

CHAPTER 5

LIQUIDITY PARAMETERS EVALUATION AND COMPOSITE LIQUIDITY : AN EMPIRICAL APPROACH

- 5.1 Introduction**
- 5.2 Liquidity Parameter Evaluation**
- 5.3 Concept of Composite Liquidity**
- 5.4 Determination of Composite Liquidity**
- 5.5 Ranking of Individual Sample Companies/Industries**
- 5.6 Multiple Discriminant Analysis**
- 5.7 Significance of Composite Liquidity**
- 5.8 Summary**

CHAPTER 5

LIQUIDITY PARAMETERS EVALUATION AND COMPOSITE LIQUIDITY : AN EMPIRICAL APPROACH

5.1 *Introduction*

The importance of liquidity seems to have been, underestimated during fifties and sixties, when competitions induced the firms to put more emphasis on earnings and profitability. After 'fifties' the competition grew intense due to the impact of the post industrial revolution. Firms willing to take risk gain an upper hand over their competitors. The focus was more on profitability. The steady downward trend in corporate liquidity, was noticed in the late 'sixties' and 'seventies' due to 'liquidity squeeze'. In private companies the liquidity balance reached dangerously low levels. Corporate world faced crisis due to inflationary pressure, tight money market, credit crunch, rigid rules and regulations and increase rate of sickness and failure.

In India, however, the steady downward trend in corporate liquidity was noticed in the same period. Cash as a percentage of current assets in private sector was of the order of 0.05 and current ratio was on an average 1.09 during 1978-79 and the average current ratio in corporate enterprises in the same period was 1.15 and proportion of cash to current asset was 0.10.

The sickness and virtual collapse of a business enterprise is rarely sudden and seldom the result of a single disaster. It emits a number of signals before reaching a state of illiquidity. A firm in order to remain in existence and sustain its activities as a good concern must remain liquid and meet its obligations properly. Therefore, it is necessary that the financial executives analyse the firm's position with symptoms and take appropriate preventive steps in right time to avert disaster and virtual collapse. Hence, it is the responsibility of financial manager to review the operations periodically and identify concerns which are likely to be affected adversely by illiquidity.

5.2 *Liquidity Parameter Evaluation*

The liquidity ratios for the analysis of financial statements are obviously very high. Even within each of the main categories of liquidity ratios, there are minimum two or three different ratios proposed in literature discussed in chapter-3 (section 12) at length. Most of the liquidity ratios under each of the category overlap in the information they provide about liquidity. Now the question arises as to how many ratios are to be selected from each category so that the overall liquidity can be measured with fair degree of accuracy. To overcome the problem in selecting ratios from the pool of ratios for analysis of liquidity of corporate sector as a whole and variable wise analysis and to study the degree of relationship between ratios under study, we propose to find out product moment correlation coefficient between the liquidity ratios.

The first step in selecting the liquidity ratios is to compute the correlation between various liquidity ratios. On the basis of our review of related literature, we have identified the following thirteen liquidity ratios which will be subject to empirical testing for their degree of association. Over and above the thirteen ratios, as many as eight ratios have been employed for determination of composite liquidity and ranking of individual firms and also for multiple discriminant analysis.

- (a) Traditional liquidity parameters
 - (i) Current ratio (CR)
 - (ii) Liquid ratio (LR)
 - (iii) Absolute liquid ratio (ALR)

- (b) Supporting ratios for general measures of working capital efficiency
 - (i) Debtors turnover ratio (DTR)
 - (ii) Inventory turnover ratio (ITR)
 - (iii) Cash & Bank turnover ratio (CBTR)

- (iv) Working capital turnover ratio (WCTR)
 - (v) Working capital to total tangible asset ratio (WCTTA)
 - (vi) Interval measure (IM)
- (c) A measure of general performance and straight forward indicator of liquidity :
- (i) Ratio of Earnings before Depreciation, Interest and Taxes to Gross total Asset or called Gross surplus ratio (GSR)
 - (ii) Ratio of Cash flow from operation to sales (CFOS)
 - (iii) Ratio of Cash flow from operation to capital employed (CFOCE) and
 - (iv) Ratio of Cash flow from operation to total debts (CFOTD)

A group of thirteen ratios have been computed using annual statements of 80 non-government, non-financial listed public limited companies published in the Stock Official Exchange Directory, Mumbai for a period of ten years, i.e., from 1987-88 to 1996-97. These ratios have been then tested as to how strongly they are correlated. The correlation coefficient between each pair of ratios is determined using average ratio values of ten years across all enterprises. Then the ratios are grouped according to their degree of correlation between them for analysis and interpretation.

Table 5.1 presents the correlation coefficient between the average liquidity ratios for 10 years under study.

TABLE 5.1

CORRELATION MATRIX AMONG THE VARIABLES FOR THE AVERAGE OF TEN YEARS

	CR	LR	ALR	DTR	ITR	CTR	WCTR	WCTTA	I.M	GSR	CFOS	CFOCE	CFOTD
CR													
LR	0.7967												
ALR	0.5782	0.8996*											
DTR	-0.1746	-0.2185	-0.0502										
ITR	-0.0063	0.3317	0.1318	-0.0752									
CTR	-0.0146	-0.14	-0.2142	0.0657	-0.0068								
WCTR	0.0252	0.0849	0.0292	-0.0432	0.0546	-0.0202							
WCTTA	0.7712	0.504	0.3184	-0.1453	-0.1498	0.0397	0.0182						
I.M	0.2723	0.4956	0.0819	-0.0671	0.7252	-0.0914	0.0404	0.062					
GSR	0.0337	0.0525	0.0835	-0.0218	0.0178	0.0275	-0.0553	0.1769	-0.0083				
CFOS	-0.0726	-0.0296	-0.0897	0.032	0.4913	0.0956	-0.0078	0.0471	0.4209	0.2371			
CFOCE	-0.0652	-0.0806	0.0031	0.0639	0.0076	0.0987	-0.0628	0.0518	-0.1142	0.9386*	0.1959		
CFOTD	0.0245	0.0602	0.1132	0.0057	0.0553	0.0248	-0.0442	0.1135	-0.026	0.9608*	0.2297	0.957*	

Source : Compiled and calculated from the annual reports of sample companies published in Stock Exchange Official Directory, Mumbai

Note : * Indicates high degree of correlation

Table 5.1 presents the correlation matrix, taking the average ratio for all the ten years from 1987-88 to 1996-97. In order to discriminate between the ratios, we have arbitrarily fixed a cutoff point, i.e., correlation coefficient of + 0.8. If the correlation coefficient is at least + 0.8, we need not consider both the ratios. On the other hand, if it is less than + 0.8, we consider both the ratios so that we can get some additional information by looking at both the ratios.

