IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A STUDY ON THE IMPACT OF OIL DERIVATIVES ON THE INDIAN AIRLINE INDUSTRY AND DEVELOPING A HEDGING STRATEGY TO HELP AIRLINES MAXIMIZE SHAREHOLDER RETURNS

[1]Aadit Daphatary, [2]Dr. Middi Appalaraju,

[1]Student, [2]Professor

[1]School of Business and Management

[1]CHRIST (Deemed to be University), Bangalore, India

Abstract: This paper understands the concepts of derivatives, hedging and analyzes the Indian Aviation Sector in India. This paper reviews thirty published articles by renowned authors to further understand this field of research. This paper collects the data of Crude Oil prices, Aviation Turbine Fuel prices, Brent prices among others. This paper analyzes the data using models such as Descriptive Statistics, Correlation, Regression, GARCH Model, One-Way ANOVA Test, Unit Root Test, Co-integration and the Granger's Causality test. The analysis provides desirable results and helps further interpretation and analysis. The results of the analysis also help develop good strategies for airline companies. This paper finds that Crude Oil Prices and Aviation Turbine Fuel prices are highly positively related whose correlation is almost perfect positive (0.98 correlation). The Crude Oil daily future prices do not show any effect of GARCH which shows that its volatility is not significant. The GARCH of Aviation Turbine Fuel prices is significant which helps the authors develop a strategy. Finally, the authors recommend that airline companies use Crude Oil as a proxy hedge for Aviation Turbine Fuel. Hedging using this proxy will help airlines reduce uncertainties and aid better financial planning and provide higher shareholder's wealth.

Index Terms - Hedging, Derivatives, Crude Oil, Aviation Turbine Fuel, Proxy-hedge, Correlation, Regression.

I. INTRODUCTION

Oil is one of the most important commodities in the world in terms of trade, usage and defining economies. Oil at the same time is what shapes the Airline Industry. About 30-40% of the operating expenses of airlines comprise of oil. Indian Airline companies are no exception to this statistic. At times of low oil prices, airlines can generate higher profits thereby providing higher shareholder return both, in terms of dividend and EPS. At the same time, during times of high oil prices, the overall profitability of the airline reduces thereby also reducing shareholder return, both in terms of dividend and EPS. These further decrease shareholder value as well. Surging oil prices are reflected in terms of surging air ticket costs which reduce competitiveness and reduces customer base. The airline industry is one where profitability can be determined by oil prices. In most cases of loss, oil prices are the culprit. There, of course, are various other factors such as product/service offering, competitive pricing, rewards program among others however, operational costs arising of oil prices are something that airlines can control by hedging.

Airline companies sell tickets in advance thereby locking their revenues. However, oil is purchased on the spot market. In most industries, sales are determined based on various costs incurred by the company. However, the airline industry is one where one of its major costs is determined after its sales. This can have major cash flow implications and create major uncertainties. Airline companies are large and deal with very large amounts of cash daily. Even the slightest deviation can cause major liquidity and profitability issues.

By hedging using various financial derivative products airlines can reduce uncertainty and risk, lock in cash flows and determine liquidity requirements in advance. This will help airlines make financial decisions effectively and this will help in good financial planning. Unnecessary financial crises can be kept at bay by effectively using hedging strategies.

II. LITERATURE REVIEW

Effects of fluctuating fuel prices on the var of the Indian airline Industry - Rohan Gujar (Gujar, 2016)

This paper analyzes the effect of aviation fuel oil price on the Value at Risk (VaR) of the Indian Airlines Industry. It also talks about how VaR can be minimized by using derivatives as a hedging strategy. The author calculates the VaR of the airlines and also creates an index of the airlines. The author calculates the volatility of oil prices. The paper finds that there is a direct relationship between the prices of oil and the VaR. The author uses Pearson's correlation coefficient. Although ATF prices can be hedged, though indirectly, some investors can find it useful to calculate future ATF prices. This will only be necessary if the hedging strategy leads to an increase in the value of the airline company. This, in reality, as its underlying risk is that, would also be reflected in the higher intrinsic value. On the other hand, the stock volatility should be reduced if the ATF price is set or decreased as in India due to the market forces isolating prices to some degree. Nevertheless, it is clear that it is generally perceived that the stock of airlines engaged in hedging is less risky.

