CHAPTER SIX

Data Analysis and Observations

This section presents the empirical results of the research objectives. At the outset, it displays the descriptive analysis i.e.,(mean, standard deviation, minimum, maximum, and graphs) of the selected variables related to working capital management efficiency in section 6.1. In section 6.2, the correlation between dependent variable and explanatory variables have been assessed by Pearson correlation matrix. The result of the analysis on the impact of explanatory variables on the profitability is explained by linear regression in section 6.3. The findings of descriptive statistics of the efficiency ratios are elaborated in section 6.4 and in the last section i.e. 6.5 discusses the findings on the association between efficiency ratios with the dependent variable.

6.1 Descriptive Analysis

Descriptive statistics of the relevant variables for the selected iron and steel companies of West Bengal is discussed in this section. More clearly, mean, standard deviation, minimum and maximum of the variables ACP, ICP, APP, and CCC have been reported in the **Tables 6.1, 6.5, 6.9, and 6.13** respectively. In addition, test results of the equality of mean of the variables ACP, ICP, APP, and CCC among the groups have been disclosed in the **Tables 6.2, 6.6, 6.10, and 6.14** respectively. Post-hoc test i.e., multiple comparison test of the mean differences of the above variables is exhibited in the **Tables 6.3, 6.7, 6.11, and 6.15**. In **charts 6.4, 6.8, 6.12, and 6.16,** the graphical presentation of the selected variables is displayed.

Table 6.1

Accounts Conversion Period (in days) of Selected Iron and Steel Companies in West Bengal

Years	DSP	ASP	IISCO	Average	Standard Deviation
2001-02	4.71	41.38	37.09	27.72	20.04
2002-03	5.69	27.86	32.90	22.15	14.47
2003-04	4.98	33.81	27.21	22.00	15.10
2004-05	3.90	51.33	13.09	22.77	25.15
2005-06	0.98	40.45	17.29	19.57	19.83
2006-07	1.03	35.35	2.36	12.91	19.44
2007-08	1.30	39.28	0.85	13.81	22.05
2008-09	2.29	29.29	0.19	10.59	16.22
2009-10	2.37	19.47	0.19	7.34	10.55
2010-11	0.77	13.50	0.13	4.80	7.54
2011-12	1.99	29.63	0.07	10.56	16.54
2012-13	1.98	78.85	0.12	26.98	44.92
Average	2.67	36.68	10.96	16.77	17.73
Std.Dev.	1.71	16.68	14.25		
Max.	5.70	78.85	37.09		
Min.	.77	13.50	.07		

Sources: Researcher's computation from annual reports.

Inference

Table 6.1discloses the values of accounts conversion period (in days) during the study period,for the selected iron and steel companies in west bengal. ACP (in days) of DSP showed intermittent and fluctuating trend during the study period. It varied between 5.70 or approx. 06 days in 2002-03 and 01 day in 2010-11. Average accounts conversion period of DSP during the period was 2.67 or approx. 03 days. The deviation from the mean of ACP in days was 1.71 or 02 days approximately.

Accounts conversion period in days of ASP uncovered progressive drift from year 2001-02 to 2007-08. From 2007-08 to 2008-12, it inclined to fluctuating flow. It ranged between 79 days in 2012-13 and 13 days in 2010-11. Mean of ACP in days of ASP during the selected study period was 36.68 days. Its deviation from the average was 16.68 or 17 days approx.

Days in Accounts conversion period of IISCO unfold slashed trend throughout the study period. ACP in days varies between 37.09 days in 2001-02 and .07 or 01 day in 2011-12. An average of ACP was 10.96 or 11 days. It deviated from the mean by 14 days.

From the table 6.1, it is found that the sample average of accounts conversion period is 16.77 days; based upon sample average, the data in table 6.1 manifest that two of the three selected firms i.e., DSP and IISCO held their debtors collection period for lower than the yearly sample average.Specifically, IISCO took less time to collect accounts receivable from debtors - lower than average collection period viz. 37 days, 33 days, and 27days in the years 2001-02 to 2003-04 respectively. Whereas ASP took hold of its accounts conversion period above the yearly sample average almost for the entire study period 2001-02 to 2012-13 excepting in 2010-11 when they could keep it at 13 days which is below the average holding period. Interesting about DSP, the firm maintained its credit collection period in less than sample average holding period throughout the study period 2001-02 to 2012-13 (05 days, 06 days, 05 days, 04days, 01day, 01day, 01day, 02 days ,02 days, 01day, 02 days, and 02 days) respectively. The firm DSP was competent enough in respect of credit collection policy. On the yearly sample average basis, we could say that the firm DSP was efficient by holding the debtors by lesser number of days than that of aggregate accounts holding period of 16.77 or 17 days approximately.

Keeping IA (Industrial Average) of accounts collection period of 27.36 or approximately 27 days as bench mark, two selected firms namely, DSP and IISCO under study are having lesser number of days in collecting their dues and which are satisfactory since its averages are 2.67 days, 10.96 days for DSP and IISCO respectively, being specifically very lower than grand industry average (27 days). It means that these two firms have good practice of collecting their outstanding receivables from customers by allowing lesser number of days from customers

whereas average of the firm ASP is to some extent higher and unsatisfactory since its average is 36.68 days which is higher than the grand industry average.

Summing up the discussion on the efficient management of accounts collection policy from debtors, the firms DSP and IISCO are efficient and competent enough whereas ASP do not have good practice of collecting dues from debtors at faster rate.

Overall, mean of ACP of selected iron and steel companies under study is to some extent lower and acceptable as its average is 16.77 days which is lower than industrial average (27 days).

Null Hypothesis: There is no significant difference in ACP of selected iron and steel companies.

Alternative Hypothesis: There is significant difference in ACP of selected iron and steel firms.

Table 6.2

Robust Tests of Equality of Means

ACP

	Statistic(a)	df1	df2	Sig.
Welch	25.394	2	15.027	.000
Brown-Forsythe	23.384	2	21.738	.000

a Asymptotically F distributed.

The test result as shown in Table 6.2 reveals that, F ratio [F (2, 15.027)] equals to 25.394, significance p-value equals to .000 is statistically significant which shows that there is significant difference in accounts conversion period in days of the selected companies. Thus, null hypothesis is rejected and alternative hypothesis is accepted.

Table 6.3

Multiple Comparisons

Dependent Variable: ACP (Games-Howell)

(I) COMPANY	(J) COMPANY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
DSP	ASP	-34.01744(*)	4.84129	.000	-47.0531	-20.9818
	IISCO	-8.29230	4.14374	.157	-19.4375	2.8528
ASP	DSP	34.01744(*)	4.84129	.000	20.9818	47.0531
	IISCO	25.72513(*)	6.33389	.002	9.7864	41.6638
IISCO	DSP	8.29230	4.14374	.157	-2.8528	19.4375
	ASP	-25.72513(*)	6.33389	.002	-41.6638	-9.7864

* The mean difference is significant at the .05 level.

Table 6.3 presents multiple comparisons using Games-Howell test pointing out that there was significant difference between ASP and DSP; p value is .000; the company ASP took an average of 34 days more in collecting its accounts receivable than DSP. There was also statistically significant difference between ASP and IISCO .p-value is .002, mean accounts conversion or collection period of the unit ASP on average is 25.72 days higher or more than the firm IISCO. However, no significant mean difference is found between the firms DSP and IISCO as p (equals to .157) is greater than .05 level.Taken together, the results indicate that the firm DSP (mean 2.67 and standard deviation 1.71) was efficient in collecting its accounts receivable in lesser number of days in comparison to the firms ASP and IISCO whose mean scores and standard deviations are: (36.68 &16.68) and (10.96 &14.25) respectively.

Chart 6.4

Graphical Representation

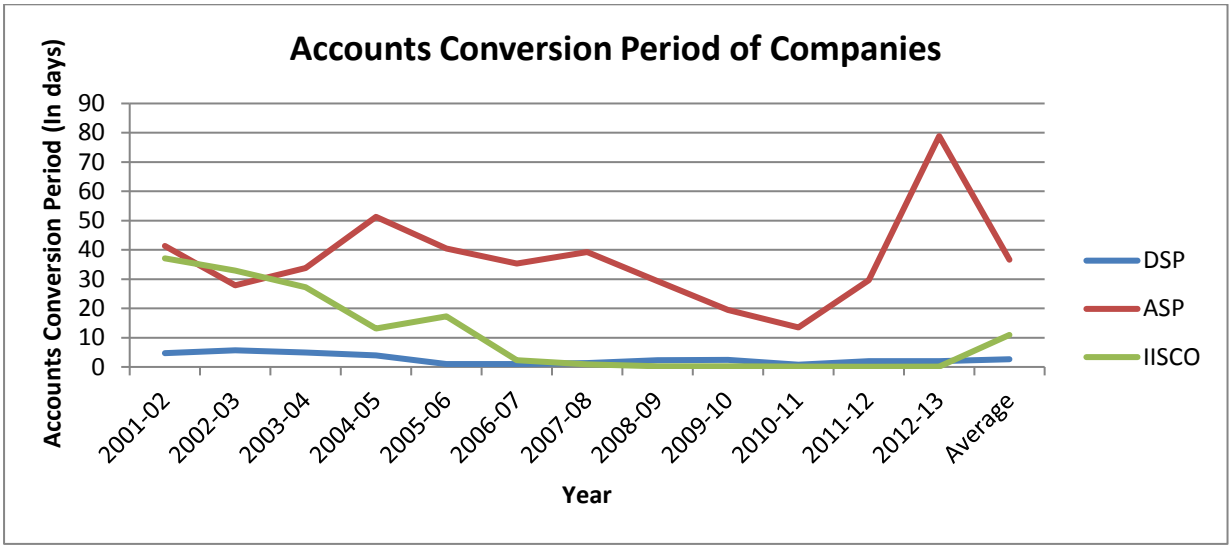


Table 6.5

Inventory Conversion Period (in Days) of Selected Iron & Steel Companies in West Bengal