It can be observed from table 5.1 that there exists a very high positive correlation ($r \geq +0.8$) between LR and ALR with a coefficient of + 0.8996. These two ratios have come out as a group reflecting working capital/liquidity efficiency. Hence, we can consider LR only and drop ALR for the analysis of a firm's liquidity. Since there is no high degree of correlation between the supporting ratios, we

have considered all the six supporting ratios without eliminating any one of them for analysis. Gross surplus ratio (GSR) is highly and very positively correlated with cash flow ratios namely CFOCE and CFOTD having correlation coefficient of +0.9386 and +0.9608, respectively. Similarly, cash flow ratios have a very strong bond of relationship among themselves, that is, CFOCE with CFOTD with correlation of coefficient of + 0.9574. Therefore, GSR, CFOCE, and CFOTD have distinctly come out as a group for measuring liquidity position of corporate sector. Hence, only CFOCE can be considered as a better indicator of liquidity and general performance of corporate sector as a whole. The other allied ratios GSR & CFOTD may be dropped for analysis. Further, the correlation analysis of ratios of the sample companies for the first year (1987-88) and the last year (1996-97) have also yielded the same result. Hence the need for presentation of correlation matrix table for ratios of first and last year has not been felt essential for similar analysis. So far out of thirteen liquidity ratios, ten ratios have been selected for final analysis of corporate liquidity. Thus, it is observed that these ten ratios, if analysed, would cover all aspects of liquidity of total sample companies (i.e., corporate sector) and variable wise analysis of liquidity of sample companies as well. The ratios selected are namely, CR, LR, DTR, ITR, CBTR, WCTR, WCTTA, IM, CFOS and CFOCE.

5.3 *Concept of Composite Liquidity*

Analysis of liquidity of a corporate enterprise is a subject of much interest and research. Ratios as an important tool for analysis of corporate liquidity is not free from limitations. There is a tendency to over-employ them in analysis of liquidity of a business. A single ratio in itself does not convey much of the sense and there is no international accepted standard for financial ratios against which the results can be compared. However, a good number of liquid ratios do exist to measure various aspects of corporate liquidity. If they are combinedly used, it

is possible that they may yield different conclusions for the same firm. Therefore, it has raised an issue as to how to evaluate the composite corporate liquidity of a firm. This section suggests the procedure for evaluating the composite liquidity of a firm based on empirical analysis of the data of individual sample companies. Based on their composite liquidity the sample companies have been ranked for the study period 1987-97.

The composite liquidity refers to an overall measure of liquidity of a firm expressed in a single index, which distinguishes a liquid firm from its counterpart illiquid firm with a high degree of accuracy. It is a multivariate approach to determine the liquidity of a firm by assigning weights. Composite liquidity index gives an overall rating of the firm.

5.4 Determination of Composite Liquidity

The composite liquidity has been computed by integrating four ratios. The four ratios are inventory to current assets, Debtor to current assets, Cash and Bank to current assets, and other current assets including loans and advances to current assets.

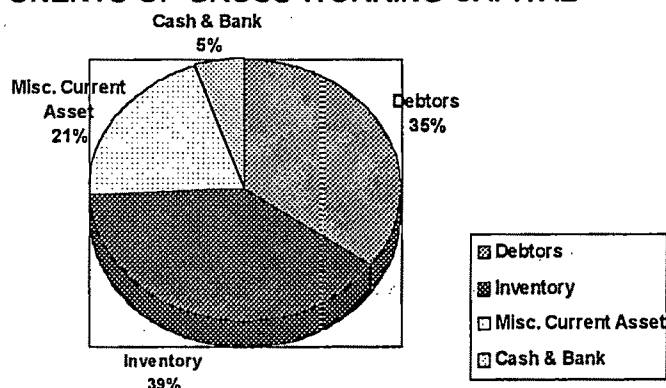
An element wise analysis of current assets (working capital) enables us to examine the element in which working capital funds are locked up. The share of each element of gross working capital has been calculated separately for each of the years under study. Out of the four elements of working capital, the element inventories contributed the highest, i.e., 39 percent of current asset (WC) in sample companies under study. It fluctuated between 30.5 percent in 1996-97 and as high as 47.4 percent in 1987-88. It has shown a declining trend during the study period, and its annual growth rate is computed as -0.016 under ordinary least square method. A large tie up of funds in inventories adversely affects liquidity of the concern as it is considered qualitatively a poor liquid asset. However, during the study period the liquidity position in the corporate sector has shown an improvement over the past in view of the declining trend of

inventories.

Debtors constituting another element of current asset contribute on an average 35.1 percent of gross working capital in the sample corporate sector under study. It fluctuated between 32.2 percent in 1988-89 and as high as 39 percent in 1996-97. It has shown an increasing trend under the study period and its annual marginal growth rate is registered as 0.009. Hence, the liquidity position of corporate sector has shown a marginal improvement over the past.

The share of cash and bank in gross working capital on an average is 5.4 percent in the sample corporate sector. It varies between 4.4 percent in 1989-90 and 8.1 percent in 1990-91. It has also registered an annual growth rate of + 0.0001 percent. In a comfortably financed business cash and bank will probably run not less than 5 to 10 percent of the current assets.¹ Hence this element of current asset further contributes to improving liquidity position of sample corporate sector during the study period. Another very significant feature is that during the period under study on an average 20.5 percent of total investment in working capital was made from other current assets including loans and advances in the sample corporate sector. It varied between 15.4 percent in 1987-88 and 25.4 percent in 1996-97 and registered an annual growth rate of 0.008%. This element of current asset also helps in improving the liquidity position of corporate sector sample companies under study. The average share of individual components of current assets in the sample corporate sector during the period under study (from 1987-88 to 1996-97) is depicted in the following figure 5.1 for forming an instant opinion about their position and their likely effect on corporate liquidity.