The final result of the research is that changes in oil prices has a positive relationship with the VaR and, airlines that hedge against oil prices tend to have a lower VaR than those who do not.

Airline Jet Fuel Hedging: Theory and Practice – Peter Morrell & William Swan (Morrell & Swan, 2006)

This paper addresses the fact that most airlines turn to hedging for gasoline. The paper disputes this notion and argues that there is little scientific rationale behind this behavior. The authors say that hedging certainly defends against unexpected oil price spikes due to geopolitical issues, conflicts or other global influences. At the same time, however, if oil price spikes are due to supply limitations or strong economic conditions, the authors argue that hedging in this situation would result in increased uncertainty. Hedging also helps move money from one time to the next, insures against recession and also talks favorably about the management's competence.

Jet Fuel Hedging Strategies: Options Available for Airlines and a Survey of Industry Practices – Richard Cobbs (Cobbs & Wolf, 2004)

This paper discusses the value of hedging. The paper highlights the importance of hedging for airline companies, since the carrier will be vulnerable to factors such as liquidity risks, dividend risks and competitiveness risks without the option of hedging. The paper also speaks about the lack of potential Aircraft Turbine Fuel (ATF) contracts. The paper emphasizes non-exchange traded options such as Forwards and Swaps as a suitable hedging method.

Fuel hedging and airline operating costs – Siew Hoon Lim & Yongtao Hong (Lim & Hong, 2014)

Fuel hedging is a common tool used to manage risk within the aviation industry. Nevertheless, past studies have not addressed the question of whether fuel hedging would provide any benefit for airline operations. This study is the first work that empirically looks into the role of fuel hedging in rising airline operating costs. Using data from US airlines from 2000 to 2012, the authors note that after adjusting for the consequences of cost inefficiency, fuel-hedging airlines have around 9–12 per cent lower operating costs, but this influence is statistically insignificant. Regardless of the hedging status, U.S. carriers will reduce operating costs by an average of 12–14 per cent per year without reducing efficiency.

III. RESEARCH METHODOLOGY

3.1 Research Objectives

This paper aims to achieve the following objectives:

- To identify the relationship between the pricing of crude oil and Aviation Turbine Fuel
- To study the volatility of Crude Oil and Aviation Turbine Fuel prices
- To find a good proxy commodity for Aviation Turbine Fuel in terms of Derivative Trading
- To devise a good derivative trading strategy for the proxy commodity

3.2 Statement of Problem

Indian Airline companies face heavy losses due to three key factors – Depreciation of the Rupee, Intense Competition and most of all, because of rising fuel prices. A Quartz India article speaks about this problem in detail. On October 1, 2018, Oil companies raised the price of Aviation Turbine Fuel (ATF) by 7.25% in relation with the global prices. This increment in oil prices causes several financial problems to airline companies as they are heavily dependent on oil for their functioning. Oil expense is one of the major operating expenses and any fluctuations in the prices of oil can cause its financials to dive into the red from green.

The oil market is very volatile due to various factors such as politics, geopolitical issues, economics amongst other which cause uncertainties. The airline may find it hard to forecast cash flows, apportion funds for meeting contingencies and may even need to block a pool of funds as a contingency reserve for oil price fluctuation. This causes the airline company to lock in crores of rupees in a contingency fund which cannot be utilized for any other operational purpose. Many companies may not even create these funds and may meet demands by borrowing which results in further interest expenses. If there was a possibility where the fund need not be created or the airline need not borrow, it can put its funds to a better purpose – a project having a good rate of return thereby helping the airline grow.

3.3 Scope of Problem

The problem of oil price fluctuation is faced by every single economy in the world. It affects foreign reserves of a country. It affects the domestic market, the consumer market, the international market and the international economy as a whole. Fluctuations in oil prices cause currency values to fluctuate, they create political issues, as seen in the Middle East and they even result in supply cuts to drive up oil prices. These fluctuations in the oil price causes stock markets to react and affects stock prices of various companies to a large extent.

This phenomenon affects all airline companies, both in India and abroad. It has a very large scope ranging right from small domestic airlines to large international companies operating hundreds of flights every single hour.

