A study on the Profitability Analysis of Power Grid Corporation of India Ltd

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***Abstract*—India is undergoing rapid economic growth and this has increased the burden on the country's infrastructure. Infrastructure deficiency would impede the growth of India and this has been recognized by the policy makers. In past few years, collective efforts have been made by the governments to accelerate the infrastructure development. Telecommunications, Roads, Ports and Airports have seen sea changes. On similar lines, Power Sector in India has also seen many changes. India's demand is likely to cross 300GW in next decades. Power Grid Corporation of India Limited (PGCIL) is state owned electric utilities company in India. Power Grid wheels about 50% of the total power generated in India on its transmission network. Power Grid has consistently maintained the transmission system availability over 99.00% which is at par the international utilities. Therefore it is always important to know the financial management practices prevalent in the company. In this paper, we study the financial management and profitability analysis of PGCIL by taking twelve year data from 2002to2014. Tools which we used to calculate financial ratio analysis is profitability ratio also we calculate Du Pont analysis to computing rate of returm . The result of statistical analysis indicates the financial health and impact of recession during 2007-08 on the financial performance of PGCIL.**

Keywords—Profitability ratios, DuPont analysis,

I. INTRODUCTION

Every firm is highly concerned with its profitability. The most frequently used tool of financial ratio analysis is profitability ratios which are used to finalize the company's bottom line and its return to their investors. Profitability measures are important to company managers and their owners . If a small business has outside investors who have put their own money into the company, the company managers certainly has to show profitability to those equity investors. This paper is divided into three sections. Section I discusses about the profitability ratios related to the sales. Equally important are the ratios related to the investment. These have been summarized in Section II. A method of performance measurement popularly known as DuPont analysis was started by the DuPont Corporation in the 1920s. Section III describes this DuPont analysis. Section IV presents the concluding observations. It is to be seen whether subprime crisis and subsequent recession in 2007-08 had any impact on the profitability of PGCIL. Therefore, the data is segregated into two phases, namely 2002-03 to 2007-08 (pre-recession Phase-I) and 2008-09 to 2013-14 (post-recession Phase-II).

II. SECTION-1: PROFITABILITY RATIOS RELATED TO SALES

First, The higher the profit margins, the better it is from the perspective of the investors and the owners. Likewise, lower the expenses ratios, the better it is for the firm. Here, for the profit margins, we would look at gross profit ratio, operating profit ratio and net profit ratio of PGCIL and for the expenses we would look at cost of goods sold ratio, power and fuel expenses ratio, employee expenses ratio, operating expenses ratio and total expenses ratio.

The gross profit ratio, operating profit ratio and net profit ratio of PGCIL for 2002-14 are presented in Table 1 and Figure 1. The following bases have been used for the computation:-

$$\text{Gross profit ratio} = \text{Gross profit} / \text{Net sales} \qquad (1)$$

$$\text{Operating profit ratio} = \text{Operating profit} / \text{Net sales} \qquad (2)$$

$$\text{Net profit ratio} = \text{Net profit after taxes} / \text{Net sales} \qquad (3)$$

The net profit ratio is in the range of 0.25 – 0.35. Over the 12 year period, the average net profit ratio is 0.32. If we see the trend over the past 12 years, the profitability was hit during 2008-09 and 2009-10 probably because of the sub-prime crisis and subsequent recession and its impact on India/World. One other factor which may have contributed in decline of net profit ratio during 2008-2010, could be the implementation of sixth pay commission in PGCIL. However, there is no significant difference between the profitability ratios in pre- recession phase and post-recession phase. Overall, the net profit ratio of 32% over the period of 12 years means that for every 1 rupee of net sales, the company is earning 0.32 rupee. This indicates PGCIL is managing its financial resources well and thus it is good for the investors.

TABLE 1: GROSS PROFIT RATIO, OPERATING PROFIT RATIO AND NET PROFIT RATIO OF PGCIL, 2004-14

Year	Gross profit ratio	Operating profit ratio	Net profit ratio
2002-03	0.92	0.70	0.31
2003-04	1.06	0.77	0.32
2004-05	0.95	0.81	0.32
2005-06	0.93	0.80	0.34
2006-07	0.96	0.82	0.34
2007-08	0.91	0.81	0.35
2008-09	0.89	0.83	0.25
2009-10	0.88	0.82	0.29
2010-11	0.93	0.84	0.32
2011-12	0.91	0.84	0.32
2012-13	0.93	0.84	0.32
2013-14	0.88	0.82	0.29
Mean (2002-03 to 2007-08)	0.96	0.79	0.33
Mean (2008-09 to 2013-14)	0.90	0.83	0.30
Mean (2002-03 to 2013-14)	0.93	0.80	0.32
Median (2002-03 to 2007-08)	0.94	0.81	0.33
Median (2008-09 to 2013-14)	0.90	0.84	0.31
Median (2002-03 to 2013-14)	0.93	0.82	0.32