FIGURE 5.1 COMPONENTS OF GROSS WORKING CAPITAL



5.5 *Ranking of Individual Sample Companies/ Industries*

The liquidity position of a firm is largely affected by the composition of working capital in as much as any considerable shifts from the relatively more current assets to the relatively less current assets or vice-versa, will materially affect a firm's ability to pay its current debts promptly². Therefore, to determine the liquidity position of the companies and industries more precisely a comprehensive test has been done. A process of 'ranking' has been used to arrive at a more comprehensive measure of liquidity of the sample companies in which four factors—namely, Inventory to current assets ratio, debtor to current asset ratio, cash and bank to current assets ratio, and other current assets including loans and advances to current assets ratio, have been combined into a point score. In case of Inventory to current asset ratio, a lower ratio shows a more favourable position and hence ranking has been done in that order : from 1 to 80, (low ratio to high ratio) for sample companies and 1 to 15 for sample industries groups. On the other hand, for debtors to current assets ratio, cash and Bank to current assets ratio and other current assets including loans and advances to current assets ratio, a high ratio indicates relatively favourable position and ranking has been done in that order, i.e., score from 1 to 80 (high to low ratio) for sample companies and 1 to 15 for sample industries groups:

In order to rank the sample companies as well as the sample industries groups in terms of liquidity, ratio-wise scores have been aggregated and ultimate ranking has been done on the principle that the lower the points scored the more favourable is the liquidity position. Table 5.2 and 5.3 give year-wise composite score and the overall rank of sample companies as well as Industry groups respectively during the period from 1987-88 to 1996-97. It can be observed from the table 5.2 that only the tea plantation companies could occupy five ranks out of first ten ranks namely 2nd, 3rd, 5th, 6th, and 7th. The first rank went in favour of EIH Ltd., and the fourth rank in favour of AFT India Ltd. under the miscellaneous industry group of companies. The eighth, ninth and tenth ranks

TABLE 5.2

**YEAR WISE COMPOSITE SCORE AND
OVERALL RANK OF SAMPLE COMPANIES**

Sl. No.	Name of the Company	Yearly Composite Score										Overall	
		1987 - 88	1988 - 89	1989 - 90	1990 - 91	1991 - 92	1992 - 93	1993 - 94	1994 - 95	1995 - 96	1996 - 97	SCORE	RANK
	COMPANY GROUP												
1.	Alfrederbet (Ind.) Ltd.	192	197	176	164	115	174	153	129	149	137	1586	41
2.	Hindustan Due Corp. Ltd.	106	115	156	105	122	103	167	155	139	152	1320	20
3.	Hindustan Motors Lt.d.	198	128	200	212	173	193	159	176	193	173	1805	62
4.	Ingersall-Rand (Ind) Ltd.	117	170	150	111	130	160	147	153	195	159	1492	34
5.	Kilburn Engg. Ltd.	182	199	199	161	280	211	211	204	173	118	1938	67
6.	TRF Ltd.	175	127	106	146	142	134	136	127	243	177	1513	36
7.	Texmac Co. Ltd.	184	206	206	163	164	175	181	107	127	156	1669	49
8.	Tata Sponge Iron Ltd.	171	116	173	171	149	161	118	106	93	130	1388	27
9.	Tata Engg. & Loco. Co. Ltd.	133	151	155	118	142	171	168	150	152	110	1450	30
10.	Tata Yodogouar Ltd.	99	135	172	222	168	240	191	177	211	169	1784	60
11.	Binani Zinc Ltd.	138	203	124	269	237	296	169	138	156	178	1908	66
12.	Century Extrusions Ltd.	70	77	138	136	146	145	165	221	258	155	1511	35
13.	Electro Steel Casting Ltd.	158	146	112	120	125	97	135	146	167	169	1375	26
14.	Ferro Alloys Corp. Ltd.	178	193	212	204	221	248	176	204	252	274	2162	73
15.	GKW Limited	206	195	198	212	218	205	168	214	175	175	1966	68
16.	Gountermann Peipers Ltd.	164	186	165	160	155	154	174	119	140	122	1539	38
17.	Indian Charge Chrome Ltd	130	138	113	118	124	110	124	131	180	118	1286	16
18.	Ispat Alloys Ltd.	157	124	85	129	90	80	55	108	119	133	1080	8 ✓
19.	Ispat Industries Ltd.	98	196	153	127	128	152	124	122	134	120	1354	25
20.	IMFA Ltd.	215	132	208	193	249	189	166	167	183	148	1850	63
21.	National Std. Duncan Ltd.	97	127	111	203	207	186	177	183	119	183	1593	42
22.	SWIL Ltd.	176	142	190	260	133	143	195	238	164	169	1810	61
23.	Tinplate Co. of Ind. Ltd.	111	186	191	111	85	118	98	115	147	159	1321	22
24.	Usha Martin Ind. Ltd.	75	134	194	163	134	135	132	129	162	163	1421	28
25.	Orissa Spone Iron Ltd.	250	261	210	252	245	241	209	145	171	182	2166	74
26.	OCL India Ltd.	172	175	189	216	197	187	195	195	161	166	1853	64
27.	Mangalam Cement Ltd.	112	75	83	91	113	107	179	153	164	126	1203	12
28.	Kalyanpur cements Ltd.	182	177	199	174	198	224	216	215	195	196	1988	69
29.	Indo-Asahi Glass Co Ltd.	174	175	167	106	133	157	169	167	163	231	1642	47