Years	DSP	ASP	IISCO	Average	Standard Deviation
2001-02	81.48	164.60	56.36	100.81	56.65
2002-03	77.58	138.41	42.87	86.28	48.36
2003-04	65.52	116.43	48.65	76.86	35.28
2004-05	69.39	156.37	56.22	93.99	54.41
2005-06	74.19	173.68	83.21	110.36	55.02
2006-07	87.06	243.00	82.97	137.67	91.23
2007-08	78.56	187.24	76.01	113.93	63.49
2008-09	86.42	154.26	65.33	102.00	46.46
2009-10	118.15	124.30	50.96	97.80	40.68
2010-11	56.38	104.05	42.66	67.69	32.22
2011-12	55.65	119.38	38.44	71.15	42.63
2012-13	62.59	167.06	66.31	98.65	59.27
Average	76.08	154.07	59.17	96.44	50.62
Std.Dev.	17.00	38.05	15.60		
Max.	118.15	243.01	83.22		
Min.	55.66	104.06	38.44		

Sources: Researcher's computation from annual reports.

Inference

Table 6.5 reports inventory conversion periods (ICP in days) of selected iron and steel companies. ICPs in days of DSP display a fluctuating trend during the study period. It ranged between the highest of 118.15 days in 2009-10 and lowest of 55.66 days in 2011-12. Mean of ICP in days of DSP was 76 days and its normal deviation from the average was 17 days.

Average inventory holding period (in days) of ASP was 154 days; it showed variation in ICP during the selected study period. From year 2001-02 to 2003-04 and 2007-08 to 2011-12, holding period of stock declines. It takes upward movement from 2004-05 to 2007-08. Its dimensions ranged from highest of 243 days in 2006-07 and lowest of 104 days in 2010-11. Standard deviation in case of the firm ASP was 38 days.

Inventory holding period (in days) of IISCO reveals a low fluctuation movement during the study period. It varied between the highest of 83 days in 2005-06 and the lowest of 38 days in 2011-12. Average inventory conversion period of the firm was 59 days and it deviated from the mean by 15 days.

From table 6.5, we find that sample average of inventory conversion period was 96 days. On the base of this, it appears that the firm ASP held its inventory in stores for higher number of days than the sample average number of days, particularly,164 days, 138 days, 116 days,156 days, 173 days, 243 days,187 days, 154 days, 124 days,104 days,119 days,167 days from the year 2001-02 to 2012-13 respectively. Other two firms i.e., DSP and IISCO retained their inventories for lesser number of days than yearly sample average of 96 days during the study period. However, inventory conversion period of the firm DSP was comparatively lesser than the firm IISCO. In respect of holding inventories, both the selected firms DSP and IISCO were efficient in inventory management in terms of inventory conversion period by holding inventory for lesser number of days- means these firms grasped less number of days in a year to convert their stock.

Comparing the mean of inventory conversion period of the selected units with the industrial average of 87 days, taking it as yardstick, it is found that ASP held its stock for long period of time as its average is 154.07 days, being higher than yardstick average of 87 days. Whereas the other two companies, DSP and IISCO, are efficient in converting their stock into sale. Average of inventory holding period of DSP and IISCO are 76.08 and 59.17 respectively,which are very lower than benchmark industrial average of 87 days.

Overall, average of ICP of particular Indian and iron steel companies under the study period is more or higher and unsatisfactory because their mean is 96.44 days, which is particularly higher than grand industry average of 87 days, unambiguously, in use as bench mark.

Hypothesis: There is no significant difference in ICP of selected iron and steel companies.

Alternative Hypothesis: There is significant difference in ICP of the selected iron and steel units in the study area.

Table 6.6

Robust Tests of Equality of Means

ICP

	Statistic(a)	df1	df2	Sig.
Welch	31.053	2	20.514	.000
Brown-Forsythe	46.555	2	19.271	.000

a Asymptotically F distributed.

Table 6.6 reports that F ratio; F (2, 20.51) equals to 31.053 and p-value equals to .000 is statistically significant which shows that there is significant difference in inventory conversion period of the selected units or companies. Hence, alternative hypothesis is accepted and null hypothesis is rejected. Significant difference in ICP in days of the companies could further lead to pair wise comparisons of the companies with each other.

Table 6.7
Multiple Comparisons
Dependent Variable: ICP (Games-Howell)

(I) COMPANY	(J)COMPANY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
DSP	ASP	-77.98517(*)	12.03370	.000	-109.1932	-46.7772
	IISCO	16.91437(*)	6.66441	.048	.1642	33.6645
ASP	DSP	77.98517(*)	12.03370	.000	46.7772	109.1932
	IISCO	94.89954(*)	11.87448	.000	63.9658	125.8333
IISCO	DSP	-16.91437(*)	6.66441	.048	-33.6645	-.1642
	ASP	-94.89954(*)	11.87448	.000	-125.8333	-63.9658

* The mean difference is significant at the .05 level.

Source: SPSS 15.0 Analysis

Multiple comparisons of companies with other units on mean difference of inventory conversion period has been presented in the above table 6.7. The mean differences between units DSP and ASP, also between units DSP and IISCO are statistically significant at 5 percent level where p-values are .000 and .048 respectively, both of which are less than the value 0.05. It is also found that mean difference between units ASP and IISCO is also statistically significant as p-value is .000 which is less than the value 0.05. Overall, the results suggest that all the selected iron and steel firms have significant mean differences between one another. The firm ASP had retained its inventories for higher number of days i.e. 77.98 than the unit DSP. Also, the firm DSP kept the stock for more number of 16.91 days than the IISCO. The result concludes that the firm IISCO was more efficient in inventory management in holding the inventory conversion period for lesser number of days in comparisons with the two other selected units.

Chart 6.8

Graphical Representation

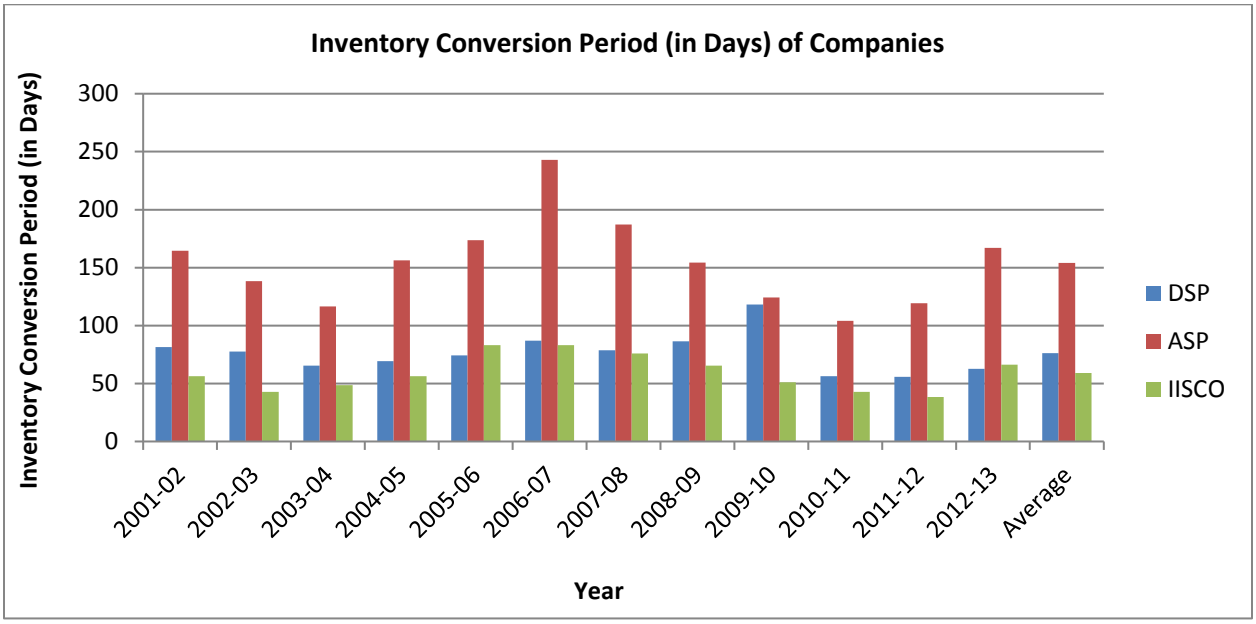


Table 6.9

Accounts Payable Period (in Days) of Selected Iron & Steel Companies in West Bengal

Years	DSP	ASP	IISCO	Average	Standard Deviation
2001-02	11.48	136.39	217.65	121.84	103.85
2002-03	7.47	86.08	278.18	123.91	139.26
2003-04	4.36	62.73	256.15	107.74	131.79
2004-05	39.23	48.56	93.27	60.35	28.88
2005-06	28.63	50.78	84.77	54.72	28.27
2006-07	36.44	57.62	65.16	53.07	14.89
2007-08	31.03	37.10	80.58	49.57	27.02
2008-09	21.97	36.17	62.39	40.17	20.50
2009-10	56.68	52.98	156.25	88.63	58.58
2010-11	40.17	37.67	62.48	46.77	13.65
2011-12	17.38	16.63	27.75	20.58	6.21
2012-13	20.99	17.52	25.69	21.40	4.10
Average	26.32	53.35	117.53	65.73	46.84
Std.Dev.	15.35	32.39	87.84		
Max.	56.68	136.39	278.19		
Min.	4.37	16.63	25.70		

Sources: Researcher's computation from annual reports.

