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WORKING CAPITAL MANAGEMENT OF CENTRAL PUBLIC SECTOR ENTERPRISES (CPSEs) IN INDIA DURING THE POST-FINANCIAL RECESSION PERIOD: EMPIRICAL EVIDENCE ON AGGREGATION

Rajni Bansal[1], Sushendra Kumar Misra[2], Dinesh Tandon[3]

[1]Assistant Professor, Chitkara Business School, Chitkara University, Punjab, India.
[2]Registrar and Head Centre for Continuing Education, Dr. B R Amdedkar National Institute of Technology , Punjab, India
[3]Assistant Professor, Chitkara Business School, Chitkara University, Punjab, India.

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ABSTRACT: Working capital or circulating capital indicates circular flow of cash (cash-flow cycle), i.e., a sort of a revolving fund starting with cash used to pay for raw materials, labor, and operating expenses and when finished products are ready for sale, the cash is recovered through the sale of these, goods (on cash or credit).The present paper is an attempt in Central Public Sector Enterprises (CPSEs), during the post-financial crisis period, i.e. from 2010-11 to 2017-18, to empirically examine working capital management in India. Secondary data has been used for this reason, and statistical and econometric techniques have been used to evaluate the relevant time series data. The findings of the study concluded that CPSEs in India have managed their working capital efficiently (except last year) during the post-financial recession period, although they have followed an aggressive current assets policy. Additionally, the CPSEs had a positive impact on profitability, indicating that CPSEs have effectively used the various components of current assets during the study period. Nevertheless, it is required to improve the turnover of working capital to effectively generate liquidity in the years ahead.

KEY WORDS: Working Capital, CPSEs, Motaals Test, Liquidity, Profitability.

I. INTRODUCTION

Working capital is the revitalizing force of a financial body. It is additionally needed as a 'motor force' to construct the permanent resources work for desired results by the company. Businesses remain inefficient most of the time because they are unable to meet their needs for working capital. So it is pertinent to properly manage working capital for the survival of the organization. A company's maximum achievement is dependent on its role in working capital. The sustainability of any company is therefore working capital, whether it be an industrializing business or a commercial or service business.

In Cohen and Robins ' (1978) terms, "Working capital is the portion that is disseminated in the daily conduct of a business from one type to another."

According to Donaldson (1957), "the method of management of existing resources to a larger degree signifies the achievement of operations of a firm. Regular management is essential to sustain suitable levels in the diverse working capital accounts". A business with sufficient working capital is always eager to receive the surplus of any profitable opportunity, either to purchase basic goods or to complete an order or to wait for an improved market positioning. Working capital sufficiency increases a business ' creditworthiness with smooth credit terms, lower production costs due to securing ready-money discounts, and positive interest rates on bank loans the ability to meet all appropriate cash needs without unwarranted postponement is a crucial psychological attribute for enhancing the overall competence of a company as well as building people's confidence in the growth plan of the business and embarking on positive research and innovation.
The excess of working capital refers to the manifestation of incompetent store-keeping surplus stock of unfinished and finished goods, postponement in the flow of on-going work and lack of synchronization in the enterprise. Insufficient working capital hinders the objectives of a business, leading to its failure. Thus the

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amount of working capital must be as per requirement in each business entity. Besides having an optimum working capital, a business must concentrate on efficient management of working capital, as it promotes maximization of productivity. Zenoff and Zwick (1969) observe that "Good managing of working capital essential for the accomplishments of any business entity. The objective is to secure the procuring control of resources and capitalize on the savings return".

Generally speaking, liquidity and profitability always have a negative relationship. But it cannot be overlooked that, unless the current assets have a minimum level of investment, growth, and income cannot be sustained to some degree. Thus one is a complement to one another. Maintaining a sound liquidity position increases benefit as long as the defined degree of liquidity is in harmony with the nature of the business.