30.	Hindustan Sanitary Glass	117	162	193	193	191	199	144	204	189	187	1779	59
31.	Hindustan National Glass	129	131	145	145	145	143	176	174	184	204	1576	40
32.	Nalco Chemicals Industry	99	231	215	219	197	160	145	119	145	138	1768	58
33.	Reckitt & Colman of India.	89	100	117	126	128	119	112	120	134	122	1167	10 ✓
34.	ICC India Ltd	215	197	188	179	173	110	155	154	140	112	1623	45
35.	Eveready India Ltd.	131	133	144	149	148	130	131	135	113	106	1320	20
36.	Indian Aluminium Co. Ltd	154	156	164	168	166	188	198	190	191	169	1744	55
37.	Indian Foils Ltd.	139	144	151	151	157	136	152	154	140	139	1463	31
38.	Hukum Chand Jute & Ind.	132	80	105	87	104	111	124	113	119	123	1098	9 ✓
39.	GIS Ltd.	176	211	180	255	255	271	257	242	197	230	2274	78
40.	Chevot Co. Ltd.	195	230	310	191	207	207	199	147	189	141	2016	70
41.	Birla Co. Ltd.	121	141	166	143	141	174	158	172	145	153	1516	37
42.	Mahalaxmi Fibres & Ind.	222	153	212	229	223	236	257	259	237	236	2264	77
43.	Dhana Laxmi Mill Ltd.	220	229	247	165	203	217	125	108	91	90	1695	51
44.	Sterlite Project Ltd.	211	155	132	127	114	120	81	71	68	100	1179	11
45.	Ceeta Ind. Ltd.	165	159	119	116	112	128	67	107	171	205	1349	24
46.	Century Enka Ltd.	179	126	153	169	184	177	187	213	175	174	1737	53
47.	Exide Ind. Ltd.	143	124	207	212	193	193	91	178	179	196	1716	52
48.	Usha Beltron Ltd.	205	219	169	211	239	172	115	106	92	124	1652	48
49.	Philips India Ltd.	175	162	136	170	161	149	167	163	143	129	1555	39
50.	Orient Papers & Ind. Ltd.	100	120	110	106	90	132	136	152	146	134	1226	13
51.	J K Corporation Ltd.	114	140	154	126	134	95	103	171	146	121	1304	18
52.	Upper Ganges Sugar & Ind.	203	220	193	224	220	253	237	230	268	232	2250	76
53.	Sakti Sugar Ltd.	164	136	189	189	165	192	191	212	229	210	1877	65
54.	Balarampur Chini Mills Ltd.	258	280	268	251	259	225	277	218	256	205	2497	80
55.	Berger Paints Ind. Ltd.	210	189	207	255	207	231	220	239	207	163	2158	72
56.	Dunlop India Ltd.	194	97	138	140	122	153	145	120	112	91	1312	19
57.	Kitply India Ltd.	180	175	144	121	118	133	163	180	104	148	1466	32
58.	ITC Ltd.	140	114	155	176	151	194	186	177	224	159	1686	50
59.	EIH Ltd.	64	54	65	60	71	78	80	77	83	68	700	1 ✓
60.	Bells controls Ltd.	188	201	185	137	175	154	178	185	176	158	1737	53
61.	Bata India Ltd.	189	206	201	250	236	252	249	257	185	182	2207	75
62.	AFT Ind. Ltd.	91	99	88	71	90	98	124	100	82	77	920	4 ✓
63.	Assam Co. Ltd.	94	101	82	92	89	89	133	127	126	116	1049	7 ✓
64.	Assam Brook Ltd.	109	93	98	203	162	123	93	115	118	146	1260	15
65.	B & A Plantation & Ind.	94	125	117	68	80	82	96	95	115	146	1018	5 ✓

66.	Bishnaunth Tea & Co. Ltd.	97	79	58	91	54	61	59	63	125	87	774	3 ✓
67.	George Williams (Assam)	66	68	50	69	55	78	61	103	73	110	733	2 ✓
68.	Hasimara Ind. Ltd.	167	157	192	213	207	179	159	141	169	171	1755	57
69.	Jayshree Tea & Ind. Ltd.	155	117	135	163	146	180	177	183	199	150	1605	44
70.	Ledo Tea Co. Ltd.	127	109	170	122	205	160	140	195	175	191	1594	43
71.	Mc Ledo Russel Ind. Ltd.	196	110	118	105	83	170	135	134	216	203	1470	33
72.	Moran Tea Co. (Ind.)Ltd	134	203	136	200	192	95	159	98	109	116	1440	29
73.	New Terai Asso, Ltd.	276	251	240	192	175	185	206	262	268	252	2307	79
74.	Rani Chera Tea Co. Ltd.	267	256	137	153	218	213	238	224	206	181	2091	71
75.	Rossell Ind. Ltd.	142	140	140	111	103	132	113	148	114	179	1322	23
76.	Tata Tea Ltd.	167	197	123	135	108	83	98	115	128	133	1287	17
77.	Warren Tea Ltd.	129	81	101	80	79	94	135	100	101	119	1019	6 ✓
78.	Alipurdur Ltd.	279	268	218	221	177	236	184	227	234	230	2274	78
79.	Britannia Ind. Ltd.	154	146	195	192	175	182	143	148	150	147	1632	46
80.	Rasoi Ltd.	149	123	106	133	172	126	107	131	98	104	1249	14

Source : Compiled and calculated from the various volumes of Stock Exchange Official Directory, Mumbai

