



MAKING THE LIVEABLE PLANET EARTH

Learning, Living and Leading

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Sustainable Development and Financial Health: A Study Based on Central Public Sector Enterprises

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Abstract

The Central Public Sector Enterprises (CPSEs) have been paramount in meeting the socio-economic objectives of the country. Since the inceptions, many CPSEs have achieved a most ostentatious place in the Indian economy by acquiring sustainable competitiveness, social gain, and strategic value through their exceptional performance. On the contrary, the performance of many CPSEs has been below the planned targets.

The present study makes an honest attempt to assess the financial performance and financial health of the sample capital goods manufacturing CPSEs listed on Bombay Stock Exchange and included in PSU Index of the exchange by using Altman's Z-Score. The study based on secondary data for a period of 10 years, from 2005-06 to 2014-15. This paper focused to investigate the interrelationship and consequences of the financial distress. The results show that BHEL, BEL and HMT are likely to fail in the future as the financial health is in the distress zone. The financial health of BEL, BHEL and HMT is dependent on net sales, EBIT and working capital respectively. It is better to adopt the financial practice of calculating the Z score to know the financial health of the CPSE for sustainable development.

Keywords:

Central Public Sector Enterprises, financial health, socio-economics, sustainable development, Z score.



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Introduction

The Central Public Sector Enterprises (CPSEs) are the fundamental element of Indian economy, In India, the concept of CPSEs has grown up from compulsions of an accelerating the Indian economy, which was under foreign rules for over a two hundred years (Bhatia, B., Batra, G., 2000; Ghose, 2011). The different types and dimensions of the economic, social problems faced by the country, it became a pragmatic compulsion to the government to use these enterprises as an instrument for self-reliant economic growth (Humayun, M, 2008). Pandit Jawaharlal Nehru, foresees the Public Sector Units (PSUs) as the 'temples of modern India'. Since India's independence, the CPSEs have contributed heavily towards the economic growth of the India. (Sharma G L,

2013). The role of Central Public Sector Enterprises as an apparatus to the government for planning and implementing policies to attain the specific objectives is highly significant. Traditionally, heavy capital based infrastructure projects were taken up the public sector enterprises where the private sector feared to enter (Pandiya, D K 1986). Hereafter, CPSEs were recognised as the predecessor of advanced technology, which could help in resolving the problems of insufficiency in mobilising the financial resource. (Pardeshi, B, 2015). Since the inception, many CPSEs have achieved a most ostentatious place in the Indian economy by acquiring sustainable competitiveness, social gain, and strategic value through their exceptional performance (Sharma, G.L., 2013; Pardeshi, B., 2015). On the contrary, the performance of many CPSEs is below the planned targets (Talha Mohd., 1986; Trivedi, P., 1986; Mehta, S. 1987; Narain L., 1994). The accumulated deficits of these CPSEs over a period are causing considerable drain to exchequer (Venketachalam, C. 1986). Public Enterprises is said to be "is a neat label for a very untidy concept (G.D. Sharma 1978). During 2005-06 to 2014-15 around 25 percent of the CPSEs incurred loss and their financial health remained weak. According to the minister of heavy industries and public enterprises, the government has been considering to sale the loss making HMT watches, HMT Chinar, HMT Bearings, Hindustan Cable Corporation to raise INR 22,000 crore (Business Standard, 2015). At the same time government is looking to raise INR 69,500 crore from disinvestment of loss making CPSEs (Business Standard, 2015). The failure of any CPSE highly affects the stakeholders and the Indian economy. There is a big doubt on the sustainability of these CPSEs. Hence, the present study is an honest attempt to assess the financial performance and financial health of the sample capital goods manufacturing CPSEs listed on Bombay Stock Exchange and included in PSU Index of the exchange by using Altman's Z-Score. This paper focused to investigate the interrelationship and consequences of the financial distress.

Review of Literature

Jenkin, G.P. (1980) evaluated the public enterprises on the basis of financial, economic and social objective. The CPSEs were more efficient and cost effective in term of its social objectives rather than financial and economic objectives. Mishra, K.C. (1986) analysed the CPSEs for the economic feasibility and viability and suggested that these CPSEs should generate sufficient surpluses for the viability. Trivedi, P. (1986) concluded that the policy of pushing and protecting the CPSEs from competition, the CPSEs should be provided autonomy, incentive schemes and institutional support. According to Talha Mohd (1986); Sinha, S.L.N. (1988); Venkitachalem, G (1988) the financial performance of the CPSEs had been unsatisfactory and the efficiency of the CPSEs in generating the profit is very low. The underperformance of these CPSEs is the great burden to the economy. Verghese, M (1997); Ritu, C. (2002); Singh, J & Chittendi, R. (2011); Beena, R. (2012) examined the financial health of state owned public sector undertakings and observed that the enterprises were failed to perform and there is a big doubt on the future prospects of these enterprises. Gilker (1999) examined the financial health of CPSEs and state public sector enterprises of Jammu & Kashmir state by testing the technique of Altman's Z-Score analysis and observed that these enterprises were unsuccessful to meet the expectations of the society and are identified various areas of unsatisfactory performance of the enterprises. Seetharaman, V.P. (2000) studied 10 central public sector enterprises from heavy and medium engineering sector covering 21 years from 1975-76 to 1995-96. The overall analysis was focused on

