The Impact of Covid-19 on the Profitability and Liquidity of Air New Zealand: Compare with the Whole Airline Industry

Junjie Chen *

Business School, The University of Auckland, Auckland, New Zealand

* Corresponding Author Email: jche527@STUDENT.KSUA.EDU.KG

Abstract. As an industry sensitive to changes in external factors, the airline industry has been affected negatively by the Covid-19 outbreak. Global travel restrictions sent shock waves throughout the industry, and Air New Zealand is no exception. This study investigates the impact of Covid-19 on the profitability and liquidity of Air New Zealand and the whole airline industry based on financial ratio and regression analysis. The profitability and liquidity are represented by Operating Return on Assets (OROA) and Quick Ratio. Twenty commercial airlines from around the world were chosen as samples to examine how Covid-19 affected the overall airline industry's profitability and liquidity. This study compares the effects of Covid-19 on their profitability and liquidity in an effort to identify commonalities and variances. The study results show that both liquidity of Air New Zealand and the whole airline industry received a significant and positive impact from the Covid-19 pandemic due to the airline's private remediation measures and government interventions. In addition, the study found that the profitability of Air New Zealand was not received significant and negative impact by the Covid-19 pandemic like the whole airline industry due to the cargo schemes supported by New Zealand and Australia. This study is helpful for airlines and the government to formulate remediation measures and policies to facilitate the recovery of the airline industry. Finally, this study recommended that governments can place orders to airlines to support the recovery of the airline industry. And each airline can diversify its sources of profitability to mitigate the negative impact of Covid-19.

Keywords: Covid-19; Airline; Profitability; Liquidity; Regression.

1. Introduction

1.1. Background

The airline industry is crucial for international trade because it offers the sole quick global transportation network and connects people, cultures, and enterprises across every continent. But the Airline industry is received a continuous threat from the Covid-19 pandemic outbreak. The accompanying global travel restrictions have disrupted the airline industry's operations significantly and led to airline facing many problems. Air New Zealand is the only airline that specializes in carrying passengers to, from, and around New Zealand. More than 15 million travelers a year are served by its cargo and passenger flight services. Profitability and liquidity are two important key performance indicators to measure an airline's finance. These two indicators represent a company's financial health. And so far, there is no study on the impact of Covid-19 on the profitability and liquidity of Air New Zealand. Thus, this study attempts to investigate the impact of Covid-19 on the profitability and liquidity of Air New Zealand and the whole airline industry and identify the reason for the similarity and differences between them. The results of this study may provide some insight into how Covid-19 affects airlines around the world.

1.2. Related research

Since 2020, the Covid-19 outbreak has spread throughout the entire world. One of the worst affected industries by the pandemic outbreak is the airline industry, which is particularly susceptible to changes in outside factors. The global airline business has received a significant impact in many ways due to the unprecedented nature and scale of the pandemic outbreak.

Airlines' economic performance has been significantly impacted by the Covid-19 pandemic. Xuan et al. conducted in-depth analysis and research on data in 15 countries from the International Civil Aviation Organization. To examine and project the Covid-19 influence on the airline industry revenues, they employed the vector autoregression model (VAR) [1]. The countries in this study cover the nations, which are tourism and economic counties. The authors found that these countries' airline industry revenues (ARL) are devastated due to the pandemic outbreak. The pandemic has resulted in social isolation and lockdowns, severely impacting the economy and tourism. The number of scheduled flights and passengers declined by nearly 80% in 2020 compared to 2019 because of rigorous global lockdown, and only two-thirds of the flight can be filled as a result of social isolation, which has squeezed ARL [1]. The current pandemic is predicted to cause a 48% total decline in airline industry revenue. The results of the forecasting indicate that ALR will continue to decline until 2023, at which point recovery can begin. IATA studied Global revenue passenger kilometers (RPKs) quarterly percentage change year-on-year. The author found that international RPKs will decline by 48% in 2021, and passenger revenues will decrease by over $300 billion next year because of Covid-19 [2]. In addition, the speed of the recovery in airlines is expected to be slow based on the Oxford Economics forecast. Xuan et al. give a critical analysis of the performance of the entire aviation value chain in 2020. The authors found that all value chain players across the aviation value chain suffered massive losses due to the pandemic, especially airlines [3]. External shocks, like Covid-19, extremely easy to wreak financial devastation on airlines because airlines have high fixed costs and their revenues are mostly variable. The pandemic caused $168 billion in economic losses in 2020. Moreover, it is predicted that airlines' performance will remain weak in the years to come.