3.4 Variables

The variables used for the research are - Crude Oil Prices, Brent Prices, Aviation Turbine Fuel Price, Prices of Crude Oil daily futures contracts, Stock prices of Indigo Airlines and Stock prices of SpiceJet Airlines

3.5 Hypotheses

H0: There is no regression between Crude Oil Prices and ATF Prices
H1: There is regression between Crude Oil Prices and ATF Prices

H0: There is no Granger's causation between Crude Oil Price and ATF Price
H1: There is Granger's causation between Crude Oil Price and ATF Price

H0: There is no co-integration between Crude Oil Prices and ATF Prices
H1: There is co-integration between Crude Oil Prices and ATF Prices

H0: There is no effect of the GARCH Model on the price of crude oil
H1: There is an effect of the GARCH Model on the price of crude oil

H0: There is no effect of the GARCH Model on Price of Aviation Turbine Fuel
H1: There is an effect of the GARCH Model on Price of Aviation Turbine Fuel

H0: There is no effect of the GARCH Model on the Daily Crude Oil Future Price
H1: There is an effect of the GARCH Model on the Daily Crude Oil Future Price

3.6 Method of Data Collection

The data collected for this research is from secondary sources. Online resources such as Indexmundi, Investing.com, US Energy Information Administration, Moneycontrol.com and other such resources were used. These resources helped collect the historical prices of the commodities. Further, these resources were able to provide location and currency specific data.

3.7 Sampling Type and Sampling Size

The sample size is as follows:

Crude Oil Prices	Monthly values from Oct 2019 to Oct 2019 (10 years)
Brent prices	Monthly values from Oct 2019 to Oct 2019 (10 years)
WTI prices	Monthly values from Oct 2019 to Oct 2019 (10 years)
Aviation Turbine Fuel prices	Monthly values from Oct 2019 to Oct 2019 (10 years)
Prices of Daily Futures of Crude Oil contract	Daily values from 12 Dec 2011 to 1 Nov 2019
Stock price of Indigo Airlines	Daily values from 10 Nov 2015 to 30 Sep 2019
Stock price of SpiceJet Airlines	Daily values from 03 Jan 2010 to 27 Jan 2020

3.8 Statistical Tools

Tools such as Descriptive Statistics, Stationary Tests, ANOVA, Correlation, Regression, GARCG and Granger's Causality are used for the analysis of data in this paper.

3.9 Limitations of the Study

One of the limitations of this study is the estimation of the positive impact on shareholder's wealth if airline companies use the derivative hedging strategy. The data available on the public domain provides the total expense on airline fuel. However, it does not provide any specific details about the airline expenses such as monthly, quarterly etc. Further, the volatility of the airline stock price can be determined however, the volatility of airline stock prices is due to various factors such as economic factors, Governmental policies, demand & supply, competition etc. This paper does not help capture the specific impact of hedging using derivatives on the shareholder's wealth.

IV. RESULTS AND DISCUSSION

The relationship between Crude Oil Prices, Brent Prices and WTI Prices

	BRENTPRICE	WTIPRICE	CRUDEPRICE
BRENTPRICE	1	0.97257994914	0.99698345626
WTIPRICE	0.97257994914	1	0.98692871584
CRUDEPRICE	0.99698345626	0.98692871584	1

As it can be observed from the table above, all the 3 variables have a very high positive correlation. The correlation between Brent and Crude is almost perfect positive correlation. The correlation between WTI and Brent and WTI and Crude, too is very high. This is a positive result as it will help remove bias between which financial commodity to choose during strategy formation. As all the 3 variables are very closely related, the analysis can be done using any of the 3 variables.

The relationship between Crude Oil Prices and Aviation Turbine Fuel Prices (ATF):

Covariance Analysis: Ordinary
Date: 01/28/20 Time: 17:48
Sample: 2009M10 2019M10
Included observations: 121

Correlation t-Statistic	CRUDEPRICE	ATFPRICE
CRUDEPRICE	1.000000 -----	
ATFPRICE	0.984643 61.52513	1.000000 -----

As it can be seen, there is a very high positive correlation between the prices of ATF and Crude Oil. This is a desirable result as it will help develop proxy trading strategies in the future. This high correlation shows that the prices of both the variables move in the same direction in almost the same percentage increase/decrease. The correlation is almost perfect positive.