the trends in operating and financial performance. The performance of these enterprises based on the managerial performance, capital structure, output to capital, quantum of value added, financial trend and managerial performance.

Various researchers focused on the profit and profitability for measuring the performance of the CPSEs and concluded the poor performance of the CPSEs. This study considers the capital structure, investment mix, long term and short term liquidity position, operating performance, profit and financial health for the sustainable development. The early warning signals of probable failure of the CPSE will help in taking preventive measures and abridge the length of future losses. The study will help the CPSEs in maintaining sustainable financial management practices.

Objectives

To assess the financial performance of the sample CPSEs To evaluate the financial health and viability of the sample CPSEs Hypotheses

There is no significant impact of working capital, retained earnings, earnings before interest and tax, market value of equity and net sales on the financial health of the selected CPSEs.

Research Methodology

The present study is exploratory in nature and based on the secondary data. The secondary data is extracted from the Public Enterprises Survey published by the Department of Public Enterprises, Ministry of Heavy Industries and Public Enterprises, Government of India. The study covers from 2005-06 to 2014-15, a period where there were major changes in the policies and guidelines on privatisation.

The sample size is derived from the PSU index of Bombay Stock Exchange. There are 23 holding CPSEs included in the PSU index which is categorised in five different sectors. In a capital goods category, there are 5 CPSEs out of them; 3 CPSEs were selected by using simple random sampling.

Table 1: List of Selected CPSEs in India

Sr. No.	Name of the CPSEs
1	Bharat Heavy Electricals Limited (BHEL)
2	Bharat Electronics Limited (BEL)
3	HMT Limited (HMT)

In the study, the financial tools like ratio analysis and the statistical measures like average, standard deviation, coefficient of variance, multiple correlation (Karl Pearson), multiple regression has used. The Altman's ZScore Model of 1968 is applied to examine the financial health of the selected CPSEs.

$$Z = 0.012 (X1) + 0.014 (X2) + 0.033 (X3) + 0.006 (X4) + 0.999 (X5)$$

Where, X1 = working capital/total assets

X2 = retained earnings/total assets

X3 = earning before interest and taxes/total assets

X4 = market value of equity/book value of total debt

X5 = sales/total assets

The Z score discriminates in three zones i.e. $Z > 2.99$ "Safe" zone, $1.8 < Z < 2.99$ "Gray" zone and $Z < 1.80$ "Distress" zone.

Results & Discussion

In this section, the data were analysed to examine the financial performance of the selected CPSEs.

Table 2: Analysis of Financial Performance of BHEL

Year	X1	X2	X3	X4	X5
2005-06	0.3306	0.0701	0.1441	0.0023	0.7357
2006-07	0.2851	0.0739	0.1622	0.0011	0.7399
2007-08	0.2569	0.0647	0.1455	0.0023	0.6290
2008-09	0.2025	0.0523	0.1175	0.0014	0.6328
2009-10	0.2119	0.0614	0.1365	0.0005	0.6777
2010-11	0.3095	0.0715	0.1529	0.0003	0.7129
2011-12	0.2994	0.0782	0.1550	0.0006	0.7185
2012-13	0.3298	0.0723	0.1363	0.0003	0.6905
2013-14	0.3637	0.0000	0.0707	0.0002	0.5373
2014-15	0.3846	0.0000	0.0326	0.0003	0.4408
Average	0.30	0.05	0.13	0.00	0.65
SD (σ)	0.06	0.03	0.04	0.00	0.10
CV	20.18	54.37	33.27	88.71	14.80

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Source: Compiled from various Public Enterprise Survey Vol. 1, Department of Public Enterprises, New Delhi: Ministry of Heavy Industries and Public Enterprises, Government of India. The average net working capital to total assets for BHEL is 30 percent, for BEL is 37 percent and for HMT is 10 percent. It shows the poor proportion of the working capital against the total assets. The coefficient of variance of BEL is (12.61) low which reflect the consistency in the results whereas the coefficient of variance for HMT is 115.99 shows inconsistency in performance and high risk. It is inferred that the selected CPSEs have not utilised the short term fund optimally. The efficiency of working capital is very poor in the selected CPSEs (Tables 2- 4).

