EARNINGS PER SHARE (EPS) PREDICTOR-EVIDENCE FROM TWO SECTORS OF INDIA

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Abstract

The contribution of the automobile industry to the growth of the Indian economy has been highly accelerated due to the measures adopted by the Government to liberalize the licensing policy and to allow 100% Foreign Direct Investment (FDI) in this sector. Despite having a bright opportunity in the future, the sector is also affected by various macro-economic factors whereas the oil and gas division has assumed a noteworthy role in affecting the basic leadership for various critical segments of the economy. In order to fill the deepening gap between the demand and supply, the New Exploration Licensing Policy (NELP) was formulated to allow 100% FDI in many sub-sectors including the natural gas, petroleum products and refineries etc. Hence a comparative study is made between both the prominent sectors by developing a uniform model to predict their Earnings per Share (EPS). Therefore, the data of 12 companies of the auto sector and 8 companies of the oil and gas sector listed in the Bombay Stock Exchange are taken into consideration. Panel Data Regression (Econometric Method) is used to set up the prediction model, with which the EPS prediction could be quite accurate in nature. Five control variables have been chosen carefully to construct the models for both sectors. From the results obtained, the model developed for the oil & gas sector was found to be more accurate and robust than that of the automobile industry.
Index Terms—FDI, EPS, NELP, Panel Data Regression, prediction model

I.   INTRODUCTION

The economic growth of India has been largely influenced by the contribution of the Automobile Industry with liberalization in 1991. The evidence for this is the strong presence of major automobile giants in India at present. Nevertheless, the year 2013-2014 witnessed a decrease in the business' generally hassle-free development. The depression of the sector was mainly due to the rising interest rates and fuel costs accompanied by high inflation along with the economic slowdown. It has been observed that this sector has a commanding future in the domestic market. The Indian automobile industry has not only been concentrating in fulfilling the ever-growing domestic demand but is also trying to mark its presence in the global market

as well. This sector in particular has a lot of benefits which has helped it to grow exponentially. The capacity to produce steel at a reduced cost accompanied by the availability of low-cost skilled labor and surging income of the Indian population has helped the industry to attract investors and provide employment opportunities.

The oil and gas sector is among the six core businesses in India and plays an important role in affecting the decisions of the others prominent sectors of the economy. The New Exploration Licensing Policy (NELP) was formulated with an objective to reduce the steadily growing gap between the demand and supply of gas in India during the year 1997-98. It has been forecasted that the need for oil and gas in the Indian economy is going to increase to a greater extent which in turn will render the sector more attractive for investments. By permitting 100 percent FDI in many segments of the oil and gas industry the government has been able to satisfy the ever-growing demand to a larger extent. The demand for Oil in India is forecasted to grow at a CAGR of 3.6% to Million Tons of Oil Equivalent (MTOE) by the year 2040. By then the economy is anticipated to grow to more than five times its prevailing size which in turn is going to affect the demand for energy.

'Earnings per Share' (EPS) is a cardinal parameter, which will affect the performance of the industry in the bourses. Therefore, in this study 12 companies of the auto sector and 8 companies of the oil and gas sector are taken into consideration. Panel Data Regression (Econometric Method) is used to set up an accurate model, with which the EPS prediction could be quite accurate in nature. Five control variables are chosen carefully to construct the models for both sectors.

Source of Data: Ace Analyser

Auto Companies : Ashok Leyland, Bajaj Auto, Bharat Forge, Bosch, Cummins, Eicher Motors, Exide, Hero Motocorps, Mahindra & Mahindra, Maruti Suzuki, Motherson, MRF

Oil & Gas Companies: BPCL, GAIL, HPCL, IGL, IOC, Oil India, ONGC, LNG.

II.   **OBJECTIVES**
- To predict the EPS of the Oil & Gas Sector of India.
- To predict the EPS of Auto Sector of India.
- To identify the variables that have a significant impact on the EPS.
- To make a comparative analysis of both the sectors.

III.   LITERATURE REVIEW

In order to meet the objectives of this research paper, it was essential to have an understanding of the works done by fellow researchers across the world on the chosen sectors and the various statistical methods employed.

A study [17](Tran & Ngo, 2014) on the Vietnamese Automobile Industry to assess the efficiency and productivity change using Data Envelopment Analysis (DEA) & Malmquist Index approach found that the efficiency of the country's automobile sector was very low of about 0.5 in 2007 which was attributed to the wastage of capital resources. Consequently, the turnovers of the companies were far lesser than their capabilities. A similar study on the Chinese transport sector [20](Zhou, Chung, & Zhang, 2014)showed that the significant contribution to the overall growth in the consumption levels of fuel was from the increase in consumption of kerosene and diesel. The year 2007 witnessed the overall average energy efficiency drop to an all-time record low and the total potential energy saving was approximately 2.75% of the total transport energy use. It can be inferred that the energy efficiencies of both the Vietnamese and the Chinese automobile markets have been low during 2007 and it might have had consequence effect on their financial performance as well.

