

Emperical Exploration of Public Sector Undertaking in Petroleum Industry: Perils and Prospects

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Abstract

India is one of the major oil producing countries in the world and the credit goes to the affirmative and supportive policies of the state and central government at different time intervals. In the period of last 10-20 years a number of private operators had entered the market and start to share the profit pie which was solely owned by the respective government owned and sustained oil companies. The time is changing fast and the orientation of the oil companies is also changing in the same pace. In this present paper the researcher had tried to assess the viability of the stock prices of selected state owned oil companies, in the present and the prospects of the same in near future. Here the fluctuation in the stock prices of the selected companies i.e. IOCL, HPCL and BPCL is studied for the period of 5 years. The tool used for the study was ARIMA model of forecasting and also the concepts of descriptive statistics are considered for studying the data

Keywords: BPCL and HPCL, Futureprospects, IOCL, Stock trends.

I. INTRODUCTION

In the present scenario India can be considered as one of the major oil producer in the world and even the third largest country as far as consumption is concerned. as a matter of fact out of the total oil requirement it imports around 75% from other oil producing companies. Growth rate and the actual level of oil production in the country have remained stagnant since 2014. As of now most of the petroleum and petroleum related business is being governed by 6 of the state owned companies. Then on the other hand, after the central government has allowed the private participation in oil exploration, many of the private players had entered the market like Reliance industries, Essar, etc. apart from this IOCL, HPCL and BPCL are three major

companies which are into exploration, distribution, stocking, etc.

Just like other public limited companies IOCL, HPCL and BPCL are having a part of share capital in their overall portfolio and this present study is directed towards the present situation of the stocks of above mentioned companies and also attempts to forecast the future growth prospect for the same. ARIMA model is being used in this present study and the duration of evaluation is 5 years.

Scullyet al (1992) had taken the help of backward integration and proved that the private oil companies are better performer as compared to the national oil exploration companies. The respective parameter of the study was output at a common point of time. it was also stated in the study that off-shore business can be one of the deciding factors for rating the business of the company.

There are a number of examples in the recent past where the petroleum and related companies have kept the profile of their profitability low and increased their respective margin and even the market shares. Then on the other hand concentrating on exploration had also increased their viability in the market. This phenomenon has resulted in the positive feedback of the company in stock market. Antillet al(2002).

There have been studies which have shown that considerable differences exist within national oil companies with few of them performing well and rank among the top performers e.g. Statoil and Petronas and feature in the ranking of top 100 energy companies in the past decade. The performance of national oil companies suffers due to the pursuit of noncommercial objectives which has been highlighted by various studies (Wolf & Pollitt, 2008) (Victor N. M., 2007). There have been various approaches like case studies and efficiency studies for comparing the performance of national oil companies with private for-profit oil companies.

II. BRIEF PROFILE OF COMPANIES

Indian Oil Corporation Limited (IOCL)

It is one of few crown-jewels which are successfully adding to the tons to Indian economy, downstream it is called as '*Indian Oil*.' Considering the structural changes in exploration, distribution, etc. in the last few decades, the company was honored as the largest petroleum in the country that is successful on commercial grounds. It can be observed from the calculated growth rate of 11.3% from the last year's net profit of around 19000 crore in the financial year ended in 2017 and 9.7% growth in the turnover i.e. from around 500, 000 crore in the year 2018.

As a matter of fact it is the success of strategic overview of the company that it has secured 115th position in the fortune 500 companies in the year 2019. On the other hand even the company is

largest employer in its sector i.e. there are around 34,000 employees working in the company.

The main operations of the company include, refining of crude oil, exploration of crude oil and gas, hydrocarbons. Even the production of the above can also be added to the total portfolio. It is not so that company is only engaged in the production and exploration of petroleum products, even the company is known for its contribution in venturing for alternative sources of energy. There are a number of off shore operations of the company like in Middle East, Sri Lanka, Mauritius. Etc. The nearest competitor of the company is ONGC, in terms of profit generation, the records show that IOCL earned a profit of 21000 crores in 2018 and in the same year ONGC earned around 19000 crores of profit.