Table 3: Analysis of Financial Performance of BEL

Year	X1	X2	X3	X4	X5
2005-06	0.2919	0.0869	0.1715	0.0050	0.6768
2006-07	0.3441	0.0943	0.1804	0.0009	0.6663
2007-08	0.3789	0.0911	0.1656	0.0009	0.5844
2008-09	0.3685	0.0671	0.1393	0.0002	0.5387
2009-10	0.3924	0.0581	0.1156	0.0005	0.5559
2010-11	0.3501	0.0502	0.0883	0.0000	0.4243
2011-12	0.3223	0.0428	0.0724	0.0000	0.3882
2012-13	0.3769	0.0472	0.0772	0.0000	0.4225
2013-14	0.4183	0.0641	0.0811	0.0001	0.4320

2014-15	0.4546	0.0768	0.0966	0.0020	0.4502
Average	0.37	0.07	0.12	0.00	0.52
SD (σ)	0.05	0.02	0.04	0.00	0.11
CV	12.61	27.60	35.42	161.13	20.52

Source: Compiled from various Public Enterprise Survey Vol. I, Department of Public Enterprises, New Delhi: Ministry of Heavy Industries and Public Enterprises, Government of India.

Table 4: Analysis of Financial Performance of HMT

Year	X1	X2	X3	X4	X5
2005-06	0.0389	0.0080	-0.0067	0.0006	0.1495
2006-07	0.1857	0.0239	-0.0241	0.0001	0.0990
2007-08	-0.0013	0.0000	-0.0230	0.0036	0.0881
2008-09	-0.0229	0.0000	-0.0287	0.0002	0.0813
2009-10	-0.0448	0.0000	-0.0163	0.0033	0.0940
2010-11	0.1177	0.0000	-0.0001	0.0004	0.1365
2011-12	0.1176	0.0000	0.0049	0.0002	0.1059
2012-13	0.0681	0.0000	-0.0279	0.0001	0.0670
2013-14	0.3075	0.0593	0.0000	0.0003	0.0534
2014-15	0.2596	0.0000	0.0000	0.0017	0.0421
Average	0.1026	0.0091	-0.0122	0.0010	0.0917
SD (σ)	0.12	0.02	0.01	0.00	0.03
CV	115.99	210.56	-107.98	129.41	36.85

Source: Compiled from various Public Enterprise Survey Vol. I, Department of Public Enterprises, New Delhi: Ministry of Heavy Industries and Public Enterprises, Government of India. The results of retained earnings to total assets shows the fluctuating trend in case of BEL, BHEL which indicates the unstable growth in the business function (Table 2 and 3). The retained profit percentage of HMT is (0.91) very low, in the study period HMT is consistently showing loss in the business. The coefficient of variance 215.16 indicates the inconsistency and uncertainty of return over the period (Table 4). The ratio for BHEL and BEL is 5 percent and 7 percent respectively which is not a satisfactory result.

The results of retained earnings to total assets shows the fluctuating trend in case of BEL, BHEL which indicates the unstable growth in the business function (Table 2 and 3). The retained profit percentage of HMT is (0.91) very low, in the study period HMT is consistently showing loss in the business. The coefficient of variance 215.16 indicates the inconsistency and uncertainty of return over the period (Table 4). The ratio for BHEL and BEL is 5 percent and 7 percent respectively which is not a satisfactory result. The EBIT to total assets shows the earning power of its assets, in case of BHEL and BEL the operational efficiency is low (Table 2 and 3). During the study period, consequently eight years HMT have registered negative return in operation of its assets. The average percentage of EBIT to total assets is (-)1.22. This is due to rising cost of operation and poor profit figures (Table 4). The coefficient of variance is (-) 107.98.

The results of market value of equity to book value of total debt for BHEL and BEL is zero percent which shows the selected CPSEs have not used the debt equity mix optimally. The financial health of all the selected CPSEs is low and it provides fewer margins to its creditors in bankruptcy (Table 2-4). The poor figure of coefficient of variance is the indications of greater financial risk.

The sales to total assets ratio of BHEL is 65 percent which has shown a satisfactory performance in utilisation of its assets efficiently to generate sales. The coefficient of variance for BHEL is 14.80 which indicate that BHEL is more consistent in generating the sales as compared to BEL and HMT. The average sale of HMT was 9.16 percent in the period (Table 2-4).