TABLE - 5.3
YEAR WISE COMPOSITE SCORE AND
OVERALL RANK OF SAMPLE INDUSTRIES

No.	Name of the Industry	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	SCORE	RANK
		- 88	- 89	- 90	- 91	- 92	- 93	- 94	- 95	- 96	- 97		
1.	General Engineering	31	29	34	20	29	25	31	24	25	25	274	5
2.	Metals and Alloyes	30	35	24	34	27	33	23	22	29	28	285	6
3.	Cement Industries	39	38	40	39	35	42	45	43	41	40	402	13
4.	Refractories Industries	23	31	28	25	32	34	28	39	40	46	325	9
5.	Chemicals Industries	32	30	32	30	31	9	20	20	18	19	241	3 ✓
6.	Aluminium Industries	30	16	35	30	26	29	40	34	31	33	304	7
7.	Jute Industries	25	35	44	33	37	43	41	36	33	37	364	12
8.	Cotton Industries	49	52	51	38	49	45	47	41	34	31	437	14
9.	Synthetics Industries	40	22	27	33	34	29	38	46	38	41	348	11
10.	Electro, Elect, Equip	34	34	26	40	36	31	28	29	27	29	314	8
11.	Paper Industries	14	21	22	19	14	22	22	23	28	23	208	2 ✓
12.	Sugar Industries	45	42	41	47	42	43	46	43	49	51	449	15
13.	Miscellaneous Industries	35	30	37	34	41	36	32	37	33	29	344	10
14.	Tea Plantations Ind.	20	13	11	15	15	14	17	16	21	17	159	1 ✓
15.	Food Products Industries	20	29	18	39	32	34	19	27	25	26	269	4

Source : Same as in Table 5.2

went in favour of Ispat Alloys Ltd., Hukumchand and Jute industries Ltd., and Reckitt & Colman of India Ltd., respectively. With regard to industries group ranking the first, second, and third positions are attributed to tea plantations industries, paper industries and chemical industries, respectively.

Determination of composite liquidity with the help of a single index has helped and highlighted one dimension of the corporate liquidity that is the quantitative concept of liquidity. Liquidity on this concept is defined as the ability to realise value in money from the most liquid assets. It refers the ability to pay in cash, the obligations that are due. The quantitative concept includes the quantum, structure and the utilization of liquid assets only.

On the other hand, in the qualitative concept, liquidity is the ability to meet all present and potential demands on cash from any source in a manner that minimises the cost and maximises the value of the firm³. Corporate liquidity is an essential factor for business success. Excess liquidity though a guarantor of solvency would result in lower profitability, deterioration in managerial efficiency, increased speculation and unjustified expansion and extension of too liberal credit. On the contrary, too little liquidity may lead to frustration of business objectives, reduced rate of return, missed business opportunities and weakening of morale. It will reduce management freedom of choice and movement. It will also lead to financial embarrassment of negotiating its obligations to creditors at ease. Thus, the control of liquidity requires active working capital management. In the following section, an attempt has been made to determine the liquidity efficiency and ability under qualitative concept by using the technique of multiple discriminant analysis.

5.6 *Multiple Discriminant Analysis*

To check the efficiency of working capital management and evaluation of liquidity position, an empirical 'Y' score model using the technique of multiple discriminant analysis has been developed. Ratio as a tool to judge the liquidity

position of an enterprise is not free from limitations. They arise from the fact that the methodology is basically univariate since they are examined in isolation. Therefore, the financial analyst applies his own judgement to assess the combined effect of two or more related ratios. Further, it does not help in deducing a full proof inference. Hence, the need for the use of discriminant analysis is becoming more and more popular and also felt in this study.

The authors of empirical 'Y' score model using the technique of Multiple Discriminant Analysis have developed the following equation model by using four related liquidity ratios.

$$Y = 14.5166 v_2 + 0.0015 v_{25} + 0.8715 v_{31} + 0.7914 v_{35}$$

where

Y= overall discriminant score,

v_2 = cash flow/total tangible assets,

v_{25} = current assets/current liabilities,

v_{31} = Net sales/total tangible assets,

and v_{35} = Defensive assets /total operating expenses.

If Y score is more than 1.7068, it can be said that management of working capital is effective and available liquid resources have been efficiently utilised. If the 'Y' score value is less than 1.7068, it will reveal a state where working capital and liquid resources have ineffectively managed. For a detail analysis of effectiveness of management of working capital in the selected sample companies/industries of Eastern India, the Y score value is depicted in Table 5.4 on the next page.

