

# Profit Rate Performance of Central Public Sector Enterprises (CPSEs) in India: Empirical Evidence on Aggregation

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## ABSTRACT

Profit rate may be defined as the relationship between capital and profit. When a firm earns more profit, the more efficient is the firm and vice versa. It indicates financial stability and helps to increase the earning capacity of an enterprise. In this backdrop, the present study is an attempt to empirically examine the profit rate performance of Central Public Sector Enterprises (CPSEs) in India during the period 2010-11 to 2016-17.

To carry out the study, secondary data have been sourced from the published annual reports of Public Enterprises Survey. Return on Capital Employed (ROCE) and Return on Net Worth (RONW) are examined to evaluate the profit rate performance of the CPSEs in India. Linear trend equation is used to estimate the trends in profit rate performance. Further, Chi-square test has been applied to examine whether there is any significant deviation between observed and trend values in profit rate performance of CPSEs during the period under study.

The findings of the study reveal that profit rate performance (in terms of ROCE and RONW) of CPSEs in India has shown a decreasing trend during the period under study. However, no significant deviation has been observed between actual values and trend values in ROCE and RONW under study.

## 1. Theoretical Background

Profit rate may be defined as the relationship between capital and profit. When a firm earns more profit, the more efficient is the firm and vice versa. It indicates financial stability and helps to increase the earning capacity of an enterprise. Thus, profitability plays a vital role in the growth and survival of an enterprise. In particular, profitability is useful for the following reasons:

- Pricing policy,
- Evaluation of project,
- Impact of price change, and
- Valuation of goodwill and shares.

## 2. Literature Review

Some of the empirical studies that are available in this context are briefly summarized as follows:

*Mohanakumar, P.S. (1996)* in his study showed that profitability of textile industry in Kerala was low in comparison to other major industries. The study further revealed that the internal resource mobilization of the selected spinning mills was very poor.

*Rej, Debasis and Sur, Debasish (2001)* stated that profitability performance of Cadbury India Ltd. was inconsistent during the study period. The study revealed positive as well as negative associations between the company's position and performance and profitability.

*Pandey, R. and Bandyopadhyaya, S. (2003)* examined cost-volume-profit analysis of 27 public sector banks and

stated that profitability was influenced by several factors such as reduction in operating cost.

*Eljelly, Abuzar M.A. (2004)* tested the relationship between liquidity and profitability of a sample of joint stock companies in Saudi Arabia. The study found significant negative relationship was observed between liquidity and profitability.

*Oberholzer, M. et al. (2004)* studied profitability and efficiency of ten regional offices of one of the largest banks of South Africa for a period of 36 consecutive months. The study revealed that region ten had the highest technical efficiency and profitability.

*Abu-Tapanjeh, A.M. (2006)* examined the relationship between firm structure and profitability of 48 Jordanian industrial companies listed in the American Stock Exchange. The study results found that firm structure was the most important factor that affected profitability.

*Selvi, A. Manor and Vijayakumar, A. (2007)* examined the trends in profit rates of selected companies in the Indian automobile industry. The study found a fall in profit rates in majority of the selected companies during the period under study.

*Ghosh, Sudipta (2012)* studied the impact of profitability in selected central public sector power companies in India. The study showed an improvement in profitability performance of the selected companies under study.

## 3. Brief Profile of Central Public Sector Enterprises (CPSEs) in India

Public sector enterprises were established to serve the broad macro-economic objectives of higher economic growth, self-sufficiency in production of goods and services, long term equilibrium in balance of payments and low and stable prices besides meeting certain socio-economic obligations.

The CPSEs are key and strategic actors in the nation's economy providing essential goods and services and holding a substantial market position in critical sectors such as Petroleum, Power, Steel, Mining, and Transportation. The CPSEs are also operating in competitive markets such as Telecommunication and Information Technology, Hospitality etc.

**4. Research Objectives**

The principal objective of the study is to analyze the profit rate performance of CPSEs in India. To attain this principal objective, the following sub-objectives are sought to be achieved:

- To examine the profit rate trends of CPSEs.
- To examine the profit rate performance of CPSEs through some selected ratios.
- To know whether there is any deviation between actual values and trend values in profitability performance of CPSEs.

