

Evaluating the Drivers of Airlines Profitability in Nigeria Domestic Network

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Abstract

A firm's profitability is critical to its competitiveness and sustainability. This research looked at the elements that influence airline profitability in Nigeria. From 2005 to 2019, two airlines were picked, and their data were retrieved from Nigerian Civil Aviation Authority (NCAA). From estimated quarterly panel data using E-views 8 and SPSS 22, the overall findings of the regression study demonstrate that with ROA used as a proxy for profitability, the R-square is 83.6 per cent and 89.4 per cent, respectively for Aero contractors and Med-view airline, representing 83.6 per cent and 89.4 per cent of the changes in profitability of the Aero contractors and Medview in the sample, respectively, could be explained by changes in the study's independent variables, namely growth, liquidity, leverage, lease, tangibility, fuel cost and personnel cost. Besides the total of the explanatory variables, growth, leverage and tangibility are statically significant at a 5% level of significant Aero Contractors. Growth, leverage, leasing cost, fuel cost, and staff cost, on the other hand, are statistically significant at the 5% level of significance for Medview airlines. Profitteering, expansion, leverage, and tangibility are the primary activities of any airline firm. Lease cost, fuel cost, and staff cost show a statistically significant positive link with the profitability metric ROA. As a result, stakeholders of Nigerian airlines should prioritize profitability over other criteria in this study. Airline executives should do a comprehensive analysis of all potential elements impacting their company's profitability in the literature, including aspects other than economic variables. According to the findings of this study, political issues account for a greater proportion of the reasons why airlines fail in Nigeria.

Keywords

Airliners, Profitability, Tangibility, Leverage, Liquidity and ROA

1. Introduction

Airlines from all regions and business models, over the last full business cycle, generated average ROICs below their Weighted Average Cost of Capital [1]. These are all threats that need to be mitigated by African airlines if they are to remain economically sustainable, and will shape any conclusions on sustainable business models on the continent. Over the last decade, 37 airlines have launched in Africa (Nigeria inclusive) and 37 have failed [2]—the problems facing the aviation landscape within Africa are extensive. [3] opined that airlines have had to implement a number of competitive strategies to compete against each other in this intensely competitive environment. Every firm should make enough money to survive and develop over time. Profit is a financial advantage received by Nigerian airlines when the quantity of income collected from a commercial activity exceeds the expenses, charges, and taxes required to support the activity. Any profit made belongs to the firm's owners, who may or may not elect to spend it on the business. Profitability, on the other hand, relates to a firm's operational efficiency and is a result of profit, therefore businesses with the same amount of profit may differ in terms of profitability. Furthermore, profit is a test of efficiency for the financial management, a gauge of the worth of their investment for the owners, a margin of safety for creditors, and a measure of taxable revenue for the government. Because of the particular nature of the aviation sector, profitability has always been lower than in other industries. Looking at African airlines, despite efforts by respective governments to improve profitability, efficiency, and productivity, the financial performance of the continent's airlines has been relatively weak in comparison to the industry itself, owing to operational inefficiencies, high levels of regulatory costs and taxes, low levels of credit rating, limited capitalization, and higher levels of liquidity risk. Airlines have developed a set of business models to increase their market share and gain competitive advantage against each other. One of the business models that have recently captured attention is the low-cost business model [4]. Performance measurement is critical for every enterprise involved in air transportation. With these measurements, companies are able to establish an understanding of their internal systems which then informs their understanding of the competition. A comprehensive performance measurement is also an essential tool in achieving the goals of the enterprise [5].

Furthermore, profitability is a leading indication for measuring the final success of airlines, and it assists airlines in understanding the volume and breadth of their activity, allowing them to make necessary changes to remain competitive in the market. Several additional studies have found that one aspect has a stronger effect than another in determining profitability, depending on whether it is a single airline or a panel of airlines situated in different regions of the world, each with its unique characteristics. Particular of the elements that impact airline profitability investigated by different academics are applicable in some regions of the world or specific carriers, while others are not. Returning to the

case of Nigerian Airlines, while a large body of research on profitability has been undertaken in the banking and insurance industries in Nigeria, empirical studies on the factors affecting Nigerian airline profitability are rarely available, to the best of the researcher's knowledge. As a result, there is a research gap that must be filled to discover key factors of Nigerian airline profitability. As a result, this study fills a void by giving information on the factors that influence Nigerian airline profitability.