TABLE - 5.4

YEAR-WISE 'Y' SCORE OF SAMPLE COMPANIES AND INDUSTRIES IN CORPORATE SECTOR

Sl. No.	Name	1987 - 88	1988 - 89	1989 - 90	1990 - 91	1991 - 92	1992 - 93	1993 - 94	1994 - 95	1995 - 96	1996 - 97	AVERA.
COMPANY GROUP												
1.	Alfrederbet (Ind.) Ltd.	1.091	1.135	2.210	1.411	1.952	2.287	2.971	3.228	3.280	3.968	2.353
2.	Hindustan Due Corp. Ltd.	2.572	2.872	3.728	2.843	2.633	2.211	2.234	2.146	2.031	1.768	2.504
3.	Hindustan Motors Lt.d.	2.279	1.810	2.544	2.406	1.615	1.793	3.099	3.359	3.783	13.004	3.560
4.	Ingersall-Rand (Ind) Ltd.	5.361	5.790	4.203	3.605	4.587	4.730	4.715	3.906	4.326	4.468	4.569
5.	Kilburn Engg. Ltd.	1.702	1.701	1.703	3.047	1.107	2.541	2.299	2.549	2.696	1.978	2.132
6.	TRF Ltd.	3.264	3.777	3.005	2.568	2.707	2.883	3.230	3.345	4.707	3.023	3.251
7.	Texmac Co. Ltd.	1.520	1.445	1.352	2.360	2.934	2.651	1.791	0.363	0.792	1.934	1.714
8.	Tata Sponge Iron Ltd.	3.805	3.804	3.803	3.808	7.027	5.383	5.734	4.404	5.614	4.557	4.794
9.	Tata Engg. & Loco. Co. Ltd.	3.500	3.501	3.502	4.018	3.097	2.336	2.893	4.077	4.058	2.258	3.324
10.	Tata Yodogouar Ltd.	2.037	2.531	3.242	3.588	3.023	3.833	4.558	4.488	3.957	4.085	3.534
11.	Binani Zinc Ltd.	5.519	7.178	5.332	0.316	6.531	7.562	2.847	2.918	1.407	1.022	4.063
12.	Century Extrusions Ltd.	1.290	1.292	0.255	0.253	0.264	1.339	1.955	4.975	4.975	3.476	2.007
13.	Electro Steel Casting Ltd.	4.240	3.634	4.195	4.764	3.891	2.975	1.852	3.924	3.695	3.935	3.710
14.	Ferro Alloys Corp. Ltd.	3.814	3.596	3.260	0.821	1.529	1.985	1.276	0.820	3.135	0.784	2.102
15.	GKW Limited	1.446	2.649	2.612	2.735	3.281	3.112	2.872	3.323	1.926	1.765	2.572
16.	Gountermann Peipers (Ind)	2.804	3.005	2.630	3.413	3.730	3.578	4.635	3.348	1.569	1.295	3.001
17.	Indian Charge Chrome Ltd.	3.184	3.188	1.210	1.212	1.721	1.721	1.211	1.211	1.966	1.230	1.785
18.	Ispat Alloys Ltd.	3.466	3.385	2.725	2.352	2.393	2.801	2.231	-9.801	-9.803	3.086	0.283
19.	Ispat Industries Ltd.	3.417	1.494	3.402	2.558	1.938	1.794	1.620	1.840	1.925	1.492	2.148
20.	IMFA Ltd.	4.212	4.949	1.994	1.389	1.444	2.955	3.213	3.066	3.843	3.143	3.021
21.	National Std. Duncan Ltd.	3.152	2.382	4.273	3.294	3.363	3.324	4.031	3.227	3.115	3.021	3.318
22.	SWIL Ltd.	3.224	4.389	3.891	5.272	3.904	2.576	2.791	2.832	2.630	1.584	3.310
23.	Tinplate Co. of Ind. Ltd.	4.904	3.189	2.934	3.468	2.758	1.604	1.716	1.353	1.357	1.014	2.430
24.	Usha Martin Ind. Ltd.	3.220	3.303	3.016	2.692	3.336	2.752	2.145	1.779	1.646	1.392	2.528
25.	Orissa Sponge Iron Ltd.	1.446	2.128	4.097	3.671	5.844	3.647	1.775	1.600	2.390	1.613	2.821
26.	OCL India Ltd.	2.435	2.276	2.510	3.613	4.470	3.287	2.826	3.645	3.439	2.643	3.096
27.	Mangalam Cement Ltd.	3.242	2.852	2.171	3.352	3.083	1.012	0.694	1.987	4.053	2.482	2.493
28.	Kalyanpur cements Ltd.	1.219	1.217	1.633	2.098	1.543	0.429	0.179	1.005	1.668	1.672	1.266
29.	Indo-Asahi Glass Co Ltd.	2.278	3.926	3.384	6.264	5.619	3.812	-1.358	1.724	1.411	-1.859	2.520
30.	Hindustan Sanitary Glass	3.414	1.738	2.176	2.745	3.564	2.721	2.573	2.923	2.979	2.845	2.768
31.	Hindustan National Glass	2.982	2.984	2.983	2.987	2.989	2.253	2.484	2.486	2.630	2.310	2.709

Sl. No.	Name	1987 - 88	1988 - 89	1989 - 90	1990 - 91	1991 - 92	1992 - 93	1993 - 94	1994 - 95	1995 - 96	1996 - 97	AVERA
32.	Nalco Chemicals & Ind. Ltd.	4.513	1.470	4.166	4.772	6.119	6.921	6.602	6.941	6.454	4.395	5.235
33.	Reckitt & Colman of India	5.621	5.617	5.797	6.086	5.919	4.528	4.698	4.499	4.588	4.487	5.184
34.	ICC India Ltd	-1.147	-1.273	3.146	-0.759	-1.669	-1.293	2.740	2.818	2.914	2.671	0.815
35.	Eveready Ind. Ltd.	2.925	2.655	4.296	4.036	4.089	4.418	4.544	2.834	2.928	2.060	3.478
36.	Indian Aluminium Co. Ltd	4.815	8.989	4.286	-0.644	2.906	2.401	3.293	3.860	2.653	2.707	3.526
37.	Indian Foils Ltd.	4.770	4.151	3.190	3.038	3.374	3.008	3.044	2.935	2.745	2.218	3.247
38.	Hukum Chand Jute & Ind.	2.781	4.532	3.928	5.157	4.257	2.297	1.906	2.902	4.786	2.267	3.481
39.	GIS Ltd.	6.300	5.278	6.423	6.564	6.266	5.890	5.305	5.065	3.504	3.989	5.458
40.	Chevot Co. Ltd.	2.501	5.388	0.970	4.163	3.371	4.248	5.002	3.443	3.302	2.167	3.455
41.	Birla Co. Ltd.	2.084	2.274	2.268	3.605	5.905	2.521	2.684	3.074	3.793	2.367	2.980
42.	Mahalaxmi Fibres & Ind.	4.536	5.170	7.294	4.817	5.905	4.030	4.703	4.723	4.933	3.692	4.980
43.	Dhana Laxmi Mill Ltd.	3.103	3.107	5.028	2.897	1.254	-2.673	-0.289	-1.860	-0.642	0.390	1.032
44.	Sterlite Project Ltd.	4.655	3.637	4.009	3.362	1.102	-0.703	5.127	1.206	1.515	41.628	6.554
45.	Ceeta Ind. Ltd.	0.618	3.815	6.517	4.013	3.525	2.251	1.802	1.716	1.012	1.404	2.667
46.	Century Enka Ltd.	3.814	3.954	4.793	3.731	3.256	3.311	4.374	1.969	3.464	3.273	3.594
47.	Exide Ind. Ltd.	5.460	7.292	6.307	4.805	3.812	3.656	3.312	2.990	3.134	3.563	4.433
48.	Usha Beltron Ltd.	1.121	1.125	3.635	3.094	4.893	6.843	6.445	4.534	3.021	2.805	3.752
49.	Philips India Ltd.	2.569	2.919	4.141	5.337	4.088	3.227	5.080	3.390	3.342	2.612	3.670
50.	Orient Papers & Ind. Ltd.	1.670	1.614	2.479	3.492	3.177	2.444	2.681	2.477	4.120	2.087	2.624
51.	J K Corporation Ltd.	1.883	2.157	2.809	2.311	2.873	1.938	1.925	1.654	1.834	1.592	2.098
52.	Upper Ganges Sugar & Ind.	3.607	3.215	3.304	2.637	3.022	2.617	4.336	5.909	2.410	2.193	3.325
53.	Sakti Sugar Ltd.	3.684	3.087	4.507	3.748	3.269	2.587	2.679	2.651	2.349	2.360	3.092
54.	Balarampur Chini Mills Ltd.	4.034	2.620	2.798	3.606	2.987	3.524	3.067	3.912	3.113	2.462	3.212
55.	Berger Paints Ind. Ltd.	3.723	2.383	5.255	3.027	3.871	3.696	4.435	4.730	5.278	4.795	4.119
56.	Dunlop India Ltd.	4.665	2.928	2.499	2.661	2.442	2.569	2.027	1.713	2.441	1.703	2.565
57.	Kitply Ind. Ltd.	2.426	2.456	2.448	2.559	3.083	2.942	2.787	3.110	2.617	2.668	2.710
58.	ITC Ltd.	4.605	3.775	5.082	5.037	5.453	6.436	5.390	4.343	4.787	5.100	5.001
59.	EIH Ltd.	2.034	2.223	2.230	1.800	2.646	1.664	2.353	2.812	3.656	3.330	2.475
60.	Bells controls Ltd.	1.216	1.659	2.089	2.707	2.538	1.890	3.101	2.855	3.153	2.795	2.400
61.	Bata India Ltd.	4.301	3.826	4.058	4.135	4.434	2.808	4.562	2.845	0.540	3.508	3.502
62.	AFT Ind. Ltd.	5.096	4.835	7.908	6.514	4.705	3.500	1.752	1.342	1.347	1.340	3.837
63.	Assam Co. Ltd.	5.448	4.192	4.956	7.064	6.829	1.750	1.858	1.441	1.021	1.410	3.597
64.	Assam brook ltd	2.024	1.584	4.175	2.337	3.248	2.912	2.091	2.114	2.317	1.869	2.467
65.	B & A Plantation & Ind. Ltd.	2.734	3.896	3.699	2.160	2.864	1.909	1.689	1.699	1.708	1.651	2.398
66.	Bishnanunth Tea & Co. Ltd.	1.747	1.748	3.364	4.728	1.948	1.863	1.452	1.605	1.685	2.019	2.216