Applying the Data Envelopment Analysis (DEA) and Malmquist Productivity Analysis, a research on the Taiwan Automobile industry [10](Maritz & Shieh, 2013) estimated the average total efficiency of nine Taiwanese companies to be about 89%. Sensitivity Analysis and Slack Variable Analysis were utilized to find the factors to improve the operation efficiency. Several suggestions were proposed to move towards a permanent optimal scale of operation. With respect to the performance of the energy sector, the Dutch energy sector was studied [11](Ptasinski, Koymans, & Verspagen, 2006) to analyze three sub-sectors namely exploitation, transformation & distribution of energy. The key indicators used in the study were energy, exergy & cumulative exergy consumption (CExC). Analysis showed that most of the sub-sectors that were considered for the study had high energy and exergy efficiency but the CExC efficiency was comparatively lower. Extended Energy Accounting method was found to be a more reliable tool to analyze performance of chemical and energy transformations.

On a larger scale, the effect of partnerships with rivals on the relative competitive positions of the partner firms in the global auto industry during the period 1966-1995 was studied [5](Dussauge, Garrette, & Mitchell, 2004) and it was found that more asymmetric is the outcome from link alliances greater is the change in the relative market shares of the partnering firms as there is a striking imbalance in the opportunities for learning by doing and mutual learning among the partners. The results from a study conducted on the U.S Automobile industry [16](Thomas & Weigelt, 2000) showed that the managers of automobile companies opted for innovative models in line with their already existing prototypes. On the other hand, the new players and the foreign competitors positioned their products closer to those of their rivals. The findings were in compliance with the economic models of product differentiation and theories of firm capabilities.

In the Indian context, the financial performance of the Indian automobile sector was analyzed in detail in various studies and different statistical tools were utilized in the process. Financial ratios are the best indicators of the performance of the Indian automobile industry. This was evident from the research done using factor analysis and multiple regression [15](Shrabanti Pal, 2015). Solvency management, profit management and operation efficiency were found to be the significant factors with Eigen value greater than 1. Having profitability as the dependent variable, multiple regression analysis was deployed to find the relation between the above-mentioned factors and profitability. The variation was explained to about 63.8% (adjusted R square) by the regressing variables and proved to be a significant model. An elaborate study was done to analyze the performance of the Indian Automobile sector with capacity utilization as the study variable [13](Sarbapriya, 2012) and revealed that the average capacity utilization(CU) for the sector was in the range of 0.3819 to 0.7359. The post LPG era witnessed a surge in capacity expansion. CU had a negative correlation with import-penetration and export-intensity. Meanwhile it was positively correlated with size and market share.

An extensive analysis was done [2](Ali M Ghanbari, 2007) according to which the Economic Value Added (EVA) was more related to the Market Value Added (MVA) in comparison to the conventional measures to determine the performance and it is the best interior measure of corporate achievement in increasing the value of shareholders' ventures. As a supporting evidence to this work, a comparative study between the predictive capacities of Economic Value Added (EVA) and parameters used in conventional accounting methods was conducted [19](Vijayakumar, 2012).The study measured the relationship of EVA with selected financial variables using ANOVA, Durbin-Watson test, Kendall's tau-b and Multiple regression. The results of multiple regression analysis revealed that Sales, PAT, EPS and MVA were the significant factors. In the last few years of the chosen period of study, about 50-70% of the sample companies had negative values for EVA.

A study on the performance of the Indian power sector while undergoing the restructuring process [14](Sharma, Nair, & Balasubramanian, 2005) examined the effectiveness of the processes undertaken for restructuring in realizing the objectives set by government for this sector. A huge loss of about 40.2 Billion INR in this sector was largely attributed to the inefficient management technical & commercial factors and also unstructured tariff. There was minimal contribution to the GDP from this sector of about 2%. The study also showed that the rate of return of the State Electricity Boards has sharply declined from -12.7% (1992-93) to - 44.1 %(2001-02). Statistical techniques tools like Tobin q and Ordinary Least Square method were utilized in a research [12](R.N. AGARWAL, 1991) to find the impact of the removal of price control and the change in government policies on the profitability and the growth of the Indian automobile industry. It was found that the profitability remained < 1 for both the periods. Vertical integration & diversification were significant for car-sector but not so for the non-car sector. Age or the experience of the firms was the most significant for both sectors.