2. Literature Review

According to [6], four characteristics are required for systems to work properly: 1) robustness, 2) self-organization, 3) hierarchy, and 4) efficiency. These dynamics must be in sync to have a beneficial impact on airline profitability. When a system can rebound from a setback caused by internal or external negative factors, it demonstrates resilience [6]. The price of gasoline has a significant impact on airline earnings [2]. External influences such as terrorism harm the price of petroleum. Furthermore, disturbances in the production, refining, and delivery of oil might result in increased fuel costs. Resilience in systems theory permits a system to recover and exist in a changing environment. The airline and petroleum sectors are robust systems that operate in an ever-changing social, political, and commercial context and are important to one another. Many academics, particularly in Western nations, have empirically investigated the variables influencing airline profitability. Though there are context differences in airline profitability in developed and developing countries, the difference is very small for airlines operating internationally, providing full service, and serving long-distance routes due to the standardization of most services and the availability of competition on each route. [7] investigated earnings and the factors that influence them to keep US carriers in operation. The researcher evaluated the influence of revenue components, US GDP, airline RPK and load factor, as well as fuel, labour, maintenance, landing, and other cost components on the airline's profitability. It also discovers that the load factor is a significant indicator of airline profitability. A 1% change in the average load on an operational aircraft might result in tens or even hundreds of millions of dollars in profit. It also discovers that unit costs determine the cost function and profit. Fuel was especially essential because it is the airline's second-highest expense. Finally, the study demonstrates that airlines, like any other business, profit from an increasing market.

[8] investigated the relationship between productivity metrics and financial data in the airline business. The primary goal of this thesis is to investigate the presence of a relationship between technical efficiency and financial information based on public annual reports from 1991 to 1999, utilizing 35 airlines from 25 countries as a sample. The findings indicate that breaking down productivity change into technical and efficiency changes provides more information, and a negative association between change in operating expenses and technological

change is established. The theory reveals no evidence of productivity increases being reflected in profits or cash flow data. As a result, the link between productivity measurement and the importance of cash flow information in contrast to earnings, as well as the converse, provides no support. [9] investigated the comparison of low cost and legacy carriers to identify the significant drivers of the difference in performance based on statistical analysis where the number of employees per ASK, salary expense per employee, and fuel costs are the primary cost and performance drivers. Revenue per RPK, load factor, and flight stage length are the key revenue drivers. According to the findings, the financial performance gap between low-cost carriers and legacy carriers has been significant, particularly between 2001 and 2004. Per ASK, low-cost carriers had less operational income than traditional carriers during this period. Furthermore, data shows that an airline can choose to be either cost-driven or revenue-driven, but it is difficult to be both. Point-to-point network designs are better suited for cost-driven airlines, but hub-and-spoke networks are better suited for revenue-driven airlines.

Through a rigorous review of the airlines' performance from 2000 to 2008, [10] explored the factors influencing the profitability of European budget airlines. Profit will be calculated as the difference between operating revenue and operating costs in this study, and profit rate will be employed as a major metric of profitability. It begins by defining cheap airlines and then investigates their beginnings in Europe before conducting a full examination. The researcher investigated the influence of variables such as unit staff cost, unit fuel cost, other miscellaneous costs, the quality of management and business strategy, and load factor on the profitability of Europe's best-known low-cost carriers Ryan Air, Easy Jet, and Sky. The study closes by identifying the elements influencing sample airline profitability, and this article will conclude several profitability drivers in the European budget airline business. Giving employees stock options, discouraging unions, outsourcing and relocating jobs to lower labour cost countries, fuel hedging, adopting more fuel-efficient aircraft, improving management, a clear business strategy, a high load factor, the ability to generate ancillary revenue, size, scale, and first-mover advantage are all recommended by the researcher. [11] conducted exploratory research on the link between liquidity and profitability in the airline business. Between 2005 and 2008, the researcher examined the link between liquidity and profitability in a group of enterprises that included the world's main airlines. Using financial data disclosed by the firms, the link was investigated using statistical processes as well as a two-dimensional study. The study was exploratory in nature, and its results are limited to the firms studied and the periods covered. Surprisingly, a substantial positive association between liquidity and profitability was identified in the short run, and for the year 2008, firms with a high liquidity index outperformed less liquid ones.

[12] conducted a study on the Influence of Systematic Risk Exposures on the East Asian Airline Industry. The study aims to investigate the determinants of

systematic risk for the East Asian airline industry by using a panel regression of seven long-established listed airline companies from 1996 to 2009, namely Japan, Korea, Hong Kong (China), Chinese Taipei, Singapore, Malaysia, and Thailand. Only size and operational efficiency are shown to be positively and significantly associated with systematic risk, but aviation safety is found to be negatively and significantly connected to systematic risk. Furthermore, the study found that the systemic risk of East Asian airlines was much greater during the 2000 Dot-Com crash, but was unaffected by the 1997 Asian financial crisis or the 2008 subprime crisis. [13] explored optimal financial key performance indicators in the airline business. Choosing appropriate Key Performance Indicators entails consideration of both cost- and revenue-driven metrics. The researchers differentiate between cost and revenue-driving variables and assess the efficacy of two current models for measuring airline performance per seat as well as every passenger-kilometre. This study utilized seats sold with passengers transported, largely because any existent difference between the two is minimal and, in any event, most corporate reports do not provide access to the data. It investigates the efficacy of models that define performance based on two performance measures, namely seats and passenger-kilometres. According to the findings, the most significant variable in explaining the difference in airline profitability is operating profit per passenger-kilometre, and the performance model based on kilometres matches the industry somewhat better than the one based on passenger seats. The major findings show that Operating Profit per Passenger or Passenger-Kilometer is the most important variable influencing airline profitability. It was discovered to be more essential than revenue, unit cost, and load factor, which were previously employed by the industry. There was no substantial relationship between size, business model, or area that might explain an airline's low or high profitability.

