Inoculating the Ailing Sector: A Proposal for FDI in the Indian Aviation Industry

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Abstract

The outcome from the relationship between accounting variables and stock price would help the investors and managers in determining the variables that are more relevant for the valuation purposes and also they can rationalize on using these accounting variables as a tool for gauging financial performance of the firm (Smith, 2008). It is true that air travel in India is booming but the aviation sector seems to be hurtling towards bust. There are many reasons for the plunge of this sector in India. In order to revive and to bring a new life to this sector the budget of 2019 has announced plans to open up further FDI in this sector. In this context an attempt is made to determine the accounting variables that have explanatory power on stock price of the aviation sector in India. The study tries to determine the accounting variable that has explanatory power on stock price, To identify the adequacy of accounting variables taken for the study, To explore collinearity among the independent variables and examine the correlation among the residuals and to recognize the variables that comes under a linear combination in forming a factor. The study is confined to only five companies listed in the Aviation sector in BSE. The methodology adopted in the study is in line with dimension reductions followed by the Ohlson model. The dimension reduction applied in this study focuses on selection of accounting variables for the Ohlson model based on the loadings of these variables to the factor. This process is performed with the help of a factor analysis. The application of Ohlson model reveals that the explanatory power of accounting variables is only 42% of variance in the stock price. This is less than fifty per cent and is very small and irrelevant for making a prediction or valuation of share price. In this context it is indeed going to be very difficult for the FDI investors.

Keywords

Ohlson model, Factor analysis, Autocorrelation, Market based Accounting and Collinearity, EDI, Aviation Industry

1. Introduction

The generation of wealth is the basic objective for most of the organizations. The policies they adopt may be different regarding the distribution of wealth. Whatever diverse policies they undertake for the distribution of wealth, it has to be implemented with the first priority. If this priority is not given then the firm would find it difficult to raise capital in supplementing their activities. The concept of value creation is not only relevant for the investors but it is also useful for those persons who administer and direct the firm in moving ahead on a day to day basis. The financial performance of a business or firm is gauged by managers through the system of accounting followed by concerned firms, which provide figures of accounting variables that are less impulsive in nature. At the same time the investors selects or prefers shares of a company in their portfolio by relying on the financial variables that are already published. In this context the

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association or relationship between accounting variables and the share price is of utmost importance.

The outcome from these relationships would help the investors and managers in determining the variables that are more relevant for the valuation purposes and also they can rationalize on using these accounting variables as a tool for gauging financial performance of the firm (Smith, 2008).
The aviation sector in India is considered to be an ailing sector. To help them overcome this situation the 2019 budget has put forward a suggestion for opening up of FDI in this sector. This proposal of the government has really given a thread for moving ahead with the research work in this study.

II. Statement of the Problem

It is true that air travel in India is booming but the aviation sector seems to be hurtling towards bust. There are many reasons for the plunge of this sector in India. The reasons contributing towards nose diving are rising aviation turbine fuel prices, depreciating rupee and competitive ticket pricing. The FDI investors would look out for those avenues that would bring returns to them. The investors would go for the valuation of shares before making a decision to invest. The valuation of shares is based on the financial or accounting variables. In this context an attempt is made to determine the accounting variables that have explanatory power on stock price of aviation sector India.

III. Objectives of the Study

Following are the important objectives of this study:

1) To determine the accounting variable that has explanatory power on stock price
2) To identify the adequacy of accounting variables taken for the study
3) To explore collinearity among the independent variables
4) To examine correlation among the residuals
5) To recognize the variables that comes under a linear combination in forming a factor

IV. Limitations

The study has the following limitations:

1) The study is confined to only five companies listed in the Aviation sector on BSE.
2) The conclusions are drawn sector wise and not on the basis of specific companies under this sector.

V. Literature Review

Many studies that were done earlier focused on association between share price and accounting variables. The accounting variables taken for the study by (Brown, 1968) were Book value per share, Earnings per share and accounting profit. In this study he has concluded that the accounting profit had more explanatory power on stock price or it had more value relevant towards the stock price. The study conducted by (Ohlson, 1995) revealed that the financial information disclosed in the balance sheet and income statement has an impact on the price of shares. The authors like (Ohlson B. L., 1982) have coined the term market based accounting research in unfolding a series of literature that shows the relationship between the share price and the accounting variables. Similarly, (Walker, 1997) has also coined the same term for describing the association between variables exhibited in the final accounts and stock price.

