DETERMINANTS OF WORKING CAPITAL IN THE INDIAN SUGAR INDUSTRY

Mihir Dash*

Abstract *This study examines the firm-level determinants of working capital for sugar manufacturing companies in India. Working capital management is particularly important for sugar manufacturing companies, as inventory cycles in the sugar industry generally tend to be relatively long, as its raw material inputs are seasonal and thus require a longer period of storage. The sample for the study included 15 listed sugar manufacturing companies for the period 2008–18. The study uses fixed-effects panel regression models, with size (logarithm of total assets), leverage (debt-equity ratio), asset tangibility (fixed assets as a percentage of total assets), growth rate of sales and profitability (return on assets) as the independent variables, and the current ratio, inventory cycle, receivables cycle, payables cycle, cash conversion cycle, total assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, receivables turnover ratio and payables turnover ratio as the dependent variables. The key results of the study were significant positive size and leverage effects and a significant negative asset-tangibility effect on working capital in the Indian sugar industry.*

Keywords: *Determinants of Working Capital, Sugar Manufacturing Companies, Inventory Cycle, Receivables Cycle, Payables Cycle, Cash Conversion Cycle, Size, Leverage, Asset Tangibility, Growth Rate of Sales, Profitability*

INTRODUCTION

Working capital management involves the control of current assets and current liabilities, balancing between the twin objectives of liquidity and profitability (Dash & Hanuman, 2015). At one extreme, too much investment in working capital reduces firm profitability, while at the other extreme, too little working capital may disrupt the firm's day-to-day operations. Therefore, working capital is often described as the 'life-blood' of a firm, providing short-term liquidity for uninterrupted business operations while creating the maximum wealth to the firm.

Working capital management is particularly important for sugar manufacturing companies, as inventory cycles in the sugar industry generally tend to be relatively long, as its raw material inputs are seasonal and thus require a longer period of storage.[1] The average net working capital cycle for sugar manufacturing companies in 2010–11 was about 57 days, with inventory accounting for about 124 days, receivables about 17 days and payables about 84 days.

The Indian sugar manufacturing industry has become increasingly uncompetitive. According to the Indian Sugar Mills Association,[2] the cost of sugar production has been very high, consistently more than 50% above the global cost of sugar production, reflecting inefficiencies in the operational standards of the Indian sugar industry as compared with global standards. This in turn is mainly due to high sugar cane prices (viz. the Fair and Remunerative Price (FRP)), which have been growing at a Compound Annual Growth Rate (CAGR) of 8.6% p.a. This has also led to unprecedented levels of arrears to sugar cane producers, exceeding Rs. 30,000 crore in the last quarter of 2019, and sugar stock levels standing at about 125 lakh tons and growing at a CAGR of 8.6%.[3] This again highlights the importance of effective working capital management in Indian sugar manufacturing companies.

There are some general determinants of working capital. The nature of the business/industry plays a major role in determining working capital; working capital requirements in manufacturing industries are generally higher than in trading or service industries. Macroeconomic conditions such as the stage in the business cycle also play a major role in determining working capital; more working capital is required in boom periods as compared to periods of recession and depression due to the higher level of demand and sales.

---

[1] https://www.equitymaster.com/detail.asp?date=11/30/201 1&story=10&title=Working-capital-management-across-industries

[2] https://www.indiansugar.com/uploads/Niti_Aayog.pdf

[3] http://content.icicidirect.com/mailimages/IDirect_SugarSector_IC.pdf

* Professor & Head of Department, Management Science, School of Business, Alliance University, Karnataka, India. mihirda@rediffmail.com

Another important determinant of working capital is the credit terms offered and received. If sales are carried out mainly in cash, the working capital requirement would be less, and the working capital requirement would increase with the proportion of credit sales. On the other hand, if purchases are carried out in cash, the working capital requirement would be more, and the working capital requirement would decrease with the proportion of credit purchases. The credit terms could be further affected by market power of the firm, its suppliers and its customers.

