ECONOMIC VALUE ADDED VALUATION IN INDIAN OIL AND NATURAL GAS SECTOR

DR. M. SHARMEEN FAROOQ

Associate Professor,Ethiraj College for Women,Chennai,Tamil Nadu
India

Postal Address ,No 22/25 Chanda Street,Royapettah,Chennai 600014,Tamil Nadu
India

ABSTRACT

The Economic Value Added technique popularly known as EVA estimates the excess returns or residual wealth created by a firm over its cost of capital. It relects the true value creation that an entity creates based on its operating after tax profits and forms an edifice of fundamental analysis.The paper in its assessment of EVA for the BSE Oil and Natural Gas constituent companies between 2017 and 2021, evaluates the risk existing in the Oil and Natural Gas sector with the computation of beta using the CAPM approach.The beta has been unlevered and levered in the measurement of cost of equity and the cost of debt has been estimated with the Synthetic Default spread method.The paper provides consideration to India's risk free rates and equity risk premium for the cost of capital assessment.The overall cost of capital has been computed and utilised for the measurement of EVAs for the period of five years chosen. Further the paper also estimates the abnormal returns of the stock with monthly prices durng the period and attempts to find any relationship existing between the returns with EVAs.The paper finally converts the EVA values into a DCF valuation to estimate the intrinsic value of the share and compares it with the average closing monthly share price of the year.The results disclose proximity to the market prices and reveal the success of the method in reflecting true values.This proximity would also illustrate evidence of the market efficiency as the markets understand all information to reflect market prices close to its the real intrinsic prices.The EVA has revealed a statistically insignificant relationship between EVA and AAR for all the sample companies. The negative t value

-2.816 indicates that the relationship between EVA and stock return is negative which means negative EVAs have produced positive abnormal returns but the significance value of t 0.007 is closer to proving the association between them, EVA could be taken as a valid indicator of stock performance.

KEY WORDS

EVA, Discounted Cash Flow, Average Abnormal Returns, Terminal Value, Intrinsic Value, Risk Free Rate and Equity Risk Premium

1.1 INTRODUCTION

Oil and Gas is the primary fuel of the world. India is the third leading consumer of oil in the world, following the United States & China; it has 247.57 MTPA of refining capacity with an excess refining capacity of about 15%, hence establishing it as the

second-largest refiner in Asia after China. Energy plays a foremost role in decisions impacting the other important sectors of the economy. The Indian Natural Gas production has increased by 22.7% in April 2021. The sector is among the core industries which contribute to 40.27 percent of the weight of items in Index of industrial production. Refinery Products in India are the leading among the eight core industries. The rationale to invest in this sector is the growing economy and growth in population which are the main drivers for oil & gas demand, increasing every year.

The Energy demand of India is anticipated to grow faster than energy demand of all major economies on the back of continuous robust economic growth. India's energy demand is expected to double to 1,516 Mtoe by 2035 from 753. The selection of EVA technique helps integrate into the model of valuation, capital expenditures and changes in working capital which are customary in the sector and its results represent what will be surplus to the investors. The companies in the sector have witnessed negative growth rates of growth and its stocks have been bearish. In India EVA has been adopted by many large cap companies such as TCS, HUL, Godrej Consumer Products Limited, Ranbaxy, and Infosys who have reported it in the financial statements. The forthcoming session discusses the results of EVA valuation Oil and gas (O&G) sector for the years 2017 to 2021.

1.2 REVIEW OF LITERATURE

EVA model has been the subject of academic literature and contributions of several authors have been noted. EVA technique has been applied to arrive at an intrinsic value useful for comparison with the market value.Some of the various studies in this regard are as follows. Misra, Anil & Kanwal, (2005) verified that EVA is the single most important variable explaining the MVA and market price variation. Madan Lal Bhasin (2013) demonstrated that there is less evidence to show that EVA is more associated with MVA than the traditional measures. A G Awan,K Siddique,G Sarwar,(2014) emphasized that EVA does affect the value of the stock and must reflect intrinsic value of the stock. Bhargav Pandya (2014) in his study showed that the measures created shareholder value. Market Value Added and Economic Profit together explain the variation in the selected banking firms. Reddy, Y.V. & Parab, Narayan &, Poornima. (2015) in their study confirmed EVA to be a significant indicator of growth in banks as against return on economic value added. Najmus Sahar Sayed, Gazia Sayed, (2015), advocate that MVA was the best gauge of wealth which is influenced with the payment of dividends by the Indian Banks. Althaf (2016) in his study

concluded that both the manufacturing and service firms reveal a strong association between operating income and market value. Gounder and Venkateshwarlu (2017) established a significant relationship between the intrinsic prices determined under the residual valuation model and the market prices. Sujata Behera (2020l held that the EVA model performed better with a changing required rate of return than a constant required return with a recent dataset. Geng, Songtao & Liu, Suyu & Liao, Xuelin. (2021) utilised EVA to analyse the operating performance of Tourism companies in China and found that almost half of these did not indicate positive EVA. They suggested the use of such measures to improve their operating performance.

Many studies have been directed to examine the relationship between EVA and abnormal returns of the stock. Some of the major contributions with respect to these include the following. Stewart (1994) glorified that EVA had 50 percent better predictive ability than the traditional measures in explaining the changes in Shareholder value. Chen and Dodd (1997) in their study of 566 companies in the United States showed that the EVA has superior explanatory ability than the traditional measures of accounting. They also concluded that EVA does not depict a perfect relationship with stock return. Lehn and Makhija (1997) tested whether EVA has a much better relationship with the returns on stock than ROE and ROA. They even used the measure to predict the COE turnover in the companies. Shubita Mohammad (2010) recognized Net income superior to the Residual income and EVA in terms of stock return association. Adil Pasha & Muhammad Ramzan (2019) identified weak but significant association between EVA and abnormal stock returns. Kaur and Narang (2004) state that EVA did not provide clear evidence to reveal superiority over the traditional accounting measures to exhibit value creation to the shareholders. Singh and Garg (2004) in a comprehensive study of EVA institute that the corporate would fail to exist if they could not create wealth with the use of EVA.G. Athanassakos,(2007) depicted that the use of EVA by companies was linked with better stock performance.

