

Do Industry-wise Investment Returns Move with Aggregate Investment Returns? (The Case of Indian CPSEs)

Sudipta Ghosh^{1,2,*}, P.S. Aithal³

Abstract

Investment return can be defined as a performance measure which is used to calculate the effectiveness of an investment. It judges the efficacy of diverse investments of an enterprise. ROI is an endeavor to determine the profit of a particular investment in relation to the cost of its investment. The Government of India has established the Central Public Sector Enterprises (CPSEs) that plays a vital role in the growth process of Indian economy. They are regarded as strategic players in the building of an economy. Over the years, the performance of the CPSEs is not satisfactory. Accordingly, the Indian Government started the route of disinvestment to develop competency and increase output of the CPSEs. The chief intention of this research work is to contrast the movement of industry-wise investment returns with the pooled investment returns of Indian CPSEs from 2010–2011 to 2019–2020. For this purpose, Man-Whitney U-Test is employed in the study. Overall, the performances of investment returns (i.e., ROA, ROCE, and ROE) in majority of the selected industries have not moved with the aggregate investment returns of the CPSEs. This indicates that industry precise factors are strong enough in determining their individual performance with respect to investment returns. Further study may be conducted with respect to movement of investment returns at company level.

Keywords: CPSEs, investment returns, ROA, ROCE, ROE

INTRODUCTION

Investment return can be defined as a performance measure which is used to calculate the effectiveness of an investment. It judges the efficacy of diverse investments of an enterprise. ROI is an endeavor to determine the profit of a particular investment in relation to the cost of its investment [1].

*Author for Correspondence

Sudipta Ghosh
E-mail: sgcostmanagement@gmail.com

¹Post-Doctoral Research Fellow, Faculty of Management & Commerce, Srinivas University, Mangaluru, Karnataka, India

²Assistant Professor, Department of Commerce (UG & PG), Prabhat Kumar College, Contai, West Bengal, India

³Professor, Faculty of Management & Commerce, Srinivas University, Mangaluru, Karnataka, India

Received Date: July 30, 2022

Accepted Date: August 05, 2022

Published Date: August 17, 2022

Citation: Sudipta Ghosh, Aithal PS. Do Industry-wise Investment Returns Move with Aggregate Investment Returns? (The Case of Indian CPSEs). NOLEGEIN Journal of Operations Research & Management. 2022; 5(1): 25–31p.

The Government of India has established the Central Public Sector Enterprises (CPSEs) that plays a vital role in the growth process of Indian economy. They are regarded as strategic players in the building of an economy. Over the years, the performance of the CPSEs is not satisfactory. Accordingly, the Indian Government started the route of disinvestment to develop competency and increase output of the CPSEs [2].

LITERATURE REVIEW

The important studies that have been conducted in the past are briefly stated below:

Sankar and Reddy (1989) [3]

They observed that State owned PSEs that work in aggressive market with low social purpose and low resource collection were the most suitable players for disinvestment [3].

Kumar (1992) [4]

Kumar observed that straight auction through cutthroat tender is suitable because it shows elevated level of clearness [4].

Galal *et al.* (1994) [5]

Galal *et al.* observed that every trouble associated with shift cannot be considered responsible for privatization. Moreover, monetary performance showed increase in profitability and sales competency [5].

Naik (2001) [6]

Naik observed that the procedure of reforms did not cross the restricted divestment of equity shares in the selected PSEs [6].

Nagaraj (2005) [7]

Nagaraj suggested that disinvestment could bring optimistic outcome in the country provided the enterprises work in aggressive environment [7].

Mathur and Mathur (2010) [8]

Mathur and Mathur observed that performances of the CPSEs were better after the introduction of reform measures by the Government. The study found positive impact of the reform measures adopted by the Govt. However, a wide scope still exists in order to improve effectiveness of the CPSEs [8].

Seema *et al.* (2011) [9]

Seema *et al.* concluded that disinvestment did not produce optimistic outcomes in majority of the performance indicators chosen in the study. The reasons behind these pessimistic results may be attributed to ineffective industrial formation, environment limitations, etc. [9].

Pardeshi and Thorat (2014) [10]

Pardeshi and Thorat found that the CPSEs had produced poor economic profits, low production, enormous losses in some cases, and elevated cost. Underutilization of installed ability was the major cause for unsatisfactory performance of the CPSEs. The researchers concluded that the CPSEs had satisfied the different social objectives during the study period [10].

Singh (2017) [11]

Singh stated that the policymakers have a huge challenge to develop the competitiveness and effectiveness of the CPSEs. Furthermore, reform measures adopted so far had optimistic effect on the performance of the Indian CPSEs [11].

