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# Airline fuel prices volatility impacting the profitability in India

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**ABSTRACT:**
**Purpose:** The purpose of the research is to understand if there is any impact of air-fuel prices on the profitability of airlines in India.

**Design/methodology/approach:** A review of literature has been conducted on various related articles to understand the gap. After analysing the gap, we collected secondary data from screener.com and annual reports of the airline companies and generated correlation and regression analysis on excel.

**Findings:**The research analysis has helped us determine that there is certainly an impact of air fuel prices on the profitability of the airline industry through correlation and regression calculations. The impact is evident but not to a greater extent that it majorly affects the profitability of the airline companies. It is understood that several other factors affect the profitability and air fuel prices in one among the factors.

**Originality/value:** To the best of authors knowledge, as there was data on air fuel prices on foreign airlines but not much on Indian airline companies. This study is unique as the study considers the past five financial years' data to study the impact of air-fuel prices on profitability of Indian Airline companies.

**Keywords:** Indian Airline Industry, Air fuel prices, ROIC, Ancillary revenue

## Introduction

The aviation industry has an important role in the global economy which offers efficient travel options. However, the industry faces a significant challenge due to the unpredictable fluctuations in the price of aviation fuel. The price of air fuel is one of the most significant expenses for airlines, and it is heavily dependent on several factors such as political tensions, demand and supply dynamics, and changes in crude oil prices. When fuel prices increase, airlines may have to raise ticket prices or cut costs to maintain their profits. Conversely, when fuel prices decrease, airlines can lower ticket prices or invest in other business areas. Therefore, fuel price volatility is a critical issue for aviation companies, and they must manage this risk to remain profitable in a competitive market.

According to (Chevron Products Company, 2007) Airline Fuel is a refined by-product of crude oil or petroleum used to power aeroplanes. It must meet performance criteria for both the rich mixture conditions necessary for take-off power settings and the cleaner mixture conditions utilized during a cruise to save fuel consumption. The basic functions of aviation turbine fuel (jet fuel) are to power an aircraft, as well as to provide energy and improve combustion quality. Other important product performance characteristics include stability, lubricity, fluidity, volatility, non-corrosivity, and cleanliness. Fuel is utilised as a hydraulic fluid in engine control systems and as a coolant for some fuel system components, in addition to being a source of energy.

According to (Maung Yee Shwe Yun et al., 2022) because of the cyclicality nature of the industry, risk of air fuel exposure significantly impacts the airlines' performance outcomes. They also examine that although there are regulatory changes in the global and economic world has helped the airline to grow capacity, profitability has been stagnant. The full-service network carriers are facing the trade-off between the growth and operating profits but low-cost carriers are growing as well as adding on to the profitability.

In India due to liberalisation and globalisation the aviation industry grew tremendously as it attracted many business tycoons. In the last four years, this industry has flourished and has become one of the fast-growing industries in the country. According to (Tale, 2023) as per the data of FY 2022-23 there has been a growth of 104.24% in the airline industry and Indian airports have the capacity to accommodate 1 billion passengers annually. The air traffic movement for the first quarter has been 613,566 during the financial year 2022-23 indicating that the Indian aviation sector has fully recovered from the COVID-19 pandemic.in the upcoming ten years, India, which now has the seventh-largest civil aviation industry in the world, would be able to overtake the United States as the third-largest civil aviation market. With the highest market share, IndiGo is the largest airline carrier in India. India has overtaken the UK to become the world's third-largest domestic aviation market and is expected to overtake it by 2024. The civil aviation sector in India is expanding in many areas, but there are still many hurdles to overcome. However, the recent hike in jet fuel prices in India has added to the challenges faced by the aviation industry.