The studies that were conducted earlier and those practical in nature focused on earnings. These studies propagated on the improvements in earnings with the dissemination of information or facts related to financial position of the firm. It never laid emphasis on finding out an association of accounting variables over the stock price. Furthermore, the review of research on earnings (Lev, 1989) has revealed that earnings, which is taken as an accounting variable has a very low-explanatory power over the stock price. This finding has made the author to come to a conclusion that the reported value of earnings has no relevance in establishing an association with the price of stock. But from the study it was substantiated that earnings have a significant role in forming a judgment or belief about the price of securities. Whereas the actual value of earnings when compared to prices of stock reveals a weaker conclusion. This indicates that the empirical usage of earnings figures is limited. The author is of the opinion that this has happened due to the existence of bias in the accounting rules so framed. Lev recommends that the research must shift its focus from the information content of accounting variables and emphasise on the accounting rules that have been introduced for determining these variables.

Consequently, the review of other relevant literature casts a claim that the information content of accounting variables does not impact the share prices. But most of the research taken in connection with market based accounting research exposes that accounting variables have explanatory power on stock price, if these variables could provide information content. This assumption is considered to be erroneous (Penman, 1992). Penman promoted a viewpoint that describes the accounting figures could be used for determining the asset value. For this purpose he has recommended for a return to the fundamentals. In spite of such a recommendation, he admits the fact that for a meticulous economic analysis the existing traditional fundamental analysis is deficient with strong theoretical

foundations. But he reveals that the works of James A. Ohlson have advanced a step ahead in this regard. The application of Ohlson model in different contexts is described in the following two sections to prove its breakthrough and to justify its application in this research paper.

a. *The version of Ohlson model in various rules of Accounting*

(Lee, 1998) has made an attempt to excavate an association between accounting variables and share price based on variations in accounting rules adopted and followed in different countries. For this purpose, the authors have sought data from the twenty nations. In this research paper they have applied the residual income model. The model was displayed as:

$$P0 = yo + \sum_{t=1}^{\infty} \quad \left(\frac{E0\,[x_t^a]}{(1+r)^t}\right) \qquad (1)$$

The residual income model shown above takes into consideration both the present book value of equity and the current value of all future residual income or abnormal earnings. When both of these are combined or added together results in current book value of the equity. This model deliberate only on the anticipated future values of earnings to determine the clean surplus relation. At the same time for measuring the clean surplus relation the model does not consider the present value of accounting variables. To derive a better conclusion this anticipated future value of earnings is considered as an influential variable along with both the present book value and present earnings for incorporation in the Ohlson version model. The ohlson version model in this context was exhibited as:

$$P_t = (1 - \hat{k})y_t + \hat{k}(\omega x_t - d_t) + \alpha_2 v_t \qquad (2)$$

This model of Ohlson has incorporated the dynamics of linearity that enables the share price to be articulated in terms of present accounting variables. This model further goes beyond rather than explaining the mere relationship between the variables to exploring the explanatory power between the variables by predicting the sign and range of values for the same. The study finally concluded that the anticipated values taken by the residual income model cannot be relied on establishing an association of accounting variables with share price based on different accounting rules adopted in various countries. This is due to the fact that these are applied already on the published financial statements. Hence it proves that the present value of accounting variables taken in Ohlson model is more relevant in establishing an association with the share price.

The review of another research paper contributed by (Langli, 1998) has revealed the association between share price and the accounting variables in the midst of diversity in accounting rules adopted in three nations. The three nations in which the study was undertaken were Germany, Norway and the United Kingdom. The accounting rules practiced in these three nations are different to the extent to the conservatism principle. The study also focused to determine the deviation of accounting rules when it is compared to the clean surplus. The authors in this study have relied on the version of Ohlson model (2) which enabled a positive link between two accounting variables to share price in three nations. The accounting variables considered for the study were book value and earnings. But the results shown in this study stated that there is no consistency arrived with the differences in accounting rules. In this context with the introduction of the extended version of Ohlson model a slight difference in the market price was determined with the comparison of accounting variables. This variation was not detected in the earlier application of the model, which assumed the expected earnings. The extended model has taken into consideration the realized or abnormal earnings. This is exhibited as below:

$$P_{it} = a_o + a_1 book_{it} + a_2 AE_{it} + a_3 AE_{it+1} + a_4 AE_{it+2} + \ldots\ldots + a_k AE_{It} + e_{it} \qquad (3)$$

This extended model was derived as a continuation of Ohlson model for the Dividend Discount model and the current residual earnings. Based on this model the market value (MV) of share is expressed as below:

$$MV_t = B_t + \alpha_1 x_t^a + \alpha_2 v_t \qquad (4)$$

Another study that took place in eastern Asian countries based on the differences of international accounting stated that the influence of accounting variables to stock price differed significantly among the countries. The lower influence of accounting variables to stock was recorded at 24 per cent in Taiwan and the largest explanatory of variables to stock price was reflected in the Philippines. This study carried out by (King, 2000) used Ohlson model (2) for relating the share price to two accounting variables like book value and residual income. In this study it was revealed that out of the two accounting variables it was book value that showed higher influence to stock price among the six countries taken for the study.

