Chapter - 6

WORKING CAPITAL MANAGEMENT EFFICIENCY

An attempt has been made here to examine the impact of the New Bank Lending System (NBLS) on the Working Capital Management Efficiency (WCME) of industrial units. For the purpose, the following main and sub-hypotheses have been formulated and subsequently tested in this section.

Hypotheses

H_2 · "The WCME in large industrial units in India has improved under the New Bank Lending System".

To test the H_2 the following sub-hypotheses have been framed:

SH_1 "For the same level of sales, the Gross Working Capital employed has declined under the New Bank Lending System".

Or

"The Working Capital turnover in sales has improved under the New Bank Lending System".

SH_2 "The dependence of industry on bank credit to meet the Gross Working Capital needs has declined under the New Bank Lending System".

Or

"The Bank Borrowing multiplier in Gross Working Capital has increased under the New Bank Lending System".

SH_3 "The ratio of Net Working Capital to Bank Borrowings has increased under the New Bank Lending System".

Or

"The matching contribution of the company in terms of Net Working Capital has increased in relation to Bank Borrowing".

SH_4 "The working capital management efficiency of industries, in terms of their ability to safely meet their current obligations has not improved to the desired level".

To test the main hypothesis, a composite Working Capital Management Efficiency Index called 'Turnover-Dependency Index' ($T\text{-}D_I$) has been developed by integrating the three efficiency factors, viz., 'Turnover-Efficiency', 'Dependency-Efficiency' and 'Matching-Contribution-Efficiency'.

The three factoral integrated identity equation is called $T\text{-}D_I$ model.

The $T\text{-}D_I$ Model

The $T\text{-}D_I$ model is given as

$$T - D_I = T_I \cdot D_I \cdot Mc_I \quad \ldots \quad (1)$$

Each of the components of T-D model are given below :

$T - D_I$ = Turnover - Dependency Index

T_I = Turnover efficiency

D_I = Dependency efficiency

Mc_I = Matching Contribution Efficiency

$$(A)\ T_I = NS \div GWC \quad \ldots \quad (2)$$

Where,

T_I = Turnover Efficiency

NS = Sales less returns, and

GWC = Gross Working Capital

arrived at by

$$(CA_i) \div CE \quad \ldots \quad (3)$$

Where,

CA = Current Assets,

CE = Contra entries,

and subsequent

i_1 = CCA of Chargeable Current Assets

i_2 = CCA of other Current Assets

$$(B)\ D_I = GWC \div BB \quad \ldots \quad (4)$$

Where,

D_I = Dependency Efficiency

GWC = Gross Working Capital

BB = Bank Borrowings for Working Capital

$$(C)\ Mc_I = NS \div NWC \quad \ldots \quad (5)$$

Where,

Mc_I = Matching Contribution Efficiency

NS = Sales less return

NWC = Net Working Capital

To feed the above equations, both secondary and primary data have been collected from the source and through the methodology already explained in the research design. At the first stage, the three sub-hypotheses have been tested through the use of T_I, D_I and Mc_I respectively. Thereafter, the main hypothesis is tested with the help of the integrated $T\text{-}D_I$ model. After the $T\text{-}D_I$ model analysis, an attempt has been made to statistically ascertain the relative contribution of each of the three factors of the $T\text{-}D_I$ model in influencing the behaviour of Working Capital Management efficiency. In this statistical exercise, Liquidity Ratio has been considered as a dummy variable. In the final analysis overall conclusions have been drawn on the basis of both the financial and the statistical analysis of Working Capital Management Efficiency.

Testing of Sub-Hypotheses

SH_1 : Aggregate Level

This hypothesis is based on the assumption that during the post NBLP period, industrial units covered by the NBLS should have achieved a higher level of efficiency in managing their working capital, which is determined by the working capital turnover in relation to the sales, during a given period of time. The T_I is the turnover figure and an increase in T_I over the base year indicates improvement in the WCME of industrial Units. The change in the WCME can be measured in terms of percentage also.

The following table depicts the relevant data to measure the changes in the WCME of Industrial Units, at the aggregate level on the basis of T_I.

Table - 6.1 Turnover Efficiency : Aggregate Level

Year	S (Rs.Crs)	S_I (%)	WC (Rs. Crs)	WC_I (%)	T_I (X)
	1	2	3	4	5
1977-78	8589.41		4648.20		1.85
1983.84	21708.60	100.00	11890.43	100.00	1.83
1984-85	25571.66	117.80	13394.58	112.65	1.91
1985-86	29432.64	135.58	15956.91	134.20	1.84
1986-87	32190.61	148.29	18227.11	153.30	1.76
1987-88	35811.19	164.97	19436.90	163.47	1.84

Source- Financial Performance of Companies, ICICI portfolio 1987-88. The Industrial Credit & Investment Corporation of India Ltd. Bombay, June 1989

Explanations

1. S = Sales
   S_I = Sales index
2. WC = Gross working capital
   WC_I = Gross working capital index
3. T_I = Working capital multiplier in sales
4. Annual Growth rates have been calculated for the years 1983-84 to 1987-88 with 1983-84 as base.

