that the market has been approximately on the same level the last decade.

Looking at the two other levers, PM and ERR, more interesting findings appear which could help explain the difference in recovery between the airline groups. For the PM it was observed from the graph that the recovered airlines deliver a consistently higher PM in 8 out of 9 years. Looking at the number from table 4.1, the difference become even more apparent that the recovered airlines deliver on average a three times higher PM than failed airlines. Another difference in the PM is that recovered airlines consistently deliver above three percent, while the failed airlines fluctuate between a negative and positive PM. This is an indication of how the recovered airlines is on average not only making more money but also how stable they are over longer periods of time by delivering positive numbers. When it comes to investments and companies surviving over longer periods of time, stability is a natural synonym with strong companies.

Furthermore, it can be argued that the higher PM from the recovered airlines gives them the opportunity of delivering more value in the form of dividends to their shareholders. This plays out in the ERR where the recovered airlines 6,1 % below the failed airlines on average, showing how the recovered airlines' focus is on delivering value for their owners before reinvesting and expanding their enterprises. A high ERR is strongly correlated with business who focus on growth and expansion (ReadyRatios, 2021), and is one of the clearest indicators found of how the failed airlines differs from the recovered airlines, showing that a strong focus on growth could play out negatively in a time of crisis. It was also observed from figure 4.4 that the ERR surpasses 100% in 2019, an ERR of over 100% which is generally not a good sign for a company. This means that the company, in addition to delivering a negative net income, pays out dividends using existing cash or through raising additional funds. In such a situation it can be argued that the economic situation in these companies, so close to the upcoming pandemic, is one of the strongest indicators of why the failed airlines is being outperformed by others.

For the LEV ratio, from table 4.1 it is illustrated that the standard deviation is so large that it can only be used as an indicator. The recovered airlines on average have a lower score which could indicate a more stable and cautious company environment.

When discussing the SGC the topic of stability comes to mind and even though both the recovered and failed graphs form figure 4.3 do not seem like prime examples of stability. It is shown that recovered airlines are below the failed airlines in 7 out 9 years keeping in mind that the airline industry is a more volatile industry than for example the banking industry. This is suggesting that this group of airlines are being more conservative with their growth and investing, thus strengthening other areas of their business. Looking at the difference in the mean score in SGC from table 4.1, a 6,9% difference in the SGC score between failed and recovered airlines is shown. This suggest that the recovered airline companies on average have a more cautious and conservative stance on growth compared to the failed airline group.

4.2.2 Summary of statistical findings

To sum up, the differences in PM, ERR, and SGC are the most clear and helpful indicators when explaining why the two groups of airlines have made different recoveries after the covid-19 crisis hit in March 2019. It is also observed that the failed airlines are smaller in size and that they are on average more effective with their assets. In general, it is portrayed that the recovered airlines are more cautious when making decisions, and the numbers indicate that the recovered airlines focus on stability before growth. For the failed airlines the numbers tell

another story where growth and riskier decisions are applied, exemplified especially in the ERR stats.

4.2.4 Regression results and discussion

Table 4.2 summarizes the regression results from the SUR model for of two groups of airline companies. First it is important to note that the Breusch-Pagan test of independence turns out highly significant (<1%) for both the failed and the recovered group. This is indicating the existence of correlation within the error terms of the different equations and allows for the adaptation of the SUR model.

Looking at the PM-equation, the lagged-PM variable turns out highly significant, with a positive coefficient for all airlines. Meaning that profitability momentum from the year before will affect the profitability of the current year. The SGC-variable also turns out highly significant for both groups, stating that more conservative growth behavior will be rewarded with higher profitability. The coefficients indicate that the failed airlines are slightly more rewarded than the recovered airlines for a conservative approach, since failed airlines will only need a ≈ -11.6% decrease in SGC while recovered ones will need a ≈ -13.7% decrease to receive the same increase in PM.