According to the (The Economic Times, 2023) it reports that India's state-owned oil marketing companies have raised the price of aviation turbine fuel (ATF) or jet fuel by 4% with effect from midnight of August 31, 2021. According to the report, this is the seventh consecutive increase in jet fuel prices since May this year. The hike in price comes after a recent surge in global crude oil prices, which have been driven up by an increase in demand as economies continue to recover from the COVID-19 pandemic. The article goes on to state that the increase in jet fuel prices is likely to have an impact on the domestic aviation sector, which has already been struggling due to the pandemic. The report also notes that the Indian aviation sector has been lobbying the government to reduce taxes on jet fuel to help ease the financial burden on airlines. However, the government has so far not taken any action on this front. The air transportation industry is heavily dependent on oil prices as the cost of fuel is one of the most significant expenses for airlines. When oil prices increase, airlines face higher operating costs, which can lead to decreased profitability or even financial losses. Conversely, when oil prices decrease, airlines can benefit from lower operating costs and increased profitability.

According to (Kar & Khandelwal, 2020) in order to offset this risk airlines may engage in fuel hedging, which involves purchasing fuel at a fixed price for a certain period. This can help airlines mitigate the impact of sudden changes in oil prices, but it can also result in losses if the price of oil drops below the fixed price. Flight schedules: Airlines may adjust their flight schedules in response to changes in oil prices. For example, they may reduce the number of flights or use smaller aircraft to save on fuel costs. Aircraft design- Aircraft manufacturers are constantly developing new technologies to improve fuel efficiency and reduce the impact of oil prices on the industry. This includes the use of lighter materials, more efficient engines, and aerodynamic design improvements. Overall, the impact of oil prices on the air transportation industry is significant and far-reaching. It affects everything from ticket prices to flight schedules to aircraft design, and airlines must carefully manage their costs and adapt to changes in oil prices to remain competitive and profitable.

As per the article published by the McKinsey&Company on the parameters of the profitability for the airline industry, which are ROIC (Return On Invested Capital), and ancillary service revenue (revenue earned from non-ticket sources). In this research article, we have taken these parameters as profitability parameters of the airline industry for four Indian companies, namely InterGlobe Aviation Limited, Blue Dart Aviation, Global Vectra Helicorp Limited, SpiceJet. The data has been collected from the annual reports of the companies.

After the analysis we can conclude that there is impact of air fuel prices on the profitability of airline companies but not to the significant level as there are other factors which impacts the profitability like the geopolitical issues.

**Literature Review**

The aviation industry in India has experienced tremendous growth due to liberalization and globalization. In the past four years, the industry has flourished and has become one of the fastest-growing industries in the country. According to (Sharma Anu, 2023) domestic air travel has increased by 47% to 123.2 million in the year 2022, indicating a significant boost in the aviation industry, which had been dampened after the COVID-19 pandemic hit.

Furthermore, as per the data for FY 2022-23, there is a growth of 104.24% in the industry, and India's airports have the capacity to accommodate 1 billion passengers annually, as stated by (Tale, 2023). The air traffic movement, which stood at 613,566 in the first quarter of FY 2022-23, indicates that the Indian aviation sector has fully recovered from the COVID-19 pandemic.

India now has the seventh-largest civil aviation industry in the world and is expected to overtake the United States as the third-largest civil aviation market in the next ten years, according to (Tale, 2023).With the highest market share, IndiGo is the largest airline carrier in India. India has overtaken the UK to become the world's third-largest domestic aviation market and is expected to overtake it by 2024.Despite the expansion of the civil aviation sector in India, there are still many hurdles to overcome, as mentioned by (Tale, 2023). However, the growth in domestic air travel and the recovery of the industry after the COVID-19 pandemic are positive signs for the future of the aviation industry in India.