Regression between Crude Oil Prices and ATF Prices:

H0: There is no regression between Crude Oil Prices and ATF Prices
H1: There is regression between Crude Oil Prices and ATF Prices

Dependent Variable: DIFFATFPRICE
Method: Least Squares
Date: 01/28/20 Time: 18:03
Sample (adjusted): 2009M11 2019M10
Included observations: 120 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.206470	12.72140	0.723699	0.4707
DIFFCRUDEPRICE	1.049641	0.041532	25.27337	0.0000

R-squared	0.844069	Mean dependent var	14.52500
Adjusted R-squared	0.842747	S.D. dependent var	351.3719
S.E. of regression	139.3369	Akaike info criterion	12.72819
Sum squared resid	2290944.	Schwarz criterion	12.77465
Log likelihood	-761.6916	Hannan-Quinn criter.	12.74706
F-statistic	638.7431	Durbin-Watson stat	2.166193
Prob(F-statistic)	0.000000		

As we can see, the p value is less than 0.05, hence, H0 is rejected. Therefore, there is regression between Crude Oil Prices and ATF Prices. The Regression Equation for the same is: ATF = 9.2064 + 1.0496(Crude)
The dependent variable in this case is the Aviation Turbine Fuel price and the independent variable is the price of Crude Oil. The same regression model had been calculated using the non-stationary data as well. However, since the Akaike Information Criterion was more than the stationary data, it was rejected.

Granger's Causality:

H0: There is no Granger's causation between Crude Oil Price and ATF Price
H1: There is Granger's causation between Crude Oil Price and ATF Price

Pairwise Granger Causality Tests
Date: 01/28/20 Time: 18:17
Sample: 2009M10 2019M10
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DIFFCRUDEPRICE does not Granger Cause DIFFATFPRICE	118	1.70599	0.1862
DIFFATFPRICE does not Granger Cause DIFFCRUDEPRICE		0.08730	0.9165

As we can see, the p value is more than 0.05, hence, H0 is accepted. Therefore, there is no causality relationship between Crude Price and ATF Price. This is a positive result as this shows that both prices move independently of each other, however, towards the same direction (as shown in correlation)

Co-integration of Crude Oil Price and ATF Price:

H0: There is no co-integration between Crude Oil Prices and ATF Prices

H1: There is co-integration between Crude Oil Prices and ATF Prices

Date: 02/04/20 Time: 14:33
Sample (adjusted): 2010M04 2019M10
Included observations: 115 after adjustments
Trend assumption: Linear deterministic trend
Series: DIFCRUDEPRICE DIFATFPRICE
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.268851	59.35539	15.49471	0.0000
At most 1 *	0.183719	23.34459	3.841466	0.0000

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.268851	36.01080	14.26460	0.0000
At most 1 *	0.183719	23.34459	3.841466	0.0000

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

DIFCRUDEPRICE	DIFATFPRICE
-0.022802	0.021247
0.002837	0.003307

Unrestricted Adjustment Coefficients (alpha):

D(DIFCRUDEPRICE)	-12.46156	-137.0766
D(DIFATFPRICE)	-91.79030	-140.1027

1 Cointegrating Equation(s): Log likelihood -1549.734

Normalized cointegrating coefficients (standard error in parentheses)

DIFCRUDEPRICE	DIFATFPRICE
1.000000	-0.931797
	(0.04167)

Adjustment coefficients (standard error in parentheses)

D(DIFCRUDEPRICE)	0.284145
	(0.71311)
D(DIFATFPRICE)	2.092975
	(0.80156)

As we can see above, there is co-integration between both Crude Oil Prices and ATF Prices. The p value is 0, which is less than 0.05. Therefore, H1 is accepted. This shows that both influence each other and have a high level of relationship. In line with the results in the correlation test, both variables have a good positive relationship.