[14] did a study on Norwegian Air Shuttle ASA's strategic analysis and assessment, intending to give many strategic choices that might assist the firm to secure its position as a major European low-cost carrier in the future. The work is based on an inductive case study research technique and is extremely realistic in character. The thesis includes an overview of the company, a strategic analysis, and scenario planning. As a result, the paper's major conclusions are largely case-specific. In response to the first scenario, Enemy at the Gates, NAS should pursue the following important strategic options: expand its brand emphasis, form a strategic partnership, and modify its planned long-haul activities. Concerning the second scenario, Survival of the fittest, NAS should provide a pure LCC business model, exploit the high price sensitivity and improve its liquidity. Finally, NAS might optimize its present LCC business model or pursue a hybrid business model with several ticket classes and should focus on long-haul low-cost operations, travel convenience, and route network adaptation. [15] investigated The researcher intends to study the core reasons for the operational loss and cash flow problems experienced by Air Namibia. The yearly reports were eva-

luated using Microsoft Excel, and a comparative research technique was utilized to compare Air Namibia against Kenya Airways, British Airways, Fly Emirates, and US Airways. According to the report, Air Namibia has been losing money for all fiscal years beginning on April 1, 2006, and ending on March 31, 2011. Air Namibia Ltd is more socially oriented, flying routes based on societal requirements regardless of whether they are lucrative or not, and is politically driven; as a result, Air Namibia need funding to support its operations and stay afloat. Without the government rescue, the national airline would have been closed and liquidated, and the company would have faced a going concern difficulty since its liabilities outweighed its assets.

[16] investigated the impact of macroeconomic factors on the financial performance of Kenya's aviation industry. The goal of this research was to examine the influence of macroeconomic factors on the financial performance of Kenya's aviation industry. The Return on Assets (ROA) was used to measure the financial performance of enterprises in the aviation sector, and it was regressed against independent variables such as the real exchange rate, GDP, the change in money supply, and average yearly lending interest rates, and inflation rate. The findings found that return on assets (ROA) had a modest positive insignificant association with the rate of GDP growth and the yearly change in the money supply. The study also discovered a weak negative negligible link between ROA and the exchange rate, annual loan rate, and annual average inflation. [17] investigated the major cost drivers in airline management. They investigated the major elements influencing airline cost-cutting initiatives. These cost criteria were offered to airline industry professionals via two rounds of questionnaires to be weighed and questionnaires completed by industry experts. It was used a method based on the framework of the Analytic Hierarchy Process, and the findings suggest that the key significant aspects of a cost-related airline strategy are route structure and aircraft type and characteristics, labour cost, and management quality. When faced with the necessity to define priorities in cost reduction, this hierarchy might assist the decision-maker.

[18] investigated the profitability of Ethiopian Airlines, with the main goal of studying the commissioning company's financial accounts and analyzing its financial performance from 2009 to 2012. The researcher examines the example company's income statement and, using financial statement analysis ratios, benchmarks it against its immediate rivals. During the specified period, the case firm increased its service to foreign locations by using new planes and signing alliance and codeshare agreements with several airlines. The statistical analysis demonstrated that a rise in travelling costs is the primary cause of the case company's deteriorating earnings. Furthermore, minor reductions in marketing and sales expenses, as well as bad results from non-operating activities, have contributed to the dismal profit reporting. Furthermore, According to the report, Ethiopian Airlines' sales income climbed consistently over the last four years. It has climbed by 10% or more in comparison to previous years, owing to the

company's goal of expanding its destinations, purchasing new aircraft, and increasing demand for air transportation due to economic recovery, among other factors. Total operational expenditures climbed dramatically, reaching 97 per cent of total revenue. Operating earnings fell in the 2011 and 2012 fiscal years compared to the previous year's performance, owing mostly to a rise in flying expenses. Jet fuel expenses, in particular, had a significant impact on the company's operational results. Furthermore, this decreased in 2012, when the corporation faced an interest charge greater than the interest income generated. According to benchmarking and ratio research, Ethiopian Airlines' total profitability over a four-year financial period was higher than that of its immediate competitors.

[19] highlighted the factors that influence profitability in the Turkish airline business. Data was collected from DataStream software for a sample of 13 major airline companies from 1994 to 2013, and panel data analysis was used, with a focus on financial ratios that measure profitability, the tangibility of assets, firm size, leverage ratio, growth opportunities, and liquidity as an independent variable. The findings revealed that of all the explanatory factors regressed on the profitability of the companies in the sample, the only tangibility of assets, growth prospects, and liquidity ratios have a meaningful influence on firm profitability. The tangibility of assets hurts the profitability of airline businesses in the sample, whereas expansion prospects have an inverse impact on the profitability of airline companies in the sample. Furthermore, the liquidity ratio is another characteristic that has a negative and statistically significant link with company profitability. Furthermore, the empirical study revealed that expansion prospects hurt the profitability of the sample's airline enterprises. [20] investigated Traditional Ratio Analysis in the Airline Business: A Case Study of Leading US Carriers, a ratio analysis that aims to reveal the airline industry-specific behaviour of the selected liquidity, profitability, and solvency ratios computed for eight US largest airlines from 2007 to 2012. The study provides a quantitative examination of information presented in financial statements of chosen prominent airlines in the United States. The findings revealed that profitability in the airline industry has been poor throughout the studied period and has remained so despite improvements, potentially arise to losses incurred during the economic recession, slowing demand for air travel, and rapidly increasing operating expenses primarily driven by rising fuel expenses and labour costs, although the analysis of long-term solvency risk revealed high financial leverage in the US airline industry, putting the leading carrier at risk.