Jet fuel is a significant operating cost for airlines and is subject to fluctuations in global oil prices and other market factors (Piranti, 2021). For the Indian airline industry, changes in oil prices can lead to significant fluctuations in profitability, making it necessary to develop a hedging strategy to minimize financial risk and improve stability(Daphatary & Appalaraju, 2020) .The use of oil derivatives, such as futures and options contracts, can provide airlines with a way to hedge against price fluctuations and reduce their exposure to oil price volatility.Low-cost airlines, which typically operate with a lower cost structure than traditional airlines, are not immune to fuel price volatility, as fuel costs are a key component of their expenses (Piranti, 2021). Both low-cost and traditional airlines must carefully manage their fuel costs and adapt to changing market conditions to remain competitive and financially viable.

In recent years, jet fuel prices have experienced significant volatility due to geopolitical tensions, changes in global oil supply and demand, and the COVID-19 pandemic(Piranti, 2021) . The pandemic led to a sharp decline in air travel demand, resulting in a decrease in jet fuel prices due to oversupply. However, as air travel has started to recover, jet fuel prices have begun to rise again, although they remain lower than pre-pandemic levels.

Managing fuel costs is critical for airlines' financial performance and operational efficiency, and both low-cost and traditional airlines must develop strategies to manage the impact of fuel price volatility on their profitability (Piranti, 2021; Daphatary & Appalaraju, 2020). For Indian airlines, the use of oil derivatives and a combination of short-term and long-term hedging can help maximize shareholder returns by reducing exposure to oil price fluctuations and improving financial stability (Daphatary & Appalaraju, 2020).

The impact of jet fuel prices and macroeconomic variables on the profitability of airline companies has been studied extensively. Putra and Suhadak (2017) found that jet fuel prices had a significant negative effect on airline profitability, while macroeconomic variables such as GDP, inflation, and exchange rates had mixed effects on profitability. The study also suggests that airline companies can use hedging strategies to mitigate the negative impact of fuel price volatility on their profitability.

Airline industry has been impacted by the COVID-19 pandemic, leading to a drop in air fuel prices to 50% of the original price due to the suspension of operations (Shetty & Shetty, 2021). During the lockdown, the airline industry faced a loss of 240 billion rupees from March 25, 2020, to May 24, 2020 (Agarwal Anshu, 2020) , with daily losses of 2.67 to 3 billion rupees during the extended lockdown period.

As economies reopened, the demand for the aviation industry increased, leading to a surge in oil prices. CNBC (2022) reported that while airline companies did have good revenues, their profits were still not good due to the hike in oil prices. The rating agency ICRA estimated a loss of 15000 crore to 17000 crore rupees in the financial year 2022-2023 due to the surge in fuel prices (FortuneIndia, 2023). Low-cost airlines have been impacted the most due to the hike in fuel prices, as their revenue generated from ticket fees goes into paying for air fuel only (Georgiadis Philip, 2019).

(Kathiravan et al., 2019) observed that there is a direct relationship between stock prices and air fuel prices. When there is a fluctuation in the price of air fuel, there will be an impact on the returns from the stock. Fuel prices lead to an increase in operating costs, which would lead to a reduction in the profitability of the airline businesses.

(Sen Pritha & Rungta Anushree, 2019) researched the financial performance evaluation of the Indian aviation industry and found that return on assets, operating profit margin, and return on equity have an impact on the profits of the companies and are correlated to net profit margin.

Many airlines hedge on fuel strategy against fuel prices, which has helped reduce the volatility of fuel prices and minimize their impact on profitability (Samunderu et al., 2023). Overall, these studies provide insights into the complex interactions between various economic factors that affect the airline industry's financial performance.

Fuel price uncertainty is a major challenge that airlines face when it comes to strategic planning (Naumann & Suhl, 2013) . The price of fuel is highly volatile and can fluctuate rapidly, making it difficult for airlines to predict their operating costs and revenues. Fuel prices have a significant impact on an airline's profitability and competitiveness. Higher fuel costs can increase an airline's expenses, which can lead to lower profits or even losses. This can force airlines to raise ticket prices, reduce services, or even go out of business. To mitigate the impact of fuel price uncertainty, airlines typically use various strategies such as fuel hedging, fleet optimization, and route planning.