b. *The extension of Ohslon model to other Variables*

The (Ohlson J. A., 1995) in his study has based his assumptions on simplifying the numbers disclosed in

the financial statements. In the model prescribed by the Ohlson it was assumed that the investors are impartial towards the risk, the accounting systems followed are not biased, the existence of clean surplus relation, the information in the market has no irregularities, the tax rates encountered by the shareholders are not considered and also it is assumed that through auto regression the 'v' in equation (4) and abnormal earnings are evolved. These limitations were pointed out by the (William R. Gebhardt, 2001) on risk neutrality by investors; the irregularity of information was pointed out by (Mary E. Barth, 1999), the issue of tax by shareholders was raised by (Kemsley, 2000) and (Kemsley T. S., 1999), criticism on evolution of abnormal earnings through auto regression was made by (Patricia M. Dechow, 1999).

The researchers modified the basic version of Ohlson model in their studies. The authors who have contributed in their studies the modified version of Ohlson model that focused on the USA are (Myers, 1999) and (Morel, 2001). The other authors who adopted the modified version of Ohlson has focused their studies on nations like Sweden, Spain and Japan. The authors who established the use of value relevance of accounting variables to stock price in these three nations were (Nilsson, 2001), (Ota, 2002) and (Sánchez, 2006) respectively. The modified version of Ohlson model from the equation (4) is as follows:

$$MV_t = \beta_o + \beta_1 B_{it} + \beta_2 x_{it}^{a} + \beta_3 v_{it} + \varepsilon_{it} \qquad (5)$$

In the above equation the importance of the intercept and the residual term (ε) is commendable. These help to identify the share price variation, which is not addressed by the other variables in the equation. The emphasis of regression model used in equation (5) has led to framing of the equation based on OLS regression is as follows:

$$P_t = \beta_o + \beta_1 B_{it} + \beta_2 X_{it} + \beta_3 v_{it} + \varepsilon_{it} \qquad (6)$$

The works of (Aboody, 1996) and (Lev E. A., 1996) focused on revised models based on equation (6). This has really opened avenues for the researchers to explore the value of relevance based on the regression model and with inclusion of more accounting variables. The researchers focused on this regression model in establishing value relevance in more than two accounting variables on stock price. The contributions of these works are as follows:

(Hwang, 2000) in his study has found out the value relevance of earnings on stock returns, value relevance of accruals on stock return and value relevance of book value and earnings on stock price. After finding out value relevance on these factors, his next attempt was to establish correlation among the three value relevance measures. All these findings were excavated with the help of OLS regression mentioned in equation (6). (Mary E. Barth W. R., 2008) used accounting variables like percentage change in sales, percentage change in common stock, leverage, percentage change in total liabilities, turnover and cash flow from operations for establishing value relevance with change in net income. This was also found out with the help of regression. (Burger, 2012) in his thesis had focused on finding out the value relevance of accounting conservatism and absolute past investment growth on stock returns beta. (Louis K. C. Chan, 2008) has found out the value relevance of dollar value of acquisitions relative to the change in the firm's total assets, change in cash relative to the change in total assets, the past growth rate of sales per share and long term past returns on the abnormal return for stock. (Peter Clarkson, 2011) has made an attempt to find out the value relevance of BPS and EPS on the price of stock of countries where IFRS was adopted. (Stettler, 2009) emphasized on establishing the value relevance of human development index, exports of goods and services, GDP per capita growth, legal system, inflation level and stock market development on the corporate disclosure. (George Foster, 2011) focused on finding out the influential power of country-related factors with regression models on company-specific and blocks of country-specific variables. (Gay, 2016) in his research work emphasized on finding out the explanatory power of exchange rate and oil price on the stock price. The review of above literature helped the researcher to frame the present study with more than two accounting variables for checking its explanatory power on the stock price of the aviation sector.

c. *The review of accounting variables taken for the study*

The accounting variables of the aviation sector taken for this study are Earning Per Share, Book value Per share, Return on Capital Employed, Return on Total assets and Net profit to sales. The Book value per share and Earnings per share are used as accounting variables for explaining its influential power on stock price under the studies conducted by (Lang, 1994) and (Rees, 1997). The return on total assets and net profit to sales and Return on Capital employed represents the growth of the firm. These are used in the studies of (Fama, 1970), (Marx, 2010) and (Louis K. C. Chan, 2008).