[21] analyzed the determinants of SSA airlines' profitability. This study investigates the airline-specific, industry-specific, and macroeconomic factors influencing the profitability of Ethiopian, Kenyan, and South African airlines from 2003 to 2013. The researcher employs both quantitative and qualitative data. According to the findings, load factor and exchange rate volatility have a statistically significant and favourable association with airline profitability. Variables like debt

and liquidity, on the other hand, have a negative and statistically significant link with airline profitability. The correlation between airline size, sales growth, and big incidents/shocks, on the other hand, is statistically insignificant. According to the report, emphasizing and reengineering the airline's operations, in addition to the primary internal drivers, might increase profitability. [22] used an explanatory research design and an error correction model to show the impact of the independent variables, load, yield, available seat kilometre (ASK), labour cost, fuel cost, maintenance cost, and lease on the dependent variable profitability based on income statement data from 1987 to 2014. The findings indicated that while load and yield have a major influence on Ethiopian airlines' profitability, ASK and lease have a negative impact. Labour costs, on the other hand, are statistically unimportant in determining Ethiopian Airlines' profitability.

[11] examined the determinants of profitability in the aviation industry of Europe and America using multivariate regression on balanced panel data, taking into account business size, efficiency, and overall economic growth. Profitability determinants are studied using econometric modelling on data from 50 airlines from 2005 to 2011. Principal Component Analysis is used to reduce the number of variables and reject potentially associated data. According to the findings, six explanatory factors are statistically significant at the 1% level of significance, whereas company size is statistically significant at the 5% level of significance. The results show that the main differences between more profitable aviation firms are size, cash flows to liabilities, return on invested capital, net margin, location, quick ratio, and short term investments, implying that larger American aviation firms are more profitable than smaller European firms. The firm location appears to play a substantial effect on profitability, with American businesses appearing to be more lucrative than European firms. Furthermore, larger businesses tend to benefit more than smaller businesses, demonstrating that increasing overall assets contribute to improved profitability. Also, short-term investments show a negative trend, implying a negative influence on aviation enterprises' earnings, but Property, Plant, and Equipment appear to have little impact on profitability.

3. Methodology

One of the most important aspects of performing research is data collecting. The researchers attempted to collect data for the following stage in this phase or procedure. The data for this study will be acquired from secondary sources, namely Nigeria Airlines websites, aircraft manufacturers, different papers and publications of the International Air Transport Association (IATA). Only audited yearly reports (balance sheet and income statement data) of Nigeria Airlines from 2005 to 2019 will be utilized to test the hypothesis and examine the regression results. Regarding the trustworthiness of the sources, the researcher has no reason to dispute their legitimacy because the whole material is from official Nigeria Airlines records that have all been examined by professional auditors and all data,

which are used in the hypothesis testing are collected directly from Nigeria Airlines annual reports.

The time-series approach of analysis was used in this investigation. The data analysis summarizes the findings of the study and empirical testing. It includes variables and ratios utilized in financial performance measurements, as well as statistical correlations between dependent and independent variables. To evaluate the stated hypotheses, statistical analyses were performed using the following methodologies, and financial data were analyzed using the SPSS program. First, descriptive statistics (mean, standard deviation, maximum, and minimum) was computed for the time spans from 2005-to 2019. It aids in visualizing the current situation and provides pertinent information. At this point, the required variables' mean, standard deviation, maximum and lowest values have been computed and discussed. Correlation studies are also given between dependent and independent variables. Finally, the study employed regression analysis, in which multi-factor regressions were performed to confirm that the elements assumed to be influencing Nigeria Airlines' economic sustainability and profitability have a statistically significant link. Time-series observations are integrated to estimate the regression result in this manner.

Nigeria Airlines' economic sustainability and profitability, as well as the factors that influence them, are major variables in this research. As discussed in the literature section, a variety of factors influence profitability. Growth of sales, liquidity, leverage, the tangibility of asset, leasing, and fuel cost is included as explanatory factors in this study, while others are collectively incorporated in the error term. Thus, six independent variables were chosen in the literature section of this study based on their ambiguous relationship with airline profitability, and the data utilized for the independent variables may be verifiable.