Findings

(1) There has been a growth of 416.94 per cent in sales during the period of analysis, taking 1977-78 data as the base. The growth in the amount of working capital employed has been slightly higher compared to the growth in sales. However, the differences in the two growths have not been substantial and consequently the Turnover Index has more or less remained constant during the period of analysis.

(2) It can, thus, be inferred that inspite of the introduction of New Bank Lending Policy and the procedural changes introduced by commercial banks to implement the same, the Working Capital Management Efficiency (WCME) has not improved during the period. A test of hypothesis (SH_1) on the basis of the above analysis safely enables us to reject the hypothesis and conclude that the New Bank Lending Policy has failed to achieve its object of ensuring improvement in the working capital management efficiency in industries.

SH_1 : Sample Units

The hypothesis SH_1 has further been tested on the basis of data drawn from the sample units in Gujarat State. The following table

depicts the analysis of the relevant data for the period 1983-84 to 1987-88.

Table - 6.2 Turnover Efficiency : Sample Level

Year	S (Rs. lacs)	S_I (%)	WC (Rs. lacs)	WC_I (%)	T_I (X)
	1	2	3	4	5
1983-84	281653.41	100.00	126461.81	100.00	2.23
1984-85	314542.68	111.68	136759.41	108.10	2.31
1985-86	340178.80	120.78	157614.60	124.60	2.16
1986-87	456149.43	161.95	238504.21	188.60	1.91
1987-88	501498.56	178.06	257580.30	203.70	1.95

Source- Annual Reports of the Sample industries for the concerned years.

Explanation Abbreviations in this table are as per the explanation given below table no.6.1.

The table reveals a relatively higher growth in the amount of working capital employed by the sample industries compared to the growth in the value of their sales. This is reflected by the Turnover Index which has dropped down from 2.2 to 1.9 during the period with the exception of the year 1984-85 when it was 2.3. This evidence enables us to reject the hypothesis on the basis of sample units' data.

SH_2 : Aggregate Level

One of the important objectives of the NBLP has been to ensure that the dependence of industries on banks for working capital be reduced and the limited resources of banks be utilised more effectively. This can be understood by analysing the share of borrowings from banks (BB) in relation to the total working capital employed. Accordingly, a dependency index (D_I) has been developed to measure the changes in the dependence of industries on banks. The D_I can be expressed in 'fraction' as well as in 'multiplier'. However, with a view to maintain uniformity, we have expressed dependency index as a multiplier; BB in relation to GWC. The relationship between 'D_I' and 'Dependency' is inversed i.e., a higher D_I figure means a lower dependence on bank credit while a lower D_I indicates a higher dependence on bank credit. Thus, the higher D_I figure indicates a higher WCME and a lower D_I figure indicates a lower WCME.

The following table contains the changes in dependence of industries on banks in terms of D_I.

Table - 6.3 Dependency efficiency : Aggregate Level

Year	WC (Rs. Crs)	WC_I (%)	BB (Rs. Crs)	BB_I (%)	D_I (X)
	1	2	3	4	5
1977-78	4648.20	-	1250.69	-	3.72
1983-84	11890.43	100.00	2451.82	100.00	4.85
1984-85	13394.58	112.6	2725.62	111.2	4.91
1985-86	15956.91	134.2	3187.46	130.0	5.01
1986-87	18227.11	153.3	3640.69	148.5	5.01
1987-88	19436.90	163.50	3984.60	162.50	4.88

Source- Financial performance of Companies, ICICI portfolio 1987-88, The Industrial Credit and Investment Corporation of India Ltd., Bombay, June- 1989.

Explanation
1. GWC = Gross Working Capital
2. WC_I = Working Capital index
3. BB = Bank Borrowing for working capital
4. BB_I = Index of BB
5. D_I = Dependency index i.e., WC/BB

Findings

(1) Both the WC index as well as the BB index have risen more or less to the same level with some difference in the pattern of growth during 1983-84. Thus, there has been a marginal decline in the Dependency Index during this period at the aggregate level. On the basis of this evidence, the hypothesis SH_2 is sustained.

(2) However, if a period of time is considered from 1977-78 to 1987-88, there has been an increase of 1.16 points in the D_I depicting a proportionate decline in dependency. On the basis of this evidence, the hypothesis SH_2 is sustained.