Sl. No.	Name	1987 - 88	1988 - 89	1989 - 90	1990 - 91	1991 - 92	1992 - 93	1993 - 94	1994 - 95	1995 - 96	1996 - 97	AVERA
67.	George Williams (Assam)	2.466	3.386	4.352	3.061	2.957	2.071	1.777	1.681	1.760	1.978	2.549
68.	Hasimara Ind. Ltd.	2.065	2.656	4.868	5.396	5.694	4.483	4.672	-0.270	4.407	2.042	3.601
69.	Jayshree Tea & Ind. Ltd.	2.463	2.986	5.629	1.943	1.763	2.900	4.048	1.899	1.733	2.467	2.783
70.	Ledo Tea Co. Ltd.	5.079	3.052	4.059	2.618	3.460	3.315	3.139	3.153	2.721	3.017	3.361
71.	Mc Ledo Russel Ind. Ltd.	5.461	6.301	4.362	4.284	5.202	1.884	1.892	1.455	1.418	1.139	3.340
72.	Moran Tea Co. (Ind.)Ltd	2.276	2.154	3.070	2.491	2.490	2.815	2.652	2.061	2.352	2.944	2.530
73.	New Terai Asso. Ltd.	4.843	5.008	-2.323	10.446	8.670	3.176	4.924	6.970	0.658	5.644	4.802
74.	Rani Chera Tea Co. Ltd.	1.313	1.791	-1.330	7.679	5.667	2.307	4.891	3.716	3.667	-0.174	2.953
75.	Rossell Ind. Ltd.	4.452	3.532	3.125	6.393	7.498	3.436	1.181	1.013	0.784	0.418	3.183
76.	Tata Tea Ltd.	4.092	3.481	5.557	5.090	4.132	3.816	3.980	2.631	2.806	2.986	3.857
77.	Warren Tea Ltd.	2.565	2.892	4.673	4.896	4.062	3.681	3.031	2.582	2.411	3.034	3.383
78.	Alipurduur Ltd.	1.827	2.016	1.125	4.627	2.566	2.635	5.402	3.698	0.899	3.119	2.791
79.	Britannia Ind. Ltd.	5.638	5.291	4.645	4.366	5.315	4.500	4.380	3.525	3.181	3.861	4.470
80.	Rasoi Ltd.	5.509	4.263	1.923	3.407	3.150	2.660	2.125	-0.564	-1.107	-0.961	2.040
INDUSTRY GROUP												
1.	General Engineering	3.012	2.877	3.146	3.414	2.870	2.304	2.814	3.496	3.580	2.998	3.051
2.	Metals and Alloyes	2.158	2.316	2.513	1.614	2.208	2.073	1.708	1.067	1.447	1.492	1.860
3.	Cement	2.379	2.276	2.332	3.328	3.493	1.638	1.226	2.137	3.073	2.215	2.410
4.	Refractories	2.880	2.813	2.779	3.729	3.953	2.756	1.960	2.556	2.581	1.834	2.784
5.	Chemicals	-0.015	0.141	3.567	0.692	0.167	0.978	3.550	3.180	3.243	2.543	1.804
6.	Aluminium	4.805	8.051	4.134	-0.154	2.960	2.474	3.258	3.699	2.672	2.580	3.448
7.	Jute Textile	2.440	2.672	2.450	3.927	5.116	2.783	2.939	3.292	3.802	2.497	3.192
8.	Cotton Textile	3.494	3.650	5.576	3.273	2.406	-0.110	2.188	1.792	2.320	0.714	2.530
9.	Synthetics	3.778	3.946	4.796	3.733	3.249	3.259	4.278	1.958	3.294	3.128	3.542
10.	Electro, Elect, Equip	2.910	3.583	4.604	5.061	4.042	3.655	4.741	3.435	3.027	2.731	3.779
11.	Paper	1.757	1.870	2.629	2.770	2.998	1.962	2.047	1.744	2.269	1.602	2.165
12.	Sugar	3.698	3.025	3.844	3.382	3.114	2.788	3.212	3.524	2.566	2.360	3.151
13.	Tea plantations	3.760	3.036	3.616	3.583	2.835	4.271	4.038	3.347	3.663	3.921	3.607
14.	Food products	3.418	3.384	4.945	4.320	3.765	2.664	2.410	1.742	1.619	1.737	3.000
15.	Miscellaneous	5.612	5.128	3.912	4.237	4.992	4.275	4.067	3.137	2.881	3.542	4.178