Fuel hedging involves locking in fuel prices through contracts, while fleet optimization involves choosing aircraft that are more fuel-efficient. Route planning involves choosing routes that are more fuel-efficient and avoiding routes with higher fuel costs. The practice of fuel hedging, which involves purchasing fuel in advance to lock in prices and mitigate the risk of price volatility, has been a popular strategy for airlines to manage their fuel costs (Carter et al., 2002). However, there has been debate about whether fuel hedging actually makes economic sense for the US airline industry.

A study conducted by researchers at the Massachusetts Institute of Technology (MIT) analysed the fuel hedging practices of major US airlines between 1996 and 2015 (Carter et al., 2002). The study found that fuel hedging did, in fact, provide economic benefits to airlines, particularly during times of high fuel price volatility. Specifically, the study found that airlines with higher levels of fuel hedging had lower fuel costs, higher profitability, and a lower risk of bankruptcy. The benefits of fuel hedging were most pronounced during periods of high fuel price volatility, which are typically associated with greater uncertainty in the global oil market.

Overall, the study suggests that fuel hedging can be an effective tool for airlines to manage their fuel costs and reduce their exposure to price volatility, particularly during times of economic uncertainty. However, the effectiveness of fuel hedging may change due to various factors,which includes the size of an airline's fuel budget, the degree of price volatility in the market, and the specific hedging strategies employed. In conclusion, the ability to effectively manage fuel costs can be a key factor in an airline's long-term success and profitability.

Fuel hedging is a common practice among airlines to protect against sudden increases in oil prices caused by external factors such as geopolitical tensions or armed conflicts (Morrell & Swan, 2006). However, this practice has been challenged, and there is little scientific support for this behaviour. While hedging can transfer funds from one period to the next and protect against economic downturns, it may raise uncertainty if oil price surges are due to supply restrictions or robust economic conditions. On the other hand, not hedging exposes airlines to liquidity risks, dividend risks, and competitiveness threats, as well as the absence of potential contracts for aircraft turbine fuel (ATF) (Cobbs & Wolf, 2004). Forwards and swaps are non-exchange traded options that can be used for hedging, as emphasized in the study.

Despite the prevalence of fuel hedging in the aviation sector, previous research has not examined whether it is beneficial for airline operations(Lim & Hong, 2014) . However, Lim and Hong's study on US airlines from 2000 to 2012 found that fuel-hedging airlines have reduced operating costs by around 9-12%, although this effect is statistically insignificant after accounting for cost inefficiency. The study concludes that US carriers can lower operating expenses by an average of 12-14% per year, regardless of their hedging status.

In the Indian aviation industry, the high prices of ATF and intense competition have led to loss-making airline companies. Despite policy impetus, airlines are reluctant to import ATF due to infrastructural constraints and uncertainty about cost savings(Kar & Khandelwal, 2020) . Thus, the cross-hedging of ATF price exposures with crude oil and Brent oil futures may be a viable strategy for Indian airline companies to mitigate risks and improve their financial performance.

Inflation has been on the rise globally, affecting several countries, including members of the OECD. In June, inflation reached a 30-year high of 10.3% for the 38 countries that are members of the OECD, representing around half of global GDP (Download, n.d.). According to (Welsh Jonathan, 2022) Jet fuel prices have been hit even harder, with inflation in the price of jet fuel reaching 128% in June, more than doubled from a year ago.

According to (Mckensey&Company, 2022) the return of airline travel worldwide has caused a surge in demand for jet-A fuel. However, the booming freight and shipping markets are also competing for diesel fuel, leading to limited supply and higher prices for both industries. As the summer driving season arrives, gasoline production will further strain the market as it competes for crude supply.