1.3 OBJECTIVES OF THE STUDY

The following are identified to be objectives of the study:

1. To assess risk in the industry with computed beta and cost of capital using beta.

2. To measure the EVA of the firm and determine its intrinsic value per share with the use of the DCF methods of valuation and make a comparison of the market price and its corresponding intrinsic values.

3. To examine the abnormal returns verifying its association with the EVA

1.4 METHODOLOGY

1.4.1 RESEARCH DESIGN

The study seeks to value the stocks in the Oil and Natural Gas sector. An assessment of risk is made by determining the beta of the stocks with the study of monthly closing stock prices for a period of five years from December 2016 to November 2021. The dividends declared by the companies during the aforesaid period were also incorporated in the computation of returns and the risk of the stock. The study uses the risk free rates current and for the period as computed by the Valuation expert Professor Aswath Damodaran, Stern School of Business New York. The stock prices and index prices collected from the BSE website www.bseindia.com have been compared with the BSE Oil and Natural Gas index prices in the computation of beta and abnormal returns.

The beta of the stocks so computed in the above manner has been unlevered to eliminate the leverage effect of the individual company and levered with the industry debt equity. The Synthetic Default spread method has been used to calculate the cost of debt. For this purpose the study uses the company's interest coverage ratios to relate them to the table which provides a synthetic rating and the default spread of the rating. The cost of debt so determined is adjusted with computed tax rates of the company. These costs of debt and equity are further utilised for the calculation of cost of capital with the due weightage being provided to book values of debt and equity. Hence the cost of capital of each company was determined foe the years 2017 to 2021.

The next step was to compute EVA for the five years The taxes were reduced from the EBIT of the company and the cost of capital was multiplied with the capital invested been deducted from the above operating profit after taxes. If the resulting figure was positive the company has created wealth and vice versa with negative values. The capital invested has been adjusted for net capital expenditures and changes in working capital. The EVA calculation was converted to a DCF valuation with the computation of Terminal Value. The return on capital is assessed with the last year net capital expenditures and changes in working capital and the growth in the sales revenues and return on capital the capital invested in the terminal

year is arrived along with the change in capital between the year 2021 and the terminal year. The EVA of the terminal year is divided with the differences in cost of capital and rate of growth of the economy. All the EVAs are discounted with the respective years cost of capital and are summed up together with the initial capital invested and the change in capital in the terminal year. The total firm value is reduced with the value of debt from the last year and divided with the total number of shares to determine the intrinsic value per share.The success of the method is revealed with its comparison to the average monthly closing share price of the company in the year 2021.The proximity is subject to t test to verify the accuracy of the model.

The paper also attempts to evaluate the relationship between Average Abnormal returns made by the companies in the five year period with the Economic Value Added computed for the corresponding period. For this purpose the abnormal returns on monthly stock prices are computed over the BSE Oil and Natural Gas index prices and year wise averages are considered. The paired sample t test and one way ANOVA have been used to test the significance of the relationship between the two variables.

SAMPLE

The sample chosen for the study are the constituent companies of the BSE Oil and Natural Gas Sector. Since the companies comprise the index they serve to represent the sector. The reason for the choice of the sector is that the Oil and Natural Gas sector is one among the eight core Indian industries which contributes to 43.9 percent of the weight of items in Index of industrial production and refinery products are the highest in terms of weightage.

EMPIRICAL RESULTS

The assessment of EVA requires the computation of cost of capital.The calculation for cost of equity ,cost of debt and the overall cost of capital has been depicted in the tables below.

Table 1.1 Computayion of Cost of Capital-2017

Co No	Beta	Tax rate	D/E	ul beta =Col 2/{1 +(1-Col3)(Col 6)}	IND D/E	lev beta =ul beta x{1+ (1-col3) (col8)}	Ke=Rf r+Col9 xERP*	RFR	ICR	De pr	Kd	after taxK d	E	D	Ko17
Adani	1.41	0.25	0.00	1.41	0.13	1.55	18.76	5.13	5.94	0.98	6.11	4.56	714.85	490.67	12.98
BPCL	-0.01	0.20	0.46	0.36	0.13	0.40	8.66	5.13	23.27	0.63	5.70	4.56	29668.38	13776.44	7.36
Gail	1.31	0.24	0.08	1.37	0.13	1.50	18.37	5.13	12.29	0.63	5.53	4.19	38149.37	3004.55	17.33

Co No	Beta	Tax rate	D/E	ul beta	IND D/E	lev beta	Ke	RFR	ICR	Depr	Kd	after tax Kd	E	D	Ko
Gujarat Gas	0.88	0.25	0.00	0.88	0.13	0.96	13.61	5.13	13.73	0.63	5.95	4.47	47810.49	0.00	13.61
HPCL	0.26	0.25	0.31	0.49	0.13	0.54	9.89	5.13	17.84	0.63	7.13	5.34	1696.11	126.30	9.58
Indraprastha Das	0.82	0.22	0.01	0.83	0.13	0.91	13.17	5.13	712.31	0.63	5.53	4.30	304909.39	9993.80	12.88
IOCL	0.15	0.23	0.20	0.30	0.13	0.33	8.07	5.13	8.60	0.63	5.53	4.27	9322.21	0.00	8.07
ONGC	1.11	0.19	0.00	1.11	0.13	1.23	15.92	5.13	21.64	0.63	5.95	4.82	19138.13	1.80	15.92
Petronet	0.76	0.22	0.18	0.90	0.13	0.99	13.89	5.13	12.26	0.63	5.91	4.63	8093.89	1450.03	12.48
Reliance Prteoleum	1.21	0.22	0.38	1.50	0.13	1.65	19.70	5.13	15.98	0.63	5.53	4.31	288313.00	10594.00	19.15

Computation of Riskfree rate
ERP*= 8.81   Bond Rate=6.88   Defaukt Spread**= 1.75   Risk Free Rate=5.13(6.88-1.75)
- ERP for india 2017 ** Default Spread of Indai based on Moody's rating