PAIRED SAMPLE TEST

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair1:Pre-Recession Post-Recession	.01667	.05132	.02963	-.11081	.14414	.563	2	.630

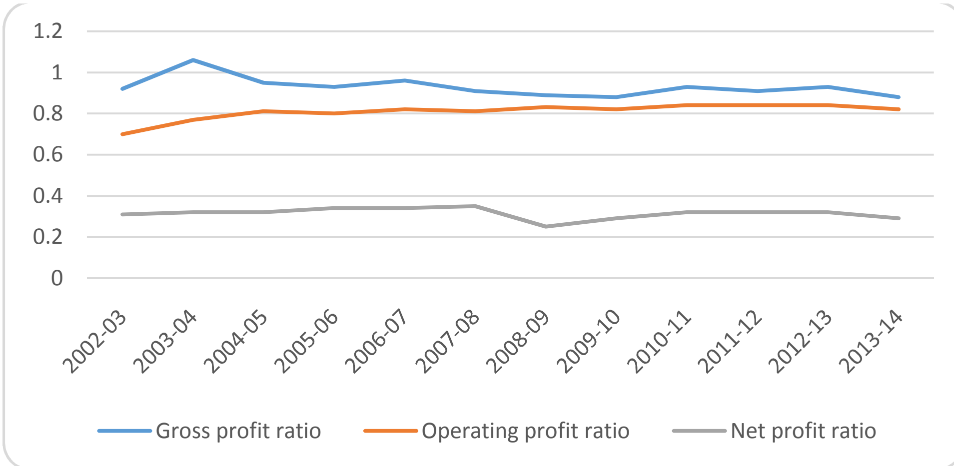

Figure 1: Gross Profit Ratio, Operating Profit Ratio and Net Profit Ratio of PGCIL, 2002-14

The Figure 2 and Table 2 indicate the various expenses ratios that are; namely, cost of goods sold ratio, power and fuel expenses ratio, employee expenses ratio, operating expenses ratio and total expenses ratio of PGCIL over the 10 year period, 2004-14. The following bases have been used for the computation:-

Cost of goods sold ratio = Cost of goods sold / Net sales (4)
Power and fuel expenses ratio = Power and fuel expenses / Net sales (5)
Employee expenses ratio = Employee expenses / Net sales (6)
Operating expenses ratio = Administrative and selling expenses / Net sales (7)

TABLE 2: COST OF GOODS SOLD RATIO, POWER AND FUEL EXPENSES RATIO, EMPLOYEE EXPENSES RATIO AND OPERATING EXPENSES RATIO OF PGCIL, 2002-14

Year	Cost of goods Sold Ratio	Power and Fuel Expenses Ratio	Employing Expenses ratio	Operating Expenses ratio
2002-03*	0.30	0.00	0.00	0.07
2003-04	0.23	0.01	0.15	0.05
2004-05	0.19	0.01	0.13	0.06
2005-06	0.20	0.01	0.11	0.03
2006-07	0.18	0.01	0.13	0.03
2007-08	0.19	0.01	0.15	0.03
2008-09	0.17	0.01	0.13	0.03
2009-10	0.18	0.01	0.13	0.03
2010-11	0.16	0.01	0.12	0.02
2011-12+	0.16	0.01	0.08	0.00
2012-13	0.17	0.01	0.13	0.03
2013-14	0.16	0.01	0.12	0.02
Mean (2002-03 to 2007-08)	0.22	0.01	0.11	0.05
Mean (2008-09 to 2011-12)	0.17	0.01	0.12	0.02
Mean (2002-03 to 2011-12)	0.20	0.01	0.11	0.04
Median (2002-03 to 2007-08)	0.20	0.01	0.13	0.04
Median (2008-09 to 2011-12)	0.17	0.01	0.13	0.03
Median (2002-03 to 2011-12)	0.19	0.01	0.13	0.03

Note: * For year 2004-05, the cost of goods sold includes power and fuel expenses and employee expenses.

+ For year 2013-14, the operating expenses are included in the cost of goods sold expenses

Identify applicable sponsor/s here. If no sponsors, delete this text box (*sponsors*).