Table 6.9 points out accounts payable period of the selected companies in the state of west bengal. APP (accounts payable period; in days) of DSP showed erratic movement during the research period. Average APP of the firm DSP was 26 days and its deviation from mean was 15 days. It varied between the highest of 57 days approximately in the year 2009-10 and the lowest 04 days in the year 2003-04.

Average APP (in days) of ASP was 53 days and its deviation from the yearly mean was 32 days. Table 6.9 demonstrates downfall trend of accounts payable period of ASP during the selected study period. It maintained the highest number of days of 136 in year 2001-02 and the minimum of 16.63 or 17 days approximately in 2011-12.

Firm IISCO's accounts payable period showed downturn from 2002-03 to 2006-07 and again from 2010-11 to 2012-13 with average of 117 days of APP. It went high to 278 days in 2002-03 and goes down to the lowest of 26 days approximately in 2012-13 with standard deviation of 88 days.

Data in the table 6.9 imply that the firm IISCO held accounts payable period for higher number of days than the sample average accounts payable period during the entire study period. The firm took longer time to pay off its accounts payable outstanding. Whereas the other two selected firms i.e., DSP and ASP took lesser number of days in paying off its outstanding to suppliers outstanding than the average accounts payable period of 66 days approximately.

Particularly, DSP paid off accounts outstanding to suppliers at a faster rate than the firm ASP during the study period. The firm DSP was able to clear its outstanding payables to suppliers in 11 days, 07 days, 04 days, 39 days, 29 days, 36 days, 31days, 22 days, 57 days, 40 days, 17 days, and 21days respectively as found for the study period of 2001-02 to 2012-13.

Keeping IA (Industrial Average) of accounts payable period of 90.35 or approximately 90 days as bench mark, the firm IISCO took higher number of days (117.53) to pay its outstanding to suppliers; cause of such delay in paying may be that the firm had been taking advantage of the credit days allowed by its suppliers and was unable to realize cash from sale of its stock within the stipulated time period. Other two selected public steel companies (DSP and ASP) were efficient in paying their outstanding to creditors, whose mean APP of 26.32 and 53.35 days respectively were very much lesser than the industrial average of 90 days. Payment policy of these two companies, DSP and ASP, was satisfactory in comparison with the firm IISCO.

Overall, sample average of accounts payable period under the study period is 65.73 days when compared with the industrial benchmark of 90 days;it is found to be lower and satisfactory since

its average of 65.73 days, in particular, is lesser than the grand industry average considered as benchmark.

Null Hypothesis: There is no significant difference in APP of selected iron and steel companies.

Alternative Hypothesis: There is significant difference in APP of selected iron and steel firms in the study area.

Table 6.10
Robust Tests of Equality of Means
APP

	Statistic(a)	df1	df2	Sig.
Welch	8.724	2	17.595	.002
Brown-Forsythe	8.777	2	14.684	.003

a Asymptotically F distributed.

Table 6.10 displays the robust test equality of means of Welch and Brown-Forsythe, which signify that the F ratio, F (2, 17.595) equals to 8.724 and p-value equals to .002 is statistically significant thereby entailing to rejection of null hypothesis and acceptance of alternative hypothesis. It means there is statistically significant difference in accounts payable period (in days) of the selected companies. The presence of significant difference in APP (in days) among the companies move ahead for post hoc comparisons.

Table 6.11
Multiple Comparisons
Dependent Variable: APP (Games-Howell)

(I) COMPANY	(J) COMPANY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
DSP	ASP	-27.03315(*)	10.34825	.047	-53.7841	-.2822
	IISCO	-91.20905(*)	25.74322	.011	-160.1493	-22.2688
ASP	DSP	27.03315(*)	10.34825	.047	.2822	53.7841
	IISCO	-64.17590	27.02738	.078	-134.9508	6.5990
IISCO	DSP	91.20905(*)	25.74322	.011	22.2688	160.1493
	ASP	64.17590	27.02738	.078	-6.5990	134.9508

* The mean difference is significant at the .05 level.

Post hoc comparisons using Games-Howell test indicate that there is statistically significant difference between companies DSP and ASP and between DSP and IISCO. It denotes that (from Table 6.11) mean of accounts payable period for IISCO (mean equals to 117.53 days and standard deviation equals to 87.84) was significantly different from the other two companies- for DSP: mean 26.32 days, standard deviation 15.35 and for ASP: mean 53.35 days, standard deviation 32.39. Again, there were statistically significant differences in mean scores between DSP (mean 26.32 days, standard deviation 15.35) and ASP (mean 53.35 days, standard deviation 32.39). The results suggest that among the selected iron and steel companies, IISCO held its accounts payable period for higher number of days in the study period in comparisons to other two units whereas DSP took lesser number of days (26 days) in paying off its accounts payable, followed by the unit ASP (53 days).

Chart 6.12

Graphical Representation

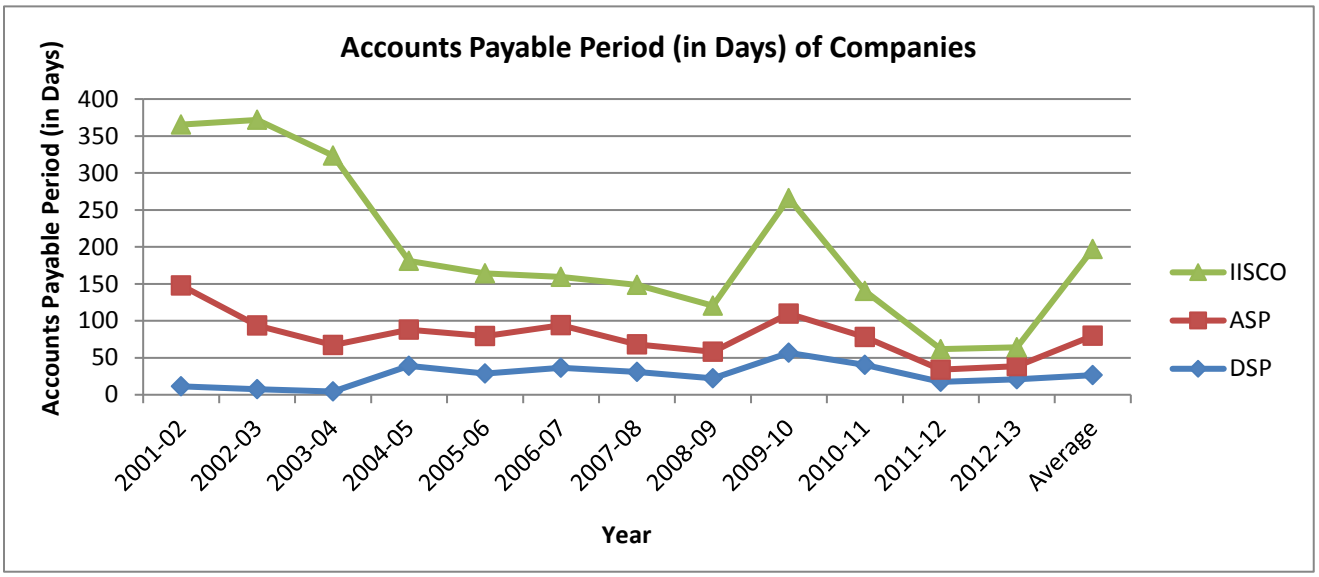


Table 6.13
Cash Conversion Cycle (in Days) of Selected Iron & Steel Companies in West Bengal

Years	DSP	ASP	IISCO	Average	Standard Deviation
2001-02	74.72	69.58	-124.17	6.71	113.37
2002-03	75.80	80.19	-202.40	-15.47	161.90
2003-04	66.14	87.51	-180.28	-8.87	148.82
2004-05	34.06	159.15	-23.95	56.42	93.57
2005-06	46.54	163.35	15.73	75.20	77.87
2006-07	51.65	220.74	20.18	97.52	107.86
2007-08	48.83	189.42	-3.71	78.18	99.85
2008-09	66.75	147.38	3.13	72.42	72.29
2009-10	63.85	90.79	-105.09	16.51	106.17
2010-11	16.97	79.88	-19.67	25.72	50.34
2011-12	40.26	132.38	10.75	61.13	63.44
2012-13	43.58	228.38	40.74	104.23	107.52
Average	52.43	137.40	-47.39	47.48	92.49
Std.Dev.	17.67	56.44	83.33		
Max.	75.81	228.39	40.75		
Min.	16.98	69.59	-202.40		

Sources: Researcher's computation from annual reports

Table 6.13 indicates cash conversion cycle or period (in days) of the selected firms during the study period. CCC of the firm DSP marked seesaw movement during the research period 2001-02 to 2012-13. It varied between the highest of 76 days and lowest of 17 days in the year 2010-11 and 2002-03 respectively with an average cash conversion cycle of 52 days. Its standard deviation was 17.67 or 18 days approximately.