In the EER-equation, the momentum (lagged EER) is also significantly (<1%) affecting the current year's ERR for all airlines, but at a stronger rate within the failed ones. The SGC variable turs out highly significant as well, but only within the recovered group. The negative coefficient signalizes that a conservative growth strategy approach yields a higher ERR.

The ATO-equation signifies that also in this case the momentum of the asset productivity (lagged-ATO) is highly significant for the current year's asset productivity within both groups. The momentum is slightly more important in the failed group. The SGC variable turns out highly significant for both groups in this case, thus the positive coefficient signifies that an aggressive growth approach will yield a higher asset turnover.

Looking at the LEV-equation, the lagged variable that measures momentum turns out highly significant for both groups. The coefficient indicates that it is affecting the recovered group slightly more than the failed group. The SGC variable only turns out highly significant for the failed group in this equation. The positive coefficient states that an aggressive growth approach will provide a higher LEV ratio for the airlines within the failed group.

In the SGC equation, the given results indicate that higher asset productivity will lead to more aggressive growth behavior (positive coefficients) in both groups. Increased PM will lead to more conservative growth approaches for both groups, while increased financial leverage will lead to more aggressive growth behavior for all airlines. All these results at a highly significant level. An increase in ERR will, at slightly less significant (<5%) level, lead to a more conservative growth behavior within the recovered group.

One can observe that the size of the different airlines did not turn out significant for any of the two groups in any of the different equations. This implies that the difference in airline size between the two groups, might be random.

Variables	Failed Airlines	Recovered Airlines
Profit Margin Equation		
Intercept	0.0010885 (0.0272934)	-0.0092353 (0.0225254)
Lagged Profit Margin	0.6800412*** (0.0348157)	0.669353*** (0.039178)
Airline Size	0.000447 (0.0042421)	0.0024978 (0.0034189)
Sustainable Growth Challenge	-0.1157293*** (0.0085617)	-0.1369467*** (0.0119895)
Earning Retention Ratio Equation		
Intercept	0.2860732*** (0.0366168)	0.474391*** (0.0383227)
Lagged Earnings Retention Ratio	0.6487625*** (0.0414368)	0.3427806*** (0.0447718)
Sustainable Growth Challenge	-0.011839 (0.0404081)	-0.3780443*** (0.0851608)
Asset Turnover Equation		
Intercept	0.1540881 (0.1016302)	0.1057602 (0.0980425)
Lagged Asset Turnover	0.9065872*** (0.0231922)	0.8895696*** (0.0229397)
Airline Size	-0.013258 (0.0143233)	-0.0049717 (0.0135771)
Sustainable Growth Challenge	0.1278838*** (0.028253)	0.1443482*** (0.0460785)
Financial Leverage Equation		
Intercept	-1.083592 (2.025474)	0.2107457 (0.6589108)
Lagged Financial Leverage	0.7090765*** (0.0372698)	0.7662729*** (0.0311221)
Airline Size	0.4136249 (0.3146344)	0.0998346 (0.1000711)

Sustainable Growth Challenge	1.905462*** (0.652863)	0.1643713 (0.3663129)
Sustainable Growth Challenge Equation		
Intercept	0.0883178 (0.1570922)	-0.948376 (0.0872823)
Change in Profit Margin	-2.810776*** (0.2639878)	-2.280381*** (0.2058435)
Change in Earning Retention Ratio	-0.0083563 (0.0627351)	-0.0481114** (0.0244953)
Change in Asset Turnover	0.6597996*** (0.1283036)	0.5555511*** (0.0802539)
Change in Financial Leverage	0.0191039*** (0.0043613)	0.0345313*** (0.0078088)
Airline Size	-0.0145937 (0.0244063)	0.0067788 (0.0133208)
Model's Statistic		
Breusch-Pagan test of Independence (X^2)	74.516***	53.019***
Note: ***, **, ***** denotes significance at the 10%, 5%, 1% confidence levels.		