Thus, it can be finally inferred that during the post NBLP period, there has been some improvement in the WCME of industries at the aggregate level, at least, in terms of D_I.

SH_2 : Sample Units

With a view to cross check the decline in the dependence of industrial units on banks to meet their gross working capital needs and to reassure ourselves about the findings on SH_2, data drawn from the sample industrial units of Gujarat have been analysed to calculate the Dependency Index (D_I) for the period covered by the primary survey. The following table indicates the dependency level of industries on banks.

Table - 5.4 Dependency Efficiency : Sample Units

Year	WC (Rs. lacs)	WC_I (%)	BB (Rs. lacs)	BB_I (%)	D_I (X)
1983-84	126461.81	100.0	40967.12	100.0	3.09
1984-85	136759.41	108.1	43610.40	106.5	3.14
1985-86	157614.60	124.6	50343.92	122.9	3.13
1986-87	238504.21	188.6	71758.53	175.2	3.32
1987-88	257580.30	203.7	80469.98	196.4	3.20

Source- Annual reports of the sample industries.

Explanation

Abbreviations in this table are as per the explantion given below the Table no. 5:3

Findings

(1) The Gross Working Capital employed in sample industrial units registered an increase of more than 103 per cent whereas the borrowings from banks as a component of Gross Working Capital increased by 96 per cent only. As a result, the dependency index increased from 3.09

to 3.20. This indicates that there has been a marginal decline in the dependence of the industries on banks during the period covered by this study. On the basis of this evidence it can be concluded that the hypothesis SH_2 is sustained at the sample level.

(2) Considering both the aggregate level analysis as well as the sample level analysis, the hypothesis SH_2 is more or less sustained. Although during the period covered by the survey, the decline in dependency is not substantial.

SH_3 : <u>Aggregate Level</u>

As pointed out earlier, it was expected that the net working capital base will improve as a result of the implementation of NBLP and the dependence of industries on banks for working capital will decline proportionately. In order to ascertain the achievement of NBLP in this regard we have developed Matching Contribution Index (MC_I), which is capable of reflecting changes in the net working capital base, in relation to borrowings from banks. A high value of MC_I means a relatively lower dependence on banks. The following table contains the analysis of aggregate level data to arrive at the Matching Contribution efficiency.

Table - 6.5 **Matching Contribution Efficiency : Aggregate Level**

Year	BB (Rs. Crs)	BB_I		NWC (Rs. Crs)	NWC_I		MC_I (%)
1977-78	1250.69	100.00	-	604.24	100.00	-	2.07
1983-84	2451.82	196.04	100.00	1557.29	257.73	100.00	1.57
1984-85	2725.62	217.93	111.12	1876.95	310.63	120.53	1.45
1985-86	3187.46	254.86	130.00	2302.86	381.12	147.88	1.38
1986-87	3640.69	291.19	148.49	2801.56	463.66	179.90	1.30
1987-88	3984.60	318.60	162.52	2905.76	480.90	186.59	1.37

Source- Financial Performance of Companies, ICICI portfolio 1987-88 The Industrial Credit and Investment Corporation of India Ltd. Bombay, June 1989.

Explanations

1. NWC = Net Working Capital
   NWC_I = Net Working Capital Index
2. BB = Bank Borrowing for Working Capital
   BB_I = Index of Bank Borrowing for Working Capital
3. MC_I = Ratio between 1 and 3 in per cent

Findings

(1) The index of bank borrowing has increased from 100.00 in the base year 1977-78 to 318.60 in the year 1987-88. As against this the net working capital index has increased to 480.90, during the period. As a result, MC_I has declined from 2.07 to 1.37 during the same period. On the basis of this finding, it may be observed that the hypothesis SH_3 is sustained at the aggregate level.

(2) During the period 1983-84 to 1987-88 also there is a decline in the MC_I , but not so significant as it was found during the period of eleven years. However, during this short period also the decline in MC sustains the hypothesis SH_3.

SH_3 : Sample Units

In order to test the hypothesis, on the basis of the data drawn from sample units in Gujarat, Matching Contribution Efficiency has been calculated for the years 1983-84 to 1987-88, as given in the following table.

Table - 6.6 Matching Contribution Efficiency : Sample Industries

Year	BB (Rs. Lacs)	BB_I (%)	NWC (Rs. lacs)	NWC_I (%)	MC_I (X)
	1	2	3	4	5
1983-84	40967.12	100.00	28429.51	100.00	1.44
1984-85	43610.40	106.45	31900.62	112.21	1.37
1985-86	50343.92	122.89	35963.92	126.50	1.40
1986-87	71758.53	175.16	50261.15	176.59	1.42
1987-88	80469.98	196.43	58215.55	204.77	1.38

Source- Annual reports of the Sample Industries.