Cash conversion cycle of the firm ASP was showing upward trend from the year 2001-02 to 2006-07 and again from 2011-12 to 2012-13.Thereafter, it bents to downward movement from 2007-08 to 2010-11. It varied between the highest of 228 days in 2012-13 and the lowest of 69 days in the year 2001-02 with average cash conversion period of 137 days and standard deviation of 56 days.

Cash conversion cycle of the firm IISCO manifested downtrend from 2001-02 to 2011-12 of the study period except in year 2012-13. It ranged between the highest of 41 days in the year 2012-13 and the lowest of -202 days in the year 2002-03 with an average of -47 days and standard deviation of 83 days.

As against a sample average cash conversion period of 47 days, the firms DSP and ASP took more time in terms of number of days in conversion of stock into sales realization. Particularly, in DSP cash conversion periods were longer than the sample average cash conversion period of 47 days in 7 out of 12 years i.e., in years 2001-02 to 2003-04 and 2006-07 to 2009-10 respectively. On the other hand, the firm ASP held its cash conversion cycle above the yearly sample average throughout the entire study period. More specifically, it blocked up cash for 70 days, 80 days, 88 days, 159 days, 163 days, 221 days, 189 days, 147 days, 91 days, 80 days, 132 days, and 228 days throughout the period. It is evident that the cash conversion period went up to as high as approximately 5 times (actually 4.8 times) the average conversion period in the last year of the study period. Thus, it is an easy saying that the two firms, DSP and ASP were inefficient in managing cash conversion cycle by holding it for more number of days. Whereas the firm IISCO showed negative cash conversion cycle in 7 out of 12 years. Moreover, though the cash conversion cycle was positive in rest of the 5 years in IISCO, it was less than half of the average cycle of 47 days in 4 years. On the aggregate, IISCO was dynamic in holding the cash for lesser time compared to other two firms.

Comparing mean of cash conversion cycle (CCC) of selected public steel companies under the study period with industrial average of 24 days as standard, the study found that two companies, namely, DSP and ASP, took higher number of days in conversion of stock into sales realization. Specifically, averages of CCC of the firms DSP and ASP are 52.43 and 137.40 days respectively,

which are relatively higher than the grand industry average. Whereas, the firm IISCO took an average of (-) 47.39 days in cash realization from manufacturing point to sale of finished goods. Thus, it's an easy saying that firms DSP and ASP are inefficient in managing cash conversion cycle as compared with the industrial standard. On the other hand, the firm IISCO is well organized and competent enough in managing its CCC.

Overall, average of cash conversion cycle of 47.48 days of particular Indian steel companies under study is somewhat more and unsatisfactory or unacceptable since its mean of 47.48 days is nearly double the grand industry average of 24 days.

Null Hypothesis: There is no significant difference in CCC of selected iron and steel companies.

Alternative Hypothesis: There is significant difference in CCC of selected iron and steel companies.

Table 6.14
Robust Tests of Equality of Means
CCC

	Statistic(a)	df1	df2	Sig.
Welch	21.109	2	16.532	.000
Brown-Forsythe	29.495	2	20.514	.000

a Asymptotically F distributed.

Table 6.14 exhibits that F ratio, F (2, 16.532) is equal to 21.109 and p-value is .000; it means that there is statistically significant difference in cash conversion cycle of the selected firms at p-value being less than .05 level and thereby giving rise to acceptance of the alternative hypothesis and rejection of null hypothesis.

Table 6.15
Multiple Comparisons
Dependent Variable: CCC (Games-Howell)

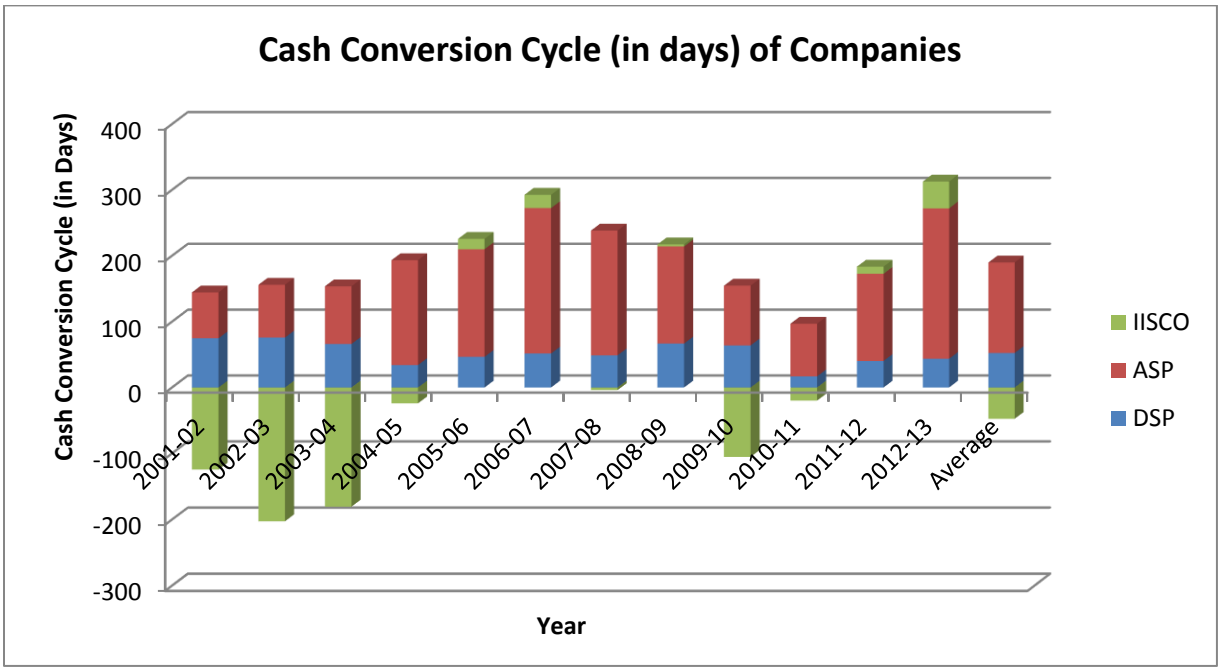
(I) COMPANY	(J) COMPANY	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
		Lower Bound	Upper Bound	Lower Bound	Upper Bound	Lower Bound
DSP	ASP	-84.96911(*)	17.07316	.001	-129.9918	-39.9464
	IISCO	99.82917(*)	24.59221	.004	34.2112	165.4471
ASP	DSP	84.96911(*)	17.07316	.001	39.9464	129.9918
	IISCO	184.79828(*)	29.05534	.000	111.0909	258.5057
IISCO	DSP	-99.82917(*)	24.59221	.004	-165.4471	-34.2112
	ASP	-184.79828(*)	29.05534	.000	-258.5057	-111.0909

* The mean difference is significant at the .05 level.

Multiple comparisons test has been conducted by applying Games-Howell test which points out that there is statistically significant difference between DSP and ASP and between DSP and IISCO. The mean score of ASP (mean 137.40 days and standard deviation 56.44 - refer to Table 6.13) was significantly different from both the companies i.e., DSP (mean 52.43 days and standard deviation of 17.67 – Table 6.13) and IISCO [mean (-)47.39 days and standard deviation of 83.33 – Table 6.13]. Specifically, the results suggest that ASP took longer time (more number of days) in converting sales into cash. In other words, it blocked funds in trade for longer period of time than in IISCO and DSP.

Chart 6.16

Graphical Representation



Objective 2. *To discover the relationship between working capital management efficiency and profitability in the selected iron and steel companies in west Bengal.*

Null Hypothesis: Working capital management has no significant relationship with firms' performance.

Alternative Hypothesis: Working capital management has significant relationship with firms' performance.

6.2 Pearson Correlation Analysis

The association between the dependent variable (ROA) and the independent variables (ACP, ICP, APP, and CCC) related to working capital management for the selected samples i.e., DSP, ASP, and IISCO have been depicted in the **Tables 6.17, 6.18, and 6.19** respectively.