Pared Sample Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre-Recession – Post-Recession	.0175	.02754	.01377	-.02632	.06132	1.271	3	.293

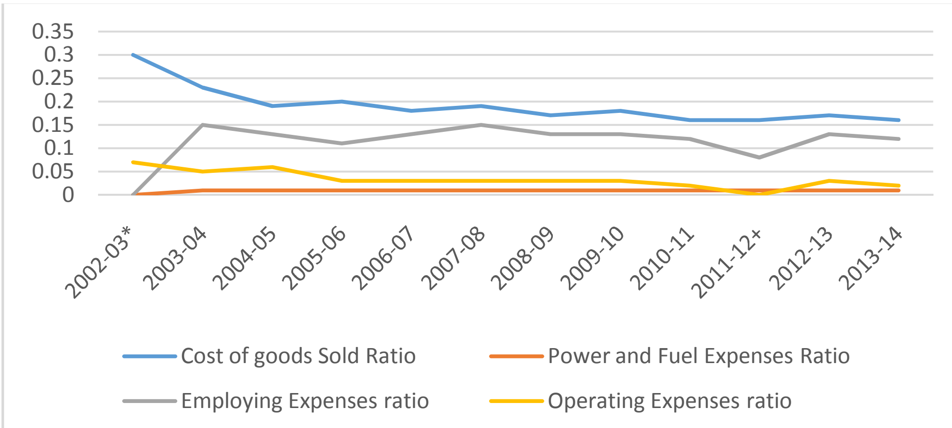

Figure 2: Cost of Goods Sold Ratio, Power and Fuel Expenses Ratio, Employee Expenses Ratio and Operating Expenses Ratio of PGCIL, 2002-14

From the data, it is observed that the employee expenses constitute a major part of the total expenses of the order of 50%-60%. The total expenses ratio is in the range of 16% to 30%. Over the 12 year period, the average total expenses ratio is 0.20. If we see the trend, we can infer that over the years, the total expenses ratio has decreased from 30% to 16%. This is a good sign for the investors and owner.

III. SECTION 2: PROFITABILITY RATIOS RELATED TO INVESTMENTS

Ratios can be invaluable tools for making an investment decision. Profitability ratios form a core set of bottom- line ratios and are crucial to all investment analysis. Profitability ratios are typically based on net earnings, but variations will occasionally use cash flow or operating earnings. These ratios give the true measure of the profitability of the company. The following bases have been used for the computation of profitability ratios related to investments:-

Return on assets, ROA = EAT / Average total assets (8)
Real ROA = (EAT + Interest) / Average total assets (9)
Return on capital employed, ROCE = (EAT + Interest) / Average capital employed (10)
Return on shareholder's equity = EAT / Average total shareholder's equity (11)
Return on ordinary shareholder's equity = (EAT – Preference dividend) / equity funds (12)
Earnings per share, EPS = (EAT – Preference dividend) / Number of equity shares (13)
Dividend per share, DPS =
EAT distributed as dividends among equity holders / Number of equity shares outstanding (14)

Net worth per share =
(Equity share capital + Reserves and surplus – Accumulated losses) / Number of equity shares outstanding (15)

P/E ratio = Market price of equity share / Earnings per equity share (16)

TABLE 3: RETURN ON ASSETS, REAL ROA, ROCE, RETURN ON SHAREHOLDER EQUITY, EPS, DPS, NETWORTH PER SHARE AND P/E RATIO OF PGCIL, 2002-14

Year	ROA	Real ROA	ROCE	Return on shareholder's equity	EPS (RS.)	DPS(RS.)	Networth per share(RS.)	P/E ratio
2002-03	3%	6%	7%	7%	211.71	32.95	2546.29	--
2003-04	3%	7%	8%	8%	229.85	41.18	2796.96	--
2004-05	3%	6%	7%	9%	248.17	58.13	2840.89	--
2005-06	4%	7%	8%	11%	301.75	84.44	2779.42	--
2006-07	3%	6%	8%	11%	3.22	0.97	28.85	--
2007-08	4%	7%	8%	12%	3.87	1.20	32.68	31.27
2008-09	3%	8%	10%	12%	4.02	1.20	32.16	28.11
2009-10	3%	6%	7%	13%	4.85	1.50	37.53	20.21
2010-11	4%	6%	7%	13%	5.83	1.75	45.81	18.01
2011-12	4%	6%	7%	14%	7.03	2.11	51.80	14.08
2012-13	4%	6%	7%	13%	5.83	1.75	47.81	14.02
2013-14	4%	6%	7%	14%	6.03	2.11	52.0	14.08
Mean (2002-03 to 2007-08)	3%	7%	8%	10%	166.43	36.48	1837.52	31.27
Mean (2008-09 to 2013-14)	4%	7%	8%	13%	5.43	1.64	41.83	20.10
Mean (2002-03 to 2013-14)	3%	7%	8%	11%	102.03	22.54	1119.24	22.34
Median (2002-03 to 2007-08)	3%	7%	8%	10%	220.78	37.07	2662.86	31.27
Median (2008-09 to 2013-14)	4%	6%	7%	13%	5.34	1.63	41.67	19.11
Median (2002-03 to 2013-14)	3%	6%	8%	12%	6.43	1.93	48.81	20.21