The firm-level determinants of working capital include firm size, asset tangibility, leverage, profitability, operational efficiency, operating cash flows, sales growth and increase in capital expenditure. The current study examines the firm-level determinants of working capital in the Indian sugar industry.

LITERATURE REVIEW

Working capital management is a well-studied area of financial management. Several studies have found significant impact of working capital management policies on firm profitability (Shin & Sonen, 1998; Deloof, 2003; Lazaridis & Tryfonidis, 2006; Rehman, 2006; Rehman & Nasr, 2007; Afza & Nazir, 2009; Azhar & Noriza, 2010; Chatterjee, 2012; Sharma, 2012; Baños-Caballero et al., 2014; Das, 2015a, 2015b). This necessitates the understanding of the determinants of working capital in order to set working capital levels to increase firm profitability.

Several studies have examined the firm-level determinants of working capital, identifying several internal factors, including firm size, profitability, asset tangibility and growth, along with external factors, predominantly economic conditions, viz. macroeconomic variables including GDP and inflation. Chiou et al. (2006) found that working capital requirements were significantly negatively related to leverage and operating cash flow to total assets and significantly positively related to firm age and profitability. Appuhami (2008) found that capital expenditure, operating cash flow and sales growth have a significant impact on working capital. Afza and Nazir (2009) found that the operating cycle, leverage, return on assets and Tobin's q were significant internal factors affecting firms' working capital. Gill (2011) found that working capital requirements were significantly negatively related to firm size and Tobin's q, significantly positively related to operating cycle and return on assets, and not significantly related to leverage and operating cash flow. Mansoori and Muhammad (2012) found that firm size, operating cash flow to sales and capital expenditure to sales were significantly negatively related to working capital. Palombini and Nakamura (2012) found that significant negative impact of size and growth rate on inventory,

receivables, and payables days and cash conversion cycle, and a significant negative impact of leverage on inventory and cash conversion cycle but a significant positive impact of leverage on receivables and payables days. Abbadi and Abbadi (2013) found that working capital requirements were significantly negatively related to firm size and leverage and significantly positively related to the cash conversion cycle, operating cash flows and profitability; they also found that working capital requirements were not significantly related to economic variables such as interest rate and read GDP growth rate. Mongrut et al. (2014) found that the cash conversion cycle was negatively related to firm size and positively related to the industry concentration index, suggesting that market power plays a role in working capital management. Zariyawatt et al. (2016) found that leverage, performance, capital expenditure and operating cash flow were the significant firm-level variables affecting the cash conversion cycle, along with economic conditions (random effects); further, working capital management decisions in small firms were quite different from that in large firms. Cuong and Nhung (2017) found that size and asset tangibility had a significant negative impact on working capital ratio, while profitability had a significant positive impact on working capital ratio for listed non-financial firms.

Thus, there is mixed evidence of working capital determinants in the literature, varying across countries and according to industry. The present study examines the firm-level working capital determinants for Indian sugar manufacturing companies.

METHODOLOGY

The objective of the study is to analyse the firm-level determinants of working capital for sugar manufacturing companies. The sample for the study included 15 listed sugar manufacturing companies given in Table 1 below. The data for the study pertained to the period 2008–18 and was collected from the Capitaline database.

Table 1: Sample Sugar Manufacturing Companies

1	Balarampur Chini	9	Kothari
2	Bannari Amman	10	Ponni
3	Dalmia Bharat	11	Rajshree
4	DCM Shriram	12	Sakthi
5	Dhampur Mills	13	Sir Shadi Lal
6	Dharani	14	Triveni
7	Eid Parry	15	Ugar
8	Kesar		

Following Driscoll and Kraay (1998), to control for firm-specific differences in working capital management as

well as for year-to-year differences in working capital management for the industry as a whole, fixed-effects panel regression methodology was used. The independent variables considered were size (logarithm of total assets), leverage (debt-equity ratio), asset tangibility (fixed assets as a percentage of total assets), growth rate of sales and profitability (return on assets). These variables were considered for the study as they were some of the most commonly examined determinants of working capital in the literature. The dependent variables considered include the current ratio, inventory cycle, receivables cycle, payables cycle, cash conversion cycle, total assets turnover ratio, fixed assets turnover ratio, inventory turnover ratio, receivables turnover ratio and payables turnover ratio.