Explanations

Abbreviations in this table are as per the explanation given below the table no. 6.5

Findings

(1) There has been a marginal decline of 0.06 point in the matching contribution efficiency during the period which again sustains the hypothesis SH_3.

(2) An aggregate view of the larger as well as the smaller samples sustains our hypothesis SH_3 , which means that during the post NBLP period industrial units have brought in more funds from long term sources to meet their

working capital needs.

H_2 : Aggregate Level

In order to ascertain the impact of NBLP on the NWC, we have also developed a measure of change which is 'a multiplier of NWC in the Net Sales' during each year over the period of time covered by the Study. This multiplier integrates the three critical factors that depict the change in the efficiency of industrial units in the management of their capital. The three component factors are T_I , D_I and MC_I , each one of which has been examined separately under SH_1 to SH_3. The overall picture of change considering all the three measures examined earlier can be better appreciated with the use of the $T\text{-}D_I$ multiplier. The following table depicts the direct calculation of $T\text{-}D_I$ at the aggregate level.

Table - 6.7 **Turnover-Dependency Index : Aggregate Level**

Year	S (Rs. Crs)	S_I (%)		NWC (Rs. Crs)	NWC_I (%)		$T\text{-}D_I$
	1	2		3	4		5
1977-78	8589.41	-	100.00	604.24	-	100.00	14.22
1983-84	21708.60	100.00	252.74	1557.27	100.00	257.73	13.94
1984-85	25571.66	117.80	297.71	1876.95	120.53	310.63	13.62
1985-86	29432.64	135.58	342.66	2302.86	147.88	387.12	12.78
1986-87	32190.60	148.29	374.77	2801.56	179.90	463.66	11.49
1987-88	35811.19	164.97	416.92	2905.76	186.59	480.90	12.32

Source- Financial performance of Companies, ICICI portfolio 1987-88,The Industrial Credit and Investment Corporation of India Ltd. Bombay, June- 1989.

Explanations

1. S = Sales
2. S_I = Index of sales
3. NWC = Net Working Capital
4. NWC_I = Index of Net Working Capital
5. $T\text{-}D_I$ = Sales /NWC

Findings

The growth in sales during 1978-1988 has been about 317 per cent. As against this, the growth in Net Working Capital has been 381 per cent during the same period. As a result, the $T\text{-}D_I$ expressed as a multiplier has

declined from 14.22 to 12.32. This decline indicates that the Net Working Capital base has definitely improved in the industrial units at the aggregate level during the post NBLP period. The H_2 thus gets sustained and it can be concluded that during the post NBLP period the NWC has improved in the industries, which was one of the objects of NBLP.

H_2 : Sample Units

In order to cross-check the results of analysis of the aggregate level, the same analysis has been carried out for the situation relating to sample units located in Gujarat. The following table depicts the TD_I for the sample units during the period 1983-84 to 1987-88.

Table - 6.8 Turnover-Dependency Index : Sample Units

Year	S (Rs. lacs)	S_I (%)	NWC (Rs. lacs)	NWC_I (%)	$T\text{-}D_I$
	1	2	3	4	5
1983-84	281653.41	100.00	28429.51	100.00	9.91
1984-85	314542.68	111.68	31900.62	112.21	9.86
1985-86	340178.80	120.78	35963.92	126.50	9.46
1986-87	456149.43	161.95	50261.15	176.79	9.08
1987-88	501498.56	178.06	58215.55	204.77	8.61

Source-Annual reports of the sample industries.

Explanations- Abbreviations in this table are as per the explanation given below the table no.6.7

Findings

In the sample units also, we observe a decline in the $T\text{-}D_I$ during the period of analysis. This decline, however, has been less during the first four years, compared to the last year. However, on the basis of this evidence, again we have to confirm that the H_2 is sustained and the Net Working Capital base of industries has strengthened during the post NBLP period.

Concluding Findings on T-D_I Model

The above analysis, while sustaining our main hypothesis, poses a new question unanswered and calls for a further analytical investigation. While SH_1 was rejected, the SH_2 & SH_3 get sustained. It means that during the post NBLP period, while the Net Working Capital base improved and the dependence on banks declined, still the improvement in Net Working Capital base is not adequate to meet the decline in bank borrowings. Also, the size of growth of GWC in relation to sales, expressed in terms of a multiplier, confirms that the gross working capital, employed relative to sales, has not declined at all. This situation calls us to probe further into the matter and find out that source on which the dependency has largely shifted during the period. For the purpose, we have developed the following identity equation to explain the situation.

$$GWC = NWC + BB + TC$$

Where,

NWC = share of net working capital in gross working capital.