Table 6.17
Pearson Correlation Matrix of Profitability and all independent variables of working capital management for Durgapur Steel Plant (DSP)

		ROA	ACP	ICP	APP	CCC
ROA	Pearson Correlation	1	-.665(*)	.177	.694(*)	-.497
	Sig. (2-tailed)		.018	.582	.012	.100
	N	12	12	12	12	12
ACP	Pearson Correlation	-.665(*)	1	.028	-.597(*)	.643(*)
	Sig. (2-tailed)	.018		.932	.040	.024
	N	12	12	12	12	12
ICP	Pearson Correlation	.177	.028	1	.476	.551
	Sig. (2-tailed)	.582	.932		.117	.063
	N	12	12	12	12	12
APP	Pearson Correlation	.694(*)	-.597(*)	.476	1	-.469
	Sig. (2-tailed)	.012	.040	.117		.124
	N	12	12	12	12	12
CCC	Pearson Correlation	-.497	.643(*)	.551	-.469	1
	Sig. (2-tailed)	.100	.024	.063	.124	
	N	12	12	12	12	12

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Interpretations

Table 6.17 shows the correlations of Return on Assets (ROA) with the Accounts Conversion Period (ACP), Inventory Conversion Period (ICP), Accounts Payable Period (APP), and Cash Conversion Period (CCC) of the firm DSP. The study found negative correlation of ROA with ACP and CCC. The coefficient value of ROA with ACP is (-.665), which means that there is statistically significant strong negative association between ROA and ACP at 0.05 level of significance. It indicates that the debtors are taking less number of days in paying off the dues to the firm. It enables the firm DSP to regenerate more inventories leading to more sales, which in turn results in higher profitability. The correlation of ROA with CCC is (-.497), which means a moderately negative association between ROA and CCC. Negative relationship between ROA and CCC is steady with the view point that reducing the longer time lag between purchase of raw-materials and sale of finished goods could have increased the profitability. However, the

correlation between ROA and CCC is not significant. Among the working capital management variables, there are positive correlations of ROA with ICP and APP. There is significant strong positive correlation between ROA and APP, coefficient value is (.694) which implies that early or quick payment to suppliers would empower the firm to increase its profitability. Inventory conversion period shows a positive correlation with Return on Assets with coefficient of correlation value being (.177). Further, the association between ICP and ROA is insignificant at 5 percent level. It implies that the firm DSP maintains inventories at moderate level in order to reduce the cost of interruptions in the manufacturing process. This also helps in reducing the chances of failure in supplying goods to the buyers that leads to safeguard DSP against price fluctuation.

Table 6.18
Pearson Correlation Matrix of Profitability and all independent variables of working capital management for Alloy Steel Plant (ASP)

		ROA	ACP	ICP	APP	CCC
ROA	Pearson Correlation	1	.049	.311	-.668(*)	.608(*)
	Sig. (2-tailed)		.879	.325	.018	.036
	N	12	12	12	12	12
ACP	Pearson Correlation	.049	1	.406	-.136	.647(*)
	Sig. (2-tailed)	.879		.191	.674	.023
	N	12	12	12	12	12
ICP	Pearson Correlation	.311	.406	1	.102	.735(**)
	Sig. (2-tailed)	.325	.191		.751	.006
	N	12	12	12	12	12
APP	Pearson Correlation	-.668(*)	-.136	.102	1	-.545
	Sig. (2-tailed)	.018	.674	.751		.067
	N	12	12	12	12	12
CCC	Pearson Correlation	.608(*)	.647(*)	.735(**)	-.545	1
	Sig. (2-tailed)	.036	.023	.006	.067	
	N	12	12	12	12	12

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Interpretations

Table 6.18 provides the correlation results between Return on Assets (ROA) and working capital management variables for the firm ASP. Among the independent variables of working capital

management, there is a positive association between ROA and the three independent variables (ACP, ICP, and CCC), the only exception being in relation to APP. However, CCC is having significantly positive correlation with ROA with coefficient value of (.608). This implies that the firm ASP has longer CCC period to generate cash between expenditure for purchase of raw materials and collection of cash from sale of finished goods. The profitability could be improved by reducing this CCC period. The correlation between ROA and ACP is positive with coefficient value of (.049) which is insignificant at 5 percent level. The customers taking more days or time to clear the due bills, the result being that less cash is available with the firm to replenish the inventories that leads to affect the profitability. The association between ROA and ICP is positively weak with correlation coefficient value of (.311); however, the relationship between these two variables is insignificant at 5 percent level of significance. This would suggest that if the inventory conversion period is higher which leads to an increase in the cost of holding inventory, as a result of which the earnings of the firm decline. It implies that the firm ASP holds or maintains lower level of inventories that is in commensurate with sales and profitability. Accounts payable period is negatively correlated with ROA and it is significant at 5 percent level of significance with coefficient value of (-.668). It means that the firm ASP is being able to pay their outstanding bills to vendors faster; it creates a good image to the customers also and helps attract more customers that may in turn increase its profitability.

Table 6.19

Pearson Correlation Matrix of Profitability and all independent variables of working capital management for Indian Iron & Steel Company (IISCO)

		ROA	ACP	ICP	APP	CCC
ROA	Pearson Correlation	1	-.064	-.482	.224	-.337
	Sig. (2-tailed)		.844	.113	.484	.284
	N	12	12	12	12	12
ACP	Pearson Correlation	-.064	1	-.197	.850(**)	-.762(**)
	Sig. (2-tailed)	.844		.540	.000	.004
	N	12	12	12	12	12
ICP	Pearson Correlation	-.482	-.197	1	-.364	.537
	Sig. (2-tailed)	.113	.540		.245	.072
	N	12	12	12	12	12
APP	Pearson Correlation	.224	.850(**)	-.364	1	-.977(**)
	Sig. (2-tailed)	.484	.000	.245		.000
	N	12	12	12	12	12
CCC	Pearson Correlation	-.337	-.762(**)	.537	-.977(**)	1
	Sig. (2-tailed)	.284	.004	.072	.000	
	N	12	12	12	12	12

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Interpretations

Table 6.19 shows correlation between ROA and the explanatory variables of working capital management in IISCO. ROA has negative correlation with the three components (ACP, ICP, and CCC) excepting APP. The negative correlation between ACP and ROA can be explained with the fact that customers are paying their due amount faster to the firm IISCO that enables it to purchase more inventories to increase volume of production and sales and thus leading to attain higher profitability. However, the strength between ROA and ACP is low and insignificant at 5 percent level of significance with correlation coefficient value of (-.064). ROA has negative correlation with ICP also but not significant with coefficient value of (-.482); that suggests better returns could be generated with rapid production and sales. There is negative association between ROA and CCC too with correlation coefficient value of (-.337). It implies that the firm IISCO can increase the earnings by reducing the CCC but finds no statistical significance of the statement at 5 percent level. ROA has positive relationship with APP with correlation coefficient

value of (.224). It signifies that the firm IISCO is making delay in payment to suppliers and not comfortable to ensure that the firm could maintain enough stock to boost production, sales, and profit. It is interesting to note that there is no independent variable of working capital management in IISCO that could show significant relationship with profitability.

Objective 3: *To examine the effect of accounts collection period on selected firms' performance.*

Hypothesis H_3: Accounts collection period (ACP) of less than 27 days has significant impact on profitability in the selected samples

Null Hypothesis: Accounts collection period (ACP) of less than 27 days does not affect the profitability significantly in the selected firms.

Alternative hypothesis: Accounts collection period (ACP) of less than 27 days affects the profitability significantly in the selected firms.

6.3 Linear Regression Analysis

By using linear regression model,**Tables 6.20 and Table 6.21** have shown the results of analyses of the impact of the independent variables ACP and CCC on the profitability as dependent variable (ROA) for the selected units in the study. Two linear regression models framed to test the research hypotheses are:

Model I: $\mathbf{ROA=}a+\beta_1 ACP+\varepsilon_t$

Model II: $\mathbf{ROA=}a+\beta_1 CCC+\varepsilon_t$

Where, ROA- Dependent variable,

ACP and CCC- Independent variables,

a, β_1 and ε_t = "a" is a constant, β_1 is the slope of coefficients and ε_t denotes the residual disturbance term along with subscript 't' denoting the time dimension.

Table 6.20

Linear regression results of the effect of accounts collection period (ACP; in days) on the Profitability, ROA

ANOVA(a)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.370	1	6.370	111.902	.000(a)
	Residual	1.935	34	.057		
	Total	8.306	35			

a Predictors: (Constant), ACP
b Dependent Variable: ROA

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.876(a)	.767	.760	.23859	2.133

a Predictors: (Constant), ACP
b Dependent Variable: ROA

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	.988	.053		18.590	.000	.880	1.096					
	ACP	.022	.002	.876	10.578	.000	.018	.027	.876	.876	.876	1.000	1.000

a. Dependent Variable: ROA

Inference:

Table 6.20 consisting of (ANOVA, model summary, and coefficient value) represents the result of the analyses for hypothesis 3. Analysis of variance (ANOVA) was conducted on the means of two groups of profitability (ROA). One group had ACP of less than 27 days and the other group had greater than 27 days. ACP of 27 days was chosen based on industrial average. In this analysis, 'value equals to 1' is assigned to 'accounts collection period less than industrial average

of 27 days' and 'value of 2' is allotted to 'accounts collection period of more than 27 days'. One-way ANOVA reveals the evidence of significant difference between profitability (ROA) of the group that is having ACP of less than 27 days and that of the group with ACP of more than 27 days. Since the calculated value F (111.902) is higher than its critical or table value (4.13), it is evident that the group having accounts collection period of less than 27 days (<27 days) is significantly affecting the profitability of the selected firms. To assess the influence of the selected variable i.e., ACP on the ROA of the companies, linear regression technique has been applied. Linear regression result supports the statistical findings (R square = 76.7 %; Adj. R square = 76 %; t value =10.57; p =.000) i.e., ACP could explain for 76% of variability in the profitability (dependent variable -ROA) of the selected units. Selected firms in the study could boost or raise its return on assets by shortening the accounts collection period to less than 27 days which might have enabled the selected firms to utilize quicker cash inflows replacing much dependence on the borrowed funds to run their business operations smoothly. Thus, firms could improve not only their cash flows but also revamp working capital position.