**5. Hypotheses Development**

In conformity with the above objectives, the following testable null hypotheses have been formulated:

- H<sub>0</sub> (1): There is no significant trend in profit rate performance of CPSEs over the time.
- H<sub>0</sub> (2): There is no significant deviation in actual and trend values in profit rate performance of CPSEs.

**6. Research Design**

**6.1 Data and Study Period:** Data have been sourced from secondary sources (i.e., published annual reports of Public Enterprises Survey) for a span of ten years i.e., from the financial year 2010-11 to the financial year 2016-17.

**6.2 Sample:** The present study covers all the CPSEs except Food Corporation of India, Cotton Corporation of India Ltd. and Jute Corporation of India. Further, the public sector enterprises operating in Industrial Development and Technical Consultancy Services, Tourist Services, Financial Services have also been excluded from the sample size.

**6.3 Methodology:** To analyze the trends in profit rate performance of the CPSEs, linear regression model is employed in the study which is shown below:

$$P = a + \beta t + e \text{ -----eq. (1)}$$

Where: P = Profit rate

t = time.

a and b = parameters indicating intercept and co-efficient respectively.

e = error term.

The significance of beta coefficient has been tested by 't' test.

For detection of autocorrelation problem, Durbin-Watson d (D.W.) statistic is applied in the study. The presence of autocorrelation (if any) is adjusted by the technique of first difference operator. The D.W. statistic is computed as follows:

$$d = \frac{\sum_{t=2}^n (\hat{U}_t - \hat{U}_{t-1})^2}{\sum_{t=1}^n \hat{U}_t^2} \text{ -----eq. (2)}$$

The above ratio indicates the sum of squared differences in successive residuals to the RSS.

Profit rate performance of the CPSEs is analyzed on the basis of the following ratios:

<u>Performance Drivers</u>	<u>Performance Measures</u>
Return on Capital Employed (ROCE)	Net Profit ÷ Capital Employed
Return on Net Worth (RONW)	Net Profit ÷ Net Worth

The significance of the deviation between actual and estimated values with respect to profit rate performance has been tested by Chi-square test. The Chi-square statistic is computed as follows:

$$\chi^2 = \sum \{(f_o - f_e)^2 \div (f_e)\} \text{ -----eq. (3)}$$

Apart from the above, simple statistical measures like average, standard deviation, and co-efficient of variation have also been used in the study.

**7. Empirical Findings and Analysis**

**7.1 Profit Rate Trends of CPSEs in India**

From Table-I, we found negative trend (-0.39) in ROCE which is statistically significant at 5% level. This leads to the rejection of the first hypothesis of the study.

On the other hand, there is no definite trend in RONW as the result is found to be statistically insignificant, thereby leading to the acceptance of the first hypothesis of the study.

On the whole, there has been a decreasing trend in profit rate performance of CPSEs in India during the period under study.

**Table – I: Profit Rate Trends of CPSEs during 2010-11 to 2016-17**

Ratios	R <sup>2</sup>	Regression coefficient (b)	D.W.	t value
Return on Capital Employed (ROCE)	0.74	-0.39**	2.42	-3.79
Return on Net Worth (RONW)	0.39	-0.34 <sup>i</sup>	2.28	-1.80

Source: Computed by the Author

**Key Notes:** 1) \*\*marked value indicates significant at 5% level (2-tailed). 2) i marked value indicates insignificant. 3) D.W. indicates Durbin – Watson d statistic.