Table 4.2 shows the Seemingly Unrelated Regression results, 2011-2019. (Standard deviation is noted in parentheses)

5 Discussion of Assumptions and Limitations

5.1 Possible Limitations

One reason the results might not appear as expected, could be that one of the assumptions that the SGC model builds on is that each company should not receive external funding, only increase the capital within the company through net income minus dividends paid. If several of the companies have acquired external funding within the selected time-period that this thesis is examining, it might affect the analysis as companies that is supposed to be in the failed category without external funding, might be placed in the recovered-group and vice versa. If this is the case, then there might still be significant differences between companies, but it will not show in the results. This could be the case even if the stock price reported in this analysis is adjusted for stock splits and mergers, as the splits/mergers could have helped the company in a way that made it perform better and then again return a higher AASP.

5.2 Bailouts in the Airline Industry

As of May 2021, the world is in the middle of one of the worst economic crises in the last decades. And one of the industries that is taken the hardest hit due to travel restrictions is the airline industry. There are many ways to compare what happened to the banking industry in 2008 to what is happening to the airline industry right now, and this thesis exemplifies that through using the same analysis that was used towards banks in 2008 applying it to the airline industry now. One of the big discussion points back then was whether or not the banks should be bailed out by their governments and this discussion has risen again towards the airlines now.

The analysis performed has discovered that almost every large airline have in one way or another received support from their governments. Either through tax cuts, reduction in fees, loans, grants or in exchange for equity in the companies. By May 2020, 85 billion dollars was confirmed to be paid out to the top airlines in the industry all over the world (Jasper et al., 2020). In the moment of writing, companies are still receiving new bailout packages. The motivation to look at this was that, with the exception of Ryanair and a few others, the entire airline industry has been considered too important to fail by their governments and this affects how we classify them in our study. It is necessary to figure out whether if a company was struggling or failing. By traditional terms a company cannot be considered to be operating very well if they are in need of a bailout. Because of this situation , this thesis used the stock price of the companies in the evaluation and classification of the situation each company is situated

in. Since these financial emergency packages have played such an important role in the industry during the covid-19 crisis, they could not be left unaddressed.

This goes directly to the core of the thesis, which is to explore whether or not the strategies in the airline industry have been too aggressive. And when looking at the number of bailouts that were needed to keep almost all of the large airlines alive, with a few exceptions, it is apparent that the industry has not been well enough prepared for the potential trauma they now are experiencing.

5.2.1 Bailouts packages, what is it?

When discussing recessions terms like stimulus and bailout packages gets thrown around a lot, a stimulus package is a too general term that could cover anything from a check to the general population to a loan or grant to a large company. For the purpose of this thesis, the topic addressed is bailouts from the government directed at the airline industry.

A government bailout can take many forms and The Economic Times defines a bailout as; *«Bailout is a general term for extending financial support to a company or a country facing a potential bankruptcy threat. It can take the form of loans, cash, bonds, or stock purchases. A bailout may or may not require reimbursement and is often accompanied by greater government oversee and regulations» (The Economic times, 2021).*

Meaning, when a country or a company is in financial distress the bailout is an option the government has when they consider the company to important to fail. Which was the case with banks in 2008 and again with the large airlines in 2020. The bailout is a measure to counter an ongoing recession or downturn.

5.2.3 Different solutions

Like mentioned before, a bailout packages can take many shapes and every government has their own conditions and terms for the financial aid they are providing. In Japan the government has chosen not to give out any extra loans or cash to their flagship carriers and are instead cutting in fees and taxes for the airline companies. (Yamaguchi, 2020). The Japanese government stated; *«The government hopes a waiver on airport landing fees, a tax-funded domestic tourism campaign and a gradual re-opening of borders will be enough to keep ANA* alive»*. This is a more passive approach compared to the likes of for example the German, Swiss, Austrian and Belgian governments which have provided Deutsche Lufthansa with a bailout exceeding 10 Billion euros in exchange for up to 30% stake in the company.

The US has chosen a third option where the largest airlines have all received support in the form of loans. (Jasper et al., 2020).