Objective 4: *To examine the impact of the length or period of cash conversion cycle on selected units' profitability*

Hypothesis H_4: Cash conversion cycle (CCC) of less than 24 days affects significantly the profitability of the selected firms in the study.

Null Hypothesis: Cash conversion cycle (CCC) of less than 24 days does not affect the profitability significantly of the selected firms.

Alternative hypothesis: Cash conversion cycle (CCC) of less than 24 days affects profitability significantly of the selected firms.

One-way ANOVA was done on the means of two groups of profitability of the firms measured by Return on Assets (ROA). One group had cash conversion cycle of less than 24 days and the

other group had cash conversion cycle more than 24 days. Cash conversion cycle of 24 days was chosen based on the industry average (it is calculated or developed from financial data of 05 years of the iron and steel sector industry as a whole). The result of the analysis is presented in the table given below.

Table 6.21

Linear regression results of the effect of cash conversion cycle (CCC; in days) on the Profitability- ROA

ANOVA(b)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.219	1	4.219	37.934	.000(a)
	Residual	3.781	34	.111		
	Total	8.000	35			

a Predictors: (Constant), CCC
b Dependent Variable: ROA

Model Summary(b)

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df	df	Sig.F Change	Durbin-Watson
1	.726(a)	.527	.513	.33349	.527	37.934	1	34	.000	2.04

a Predictors: (Constant), CCC
b Dependent Variable: ROA

Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1.494	.062		24.014	.000					
	CCC	.004	.001	.726	6.159	.000	.726	.726	.726	1.000	1.000

a. Dependent Variable: ROA

Inference

From the Table 6.21(includes ANOVA, linear regression model, and coefficient value), it is found that the calculated value of F is 37.934 which is higher than the critical or distribution value of F (4.13) at 5 percent level of significance. So, null hypothesis is rejected and alternative hypothesis is accepted.

Analysis of the results implies that there is a significant difference between profitability (ROA) of the group that is having CCC of less than 24 days and of the group with CCC more than 24 days. Since calculated value of F (37.934) is higher than the critical or table value (4.13), this confirms that cash conversion cycle is good or satisfactory in influencing company performance of the selected units. Also, linear regression result supports the statistical findings (R square = 52.7 %; Adj. R square = 51.3 %; t value = 6.15; p =.000) i.e., CCC accounted for 51.3% of variance in the profitability (dependent variable - ROA) of the selected units. It means that the selected companies in the study could bring higher profit or improve its profitability position by reducing the cash conversion cycle to a period lesser than 24 days and thereby its working capital management could also be improved.

We want to know if any other internal factors are responsible for lower profitability in the selected public sector units during the study period. Therefore, efficiency ratios like Fixed Assets Turnover Ratio (FATR), Working Capital Turnover Ratio (WCTR), Capital Employed Turnover Ratio (CETR), and Total Assets Turnover Ratio (TATR) have been computed and presented below.

6.4 Descriptive Analysis of Efficiency Ratios

Descriptive statistics of the selected variables related to efficiency ratios - FATR, WCTR, CETR, and TATR, in the form of (mean, standard deviation, maximum and minimum) for the selected iron and steel units in West Bengal have been presented in the **Tables 6.22, 6.23, 6.24, and 6.25** respectively.

Efficiency Ratios (in times) of the selected Companies during the period (2001-02 to 2012-13)

Table 6.22

Fixed Assets Turnover Ratio (in times) of Selected Iron and Steel Companies in West Bengal

Year/Companies	DSP	ASP	IISCO	Average
2001-02	0.49	1.94	2.97	1.8
2002-03	0.56	2.59	3.15	2.1
2003-04	0.77	3.46	3.58	2.60
2004-05	1.17	4.87	4.92	3.65
2005-06	1.15	5.92	3.9	3.65
2006-07	1.49	4.65	5.82	3.98
2007-08	2.00	6.4	4.3	4.23
2008-09	2.42	6.26	5.06	4.58
2009-10	2.49	6.84	4.2	4.51
2010-11	3.11	7.45	2.9	4.48
2011-12	4.02	6.2	3.27	4.49
2012-13	5.00	4.37	2.73	4.03
Average	2.05	5.07	3.90	3.67
Std.Dev.	1.42	1.73	0.98	
Max.	5.00	7.45	5.82	
Min.	0.49	1.91	2.73	

Sources: Researcher's computation from annual reports.

Table 6.22 shows the Fixed assets turnover ratio of the selected companies during the study period from 2001-02 to 2012-13.Fixed assets turnover ratio (FATR) of DSP demonstrated

augmentation or progressive trend during the study period. It moves between the highest of 5.00 times in 2012-13 and the lowest of 0.49 times in 2001-02.Mean and standard deviation of (FATR) during study period were 2.05 times and1.42 percent respectively.

Fixed assets turnover ratio (FATR) of IISCO showed fluctuating movement during the study period; it increased from year 2001-02 to 2004-05 and thereafter moved in see-saw direction. It ranged from the highest of 5.82 times in 2006-07 and the lowest of 2.73 times. Mean and standard deviation of FATR in the firm IISCO were 3.90 times and 0.90 percent respectively.

Fixed assets turnover ratio (FATR) of IISCO showed vibrate movement during the study period, it increased from year 2001-02 to 2004-05 and thereafter move in see-saw direction. It ranged from highest of 5.82 times in 2006-07 and lowest of 2.73 times. Mean and deviation of firm IISCO are 3.90 times and 0.90 percent respectively.

Sample average of FATR of 3.67 (in times) is ascertained and presented in the above Table 6.22. On the basis of sample average, it is found that two of the three firms are proficient in using their fixed assets in business operations to reap profits. Mean of FATR of firms ASP and IISCO are 5.07 and 3.90 (in times) respectively, which are found to be greater than the sample average. Whereas the firm DSP is not satisfactorily employing its fixed assets in generating higher sales. DSP's FATR mean score is 2.05 times which is below the sample average. Thus, it can be said that the firm DSP is inefficient in managing fixed assets in relation to bring in more profits and other two firms are well organized in generating turnover through the best use of their fixed assets.`

Comparing mean of FATR of the selected firms with the Industrial average (IA) of FATR (2.67times), it is found that two firms, namely, ASP and IISCO could employ their fixed assets in an ideal way as mean of FATR of these two firms (ASP and IISCO) are above the industrial

average which are 5.07 and 3.90 times respectively. However, the firm DSP failed to employ fixed assets in a productive way to boost up their turnover, as mean of FATR of 2.05 is below the industrial average. As a result, their annual profitability position deteriorated. Thus, it can be stated that DSP is inefficient in utilizing fixed assets to generate revenue whereas the other two firms, ASP and IISCO, could use fixed assets in methodical or systematic way to bring about improvement in profit earning.

Overall, average of FATR of selected Indian iron and steel companies under the study period is higher and satisfactory because it's mean value of 3.67 times, is particularly higher than the grand industry average of 2.67 times.

Table 6.23

Working Capital Turnover Ratio (in times) of Selected Iron and Steel Companies in West Bengal

Year/Companies	DSP	ASP	IISCO	Average
2001-02	-12.08	1.16	-2.33	-4.41
2002-03	-11.9	14.4	-1.73	0.25
2003-04	-8.73	-26.87	-2.7	-12.76
2004-05	-19.15	3.97	-5.36	-6.84
2005-06	-19.95	4.22	-6.93	-7.55
2006-07	-34.71	2.12	-10.47	-14.35
2007-08	-1.86	2.37	-4.64	-1.37
2008-09	-25.49	4.50	-4.27	-8.42
2009-10	-11.88	7.69	-19.24	-7.81
2010-11	-13.35	9.61	10.59	2.28
2011-12	23.95	7.00	6.92	12.62
2012-13	31.84	-0.38	3.27	11.57
Average	-8.60	2.48	-3.07	-3.06
Std.Dev.	19.08	10.09	7.80	
Max.	31.84	14.40	10.59	
Min.	-1.86	-0.38	-1.73	

Sources: Researcher's computation from annual reports.

Working capital turnover ratio (WCTR) of the firm DSP exhibited droop or declining movement from the year 2001-02 to 2009-10 and increased from 2011-12 to 2012-13. It ranged between the highest of 31.84 times in 2012-13 and the lowest of (-)1.86 times in 2007-08 with an average and standard deviation of (-)8.60 times and 19.08 percent respectively.

Working capital turnover ratio (WCTR) of the firm ASP revealed oscillatory movement during the selected study period. The space of variation bounded by the upper and the lower limits is defined by 14.40 times in year 2002-03 and (-) 0.38 times in 2012-13 respectively. Mean of WCTR is 2.48 times and its standard deviation from the average is 10.09 percent.

Working capital turnover ratio (WCTR) of the firm IISCO remained negative during the years 2001-02 to 2009-10 and continued to decline from 2010-11 to 2012-13. Its spread was defined by the highest of 10.59 times in 2010-11 and the lowest of (-)1.73 times in 2002-03; the average and the standard deviation of (WCTR) were (-)3.07 times and 7.80 percent respectively.

As against a sample average of WCTR of (-)3.06 times, it is observed that one of the three firms had positive working capital turnover ratio in comparison to others. Mean of WCTR of ASP is 2.48 times, which is above the sample average.The other two firms, namely, DSP and IISCO, could not perform well in using their working capital to generate higher sales. Thus, the annual profitability deteriorated.