II. A SYNOPTIC OVERVIEW OF CENTRAL PUBLIC SECTOR ENTERPRISES (CPSES) IN INDIA

CPSEs in India have been seen as a vehicle for institutional change and economic growth for equity and social justice. The CPSEs in India caters to the particular macroeconomic objectives of economic growth, self-sufficiency in the production, surplus balance of payments, and controlling inflationary and deflationary trends, in addition to meeting other obligations. In the First Five Year Plan there were only 5 CPSEs with a total capital investment of Rs. 30 Cr.but with passage of time there are 339 CPSEs with a total investment of Rs. 13, 73,412 Cr.as of March 31, 2018.The CPSEs are strategic players in the nation's building and provides vital goods and services and holding an important market position in critically important sectors like Petroleum, Coal, Electricity, Steel, Mining, Transport & Logistic Services. The CPSEs also run in competitive markets such as telecommunications and IT, hospitality, etc.

III. LITERATURE REVIEW

Empirical Studies conducted in this context are briefly listed below

K. R. Rajeswara (1985) found that most of the selected companies were not capable of achieving the productivity of public enterprise working capital in India. *Mohan, R. P. (1991)* found application of funds in current assets to be more than fixed assets in Andhra Pradesh's six selected large-scale private companies. *Dutta, S. (1995)* concluded that 40 percent of West Bengal's selected paper mills had precarious overall financial conditions. *K. Lazaridis and J. Lyroudi (2000)* concluded the existence of significant positive relationship between cash conversion methods and the liquidity metrics. *Deloof, M. (2003)* in his study foumd that managers create value for owners by decreasing the number of daily accounts receivable and inventories to minimum levels. *Bardia, S.C. (2006)* found that SAIL and TISCO's liquidity policies were effective whilst TISCO's liquidity performance was better than SAIL's. *Raheman, A. and Nasr, M. (2007)* examined the relation of selected listed Pakistani companies between working capital and profitability. The study found the current ratio was much below the 2:1 norm. *Ghosh, S. (2008)* noted that while the quick ratio during the study period was found to be fairly satisfactory, the current ratio was not satisfactory. *Ghosh, S. (2019)* concluded that, during the study period, both the power generation and the power transmission industries controlled their current assets and current liabilities effectively.

3.1 Research Gap: During review of literature it was found that there are no empirical studies pertaining to working capital management of CPSEs during the post-financial recession period. Therefore, the present research may be viewed as an effort to add to the existing literature.

IV. OBJECTIVES OF THE STUDY

The key purpose of this study is to analyze the post-financial-recession period by Central Public Sector Enterprises (CPSEs) for operating capital management in India.
The sub objectives of the study are as follows:
i. To assess the rate of growth of the performance indicators listed for the working capital.
ii. To examining the work capital efficiency by using chosen ratios.
iii. To research the liquidity condition with greater precision by applying the Motaals test.
iv. To analyze the liquidity/ productivity relationship.

V. HYPOTHESES DEVELOPMENT

The following testable null hypotheses were established in conjunction with the study's objectives:
i. There is no growth in the performance indicators defined for working capital management.

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ii. Liquidity and competitiveness are not related to each other.

VI. RESEARCH DESIGN

6.1 Sample Selection

The research review includes all the companies in the central public sector that work in India. However, it does exempt insurance companies and financial institutions.

6.2 Study Period

The research period was chosen from 2010-11 to 2017-18 financial year. Thus, a span of 8 years for more than 200 sample companies (number of sample companies ranges between 213 and 234 during the selected study period) gives a cross-sectional data set of more than 1600 firm-year observations.

Furthermore, the study period has been purposely selected to capture the effect of the financial recession (popularly called the economic downturn) that took place during the years 2007 to 2009.

6.3 Data Source

Secondary data collected mainly from the Public Enterprises Survey's published annual reports were used for conducting the present study. Further, composite data were used in the analysis to arrive at a rational decision.

6.4 Methodology

These are rearranged, categorized, tabulated and measured according to the study requirements after collection of the necessary data.