The result of the standard deviation shows that during the ten years study period, the results are less deviated from the mean. It means that the selected CPSEs have constitutently reporting low performance.

Table 5: Analysis of Financial Health

Year	BHEL	BEL	HMT
2005-06	1.7075	1.7179	0.1856
2006-07	1.7214	1.8072	0.2757
2007-08	1.5095	1.7138	0.0129
2008-09	1.3376	1.5346	-0.0409
2009-10	1.4687	1.4898	-0.0115
2010-11	1.6890	1.2061	0.2776
2011-12	1.6992	1.0737	0.2632
2012-13	1.6374	1.1957	0.0569
2013-14	1.2072	1.2914	0.5056
2014-15	1.0101	1.4232	0.3546
Average	1.50	1.45	0.19
SD (σ)	0.24	0.25	0.18
CV	16.34	17.40	95.51

Source: Compiled from various Public Enterprise Survey Vol. I, Department of Public Enterprises, New Delhi: Ministry of Heavy Industries and Public Enterprises, Government of India.

It is found that the average financial health of BHEL (1.50), BEL (1.45) and HMT (0.19). The financial health of all the selected CPSEs is in distress zone. The coefficient of variance of HMT is 95.51, the failure of HMT is certain within the next couple of year (Table 5). The financial positions of the CPSEs are very weak and there is a big question of future sustainability.

Table 6: Relationship between the Variables of Financial Health of BHEL

	X1	X2	X3	X4	X5	Z Score
X1	1					
X2	-0.5036	1				

Table 8: Relationship between the variables of Financial Health of BEL

	X1	X2	X3	X4	X5	Z Score
X1	1					
X2	-0.026022	1				
X3	-0.371719	0.8799247	1			
X4	-0.343618	0.5793911	0.5339527	1		
X5	-0.391868	0.8268956	0.9649602	0.610666	1	
Z Score	-0.151065	0.9332841	0.9678707	0.538609	0.9534895	1

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Table 9: (a) Model Summary – BEL

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	1.000	.0000

Predictors: (Constant), x5,x1,x4,x2,x3

Table 9: (b) Analysis of Variance (ANOVA) – BEL

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.569	5	.114	764146.000	.000 ^b
	Residual	.000	4	.000		
	Total	.569	9			

Dependent variable: Zscore

Predictors: (Constant), x5,x1,x4,x2,x3

Table 9: (c) Model Coefficients – BEL

Model B		Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Results at 1% level of significance
		Std. Error	Beta				
1	(Constant)	.000	.000		-.572	.923	
	x1	1.200	1.608	.223	1758119.000	.000	Significant
	x2	1.400	8.477	.104	54214.600	.000	Significant
	x3	3.300	6.524	.552	78698.500	.000	Significant
	x4	.600	4.633	.004	18207.540	.000	Significant
	x5	1.000	1.839	.419	645325.100	.000	Significant

Dependent Variable: ZScore

Equation: Predicted Z = 0.000 + 1.2*X1 + 1.4*X2 + 3.3*X3 + 0.6*X4 + 1*X5

	X1	X2	X3	X4	X5	Z Score
X3	-0.5247	0.9639	1			
X4	-0.3541	0.3487	0.3581	1		
X5	-0.4158	0.9367	0.9592	0.2810	1	
Z Score	-0.2504	0.9324	0.9493	0.2688	0.9697	1

Table 7: (a) Model Summary – BHEL

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	0.998	0.996	.0000

Predictors: (Constant), x5,x1,x4,x2,x3

Table 7: (b) Analysis of Variance (ANOVA) – BHEL

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	0.539	5	.108	473.432	.000 ^b
	Residual	.000	4	.000		
	Total	.540	9			

Dependent variable: Zscore

Predictors: (Constant), x5,x1,x4,x2,x3

Table 7: (c) Model Coefficients – BHEL

Model B		Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Results at 1% level of significance
		Std. Error	Beta				
1	(Constant)	-0.024	.092		-.261	.807	
	x1	1.124	.133	.275	8.423	.001	Significant
	x2	1.600	1.960	.129	.816	.460	Insignificant
	x3	3.394	.973	.578	3.487	.025	Insignificant
	x4	3.389	7.266	.011	.466	.665	Insignificant
	x5	1.020	.213	.402	4.789	.009	Significant

Dependent variable: Zscore

Equation: Predicted Z = -0.024 + 1.124*X1 + 1.6*X2 + 3.394*X3 + 3.389*X4 + 1.02*X5

The multiple correlations is used to find the relationship between the working capital, retained profit, EBIT, market value of equity, sales and Z score. The result of BHEL and BEL (Table 6 & 8) shows the positive association between the Z Score and the constituent of Z Score except working capital. The result of HMT (Table 10) shows the positive association between the Z Score and constituent of Z score except Market value of equity.