Keeping IA of working capital turnover ratio of 6.33 times as benchmark, it is found that all the three selected firms (DSP, ASP, and IISCO) were inefficient in employing working capital in a well organized manner to enhance turnover as a result of which their annual profitability position deteriorated.

As seen from the above Table 6.23, working capital turnover ratio of DSP remains negative from the years 2001-02 to 2010-11,which signifies that the firm DSP had higher current liabilities than its current assets. Working capital turnover ratio of ASP was vacillating with inconsistent values during the selected period; even in some of the years of study period working capital turnover ratio was high (14.4 times in 2002-03, 7.69 times in 2009-10, 9.61 times in 2010-11,and 7.00 times in 2011-12). It speaks about low sales by investing more in current assets that leads to low profitability. Average of WCTR is 2.48 times which is below the IA of 6.33 times. The firm IISCO's WCTR was managed in a fragile way. Noted from the above Table 6.23 that the average of WCTR is (-)3.07 times, which is below the industrial average of 6.33 times. This points out that the firm IISCO failed to utilize their current assets in proficient way to achieve higher sales;

it impacted profitability position of selected units to get severely affected and deterioted. Thus, it's an easy saying that profitability position i.e. Return on Assets is declined or deteriorated due to inefficient management of working capital turnover ratio.

In general, average of WCTR of selected units under the study period is negative and lower. Its mean is (-)3.06 times, which is unsatisfactory and lower than the grand industry average of 6.33 times

Table 6.24

Capital Employed Turnover Ratio (in times) of Selected Iron and Steel Companies in West Bengal

Year/Companies	DSP	ASP	IISCO	Average
2001-02	10.86	9.17	-10.76	3.09
2002-03	12.44	1.4	-4.18	3.22
2003-04	17.21	1.96	-10.98	2.73
2004-05	18.2	1.42	60.5	26.70
2005-06	1.03	1.57	8.92	3.84
2006-07	1.29	1.11	13.09	5.16
2007-08	1.78	1.36	58.7	20.61
2008-09	2.04	1.8	-27.39	-7.58
2009-10	1.97	2.27	5.38	3.20
2010-11	2.61	2.63	2.28	2.50
2011-12	3.15	-0.6	2.22	1.59
2012-13	3.64	-0.42	1.49	1.57
Average	6.35	1.97	8.27	5.53
Std.Dev.	6.46	2.46	26.25	
Max.	18.2	9.17	60.5	
Min.	1.03	-0.6	1.49	

Sources: Researcher's computation from annual reports.

Capital employed turnover ratio of DSP shows fluctuating trend throughout the study period; in the initial years it showed inclining direction during the period 2001-02 to 2004-05 and thereafter

it showed seesaw movement. It reached to the highest of 18.2 times in 2004-05 and declined to the lowest of 1.03 times in 2005-06. The mean and the standard deviation of CETR were 6.35 times and 6.46 percent respectively.

Capital employed turnover ratio (CETR) of the firm ASP exhibited inconsistent record during the selected period. It varied between the highest of 9.17 times in 2001-02 and the lowest of (-) 0.6 times in 2011-12. The mean and the standard deviation of the ratio were 1.97 and 2.46 respectively.

Capital employed turnover ratio (CETR) of the firm IISCO exhibited swing movement during the study period. It varied between the highest of 60.5 times in 2004-05 and the lowest of 1.49 times in 2001-02. The ratio showed negative values of (-)10.76, (-)4.18, (-)10.98, (-)27.39 times in the years 2001-02 to 2003-04 and 2008-09 respectively. The average and the standard deviation of CETR were 8.27 times and 26.25 percent respectively.

As compared the CETR of the selected public sector iron and steel manufacturing units in West Bengal with the sample average of CETR, it is ascertained that two of the three firms were capable to achieve maximum sales with minimum amount of capital employed. Mean of two firms (DSP and IISCO) are 6.35 and 8.27 times respectively both of which are higher than the sample average. ASP was unable to use its capital in proper direction to hatch revenue as mean of CETR of the firm is 1.97 times,being comparatively lower than the sample average. Thus, it can be inferred that two firms, namely, DSP and IISCO, were sensible in utilizing their capital employed to bring improvement in the sales graph of the respective organization. However, the firm ASP exercised its capital in an unproductive manner to bring about improvement in turnover.

Keeping industrial average of CETR (1.68 times) as yardstick, averages of CETR indicate that all the selected public sector firms were proficient and could satisfactorily utilize their capital in raising sales. As observed from the above table 6.24,the means of CETR of the three selected firms, namely, DSP, ASP, and IISCO are 6.35, 1.97, and 8.27 times respectively all of which are greater than the industrial average.This signifies that the selected firms were capable of managing their capital employed by investing minimum amount to achieve maximum profit through turnover improvement.

Comprehensively, sample average of capital employed turnover ratio under the study period is 5.53 times.When that is compared with the industrial benchmark of 1.68 times,the former is found to be higher and satisfactory.

Table 6.25

Total Assets Turnover Ratio (in times) of Selected Iron and Steel Companies in West Bengal

Year/Companies	DSP	ASP	IISCO	Average
2001-02	0.40	0.72	1.46	0.86
2002-03	0.47	0.91	1.36	0.91
2003-04	0.67	1.12	1.6	1.13
2004-05	0.97	1.15	1.97	1.36
2005-06	0.89	1.19	0.76	0.94
2006-07	1.05	0.93	0.78	0.92
2007-08	1.36	1.04	0.55	0.98
2008-09	1.52	1.32	0.35	1.06
2009-10	1.61	1.63	0.14	1.12
2010-11	1.86	1.93	0.11	1.3
2011-12	1.83	0.63	0.103	0.85
2012-13	1.61	0.52	0.06	0.73
Average	1.18	1.09	0.77	1.01
Std.Dev.	0.51	0.40	0.67	
Max.	1.86	1.93	1.97	
Min.	.40	0.52	.06	

Sources: Researcher's computation from annual reports.

Total assets turnover ratio (TATR) of DSP showed a progressive trend (upward drift) during the study period except in the years 2011-12 and 2012-13. It ranged between the highest of 1.86 times in 2010-11 and the lowest of .40 times in 2001-02. The average and the standard deviation of TATR were 1.18 times and 0.51 percent respectively.

Total assets turnover ratio (TATR) of ASP showed increasing trend from the year 2001-02 to 2005-06 and 2007-08 to 2010-11, but declined in the years 2006-07, 2011-12, and 2012-13 with the values 0.93, 0.63, and .52 respectively. It spreads from the highest of 1.93 times in 2010-11

and the lowest of 0.52 times in 2012-13. The mean and the standard deviation of TATR of the firm ASP were 1.09 times and 0.40 percent respectively.

During the study period, total assets turnover ratio (TATR) of IISCO moved in a downturn trend, ranging between the maximum value of 1.97 times in 2004-05 and the minimum of .06 times in 2012-13. Mean of TATR is 0.77 times and its standard deviation is 0.67 percent.

When the mean of TATR of selected units is compared with the sample average of 1.01 times, it is noticed that one of three firms, particularly IISCO,was disorganized in deploying total assets to produce the revenue. The mean of TATR is 0.77 times which is lower than the sample average. Other two firms i.e. DSP and ASP, whose means are 1.18 and 1.09 times respectively, both of which are greater than the sample mean.The fact indicates that these two firms experienced more or higher sales through proper administration of total assets at full capacity. Thus, it can be understood that DSP and ASP were coherent in deploying total assets whereas IISCO faced poor or lower sales i.e., it was inefficient in utilization of total assets to produce earnings of business.

Comparing the mean of TATR of selected units with the Industrial average (IA) of TATR (0.87 times), it is found that two out of three firms or cases, namely, DSP and ASP,are competent and could perform satisfactorily in utilizing their total assets in generating revenue during the study period. Averages of total assets turnover ratio of these two firms, DSP and ASP, are 1.18 times and 1.09 times respectively, both of which are above the IA (Industrial Average).This indicates that the firms DSP and ASP could use their total assets in active or best possible manner to plough higher sales which lead to more profits. On the other hand, the firm IISCO's performance does not appear to be satisfactory in managing total assets that resulted in lower sales and profitability.The mean of TATR of IISCO is 0.77 times which is lower than the industrial

average. This points out that the firm IISCO failed to utilize their total assets in dynamic way to achieve revenues.That failure impacted their profitability position to be severely affected or deterioted during the study period.

As a whole, the sample mean of total assets turnover ratio under the study period is 1.01 times. It is found to be higher and therefore, acceptable when compared with the industrial benchmark of 0.87 times. Its average is above the grand industry average which is considered as standard and therefore, the average value of TATR is considered to be adequate.

Thus, CCC and ICP are not the reason of enhancing profitability position of the selected companies; however, other key internal financial factors such as WCTR, FATR, and TATR require close attention of the management for improving and strengthening profitability position of the selected units.

Further analysis is carried out to know the nature and association between firm's performance and efficiency ratios to draw specific conclusions on the research interest i.e., whether these efficiency ratios have made or not any significant contribution to enhance profitability of the selected units.