Table 1.2 Computayion of Cost of Capital 2018

Co No	Beta	Tax rate	D/E	ul beta =Col 2/{1+(1-Col3)(Col 6)}	IND D/E	lev beta =ul beta x{1+(1-col3)(col8)}	Ke=Rfr+Col9 xERP*	RFR	ICR	Depr	Kd	after taxKd	E	D	Ko18
Adani	1.41	0.32	1.20	2.23	0.16	2.47	23.25	5.29	3.07	1.22	6.27	4.26	1025.73	1234.21	12.88
BPCL	-0.01	0.19	0.03	0.02	0.16	0.02	5.45	5.29	14.54	0.63	5.86	4.75	34131.49	14758.22	5.24
Gail	1.31	0.26	0.02	1.32	0.16	1.48	16.03	5.29	26.29	0.63	5.69	4.20	40328.12	976.12	15.75
Gujarat Gas	0.88	0.24	0.00	0.88	0.16	0.98	12.44	5.29	6.89	0.78	6.11	4.62	1846.41	2212.99	8.18
HPCL	0.26	0.11	0.14	0.39	0.16	0.44	8.52	5.29	17.24	0.63	7.29	6.52	1696.11	126.30	8.38
Indraprastha Das	0.82	0.24	0.02	0.84	0.16	0.94	12.12	5.29	611.94	0.63	5.69	4.35	304909.39	9993.80	11.88
IOCL	0.15	0.04	0.00	0.15	0.16	0.17	6.51	5.29	10.28	0.63	5.69	5.43	9322.21	0.00	6.51
ONGC	1.11	0.22	0.00	1.11	0.16	1.25	14.37	5.29	20.15	0.63	6.11	4.77	19138.13	1.80	14.37
Petronet	0.76	0.22	0.18	0.90	0.16	1.01	12.66	5.29	19.74	0.63	6.07	4.76	26189.26	18334.00	9.41
Reliance Prteoleum	1.21	0.22	0.00	1.21	0.16	1.36	15.16	5.29	10.82	0.63	5.69	4.44	314647.00	119590.00	12.20

Computation of Riskfree rate
ERP*= 7.27   Bond Rate=7.24   Defaukt Spread**= 1.95   Risk Free Rate=5.29 (7.24-1.95)
- ERP for india 2018 ** Default Spread of Indai based on Moody's rating

Table 1.3 Computayion of Cost of Capital 2018

Co No	Beta	Tax rate	D/E	ul beta =Col 2/{1+(1-Col3)(Col 6)}	IND D/E	lev beta =ul beta x{1+(1-col3)(col8)}	Ke=Rfr+Col9 xERP*	RFR	ICR	Depr	Kd	after taxKd	E	D	Ko19
Adani	1.41	0.35	0.31	1.61	0.31	1.94	22.63	5.37	4.97	1.08	6.35	4.65	1111.53	345.71	18.36
BPCL	-0.01	0.20	0.64	0.51	0.31	0.63	11.40	5.37	8.92	0.63	5.94	4.34	36737.68	23628.57	8.64

Co No	Beta	Tax rate	D/E	ul beta	IND D/E	lev beta	Ke	RFR	ICR	Depr	Kd	after taxKd	E	D	Ko
Gail	1.31	0.27	0.02	1.32	0.31	1.62	19.91	5.37	66.58	0.63	5.77	4.74	44092.94	870.58	19.62
Gujarat Gas	0.88	0.22	0.96	1.62	0.31	2.01	23.24	5.37	3.86	1.22	6.19	4.92	2183.99	2089.15	14.28
HPCL	0.26	0.29	0.40	0.55	0.31	0.67	11.69	5.37	13.86	0.63	7.37	5.01	28174.82	11317.22	9.78
Indraprastha Das	0.82	0.31	0.01	0.83	0.31	1.00	14.60	5.37	586.37	0.63	5.77	4.66	4129.85	20.93	14.55
IOCL	0.15	0.20	0.32	0.40	0.31	0.50	10.26	5.37	6.78	0.78	5.77	3.69	108657.51	34666.36	8.67
ONGC	1.11	0.28	0.00	1.11	0.31	1.36	17.63	5.37	17.06	0.63	6.19	4.21	202992.56	0.00	17.63
Petronet	0.76	0.24	0.01	0.77	0.31	0.95	14.14	5.37	33.69	0.63	6.15	6.01	10066.07	101.20	14.06
Reliance Prteoleum	1.21	0.22	0.41	1.52	0.31	1.89	22.22	5.37	5.86	0.98	5.77	4.15	405322.00	164707.00	17.00

Computation of Riskfree rate ERP*= 8.6   Bond Rate=7.32   Defaukt Spread**= 1.95   Risk Free Rate=5.37 (7.32-1.95)ERP for india 2019 ** Default Spread of Indai based on Moody's rating

Table 1.4 Computayion of Cost of Capital 2019

Co No	Beta	Tax rate	D/E	ul beta =Col2/{1 +(1-Col3)(Col 6)}	IND D/E	lev beta =ul beta x{1+ (1-col3) (col8)}	Ke=Rf r+Col9 xERP	RFR	ICR	Depr	Kd	after taxKd	E	D	Ko20
Adani	1.41	0.22	0.20	1.57	0.28	1.91	18.48	4.97	14.33	0.63	5.95	4.62	1480.37	297.50	16.16
BPCL	-0.01	0.08	0.62	0.56	0.28	0.71	9.99	4.97	2.74	1.56	5.54	5.12	33214.38	20481.83	8.13
Gail	1.31	0.24	0.08	1.37	0.28	1.67	16.77	4.97	74.21	0.63	5.37	4.09	43971.10	3612.12	15.81
Gujarat Gas	0.88	0.24	0.56	1.30	0.28	1.58	16.13	4.97	6.89	0.78	5.79	4.38	3290.62	1834.36	11.92
HPCL	0.26	0.11	0.77	0.95	0.28	1.19	13.38	4.97	3.36	1.22	6.97	6.23	1696.11	126.30	12.89
Indraprastha Das	0.82	0.20	0.02	0.84	0.28	1.03	12.23	4.97	70.70	0.63	5.37	4.31	304909.39	9993.80	11.98
IOCL	0.15	0.04	0.53	0.65	0.28	0.82	10.79	4.97	2.26	1.56	5.37	5.13	9322.21	0.00	10.79
ONGC	1.11	0.36	0.01	1.12	0.28	1.32	14.30	4.97	8.64	0.63	5.79	3.68	19138.13	2245.10	13.18
Petronet	0.76	0.28	0.01	0.77	0.28	0.92	11.51	4.97	8.71	0.63	5.75	4.16	26189.26	18334.00	8.48
Reliance Prteoleum	1.21	0.22	0.78	1.81	0.28	2.21	20.61	4.97	4.70	1.08	5.37	4.19	391215.00	303443.00	13.44