All these different solutions all have the purpose of helping the companies get through the financial distress they are experiencing. Even though the different approaches have the same goal they differ a lot in how they affect the future of the companies and the industry.

5.2.4 Result, and how they affect this thesis

The result from all these airline bailouts will not be determined for several years, but there is no doubt about that they will change in the airline industry. After decades with privatization and deregulation the interference of governments is once again necessary. France and Germany have increased their stakes in their flagship carriers Lufthansa and Air France-KLM and in Italy Alitalia is now 100% owned by the state. (Borrelli, 2021). Speculating in how this will affect the industry is not in the scope of this thesis, but there is no doubt that a new era of the aviation industry is emerging.

Determining the effect of this with regards to this thesis is also a difficult task but it is important to shed light on the issue. Seeing that a majority of the companies in the dataset have received government support one way or another in the time following the covid-19 pandemic, the numbers could be misrepresenting the state of the company. The uncertainty surrounding how many and how much they have received in support has to be considered a limitation of the study.

6 Conclusion

The results do provide a warning for companies operating in the airline industry if they are not operating within their means and if they are able to withstand a crisis. The results show a clear general trend between the failed and recovered airline group, companies with a more conservative and stable focus create better conditions for themselves to cope with the consequences of a crisis. This thesis shows the connection between strategic business decisions and performance through the analysis of the four growth levers. Especially in the business strategies regarding growth, a clear distinction can be made between the failed and recovered airlines. Recovered airlines tend to have a more restraining view on growth, illustrated by the differences in earnings retention ratio and sustainable growth challenge. This also confirms the hypothesis and concludes that there is a significant difference in growth strategies between the failed and recovered airlines.

Another question this thesis set out to answer was if the methods that thesis builds on could be applied to other industries than banking. Through the analysis and results it is shown that the methods can be applied to the publicly traded airline industry and give significant results. This is not a firm conclusion that it can be applied to every industry, but it is an expansion of the method.

Lastly, the thesis set out to explore the competitiveness of the airline industry and to investigate if the industry is too competitive. As the data sample almost have no bankrupt airlines in the time following the covid-19 pandemic due to the extensive amounts of bailout packages and government interference, no firm conclusion can be drawn. These stimulus payouts have also given rise to concern for the validity of the numbers in the thesis, this is expressed in the assumptions and limitations chapter.

6.1 Suggestions for Further Research

It would be interesting to see how these methods would play out when applied to other industries than banking and aviation. Also, the private sector of the aviation industry has not been addressed in this thesis due to the lack of data, thus it would be fascinating to see a study of the differences between the public and private sector.

Stimulus packages is also another topic that deserves further exploration, we would encourage researchers to investigate further what the repercussions of bailouts that are being paid out associated with the covid-19 pandemic have for the industry.

7 Bibliography

Air transport, passengers carried | Data. (2021). Data.Worldbank. https://data.worldbank.org/indicator/IS.AIR.PSGR?end=2019&start=1970&view=chart&year=1970

Bondarenko, P. (2021). *Herfindahl-Hirschman index | Definition & Facts*. Encyclopedia Britannica. https://www.britannica.com/topic/Herfindahl-Hirschman-index

Borko, S. (2018, September 14). *10 Years Later: How the Travel Industry Came Back From the Financial Crisis*. Skift. https://skift.com/2018/09/14/10-years-later-how-the-travel-industry-came-back-from-the-financial-crisis/

Borrelli, S. S. (2021, May 10). *Europe forced to turn back clock to bail out airlines*. Financial Times. https://www.ft.com/content/3ba22be6-20b8-4ee9-8441-7bcbb2488702

Carlson, R. (2019). *What Are Market Value Ratios and How Are They Used?* The Balance Small Business. https://www.thebalancesmb.com/what-are-market-value-ratios-and-how-are-they-used-393224

Domm, P. (2021, March 12). *A stunning fall and a recovery: How the stock market has evolved one year since Covid hit*. CNBC. https://www.cnbc.com/2021/03/12/a-stunning-fall-and-a-recovery-how-the-stock-market-has-evolved-one-year-since-covid-hit.html