The Covid-19 pandemic also causes major disruptions to the airline market. Priyadarshini et al. studied several industries that were affected by the Covid-19 outbreak based on the datasets from the Humanitarian Data Exchange and Johns Hopkins University Center. The author shows the predicted revenue and the actual revenue for the airline industry. The airline industry has been significantly impacted by the pandemic outbreak. Scheduled flights worldwide have already taken a huge hit because of travel restrictions [4]. Coronavirus travel restrictions have decreased the flight frequency of global airlines: global airlines were down hundreds of thousands of flights in 2020. Ng et al. studied route-level panel data from the PaxIS database and used the regression model to examine the effect of Covid-19 on airlines' capacity, frequency, and yield in Japan. The authors suggested that the pandemic outbreak has significant negative impacts on airline yield, scheduled seats, and frequency [5]. The airline market in Japan shrank significantly towards the end of 2020. Xue et al. analyzed China's Automatic Dependent Surveillance-Broadcast (ADS-B) data in 2019 and 2020. By counting the number of flights between four key international airports in China, they were able to quantify the effect of Covid-19 on the country's airlines. The authors discovered that Covid-19's effects caused China's total aircraft volume to significantly decline in 2020 compared to 2019 [6]. IATA studied passenger and cargo demand from 2011 to 2020. The author found that both cargo and passenger capacity was affected by the Covid-19 outbreak. Global passenger yields and global total cargo capacity declined sharply in 2020 because passenger and cargo demand was reduced. It leads a widespread flight cancellation in markets [7]. The deterioration is a result of Covid-19's influence on the airline industry.

The Covid-19 pandemic has significantly impacted airline operations. Budd et al. examined the data about European passenger airlines from Eurocontrol's statistics and forecasting unit and ascertained 40 European airlines' responses to Covid-19. Findings reveal that 80% of airlines had completely suspended their operations in 2020, and the average duration was as long as 80 days [8]. The rest airlines also downsized their large-scale fleet and reduced their flight frequency and the number of destinations served [8]. Moreover, many airlines decreased their staff numbers to reduce costs due to the suspension of flights. The damaging effects of the Covid-19 outbreak on air travel in the ten global macroregions are rigorously examined by Andreana et al. They also assess the difference between actual and predicted trends in the absence of the pandemic using the ITS SARIMA

model and counterfactual analysis [9]. The authors found that a decline in activity levels of more than 80% in 2020 is the pandemic's natural result [9]. It leads to airline sustainability at high risk.

Finally, Airline stock prices have been severely influenced by the Covid-19 pandemic. Zhang et al. conducted a high-frequency empirical analysis of stock prices of several representative airline companies in China from 2019 to 2021. They used a heterogeneous airline service model and regression analysis to identify the airline stock price change under the pandemic's impact. The authors found that airline stock values are substantially negatively influenced by the pandemic. Airline stock prices have continuously declined in 2020 and 2021 due to the pandemic outbreak [10].

1.3. Objective

This paper aims to analyze whether the Covid-19 outbreak has a similar impact on the profitability and liquidity of Air New Zealand as it has on the whole airline industry's profitability and liquidity.

This is broken down into three objectives:

(1) To analyze the impact of Covid-19 on the whole airline industry's profitability and liquidity.

(2) To analyze the impact of Covid-19 on the profitability and liquidity of Air New Zealand.

(3) To compare the impact of Covid-19 on their profitability and liquidity, and identify the reason for the similarity and differences between the airline industry and Air New Zealand.

2. Methods and data

2.1. Financial Ratios Analysis

The first research method used was the financial ratio analysis approach since it can provide an effective analysis of the financial impact of Covid-19 on each airline. This methodology was used to compare these airlines' financial ratios before the period of pandemic and during the period of the pandemic. Specifically, the average profitability ratios and liquidity ratios of these airlines will be measured to evaluate the impact of Covid-19 on the airline industry's finance. This analysis focuses on measuring the difference in airlines' performance before and after the global recession brought on by the Covid-19 outbreak.

The profitability ratios represented by Operating Return on Assets (OROA) and liquidity ratios by Quick Ratio will be measured. The calculation formula for each ratio is as follows.

Operating Return on Assets: This ratio is calculated by dividing Earnings before interest and taxes (EBIT) by Average total assets. It is usually indicated as a percentage.

$$\text{OROA} = \text{EBIT}/\text{Average total assets} \tag{1}$$

Quick Ratio: This ratio is calculated by adding the most liquid assets (Cash, Accounts Receivables, and Marketable Securities) and dividing the total by current liabilities.

$$\text{Quick Ratio} = (\text{Cash} + \text{Accounts Receivables} + \text{Marketable Securities})/\text{Current liabilities} \tag{2}$$

The impact of Covid-19 on the profitability and liquidity of the airline industry will be measured through these financial ratios.