Computation of Riskfree rate ERP*= 7.08   Bond Rate=6.56   Defaukt Spread**= 1.59   Risk Free Rate=4.97 (6.56-1.95)ERP for india 2020 ** Default Spread of Indai based on Moody's rating

Table 1.5 Computayion of Cost of Capital 2021

Co No	Beta	Tax rate	D/E	ul beta= Col2/{ 1+(1-Col3)(Col6)}	IND D/E	lev beta =ul beta x{1+ (1-col3) (col8)}	Ke=Rf r+Col9 xERP	RFR	ICR	Depr	Kd	after taxKd	E	D	Ko21
Adani	1.41	0.22	0.16	1.53	0.21	1.78	15.51	4.41	16.59	0.63	5.63	4.39	1952.47	307.88	14.00
BPCL	-0.01	0.23	-28.3	0.23	0.21	0.27	6.10	4.41	13.19	0.63	4.98	3.85	54544.55	17032.84	5.56

				8											
Gail	1.31	0.24	0.19	1.39	0.21	1.61	14.42	4.41	41.96	0.63	4.81	3.64	46611.15	4827.08	13.41
Gujarat Gas	0.88	0.25	0.28	1.01	0.21	1.16	11.66	4.41	13.73	0.63	5.23	3.93	4482.65	769.95	10.53
HPCL	0.26	0.25	0.96	0.82	0.21	0.95	10.33	4.41	16.57	0.63	6.41	4.80	1696.11	126.30	9.95
Indraprastha Das	0.82	0.22	0.27	0.84	0.21	0.97	10.47	4.41	61.47	0.63	4.81	3.74	304909.39	9993.80	10.25
IOCL	0.15	0.23	1.56	0.53	0.21	0.62	8.27	4.41	10.51	0.63	4.81	3.72	110500.04	55407.95	6.75
ONGC	1.11	0.19	0.17	1.14	0.21	1.33	12.68	4.41	8.41	0.78	5.23	4.26	19138.13	6327.52	10.59
Petronet	0.76	0.26	0.34	0.76	0.21	0.88	9.91	4.41	12.81	0.63	5.19	3.85	11649.50	23.00	9.89
Reliance Prteoleum	1.21	0.22	0.18	1.58	0.21	1.84	15.86	4.41	2.41	2.00	4.81	3.75	474483.00	227715.00	11.93

Computation of Riskfree rate   ERP*= 6.23   Bond Rate=6.36   Defaukt Spread**= 1.95   Risk Free Rate=4.41 (6.36-1.95)ERP for india 2020 ** Default Spread of Indai based on Moody's rating

The above tables reflect the computation of cost of equity, cost of debt and the overall cost of capital of the company.A high beta in companies such as Adani Total Gas,Gail ltd coupled with lower debt ratios have increased the cost of equity and overall cost of capital of these companies.The effect is lower values and EVAs for such companies.The beta has been unlevered from the effect of the existing capital structure and levered with the industry debt equity.The overall cost of capital for rest of the sample companies is lower. This is on one end the result of lower beta values depicting reduced risk and the other being benefit of appropriate proportion of debt which also has the impact of reducing the overall cost of capital. The calculation of beta for the individual companies is based on the monthly closing prices for the period 2017 to 2021 with due comparison to the BSE Oil and Natural Gas index prices in the corresponding period. The Oil and Natural Gas sector has moderate risk as reflected by the cost of capital. The cost of capital is high for the companies Adani Total Gas Ltd. and Gail Ltd. making them more of a risky investment.

The following table provides the computation of abnormal returns for Indian Oil Corporation limited.The same procedure has been adopted for the computation of abnormal returns of all the other companies in the sample.

Table 1.6 Computation of Abormal Returns and Beta of Stock-IOCL

Current riskfree rate 0.06	Risk premium for stocks 0.0685	Current stock price Rs.117.7
Number of periods of data 60	Riskfree rate during period 0.07	Current Annual DPS Rs.17