The growth rate of performance indicators selected for working capital was assessed by fitting the linear trend equation shown below: log yt= a + bt + ut----------*eq.(1)*
Where: y = predicted value; a = intercept; b = Regression coefficient t = time.
U = Model error term the famous' test has been used to analyze growth rates' statistical significance. The't ' statistic is represented by t = ׀b* ÷ Sb*׀ ----------*eq. (2)*
Where: b * = co-efficient of estimated regression; Sb * = standard error of estimated coefficient of regression;
The methodology for the ratio analysis was used to evaluate the working capital outcomes of the selected firm. The ratios deemed are as follows:

Performance Drivers	Performance Measures
Current Ratio	Current Assets ÷ Current Liabilities
Quick Ratio	(Current Assets – Stock) ÷ (Current Liabilities – Bank Overdraft)
Inventory Turnover Ratio	Cost of Goods Sold ÷ Average Stock
Debtors Turnover Ratio	Net Sales ÷ Closing Debtors
Working Capital Turnover Ratio	Net Sales ÷ Net Working Capital
Current Assets Turnover Ratio	Net Sales ÷ Current Assets

The following ratios (each expressed as a percentage) are taken into account when evaluating the liquidity status by Motaals comprehensive test:
(A) Current Assets
(b) Debtors (c) Current Assets
(c) Money & Bank (d) Current Assets
(d) Loans & Advances & Other Capital
Based on the factor scores obtained from factor analysis, Spearman's rank correlation was applied to test the relationship between volatility and productivity. To this end, the co-efficient of rank correlation at Spearman is estimated below:
$Rxy = 1 - [6 \Sigma D^2 \div (N^3 - N)]$----------*eq.(3)*
Where: Rxy = rank correlation co-efficient
D = rank difference
N = number of observations
In order to test the significance of the liquidity-profit relationship, worked out as a co-efficient of rank correlations'' test was applied. The't' statistic is shown below:
$t = [R \sqrt{(n - 2)}] \div [\sqrt{(1 - R^2)}]$----------*eq.(4)*
Where, R = rank correlation co-efficient,
n = number of observations

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In addition to the above, simple statistical measurements such as mean, standard deviation, variance coefficient, were used in the analysis.

VII. KEY FINDINGS

7.1 Analysis of Growth Rate of Selected CPSE Performance Indicators for Working Capital in India

The technique of the log-linear trend equation was adapted to the relevant time-series data to evaluate the growth rate of determined performance indicators of working capital. The performance indicators selected for this purpose include current assets & liabilities, inventories, debtors, net working capital, and cash & bank balances.

Since the net working capital value includes a non-positive value (as shown in Table-II in 2017-18), log transformation cannot be applied. Hence, the calculation of the growth rate for net working capital has been kept outside the purview of our analysis.

Table – I Growth Rate of Selected Working Capital Performance Indicators Of CPSEs in India

Selected Performance Indicators of Working Capital	R^2	Growth Rate (%)	t-value
Current Assets	0.49	2.00 [i]	2.39
Current Liabilities	0.89	5.10***	7.09
Inventory	0.47	4.20[i]	2.32
Debtors	0.83	9.00***	5.32
Cash & Bank Balances	0.80	-6.60***	-4.83

Source: Computed

Notes: 1) * * * values indicate meaningful values at 1% (2-tailed), 2) [i] values indicate negligible values; 3) Growth rates are determined by multiplying the trend coefficient at 100 to reflect it in % per year.

Table-1 reveals that R^2 values are considered to be high for all performance indicators (except for current assets and inventory). Such high R^2 values suggest that the determined performance indicators are well represented by the independent variable, i.e. duration or time, in the period under examination. The growth rate of current liabilities and debtors are observed to be positive and significant at 1% level (2-tailed), while cash & bank balances have recorded significant negative growth at 1% level (2-tailed). In the rest of the cases, the results are found to be insignificant.

A more critical look at Table-I shows that the rate of current asset growth is found to be lower than that of the current rate of growth of the liabilities. It means that over the years under study, CPSEs in India have pursued vigorous current asset policy.

The results obtained in Table-I lead to the acceptability of the first null hypothesis or assumption of the study concerning current assets and inventory, while current liabilities, debtors and cash and bank balances reject the same hypothesis.