2.2. Regression Model

The second research method used was Regression Model. This methodology was used to investigate the impact of the Covid-19 pandemic on the profitability and liquidity of Air New Zealand. In this case of regression analysis, Operating Return on Assets is employed to measure its profitability, and Quick Ratio is employed to measure its liquidity. In addition, two airline-specific control variables (size and cost-to-income ratio), two country macro-control variables (GDP growth and inflation rate), and one dummy variable (Covid-19) are introduced to make the regression results more realistic. The time period was split into two parts, with the pre-pandemic period of Covid-19 lasting from 2010 to 2019 and the pandemic period of Covid-19 lasting from 2020 to 2022. The dummy variable equals 0 in the pre-pandemic period of Covid-19, and equals 1 in the pandemic

period of Covid-19. This analysis focuses on determining whether the Covid-19 outbreak will affect the profitability and liquidity of Air New Zealand. In order to explore the impact of the Covid-19 pandemic on Air New Zealand, multiple linear regression was performed on the profitability ratio and liquidity ratio of Air New Zealand, respectively. The significance level in this study is stated as 10%. The proposed regression equations for our study's model are listed below.

(1) The impact of Covid-19 on the profitability of Air New Zealand

$$\text{OROA} = \beta_0 + \beta_1 \text{CIR} + \beta_2 \text{SIZE} + \beta_3 \text{GDPGR} + \beta_4 \text{IR} + \beta_5 \text{ASK} + \beta_6 \text{RPKs} + \beta_7 \text{PC} + \beta_8 \text{CASK} + \beta_9 \text{Covid} - 19 \quad (3)$$

(2) The impact of Covid-19 on the liquidity of Air New Zealand

$$\text{QR} = \beta_0 + \beta_1 \text{CIR} + \beta_2 \text{SIZE} + \beta_3 \text{GDPGR} + \beta_4 \text{IR} + \beta_{10} \text{CFTDR} + \beta_{11} \text{CAR} + \beta_{12} \text{CICR} + \beta_{13} \text{DTI} + \beta_9 \text{Covid} - 19 \quad (4)$$

The definitions of dependent and independent variables, and the formula for calculating these variables are shown in Table 1 and Table 2:

Table 1. Descriptions of dependent variables

Variables	Definition	Measurement
OROA	Operating Return on Assets	EBIT / Average total assets
QR	Quick Ratio	(Cash + Accounts receivables + Marketable securities) / Current Liabilities

Table 2. Descriptions of independent variables

Variables	Definition	Measurement
CIR	Cost-to-income ratio	Operating cost / Operating income
SIZE	Size of Air New Zealand	Logarithm of airline total assets
GDPGR	GDP growth rate	(GDPt − GDPt−1) / GDPt−1 * 100%
IR	Inflation rate	Consumer Price Index
ASK	Available Seat Kilometres (M)	Number of seats operated multiplied by the distance flown (capacity)
RPKs	Revenue Passenger Kilometres	Number of revenue passengers carried multiplied by the distance flown (demand)
PC	Passengers Carried (000)	Total number of air passengers carried per year
CASK	Cost/ASK	Operating expenses divided by the total ASK for the period
CFTDR	Cash Flow-to-Debt Ratio	Cash Flow from Operations/Total Debt
CAR	Cash Asset Ratio	Cash + Cash Equivalents / Current Liabilities
CICR	Cash Interest Coverage Ratio	EBIT / interest
DTI	Debt-to-Income	Debt/Income
Covid-19	Covid-19	0 represents the pre-pandemic period of Covid-19; 1 represents the pandemic period of Covid-19

The existence of various collinearities between the dependent variable and independent variables is assessed using correlation analysis. The coefficient of the dummy variable (Covid-19) represents the impact of Covid-19 on the profitability and liquidity of Air New Zealand.

2.3. Data

The first method's data was based on the financial reports of 20 commercial airlines in the world from 2016 to 2021. These 20 airlines are based on a random sample of global airlines. The random sample

consists of Air Astana Airlines, American Airlines Group, Alaska Air, Air China, All Nippon Airways, China Southern Airlines, Delta Air Lines, EasyJet, GOL Intelligent Airlines, International Airlines Group, JetBlue Airways, Japan Airlines, Korean Air Lines Company, Lufthansa Group, Ryan International Airlines, Singapore Airlines, Spirit Airlines, Southwest Airlines, Turkish Airlines, and United Airlines Holdings. The time period is chosen because it includes the time when the pandemic was present and the time period before the pandemic. It can make the results more representative. These financial reports were collected from their official websites.
The second method was based on the data of the annual financial reports of Air New Zealand from 2010 to 2022, which are published semiannually on its official website. This time period is chosen because it includes the time when Covid-19 broke out.