Note: For period from 2002-03 to 2005-06, the face value of the share was Rs. 1000 and for period over 2006 -07 to 2011-12, the face value of the share was Rs. 10

PARED SAMPLE TEST

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair1: Pre-Recession – Post-Recession	250.33250	626.83232	221.61869	-73.71243	774.37743	1.130	7	.296

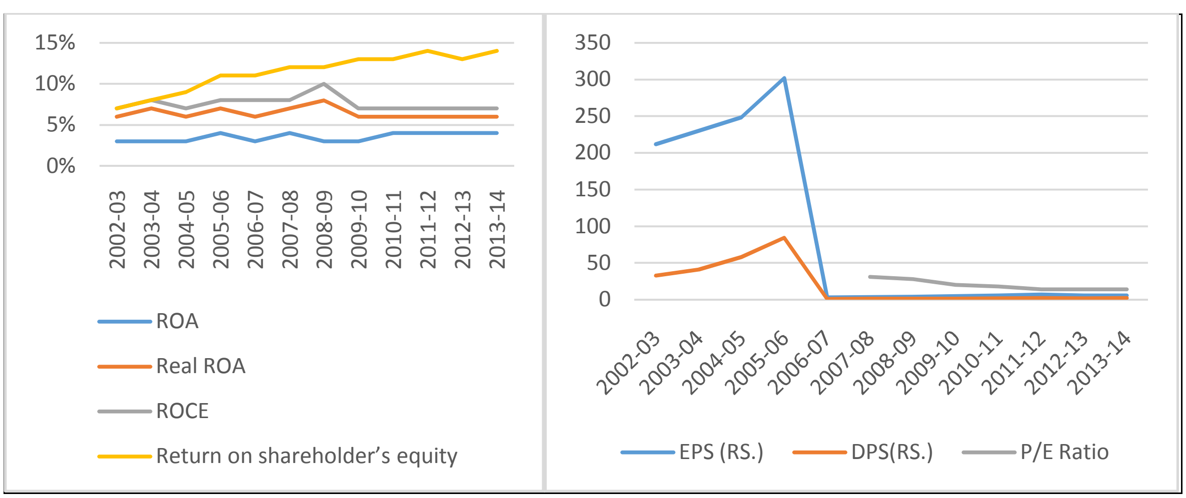

Figure 3: Return on Assets, Real ROA, ROCE, Return On Shareholder Equity, EPS, DPS, Net worth Per Share and P/E Ratio of PGCIL,2002-14

From Table 3, it is observed that the average return on assets over the ten year period i.e. 2002-14, is 3% , the real return on assets is 7%, return on capital employed is 8% and return on shareholder's equity is 11%. PGCIL hasn't issued any preference shares; therefore, there is no preference dividend. Hence, return on ordinary shareholder's equity is same as that of return on shareholder's equity. The low ROA, real ROA, ROCE and return on shareholder's equity is justified since the PGCIL core operations are capital intensive and the returns would spread over the years to come and return on shareholder's equity is justified since the PGCIL core operations are capital intensive and the returns would spread over the years to come. In 2006, PGCIL had issued a stock split from face value of Rs. 1000 to face value of Rs. 10. In 2007, PGCIL issued 573,932,895 equity shares of Rs. 10 each and in 2010, it issued 841,768,246 equity shares of Rs. 10 each. In view of this, the earnings per share is in the range of 3.22 – 302, dividend per share is in the range of 0.97 – 84.44 and networth per share is in the range of 28.85 – 2840.89. For period over 2002-03 to 2005-06 and for period over 2006-07 to 2013-14, it is observed that earnings per share, dividend per share and networth per share are steadily increasing. From the Figure 3 and Table 3, we can infer that the recession in 2007-08 had relatively no impact or minimal impact on the profitability of PGCIL

IV. SECTION:3 - *Du Pont* ANALYSIS

The Du-Pont analysis is an alternative measure of computing rate of return. It is a method of performance measurement that was started by the DuPont Corporation in the 1920s. It is also known as "DuPont identity". DuPont analysis tells us that ROE is affected by two things: Operating efficiency, which is measured by net profit margin; Asset use efficiency, which is measured by investment turnover