Time period	Index	Price(Stock)in Rs.	DPS(Stock) in Rs.	Split Factor	Index LevelBSE Oil& Natural gas	Return(Stock)	Return(Mkt)	(R(jt)-Rj)^2	(R(mt)-R(m))^2	(R(jt)-R(j))
1	1	325.65		1	12151.64					(R(mt)-R(m))
2	1	366.05	13.5	1	12838.16	0.1655	0.0565	0.0248	0.0023	0.0075
3	1	384.95	0	1	13534.47	0.0516	0.0542	0.0019	0.0021	0.0020
4	1	386.75	4	1	13563.63	0.0151	0.0022	0.0000	0.0000	0.0000
5	1	439.85		1	14455.03	0.1373	0.0657	0.0167	0.0032	0.0073
6	1	431.85	1	1	14247.08	0.1271	-0.0144	0.0142	0.0005	-0.0028
7	1	384.9		1	13202.65	0.0516	-0.0733	0.0019	0.0068	-0.0036
8	1	367.35		1	14189.96	0.0047	0.0748	0.0000	0.0043	-0.0002
9	1	453.95	0	1	15177.26	0.1373	0.0696	0.0167	0.0037	0.0078
10	1	400.05		1	14842.54	-0.0182	-0.0221	0.0007	0.0010	0.0008
11	1	414.3		1	16552.4	-0.1087	0.1152	0.0136	0.0113	-0.0124
12	1	393.5	0	1	15927.91	-0.0456	-0.0377	0.0029	0.0022	0.0025
13	1	388.4		1	16283.26	0.2357	0.0223	0.0519	0.0002	0.0031
14	1	417.75		1	16368.16	-0.1187	0.0052	0.0161	0.0000	0.0005
15	1	379.25	0	1	15505.76	0.0356	-0.0527	0.0008	0.0038	-0.0017
16	1	176.3	2	1	14614.42	-0.0454	-0.0575	0.0029	0.0044	0.0035
17	1	162.3		1	14429.52	-0.0130	-0.0127	0.0004	0.0005	0.0005
18	1	174.05	2	1	14429.44	0.0807	0.0000	0.0053	0.0001	-0.0006
19	1	155.95		1	13659.5	-0.0922	-0.0534	0.0100	0.0039	0.0062
20	1	164.45		1	15023.57	-0.5351	0.0999	0.2950	0.0083	-0.0494
21	1	155.65	0	1	15079.04	-0.0794	0.0037	0.0076	0.0000	0.0005
22	1	153.2		1	14855.41	0.0724	-0.0148	0.0041	0.0006	-0.0015
23	1	138.05		1	13246.92	-0.1040	-0.1083	0.0125	0.0137	0.0131
24	1	133.6	0	1	13246.2	0.0545	-0.0001	0.0022	0.0001	-0.0004
25	1	137.1	6.75	1	13748.57	-0.0125	0.0379	0.0004	0.0008	-0.0006
26	1	137.15		1	13612.32	-0.0157	-0.0099	0.0006	0.0004	0.0004
27	1	144.8	0	1	13802.15	-0.0989	0.0139	0.0114	0.0000	-0.0005
28	1	162.7	2.5	1	15269.7	-0.0141	0.1063	0.0005	0.0095	-0.0022
29	1	157.8		1	15357.85	0.0262	0.0058	0.0003	0.0000	-0.0001
30	1	165.55	0	1	15734.43	0.0004	0.0245	0.0001	0.0002	-0.0001
31	1	155.85		1	14803.26	0.0558	-0.0592	0.0023	0.0046	-0.0033
32	1	139.3		1	13236.95	0.1236	-0.1058	0.0134	0.0132	-0.0133
33	1	122.45	0	1	13163.72	-0.0301	-0.0055	0.0015	0.0002	0.0005
34	1	147.4		1.5	14642.13	0.5737	0.1123	0.3200	0.0107	0.0585
35	1	146.8		1	15734.75	-0.0586	0.0746	0.0044	0.0043	-0.0044
36	1	131.25	0	1	15155.61	-0.1062	-0.0368	0.0130	0.0021	0.0052
37	1	125.65		1	14744.76	-0.1210	-0.0271	0.0166	0.0013	0.0046
38	1	113.45		1	13923.67	0.2038	-0.0557	0.0383	0.0042	-0.0126
39	1	105.65	0	1	12620.01	-0.0041	-0.0936	0.0001	0.0105	0.0012
40	1	81.65	1.5	1	10020.85	-0.0957	-0.2060	0.0108	0.0462	0.0223
41	1	84.25		1	12066.36	-0.0427	0.2041	0.0026	0.0381	-0.0099
42	1	83.3	1	1	11835.97	-0.0891	-0.0191	0.0094	0.0008	0.0027
43	1	85.35		1	12668.18	-0.0688	0.0703	0.0059	0.0038	-0.0047
44	1	88.55		1	13174.29	-0.2272	0.0400	0.0553	0.0010	-0.0073
45	1	85.8	0	1	13083.32	0.0318	-0.0069	0.0006	0.0002	-0.0004

46	1	73.95		1	12242.39	-0.0113	-0.0643	0.0004	0.0054	0.0014
47	1	79.55		1	12126.12	0.0246	-0.0095	0.0003	0.0003	-0.0003
48	1	84.55	0	1	13251.24	0.0375	0.0928	0.0009	0.0070	0.0025
49	1	90.95		1	14090.07	-0.0311	0.0633	0.0015	0.0030	-0.0021
50	1	93.3	7.5	1	13811.98	-0.0507	-0.0197	0.0034	0.0008	0.0017
51	1	98	0	1	15543.42	0.0757	0.1254	0.0046	0.0136	0.0079
52	1	91.8	3	1	14820.46	0.1006	-0.0465	0.0086	0.0031	-0.0051
53	1	90.85		1	14995.68	0.0757	0.0118	0.0046	0.0000	0.0002
54	1	109.25	1.5	1	16472.31	0.0423	0.0985	0.0012	0.0080	0.0031
55	1	107.95		1	16175.51	0.0504	-0.0180	0.0018	0.0007	-0.0011
56	1	103.2		1	15441.74	-0.0633	-0.0454	0.0051	0.0029	0.0039
57	1	110.8	0	1	17083.96	-0.0103	0.1063	0.0003	0.0095	-0.0018
58	1	125.4		1	18301.57	0.2025	0.0713	0.0378	0.0039	0.0121
59	1	128.05		1	18142.94	-0.0119	-0.0087	0.0004	0.0003	0.0003
60	1	120.95	5	1	17783.21	0.0023	-0.0198	0.0000	0.0008	0.0002

This above computation enables the calculation of beta which is presented in the below table and used for the cost of capital computation.The calculations of Alpha, Beta and the analysis of its returns has been presented in the following table.

Table 1.7Analysis of stock returns with Alpha and Beta

	Adani Gas	BPCL	GAIL	Gujarat Gas	HPCL	Indraprastha	IOCL	ONGC	Petronet Ing	RIL
Intercept (Alpha)	0.107	0.030	-0.019	0.025	0.010	0.008	0.007	-0.006	0.002	0.020
Slope (Beta)	1.41	-0.008	1.319	0.879	0.262	0.825	0.146	1.119	0.763	1.207
Rf(1- Beta)	0.006	0.006	-0.002	0.001	0.004	0.001	0.005	-0.001	0.001	-0.001
Intercept-Rf(1-Beta)	0.101	0.024	-0.017	0.025	0.006	0.007	0.002	-0.006	0.001	0.021

The intercept is based on the monthly returns of the stock and for the purpose of analysis needs to be compared with the risk free rate. The eight companies have depicted positive returns as revealed by Intercept-Rf (1-Beta).Two companies Gail and ONGC have produced negative Alphas which is indicative of underperformance in relation to the broad sector. The EVA computation for each year is based on the returns above the cost of capital. The EVA calculation is converted into a Discounted Cash Flow Valuation to arrive at the intrinsic value per share and enable its comparison with the market prices for Indian Oil Corporation.