3. Results

3.1. Financial Ratios Analysis Results

3.1.1 The impact of Covid-19 on the airline industry's profitability

The results of the financial ratio analysis of 20 airlines' profitability are shown in Table 3. It represents the profitability condition of 20 airlines in the pre-pandemic and pandemic period of Covid-19. From 2016 to 2021, it was determined that the airline industry had its highest average OROA value in 2017 and its lowest in 2020. Table 3 shows that the airline industry's average OROA value has decreased dramatically during the pandemic period of Covid-19. In the pre-pandemic period of Covid-19, its average OROA value was 7.72 %, but during the pandemic, its average OROA value was -1.49%. The average value of OROA decreased by 9.21% compared to the pre-pandemic period. It demonstrates that the Covid-19 outbreak has greatly impacted the airline industry's profitability as measured by changes in the average value of OROA.

Table 3. The profitability ratio of 20 airlines in the pre-pandemic period of Covid-19 and the pandemic period of Covid-19

	The pre-pandemic period of Covid-19			The pandemic period of Covid-19		
Airline Name	2016	2017	2018	2019	2020	2021
Air Astana Airlines	6.39%	10.87%	6.23%	10.01%	-6.79%	8.75%
American Airlines Group	8.33%	6.53%	3.32%	4.32%	-16.88%	-3.24%
Alaska Air	15.84%	11.67%	5.94%	8.89%	-13.13%	4.89%
Air China	0.89%	1.61%	1.35%	-0.04%	-0.23%	3.84%
All Nippon Airways	6.02%	6.41%	6.75%	6.29%	2.32%	-16.11%
China Southern Airlines	3.97%	4.23%	1.87%	1.46%	-4.80%	-4.28%
Delta Air Lines	12.17%	10.48%	9.04%	9.93%	-22.83%	0.55%
EasyJet	9.89%	7.05%	7.14%	6.15%	-10.81%	-9.97%
GOL Intelligent Airlines	2.12%	10.55%	12.17%	12.72%	24.74%	6.73%
International Airlines Group	8.50%	9.09%	12.62%	7.14%	-23.72%	-10.84%
JetBlue Airways	14.03%	10.19%	2.57%	6.99%	-13.54%	-0.59%
Japan Airlines	12.70%	15.20%	4.43%	-19.26%	-19.76%	-11.01%
Korean Air Lines Company	-2.99%	4.62%	-1.56%	-2.58%	-0.51%	2.51%
Lufthansa Group	6.74%	9.02%	7.53%	4.60%	-21.01%	-6.35%
Ryan International Airlines	12.48%	13.22%	13.69%	7.94%	8.05%	-6.20%
Singapore Airlines	4.00%	1.79%	2.99%	-0.69%	-13.91%	-2.53%
Spirit Airlines	15.54%	10.55%	7.54%	8.21%	-6.58%	-0.67%
Southwest Airlines	12.99%	11.32%	10.34%	9.37%	-10.43%	2.55%

Turkish Airlines	-0.75%	7.09%	7.26%	4.61%	-0.65%	6.49%
United Airlines Holdings	9.32%	7.33%	5.80%	7.70%	-15.75%	-4.00%
Average OROA	7.91%	8.44%	6.35%	4.69%	-8.31%	-1.98%
Average OROA		7.57%			-1.87%	

3.1.2 The impact of Covid-19 on the airline industry's liquidity

The results of the financial ratio analysis of 20 airlines' liquidity are shown in Table 4. It represents the liquidity condition of 20 airlines in the pre-pandemic and pandemic period of Covid-19. As shown in Table 4, the airline industry's average Quick Ratio value during the pandemic period of Covid-19 is higher than its value in the pre-pandemic period of Covid-19. In the pre-pandemic period of Covid-19, the average value of the Quick Ratio was 50.72 %, while the average value of the Quick Ratio in the pandemic period of Covid-19 was 60.62%. The average value of the Quick Ratio increased by 9.9% during the pandemic. Furthermore, Table 4 further reveals that 80% of airlines had an increase in the value of Quick Ratio during the pandemic period. And the Quick Ratio value of the other 20% of airlines had not changed too much following the emergence of the pandemic. These findings suggest that the Covid-19 outbreak has led to an increase in airline liquidity as measured by changes in the value of the Quick Ratio.

Table 4. The liquidity ratio of 20 airlines in the pre-pandemic period of Covid-19 and the pandemic period of Covid-19