Hindustan Petroleum Corporation Limited (HPCL)

HPCL is one of the giants in petroleum industry and based in Mumbai, India. As per the report of IBEF 2018, the company holds around 25% of total market share considering all the public sector companies. This scenario of the company is the result of serious management considerations, as far as the strategies and the infrastructure of the company is concerned. It is a well-known fact ONGC is the second promoter of HPCL and holds more than 51% shares in the company and the remaining 48.5% (approx.) is being enjoyed by some investors and financial institutions. It is the second petroleum PSU, after IOCL which is ranked in fortune 500 companies, the present rank of the company is 354th. There are two major incidents associated with HPCL in the year 2019, i.e. the company was removed from NIFTY 50 index and given the status of '*Maharatna*'. The company came into existence in the year 1974, it was the result of merger between Esso Standard and Lube India Limited, based on Acquisition of Undertaking in India Act, 1974. By the year 1979 HPCL took over companies like CORIL, Kosan

Gas Company, etc. The registered net profit of the company in the year 2018 was around 1843 crores, which was 9.3% higher on the grounds of growth rate (*considering 2015 as base year*). The financial growth of the company can be linked to its growth in terms of production capacity, it had increased on around 6 MMT in the year 2013 to 14 MMT in the year 2017.

Bharat Petroleum Corporation Limited (BPCL)

BPCL is again a state owned company which is conferred with the status of '*Maharatna*', the company is successfully operating its largest refineries in Kochi and Mumbai. The company is just next to ONGC and holds 275th rank among the fortune 500 companies in the year 2019. As a matter of fact it is the only PSU that secured a place in the Forbes list in 2018 i.e. 275th place. At the very inception of the company it was known as Rangoon Oil and Exploration Company (ROEC), back in the year 1889. It was a establishment secured by the British rulers.

Table 1: Consumption and Market share (2011-18)

Year	IOCL		BPCL		HPCL	
	Consumption (in TMT)	Market Share (in %)	Consumption (in TMT)	Market Share (in %)	Consumption (in TMT)	Market Share (in %)
2011-12	70084	47.3	30228	20.4	27581	18.6
2012-13	71249	45.4	32232	20.5	28862	18.4
2013-14	69873	44.1	32776	20.7	30048	19.0
2014-15	71653	43.3	33394	20.2	30746	18.6
2015	75946	41.1	35514	19.2	33585	18.2

16						
2016-17	77324	39.7	36376	18.7	34441	17.7
2017-18	80212	39.1	39524	19.3	35936	17.5

III. LITERATURE REVIEW

Stevens (2008)The researcher conducted a test on the parameters of evaluating the performance of state owned petroleum companies and stated that evaluating the performance of such companies, only on the basis of financial parameters, is not sufficient enough. He claimed that in most of the companies PSUs are acting as diversified monopolies and also the objective of public welfare is associated along with the commercial objectives of the company. He also stated that in many of the developing countries there is only one Oil Company and in India there are more than three state owned companies that are successfully operating.

Victor (2013)this study was based on the strategic formulation of the petroleum companies and success of the same in the market operations. The findings of the study stated that there is a generalized model for evaluation but cause specific or clearly mentioning, strategy based evaluation is not possible. Then on the other hand there are so many models of comparison in case of private companies and even the evaluation of the same is much possible for the given set of researchers. The results of the study were based on five different case studies, considering both the state owned and private petroleum companies.

IV.OBJECTIVES

- The main objective of the present study is to evaluate the present scenario and future trends of the selected companies.

- To apply ARIMA model and judge the best suited component of the selected companies in near future.

V. RESEARCH METHODOLOGY

This study is based on secondary data, and involved the performance evaluation of IOCL, HPCL and BPCL. The basis of evaluation is the stock prices of the company for five years i.e. 2014 to 2018. As the said data is taken from the various reports of BSE and it is enormous in number so the researcher has taken the quarterly average of the said period and then analyzed it. As a matter of fact ARIMA model is used to evaluate the data and SPSS Ver. 20.0 is used for the analysis part. The researcher had also tried to present the theoretical frame of the ARIMA model.

Forecasting procedure:

The process of forecasting is mentioned in the figure given below, as can be seen it starts with the identification of model with the respective use of ARIMA (*Autoregressive Integrated Moving Average*). Then in order to proceed with the model the Autocorrelation Function i.e. ACF and Partial Autocorrelation Function i.e. PACF are to be evaluated. The values gained at this level will help the model to estimate the parameters for ARIMA. At the next level the variation in the calculated and observed values is taken which is taken on quantitative basis. And finally the errors are checked and values are forecasted.