In the first model, the dependent variable was the current ratio, i.e., the ratio of current assets to current liabilities. The current ratio is an indicator of firm liquidity, comparing the short-term assets (which represent expected cash inflows within the next one year) with the short-term liabilities (which represent expected cash outflows within the next 1 year).

In the second, third and fourth models, the dependent variables were the inventory cycle, i.e. the ratio of average inventory to sales, the receivables cycle, i.e. the ratio of average receivables to sales, and the payables cycle, i.e. the ratio of average payables to sales, expressed in days. The inventory cycle represents the average number of days between input purchases and output sales; the receivables cycle represents the average number of days between output sales and cash receipts from output sales; and the payables cycle represents the average number of days between input purchases and cash payments for input purchases. In the fifth model, the dependent variable was the cash conversion cycle, i.e. the sum of the inventory cycle and the receivables cycle, less the payables cycle. The cash conversion cycle represents the average number of days between cash payments for input purchases and cash receipts from output sales.

In the sixth and seventh models, the dependent variables were the total assets turnover ratio, i.e. the ratio of sales to total assets, and the fixed assets turnover ratio, i.e. the ratio of sales to fixed assets. The total assets turnover ratio measures how efficiently a firm generates sales revenue using its assets, while the fixed assets turnover ratio measures how productively a firm generates sales revenue using its fixed assets.

In the eighth, ninth and tenth models, the dependent variables were the inventory turnover ratio, i.e. the ratio of sales to average inventory, the receivables turnover ratio, i.e. the ratio of sales to average receivables, and the payables turnover ratio, i.e. the ratio of sales to average payables. The inventory turnover ratio measures how efficiently a

firm manages its inventory for generating sales revenue; the receivables turnover ratio measures how effectively a firm collects its receivables from its debtors; and the payables turnover ratio measures how quickly a firm settles its payables to its suppliers.

The descriptive statistics of the variables are presented in Table 2 in the Annexures, while the results of the fixed-effects panel regression models are presented in Tables 3 and 4 in the Annexures.

FINDINGS

There were found to be significant differences in the current ratio between companies and across years. Controlling for differences between companies and across years, the current ratio was found to be significantly positively related to company size and significantly negatively related to asset tangibility, and not significantly related to the debt-equity ratio, sales growth and ROA.

There were found to be significant differences in the inventory cycle between companies and across years. Controlling for differences between companies and across years, the inventory cycle was found to be significantly positively related to the debt-equity ratio and significantly negatively related to asset tangibility, and not significantly related to the company size, sales growth and ROA.

There were found to be significant differences in the receivables cycle between companies and across years. Controlling for differences between companies and across years, the receivables cycle was found to be significantly positively related to company size, and not significantly related to the debt-equity ratio, asset tangibility, sales growth and ROA.

There were found to be significant differences in the payables cycle between companies and across years. Controlling for differences between companies and across years, the payables cycle was found to be significantly positively related to asset tangibility, significantly negatively related to company size and ROA, and not significantly related to the debt-equity ratio and sales growth.

There were found to be significant differences in the cash conversion cycle between companies. Controlling for differences between companies and across years, the cash conversion cycle was found to be significantly positively related to company size and the debt-equity ratio, significantly negatively related to asset tangibility and sales growth, and not significantly related to ROA.

There were found to be significant differences in the total assets turnover ratio between companies and across years. Controlling for differences between companies and across

years, the total assets turnover ratio was found to be significantly positively related to sales growth, significantly negatively related to company size, debt-equity ratio, and asset tangibility, and not significantly related to ROA.

There were found to be significant differences in the fixed assets turnover ratio between companies and across years. Controlling for differences between companies and across years, the fixed assets turnover ratio was found to be significantly positively related to sales growth and ROA, significantly negatively related to company size and asset tangibility, and not significantly related to debt-equity ratio.