7.2 Working Capital Performance of CPSEs in India

Reviewing the working capital performance of CPSEs in India, the ratios set out in the section on methodology were estimated and presented in Table – II below:

Table – II Working Capital Performance of CPSEs in India

Ratio→ Year↓	Current Ratio	Quick Ratio	Inventory Turnover Ratio	Debtors Turnover Ratio	Working Capital Turnover Ratio	Current Assets Turnover Ratio
2010-11	1.28	0.96	6.75	10.90	8.89	1.65
2011-12	1.23	0.94	6.66	9.68	9.42	1.76
2012-13	1.22	0.94	6.87	9.44	10.28	1.82
2013-14	1.19	0.91	6.66	9.42	11.58	1.87
2014-15	1.16	0.92	7.36	8.33	13.41	1.84
2015-16	1.12	0.90	7.46	8.15	15.27	1.62
2016-17	1.06	0.76	7.23	7.35	29.70	1.75
2017-18	0.98	0.71	7.96	6.43	-71.97	1.81

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Average	1.16	0.88	7.12	8.71	3.32	1.77
S.D.	0.10	0.09	0.46	1.43	31.15	0.09
C.V. (%)	8.62	10.23	6.46	16.42	938.25	5.08

Source: Computed

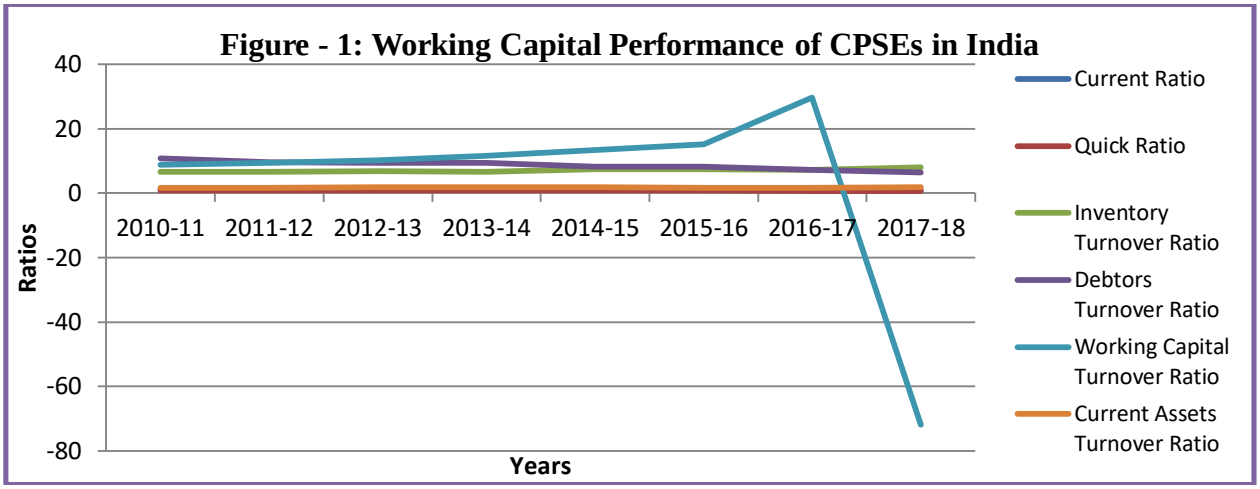

Fig. 1Working Capital Performance of CPSEs in India

Current Ratio: Table-2 and Figure-1 show that India's current CPSE ratio shows an upward pattern of 1.16 on average.

The ratio moves between 0.98 and 1.28 with a C.V.at 8.62%. Besides, the ratio during the years under review is found to be below the typical 2:1 level. Therefore, CPSE's performance in terms of the traditional standard norm during the post-financial-recession period is not satisfying.

Quick Ratio: To arrive at a more meaningful measure of working capital, the quick ratio has been calculated in India, the rapid ratio of CPSEs also reveals a declining trend (Table-2 and Figure -1) The average is 0.88.The ratio falls below the usual 1:1 level, although it is close to 1 in most years under review which can be considered an acceptable result during the period of study. The ratio varies from 0.71 to 0.96 for a C.V at about 10.23 percent.