BB = share of bank borrowing in gross working capital.

TC = share of trade credit in gross working capital.

The above equation is capable of explaining the changes in the structure of GWC.

The following table depicts the structural changes in GWC that have taken place during the period.

Table - 6.9 **Structural changes in GWC**

Year	A Aggregate level			B Sample level		
	NWC/GWC	BB/GWC	TC/GWC	NWC/GWC	BB/GWC	TC/GWC
	1	2	3	4	5	6
1977-78	13.00	26.91	60.09			
1983-84	13.10	20.62	66.28	22.48	32.39	45.13
1984-85	14.01	20.35	65.64	23.33	31.89	44.78
1985-86	14.43	19.98	65.59	22.82	31.94	45.25
1986-87	15.37	19.97	64.66	21.07	30.09	48.84
1987-88	14.95	20.50	64.55	22.60	31.24	46.16

Source- A. Financial performance of Companies, ICICI portfolio 1987-88. The Industrial Credit & Investment Corporation of India Ltd. Bombay, June 1989.

B. Annual Reports of the sample industries for the concerned years.

Explanations

1. NWC = Net working capital
2. GWC = Gross working capital
3. BB = Bank borrowings of working capital
4. TC = Trade credit.

Findings

It is interesting to observe in the above analysis that there has been a decline of 6.41 per cent in the dependence on banks during the period. To meet this, there should have been an equal increase in the share of net working capital to GWC. But the increase in NWC has been hardly of 1.95 per cent. The gap in the decline of BB and in the increase in NWC is of the order of 4.64 per cent. It is interesting to note that the industries have shifted the burden of meeting their working capital needs to the market instead of improving their efficiency in working capital management by increasing the working capital turnover. Thus, in the final conclusion it may be observed that the working capital management efficiency has not improved during the post NBLS priod and the NBLS has only helped in shifting of dependency from banks to the markets, resulting into a change in the structure of GWC.

SH_4 : Aggregate Level

In this analysis , the impact of NBLS has been examined in terms of changes in the relationship between current assets and current liabilities. It may be observed here that prior to the implementation of the NBLS, the net working capital in a large number of industrial units was negative. It was responsible for the poor state of liquidity in industry and was also a threat to the solvency of the concerned

industrial units. An important object of reforming the bank lending system was to ensure that this weakness in the financial structure may be removed and industries make up the net working capital gap to the desired level, so that their current ratio is never less than 1.33 : 1.

In this analysis our basic assumption is liquidity as a function of net working capital, and as the increase in net working capital has been marginal during the period of our study, the health of the industries in terms of their liquidity and the working capital management efficiency, in terms of their ability to meet their current commitments has not improved under the NBLS, and the NBLS has more or less failed in this regard. This impression, for emperical verification is hypothesised as below :

Hypothesis

SH_4 "The working capital management efficiency of industries, in terms of their ability to safely meet their current obligations has not improved to the desired level".

To test this hypothesis it is proposed to analyse changes in the current ratio of firms of the selected industries, at the aggregate level, and across the different categories of the industries. The following table explains the current ratio of aggregate level.

Table - 6.10 Current Ratio : Aggregate Level

Year	CA (Rs. Crs)	CA_I (%)		CL (Rs. Crs)	CL_I (%)		CR
	1	2	3	4	5	6	7
1977-78	4678.20	100.00	-	4043.96	100.00	-	1.15
1983-84	11890.43	255.81	100.00	10333.14	255.53	100.00	1.15
1984-85	13394.58	288.17	112.65	11517.63	284.82	111.46	1.16
1985-86	15956.91	343.30	134.20	13654.05	337.65	132.14	1.17
1986-87	18227.11	392.14	153.29	15425.55	381.45	149.28	1.18
1987-88	19436.90	418.16	163.47	16531.14	408.79	159.98	1.18

Source- Financial performance of Companies, ICICI portfolio 1987-88. The Industrial Credit & Investment Corporation of India Ltd., Bombay, June 1989.

Explanations :

1. CA = Current assets.
   CA_I = Index of current assets
2. CL = Current liabilities.
   CL_I = Index of current liabilities
3. CR = CA/ CL

Findings

The above table shows that there is a very marginal increase in current ratio for the period of 11 years. It has improved by 0.03 per cent only. This improved ratio also is not meeting the norms stipulated by the Tandon Group. So our hypothesis

that " The working capital management efficiency of industries in terms of their ability to safely meet their current obligations has not improved to the desired level" is accepted at the aggregate level.

To reassure ourselves in respect of the finding, at the aggregate level, we have also made an attempt to test the same hypothesis through the relevant data drawn from the sample industrial units in Gujarat. The analysis required to test the hypothesis is given in the table below.