	The pre-pandemic period of Covid-19			The pandemic period of Covid-19		
Airline Name	2016	2017	2018	2019	2020	2021
Air Astana Airlines	36.97%	122.21%	84.79%	65.50%	59.05%	65.92%
American Airlines Group	13.81%	13.33%	11.80%	11.60%	9.58%	9.35%
Alaska Air	74.24%	73.05%	54.45%	57.61%	89.12%	91.76%
Air China	53.16%	59.46%	67.50%	54.57%	84.18%	144.08%
All Nippon Airways	71.66%	82.68%	82.06%	70.15%	63.63%	213.21%
China Southern Airlines	15.50%	21.18%	21.32%	13.47%	37.93%	30.56%
Delta Air Lines	31.67%	22.11%	20.88%	28.39%	60.92%	49.30%
EasyJet	58.57%	59.04%	69.47%	59.48%	64.74%	142.96%
GOL Intelligent Airlines	27.27%	34.12%	23.32%	27.73%	13.49%	12.06%
International Airlines Group	50.79%	46.94%	49.18%	49.55%	54.98%	64.97%
JetBlue Airways	27.33%	25.54%	27.13%	44.69%	75.39%	65.12%
Japan Airlines	146.69%	143.41%	115.05%	84.37%	101.72%	130.62%
Korean Air Lines Company	19.90%	22.87%	22.19%	19.10%	26.08%	27.00%
Lufthansa Group	22.46%	28.18%	18.96%	20.42%	14.93%	20.46%
Ryan International Airlines	39.33%	42.44%	46.08%	42.35%	47.82%	75.68%
Singapore Airlines	61.23%	53.76%	39.12%	39.90%	24.41%	136.23%
Spirit Airlines	139.49%	127.97%	126.11%	94.67%	136.56%	114.64%
Southwest Airlines	32.52%	31.43%	30.64%	40.59%	162.44%	150.99%
Turkish Airlines	41.12%	57.78%	42.60%	43.85%	37.93%	53.18%
United Airlines Holdings	27.31%	22.11%	22.54%	27.62%	98.73%	108.97%
Average Quick Ratio	49.55%	54.48%	48.76%	44.78%	63.18%	85.35%
Average Quick Ratio		50.93%			64.44%	

3.2. Regression Results

In this section of the study, Regression analysis was applied to models (1) and (2) to determine the factors that affect the profitability and liquidity of Air New Zealand. In this way, whether the Covid-19 outbreak will affect the profitability and liquidity of Air New Zealand will be determined. Tables 5, 6, 7, 8, 9, and 10 display the regression results for models (1) and (2).

3.2.1 The impact of Covid-19 on the profitability of Air New Zealand

According to Table 5, Multiple R is near 1, which suggests that the controlled independent variables and dependent variable have a strong correlation in the model (1). In addition, R Square is also near 1, which indicates that the regression line almost perfectly fits Air New Zealand's profitability data.

Table 5. The result of Regression Statistics - model (1)

Regression Statistics	
Multiple R	0.999138005
R Square	0.998276753
Adjusted R Square	0.993107012
Standard Error	0.002468566
Observations	13

As shown in Table 6, the Significance F for model (1) is 0.000553159, which is smaller than the critical value of a 10% significance level. It indicates that model (1) is significant overall and has a statistically significant predictive capability.

Table 6. The result of Analysis of variance - model (1)

	df	SS	MS	F	Significance F
Regression	9	0.010590445	0.001176716	193.0999665	0.000553159
Residual	3	1.82815E-05	6.09382E-06		
Total	12	0.010608727			

Table 7 shows the P-value and Coefficients of independent variables in the model (1). For model (1), the P-value of the Cost-to-income ratio, Size of Air New Zealand, Available Seat Kilometres, Passengers Carried, and Cost/ASK are less than 0.1, which means their p-value is significant at a 90% confidence level. There is a clear correlation between these independent variables and the dependent variable, as evidenced by this. The regression coefficient of the Cost-to-income ratio, Size of Air New Zealand, and Passengers Carried are negative. That means their relationship with the dependent variable is also negative. Furthermore, the regression coefficient of Available Seat Kilometres and Cost/ASK are positive, which means their relationship with the dependent variable is also positive. However, the P-value of Covid-19 is larger than 0.1, which means that Covid-19 is not statistically significant at a 90% confidence level. This implies that the Covid-19 outbreak could not significantly affect the profitability of Air New Zealand.

Table 7. Air New Zealand Regression Results (Profitability)

Dependent Variable:OROA				
Variable	Coefficients	Standard Error	t Stat	P-value
Intercept	3.90629	0.826502	4.726	0.018
Cost-to-income ratio	-0.75271	0.147821	-5.092	0.015
Size of Air New Zealand	-0.07936	0.020871	-3.803	0.032
GDP Growth Rate(%)	0.00547	0.002373	2.306	0.104
Inflation Rate(%)	0.00159	0.001479	1.077	0.360
Available Seat Kilometres(M)	0.00001	0.000003	4.102	0.026
Revenue Passenger Kilometres(M)	0.02638	0.019825	1.331	0.275
Passengers Carried(000)	-0.37110	0.070148	-5.290	0.013

Cost/ASK	3.01457	0.758417	3.975	0.028
Covid-19	-0.00039	0.005946	-0.067	0.951

3.2.2 The impact of Covid-19 on the liquidity of Air New Zealand

According to Table 8, Multiple R is near 1, which suggests that the controlled independent variables and dependent variable have a strong correlation in the model (2). In addition, R Square is also near 1, which indicates that the regression line almost perfectly fits Air New Zealand's liquidity data.