Inventory Turnover Ratio: As shown in Table-2 and Figure -1, CPSEs Inventory Turnover Ratio indicates a fluctuating pattern between 6.66 and 7.96 during the period. The average of this ratio is 7.12 with a C.V. at 6.46%. Overall, this ratio indicates that CPSEs have satisfactorily managed their inventory during the period under study.

Debtors Turnover Ratio: The debtor turnover ratio shows a downward trend ranging from 6.43 to 10.90, with an average of 8.71 to the C.V. of the 16.42% is observed ratio. This is indicative of the fact that, during the time under review, the effectiveness of the CPSEs in extending credit and collecting debts has decreased.
Working Capital Turnover Ratio: This ratio shows a growing trend over the entire period of the study (except the previous year). The ratio is shifting from -71.97 to 29.70, averaging 3.32 and C.V. at a rate of 938.25%. This indicates tacit use of working capital by the CPSEs during the post-financial crisis era (except for last year).

Current Asset Turnover Ratio: Table-2 and Figure -1 suggest that this ratio shows no clear pattern during the time of analysis. The ratio varies from 1.62 to 1.87 with an average of 1.77 and C.V. up to 5.08%. It indicates that the general level of efficiency of working capital management of the CPSEs in India may be considered satisfactory during the study period.

7.3 Liquidity Analysis

The asset conversion ability of a company is primarily impacted by the working capital mix as any major shifts in the percentage of current assets would affect a company's ability to pay off its current debts promptly **(*Joshi & Ghosh, 2012*)**. Consequently, a comprehensive test known as the Motaals test can accurately measure the liquidity position of the CPSEs under study which is presented below in Table III:

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Table – III Liquidity Ranking of CPSEs in India by Motaals Test

Year	Inventory t/Current Assets (%)	Debtors/ Current Assets (%)	Cash & Bank/ Current Assets (%)	Loans & Advances & Other Assets/ Current Assets (%)	Liquidity Ranking				Overall Ranking	Ultimate Ranking
	1	2	3	4	1	2	3	4	(1+2+3+4)	
2010-11	22.10	15.10	31.83	52.95	3	8	1	6	18	5
2011-12	23.57	18.22	28.54	53.27	5	7	2	5	19	6
2012-13	22.46	19.31	25.96	54.74	4	6	3	3	16	3
2013-14	23.65	19.80	24.72	55.49	6	5	4	2	17	4
2014-15	20.87	22.06	24.62	53.31	2	3	5	4	14	2
2015-16	19.81	19.93	23.25	56.83	1	4	6	1	12	1
2016-17	28.28	23.81	19.47	28.43	8	2	7	8	25	8
2017-18	27.33	28.20	15.71	28.76	7	1	8	7	23	7

Source: Computed

Table-3 shows that the CPSEs reported the sound liquidity position in 2015-16 followed by 2014-15 and 2012-13.The fourth, fifth, sixth, seventh and eighth positions have been occupied by the years 2013-14, 2010-11, 2011-12, 2017-18 and 2016-17 respectively. This annual ranking shows that the liquidity performance of CPSEs has improved during the period under study.

7.4 Linkage between Liquidity and Profitability of CPSEs in India

Liquidity and profitability indices were developed using factor analysis (the function theory method). The correlation coefficient was subsequently determined based on the indices to obtain the said relationship.

Table – IV KMO and Bartlett's Test for Liquidity and Profitability

For Liquidity Ratios:		
KMO Measure of Sampling Adequacy	0.572	
Bartlett's Test of Sphericity	Approximate Chi-Square	40.649
	d.f.	15
	Sig.	0.000
For Profitability Ratios:		
KMO Measure of Sampling Adequacy	0.510	
Bartlett's Test of Sphericity	Approximate Chi-Square	6.191
	d.f.	3
	Sig.	0.103

From the results of factor analysis (Table – IV), we found KMO measures of sampling adequacy for liquidity and profitability ratios are 0.572 and 0.510 which are more than fifty percent and also statistically significant as indicated by chi-square values. This indicates the validity of factor analysis for examining the relationship between liquidity and profitability.