VI. Research Methodology and Analysis

The aviation sector taken for the study is represented by five companies. These five companies were selected based on the availability of data for 16 years from 3 companies, 15 years from one company and 9 years from the last one

company. Data of other companies listed in this sector apart from the selected five were not available. The aviation sector is one among the 99 sectors listed in BSE. The companies selected for the study from this sector were scrutinized from the data provided by the BSE. The accounting variables of these companies were collected from PROWESS.

The methodology adopted in the study is in line with dimension reduction followed by the Ohlson model. The dimension reduction applied in this study focuses on selection of accounting variables for the ohlson model based on the loadings of these variables to the factor. This process is performed with the help of Factor Analysis. As the factor analysis is initiated, then its result paves the path for the application of Ohlson model. If the result of Ohlson model shows an error term that is auto correlated, then a time series analysis is performed.

VI (1). Factor Analysis

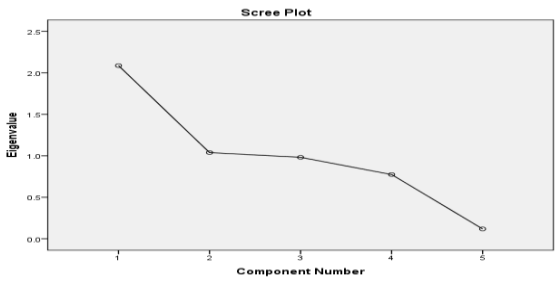
As the number of accounting variables used in this study are large, it requires a dimension reduction for meaningful results. The results from this reduction through factor analysis enable the researcher to curb out the variables that has high correlation among the other variables. In this context, the rotated component matrix was executed based on Varimax with Kaiser Normalization method. This helped in focusing only on the variables that can be taken ahead for the study. Along with this the KMO and Bartlett's sphericity test indicate the appropriateness of our data for proper configuration of variables in the study structure. The KMO value of 0.659 and a Bartlett statistic of 0.0000 indicate that factor analysis was sufficient for the independent variables scrutinized in the study.

The extraction method adopted in the study was based on the principal components analysis. This method establishes the eigen value as 1. This further explains that the variables that show values equal to or more than 1 are eligible for the selection. These deserving variables would be classified into components. In this study two principal components were derived. These two factors identified for the study along with KMO and Bartletts statistics are presented below:

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.659
Bartlett's Test of Sphericity	Approx. Chi-Square	112.202
	Df	10
	Sig.	.000

This table displays two tests that indicate the suitability of data for the detection of the structure. The **Kaiser-Meyer-Olkin Measure of Sampling Adequacy** is a statistic that shows the percentage of variance in the accounting variables taken for the study may be caused by underlying factors. Generally the high value (close to 1.0) points out that the variables are useful for the study. At the same time if the value is less than 0.50, the use of variables for the study could be questioned or challenged severely. In this study the KMO value shows 0.684, which states that the accounting variables of the Aviation sector taken for the study are adequate to derive conclusions.

The Bartlett's test of sphericity indicates the correlation matrix of accounting variables. The correlation matrix represents an identity matrix, which states that if the variables taken for the study are unrelated then it is unsuitable for structure detection. The application of factor analysis is relevant for the study (Sig: 0.000). The next aim was to find the variables that have high loadings on one factor and low loadings on other factors. Before showing the Rotated Component Matrix, a scree plot is displayed that shows how many factors or components were formed with the eigenvalue.



The scree plot above shows that two components or factors are showing eigen values more than 1. Hence these two components will be selected for the study. The components refer to classification of accounting variables taken for the study. To determine the variables that come under each component or factor is displayed in the Rotated Component Matrix mentioned below. The rotated factor matrix provides loading of each variable on each of the extracted factors. This is exactly the same as correlation matrix with loadings bearing the values between 0 and 1. The values close to 1 indicate high loadings and those close to 0 represent low loadings. The objective behind the use of a rotated component matrix is to explore the variables that have high loading on one factor and low loadings on another factor.

Rotated Component Matrix[a]		
	Component	
	1	2
Book value per share of Aviation sector	.932	
Earnings per share of Aviation sector	.944	
Return on Total Assets of Aviation sector		-.716
Net profit to sales of Aviation sector		.638
Return on Capital Employed of Aviation sector	.555	

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 3 iterations.

The rotated component matrix exhibits that out of five variables taken for the study only four variables have relevant loadings on the factors. There are two factors or components derived from the variables as mentioned in scree plot. From the above table it is clear that the study will be forwarded with four variables and not five variables. The fifth variable that is discarded from the study through rotated component matrix is *Return on Total Assets of Aviation sector*.