The independent variables and their corresponding measurement used for the data in the analysis are:

- 1) Airline growth: change in the level of sales;
- 2) Liquidity: ratio between current assets and current liabilities;
- 3) Leverage: ratio between total debt and total assets;
- 4) Lease cost: logarithm of the total cost of the lease;
- 5) The tangibility of assets: the ratio of fixed assets to total asset;
- 6) Fuel cost: logarithm of the total cost of fuel;
- 7) Personnel cost: logarithm of the total cost of hiring personnel.

3.1. Model of Profitability of Domestic Airlines

To assess the extent of the effect of the above variables on profitability, a Multiple Linear Regression model consisting of seven independent variables is used to test the effect on the dependent variable and is modelled as shown below:

$$\begin{aligned} &\text{Profitability} \\ &= f(\text{Growth, Liquidity, Leverage, Tangibility, Lease, Fuel, Personnel cost}) \end{aligned}$$

It means economic sustainability and profitability are a function of its growth,

liquidity, leverage, tangibility, Lease, fuel and personnel cost. In addition, to analyze the relationship between variables econometrically, the Ordinary Least Squares estimation method was employed, as per the empirical and theoretical frameworks to plug in SPSS for regression analysis, the model is presented as follows:

$$\text{ROA} = \alpha + \beta_1 \text{growth} + \beta_2 \text{Liquidity} + \beta_3 \text{leverage} + \beta_4 \text{Tangibility} + \beta_5 \text{Lease} + \beta_6 \text{Fuel} + \beta_7 \text{personnel} + \varepsilon_t$$

where,

1) ROA is the dependent variable used for the study. Here the profit means the bottom line of the company after interest and other payments are deducted, i.e. it is what the company announces at the end of each fiscal.

2) β_1 to β_7 are coefficients.

3) Growth is the change in the level of sales volume.

4) Liquidity is the ratio of current assets and liability.

5) Leverage is the ratio between total debt and total assets.

6) The tangibility of assets is the ratio of fixed assets to total asset.

7) Lease is the total cost of renting or leasing aircrafts.

8) Fuel is the total cost of fuel.

9) Personnel cost is the total cost of hiring personnel.

10) ε is representing the random error term of the multiple regression model.

Two airlines were sampled for this profitability study. One is an airline that is currently in operation (Aero) and the second is a defunct airline. The data (**Table 1** and **Table 2**) was primarily collected in quarters and summed up annually.

Table 1. Transformed medview profitability model variables.

Year	ROA	Airline Growth	Liquidity	Leverage	Lease cost	Tangibility	Fuel Cost	Personnel cost
2007	3.30	0.00	1.10	2.66	2.88	0.29	2.87	2.74
2008	3.13	0.69	1.29	0.37	2.88	0.32	2.98	2.99
2009	3.35	1.66	1.00	0.78	2.99	0.78	2.87	2.82
2010	3.31	0.91	0.81	0.83	2.88	0.72	2.94	2.66
2011	3.22	0.82	1.89	1.96	3.13	0.34	2.83	2.88
2012	3.26	1.07	2.16	0.39	3.09	1.06	2.85	2.99
2013	3.33	1.19	5.31	0.50	2.88	0.50	2.98	2.94
2014	3.27	0.87	1.06	0.26	2.94	0.86	2.90	2.88
2015	3.35	1.21	1.00	1.01	2.99	0.50	2.98	2.94
2016	3.34	0.96	0.96	0.56	2.99	0.51	2.99	2.89
2017	3.11	0.59	0.93	0.58	2.66	0.44	2.95	2.99
2018	3.14	1.07	0.97	1.15	3.11	0.76	2.90	2.99
2019	3.21	1.18	0.91	1.05	2.93	0.81	2.90	2.94

Table 2. Transformed aero profitability model variables.

Year	ROA	Airline Growth	Liquidity	Leverage	Lease cost	Tangibility	Fuel Cost	Personnel cost
2005	9.04	0.00	1.67	0.04	7.75	1.52	3.57	3.93
2006	9.12	1.08	1.86	0.06	7.75	1.56	3.57	3.96
2007	9.72	1.83	1.88	0.02	8.48	1.78	3.75	4.22
2008	9.98	1.29	1.60	0.15	8.38	2.18	3.79	4.33
2009	10.03	1.06	1.35	0.29	8.44	2.75	3.79	4.36
2010	10.06	1.03	2.31	0.30	7.85	2.93	3.57	4.37
2011	10.34	1.32	1.65	0.26	7.75	0.33	3.57	4.49
2012	9.70	0.53	1.35	0.33	8.49	3.90	3.75	4.21
2013	9.78	1.07	1.30	0.41	8.50	4.77	3.79	4.25
2014	9.81	1.04	1.86	0.41	8.44	4.84	3.79	4.26
2015	10.16	1.41	1.45	0.38	7.75	5.07	3.57	4.41
2016	9.33	0.44	1.80	0.43	7.80	5.66	3.57	4.05
2017	9.43	1.11	1.71	0.48	8.44	6.64	3.75	4.10
2018	9.48	1.05	2.01	0.48	8.44	7.22	3.79	4.12
2019	9.94	1.57	1.90	0.45	8.45	8.20	3.79	4.32

The data was sourced within a period of 13 to 15 years.