Source : Compiled & Calculated from various volumes of Stock Exng. Directory, Mumbai & R.B.I. Monthly Bulletins, Mumbai.

Note : $Y = 14.516V_2 + 0.0015V_{25} + 0.8715V_{31} + 0.7914V_{35}$

There are 80 sample companies selected from the corporate sector of Eastern India and all sample companies are grouped under 15 industries. The 'Y' score of all sample companies as well as industries under study have been separately computed for the entire study period from 1987-88 to 1996-97 and again the average 'Y' score for all sample companies and industry groups for the entire study period have been computed to measure the overall score. Table 5.4 presents the above calculated scores to check the efficacy of liquidity and working capital management. The actual 'Y' score depicted in the table 5.4 is compared with the standard value of Y score, i.e., 1.7068. The management of working capital can be said to be effective in case of a company/industry, if its calculated value of Y score is more than the standard value.

It is observed from the Table 5.4 that out of 80 sample companies the tabulated average 'Y' score of all most all companies except four was in excess of the standard Y score value (1.7068).

The companies are Ispat Alloys Ltd., Kalyanpur Cement Ltd., ICI India Ltd and Dhana Laxmi Mills Ltd. . In case of another five companies the computed average 'Y' score is marginally in excess of the standard values. They are namely, Texmac Ltd, Century Extrusions Ltd., Ferro Alloys Corporation Ltd., Indian Charge Chrome Ltd., and Rasoi Ltd (food). Further, an analysis of year wise 'Y' score revealed that 13 companies in 1987-88, 12 companies in 1988-89, 9 in 1989-90, 8 in 1990-91, 9 in 1991-92, 7 in 1992-93, 9 in 1993-94, 19 in 1994 -95, 20 in 1995-96 and 22 companies in 1996-97 have not effectively managed their working capital since their 'Y' score value is less than the standard value which may lead to illiquidity position. It may be attributed to the intense competition in the post liberalisation period and the liquidity might have been sacrificed at the cost of profitability.

The 'Y' score average value of all industry groups was more than the table value. It is seen that out of 15 industry groups the computed average 'Y' score of two industries is marginally higher than the standard value. They are namely metals and alloys industries, and chemical industries.

Thus, we can conclude that working capital and liquid assets in sample companies of Eastern India are fairly managed during the decade under study.

5.7 Significance of the Composite Liquidity

Composite scoring system is the quantification of the overall liquidity of the firms. It acts as a potent tool for corporate planning and control. The financial manager of a firm may find the approach useful in ascertaining its position in terms of liquidity in the industry to which the firm belongs. The outsiders, namely the investor, lending and financial institutions, credit rating agencies, policy makers in the government, researchers and the institutional organisations may also find this approach useful for analysing financial strength of corporate sector in India.

5.8 Summary

Ratios are used as an important tool for analysis of corporate liquidity. A single ratio may fail to analyse the liquidity due to some of its inherent limitations and lack of accepted international standards. Hence, there is every likelihood of its over employment. A good number of ratios have been developed over the years for this purpose. When they are jointly applied in the analysis, it may provide at times conflicting results. Therefore, it has raised an issue as to how to evaluate the composite corporate liquidity of a firm. Efforts have been made to rank the sample companies through empirical analysis of their composite liquidity.

The product moment coefficient of correlation has been applied to select and identify a few appropriate ratios out of a pool of thirteen ratios for use in future to analyse liquidity of total corporate sample companies. This technique helped in identifying ten ratios for use of liquidity analysis in corporate sector.

The composite liquidity refers to an overall measure of liquidity of a firm

expressed in a single index. Composite liquidity gives an overall rating of the firm as well as industry.

Four ratios such as inventory to current assets, debtors to current assets cash and bank to current assets, and miscellaneous current assets to current assets have been used to analyse the composite liquidity of sample companies. These ratios help in measuring the liquidity position of the sample companies under study.

The position of liquidity of a firm is fairly influenced by the quality of working capital (current asset) it holds. It will materially affect a firm's ability to meet its obligations. A comprehensive test has been done through the process of ranking to determine the composite liquidity. To rank the sample companies and industries year wise scores have been aggregated. The ultimate ranking has been done on the principle that the lower the points scored the more favourable is the liquidity position. Finally it was revealed that the tea plantations companies as well as tea plantations industry performed well in terms of their composite liquidity.

The efficacy of working capital management and evaluation of liquidity position can be checked by using an empirical 'Y' score model of the multiple discriminant analysis. This model effectively works by combining the effect of four related ratios, namely cash flow to total tangible assets ratio, current ratio, net sales to total tangible assets ratio and defensive assets to operating expenses ratio. It is seen from the study that most of the sample companies under study have fairly managed their working capital during the study period.

NOTES

1. Banarjee, D. and Hazra, M.K. 'Working Capital Management in Grasim Industries Ltd. : A Case Study' : The Management Accountant, Calcutta, May 1992.
2. Sur, D., 'Working Capital Management' :An Overview of Balmer Lawries and Co. Ltd.' Indian Journal of Public Enterprise, Allahbad, June 1994, p.823.
3. Kumar Vijaya A. Assessment of Corporate Liquidity : A Discriminate Analysis Approach ,The Management Accountant, Calcutta ,August 1996, p. 589.