Table - 6.11 Current Ratio : Sample Industries

Year	CA (Rs. lacs)	CA_I (%)	CL (Rs. lacs)	CL_I (%)	CR
	1	2	3	4	5
1983-84	126461.81	100.00	98033.30	100.00	1.29
1984-85	136759.41	108.14	104858.79	106.96	1.30
1985-86	157614.60	124.63	121650.68	124.09	1.30
1986-87	238504.21	188.60	188243.06	192.02	1.27
1987-88	257580.30	203.68	199364.75	203.36	1.29

Source- Annual reports of the sample industries.

Explanations-

Abbreviations in this table are as per the explanation given below table no.6.10

It may be observed that during the period of the study, the current ratio has more or less remained at the same level. The NBLS could not improve the situation. However, a comparison of sample data with aggregate level data indicates a superior liquidity position in Gujarat State. Still a comparison of even this superior liquidity position with the desired minimum, reconfirms our hypothesis that the NBLS has not been able to bring about the desired change.

Thus, an overall review of the findings, gives a very complex impression. The hypothesis SH_2 related to dependency on banks and the hypothesis SH_3 related to the net working capital are sustained. On the basis of the analysed data, the SH_4 related to the liquidity position of firms and the SH_1 examining the position of working capital are getting rejected, although, in a direct analysis of the main hypothesis H_2 we find an improvement in the working capital management efficiency. This dilematic situation compells up to reexamine the SH_2 to find out the relative influence of each components of $T\text{-}D_I$ model and the liquidity ratio on the overall working capital management efficiency. For the purpose a working capital management efficiency model called WCME-E model has been developed and used.

WCME-E Model

Working capital management efficiency may be analysed with the help of a statistical model in terms of the four independent

variables spelt out in the foregoing analysis in the general form of the function. This can be denoted as -

$$WCME\text{-}E = f\ (T_k,\ D_k\ ,\ M_k\ ,\ L_I)$$

Where,

WCME-E	=	Working Capital Management Efficiency
T_k	=	Turnover multiplier
D_k	=	Dependency multiplier
M_k	=	Matching contribution multiplier
L_I	=	Liquidity ratio expressed as dummy variable with reference to norm prescribed by the Tandon Group

The first three independent variables are in the form of multiplier and the fourth one is in the form of a dummy variable. The specific form commensurate with the nature of this variable is obviously an exponential one, i.e.,

$$WCME\text{-}E = a,\ T_k \cdot d_k \cdot M_k \cdot L_I$$

Where,

a	=	intercept of the function
T_k	=	turnover multiplier elasticity of WCME
D_k	=	dependency multiplier elasticity
M_k	=	matching contribution multiplier elasticity
L_I	=	range of the dummy variable i.e., liquidity ratio in relative terms.

The number of observations on each of the variables estimation of exponential parameters is not feasible if we use this form of the function. For the sake of estimation the same is converted into linear form using the double log form.

$$\log \text{WCME-E} = a. + \log T_k + \log D_k + \log M_k + L_I$$

The estimation procedure suitable for this type of specification is the maximum likelihood method. For this method, using of the probability measure, in relative terms, for each of the first three variables, is inevitable. The variable being qualitative in nature calls for using of mean deviation measure, instead of probability measure. The estimation is done for aggregate level as well as sample level. For the first sum of estimation only first three variables are included and for the second sum a dummy variable is also included. According to the New Bank Lending System, the minimum level of net working capital in current assets should be 25 per cent, atleast after such a long period of the working of the NBLS. However, the actual situation appears to be disappointing as revealed by the following table.

Table - 6.12 (A) Share of NWC in Total Current Assets : Aggregate Level

Year	NWC (Rs.Crs)	TWC (Rs.Crs)	NWC/TWC
	1	2	3
1977-78	604.24	4648.20	13.0
1983-84	1557.29	11890.43	13.1
1984-85	1876.95	13394.58	14.0
1985-86	2302.86	15956.91	14.4
1986-87	2801.56	18227.11	15.4
1987-88	2905.76	19436.90	14.9

Table - 6.12 (B) Share of NWC in Total Current Assets : Sample Level

Year	NWC (Rs. lacs)	TCA (Rs. lacs)	NWC/ CA (%)
	1	2	3
1983-84	28434.51	126461.81	22.5
1984.85	31900.94	136759.41	23.3
1985-86	35963.92	157614.60	22.8
1986-87	51561.15	238504.21	21.6
1987-88	59215.55	257586.30	22.9

Source- (A) Financial performance of companies, ICICI portfolio 1987-88, The Industrial Credit and Investment Corporation of India Ltd. Bombay -June 1989.

(B) Annual report of the sample industries.