Richard and Kalyani (2019) [12]

Richard and Kalyani found affirmative fiscal ratios among the troubled and non-troubled firms. It showed that Indian PSEs may become monetarily sound if they set an excellent system of fiscal administration strategy [12].

Behera and Dhal (2020) [13]

Behera and Dhal found that few ratios had performed better. This showed that there was notable monetary impact on the CPSEs that had adopted ERP method. However, the study suffered from the restriction of shorter time period [13].

OBJECTIVE

The chief intention of this research work is to contrast the movement of industry-wise investment returns with the pooled investment returns of Indian CPSEs.

HYPOTHESIS

- Null Hypothesis (H_0): Investment returns of each selected industry are moving with the aggregate investment returns.
- Alternative Hypothesis (H_A): H_0 is not true.

STUDY DESIGN

Sample

The sample of the study comprises of industries that covers both manufacturing sector and service sector. The industries under manufacturing sector and service sector selected in this respect are presented in Table 1:

Table 1. Industry-wise classification of the selected sample.

Manufacturing Sector	
1	Agro Industry (AI)
2	Coal Industry (CI)
3	Crude Oil Industry (COI)
4	Other Minerals and Metals Industry (OMMI)
5	Steel Industry (SI)
6	Petroleum (Refinery and Marketing) Industry (PRMI)
7	Fertilizers Industry (FI)
8	Chemicals and Pharmaceuticals Industry (CPI)
9	Heavy and Medium Engineering Industry (HMEI)
10	Transportation Vehicle and Equipment Industry (TVEI)
11	Industrial and Consumer Goods Industry (ICGI)
12	Textiles Industry (TI)
13	Power Generation Industry (PGI)
Service Sector	
14	Power Transmission Industry (PTI)
15	Trading and Marketing Industry (TMI)
16	Transport and Logistic Services Industry (TLSI)
17	Contract and Construction and Tech. Consultancy Services Industry (CCTCSI)
18	Hotel and Tourist Services Industry (HTSI)
19	Financial Services Industry (FSI)
20	Telecommunication and Information Technology Industry (TITI)
Source: Published Annual Reports of Public Enterprises Survey from 2010–11 to 2019–20, Government of India, New Delhi [2].	

Accounting Ratios

The accounting ratios that are selected in the study are as follows [1]:

- $ROA = \text{Net Profit after Taxes} \div \text{Total Assets}$.
- $ROCE = \text{EBIT} \div \text{Capital Employed}$.
- $ROE = \text{Net Profit after Taxes} \div \text{Equity of the Shareholders}$.

Data Source and Study Period

The study is based on secondary data which is collected from the published annual reports of Public Enterprises Survey, Government of India. The study covers the period from the financial year 2010–2011 to the financial year 2019–2020 [2].

METHODOLOGY

To compare the investment returns of each selected industry with the summative investment returns of the CPSEs, Man-Whitney U-Test has been applied in the study [14].

The Man-Whitney U-Test is based on the ranks of the observations of two samples placed together.

The observations of the two samples are combined together and then their positional ranks are derived from lowest (1) to highest (N) from left to right in that order.

In this respect, let R_1 and R_2 be the sum of the ranks of the observations of the 1st sample and the 2nd sample in that order. Since the size of the 2nd sample (n_2) is greater than 8 in our study, we have normal estimate to the given data with the following random variable:

$$U = (n_1 n_2) + [\{n_1 (n_1 + 1)\} \div 2] - R_1$$

$$U \sim N(\mu_U, \sigma_U^2)$$

Where: μ_U (mean) $= [(n_1 n_2) \div 2]$ and σ_U^2 (variance) $= [\{n_1 n_2 (n_1 + n_2 + 1)\} \div 12]$.

Hence, $Z_U = (U - \mu_U) \div \sigma_U$.

Table 2. Man-Whitney U-Test for Comparison of Industry-wise Investment Returns with that of Aggregate Investment Returns of the CPSEs (represented by ROA) during 2010–11 to 2019–20.