There were found to be significant differences in the inventory turnover ratio between companies and across years. Controlling for differences between companies and across years, the inventory turnover ratio was found to be significantly positively related to asset tangibility, and not significantly related to company size, debt-equity ratio, sales growth and ROA.

There were found to be significant differences in the receivables turnover ratio between companies. Controlling for differences between companies and across years, the receivables turnover ratio was found to be significantly positively related to ROA, significantly negatively related to company size, and not significantly related to debt-equity ratio, asset tangibility and sales growth.

There were found to be significant differences in the payables turnover ratio between companies and across years. Controlling for differences between companies and across years, the payables turnover ratio not significantly related to company size, debt-equity ratio, asset tangibility, sales growth and ROA.

DISCUSSION

The results of the study indicate a significant positive size effect on working capital, particularly the current ratio, the receivables cycle and the cash conversion cycle, and a significant negative size effect on the payables cycle. This suggests that larger sugar manufacturing companies tend to permit their debtors longer time to settle, while they prefer to settle their payments with creditors earlier. This could reflect the asymmetries in the sugar market. Their suppliers are the sugarcane producers, which are fragmented and unorganised, so that earlier payment may induce them to provide sugarcane at lower costs and retain them as dedicated suppliers. Their customers are various agro-businesses and food retailers, which tend to be more organised and may be able to exert market power to delay settlement of their receivables. As a consequence, larger companies tend to have longer cash conversion cycles and higher current ratios. Interestingly, the inventory cycle was not significantly affected by firm size.

The results of the study also indicate a significant negative asset-tangibility effect on working capital, particularly the current ratio, the inventory cycle and the cash conversion cycle, and a significant positive size effect on the payables cycle. This could suggest that companies with greater fixed-assets investments, e.g. more modern/mechanised, tend to be leaner, i.e. require to hold less inventory. They also seem to be able to delay settlement of their payables, perhaps as they may buy sugarcane directly from the market, not relying on dedicated suppliers. As a consequence, they tend to have shorter cash conversion cycles and lower current ratios.

The results of the study also indicate a significant positive leverage effect on working capital, particularly the inventory cycle and the cash conversion cycle. This may be explained by the Pecking Order Theory: firms with a lower level of debt would tend to reduce their inventory levels to release internal funds in the short run rather than relying on external funding. As a consequence, firms with lower leverage would tend to have shorter cash conversion cycles.

The results of the study indicate a significant negative profitability effect on the payables cycle. Though this is apparently counter-intuitive, it may suggest that less profitable sugar manufacturing companies tend to delay their payments, as observed by Deloof (2003). The results of the study also indicate a significant negative growth effect on the cash conversion cycle. This may suggest that firms with faster growth tend to be more efficient in managing their working capital requirements. This latter observation needs to be examined further.

The results of the study indicate the significant negative size and asset tangibility effects and significant positive growth effect on total assets turnover and fixed assets turnover ratios. This suggests the possibility of diseconomies of scale and diminishing productivity for larger sugar manufacturing companies and those with greater fixed-assets investments. However, these effects could develop after a threshold level. On the other hand, the results suggest that growth stimulates productivity. These phenomena would have to be examined in greater detail, perhaps using a production function approach.

There are some limitations inherent in the present study. The sample size considered for the study was relatively small, only 15, selected from among the large/medium-sized sugar manufacturing companies, and the study period is limited to 10 years, so that the results of the study may not be generalisable. Also, only some determinants of working capital have been considered in the study; other determinants such as capital expenditure and operating cash flow should also be considered for further studies.

REFERENCES

Abbadi, S. M., & Abbadi, R. T. (2013). The determinants of working capital requirement in Palestinian industrial corporations. *International Journal of Economics and Finance, 5*(1), 67-75.

Afza, T., & Nazir, S. M. (2009). Is it better to be aggressive or conservative in managing working capital? *IUP Journal of Applied Finance, 15*(8), 19-30.