According to (Pande Pranjal, 2022) high fuel prices can be painful for airlines in the short term. Fuel is the single largest operational expense for airlines, accounting for anywhere between 30% and 60% of expenditure in an average year. However, airlines have remained profitable in times of high and low fuel prices in the past. Getting capacity deployment right is important, especially with the due to the requirements to be environmentally friendly and reduce emissions. Operating ghost flights is becoming untenable, and flying marginally profitable markets is less appealing. Higher interest rates and inflation will also create pressure as the cost of borrowing to support an unprofitable operation may compound into future earnings challenges. Some passengers might be better protected than others due to a strategy known as hedging. This strategy involves agreeing to buy jet fuel at a set price in advance to avoid sudden events such as rising fuel prices.

**Research gap**

After thorough examination of the published articles sufficient information was not provided on the relationship between fuel prices and the profitability of the airline industry. Data on the profitability of Indian Airline companies are relatively less. There is a gap in understanding how the aviation industry can alter the operations to minimize the negative effects of air fuel prices. What is the relationship in profitability to the recent price hikes and how has the industry managed to overcome this sudden hike. The fluctuation in price of Jet fuel could be analyzed through literature review but it did not specify the impact directly on the profitability of Indian Airline companies. Precise information on the effect of the fuel price does not exist. The fact that the price of fuel fluctuations affect profitability is evident but the facts are blatant and does not cover methods to overcome it. The research findings must show relevance to the outcome of how price affects profitability. Several theories and policies need to be analyzed to derive the knowledge on the air fuel prices and their fluctuations. The research is mainly focused on Indian airline companies as that is a lack of information relating to them.

**Research objective:**
The research objective is to analyze the impact of fluctuations in aviation fuel prices on the profitability of airline industries. Specifically, the study aims to identify the key factors that contribute to these fluctuations, the extent to which they affect airline operations and the resulting profitability of airlines. The research will also seek to determine whether there are any differences in the impact of fuel price fluctuations on different types of airlines and also following relationship have been established in the research:

- To understand the relationship between air fuel prices and the profitability
- To understand the relationship of air-fuel and ROIC of the airline companies.
- To understand the relationship of air fuel prices and ancillary service revenue of the airline companies
- To offer strategies to manage fuel prices impact on airline company profits

**Research methodology:**
A review of literature has been conducted on various related articles to understand the research gap and secondary data has been collected for the research.

**Sample Selection:**
The research is done on secondary data. The data for the research is taken from the annual reports of the companies and from screener.com for five years for the four airline companies namely Indigo, Blue Dart, Global Vectra and SpiceJet. The data of ROIC and the Ancillary revenue has been calculated from the notes of annual reports of the airline companies.

**Sources of Data:**
The source of the data has been collected is annual reports and the website called screener.com for five years from the financial year 2018 to 2022 for the relevant airline companies

**Period of Study:**
The period of study is for five years from the financial year 2018 to 2022 for air fuel, ROIC and ancillary services.

**Tools used for study:**
In the study, a regression tool and correlation tool have been used. The regression and correlation analysis has been done on Microsoft excel.

**Research analysis:**
**Correlation Interpretation:**
Table 1 shows the correlation between air fuel prices and profits of Indigo, from the table it is clear that there is a positive correlation between the air fuel prices and profits of Indigo at 46%.
Table 2 shows the correlation between air fuel prices and profits of Blue Dart , from the table it is clear that there is a positive correlation between the air fuel prices and profits of Blue Dart at 58%.
Table 3 shows the correlation between air fuel prices and profits of Global Vectra , from the table it is clear that there is a positive correlation between the air fuel prices and profits of Blue Dart at 85%.
Table 4 shows the correlation between air and profits of SpiceJet, from the table it is clear that there is a negative correlation between the air fuel prices and profits of SpiceJet at 43%.

**Regression Interpretation:**
The Table 5 shows regression statistics as per the value indicates model fitness the R square value is 0.218295 this indicates 21.82% variation in the Indigo profits is explained by air fuel prices. The adjusted R square is nothing but R square adjusted for standard error.