Table 8. The result of Regression Statistics - model (2)

Regression Statistics	
Multiple R	0.999960345
R Square	0.999920691
Adjusted R Square	0.999682763
Standard Error	0.003517212
Observations	13

As shown in Table 9, the Significance F for model (2) is 5.48042E-06 which is smaller than the critical value of a 10% significance level. It indicates that model (2) is also significant overall and has a statistically significant predictive capability.

Table 9. The result of Analysis of variance - model (2)

	df	SS	MS	F	Significance F
Regression	9	0.467907858	0.051989762	4202.625606	5.48042E-06
Residual	3	3.71123E-05	1.23708E-05		
Total	12	0.46794497			

Table 10 shows the P-value and Coefficients of independent variables in the model (2). For model (2), the P-value of the Cost-to-income ratio, Size of Air New Zealand, Inflation Rate, Cash Flow-to-Debt Ratio, Cash Asset Ratio, Cash Interest Coverage Ratio, and Covid-19 is less than 0.1, which means their p-value are significant at a 90% confidence level. It shows a clear correlation between these independent variables and the dependent variable. At the 10% level of confidence, the Cost-to-income ratio, Cash Flow-to-Debt Ratio, Cash Asset Ratio, Cash Interest Coverage Ratio, and Covid-19 have a positive impact on Air New Zealand's Quick Ratio. The size of Air New Zealand and the Inflation Rate have a negative impact on Air New Zealand's Quick Ratio. As shown in Table 10, the regression coefficient of Covid-19 on the Quick Ratio is 0.014, which implies that the Covid-19 outbreak will increase Air New Zealand's Quick Ratio by 0.014 at the 90% confidence level. According to the regression result, the liquidity of Air New Zealand received a significant and positive impact from the Covid-19 pandemic.

Table 10. Air New Zealand Regression Results (Liquidity)

Dependent Variable:Quick Ratio				
Variable	Coefficients	Standard Error	t Stat	P-value
Intercept	0.226	0.1038	2.181	0.117276
Cost-to-income ratio	1.539	0.1018	15.113	0.000629
Size of Air New Zealand	-0.155	0.0130	-11.914	0.001272
GDP Growth Rate(%)	-0.003	0.0021	-1.331	0.275172
Inflation Rate(%)	-0.011	0.0015	-7.256	0.005400
Cash Flow-to-Debt Ratio	0.066	0.0206	3.202	0.049270
Cash Asset Ratio	0.913	0.0171	53.467	0.000014
Cash Interest Coverage Ratio	0.028	0.0018	15.447	0.000589
Debt-to-Income	0.067	0.0298	2.268	0.108138
Covid-19	0.014	0.0059	2.456	0.091167

4. Discussion

4.1. Profitability of Air New Zealand

According to the results of the Financial Ratios Analysis on the airline industry, the Covid-19 outbreak has had a great negative impact on the airline industry's profitability. Operating return on assets measures the level of profits relative to the company's assets. The decrease in the airline industry's Operating return on assets means that the airline's level of profits was affected negatively by the Covid-19 outbreak, which is a sign the company is in trouble. Two main reasons causing the negative impact are the reduction in passenger demand and the rising cost of labor and fuel. On the one hand, the pandemic and accompanying government travel restrictions have led to a significant global reduction in passenger demand. As a result, there will be 2.7 billion fewer passengers in 2020, with a 65.9% decrease in traffic. In a few of months, the airline industry reversed two decades of worldwide passenger traffic growth. The decrease in passengers led its industry revenues to decline almost 50 percent in 2020. On the other hand, the rising labor and fuel cost also influence the profitability of the airline industry. Because of a scarcity of qualified pilots and crews, airline staffs have a high market power to request improving their conditions and benefits, like wage increases. Since 2016, labor costs have exceeded fuel as the primary expense for global airlines. The labor cost of the Worldwide Airline Industry was over $ 189 billion in 2019. Almost all airlines felt the pressures from the increase in labor costs. But the high labor cost is becoming a huge burden on profitability as airlines respond pandemic crisis by reducing flights and cutting capacity. Furthermore, the price of fuel is increasing due to the Covid-19 outbreak and the War in Ukraine. The world oil price increased by 40% in recent years. According to IATA, the Worldwide Airline fuel cost increased to $ 100 billion in 2019, which accounts for 19 percent of overall costs. Therefore, the profitability of the airline industry has been dramatically impacted by the Covid-19 outbreak.