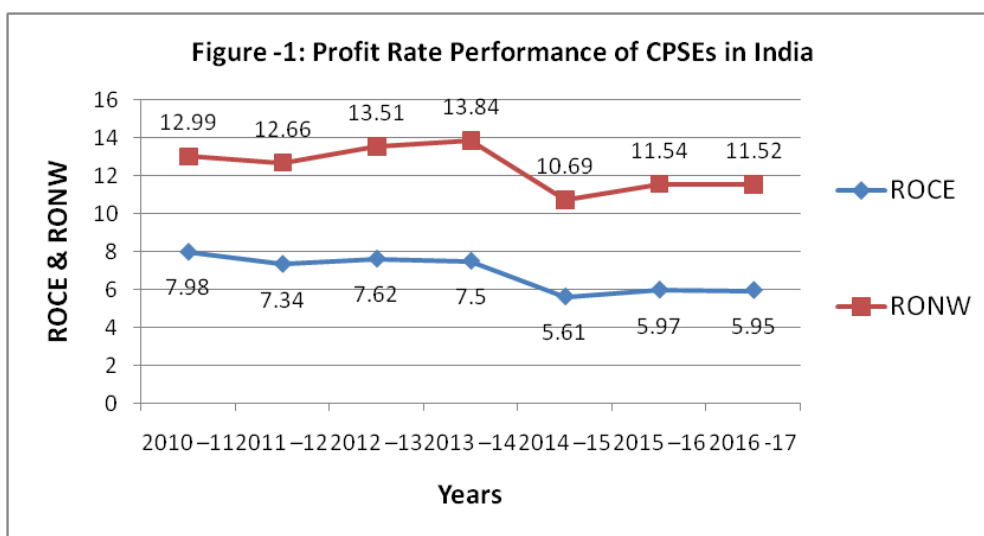
**7.2 Profit Rate Performance of CPSEs in India**

This section analyzes the profit rate performance of CPSEs in terms of ratio analysis. The results of the selected ratios are shown in Table – II, and Figure - 1 below:

**Table – II: Profit Rate Performance of CPSEs during 2010-11 to 2016-17**

Year	Return on Capital Employed (ROCE) (%)	Return on Net Worth (RONW) (%)
2010 –11	7.98	12.99
2011 –12	7.34	12.66
2012 –13	7.62	13.51
2013 –14	7.50	13.84
2014 –15	5.61	10.69
2015 –16	5.97	11.54
2016 -17	5.95	11.52
Average	6.85	12.39
S.D.	0.97	1.17
C.V.	14.16%	9.44%

Source: Public Enterprises Survey & Computed by the Author



From Table-II and Figure-1, it is observed that ROCE moves between 5.61% in the year 2014-15 and 7.98% in the year 2010-11 with an average of 6.85 and C.V. at 14.16%.

On the other hand, RONW moves between 10.69% in the year 2014-15 and 13.84% in the year 2013-14 with an average of 12.39 and C.V. at 9.44% during the study period.

Though both the ratios have shown fluctuating trend over the years, they are found to be relatively stable during the study period.

**7.3 Analysis of the Deviations between Actual Values and Trend Values in Profit Rate Performance of CPSEs in India**

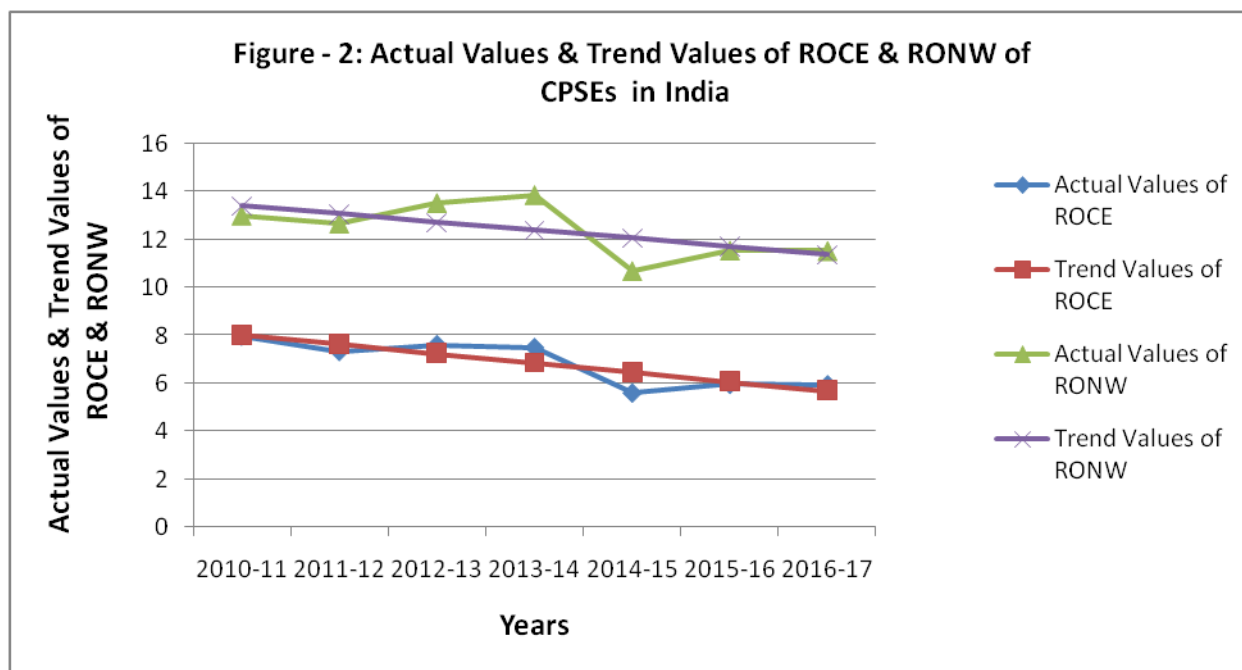
To know whether there is any significant deviation between actual values and trend values in profit rate performance of CPSEs in India, the technique of linear regression equation