The table 6 shows results of Anova which indicates the strength of the regression model. The results indicate the model fitness is weak as the computed significant F value 0.42 is greater than 0.05 this is because it is not only air fuel prices that influences the profit but there are other factors as well.

The table 7 shows the regression coefficients from this table regression equation can be obtained as follows y=-6147.74+0.465379 this indicates every unit change causes 0.46 variation in profits of Indigo.

Regression statistics are shown in Table 8 in accordance with the value indicating model fitness; the R square value is 0.347673. So, it can be concluded that air fuel prices account for 34.76% of the volatility in Blue Dart profitability. The R square is simply adjusted for standard error to produce the adjusted R square.

Table 9 displays the Anova results, which demonstrate the robustness of the regression model. The findings show that the model's fitness is poor, as indicated by the computed significant F value of 0.29 being higher than 0.05. This is due to the fact that other factors besides air fuel prices also have an impact on profit.

The regression coefficients from this table's regression equation are displayed in Table 10 as follows. y=-549.596+0.876535 This means that Blue Dart's profits vary by 0.87 for every change in unit.

The table 11 indicates the regression statistics as per the value indicates model fitness R square value is 0.726539 this indicates a 72% variation in the Global Vectra Helicorp profits is explained by air fuel prices. The adjusted R square is nothing but R square adjusted for standard error.

The table 12 shows results of Anova which indicates the strength of the regression model. The results indicate the model fitness is weak as the computed significance F value 0.066 is greater than 0.05 this is because it is not only air fuel prices that influences the profit but there are other factors as well.

The table 13 shows the regression coefficients from this table regression equation can be obtained as follows y= -56.9267+3.574174 this indicates every unit change causes 3.5variation in profits of Global Vectra Helicorp.

The model fitness R square value for the regression statistics in Table 14 is 0.190827, which means that a 19% variance in Spice Jet earnings is explained by air fuel prices. The R square is simply adjusted for standard error to produce the adjusted R square.

The Anova results in Table 15 demonstrate the robustness of the regression model. The findings show that the model's fitness is poor, as indicated by the estimated significant F value of 0.46 being higher than 0.05. This is due to the fact that other factors besides air fuel prices also have an impact on profit.

The regression coefficients from this table are displayed in table 16 Here is how a regression equation can be found. y= 485.7549+ (-0.32991) means that any change in unit generates a 3.5variation in Spice Jet's income.

Table 17 displays the correlation between Indigo's air fuel costs, ROIC, and ancillary revenue. From this table, it is clear that there is a positive correlation of 34% between Indigo's air fuel costs and ROIC and a positive correlation of 75% between Indigo's air fuel costs and ancillary income.

The table 18 shows the correlation between the air fuel prices, ROIC and ancillary revenue of Blue Dart from this table we can understand that there is negative correlation between the air fuel prices and ROIC of the Blue Dart of 20% and there is positive correlation between air fuel prices and the ancillary revenue of Indigo of 43%

Table 19 displays the correlation between Global Vectra's air fuel costs, ROIC, and ancillary revenue. Based on this table, we can deduce that there is a positive correlation of 81% between these costs and ROIC, and a negative correlation of 5% between these costs and ancillary revenue.

The correlation between SpiceJet's air fuel costs, ROIC, and ancillary revenue is shown in Table 20. From this table, we can deduce that there is a positive correlation of 8% between SpiceJet's air fuel costs and ROIC and a positive correlation of 35% between SpiceJet's air fuel costs and ancillary revenue.

**Research Findings:**

The research analysis has helped us determine that there is certainly an impact of air fuel prices on the profitability of the airline industry through correlation and regression calculations. The impact is evident but not to a greater extent that it majorly affects the profitability of the airline companies. It is understood that several other factors affect the profitability and air fuel prices in one among the factors.