Selected Industries	Z_u Values	Results (ROA)
Manufacturing Sector:		
AI	3.59	Significant at 1% level (2-tailed)
CI	-3.78	Significant at 1% level (2-tailed)
COI	-3.78	Significant at 1% level (2-tailed)
OMMI	-3.78	Significant at 1% level (2-tailed)
SI	-0.98	Insignificant
PRMI	-3.06	Significant at 1% level (2-tailed)
FI	-3.78	Significant at 1% level (2-tailed)
CPI	2.04	Significant at 5% level (2-tailed)
HMEI	-3.55	Significant at 1% level (2-tailed)
TVEI	-2.99	Significant at 1% level (2-tailed)
ICGI	0.00	Insignificant
TI	0.94	Insignificant
PGI	-3.78	Significant at 1% level (2-tailed)
Service Sector:		
PTI	-3.78	Significant at 1% level (2-tailed)
TMI	-3.78	Significant at 1% level (2-tailed)
TLSI	-1.32	Insignificant
CCTCSI	-3.78	Significant at 1% level (2-tailed)
HTSI	-3.21	Significant at 1% level (2-tailed)
FSI	-2.53	Significant at 5% level (2-tailed)
TITI	3.25	Significant at 1% level (2-tailed)
<i>Source: Author's Calculation.</i>		

RESULTS AND DISCUSSION

Comparison of Industry-wise ROA with that of Aggregate ROA

Table 2 reveals significant results in 16 industries (i.e., AI, CI, COI, OMMI, PRMI, FI, CPI, HMEI, TVEI, PGI, PTI, TMI, CCTCSI, HTSI, FSI, and TITI). This implies that ROA performances of these

16 industries are not moving with the ROA performance of the aggregate CPSEs. The remaining four industries (i.e., SI, ICGI, TI, and TLSI) reveal insignificant results.

On the basis of the above analysis of investment returns in terms of ROA, the null hypothesis of the study has been rejected for 16 industries (i.e., AI, CI, COI, OMMI, PRMI, FI, CPI, HMEI, TVEI, PGI, PTI, TMI, CCTCSI, HTSI, FSI, and TITI), while the same null hypothesis has been accepted for the remaining four industries (i.e., SI, ICGI, TI, and TLSI).

Comparison of Industry-wise ROCE with that of Aggregate ROCE

According to Table 3, twelve industries (i.e., AI, CI, OMMI, SI, PRMI, FI, CPI, TI, PTI, CCTCSI, FSI, and TITI) show significant results either at 1% or 5% levels. This is indicative of the fact that ROCE performances of these twelve industries are not moving with the ROCE performance of the aggregate CPSEs. Insignificant results are observed in COI, HMEI, TVEI, ICGI, PGI, TMI, TLSI, and HTSI with respect to ROCE.

The above analysis of investment returns in terms of ROCE leads to the rejection of null hypothesis of the study for twelve industries (i.e., AI, CI, OMMI, SI, PRMI, FI, CPI, TI, PTI, CCTCSI, FSI, and TITI), while eight industries (i.e., COI, HMEI, TVEI, ICGI, PGI, TMI, TLSI, and HTSI) accepts null hypothesis of the study.

Table 3. Man-Whitney U-Test for Comparison of Industry-wise Investment Returns with that of Aggregate Investment Returns of the CPSEs (represented by ROCE) during 2010–11 to 2019–20.

Selected Industries	Z _u Values	Results (ROCE)
Manufacturing Sector:		
AI	3.25	Significant at 1% level (2-tailed)
CI	-3.78	Significant at 1% level (2-tailed)
COI	-1.21	Insignificant
OMMI	-3.48	Significant at 1% level (2-tailed)
SI	5.40	Significant at 1% level (2-tailed)
PRMI	-2.65	Significant at 1% level (2-tailed)
FI	-2.57	Significant at 5% level (2-tailed)
CPI	3.33	Significant at 1% level (2-tailed)
HMEI	-1.59	Insignificant
TVEI	0.00	Insignificant
ICGI	0.30	Insignificant
TI	2.27	Significant at 5% level (2-tailed)
PGI	1.44	Insignificant
Service Sector:		
PTI	2.12	Significant at 5% level (2-tailed)
TMI	-1.85	Insignificant
TLSI	0.45	Insignificant
CCTCSI	-2.49	Significant at 5% level (2-tailed)
HTSI	-1.85	Insignificant
FSI	3.78	Significant at 1% level (2-tailed)
TITI	3.78	Significant at 1% level (2-tailed)
Source: Author's Calculation.		

Comparison of Industry-wise ROE with that of Aggregate ROE

Table 4 reveals significant results either at 1% or 5% levels for eleven industries (i.e., AI, CI, SI, CPI, ICGI, TI, PTI, TMI, TLSI, CCTCSI, and TITI). These significant results imply that ROE

performances of these eleven industries are not moving with the ROE performance of the aggregate CPSEs. The remaining nine industries (i.e., COI, OMMI, PRMI, FI, HMEI, TVEI, PGI, HTSI, and FSI) indicate insignificant results with respect to ROE.