Appuhami, B. R. (2008). The impact of firms' capital expenditure on working capital management: An empirical study across industries in Thailand. *International Management Review, 4*(1), 8-21.

Azhar, N., & Noriza, M. (2010). Working capital management: The effect of market valuation and profitability in Malaysia. *International Journal of Business and Management, 5*(11), 140-147.

Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2014). Working capital management, corporate performance, and financial constraints. *Journal of Business Research, 67,* 332-338.

Chatterjee, S. (2012). *The impact of working capital on the profitability: Evidence from the Indian firms*. SSRN Working Paper Series. Retrieved from https://ssrn.com/abstract=2125228

Chiou, J. R., Cheng, L., & Wu, H. W. (2006). The determinants of working capital management. *Journal of American Academy of Business, 10*(1), 149-155.

Cuon, N. T., & Nhung, N. T. H. (2017). Determinants of working capital requirement: Evidence from non-financial firms listed on the Vietnam exchange. *Journal of Insurance and Financial Management, 3*(1), 19-29.

Das, S. (2015). Measuring the efficiency of business through cash management - A study on consumer durable sector. *Journal of Commerce and Accounting Research, 4*(1), 1-13.

Das, S. (2015). Cash management in IT sector - A study. *Journal of Commerce and Accounting* Research, *4*(3/4), 27-39.

Dash, M., & Hanuman, R. (2015). A goal programming model for working capital management. *Journal of Management and Science, 5*(1), 7-16.

Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business Finance and Accounting, 30*(3/4), 573-587.

Driscoll, J., & Kraay, A. (1998). Consistent covariance matrix estimation with spatially dependent panel data. *The Review of Economics and Statistics, 80*(4), 549-560.

Lazaridis, I., & Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of Financial Management and Analysis, 19*(1), 26-35.

Gill, A. (2011). Factors that influence working capital requirement in Canada. *Journal of Economic and Finance Review, 1*(3), 30-40.

Mansoori, E., & Muhammad, J. (2012). Determinants of working capital management: Case of Singapore firms. *Research Journal of Finance and Accounting, 3*(11), 15-23.

Mongrut, S., Fuenzalida, D., Cubillas, C., & Cubillas, J. (2014). Determinants of working capital management in Latin America. *Revista Innovar Journal, 24*(51), 5-18.

Palombini, N. V. K., & Nakamura, W. T. (2012). Key factors in working capital management in the Brazilian market. *Revista de Administração de Empresas, 52*(1), 55-69.

Rehman A. (2006). *Working capital management and profitability: Case of Pakistani firms* (Unpublished Dissertation). COMSATS Institute of Information Technology (CIIT), Islamabad, Pakistan.

Rehman, A., & Nasr, M. (2007). Working capital management and profitability - Case of Pakistani firms. *International Review of Business Research Papers, 3*(1), 279-300.

Sharma, A. (2012). Cost of capital and profitability analysis: A case study of telecommunication industry. *Journal of Commerce and Accounting Research, 1*(4), 42-50.

Shin, H., & Soenen, L. (1998). Efficiency of working capital and corporate profitability. *Financial Practice and Education, 8*(2), 37-45.

Zariyawati, M. A., Annuar, M. N., & Pui-San, N. (2016). Working capital management determinants of small and large firms in Malaysia. *International Journal of Economics and Management, 10*(2), 365-377.