**Conclusion:**

The objective of this research was to find the relationship between the air-fuel price fluctuations and how it affects the profitability of Indian airline companies as India is one of the highest importers of fuel. The research was conducted to determine if the recent hike in air-fuel prices had a severe impact on the profitability of the airline industry of the country. Research was conducted based on the data of the net profit, ROIC and ancillary service revenue of the airline companies to understand the relationship with air-fuel prices.The data was collected from the annual reports of the airline companies.From the research we got the insight that there is an impact of air-fuel prices on the profitability but not to a significant extent which means the profitability is impacted from various other factors as well. For future research the study could be done on how to reduce the impact of air fuel prices and management strategies that need to be adopted by the airlines in order to mitigate this risk.

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**Research analysis:**

| fuel expenses | Indigo | Fuel expenses2 | Blue Dart | Fuel expenses | Global Vectra | Fuel Expenses4 | Spice Jet |
|---|---|---|---|---|---|---|---|
| 7,760.14 | 2,242 | 657.86 | 142.1 | 12.1133 | -1.72 | 2432.627 | 566.65 |
| 11,942.79 | 156 | 743.22 | 87.6 | 17.6072 | 7.02 | 3445.252 | -316.08 |
| 12,453.79 | -248 | 797.70 | -38.29 | 16.7985 | 2.08 | 4616.203 | -934.76 |
| 3,031.28 | -5,830 | 757.20 | 96.31 | 9.7060 | -29.28 | 1528.835 | -99.83 |
| 9,695.24 | -6,171 | 936.78 | 376.44 | 15.7619 | -5.44 | 2945.778 | -1725.47 |

**Correlation:**

Table 1:

| | *Air Fuel Prices* | *Indigo Profits* |
|---|---|---|
| Air Fuel Prices | 1 | |
| Indigo Profits | 0.46722 | 1 |

Table 2:

| | *Air Fuel Prices* | *Blue Dart Profits* |
|---|---|---|
| Air Fuel Prices | 1 | |
| Blue Dart Profits | 0.589638 | 1<br>1 |

Table 3:

| | *Air Fuel Prices* | *Global Vectra Profits* |
|---|---|---|
| Air Fuel Prices | 1 | |
| Global Vectra Profits | 0.852373 | 1 |

Table 4:

| | *Air Fuel Prices* | *Spice Jet Profits* |
|---|---|---|
| Air Fuel Prices | 1 | |
| Spice Jet Profits | -0.43684 | 1 |

**SUMMARY OUTPUT**

Table 5:

| *Regression Statistics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Multiple R | 0.46722 | | | | | | | |
| R Square | 0.218295 | | | | | | | |
| Adjusted R Square | -0.04227 | | | | | | | |
| Standard Error | 3879.962 | | | | | | | |
| Observations | 5 | | | | | | | |

| ANOVA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *df* | *SS* | *MS* | *F* | *Significance F* | | | |
| Regression | 1 | 12611796.89 | 12611797 | 0.837764774 | 0.427530421 | | | |
| Residual | 3 | 45162307.91 | 15054103 | | | | | |
| Total | 4 | 57774104.8 | | | | | | |

Table 6:

Table 7:

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -6147.74 | 4882.854695 | -1.2590466 | 0.297068455 | -21687.16457 | 9391.681197 | -21687.16 | 9391.681 |
| X Variable 1 | 0.465379 | 0.508446881 | 0.9152949 | 0.427530421 | -1.152726055 | 2.083483741 | -1.152726 | 2.083484 |

**SUMMARY OUTPUT**

Table 8:

| *Regression Statistics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Multiple R | 0.589638 | | | | | | | |
| R Square | 0.347673 | | | | | | | |
| Adjusted R Square | 0.130231 | | | | | | | |
| Standard Error | 141.5096 | | | | | | | |
| Observations | 5 | | | | | | | |

Table 9:

| ANOVA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *df* | *SS* | *MS* | *F* | *Significance F* | | | |
| Regression | 1 | 32018.37843 | 32018.378 | 1.598922819 | 0.29536212 | | | |
| Residual | 3 | 60074.90425 | 20024.968 | | | | | |
| Total | 4 | 92093.28268 | | | | | | |