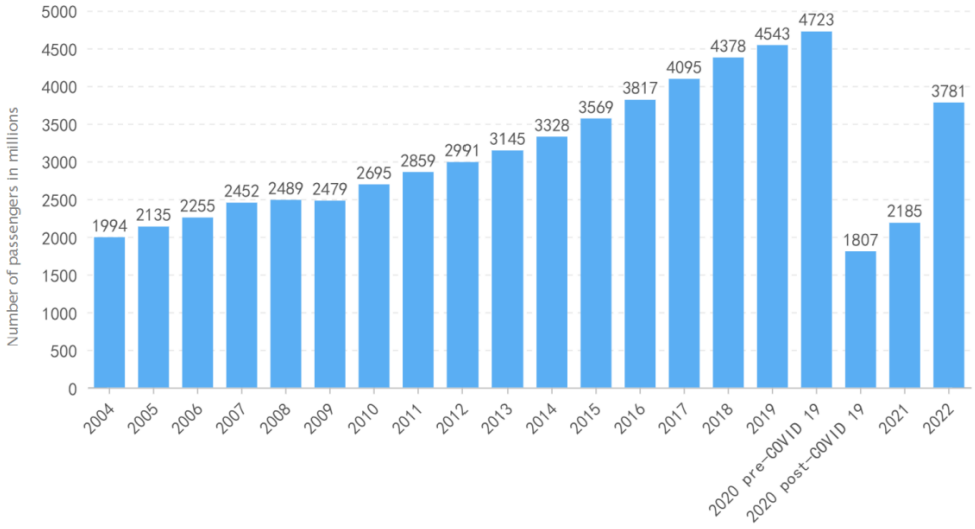

Fig 1. The number of scheduled passengers that the world's airlines have boardinged (in millions)

However, the regression result of model (1) shows that the Covid-19 outbreak has no significant impact on the profitability of Air New Zealand. This implies that Air New Zealand's profitability is not affected by Covid-19 like the other airlines. The regression result conflicts with the results of the Financial Ratios Analysis. The main reasons for this situation are the Cargo revenue provided by New Zealand and Australian freight programs. New Zealand government awarded the International Airfreight Capacity (IAFC) scheme and Maintaining International Air Connectivity (MIAC) scheme in 2020 and 2021, respectively. The IAFC scheme provides an order for more than 250 flights to assist the transportation of individual protective gear and pandemic response gear in 2020. The IAFC scheme also operated more than fifty weekly flights to other countries, like Asia, Australia, and North America. These cargo flights support New Zealand's global trade links during the pandemic period

of Covid-19. Moreover, the Australian government also awarded International Freight Assistance Mechanism (IFAM) contract in 2021. These schemes led Air New Zealand could keep on importing essential commodities and offering an important service to New Zealand exporters. In 2021, the Cargo revenue of Air New Zealand increased by 71% to $769 million. There are projections that the Cargo revenue of Air New Zealand will increase an additional 29% in 2022. So Cargo flights are becoming an important source of income under the IAFC and MIAC scheme. These schemes, supported by New Zealand and the Australian government, offer a crucial source of income at a time when there is a shortage of international passenger flights. Therefore, the profitability of Air New Zealand was not affected negatively by the Covid-19 outbreak.

4.2. Liquidity of Air New Zealand

According to the results of the Financial Ratios Analysis on the airline industry, the Covid-19 outbreak has led to an increase in airline liquidity. Using its most liquid assets, a company's capacity to satisfy its short-term obligations is gauged by its quick ratio. The airline industry's Quick Ratio has increased, which suggests the business can be more liquid and generate cash more swiftly in the short future. Two main reasons that cause the positive impact are airline private remediation measures and government interventions. On the one hand, airlines focused on their liquidity during the Covid-19 pandemic period because they have a significant amount of fixed liabilities, like aircraft lease and loan financing, and their cash flow was negatively affected by the recent Covid-19 outbreak. In order to ensure their ability to fulfill their liabilities, airlines took a series of measures to increase their liquidity during this special period. The methods and approaches used by each airline are various. The common method for airlines to fortify their liquidity is to adopt cost-cutting measures. Almost all airlines chose strategic layoffs and cutting capacity to secure short-term financial stability and continuing operations. They also suspended their share repurchase program and terminated the purchase agreement of new equipment to further reduce expenditure. Furthermore, airlines also try to find their own private sources of finance by issuing new shares and bonds. For example, United Airlines raised nearly $ 2 billion in cash by issuing stock in 2020. On the other hand, airlines also receive a large amount of cash from government support and state aid programs. According to IATA, governments around the world directly provide almost $100 billion of state aid to airlines worldwide as of 2021. These programs made airlines keep sufficient cash and cash equivalents on hand. The increase in cash and cash equivalents was the result of airline private remediation measures and government interventions. It can account for the increase in the airline industry's Quick Ratio. Therefore, the airline industry's liquidity has significantly benefited from the Covid-19 outbreak.