Table –V Analysis of Liquidity and Profitability Ratios of CPSEs in India

Ratios	Principal Component	Eigen Value (E.V)	%of Total Variance
Liquidity	Factor 1	4.12	68.58
	Factor 2	1.04	17.26
Profitability	Factor 1	1.82	60.57
	Factor 2	1.02	34.00

Source: Computed

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Notes:
i. Type of extraction: Secondary analysis of materials.
ii. The main components are selected based on Kaiser's criteria (i.e., the value of Eigen is greater than or equal to 1 for the chosen main component).

We find two main components for liquidity from Table-V, but the first main component was chosen for the liquidity index calculation (Eigen value is max. at 4.12).We listed three ratios for the productivity index, namely Net Profit to Capital Employed, Net Profit to Net Worth and Net Profit to Total Revenue (outcomes not shown here). From Table-V, we found two main profitability components, but the first main component was chosen for the calculation of the profitability index (Eigen value being maximum at 1.82).

The selected variables (i.e., key components) considered for index creation also clarify a significant portion of the overall variance (68.58 percent and 60.57 percent respectively for liquidity and profitability). The respective factor scores of the selected major components are shown as liquidity and profitability indices, as shown in Table-VI below:

Table – VI Extraction Matrix

Year	Factor Score factor-1 (Liquidity Index)	Factors Score of Factor-1 (Profitability Index)
2010-11	1.11996	0.74461
2011-12	0.74187	0.27644
2012-13	0.55298	1.24076
2013-14	0.48603	1.24076
2014-15	-0.04939	-1.11589
2015-16	-0.15266	-0.95162
2016-17	-0.64734	-0.48345
2017-18	-2.05147	-0.95162

Source: Computed

Table – VII Correlation between Liquidity Index and Profitability Index Of CPSEs in India

Particulars	R (Rank Correlation Coefficient)	t value	Table value
Rank Correlation between Liquidity and Profitability	0.62 [i]	1.94	2.37 (5% level)

Source: Computed
Note: i marked value indicates insignificant.

From Table – VII, we find that the CPSEs ' co-efficient rank correlation between liquidity and profitability is 0.62 which is statistically considered negligible at 5 percent (2-tailed). This results in the acceptance of the study's second null hypothesis. A positive (though insignificant) correlation suggests that CPSEs in India maintained a satisfactory level of liquidity, thereby affecting positively on earning capacity in the post-financial recession period.

VIII. SUMMARY OF THE FINDINGS AND CONCLUSIONS

- Current liabilities and debtors have shown a significant positive growth rate, while cash & bank balances reveal a significant negative growth rate. In the rest of the cases, the results are observed to be insignificant.
- During the period under study, CPSEs followed aggressive current asset policies.
- Working capital efficiency of CPSEs in terms of ratio analysis is found to be adequate. The CPSEs have made effective use of their working capital, except in the last year under review.
- According to Motaals test, the liquidity position of the CPSEs in India is found to be better in the year 2015-16 followed by the years 2014-15, 2012-13, 2013-14, 2010-11, 2011-12, 2017-18, and 2016-17.

The liquidity-profit coefficient of the company was positive (although negligible at the level of 5 percent). This suggests that the CPSEs maintained a sufficient level of liquidity over the analytical duration, thus creating a positive impact on profitability.

In fine, it may be concluded that CPSEs in India have managed their working capital efficiently (except the last year) during the post-financial recession period. Moreover, the CPSEs have created a positive impact on profitability which indicates that CPSEs have effectively utilized the various forms of current assets.

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Nonetheless, there is a need to enhance the working capital efficiency for delivering liquidity efficiency in the years to come.

IX. LIMITATIONS AND RESEARCH OPPORTUNITIES

The current study focuses on secondary data. The study is based on the CPSEs ' consolidated financial statements in India, which could leave some room for error. Given these limitations, further work may be carried out at a disaggregated stage, i.e., at different sectors of India's central public sector enterprises.

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