GARCH Model of Crude Oil price:
H0: There is no effect of the GARCH Model on the price of crude oil
H1: There is an effect of the GARCH Model on the price of crude oil

Dependent Variable: CRUDEPRICE
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 01/28/20 Time: 19:56
Sample: 2009M10 2019M10
Included observations: 121
Convergence achieved after 29 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(1) + C(2)*RESID(-1)^2 + C(3)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Variance Equation				
C	1180027.	48309147	0.024427	0.9805
RESID(-1)^2	1.261794	8.630824	0.146196	0.8838
GARCH(-1)	-0.318422	8.397131	-0.037920	0.9698
R-squared	-14.106213	Mean dependent var		4436.614
Adjusted R-squared	-13.981368	S.D. dependent var		1186.174
S.E. of regression	4591.179	Akaike info criterion		19.61903
Sum squared resid	2.55E+09	Schwarz criterion		19.68835
Log likelihood	-1183.951	Hannan-Quinn criter.		19.64718
Durbin-Watson stat	0.004414			

As we can see from the table above, the p value is 0.9698, which is more than 0.05. Therefore, H0 is accepted. Therefore, there is no effect of the GARCH Model on the Crude Oil Prices. This means that the prices of Crude Oil are not volatile. Even though, they fluctuate, they return back to the original position due to economic forces. The level of volatility is not significant.

GARCH of ATF Prices:
H0: There is no effect of the GARCH Model on Price of Aviation Turbine Fuel
H1: There is an effect of the GARCH Model on Price of Aviation Turbine Fuel

Dependent Variable: DIFFATFPRICE
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 01/28/20 Time: 19:57
Sample (adjusted): 2009M11 2019M10
Included observations: 120 after adjustments
Convergence achieved after 21 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	24.89702	24.40580	1.020127	0.3077
Variance Equation				
C	7830.701	8359.341	0.936761	0.3489
RESID(-1)^2	0.358257	0.129097	2.775103	0.0055
GARCH(-1)	0.640304	0.101459	6.310937	0.0000
R-squared	-0.000879	Mean dependent var		14.52500
Adjusted R-squared	-0.000879	S.D. dependent var		351.3719
S.E. of regression	351.5262	Akaike info criterion		14.48181
Sum squared resid	14704912	Schwarz criterion		14.57473
Log likelihood	-864.9088	Hannan-Quinn criter.		14.51955
Durbin-Watson stat	1.544362			

As we can see from the table above, the p value is 0, which is less than 0.05. Therefore, H0 is rejected. Therefore, there is an effect of the GARCH Model on the Crude Oil Prices. This means that the prices of Crude Oil are volatile. They have high levels of fluctuations. The level of volatility is very high. This is another prime reason as to why it has a significant impact on the shareholders of Airline companies. Due to the high level of volatility in the ATF Prices, airline companies have a disadvantage due to increased fuel costs and uncertain cash flows.

GARCH of Crude Daily Future Prices:

H0: There is no effect of the GARCH Model on the Daily Crude Oil Future Price
H1: There is an effect of the GARCH Model on the Daily Crude Oil Future Price

Dependent Variable: DIFFPRICE
Method: ML ARCH - Normal distribution (BFGS / Marquardt steps)
Date: 01/28/20 Time: 20:03
Sample (adjusted): 12/13/2011 11/01/2019
Included observations: 2145 after adjustments
Convergence achieved after 45 iterations
Coefficient covariance computed using outer product of gradients
Presample variance: backcast (parameter = 0.7)
GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-3.820970	5.499368	-0.694802	0.4872
Variance Equation				
C	18986.40	1841.333	10.31122	0.0000
RESID(-1)^2	0.051460	0.005679	9.062203	0.0000
GARCH(-1)	-0.011986	0.098463	-0.121726	0.9031
R-squared	-0.000327	Mean dependent var	-0.589744	
Adjusted R-squared	-0.000327	S.D. dependent var	178.6755	
S.E. of regression	178.7048	Akaike info criterion	12.69855	
Sum squared resid	68469489	Schwarz criterion	12.70913	
Log likelihood	-13615.20	Hannan-Quinn criter.	12.70242	
Durbin-Watson stat	2.834741			

As we can see from the table above, the p value is 0.9031, which is more than 0.05. Therefore, H0 is accepted. Therefore, there is no effect of the GARCH Model on the Crude Oil Daily Futures Prices. This means that the daily future prices of Crude Oil are not volatile. Even though they fluctuate, they return back to the original position due to economic forces. The level of volatility is not significant. This is a desirable result as airline companies can safely invest in future contracts while minimizing the risks of volatility.