On the basis of the above results in terms of ROE, the null hypothesis of the study has been rejected for eleven industries (i.e., AI, CI, SI, CPI, ICGI, TI, PTI, TMI, TLSI, CCTCSI, and TITI), while the remaining nine industries (i.e., COI, OMMI, PRMI, FI, HMEI, TVEI, PGI, HTSI, and FSI) accepts null hypothesis of the study.

Table 4. Man-Whitney U-Test for Comparison of Industry-wise Investment Returns with that of Aggregate Investment Returns of the CPSEs (represented by ROE) during 2010–11 to 2019–20.

Selected Industries	Z _u Values	Results (ROE)
Manufacturing Sector:		
AI	3.63	Significant at 1% level (2-tailed)
CI	-3.78	Significant at 1% level (2-tailed)
COI	0.15	Insignificant
OMMI	-1.51	Insignificant
SI	3.40	Significant at 1% level (2-tailed)
PRMI	-0.83	Insignificant
FI	1.40	Insignificant
CPI	3.78	Significant at 1% level (2-tailed)
HMEI	-0.76	Insignificant
TVEI	0.19	Insignificant
ICGI	3.63	Significant at 1% level (2-tailed)
TI	2.27	Significant at 5% level (2-tailed)
PGI	1.78	Insignificant
Service Sector:		
PTI	-3.14	Significant at 1% level (2-tailed)
TMI	3.70	Significant at 1% level (2-tailed)
TLSI	3.63	Significant at 1% level (2-tailed)
CCTCSI	-2.80	Significant at 1% level (2-tailed)
HTSI	-0.87	Insignificant
FSI	-1.81	Insignificant
TITI	3.78	Significant at 1% level (2-tailed)
Source: Author's Calculation.		

CONCLUSION

Overall, the performances of investment returns (i.e., ROA, ROCE, and ROE) in majority of the selected industries have not moved with the aggregate investment returns of the CPSEs. This indicates that industry precise factors are strong enough in determining their individual performance with respect to investment returns.

LIMITATION AND SCOPE FOR FURTHER STUDY

Resultant data is used in the study. The present study has examined the movement of industry-wise investment returns with aggregate investment returns of the CPSEs in India. Hence, further study may be conducted with respect to movement of investment returns at company level.

REFERENCES

1. Chandra P. Financial management-theory and practice. 8th Edn. New Delhi: Tata McGraw-Hill Education Private Limited; 2011.

2. Published Annual Reports of Public Enterprises Survey, 2010–11 to 2019–20. Department of Public Enterprises, Government of India, New Delhi.
3. Sankar TL, Reddy YV. Privatization: Diversification of ownership of Public Enterprises. Hyderabad: Institute of Public Enterprise and Book links Corporation; 1989.
4. Kumar S. Public Enterprise policy and reform measures in the 1990s. *Management in Government*. 1992; 22(2–3): 433–439.
5. Galal A, *et al.* Welfare consequences of selling public enterprises: An empirical analysis. Washington DC: Oxford University Press for the World Bank; 1994.
6. Naik SD. Decade of reforms: Privatization: A dismal report card. *Business Line*; 2001 Aug 22.
7. Nagaraj R. Disinvestment and privatization in India-Assessment and options. Paper prepared for the Asian Development Bank Policy Networking Project, New Delhi. 2005.
8. Mathur R, Mathur BL. *International Conference on Applied Economics (ICOAE)*. 2010; 505–513.
9. Seema G, Jain PK, Yadav SS, Gupta VK. Financial performance of disinvested central public sector enterprises in India: An empirical study on select dimensions. *Journal of Applied Finance & Banking*. 2011; 1(4): 57–106.
10. Pardeshi B, Thorat H. Central public sector enterprises in India: Not for profit but for social profit. *International Journal of Research in Engineering, Social Sciences (IJRESS)*. 2014; 4(8): 9–27.
11. Singh A. Financial performance of central public sector enterprises in India. *International Research Journal of Management and Commerce (IRJMC)*. 2017; 4(3): 1–37.
12. Richard PV, Kalyani B. Empirical analysis of financial distress of selected public sector undertakings in India. *Int J Bus Manag Invent (IJBMI)*. 2019; 8(4): 30–38.
13. Behera RK, Dhal SK. The impact of ERP systems on financial performance of central public sector enterprises working in mineral and metal sector. *Int J Recent Technol Eng*. 2020; 9(2): 144–149.
14. Panneerselvam R. Research methodology. Eastern economy edition. New Delhi: Prentice-Hall of India Private Limited; 2004.