Explanations

1. NWC = Net working capital
2. TWC = Total working capital
3. TCA = Total current assets.

This also has been connected to the probability form with the help of the relative frequency distribution technique.

Results of Estimation : Aggregate Level

$$WCME - E = 0.2851 + 0.36\ T_k + 0.21\ D_k + 0.29\ M_k \quad ...(1)$$

$$Ra_1^2 = 0.67$$

In this estimation WCME -E is accounted for by the three variable to the extent of 67 per cent. The contributory rate of T_k is 36 per cent that D_k is 21 per cent and that of M_k is 29 per cent.

When we include liquidity ratio as an explanatory variable in the aforesaid form, the estimated function is as under :

$$WCME - E = 3.196+0.25\ T_k +0.017\ D_k +0.25\ M_k+0.003\ L_I \quad ...(2)$$

$$Ra_2^2 = 0.78$$

Thus, the explanatory value of the model is enhanced due to the inclusion of liquidity ratio. The contributory role of each variable is changed. Turnover multiplier accounts for 25 per cent, dependency multiplier accounts for 17 per cent and matching contribution multiplier also accounts for 25 per cent of variations in WCME. The role of liquidity ratio is very marginal, i.e. .3%

Results of Estimation : Sample Level

Using the sample data, initially the estimation was undertaken by incorporating the first three variables only. The estimated

function is as under :

$$WCME - E = 2.2957 + 0.30\ T_k + 0.23\ D_k + 0.19\ M_k \quad ...(3)$$

$$R^2_{Si} = 0.69$$

Thus, at the sample level, the three variables for 69 per cent of the variations in the working capital management efficiency. The contributory role of each is 30 per cent, 23 per cent and 19 per cent, respectively.

If the liquidity ratio is also included, the following estimation is obtained.

$$WCME - E = 5.6975 + 0.28\ T_k + 0.35\ D_k + 0.18\ M_k + 0.017\ L_i \quad ...(4)$$

$$R^2_{S2} = 0.78$$

It is evident that liquidity ratio when introduced as explanatory variable increases the statistical significance of the model. Seventy eight per cent of the variations in WCME - E are explained by the said four variables with the role of each variable changing to 28 per cent, 31 per cent, 18 per cent and 1.7 per cent respectively.

Findings

The exercise established that

(1) The explanatory value of the said variables is quite

satisfactory and hence all the four may be accepted as control variables.

(2) Amongst all the four identified variables, the most important control variable is 'turnover multiplier'.

(3) 'Liquidity Ratio' taken as a dummy variable, though increased the explanatory value of the model, its own explanatory power relatively has been very low, as a control variable it is weak and also ranks last.

The above analysis enables us to understand the relative share of each identified variables, in the working capital management efficiency and the analysis of T-D_I model confirms that the overall WCME has improved in Indian industries. However, a structural analysis of the working capital revealed that there has been a shift in the dependency from banks to the market. This situation leads us to find out, if the Indian industry, over a period of fourteen years could improve its WCME and achieve the requirements stipulated under the second method of finance ? To ascertain this we have calculated the amount of permissible bank finance (PBF) under the second method and compare it with amount of actual borrowings from the bank. This analysis is given in the following table.

Table - 6.13 **Bank Borrowing and Permissible Bank Finance : Aggregate Level**

Year	ABB (Rs.Crs)	PBF under MethodII (Rs.Crs)	Excess B.B. (Rs.Crs)	Excess BB (%)
	1	2	3	4
1977-78	1250.69	692.88	557.81	81.00
1983-84	2451.82	1036.50	1415.32	137.00
1984-85	2725.62	1253.92	1471.70	117.00
1985-86	3187.46	1501.09	1686.37	112.00
1986-87	3640.69	1885.47	1755.22	93.00
1987-88	3984.60	2031.14	1953.46	96.00

Source- Financial performance of companies, ICICI portfolio 1987-88. The Industrial Credit and Investment Corporation of India Ltd. Bombay -June 1989.

Explanations

1. ABB = Actual bank borrowing
2. PBF = Permissible bank finance

The table reveals a very interesting situation. In absolute terms right from the year 1977-78 to the year 1987-88 there has been a continuous increase in the amount of excess borrowings. In terms of percentage the excess borrowings have been in the range

of 81 per cent to 137 per cent. This evidence leads us to conclude that right from the very beginning of the NBLS to 1987-88 the industries have never been able to meet the stipulated conditions of finance under the NBLS. When the system was introduced it was expected that within a reasonable period of time, say, 5 to 7 years, there will be improvement in the WCME in industry and in most of the cases accepting the case of sick units, the banks will be lending to industry under the second method only. Thus it can be reiterated that the working capital management efficiency has not improved satisfactorily under the NBLS.