V. SUMMARY OF FINDINGS

Firstly, this paper analyzed the relationship between Crude, Brent and WTI – the 3 most popularly traded commodities in the world. This was vital as this paper intends to use crude oil as its primary financial commodity. However, as seen in the analysis, there is a highly positive correlation between all the 3 variables. In a few scenarios, the correlation is almost perfect positive. This is a desirable result as it shows that when either of the commodity prices move towards a particular direction by a specific percentage, the other two commodities too, will move in the same direction in nearly the same percentage.

Secondly, this paper analyzed the most crucial aspect – the relationship between Crude Oil Prices and Aviation Turbine Fuel Prices. This is the most crucial aspect because this relationship defines the success/failure of this paper. There is a highly positive correlation between both the variables. The correlation is 0.9846 which is almost perfect positive. Regression between Crude Oil prices and Aviation Turbine Fuel prices was performed. The regression analysis, too, were desirable. The regression analysis helped this paper develop the regression equation as below:

ATF = 9.2064 + 1.0496(Crude)

The regression equation will help readers estimate the future prices of Aviation Turbine Fuel by substituting the Crude Oil prices in the equation above. The regression test was done using stationary data and not non-stationary data. This paper even compared the regression analysis of non-stationary data. However, as expected, the Akaike Info Criterion was less in the stationary data, and hence, was accepted.

Thirdly, this paper analyzed the Granger's Causality between Crude Oil prices and Aviation Turbine Fuel prices. There was no Granger's cause between both the variables. This shows that neither of the variable influence each other's price. However, due to the presence of highly positive correlation, it is seen that the variables are highly related. This means that even though the variables do not influence each other, they still move towards the same direction with almost the same percentage increase/decrease.

Fourthly, this paper analyzed the volatility of the Crude Oil prices using the GARCH model. The GARCH model of Crude Oil prices shows that there is no effect of the GARCH model on Crude Oil prices. This is highly desired as it shows that the prices of Crude Oil, even though volatile, always becomes stable over a period of time. This is desired as it provides protection to airline companies when they purchase financial instruments of Crude Oil. This paper then analyzes the volatility of Aviation Turbine Fuel prices using the GARCH model. The analysis shows that there is an effect of the GARCH model on the prices of Aviation Turbine Fuel. This shows that the prices of Aviation Turbine Fuel, as expected, are highly volatile. This paper also analyzes the volatility of the daily prices of Crude Oil Futures contracts. The analysis shows that there is no effect of the GARCH model on the daily prices of Crude Oil Futures contracts. This too, is desirable as it helps provide protection to airline companies when they use future contracts to hedge their airline fuel price fluctuation risk.

VI. RECOMMENDATIONS

Airline companies can use Crude Oil as a proxy for Aviation Turbine Fuel. Airline companies can purchase future/option contracts (regulated financial market) or forwards/swaps (unregulated financial markets). If Airline companies purchase financial derivatives for Crude Oil, they will be able to hedge the risk of the volatility and fluctuations in the prices of Aviation Turbine Fuel.
By purchasing a derivative contract with **cash settlement option**, the airline company will be able to create certainties in its cash flows. Like every other derivative contract, there is a scope for both profit and loss. However, at the same time uncertainty of cash flows is minimized. If used properly after thorough analysis, the airline company may even be able to profit off the derivative contract.

The most important feature of using derivatives is for risk minimization and for fixing future cash outflows. If airline companies are able to estimate its exact future cash outflow, it can invest its surplus cash in other profitable instruments. It can help save a lot of money for airlines and also reduce the levels of its reserves and provisions to a large extent. This will help the airline company manage its cash flows in a much more efficient manner. The airline company will be able to earn more out of its money. This will in-turn provide higher returns to the ultimate owners – the shareholders.

Example:

Suppose Company A purchases a future contract on 1st Mar 2020 for Rs. 4,000 per barrel of Crude Oil for a quantity of 10,000 barrels. The future contract expires after 1 month (31st Mar 2020). The future contract can be settled in cash. Physical delivery is not necessary.