The factor or Component 1 is loaded highly by three variables namely, EPS, BPS and ROCE. It is assumed that factor 1 is a linear combination of these three variables. Similarly the component 2 is loaded by one variable namely, Net profit to sales of aviation sector. As the accounting variables required for the study are selected through the above matrix table, the value relevance of these variables on stock price is determined on the basis of the selected four accounting variables. The value relevance of accounting variables on stock price is measured through the Ohlson Model.

VI (2). Application of Ohlson Model

The research hypothesis for the study is framed based on the theoretical framework of Ohlson Model mentioned in the literature along with the review on other studies that have measured the value relevance of accounting variables on stock price. The review of other studies include the contributions of (Lim, 2007), (Salvador, 2006) and (Omran, 2006) for formulating the hypothesis of present research work. The research hypotheses for the study are as follows:

H1: there is a positive relation between Stock price and Book Value per share

H2: there is a positive relation between Stock price and Earning per Share

H3: there is a positive relation between Stock price and Net Profit to Sales

H4: there is a positive relation between Stock price and Return on Capital Employed

The model framed for verifying the hypotheses of research (H1-H4) indicates the econometric technique of multiple linear regressions with the least squares method. This is popularly known as *Ordinary Least Squares - OLS*. The regression function used to test the research hypothesis is as follows:

$$Y_{1it} = \alpha_1 + \beta_{11}X_{1it} + \beta_{12}X_{2it} + \beta_{13}X_{3it} + \beta_{14}X_{4it} + u_{1it} \quad ..(7)$$

Here 'i' is the number of companies from **1** to **5** and't' is the number of years from **1** to **16**.Thus, there are **360** observations in total. The α_1, represents the regression constant. The β_{11}, β_{12}, β_{13} and β_{14} are the regression coefficients of independent variables $\mathbf{X_1}$, X_2, X_3 **and** X_4. The $\mathbf{X_1}$ indicates BPS, X_2 indicates EPS, X_3 represents Net profit to sales and X_4 symbolizes ROCE. The last term in the model i.e. u_{1it} indicates the error term. The (Courteau, 2008) in his book stated that this technique of OLS, which was recommended by Ohlson for removing misrepresentations in the calculation of coefficients in the line of regression that could lead to misleading results in the research. This model is applicable for all the four companies representing the Aviation sector. The implementation of this model on the accounting variables are shown in Table 1.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.660[a]	.435	.392	341.44311

a. Predictors: (Constant), Return on Capital Employed of Aviation sector, Return on Total Assets of Aviation sector, Net profit to sales of Aviation sector, Book value per share of Aviation sector, Earnings per share of Aviation sector

Table 1 provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.660 (the "***R***" Column), which indicates a high degree of correlation. The R^2 value (the "***R Square***" column) indicates how much of the total variation in the stock price of aviation parts and equipment sector (dependent variable) can be explained by the independent variable (Accounting Variables). In this case, .435 or 43.5% can be explained, which is very small. The next table is the ***ANOVA*** table, which reports how well the regression equation fits the data (i.e., predicts the dependent variable) and is shown in table 2.

Table 2: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5925552.950	5	1185110.590	10.165	.000[b]
	Residual	7694504.386	66	116583.400		
	Total	13620057.336	71			

a. Dependent Variable: Share price of Aviation Sector

b. Predictors: (Constant), Return on Capital Employed of Aviation sector, Return on Total Assets of Aviation sector, Net profit to sales of Aviation sector, Book value per share of Aviation sector, Earnings per share of Aviation sector

Table 2 indicates that the regression model predicts the dependent variable significantly well. Table 3 shows the Coefficients that clearly shows the accounting variables that are significant to the model.

Table 3 : Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	276.603	42.433		6.519	.000		
	Book value per share of Aviation sector	.085	.030	.547	2.801	.007	.224	4.456
	Earnings per share of Aviation sector	-.010	.014	-.152	-.764	.448	.217	4.608
	Return on Total Assets of Aviation sector	.092	.096	.089	.962	.340	.994	1.006
	Net profit to sales of Aviation sector	.126	.241	.049	.522	.603	.991	1.009
	Return on Capital Employed of Aviation sector	6.320	1.597	.393	3.957	.000	.870	1.149

a. Dependent Variable: Share price of Aviation Sector

Along with this a similarity between the independent variables are also tested with Multicollinearity statistics. The **Coefficients** table provides with the necessary information to predict share price from the predictors and to determine the predictor variable that contributes statistically significantly to the model. This can be measured with the help of Significance level. If the significance level of a predictor variable is less than .05, then that predictor variable is considered to be significant. From this table the Book value per share and Return on Capital Employed has emerged as variables that are statistically significant to the model.