There are various measures for the profitability of a firm. One of the most known and widely used of all financial ratios is the return on equity (ROE). It represents the performance of a firm in an accounting sense by reporting the ratio of net income to total shareholder's equity. Another measurement is the return on 19 assets (ROA) which reflects the ability of management to employ the firm's assets to make profits.

3.2. Empirical Results

The descriptive statistics give a broader picture that the residuals from the regression using these variables were expected to follow a normal distribution for efficient and unbiased estimators. It includes the meaning, median, maximum, minimum, standard deviation and others. The outcome of descriptive statics and its overall description of data used in the model was presented. **Table 3** and **Table 4** show the descriptive statistics of the variables used in the model and their interpretations are presented as follows.

According to **Table 3** and **Table 4**, all variables comprised 50 and 49 observations and the profitability measure used in this study, ROA indicates that Med-view and Aero Contractors airlines on average achieve a positive net profit over the period of study of 13 and 15 years respectively. The summary descriptive statistics of the variables used show us over the study period, the average ROA was

Table 3. Descriptive statistics dependent and independent variables of profitability for Medview Airline.

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Variance Statistic	Kurtosis	
							Statistic	Std. Error
Growth	50	0.59	1.66	1.0094	0.23659	0.056	0.921	0.662
Liquidity	50	0.81	5.31	1.5902	1.31630	1.733	4.210	0.662
Leverage	50	0.26	1.96	0.7394	0.42517	0.181	1.958	0.662
Lease Cost	50	2.66	3.13	2.9544	0.12664	0.016	0.821	0.662
Tangibility	50	0.32	1.06	0.6432	0.22080	0.049	-0.951	0.662
Fuel Cost	50	2.83	2.99	2.9278	0.05304	0.003	-1.223	0.662
Pers. Cost	50	2.66	2.99	2.9232	0.07269	0.005	5.222	0.662
ROA	50	3.11	3.35	3.2580	0.08473	0.007	-1.075	0.662
Valid N (listwise)	50							

Table 4. Descriptive statistics dependent and independent variables of profitability for Aero Airline.

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Variance Statistic	Kurtosis	
							Statistic	Std. Error
Growth	49	0.44	1.83	1.1243	0.34050	0.116	0.404	0.668
Liquidity	50	1.30	2.31	1.7096	0.28346	0.080	-0.340	0.662
Leverage	50	0.02	0.48	0.3102	0.14292	0.020	-0.503	0.662
Lease Cost	50	3.36	3.69	3.5600	0.14418	0.021	-1.758	0.662
Tangibility	50	0.33	8.20	3.8858	2.25821	5.099	-0.848	0.662
Fuel Cost	50	3.57	3.79	3.6984	0.10263	0.011	-1.797	0.662
Pers. Cost	50	4.20	4.43	4.3326	0.10650	0.011	-1.792	0.662
ROA	50	3.93	4.49	4.2536	0.14988	0.022	-0.460	0.662
Valid N (listwise)	49							

3.26% with a minimum of 3.11% and a maximum of 3.35 % for Medview airline. For Aero Airlines, the average ROA was 4.25% with a minimum of 3.93% and a maximum of 4.49%. The standard deviation statistics for ROA were 0.085 and 0.150 for Medview and Aero Contractors airlines respectively which indicates that the profitability variation in the study period was a little bit high. The result implies that the profitability of both airlines is too sensitive. The average earnings of Medview and Aero airlines are a little bit higher as compared to the industry average for the same period which stood at 2.5% [23]. This is indicative of the fact that Nigerian airlines are not just suffering from profitability crises.

Concerning explanatory variables of the profitability model, some interesting statistics have to be mentioned. Despite the existence of a little bit of variance in the minimum and maximum observation of ROA, there could be seen relatively very high variation in liquidity for Medview airline, which is measured by the ratio between total debt and total assets during the period with the value of 1.59, 5.31 and 0.81 for mean, maximum & minimum values respectively. This means

despite the inverse relationship that exists between liquidity and profitability, the liquidity measure indicates that Medview and Aero have, on average, a nearly acceptable level of liquidity position. Tangibility for Aero Contractors airline measured as the ratio of fixed asset to a total asset also has a high variation with the value of 3.89, 8.20 and 0.33 for mean, maximum & minimum values respectively.

Leverage is 73% for Medview and 31% for Aero Contractors airline on average. In addition, the standard deviation statistics for Medview airline's fuel cost, personnel cost and ROA of 0.053, 0.073 and 0.085 respectively show the existence of relatively lower variation in these variables of profitability. It is especially important to notice that the mean of tangibility is 0.64 for Medview and 3.88 for Aero airline, meaning that on average the airlines' assets are tangible. Besides Medview and Aero Contractors airlines grew by 101% and 112% respectively on average during the 13 and 15 years under study.