Annexures

Table 2: Descriptive Statistics of Variables

		log(TA)	D/E	Asset Tngbty	Sales Grwth	ROA	CR	Invtry Cycle	Rcvbles Cycle	Paybls Cycle	CCC	ATR	FATR	ITR	RTR	PTR
Balaram-pur Chini	Mean	7.95	1.25	0.56	0.21	0.06	3.52	193.21	15.02	62.62	145.61	1.02	1.41	2.14	32.27	10.32
	Std. Dev.	0.15	0.31	0.14	0.65	0.06	1.68	61.80	6.89	37.64	47.94	0.26	0.65	0.92	21.77	11.45
Bannari Amman	Mean	7.33	0.81	0.53	0.08	0.07	5.44	239.78	25.53	34.57	230.74	0.76	0.96	1.82	15.81	11.48
	Std. Dev.	0.38	0.43	0.13	0.25	0.06	2.29	113.72	7.82	12.10	115.77	0.21	0.18	0.74	5.66	3.04
Dalmia Bharat	Mean	7.51	1.63	0.54	0.09	0.03	2.86	193.48	22.92	73.95	142.45	0.76	0.89	2.09	22.21	5.48
	Std. Dev.	0.49	0.52	0.05	0.32	0.03	0.88	56.93	11.49	22.52	62.95	0.15	0.13	0.79	16.38	2.12
DCM Shriram	Mean	6.43	1.47	0.49	0.08	0.04	2.25	131.71	30.34	67.75	94.30	1.90	2.34	2.80	12.19	5.56
	Std. Dev.	0.17	0.32	0.05	0.07	0.05	0.40	14.08	3.61	11.60	13.14	0.22	1.14	0.32	1.49	1.16
Dhampur Mills	Mean	7.52	2.29	0.64	0.30	0.02	2.22	185.20	33.12	95.89	122.43	1.03	1.11	2.19	13.15	4.87
	Std. Dev.	0.28	0.74	0.08	0.79	0.04	0.83	56.51	11.70	47.26	53.05	0.38	0.40	0.86	7.54	2.70
Dharani	Mean	6.44	7.51	0.68	0.14	-0.02	2.28	158.83	30.48	82.80	106.52	0.84	0.99	2.90	16.35	8.24
	Std. Dev.	0.19	8.92	0.17	0.58	0.06	1.01	66.40	15.80	53.87	30.32	0.28	0.44	1.74	10.02	7.72
Eid Parry	Mean	7.77	0.89	0.48	0.07	0.05	2.52	105.51	34.87	47.12	93.26	0.85	1.24	4.83	11.11	9.17
	Std. Dev.	0.28	0.39	0.08	0.24	0.05	1.32	56.92	8.21	20.59	47.80	0.13	0.22	3.07	3.16	3.84
Kesar	Mean	5.91	4.07	0.66	0.06	-0.05	2.38	165.36	26.94	94.24	98.06	0.85	1.00	3.52	17.59	5.65
	Std. Dev.	0.42	2.23	0.36	0.15	0.10	1.82	85.21	16.25	45.40	110.40	0.24	0.57	3.51	8.12	5.13
Kothari	Mean	5.67	1.32	0.68	0.02	0.02	2.49	107.02	15.41	47.77	74.66	1.14	1.06	3.83	27.15	9.30
	Std. Dev.	0.06	0.29	0.05	0.22	0.02	0.82	38.25	5.38	22.06	30.59	0.15	0.29	1.38	11.80	4.86
Ponni	Mean	5.16	0.46	0.50	0.07	0.08	2.05	108.56	25.79	50.71	83.65	1.34	2.00	3.70	27.33	8.01
	Std. Dev.	0.43	0.25	0.14	0.37	0.13	0.54	33.40	16.87	15.31	35.08	0.69	1.24	1.24	29.01	3.27
Rajshree	Mean	6.50	6.69	0.72	0.07	-0.01	1.99	110.40	24.17	65.21	69.36	0.94	0.94	3.47	17.50	6.40
	Std. Dev.	0.13	5.39	0.08	0.33	0.05	0.49	24.64	9.51	24.69	18.57	0.19	0.26	0.83	7.20	2.51
Sakthi	Mean	7.43	2.45	0.75	0.00	-0.04	1.04	42.08	25.56	100.44	-32.80	0.62	0.69	10.40	23.10	4.35
	Std. Dev.	0.19	0.59	0.14	0.37	0.05	0.64	17.45	17.20	39.95	34.88	0.18	0.27	5.32	17.00	2.34
Sir Shadi Lal	Mean	5.18	0.78	0.30	0.05	-0.13	2.12	194.88	4.22	107.72	91.37	2.43	2.87	1.96	113.87	6.41
	Std. Dev.	0.51	5.66	0.09	0.14	0.20	1.26	42.20	2.23	67.87	100.41	1.19	1.07	0.46	63.43	6.15
Triveni	Mean	7.63	1.57	0.51	0.16	0.02	2.87	144.14	38.72	59.59	123.28	1.17	1.83	3.00	10.01	8.50
	Std. Dev.	0.11	0.75	0.13	0.46	0.07	0.94	64.03	8.73	33.85	50.34	0.37	0.91	1.24	3.04	5.29
Ugar	Mean	5.99	3.61	0.43	0.11	-0.01	2.18	212.64	20.87	78.20	155.31	1.68	1.51	1.74	25.98	10.40
	Std. Dev.	0.16	1.74	0.09	0.25	0.07	0.72	25.94	16.10	33.78	44.47	0.46	0.25	0.22	16.67	18.32
Overall	Mean	6.69	2.45	0.56	0.10	0.01	2.55	152.85	24.93	71.24	106.55	1.15	1.39	3.36	25.71	7.61
	Std. Dev.	0.97	3.67	0.18	0.38	0.09	1.45	74.10	13.88	40.42	79.78	0.63	0.86	2.84	31.66	6.86