Du-Pont is defined as:-

$$\text{Du-Pont} = \text{Net profit margin (x) Investment turnover} \quad (17)$$

TABLE 4: NET PROFIT MARGIN, INVESTMENT TURNOVER AND DU-PONT OF PGCIL, 2002-14

Year	Net Profit Margin	Investment Turnover	DU Pont
2002-03	0.31	0.1	0.031
2003-04	0.31	0.1	0.03
2004-05	0.31	0.1	0.03
2005-06	0.34	0.11	0.036
2006-07	0.34	0.1	0.033
2007-08	0.35	0.11	0.038
2008-09	0.26	0.12	0.032
2009-10	0.29	0.11	0.032
2010-11	0.32	0.11	0.036
2011-12	0.32	0.11	0.035
2012-13	0.32	0.11	0.036
2013-14	0.32	0.11	0.035
Mean (2002-03 to 2007-08)	0.33	0.1	0.033
Mean (2008-09 to 2013-14)	0.3	0.11	0.034
Mean (2002-03 to 2013-14)	0.32	0.11	0.033
Median (2002-03 to 2007-08)	0.33	0.1	0.032
Median (2008-09 to 2013-14)	0.3	0.11	0.034
Median (2002-03 to 2013-14)	0.32	0.11	0.033

Pared Sample Test

	Paired Differences					t	df	Sig. 110(2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 Pre-Recession – Post-Recession	.00633	.02098	.01212	-.04579	.05846	.523	2	.653

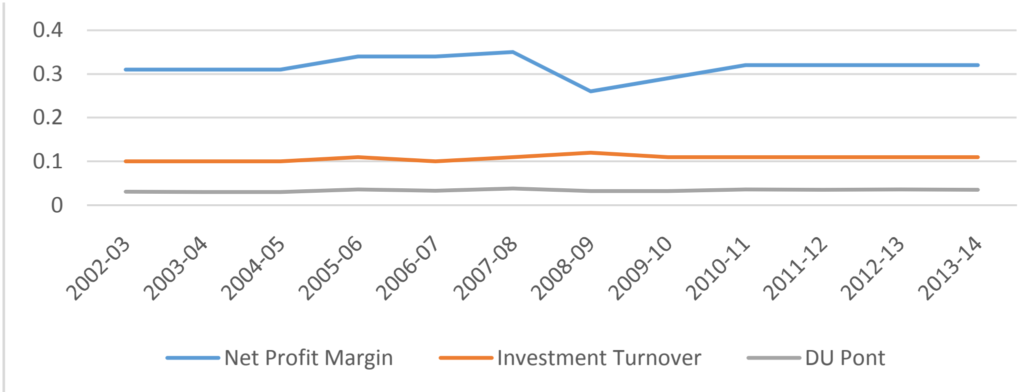

Figure 4: Net Profit Margin, Investment Turnover and Du-Pont of PGCIL, 2002-14

From Table 4 and Figure 4, it can be observed that Du-Pont averages 3.3% over the twelve year period, 2002-14. For PGCIL, the investment turnover is significantly low; which can be attributed to the fact that the company is highly capital intensive and thus the returns are spread over future years. In parallel, the net profit margin is significantly higher to the tune of 30% thus negating the effect of low investment turnover ratio.

V. Conclusion

This paper presents a study of the profitability ratios of PGCIL over the period of twelve years, 2002-14. The net profit ratio is around 30% and the expenses ratio is around 17%. This is highly satisfactory for a transmission company like PGCIL. Section II discusses about the profitability ratios related to the investments. The return on shareholder's equity has gradually increased from 7% to 14%, signaling improved performance of the company with respect to shareholders wealth maximization. The divided per share and the net worth per share is also increasing which is a good indication for company's shareholders and owners. Du-Pont analysis shows that the investment turnover is significantly low; which can be understood by the fact that the company is a capital intensive firm. Recession during 2007-08, had no effect on PGCIL profit margins, expenses or investments as can be seen from the analysis. This company has strong order book and is going to execute projects worth rupees one lakh crore in next five years and thus the net profit margins would continue the upward trend for next 7-10 year.

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Biography

Kuldeep Chaudhary is currently the Assistant Professor in the Department of Applied Mathematics, Amity Institute of Applied Sciences, Amity University. He obtained his Ph. D. in Operational Research from University of Delhi and M.Sc. from Indian Institute of Technology(IIT), Roorkee respectively. He has published more than 20 research papers in the areas of software reliability, Marketing and

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