Earnings Retention Ratio. (2021). Https://Www.Readyratios.Com/Reference/Profitability/Earnings_retention_ratio.Html

Economics A-Z terms beginning with A. (2021). The Economist. https://www.economist.com/economics-a-to-z

Fonseka, M. M., García Ramos, C., & Tian, G. L. (2012). The Most Appropriate Sustainable Growth Rate Model For Managers And Researchers. *Journal of Applied Business Research (JABR)*, *28*(3), 481. https://doi.org/10.19030/jabr.v28i3.6963

Harris, A. (2017, February 8). *The History of Airline Industry*. Travel Tips - USA Today. https://traveltips.usatoday.com/history-airline-industry-100074.html

Herfindahl-Hirschman Index. (2018, July 31). Department of Justice. https://www.justice.gov/atr/herfindahl-hirschman-index

I.C.A.O. (2020). *Coronavirus Economic Impact* [Slides]. ICAO. https://www.icao.int/sustainability/Documents/COVID-19/ICAO_Coronavirus_Econ_Impact.pdf

Jasper, C., Ryan, C., & Kotoky, A. (2020, May 11). *An $85 Billion Airline Rescue May Only Prolong the Pain*. BloombergQuint. https://www.bloombergquint.com/business/coronavirus-airline-bailouts-a-guide-to-85-billion-in-state-aid

Maoyong Zheng & Cesar L. Escalante & Carmina E. Taylor, 2020. "Did Aggressive Business Growth Strategies Lead to Bank Failures? Lessons from the Late 2000s Great Recession," Journal of Applied Finance & Banking, SCIENPRESS Ltd, vol. 10(6).

Morrison, S., & Winston, C. (1995). *The Evolution of the Airline Industry* (First ed.). Brookings Institution Press.

Nolan, J. F., Ritchie, P., & Rowcroft, J. (2004). September 11 and the World Airline Financial Crisis. *Transport Reviews*, *24*(2), 239–255. https://doi.org/10.1080/0144164032000138751

Puspitaningtyas, Z. (2017). Is Financial Performance Reflected in Stock Prices? *Proceedings of the 2nd International Conference on Accounting, Management, and Economics 2017 (ICAME 2017)*. Published. https://doi.org/10.2991/icame-17.2017.2

Suau-Sanchez, P., Voltes-Dorta, A., & Cugueró-Escofet, N. (2020). An early assessment of the impact of COVID-19 on air transport: Just another crisis or the end of aviation as we know it? *Journal of Transport Geography*, *86*, 102749. https://doi.org/10.1016/j.jtrangeo.2020.102749

Transweb Global Inc. (2017). *Sustainable Growth Rate | Finance* [Slides]. Sustainable Growth Rate. https://www.slideshare.net/transweb/sustainable-growth-rate-finance

What is Bailout? Definition of Bailout, Bailout Meaning. (2021). The Economic Times. https://economictimes.indiatimes.com/definition/bailout

What is Market Concentration? Definition of Market Concentration, Market Concentration Meaning. (2021). The Economic Times. https://economictimes.indiatimes.com/definition/market-concentration

Yamaguchi, T. L. K. (2020, October 23). *Japan prefers piecemeal approach to big bailout for carrier ANA*. U.S. https://www.reuters.com/article/us-japan-economy-ana-idUSKBN2780YU

Yasar, M., & Kiraci, K. (2017). Market Share, the Number of Competitors and Concentration: An Empirical Application on the Airline Industry. *Market Share, the Number of Competitors and Concentration: An Empirical Application on the Airline Industry*. Published.

Z. (2020, December 31). *The Breusch-Pagan Test: Definition & Example*. Statology. https://www.statology.org/breusch-pagan-test/

Zellner, A., & Huang, D. S. (1962). Further Properties of Efficient Estimators for Seemingly Unrelated Regression Equations. *International Economic Review*, *3*(3), 300. https://doi.org/10.2307/2525396