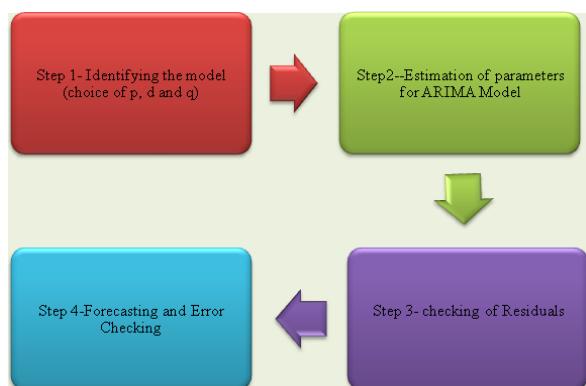


Fig 1: Block Diagram of Forecasting Procedure

Model Summary:

As stated above the ARIMA model is used in this present research. After evaluating the stationary of data in the time series and once the stationary of data is attained then the order of AR and MA processes are applied. The selected companies are IOCL, BPCL & HPCL and the stock prices of the respective companies are being analyzed for the period of five years i.e. 2013-14 to 2017-18. the data which was analyzed in the study was taken from the monthly average of Bombay Stock Exchange (BSE) for the said period of time.

Model of Time Series:

We assume that X_t is the stationary time series and the mean and variance of the same are μ and σ respectively. On the other hand we also assume that 't' will take the value of either $=, \pm 0$ or ± 1 . Then the covariance function of X_t for a lag ' k ' can be given as

$$X_t = E(X_t - \mu)E(X_{t-k} - \mu) \quad \text{-----equation 1}$$

Then again for lag ' k ' the autocorrelation function can be given as

$$\rho(k) = \frac{\gamma(k)}{\gamma(0)} = \frac{\gamma(k)}{\sigma_x^2} \quad \text{-----equation 2}$$

Then according to the model, partial autocorrelation is also calculated and the below given equation denotes the manual orientation of the same, where φ_k is denotes autocorrelation and can be obtained from the following:

$$\varphi_{k+1} = \frac{\gamma_{k+1} - \sum_j^k \varphi_j \gamma_{j+1}}{1 - \sum_j^k \varphi_j^2} = \frac{1}{1 - \sum_j^k \varphi_j^2} \varphi_{k+1} \gamma_{k+1} \quad \text{-----equation 3}$$

$$\hat{\varphi}_{kj} \gamma_{k+1,j} = \hat{\varphi}_{kj} - \hat{\varphi}_{k+1,k+1} \hat{\varphi}_{k,k+1-j} \quad \text{-----equation 3}$$

AR (p)

The order (p) for AR is:

$$X_t - \varphi_1 X_{t-1} - \varphi_2 X_{t-2} - \dots - \varphi_p X_{t-p} + a_t \quad \text{-----equation 4}$$

In the above given equation 4, a_t can be considered as the noise, and p is the sequential order of AR i.e. the denotation of φ_p as the AR parameter.

MA (q)

The order (q) for MA can be defined as:

$$X_t = a_t - \theta_1 a_{t-1} - \theta_2 a_{t-2} \dots \theta_q a_{t-q} \quad \text{equation 5}$$

In the above given equation 5, a_t can be considered as the noise, and q is the sequential order of MA.

Here p and q represent AR and MA for the process X_t . combining both we will get the following:

$$X_t = \varphi_1 X_{t-1} - \varphi_2 X_{t-2} \dots \varphi_p X_{t-p} - a_t - \theta_1 a_{t-1} - \theta_2 a_{t-2} \dots - \theta_q a_{t-q} \quad \text{Equation 6}$$

In the above given equation φ_p and θ_q are the AR and MA components and a_t is the noise or variation in the data.

Finally, ARIMA (p, d, q) can be quoted as

$$\nabla^d \varphi_{(B)} X_T = \theta_{(B)} a_t$$

Where $\nabla = (1 - B)$,

here B can be considered as the operator of backward shift, which can be given as

$BX_t = X_{t-1}$, φ and θ are the AR and MA components.

VI. DATA ANALYSIS

After defining the manual interpretation of the model, SPSS Ver. 20.0 is used to analyze the data and the interpretation of the model is given here in two parts i.e. descriptive statistics and inferential statistics. At first the descriptive statistics part is evaluated and the respective results are shown in the table given below:

Table II: Result1

Name of Company	Mean	Standard Deviation	Coeff. Of Variation	Skew.	Kurt.
BPCL	633.408	208.79	0.38470	0.51009	-3.00175
HPCL	512.04	253.73	0.51901	0.90053	0.30771
IOCL	357.041	92.42	0.31443	0.41063	-4.99265

As can be seen from the above table that the standard deviation of HPCL is highest among all the selected companies i.e. 253.73, this denotes that HPCL may show a high level of variation in the time series as compared to other companies. As a matter of fact the respective skewness value for all the companies is non-zero and the overall trend is having a normal kurtosis.

After the evaluation of descriptive statistics, next step is to evaluate the inferential statistics. At this point first of all it is required to test the stationary situation of data considered in the form of a time series. The detail of the same is mentioned in the below given table.