After examining the change in the working capital management efficiency in industries under the new banking lending system, it appears appropriate to ascertain its relationship with change in the profitability of the concerned firms. It has been accepted by many researchers and analysists that profitability is a function of working capital management efficiency. Thus a change in the profitability is taken as an indicator of change in the working capital management efficiency.

$$p = f(WCME, V)$$

where,

p = profitability

WCME = working capital management efficiency

V = other omitted variables

And $\lim \Delta WCME \rightarrow \Delta P$

In our analysis of working capital management efficiency under the new bank lending system, hence it becomes inevitable to examine the aspects of profitability in the context of WCME the following table depicts profitability of industrial units at the aggregate level.

Table - 6.14 Earning Power : Aggregate Level

Year	GP (Rs.Crs)	GP_I		TA (Rs.Crs)	TA_I		GP/TA (%)
	1	2	3	4	5	6	7
1977-78	845.41	-	100.00	7735.74	-	100.00	10.9
1983-84	2153.60	100.00	254.74	20977.92	100.00	271.18	10.3
1984-85	2576.41	119.60	304.75	23759.16	113.30	307.13	10.8
1985-86	3144.88	146.00	371.99	28069.86	133.80	362.86	11.2
1986-87	3265.41	151.60	386.25	32655.70	155.70	422.14	10.6
1987-88	3471.78	161.30	410.66	36053.02	171.90	466.06	9.6

Source- Financial performance of companies, ICICI portfolio 1987-88. The Industrial Credit and Investment Corporation of India Ltd. Bombay June 1989.

Explanations- Total assets = Current assets +fixed assets

TA = CA + FA

1. GP = Gross profit
2. GP_I = Index of gross profit
3. TA = Total assets
4. TA_I = Index of total assets

The table reveals a 310 per cent increase in the profits, alongwith a growth of 366 per cent in the total assets. These profits have not increased proportionately with increase in total assets, resulting into a decline in ROA (Return of Assets) from 10.9 per cent in 1977-78 to 9.6 per cent in 1987-88. Taking profitability as an index of working capital management efficiency, we can infer that there has been a decline in working capital management efficiency under the new bank lending system. The ROA measure of profitability, used in the above analysis, does not explain the factor responsbile for this decline. We have therefore developed a mathematic model for profitability analysis which has explanatory capability. In this model, we have related profit with working capital and have also included the turnover variable as given below.

$$PI = \frac{P}{S} * \frac{S}{WC}$$

Where,

PI = Profit Index

P = Profit

S = sales

WC = working capital

Table - 6.15 Profitability : Aggregate Level

Year	GP (Rs.Crs)	GP_I		S (Rs.Crs)	S_I		GP/S (%)
	1	2	3	4	5	6	7
1977-78	845.41	100.00	-	8589.41	100.00	-	9.8
1983-84	2153.60	254.74	100.00	21708.60	252.74	100.00	9.9
1984-85	2576.41	304.75	119.63	25571.66	297.71	117.80	10.0
1985-86	3144.88	371.99	146.02	29432.64	342.66	135.58	10.6
1986-87	3265.41	386.25	151.67	32190.61	374.77	148.29	10.1
1987-88	3471.78	410.66	161.21	35811.19	416.92	164.96	9.6

Source - Financial performance of companies, ICICI portfolio 1987-88, The Industrial Credit and Investment Corporation of India Ltd. Bombay- June 1989.

Explanations-

1. GP = Gross profit
2. GP_I = Index of gross profit
3. S = Sales
4. S_I = Index of sales

Higher level of profitability may be due to profit margin or working capital turnover. It is necessary to find out the relative share of these two in generating profitability. For this purpose, index of profitability can be used. It is defined as under :

$$PI = \frac{P}{S} * \frac{S}{WC}$$

This identity by itself does not reveal the relative shares of the two variables in the changes in profitability. It calls for an application of technique of partial derivatives which is as under :

$$Y = R.B$$

Where,

$Y = P_I =$ Profit index

$R = \frac{P}{S} =$ profit margin in sales

$B = \frac{S}{WC} =$ working capital turnover

To calculate the partial derivates, the data used are given in the Table - 6.15.

Taking the partial derivative on the basis of the product rule of differentiation, we get,

$$\frac{dy}{dx} = R. \frac{dB}{dx} + B. \frac{dR}{dx}$$

Using the data in the aforesaid tables on the respective variables, the result of derivation obtained is as under :

$$\frac{dy}{dX} = 0.63 \dot{R} + 0.37B$$

Hence, the contribution, of profit margin in sales in profit index is very significance and that of working capital turnover is relatively low. It leads us to conclude that in terms of profitability, too, the working capital management efficiency has not significantly improved.

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