The significance of ensuring quality services was emphasized through a research on a sample of twenty urban water utilities [8](Kumar & Managi, 2010).The study found that there was a

striking difference in the performances of these utilities when the estimates were done with adjustments for quality rather than the traditional quantity based approach. The due importance given to maintaining quality in water delivery services was reflected in the results obtained. It was for quality reasons that the research carried out to appraise differences in the performances between government owned, private sector and the mixed sector enterprises in India for the period of study between 1974-1989 [9](Majumdar, 1998) revealed that the least efficient (65%) was the government-owned firms. Mixed sector was found to have performed better than the government sector (91.2%) but the private sector was the most efficient in the period under study (97.5%). The results were obtained from using Data Envelopment Analysis as the statistical tool.

With reference to the oil & gas sector, a research done on the projects done by ABB [4](Dr. V. Kongezos & Jellum, 2012)elucidated the importance of industrial asset management to increase the operational efficiency. It was found that 40% of the operational expenses was spent on Electrical, Instrumentation, Control and Telecoms (EICT) systems. Asset optimization through various maintenance and monitoring systems is one of the asset management solution provided by ABB to improve the operational efficiency. Stochastic frontier estimation and DEA was used in a study on the National Oil Companies (NOCs) and private international oil companies (IOCs) [6](Eller, Hartley, & Medlock, 2011) to evaluate their revenue efficiency. It was inferred from the study that with few exceptions, the efficiency of the NOCs was very much lesser than that of the IOCs. This inefficiency was attributed to the difference in the institutional and structural features that were in line with objectives of individual firms.

To build a uniform model to predict the stock performance of the Indian automobile sector and the Oil & gas sector, various statistical methods used by researchers were examined to find out the suitable technique to be used in this study. A research using artificial neural network (ANN) and panel data regression (PDR) was done [7](Ghosh, Mc, & Ramachandran, 2016) to predict the Earnings Per Share (EPS) of the public-sector banks in India. Both the methods have proved the model robust with adjusted R square value of about 99%. Among the variables considered to predict the model, Graham's number and Book value emerged as the most significant ones closely followed by profit after tax (PAT) and return on assets (ROA).

A study to develop a robust Neural Network model to capture the nonlinear relationship between past return innovations & conditional variance was conducted [3](Arnerić & Poklepović, 2014)and proved that the Jordan Neural Network(JNN) model showed superior performance compared to the standard GARCH model. A research in the area of banking [18](Vardar, 2013)established a link between the cost & profit efficiency estimates and the stock performance across the data obtained from five countries using Stochastic Frontier Analysis model and Panel Data Regression. It was found that profit efficiency had a positive relationship with the stock returns while the cost efficiency was inversely related. Overall, the model was found to be significant. During the same period, another study [1](Abdullah, 2013)made use of distance based fuzzy time series model to predict the exchange rate of Malaysian Ringgit (MYR) against USD and it was found that the model was found to be more accurate in predicting the

exchange rate compared to the ordinary fuzzy time series model. The variance was explained to the extent of 86%.

From the review of research works above, it was found that most of the studies carried out in the chosen sectors of our paper used the Data Envelopment Analysis (DEA) as the statistical tool. Hence, this research would be one among the few to use Panel Data Regression (PDR) to build a predictive model for the performance of the Indian automobile as well as the Oil & gas sectors.

IV. RESEARCH METHODOLOGY

This study has been focused on constructing the predictive model for Indian Auto and Oil & Gas Industries in Indian Economy with the help of PDR (Panel data regression). Earnings per share (EPS) was measured by using Panel Data Regression model. Time period of data collection was within 2007 to 2016. For the study 12 companies from auto sector and 8 companies from Oil & Gas sector were taken into consideration here. Five control variables were chosen carefully for this study. They were Profit after tax (PAT), Return on Assets (ROA), Return on Investments (ROI), Total Assets (TA) and Inventory turnover (IT). The study has been carried out to determine EPS by using Panel Data Regression (PDR), fixed effects method. As this data set is a balanced panel, that means perfect mixture of cross-sectional and time series data, so PDR is applied.