This estimation focuses on the relationship between airline profitability and the determining factors. The researcher had used the econometric model of multiple regressions. The model contains one dependent variable (ROA), seven independent variables namely growth of sales, liquidity, leverage, the tangibility of assets, aircraft lease cost, fuel cost, personnel cost and the error term. Hence, the analysis focuses mainly on the results of the regression, for the selected factors that have an impact on the profitability of the selected airlines—Medview and Aero. The empirical model used in the study to identify the factors that can affect the profitability of airlines was provided as follows:

$$\begin{aligned} &\text{Profitability} \\ &= f(\text{Growth, Liquidity, Leverage, Tangibility, Lease, Fuel, Personnel cost}) \end{aligned}$$

However, the two airlines were chosen to represent the defunct airline (Medview) and the airline currently in operation (Aero Contractors). The essence is to determine is the economic parameters were responsible for airlines in Nigeria getting comatose.

The overall results of the regression analysis are shown that ROA is taken into account as the profitability proxy, the R-square are 83.6% and 89.4% respectively Aero contractors and Medview airline representing 83.6% and 89.4% of the changes in the profitability of the Aero contractors and Medview in the sample could be explained by the changes in the independent variables of the study namely growth, liquidity, leverage, lease, tangibility, fuel cost and personnel cost. Besides the total of the explanatory variables, growth, leverage and tangibility are statically significant at a 5% level of significant Aero Contractors. However, the variables of growth, leverage, lease cost, fuel cost and personnel cost are statically significant at a 5% level of significance for Medview airlines (see **Table 5** and **Table 6**).

Aero Airline Profitability Model:

$$\begin{aligned} \text{LnROA} = &-1.765 + 0.294\text{Ln}(\text{growth}) - 0.052\text{Ln}(\text{Liquidity}) \\ &- 1.188\text{Ln}(\text{leverage}) - 0.078\text{Ln}(\text{Tangibility}) \\ &+ 1.277\text{Ln}(\text{Lease}) - 17.15\text{Ln}(\text{Fuel}) + 14.914\text{Ln}(\text{personnel}) + \varepsilon \end{aligned}$$

Table 5. Estimated results for profitability model of aero airline.

Variable	Parameter Estimates
Growth	0.294*** [0.000]
Liquidity	-0.052 [0.325]
Leverage	1.188*** [0.000]
Lease Cost	1.277 [0.158]
Tangibility	-0.078*** [0.000]
Fuel Cost	-17.155 [0.088]
Personnel Cost	14.914 [0.83]
Constant	-1.765 [0.567]
R ²	0.836
Adjusted R ²	0.698

1. Model: dependent variable = $\text{Log}_{10}(\text{ROA})$; 2. standard errors in brackets are robust to heteroskedasticity and serial correlation; 3. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; statistics of the first stage.

Table 6. Estimated results for profitability model of medview airline.

Variable	Parameter Estimates
Growth	0.165*** [0.000]
Liquidity	0.008 [0.155]
Leverage	-0.076*** [0.008]
Lease Cost	0.298*** [0.000]
Tangibility	-0.083 [0.194]
Fuel Cost	0.459* [0.044]

Continued

Personnel Cost	-0.541*** [0.000]
Constant	2.546*** [0.001]
R ²	0.894
Adjusted R ²	0.798

1. Model: dependent variable = $\text{Log}_{10}(\text{ROA})$; 2. standard errors in brackets are robust to heteroskedasticity and serial correlation; 3. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; statistics of the first stage.

On the other hand liquidity, aircraft lease cost, fuel cost and personnel cost are not significant during the study period for Aero Contractors and liquidity, tangibility is not significant during the study period for Medview airline.

Medview Airline Profitability Model:

$$\begin{aligned} \text{LnROA} = & 2.546 + 0.165\text{Ln}growth + 0.008\text{Ln}Liquidity \\ & - 0.076\text{Ln}leverage - 0.083\text{Ln}Tangibility \\ & + 0.298\text{Ln}Lease + 0.459\text{Ln}Fuel - 0.541\text{Ln}personnel + \varepsilon \end{aligned}$$

3.3. Discussion

The impact of liquidity on profitability is expected to be negative and significant as a current asset has a low return. As expected liquidity is insignificant, but the sign is negative (-0.052) for Aero Contractors and also statistically insignificant for Medview but with a positive parameter estimate (0.008). The regression coefficient of this explanatory variable for Medview suggests a positive relationship between the liquidity of assets and ROA during the studied period. The low liquidity level may lead to increased financial costs and result in the reduction of profitability and the finding of this research is consistence with [24] [25], in which a greater level of liquidity is associated with the financial strength. On the other hand, the research by [1] [21] showed that a higher level of liquidity is associated with decreased profitability.

As shown in the financial statement of the airlines in NCAA documents most of the aircraft are collateralized by different loans. If, the operation or inflow of cash is not gone as is maintaining sufficient liquid assets is obligatory, to cover thus severe obligations and as well as holding enough amount of liquid assets is mandatory due to the airline's current obligation is high for current inputs of the operation, that includes crew and employee-related costs, overflying charges by various governments, airport and landing charges and fuel. This fact forces the airline to hold more liquid assets, as any failure to settle claims could result in a penalty, various operational hassles and costs. To overcome the issue in Nigerian airlines, the CBN expects the airline to consultate their treasury at a particular limit, to handle both the inflow and outflow of the most liquid asset or cash.