6.5 Pearson Correlation Analysis of Efficiency Ratios

Table 6.26, 6.27, and 6.28 reports the correlation matrix between the dependent variable (ROA) and the independent variables (FATR, WCTR, CETR, and TATR) data as a whole for the companies DSP, ASP, and IISCO respectively.

Table 6.26

Pearson Correlation Matrix of Profitability and Efficiency ratios for Durgapur Steel Plant (DSP)

		ROA	FATR	WCTR	CETR	TATR
ROA	Pearson Correlation	1	.430	-.020	-.451	.688(*)
	Sig. (2-tailed)		.163	.952	.141	.013
	N	12	12	12	12	12
FATR	Pearson Correlation	.430	1	.721(**)	-.538	.872(**)
	Sig. (2-tailed)	.163		.008	.071	.000
	N	12	12	12	12	12
WCTR	Pearson Correlation	-.020	.721(**)	1	-.081	.401
	Sig. (2-tailed)	.952	.008		.803	.196
	N	12	12	12	12	12
CETR	Pearson Correlation	-.451	-.538	-.081	1	-.645(*)
	Sig. (2-tailed)	.141	.071	.803		.024
	N	12	12	12	12	12
TATR	Pearson Correlation	.688(*)	.872(**)	.401	-.645(*)	1
	Sig. (2-tailed)	.013	.000	.196	.024	
	N	12	12	12	12	12

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Inference: Table 6.26 exhibits the correlation matrix of the profitability and efficiency ratios of the company DSP. ROA has positive association with the efficiency ratios FATR and TATR having coefficient values of .430 and .688 respectively. Out of these two positively related ratios, only Total Assets Turnover Ratio or TATR is dynamically (i.e., strong and positive) correlated with ROA having the highest magnitude of 68.8 percent or .688 which is statistically significant at 5 percent confidence level. It indicates that sales or revenue is enhanced by utilizing all its assets efficaciously.However,FATR is found to be insignificant at 1 percent and 5 percent levels. It points out that the company DSP is not competent in employing their fixed assets to bring about revenues.Whereas ROA is negatively correlated with WCTR and CETR with the magnitude of (-).020 and (-).451 respectively. A negatively weak correlation between ROA and WCTR is found that manifests that the DSP is sluggish in using their short-term assets to plough earnings for the business. There is a negatively moderate association between ROA and CETR. It entails that the capital of the firm has not been employed in optimum level in generating the sales

as a result of which the earnings get affected. However, efficiency ratios WCTR and CETR have no significant correlation with ROA.

Table 6.27

Pearson Correlation Matrix of Profitability and Efficiency ratios for Alloy Steel Plant (ASP)

		ROA	FATR	WCTR	CETR	TATR
ROA	Pearson Correlation	1	.810(**)	.369	-.428	.240
	Sig. (2-tailed)		.001	.238	.165	.452
	N	12	12	12	12	12
FATR	Pearson Correlation	.810(**)	1	.304	-.449	.613(*)
	Sig. (2-tailed)	.001		.336	.143	.034
	N	12	12	12	12	12
WCTR	Pearson Correlation	.369	.304	1	-.059	.147
	Sig. (2-tailed)	.238	.336		.857	.648
	N	12	12	12	12	12
CETR	Pearson Correlation	-.428	-.449	-.059	1	.069
	Sig. (2-tailed)	.165	.143	.857		.831
	N	12	12	12	12	12
TATR	Pearson Correlation	.240	.613(*)	.147	.069	1
	Sig. (2-tailed)	.452	.034	.648	.831	
	N	12	12	12	12	12

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 6.27 uncovers the correlation between the profitability and efficiency ratios of the unit ASP. ROA is positively correlated with the ratios FATR,WCTR, and TATR except CETR. Out of the positively correlated variables, ROA has positively strong association with FATR or Fixed Assets Turnover Ratio, having the highest magnitude of .810 or 81 percent which is significant at 1 percent confidence level. This signifies that the firm ASP has generated higher earnings or benefits by proper administration of tangible assets. A low degree of association between WCTR and ROA with coefficient value of .369 signifies that the company is inefficient in generating significant return on short-term assets. In other words, working capital is not optimally used in producing sufficient sales. As a result of this business operations,the liquidity hampers. However, WCTR is insignificantly related with ROA at 1 and 5 percent confidence levels. A low

positive correlation between ROA and TATR is found with coefficient value of .240 which indicates the firm failed to deploy the total assets at their full capacity. Therefore, inefficient use of total assets leads to poor sales and low profitability. Nonetheless, TATR is not significantly associated with the profitability at confidence level. A negative moderate correlation between ROA and CETR is found with the value of (-).428 which states that the company is inefficient in exercising their capital in proper direction to generate maximum sales with minimum amount of capital employed. However, CETR is not having statistically significant correlation with ROA at any confidence level.

Table 6.28

Pearson Correlation Matrix of Profitability and Efficiency ratios for Indian Iron & Steel Company (IISCO)

		ROA	FATR	WCTR	CETR	TATR
ROA	Pearson Correlation	1	-.146	.134	.354	.097
	Sig. (2-tailed)		.650	.678	.258	.764
	N	12	12	12	12	12
FATR	Pearson Correlation	-.146	1	-.624(*)	.322	.143
	Sig. (2-tailed)	.650		.030	.307	.657
	N	12	12	12	12	12
WCTR	Pearson Correlation	.134	-.624(*)	1	-.165	-.179
	Sig. (2-tailed)	.678	.030		.609	.578
	N	12	12	12	12	12
CETR	Pearson Correlation	.354	.322	-.165	1	.231
	Sig. (2-tailed)	.258	.307	.609		.470
	N	12	12	12	12	12
TATR	Pearson Correlation	.097	.143	-.179	.231	1
	Sig. (2-tailed)	.764	.657	.578	.470	
	N	12	12	12	12	12

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 6.28 demonstrates the association between the profitability and efficiency ratio of the company IISCO; all the independent variables are positively correlated (WCTR, CETR, and TATR) except FATR which is negatively associated [magnitude of (-) 14.6 percent or (-) .146]

with firm's profitability.This expresses that the selected company deployed fixed assets at a lower level in achieving sales. CETR is having positive correlation with the highest magnitude of 35.4 percent or .354 with firm's earnings followed by WCTR and TATR with coefficient values of 13.4 percent and 9.7 percent respectively. It connotes that for every rupee invested in capital employed, the selected company IISCO made 35.4 percent of profits through sales.The correlation between ROA and WCTR is positively low signifying that the selected organization is incompetent or disorganized in using their current assets to develop maximum sales. A low positive association between ROA and TATR indicates that the total assets have been employed in a delicate or fragile way to achieve turnover as a result of which the profitability slumped. However, it is found that none of the independent variables (efficiency ratios) has significant relation with return on assets.

Further inquiry has been executed in order to detect the causes of occurring loss in the company IISCO during the study period. Therefore, net profit and loss in terms of value and percentage have been determined for the period 2001-02 to 2012-13 which is presented in Table 6.29 as below.

Table 6.29

Net Profit & Loss of Indian Iron and Steel Company (IISCO) during the period 2001-02 to 2012-13

Year	Net Profit or Loss in Rs. (Crore)	% of Net Profit or loss
2001-02	-179.87	-19.72
2002-03	-182.23	-19.72
2003-04	27.09*	2.58
2004-05	46.59	3.13
2005-06	-257.62	-18.96
2006-07	-249.53	-15.68
2007-08	-285.19	-15.49
2008-09	-182.36	-7.75
2009-10	178.97	8.05
2010-11	25.12	0.93
2011-12	-410.80	-13.70
2012-13	-201.72	-9.14

Source: From audited annual balance sheet

Table 6.29 discloses the net profit and loss (in value and percentage) to sales of IISCO for the study period 2001-02 to 2012-13. The company suffered a huge amount of loss in the first two years of the study i.e., in 2001-02 to 2002-03 of Rs.179.87 crores or 19.72 percent and Rs.182.23 crores or 19.72 percent respectively and thereafter it turns into a profitable state of Rs.27.09 crores in the year 2003-04.The reason of turning around from loss into profit in that year (2003-04) was due to the waiver of dues to the tune of Rs.18.49 crores and interests accrued and due to Financial Institutions and Banks of Rs. 47.35 crores by the JPC (Joint Parliament Committee). From 2005-06 to 2008-09, the net profit falls down drastically, Rs.(in crores) (-)257.62,(-)249.53,(-)285.19, and (-)182.36 in the years 2005-06, 2006-07, 2007-08, and 2008-09 respectively. The justification of arising loss for the period 2005-06 to 2008-09 and a very low percentage of profit of 8.05 in 2009-10 were due to negative working capital or in other words, inefficiently using working capital to achieve sales which leads to crop up of loss in the business. In the years 2010-11, 2011-12, and 2012-13, the company earned the lowest profit of

Rs.25.12 crores or 0.93 percent and suffered a loss of Rs.(-)410.80 crores or (-)13.70 percentage and Rs.(-)201.72crores or (-)9.14 percentage respectively. This is due to inefficient management of total assets of the business. As shown in Table 6.25,Total Assets Turnover ratio (in times) of IISCO for the above period i.e., from 2010-11 to 2012-13 was very low of 0.11, 0.103 and 0.06 times respectively, which are below the industry average of 0.87 times. Thus, it can be an easy saying that the company IISCO suffered losses during the study period due to sluggish administration of its working capital and total assets of the enterprise.