has been applied and the deviation between actual values and estimated values has been tested by Chi-square test. The results are presented in Table – III and Figure – 2 below:

**Table – III: Actual Values and Trend Values of ROCE and RONW of CPSEs during 2010-11 to 2016-17**

Year	Actual Values of ROCE (in times)	Actual Values of RONW (in times)	Trend Values of ROCE (Y = 6.85 – 0.39t) (in times)	Trend Values of RONW (Y = 12.39 – 0.34t) (in times)	Deviation in ROCE (in times)	Deviation in RONW (in times)
2010-11	7.98	12.99	8.02	13.41	-0.04	-0.42
2011-12	7.34	12.66	7.63	13.07	-0.29	-0.41
2012-13	7.62	13.51	7.24	12.73	0.38	0.78
2013-14	7.50	13.84	6.85	12.39	0.65	1.45
2014-15	5.61	10.69	6.46	12.05	-0.85	-1.36
2015-16	5.97	11.54	6.07	11.71	-0.10	-0.17
2016-17	5.95	11.52	5.68	11.37	0.27	0.15

Source: Public Enterprises Survey & Computed by the Author



From Table-III and Figure-2, it is observed that the actual values of ROCE and RONW lie above the trend values of ROCE and RONW in the years 2012-13, 2013-14, and 2016-17, while in the remaining years under study, the actual values of ROCE and RONW lie below the trend values of ROCE and RONW.

To analyze whether the deviations between actual value and trend value of ROCE and RONW are significant or not, the technique of Chi-square test has been applied and the results are presented in Table – IV below:

**Table – IV: Result of Chi-square Test with respect to ROCE and RONW of CPSEs during 2010-11 to 2016-17**

Ratios	Degree of Freedom	Tabulated Value	Observed Value
ROCE	06	$\chi^2_{c(0.025)} = 14.45$	$\chi^2 = 0.23$
RONW	06	$\chi^2_{c(0.025)} = 14.45$	$\chi^2 = 0.40$

Source: Computed by the Author

Table-IV shows that the observed value of chi-square is less than that of the tabulated value of chi-square at 6 degrees of freedom for both the ratios (i.e., ROCE and RONW). This is indicative of the fact that there is no significant deviation between the observed values and trend values of ROCE and RONW, thereby leading to the acceptance of the second hypothesis of the study.

**8. Epilogue**

In relation to the main objective of the study, it may be concluded that profit rate performance (in terms of ROCE and

RONW) of CPSEs in India has shown a decreasing trend during the period under study. However, no significant deviation has been observed between actual values and trend values in ROCE and RONW.

**9. Limitations and Scope for Further Research**

The present study is limited to seven years only. Moreover, the study is based on secondary data. In spite of these limitations, further in-depth study may be undertaken at disaggregate level.

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