The coefficient of leverage ratio which is measured by total debt to total asset

was positive (1.188) for Aero Contractors and negative (-0.076) for Medview airline, both were statistically significant at a 5% significance level. The coefficient of the leverage (-0.076) adversely affects Medview airline's profitability. Considering pecking order theory, there would be a negative relationship between leverage and profitability. The theory is supported by the findings of [21] concluded that airlines' capital structure and profitability have a negative correlation. Similarly, the airline's financial performance is influenced by the level of debt [1]. Besides the finding of this study is consistent too for only Medview airline. Moreover, the result was also consistent with the existing reality in the airlines industry, which shows the existence of the inverse relationship between the level of leverage and profitability i.e., the most profitable airlines were those with lower fixed costs or burdens. That means an increase in leverage leads to a reduction in profitability by increasing the fixed cost burden to Aero Contractors, which raises the breakeven point of the airline operation and puts undue pressure on airlines to achieve their ultimate goal of expanding their market frontiers.

The coefficient of tangibility is negative for Aero Contractors (-0.078) which is as expected and it implies that as the portion of the tangibility of assets increases and keeps other things fixed Aero Contractors' profitability decreases which are measured by return on assets. The same inference is drawn for Medview airline with a coefficient of -0.083 (though not statistically significant). This result is consistent with the results of other studies by [1]. Tangibility is defined as the ratio of fixed assets to total assets. So, when a Nigerian airline increases its tangible assets, it could be interpreted as a firm with a higher potential for debt financing. Firms with a higher level of tangible assets are potentially motivated to employ more debt financing. Debt and Nigerian airline profitability have an inverse relation. So, considering the pecking order theory, there would be a negative relationship between leverage and profitability. In the meantime as the tangibility of assets increases, there would be a higher potential for debt financing which could adversely affect the profitability of a firm.

There is a positive relation between Lease cost and profitability. One would expect that the impact of lease cost on profitability is negative by expecting the opportunity of lease flexibility but that is contrary to the estimation result of this study. As per the regression result, the coefficient of the lease cost is 1.277 and 0.298 for Aero Contractors and Medview airlines respectively. Meaning when lease cost goes up by one per cent profitability also goes up by 1.3% and 0.3% for Aero Contractors and Medview airlines respectively, but the level of significance is negligible. There is a negative relationship between fuel cost and profitability for Aero Contractors. Fuel is the largest single cost during the studied period and this cost is driven by the ASK as well as the price of fuel per barrel. Referring to previous empirical studies, it isn't consistent with [22] [26] and other similar studies. Airline management should be concerned with acquiring fuel-efficient aircraft, reducing the payload, optimizing the flight routes, Regular aircraft maintenance, and fuel tinkering or buying extra fuel in countries where the fuel is

cheaper. There is a negative relation between personnel cost and profitability. One would expect that the impact of personnel on profitability is negative by the huge cost of acquiring licenses and certifications by airline personnel. As per the regression result the coefficient of personnel cost -0.541 for Medview. Meaning when personnel cost goes up by one per cent profitability also goes down by 0.5% for Medview airline, and it is statistically significant even at 0.001%.

4. Conclusion and Suggestions

Therefore, this research investigated the factors affecting the profitability of Nigerian airlines and to what extent these determinants affect their profitability during the period. In doing so, previous studies on airlines' profitability were reviewed and it was discovered that the profitability of airlines is affected by both internal and external factors. Studies dealing with internal determinants employ variables such as growth, liquid, leverage, asset tangibility, fuel cost, lease cost, personnel cost, and external determinants of profitability which were not captured by this study were adjudged to be the main reasons while Nigerian Airlines don't survive too long. The factors that were used in this study include growth, liquidity, leverage, the tangibility of assets, aircraft lease cost, fuel cost and personnel cost as a determinant of the profitability of Nigerian airlines. The research was mainly based on the quantitative research method. The quantitative data were obtained from Nigeria Civil Aviation Authority (NCAA), published annual reports, various reports of the airline and IATA annual reports. To test the effect of independent variables on the dependent one quantitatively, log-linear regression analysis is used. As per the profitability estimation result, ROA is taken into account as the profitability proxy, the R-square are 83.6% and 89.4% respectively Aero contractors and Medview airline representing that 83.6% and 89.4% of the changes in the profitability of the Aero contractors and Medview in the sample could be explained by the changes in the independent variables of the study namely growth, liquidity, leverage, lease, tangibility, fuel cost and personnel cost. Besides the total of the explanatory variables, growth, leverage and tangibility are statically significant at a 5% level of significant Aero Contractors. However, the variables of growth, leverage, lease cost, fuel cost and personnel cost are statically significant at a 5% level of significance for Medview airlines. The major objective of this paper was to investigate determinants of airline profitability in Nigeria. However the variables included in the analysis aren't the only factors affecting profitability. For researchers who are interested for further study, it is highly recommended that they replicate by adding more variables like macro-economic variables, management efficiency, overflying and landing charges, fleet type & ages, maintenance cost and other variables. Also scenario analysis of airline operations at various political regime is equally suggested.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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