The last column in table 3 mentions Collinearity statistics. If the VIF value lies between 1to10, then there exists no multicollinearity. At the same time if the VIF value is less than 1or more than 10 then there is multicollinearity. In the above table all the variables are below 10 and they are not collinear. From the table above it is clear that both variables .i.e. BPS and ROCE are significant. Other variables are not significant; hence an attempt is made to eliminate one of the variables that is not significant and shows high VIF value. In this context the EPS which is considered as insignificant with a high value of VIF is discarded. In the next step, once again regression is iterated without the EPS of the aviation sector.

VI (3). Results exhibited by First iteration of Regression

In this iteration of regression method the EPS is removed from the model as it bears highest collinearity based on VIF. The results of regression model after eliminating the EPS is as follows:

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.654[a]	.428	.402	338.56875

a. Predictors: (Constant), Return on Capital Employed of Aviation sector, Return on Total Assets of Aviation sector, Book value per share of Aviation sector

Table 4 provides the *R* and R^2 values. The *R* value represents the simple correlation and is 0.654 (the "***R***" Column), which indicates a moderate degree of correlation. The R^2 value (the "***R Square***" column) indicates how much of the total variation in the stock price of Aviation sector (dependent variable) can be explained by the independent variable (Accounting Variables). In this case, 42.8 % can be explained, which is very small. Table 5 reports how well the regression equation fits the data (i.e., predicts the dependent variable).

Table 5: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5825299.040	3	1941766.347	16.940	.000[b]
	Residual	7794758.296	68	114628.798		
	Total	13620057.336	71			

a. Dependent Variable: Share price of Aviation Sector

b. Predictors: (Constant), Return on Capital Employed of Aviation sector, Return on Total Assets of Aviation sector, Book value per share of Aviation sector

Table 5 states that the regression model with the absence of EPS significantly predicts the outcome variable. Table 6 gives information about the Coefficients and Multicollinearity.

Table 6: Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	272.257	41.656		6.536	.000		
Book value per share of Aviation sector	.065	.015	.419	4.341	.000	.905	1.105
Return on Total Assets of Aviation sector	.090	.095	.087	.950	.346	.995	1.005
Return on Capital Employed of Aviation sector	6.164	1.552	.383	3.972	.000	.906	1.104

a. Dependent Variable: Share price of Aviation Sector

Table 6 reveals that the BPS and ROCE again emerged as the accounting variables that are statistically significant to the model. The collinearity condition is also satisfied among the two variables. Hence, in the next stage once again regression is iterated to check whether there is the existence of autocorrelation in the residuals.

VI (4). Display of Results in Second iteration of Regression

The second iteration of Regression with the BPS and ROCE are as follows:

Table 7 : Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.648[a]	0.420	0.403	338.32792	.923

a. Predictors: (Constant), Return on Capital Employed of Aviation sector, Book value per share of Aviation sector

b. Dependent Variable: Share price of Aviation Sector

The R square in table7 shows 0.420 i.e. 42% of variation in stock price is explained by the independent variables i.e, BPS and ROCE. This explanation of variance by the predictor variable is very small. This further states that the predictability of stock price cannot be done accurately with the help of this independent variable. The residual error terms of this variable are also considered and Durbin – Watson test is performed to ensure that there is no sign of correlation among the residuals. The Durbin – Watson test states that if the result of DW is less than 1 and more than 3 then the residuals are considered to be correlated and time series analysis has to be performed. The results of the study indicates that the Durbin – Watson test is less than 1, which infers that residuals are correlated and

the present model is not fit for ascertaining the explanatory power of predictor variables on stock price.

In this context a time series analysis model is performed on the ROCE and BPS variable for ensuring a goodness of fit on the data.

VI (5). Application of Time series Analysis

The time series analysis is initiated with the figure of Autocorrelation and Partial autocorrelation related to the ROCE and BPS variable, which is as follows:

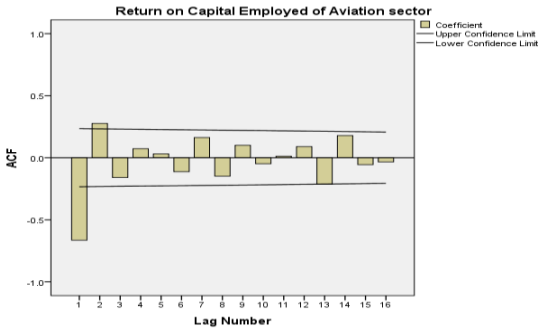


Figure: 1 Return on Capital Employed of Aviation Sector

The Autocorrelation Factor diagram fig: 1 state that the first lag is high and other lags are showing a declining trend. In this figure the points above the value zero would be considered. Hence, the lag mentioned below the value 0 is not considered for taking decision on choosing the method of time series analysis. The next figure mentions about partial autocorrelation. The PCF graph is displayed below.