The (Table 6, 8 & 10) shows that the sustainable financial health of BHEL, BEL and HMT is depend on net sales, EBIT and working capital respectively.

Tables (7a–11a) show the r^2 value of 0.998 for BHEL and 1.000 for BEL and HMT, which represent the percentage of variance in the dependent variable explained by independent variable. (Table 7c) shows that working capital and net sales the $p < 0.01$, we reject the null hypothesis but in case of retained earnings, EBIT and market value of equity $p > 0.01$, we can't reject null hypothesis. (Table 9c) shows that all the measures value is $p < 0.01$, we reject the null hypothesis. The results of HMT (Table 11c) shows that retained earning value is $p > 0.01$, we can't reject null hypothesis. The $p < 0.01$ in case of working capital, EBIT, market value of equity and net sales, we reject the null hypothesis.

There is no significant impact of working capital, retained earnings, earnings before interest and tax, market value of equity and net sales on the financial health of BEL. In case of BHEL retained earnings, earnings before interest and tax, market value of equity do not have significant impact on financial health whereas working capital and net sales have significant impact on the financial health. There is no significant impact of working capital, earnings before interest and tax, market value of equity and net sales on the financial health of HMT but retained profit do not have the significant impact on financial health.

Implication of Study

The study has several implications for the policy makers, management, investors and employees. The study enables the stakeholders to take out the information related to the profitability, efficiency, degree of risk and the financial health. The early warning signal of probable failure of the CPSE will help in taking preventive measures and abridge the length of future losses. The study will help the CPSEs in maintaining the sustainable financial management practices.

Conclusion

The study provides the preliminary evidences of the poor performance by the CPSEs. The CPSEs have failed to generate sufficient amount of profit. A great number of enterprises were formed out of 'Sick Units' or taken over from the private sector to protect the interest of large number of workers and maintained the constancy in socio-economic of the nation. In particular, there is an urgent need to improve the operational efficiency by reducing the cost of operations. It is suggested that HMT should look for some extra government support to discharge rising finance cost. The study also shows that no sampled CPSEs fall under the safe zone. The safe zone indicates the highest solvency level and no probability of bankruptcy in near future. The study reveals that the future growth perspective of the CPSEs seems to be very poor and if this situation prevails in future as well then, it will be a big problem of sustainability. It is recommended that the management should regularly calculate the Z score to know the financial health of the CPSE. The CPSEs should try to reduce the cost of goods sold

Table 10: Relationship between the Variables of Financial Health of HMT

	X1	X2	X3	X4	X5	Z Score
X1	1					
X2	0.6623	1				
X3	0.5564	0.2115	1			
X4	-0.3958	-0.3033	-0.1320	1		
X5	-0.4323	-0.2798	0.1326	-0.1217	1	
Z Score	0.9463	0.6739	0.7407	-0.4107	-0.1661	1

Table 11: (a) Model Summary – HMT

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000 ^a	1.000	1.000	.0000

Predictors: (Constant), x5, x1, x4, x2, x3

Table 11: (b) Analysis of Variance (ANOVA) – HMT

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.290	5	.058	51240.000	.000 ^b
	Residual	.000	4	.000		
	Total	.290	9			

Predictors: (Constant), x5, x1, x4, x2, x3

Table 11: (c) Model Coefficients – HMT

Model B	Unstandardised Coefficients		Standardised Coefficients	T	Sig.	Results at 1% level of significance	
	Std. Error	Beta					
1	(Constant)	.000	.000		-.572	.598	
	x1	1.200	.000	.796	1758119.000	.000	Significant
	x2	1.400	.000	.150	54214.600	.012	Insignificant
	x3	3.300	.000	.242	78698.500	.005	Significant
	x4	.600	.000	.004	18207.540	.000	Significant
	x5	1.000	.000	.188	645325.100	.000	Significant

Dependent Variable: ZScore

$$\text{Equation: } Z = 0.000 + 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1X5$$

which is affecting the profitability. It is inferred that there is a heavy investment in the total assets which does not produce the satisfactory returns in the study period; hence, the CPSEs should try to make use of the fixed assets optimally to improve the returns as well as add the value to the business. The CPSEs should focus on the retained profit as an internal source of capital. It is better to opt for the disposing of the idle real assets that are count to be excess and unproductive by realising or leasing out to reduce the operating cost.

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