Case A: (Profit Scenario): If the price per barrel of Crude Oil is Rs. 4,200 as on 31st Mar 2020, the airline will fulfill the contract at a profit of Rs 200/barrel. The airline company will not buy the Crude Oil from the other party, however, will opt in for a cash settlement.
On the day of entering into the contract, the airline company estimated a total cash outflow of Rs. 4,00,00,000.
The airline receives Rs. 20,00,000 as fulfilment from the future contract.
Since the prices of Aviation Turbine Fuel and Crude Oil are highly positively correlated, the price of Aviation Turbine Fuel too will be around the Rs. 4,200 mark. The Rs. 4,00,00,000 which the airline had already estimated along with the Rs. 20,00,000 that the airline earned through the future contract will be used to buy Aviation Turbine Fuel.

Case B: (Loss Scenario): If the price per barrel of Crude Oil is Rs. 3,800 as on 31st Mar 2020, the airline will have to fulfill the contract at a loss of Rs 200/barrel. The airline company will not buy the Crude Oil from the other party, however, will opt in for a cash settlement.
On the day of entering into the contract, the airline company estimated a total cash outflow of Rs. 4,00,00,000. Therefore, the airline company will pay a total of Rs. 20,00,000 to the other party in settlement of the future contract.
Since the price of Aviation Turbine Fuel and Crude Oil is highly positively correlated, the price of Aviation Turbine Fuel will be around the Rs. 3,800/barrel mark as well.
The balance amount of Rs. 3,80,00,000 which the airline had already provisioned beforehand will be used to purchase Aviation Turbine Fuel.
In this case, if the airline had not entered into the contract, it would have saved Rs. 20,00,000 however, it would face uncertainties. It would not be able to estimate its cash outflows accurately.
As it can be seen, even though in scenario B the company is making a loss on the future contract, it is able to lock in its cash outflows. In scenario A the company makes a profit on the future contract, however these profits and losses are theoretical in nature. The company does not, in reality make any profits/losses. It only fixes its cash outflows and the future contract compensates for any deviations in the real cash outflows.

VII. CONCLUSION

It can be concluded that the prices of Aviation Turbine Fuel are highly volatile and causes airlines to suffer uncertainties in terms of oil expenses every financial period. These uncertainties cause airlines to have liquidity and solvency issues and also creates negative sentiment amongst the market and shareholders. Various external factors create high volatility in the prices of Aviation Turbine Fuel which are not in the hands of the airline companies. However, in order to hedge from these risks, airline companies can use derivatives contracts on Crude Oil. As explained in the recommendations, airlines can purchase any derivative instrument (future, option, swap or forward) for Crude Oil and use the instrument in order to hedge the volatility in the prices of Aviation Turbine Fuel.

This strategy will definitely help airlines increase shareholder's wealth and will also be less risky to invest in. This will have positive shareholder sentiment and will eventually help the airline grow.

VIII. ACKNOWLEDGEMENTS

I would like to express my profound gratitude to all those who have been instrumental in the preparation of this Research Project. I wish to place on records, my deep gratitude to my project guide, Dr. Middi Appalaraju, for guiding me through this project with valuable and timely advice. I would like to thank Dr. Fr. Abraham V M, CMI, Vice Chancellor and Dr. Amalanathan, HOD, for their support and encouragement. Last, but not least, I would like to thank my parents – Mr. Mahendra Kumar Daphatary and Mrs. Sangita Daphatary, and my friends for their constant help and support.

REFERENCES

[1] Ghosh, K. (2018, October 25). Now, India's largest airline joins the loss-makers' club. Retrieved from Quartz India: https://qz.com/india/1435847/indigo-joins-jet-airways-and-spicejets-loss-making-spree/
[2] Gujar, R. (2016). EFFECTS OF FLUCTUATING FUEL PRICES ON THE VAR OF THE INDIAN AIRLINE INDUSTRY. Semantic Scholar.
[3] Morrell, P., & Swan, W. (2006). Airline Jet Fuel Hedging: Theory and Practice. Taylor & Francis Online.
[4] Cobbs, R., & Wolf, A. (2004). Jet Fuel Hedging Strategies: Options Available for Airlines and a Survey of Industry Practices.
[5] Lim, S. H., & Hong, Y. (2014). Fuel hedging and airline operating costs. ScienceDirect.