Table 1.8 EVA Valuation -IOCL

		2017	2018	2019	2020	2021	Terminal year		
Ebit(1-T)		₹ 18,951.29	₹ 25,400.14	₹ 20,101.54	-₹ 3,841.87	₹ 23,178.21	₹ 24,105.34		
Wacc xCI		₹ 6,617.04	₹ 8,552.54	₹ 7,070.74	₹ 9,454.62	₹ 7,731.87	₹ 25,976.98		
EVA		₹ 12,334.25	₹ 16,847.60	₹ 13,030.79	-₹ 13,296.50	₹ 15,446.34	-₹ 1,871.65		
							-110096.91	Roc in terminal	

								year	
Pv of EVA		₹ 9,127.34	₹ 13,309.60	₹ 10,815.56	-₹ 11,833.88	₹ 14,519.56	-₹ 1,03,491.09	last cap	₹ 13,948.50
							-₹ 67,552.91	last dep	₹ 9,804.30
						add cI	₹ 82,713.04	last wc	₹ 10,767.96
						ch cap	₹ 1,65,690.92	ROC	0.06
	Base Yr	2017	2018	2019	2020.	2021	₹ 1,80,851.05		
Cap invested		₹ 82,713.04	₹ 80,684.33	₹ 83,185.20	₹ 88,360.97	₹ 1,14,546.17	₹ 3,87,716.16		
add capex		₹ 4,000.39	₹ 6,793.98	₹ 20,693.71	₹ 22,654.90	₹ 13,948.50			
add ch wc		-₹ 6,029.10	-₹ 4,293.11	-₹ 15,517.94	₹ 3,530.30	₹ 10,767.96			
ending CI	₹ 82,713.04	₹ 80,684.33	₹ 83,185.20	₹ 88,360.97	₹ 1,14,546.17	₹ 1,39,262.63		Capital in	₹ 3,87,716.16
	dep	₹ 6,222.97	₹ 7,067.01	₹ 7,514.29	₹ 8,766.10	₹ 9,804.30		ter yr	
	Capex	₹ 10,223.36	₹ 13,860.99	₹ 28,208.00	₹ 31,421.00	₹ 23,752.80			
Value of Firm		₹ 1,80,851.05						ch in cap	₹ 1,65,690.92
- Value of Debt		₹ 55,407.95							
Value of Equity		₹ 1,25,443.10							
Value of Equity per Share		₹ 133.25							
Market Price of share		₹ 104.23							

The formula for the calculation of EVA is as follows.

EVA= (EBIT x (1-Tax rate)) – Capital invested x overall costs of capital of the respective year

Capital invested = Book value of equity + Book value of debt for the year 2017 as the base year

Every year the capital invested so computed is adjusted to obtain the next year's capital invested in the following manner

Closing capital invested= Opening capital invested + Capital expenditure +Change in working capital

The present values of the EVA's are obtained by discounting them at the overall cost of capital of the explicit period.

The reinvestment rate is computed for the terminal year.

Reinvestment rate in the terminal year = (capital expenditures of 2021 + depreciation of 2021 + Change in working capital 2021) / EBIT x (1-Tax rate)

This is followed by the calculation of return on capital (ROC) in the terminal year with the formula.

ROC in the terminal year = Growth rate in Sales Revenue in the terminal year/ reinvestment rate in the terminal year

If the sales growth is negative an average rate has been calculated and used in its place. The capital for the terminal year is then obtained as follows

Capital in the terminal year=EBIT (1-Tax rate) / ROC in the terminal year

The capital adjustment is calculated and its present value found with the overall cost of capital as the discount rate.

Capital adjustment = Closing Capital invested in the year 2021 – Capital in the terminal year.
The terminal value is computed in the following manner

Terminal value= EVA of the last year / (K_o- g)

K_o= overall cost of capital of the last year 2021

g= growth rate of the economy (assumed 5%)

The value of the enterprise under the EVA method is then computed as following:

Firm Value = Present value of EVA during the explicit period + Present value of EVA in the terminal year + Opening capital invested of the base year +Present value of capital adjustment in the terminal year.

The firm value is further reduced with the book value of Debt to arrive at the Equity Value. When this is divided by the total number of equity shares the result is the intrinsic value per share. A comparison is done to assess the success of the method.

The above calculation of EVA has been performed for all the companies in the sample but intrinsic value had not been done for Reliance Industries Limited as the Reliance Petroleum was only one of the several businesses for the company. Hence segment details relating to those required for EVA was drawn from the financial statements of the company and a valuation was performed to determine the value of its Petroleum operations.

Table 1.9 Comparison of Firm, Intrinsic Value and Market price

Company	Value of Firm	BV Debt	Value of Equity	Value of share	Average MP /Share

Adani Total Gas	7055.74	307.88	6747.86	64.15	992.43
BPCL	703471.19	31314.00	672157.19	336.12	424.78
Gail	40445.31	15482.64	24962.67	186.45	134.08
Gujarat Gas	29581.11	769.95	28811.16	429.77	555.48
HPCL	181690.87	27069.72	154621.15	1280.87	263.35
Indraprastha Gas	23846.03	0.00	23846.03	340.66	516.12
IOCL	180851.05	55407.95	125443.10	133.25	104.23
ONGC	138182.97	6327.52	131855.45	109.84	114.59
Petronet	33998.12	23.00	33975.12	226.65	235.20
Reliance Petroleum	407154.8156				

The proximity between the intrinsic values thereby computed was tested with the paired sample t test and its results are presented as follows. The hypothesis for the test states as follows.

H_{0i} There is no significant difference in the intrinsic value computed using EVA and average market price

H_{ai} There is a significant difference in the intrinsic value computed using EVA and average market price

The null hypothesis is desirable to be proved as the success of the EVA lies in no significant difference between the two values or in other words its proximity. The results of the test are presented below.