Based on the model regression analysis (2), Air New Zealand's liquidity also had a significant and positive impact during the Covid-19 pandemic. This result is in line with the results of the Financial Ratios Analysis on the airline industry. The reason for this situation is its private remediation measures and New Zealand government interventions. On the one hand, Air New Zealand is trying to increase its liquidity through different methods to cope with the financial difficulties brought on by the Covid-19 outbreak. In 2020, in response to the massive Covid-19 outbreak, Air New Zealand moved swiftly and decisively to change the company's operations. By 30% fewer personnel and postponing or canceling non-essential expenditures like hangar, digital, and infrastructure spending, it significantly lowered the cost base. Moreover, Air New Zealand also suspended its dividends and all short-term incentives and issued redeemable shares to keep sufficient cash and cash equivalents on hand. On the other hand, the New Zealand government provided a loan facility of $ 900 million and a government wage subsidy of $ 115 million to Air New Zealand in 2021. These government interventions help Air New Zealand to increase short-term liquidity. Therefore, the liquidity of Air New Zealand received a significant and positive impact from the Covid-19 pandemic.

5. Conclusion

The outbreak of Covid-19 has put a huge strain on global airlines. The profitability and liquidity of the airline industry are examined in this study in relation to Covid-19 based on the annual financial data and financial indicators of 20 commercial airlines in the world from 2016 to 2021. The study also investigates the impact of Covid-19 on Air New Zealand's profitability and liquidity. Moreover, this study identifies the reason for the similar impact on liquidity and different impact on profitability between the airline industry and Air New Zealand by the Covid-19 pandemic.

The results of the Financial Ratios and Regression analysis indicate that the liquidity of Air New Zealand received a significant and positive impact from the Covid-19 pandemic, which is consistent with the whole airline industry. It is due to the fact that both Air New Zealand and other airlines took their private remediation measures to increase their liquidity during the pandemic period of Covid-19. Furthermore, government interventions also help them increase their liquidity. However, the profitability of Air New Zealand was not affected by the outbreak of Covid-19 like the whole airline industry because of the cargo schemes supported by New Zealand and Australia.

Based on the above finding, the following recommendations are proposed:

(1) Governments should place orders to airlines instead of providing loans and subsidies, like the New Zealand government. It can promote the recovery of the airline industry effectively.

(2) Each airline should actively look for new profit sources to enhance their profitability. They have a good chance of quickly recovering from the effects of Covid-19..

References

[1] Xuan, X., Khan, K., Su, C., & Khurshid, A. (2021). Will COVID-19 threaten the survival of the airline industry? Sustainability, 13(21), 11666. https://doi.org/10.3390/su132111666

[2] IATA. (2020), IATA Economic chart of the week, https://www.iata.org/en/iata-repository/publications/economic-reports/return-to-air-travel-expected-to-be-slow.

[3] Bouwer, J., Krishnan, V., Saxon, S., & C. (2022). Taking stock of the pandemic's impact on global aviation. McKinsey & Company. https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/taking-stock-of-the-pandemics-impact-on-global-aviation

[4] Priyadarshini, I., Mohanty, P., Kumar, R., Son, L. H., Chau, H., Nhu, V. H., Thi Ngo, P. T., & Tien Bui, D. (2020). Analysis of Outbreak and Global Impacts of the COVID-19. Healthcare (Basel, Switzerland), 8(2), 148. https://doi.org/10.3390/healthcare8020148

[5] Ng, K. T., Fu, X., Hanaoka, S., & Oum, T. H. (2022). Japanese aviation market performance during the COVID-19 pandemic - Analyzing airline yield and competition in the domestic market. Transport Policy, 116, 237-247. https://doi.org/10.1016/j.tranpol.2021.12.006

[6] Xue, D., Liu, Z., Wang, B., & Yang, J. (2021). Impacts of COVID-19 on aircraft usage and fuel consumption: A case study on four Chinese international airports. Journal of air transport management, 95, 102106. https://doi.org/10.1016/j.jairtraman.2021.102106

[7] IATA. (2020), Airlines Financial Monitor, https://www.iata.org/en/iata-repository/publications/economic-reports/airlines-financial-monitor---march-2020/

[8] Budd, L., Ison, S., & Adrienne, N. (2020). European airline response to the COVID-19 pandemic – Contraction, consolidation and future considerations for airline business and management. Research in Transportation Business & Management, 37, 100578. https://doi.org/10.1016/j.rtbm.2020.100578

[9] Andreana, G., Gualini, A., Martini, G., Porta, F., & Scotti, D. (2021). The disruptive impact of COVID-19 on air transportation: An ITS econometric analysis. Research in Transportation Economics, 90, 101042. https://doi.org/10.1016/j.retrec.2021.101042

[10] Zhang, Y., Zhu, L., & Hao, F. (2022). The Impact of the COVID-19 Pandemic on China's Airline Industry. Frontiers in public health, 10, 865463. https://doi.org/10.3389/fpubh.2022.865463