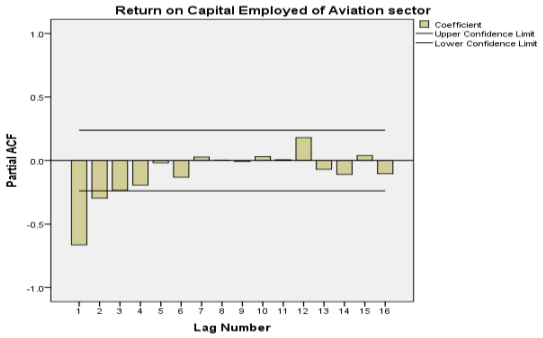


Figure 2: Return on Capital Employed of Aviation Sector

The partial autocorrelation graph will consider only the lag that appears below the value 0. From the above figure it can be inferred that the first lag shown below the value 0 is worth to be considered and other lags are much lower and are not considered. This trend also helps the researcher in choosing the appropriate method for the time series. With the combination of figures of both the ACF and PCF the most appropriate time series method arrived for the goodness of fit of the ROCE variable is ARIMA (1,0,0) model. In the next step the figure of both ACF and PCF of BPS is mentioned, which is as follows:

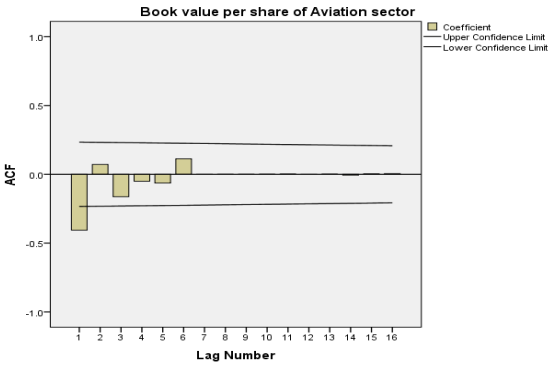


Figure: 3 Book value per share of Aviation Sector

In figure 3 the second lag is lower than the sixth lag. This shows an increasing trend in the ACF of BPS variable. This trend also helps the researcher in choosing the appropriate method for the time series. In the next step the PCF diagram of BPS variable is mentioned which is as follows:

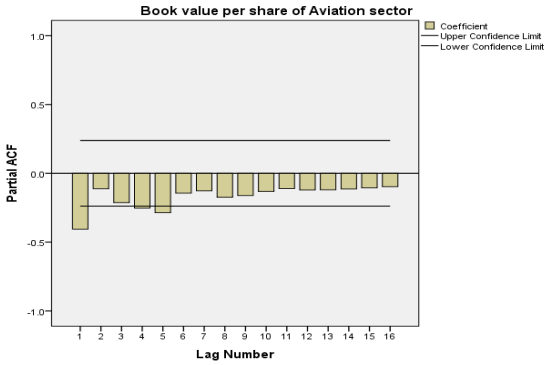


Figure: 3 Book value per share of Aviation Sector

From figure 4 it can be inferred that the first lag shown below the value 0 is high and other corresponding lags are lesser than the first lag but not so lower as the first lag. This trend also helps the researcher in choosing the appropriate method for the time series. With the combination of figures of both the ACF and PCF the most appropriate time series method arrived for the goodness of fit of BPS variable is ARIMA (2,0,0) model.

VII. Execution of ARIMA model

Based on analyzing the trend movement of lag from Autocorrelation and Partial auto correlation of both the ROCE and BPS an appropriate time series method namely, ARIMA (1,0,0) and ARIMA (2,0,0) is selected. The exhibition of results of ARIMA model for both the accounting variable is as follows:

Table 7: Model Statistics

Model	Number of Predictors	Model Fit statistics		Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Normalized BIC	Statistics	DF	Sig.	
Book value per share of Aviation sector-Model_1	0	.659	15.020	3.906	16	.999	0

Table 7 states that the error terms are not correlated. The presence of autocorrelation for the BPS variable was solved with the help of the ARIMA (2,0,0) model. This was inferred with the significance level mentioned in the Ljung- Box. The interpretation of Ljung-Box states that if the significance level is more than .05, then the variables are not correlated. Table 7 shows the significance level in the Ljung-Box indicates .999, hence it can be concluded that the error term of BPS is no longer correlated. This is further substantiated by the observed data and the model generated fit data. This figure is presented below:

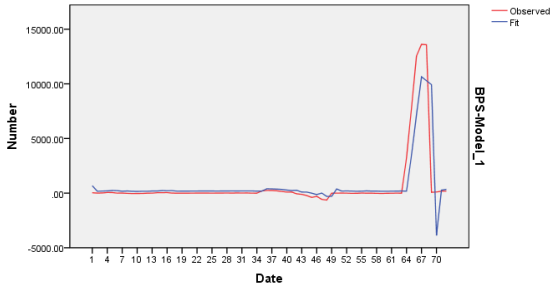


Figure 5

The figure above clearly mentions the data that was earlier available and the model generated fit data that eradicates the presence of autocorrelation in the error term of the independent variable. The model that is enabled to give the fittest data in table 8 is ARIMA.