Table 1.10 Paired Samples Statistics - Intrinsic Value and Market price

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	**Intrinsic value**	345.31	9	371.03	123.68
	MP	371.14	9	288.80	96.27

The descriptive statistics shows a lower mean in terms of the intrinsic values which means most of the stocks are overvalued and in terms of standard deviation intrinsic value show larger variation. This indicates that the fundamental value of the stocks is lower than the market prices.

Table 1.11 Paired Samples Correlations - Intrinsic Value and Market price

		N	**Correlation**	**Sig.**
Pair 1	Intrinsic value & MP	9	-.105	.787

Table 1.12 Paired Samples Test- Intrinsic Value and Market price

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		Mean	Std. Deviation	Std. Error Mean
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Pair 1	Intrinsic value - MP	-25.83	493.61	164.54	405.25	353.59	-.157	8	.879

The intrinsic values using the EVA technique are not significantly different from the average market price as shown evidence by the results of the table. The non significant results of the t test discloses that there is no significant difference between the intrinsic values computed under the EVA method and the market price which proves that the values are in proximity to the market price. The results of this test hold testimony that the EVA method is successful in producing intrinsic values in proximity to market prices.

To assess the relationship between Average Abnormal returns made by the companies in the five year period with the Economic Value Added computed for the corresponding period. The following table provides the computed AARs and EVAs for the respective years.

Table 1.13 Average Abnormal returns of stock and Economic Value Added for the companies

	2017		2018		2019		2020		2021	
	AAR	**EVA**	**AAR**	**EVA**	**AAR**	**EVA**	**AAR**	**EVA**	**AAR**	**EVA**
Adani	0.0368	57.79	0.1182	172.63	0.0368	122.30	0.1182	232.51	0.1348	307.69
BPCL	-0.0448	4067.96	0.0323	2009.53	0.1330	1599.01	0.0343	-1742.88	0.0413	11302.82
Gail	-0.0064	-1280.88	-0.0071	1025.29	-0.0701	770.05	0.0156	704.25	-0.0097	-468.44
Gujarat Gas	0.0184	-317.84	-0.0024	30.09	0.0240	-244.24	0.0471	433.90	0.0327	907.68
HPCL	0.0010	4599.29	-0.0407	2900.66	0.0673	3481.77	-0.0378	-2913.21	0.0295	5812.01
Indraprast ha Das	-0.0414	415.33	-0.0014	458.60	0.0778	616.57	0.0197	840.00	-0.0225	735.57
IOCL	0.0367	12334.25	-0.0504	16847.60	0.0202	13030.79	-0.0240	-13296.50	0.0132	15446.34
ONGC	-0.0192	294.29	-0.0052	570.09	-0.0164	2334.99	-0.0133	-11211.99	0.0276	-8323.06
Petronet	-0.0362	534.84	0.0068	1076.97	0.0532	606.39	0.0018	1174.80	-0.0253	1591.19
Reliance Prteoleum	-0.0175	2023.62	0.0339	8844.06	0.0644	15137.95	0.0300	23469.24	-0.0022	27090.39

AAR-Average Abnormal Returns

Table 1.14 Descriptive Statistics - Average Abnormal returns of stock and Economic Value Added

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
AAR	50	-.0701	.1348	.016252	.0460531
EVA	50	-13296.50	27090.39	2924.2412	7342.37242

The above table provides the mean abnormal returns and EVAs for the companies. The lowest returns are -7.01 percent and the highest are 13.48 percent. A paired t test was conducted to test the significance of the relationship between EVA and AAR and the results are presented below.

Table 1.15 Paired Samples Statistics - Average Abnormal returns of stock and Economic Value Added

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	**AAR**	.016252	50	.0460531	.0065129
	EVA	2924.2412	50	7342.37242	1038.36827

Table 1.16 Paired Samples Correlations - Average Abnormal returns of stock and Economic Value Added

		N	Correlation	Sig.
Pair 1	AAR & EVA	50	.047	.744

Table1.17- Paired Samples Test- Average Abnormal returns of stock and Economic Value Added

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		Mean	Std. Deviation	Std. Error Mean
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
Pair 1	AAR - EVA	-2924.22	7342.37	1038.37	-5010.90	-837.55	-2.816	49	.007

The results show a statistically insignificant relationship between EVA and AAR for all the sample companies. The negative t value indicates that the relationship between EVA and sock return is found to be negative. This means negative EVAs have produced positive abnormal returns. This indicates that the returns on stock prices are not related to the book value of the stock. But the value is closer to significance being 0.007.Consequently EVA could be taken as a valid indicator of stock performance.

Table 1.18 ANOVA- Average Abnormal returns of stock and Economic Value Added

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2641607328.990	47	56204411.255	29019.383	.000
Within Groups	3873.577	2	1936.789		
Total	2641611202.567	49			

But the results of ANOVA prove that there is a significant difference in the means of the EVAs and Average abnormal returns. The results are similar to Chen and Dodd (1997), Biddle (1197) and Kumar and Sharma (2011) that there is little evidence to support that EVA has an association with abnormal returns on stock. The results are also similar to Muhammed Asad et al (2012) who find that the variable is negatively related to stock return.

IMPLICATIONS OF THE STUDY

The section analyses the implications of the study to the Management and the investors. The following have been observed in relation to the study :

➢ The Oil and Natural Gas sector has moderate risk as reflected by the cost of capital. The cost of capital is high for the companies Adani Total Gas Ltd. and Gail Ltd. making them more of a risky proposition

➢ The adoption of EVA though not statistically significant with the monthly average abnormal returns directs the attention of the management to important considerations. The two tailed significance value is 0.007 being closer to the acceptance value. Consequently EVA could be taken as a valid indicator of stock performance. A small size of the sample could have produced variation in the results

➢ There is a need for cost of capital reduction which is primarily found lower in the companies which have taken the benefit of debt and higher for those companies with nil leverage is perceived important for the creation of positive EVAs

➢ A high beta signifying more operating risk coupled with the use of leverage has been found in four companies. This has led to a higher cost of capital for the firms such as Adani, Gail, ONGC and RIL.A higher cost of capital suppresses the EVA and two companies Gail and ONGC have even reported negative EVAs.