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -549.596 | 543.3863749 | -1.011428 | 0.386303712 | -2278.894178 | 1179.701745 | -2278.894 | 1179.702 |
| X Variable 1 | 0.876535 | 0.693195285 | 1.2644852 | 0.29536212 | -1.329521596 | 3.082591953 | -1.329522 | 3.082592 |

Table 10:

Table 11:

**SUMMARY OUTPUT**

| *Regression Statistics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Multiple R | 0.852373 | | | | | | | |
| R Square | 0.726539 | | | | | | | |
| Adjusted R Square | 0.635386 | | | | | | | |
| Standard Error | 8.507308 | | | | | | | |
| Observations | 5 | | | | | | | |

Table 12:

| ANOVA | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *df* | *SS* | *MS* | *F* | *Significance F* | | | |
| Regression | 1 | 576.8592231 | 576.85922 | 7.970499718 | 0.066561774 | | | |
| Residual | 3 | 217.1228569 | 72.374286 | | | | | |
| Total | 4 | 793.98208 | | | | | | |

Table 13:

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | -56.9267 | 18.61988878 | -3.0573086 | 0.055109692 | -116.1835415 | 2.330050976 | -116.1835 | 2.330051 |
| X Variable 1 | 3.574174 | 1.265997796 | 2.8232073 | 0.066561774 | -0.454795731 | 7.603144287 | -0.454796 | 7.603144 |

**SUMMARY OUTPUT**

Table 14:

| *Regression Statistics* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Multiple R | 0.436837 | | | | | | | |
| R Square | 0.190827 | | | | | | | |
| Adjusted R Square | -0.0789 | | | | | | | |
| Standard Error | 902.9045 | | | | | | | |
| Observations | 5 | | | | | | | |
| table 15 | | | | | | | | |
| ANOVA | | | | | | | | |
| | *df* | *SS* | *MS* | *F* | *Significance F* | | | |
| Regression | 1 | 576770.3412 | 576770.34 | 0.707488385 | 0.462035481 | | | |
| Residual | 3 | 2445709.443 | 815236.48 | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Total | 4 | 3022479.784 | | | | | | |

Table 16:

| | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
|---|---|---|---|---|---|---|---|---|
| Intercept | 485.7549 | 1241.696203 | 0.3912027 | 0.721776722 | -3465.87661 | 4437.386375 | -3465.877 | 4437.386 |
| X Variable 1 | -0.32991 | 0.39222091 | -0.8411233 | 0.462035481 | -1.578128129 | 0.918315845 | -1.578128 | 0.918316 |

Table 17:

| | *Air Fuel Prices* | *ROIC of Indigo* | *Ancillary Revenue* |
|---|---|---|---|
| *Air Fuel Price* | 1 | | |
| *ROIC* | 0.347662121 | 1 | |
| *Ancillary Revenue* | 0.759843375 | -0.211061094 | 1 |

Table 18:

| | *Air Fuel Prices* | *ROIC of Blue Dart* | *Ancillary Revenue* |
|---|---|---|---|
| Air Fuel Price | 1 | | |
| ROIC | -0.205459142 | 1 | |
| Ancillary Revenue | 0.430719941 | 0.264459936 | 1 |

Table 19:

| | *Air Fuel Prices* | *ROIC of Global Vectra* | *Ancillary Revenue* |
|---|---|---|---|
| Column 1 | 1 | | |
| Column 2 | 0.814666558 | 1 | |
| Column 3 | -0.056341992 | -0.45661032 | 1 |

Table 20:

| | *Air Fuel Prices* | *ROIC of SpiceJet* | *Ancillary Revenue* |
|---|---|---|---|
| Air Fuel prices | 1 | | |
| ROIC | 0.082188631 | 1 | |
| Ancillary Revenue | -0.358839752 | -0.945953681 | 1 |