V. STUDY OUTPUT

Panel Data regression output
Method: Panel Least Square
Periods: 9
Cross-Sections: 12

Auto Sector

PDR output (Auto Sector) Table I

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Occurrence
Code	-74.87907	398.2977	-0.187998	0.8513	
Inventory Turnover	2.867087	26.49795	0.1082	0.9141	9%
Profit After Tax	0.245633	0.149223	1.646086	0.1036	90%
Return on Asset	-13.29563	36.17742	-0.367512	0.7142	29%
Return on Investment	10.14218	13.56079	0.747905	0.4567	54%
Total Asset	-0.019004	0.019453	-0.976937	0.3315	67%

PDR output (Auto Sector) Table I (i)

R-squared	0.595988	Mean dependent var	197.8247
Adjusted R-squared	0.476281	S.D. dependent var	621.3818
S.E. of regression	449.6844	Akaike info criterion	15.25768
Sum squared resid	16379502	Schwarz criterion	15.88585
Log likelihood	-783.6569	Hannan-Quinn criterion	15.51228
F-statistic	4.978712	Durbin-Watson stat	0.771318
Prob(F-statistic)	0		

Model Based on PDR

EPS = -74.8790742905 + 2.86708745974*IT + 0.245633450311*PAT – 13.2956252208*ROA   + 10.1421831458*ROI – 0.0190043532869*TA

Oil and Gas Sector

Panel Data Regression
Method: Panel Least Square

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Occurrence
Code	42.61439	12.86264	3.313037	0.0017	
Asset Turnover	-11.56358	4.597412	-2.515237	0.015	99%
Inventory Turnover	-0.019997	0.121582	-0.164475	0.87	13%
Profit After Tax	8.03E-06	9.54E-06	0.842279	0.4034	60%
Return on Asset	4.89977	2.051038	2.388922	0.0205	98%
Return on Investment	-0.500376	0.901659	-0.554951	0.5813	42%
Total Assets	-3.78E-06	7.34E-07	-5.145726	0	100%

Periods: 10
Cross-Sections: 8

PDR output (Oil & Gas Sector) Table II

PDR output (Oil & Gas Sector) Table II (i)

R-squared	0.874892	Mean dependent var	30.66776
Adjusted R-squared	0.82296	S.D. dependent var	20.27711
S.E. of regression	8.531815	Akaike info criterion	7.370303
Sum squared resid	3857.969	Schwarz criterion	8.075656
Log likelihood	-257.0715	Hannan-Quinn criterion	7.652196
F-statistic	16.84698	Durbin-Watson stat	1.50545
Prob(F-statistic)	0		

Model Based on PDR Equation:

$$EPS = 42.6143877321 - 11.5635817811*AT - 0.0199973044188*IT + 8.03328000321e\text{-}06*PAT + 4.89977044438*ROA - 0.500376448977*ROI - 3.77862267367e\text{-}06*TA$$

VI.   CONCLUSION

Remark for Auto Sector (Table 1 and Table 1.1)

- PDR affirms that PAT is very close with around 90% yet it cannot be considered, as the certainty is 95% in this PDR.
- Adjusted R Squared is around 47.6% makes it decent model that can predict EPS of Auto Sector in India, 47.6 times out of 100 circumstances.
- PAT imparts a positive connection to EPS. F-Stat in ANOVA is more than 1 and likelihood of F Stat is zero makes the model decent enough to predict the EPS.
- Akaike info criterion, Hannan-Quinn criterion and Schwarz criterion coefficients are little high compared to Oil and Gas sector demonstrating the precision as low compared to that model.
- Durbin-Watson is more prominent than R Squared means the PDR is substantial and it is non-spurious in nature.

Remark for Oil and Gas Sector (Table 2 and Table 2.1)

- PDR shows that Asset Turnover, return on Assets and Total Assets do choose the EPS with almost 100% occasion probability.

- Adjusted R Squared is around 82.2% makes it possible that this model can describe EPS of Oil and Gas sector in India 82.2 times out of 100.
- Asset Turnover and Total Assets however shows a regressive relationship to EPS, and Return on Asset gives a positive association with EPS. F-Stat in ANOVA is more than 1 and probability of F Stat is zero makes the model effective.
- Schwarz criterion, Akaike info criterion and Hannan-Quinn criterion coefficients are quite small indicating the accuracy as very high.
- Durbin-Watson is more noticeable than R Squared means the PDR is considerable and it is non-spurious in nature.

Conclusive remark

- Oil & Gas Sector is among the core industries in India, which affects the decisions on other important sections of economy whereas Auto sector is dependent on the core sections of the economy.
- Auto sector has variety of products ranging from small segment cars to high-end models; it is difficult to standardize it, whereas Oil and Gas sector do not show much variation in terms of variety
- It is easy to develop a predictive model with high accuracy for Oil and Gas sector than Auto sector.

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