➢ It is observed that a wide fluctuation in the capex in the company causes change in the EVA and also deviations the intrinsic values and market prices. This has been traced with Adani, BPCL, Gail and Indraprastha Gas.

➢ The companies have the return (EBIT*(1-T)) on the capital invested ranging from -4.34 percent in IOCL in 2020 to 73.76 percent in RIL. Negative EVA results when the return is lower than the cost of capital. In the sample companies it is observed that BPCL (4.69%-2020), Gail (11.85%-2021, Gujarat Gas (9.47%-2019) HPCL (5.31%-2020), IOCL (-4.34 %-2020) and ONGC (6.45%-2020) have negative EVAs for the year when their returns fall short of the cost of capital

➢ The changes in working capital as a percentage of capital invested was found higher in companies such as BPCL, Petronet ING, Indraprastha Gas and RIL. A higher change in working capital increase or decrease has the effect an increase or decrease in Capital invested consequently increasing or reducing return on capital invested.

The computation of intrinsic values with the EVA technique using Discounted Cash flow indicates that both the intrinsic and market values are in proximity. Hence the method could easily be adopted by investors to arrive at a fair value of the equity share. The Management could also measure EVAs regularly to ensure earnings to cover its cost of capital.

The small sample size hinders in drawing favourable robust conclusion in the field. The study recommends analysis of the association between EVA and stock returns with different industry, leverages and capex and envisage when the association is highest.

Bibligraphy

1. A G Awan,K Siddique,G Sarwar,(2014)The effect of Economic Value Added on Stock return: Evidence from Selected companies of Karachi Stock exchange,Research Journal of Finance and Accounting,Vol5,No 23,pp140-152.

2. Adil Pasha & Muhammad Ramzan | David McMillan (Reviewing editor) (2019) Asymmetric impact of economic value-added dynamics on market value of stocks in Pakistan stock exchange, a new evidence from panel co-integration, FMOLS and DOLS, Cogent Business & Management, 6:1

3. Bartolomé Deyá Tortella, Sandro Brusco,(2003)The Economic Value Added (eva): an analysis of market reaction,Advances in Accounting,Volume 20, ,pp 265-290.

4. Bhargav Pandya,(2014) Association of Total Shareholder Return with other Value Based Measures of Financial Performance: Evidence from Indian Banking Sector, Journal of Entrepreneurship, Business and Economics,Vol2,pp 26-44.

5. Chen and Dodd, (1997)EVA: An empirical examination of a new corporate performance measure.Journal of Managerial Issues, 9 (1997), pp. 318-333

6. G. Athanassakos,(2007)Value-based management, EVA and stock price performance in Canada,Management Decision, 45 (9) (2007), pp. 1397-1411

7. Geng, Songtao & Liu, Suyu & Liao, Xuelin. (2021) Operating Performance of Tourism Listed Companies in China: The Perspective of Economic Value Added. SAGE

8. Gounder Chitra Gunashekhar,Venkateshwarlu Mamilla,(2017),Bank Valuation Models A comparative Analysis,Accounting and Finance Research,6(1),pp-148-157

9. Kenneth Lehn and Anil K. Makhija, (1997),Eva, Accounting Profits, and CEO Turnover: An Empirical Examination, 1985–1994,Journal of Applied Corporate Finance, vol. 10, issue 2, pp 90-97

10. Kumar and Sharma, (2011a)Association of EVA and accounting earnings with market value: Evidence from India Asia-Pacific Journal of Business Administration, 3, pp. 83-96

11. Madan Lal Bhasin(2013) Economic Value Added and Shareholders' Wealth Creation: Evidence from a Developing Country, International Journal of Finance and Accounting 2013, 2(4) pp 185-198

12. Misra, Anil & Kanwal,. (2005). Linkages Between Economic Value Added and Share Prices: An Empirical Study of Indian Corporate Sector. The IUP Journal of Industrial Economics. II. pp 30-57

13. Mandeep Kaur and Sweety Narang, (2009) Does EVA Dominate Earnings? Empirical Evidence from   Indian Market, Asia-Pacific Business Review Vol. V, No. 2, April - June 2009 pp. 75-90.

14. Khan Muhammad Asad,(2012) The Relationship between Stock Return and Economic Value Added (EVA): A Review of KSE-100 Index (January 26, 2012). Available at SSRN: https://ssrn.com/abstract=1992209 or http://dx.doi.org/10.2139/ssrn.1992209

15. Najmus Sahar Sayed, Gazia Sayed, (2015), Indian Banking Sector: Measurement and Analysis of Market Value Added an Empirical Study in the Select Indian Banks, Journal of Management Research and Analysis, January – March 2015;2(1):24-34

16. Nufazil Altaf,(2016),Economic value added or earnings: What explains market value in Indian firms?,Future Business Journal,Volume 2, Issue 2,2016,Pages 152-166.

17. Reddy, Y.V. & Parab, Narayan & bg, Poornima. (2015). Economic Value Added (EVA) as an Emerging Tool of Performance Measurement: Evidence from Indian Companies. IUP Journal of Accounting Research and Audit Practices. 14. 38-48.

18. Shimin Chen and James L. Dodd, (1997) Economic Value Added (EVA™):An Empirical Examination Of A New Corporate Performance Measure, Journal of Managerial Issues,Vol. 9, No. 3 , pp. 318-333

19. Shubita, Mohammad. (2010) The relationship between EVA and stock returns. International Research Journal of Finance and Economics. 59. 35-41.

20. Singh and Garg(2004)Economic Value Added in Indian Corporates,Deep and Deep publications

21. Stoyu I. Ivanov, Kenneth Leong, Janis K. Zaima, (2014) An Empirical Examination of Negative Economic Value Added Firms, The International Journal of Business and Finance Research, Vol 8 (1) pp 103 – 112.

22. Sujata Behera,(2020)Does the Eva Valuation Model explain the Market Value of Equity better under the Changing Required Return than Constant Rquired Return,Financial Innovation, ,pp 1-23.

23. https://pib.gov.in/PressReleasePage.aspx?PRID=1708714