Table 8: ARIMA Model Parameters

					Estimate	SE	t	Sig.
Book value per share of Aviation sector-Model_1	Book value per share of Aviation sector	No Transformation	AR	Lag 1	1.031	.114	9.053	.000
				Lag 2	-.296	.114	-2.597	.011

Table 8 shows the result presented by the ARIMA model. The differencing applied for the ARIMA model is 2 and it is revealed in the table that for Lag 1 and Lag 2 the significance level is .000 and .010 respectively. The model is significant as it is lesser than .05. Hence, this model is recommended to be the best fit for the variable. Similarly, the ARIMA model parameter of ROCE is also as follows.

Table 9: ARIMA Model Parameters

					Estimate	SE	t	Sig.
Return on Capital Employed of Aviation sector-Model_1	Return on Capital Employed of Aviation sector	No Transformation	AR	Lag 1	.392	.109	3.594	.001

The differencing applied for the ARIMA model on ROCE is 1 and it is revealed in the table that for differencing 1 and for lag 1 the significance level is .001, which is lesser than .05. Hence this model for the ROCE is recommended to be the best fit for the variable. The Ljung-Box Test statistic and the figure displaying observed and fit data for ROCE are also exhibited below:

Table 10: Model Statistics

Model	Number of Predictors	Model Fit statistics		Ljung-Box Q(18)			Number of Outliers
		Stationary R-squared	Normalized BIC	Statistics	DF	Sig.	
Return on Capital Employed of Aviation sector-Model_1	0	.157	6.495	15.412	17	.566	0

The ARIMA model is termed as fit for the ROCE as the significance level is more than .05 in the Ljung-Box. The figure 6 shows the observed data and the model generated fit data of ROCE.

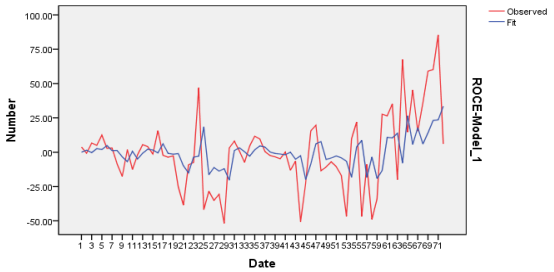


Figure 6: ROCE Model_1

Figure 6 substantiates that the model has eradicated auto correlation in the error terms and has generated the fit values of variables along with the observed value of variables.

VIII. Conclusion

The findings of the study wraps up with the revelation that the accounting variables of the aviation sector in India have no explanatory power on the stock price. The two variables that emerged as significant were ROCE and BPS. But in the Ohlson model when its explanatory power was evaluated it was found that both of the variables explained only 42% of variance in the dependent variable. This is less than fifty per cent and is very small and irrelevant for making a prediction or valuation of share price. In this context it is indeed going to be very difficult for the FDI investors. The FDI investors cannot rely on the accounting variables of this sector for the valuation of equity. If they cannot use the variables for valuation of shares then they would give a least importance in investing this sector.

In spite of having plans to move ahead with FDI in the budget of 2019, it would not prove as lucrative for the investors as the aviation sector in India is experiencing a nose dive. The reasons for their nose dive is plenty and amidst this turbulence this lack of explanatory power of accounting variables on stock price will just add fuel into the fire.

The FDI investors would be very prudent this time to invest in India through FDI. The one important reason for this is the incident of Daichi Sankyo investing in Ranbaxy through FDI in India. This happened when 100% FDI was opened to the pharmaceutical sector. After investing in Ranbaxy, Daichi had to face many issues in the court and they even blamed Ranbaxy for suppressing facts relating to the plants. All these issues made them sell their stake to Sun pharmaceuticals. This history of FDI is not so alluring for the investors coming from abroad. These incidents would definitely make investors cautious and if they realize the proposed plan of the government to further open up FDI on the ailing sector like aviation also suffers lack of explanatory power of accounting variables on the stock price then it would be very difficult for getting FDI participation. This proposal for FDI could be attractively recorded in the books but in reality it is hard to get participation from the investors. Because investors who are spending huge amounts would definitely look for a credible instrument that would help them in the valuation of shares. The credibility of the instrument depends on the variables used and the best such variables are accounting variables. But in the case of the aviation sector the research has proven that the accounting variables have no influence over the stock price.

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