Table III: Result 2

Name of Company		Coeff.	Standard Error	Value of t-test	Validity of 'P' value
BPCL	θ	677.25	89.3521	7.3631	<0.00001
	φ	0.91223	0.49006	18.4802	<0.00001
HPCL	θ	503.22	104.664	5.6847	<0.00001
	φ	0.793304	0.06325	12.8794	<0.00001
IOCL	θ	442.215	29.6508	8.7357	<0.00001
	φ	0.795862	0.051120	12.6090	<0.00001

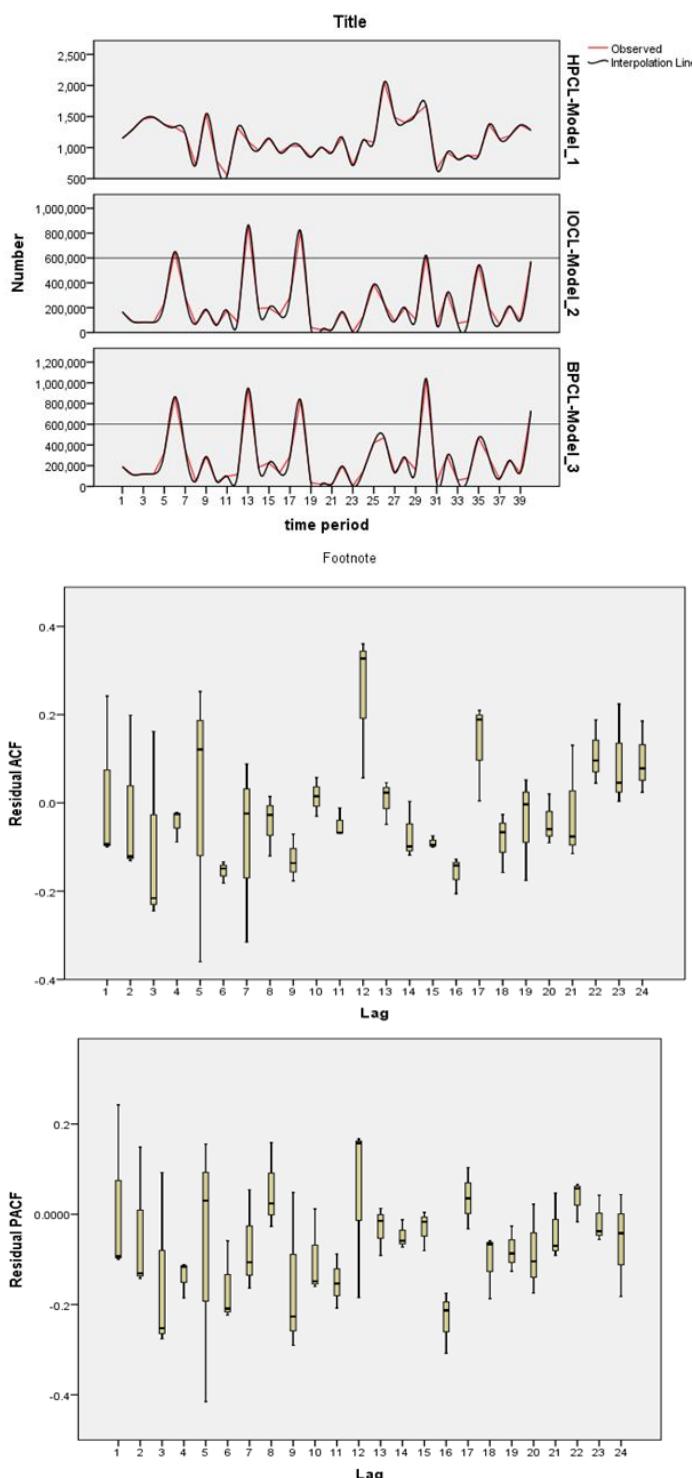


Fig 2: a.Analysis over time b: Graph of Lag vs Residual ACF c: Graph of Lag vs Residual PACF

VII. CONCLUSION

This paper attempts to study the stock prices for the stipulated period of 5 years, the values of the stocks are taken on monthly average basis for a

given year. Close evaluation of the time series data state that there is an increasing trend in all the selected companies for the given period of time. residual ACF and residual PACF charts given above state that there is a fluctuation in the stock prices if they are viewed on the quarterly basis, but then again this can be due to the effect of external environment, but at the starting of every next quarter the prices are again showing the increasing trend. This is a positive sign for the overall industry and suggests that the investors may hold for a stipulated period of time and do not act as aggressive buyers or sellers as far as the stocks of the oil companies are concerned.

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