Table 3: Fixed-Effects Panel Regression Results

	Current Ratio		Inventory Cycle		Receivables Cycle		Payables Cycle		Cash Conversion Cycle	
	F Stat	p-value	F Stat	p-value	F Stat	p-value	F Stat	p-value	F Stat	p-value
Corrected Model	9.4426	0.0000	9.1687	0.0000	5.4600	0.0000	7.6027	0.0000	13.4955	0.0000
Intercept	2.7855	0.0980	1.2913	0.2584	4.6956	0.0325	29.8414	0.0000	7.6602	0.0067
company	9.4691	0.0000	8.8756	0.0000	5.1706	0.0000	5.3164	0.0000	11.8911	0.0000
year	2.9263	0.0054	3.0003	0.0045	3.8554	0.0005	6.0681	0.0000	1.3846	0.2115
log(TA)	14.8806	0.0002	1.5511	0.2157	8.9920	0.0034	23.4603	0.0000	26.2430	0.0000
D/E Ratio	0.1296	0.7196	4.5318	0.0356	0.1340	0.7151	0.1296	0.7195	3.8741	0.0476
Asset Tangibility	34.2022	0.0000	34.9249	0.0000	2.3920	0.1249	5.4923	0.0209	55.7862	0.0000
Sales Growth	0.0557	0.8139	2.9303	0.0898	3.2899	0.0725	0.1028	0.7491	6.0764	0.0153
ROA	0.0206	0.8861	0.1046	0.7470	0.0098	0.9211	3.6262	0.0496	0.7905	0.3759
R^2	70.40%		69.80%		57.90%		65.70%		77.30%	
adj R^2	63.00%		62.20%		47.30%		57.10%		71.60%	
	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
Intercept	-4.1350	0.0441	166.4018	0.1045	-50.5938	0.0246	355.1543	0.0000	-239.3463	0.0130
[Balarampur Chini]	-0.6447	0.4234	-23.2486	0.5639	-27.3250	0.0024	83.0742	0.0007	-133.6478	0.0005
[Bannari Amman]	2.2417	0.0010	33.3908	0.3151	-12.8403	0.0783	24.8380	0.2088	-4.2875	0.8897
[Dalmia Bharat]	-0.5221	0.4297	-13.6019	0.6808	-16.7730	0.0217	59.6020	0.0029	-89.9769	0.0042
[DCM Shriram]	-0.2450	0.6075	-75.5587	0.0020	4.0255	0.4405	16.5347	0.2448	-88.0679	0.0001
[Dhampur Mills]	-1.1657	0.0958	-7.0147	0.8403	-6.0714	0.4250	90.4150	0.0000	-103.5010	0.0018
[Dharani]	0.6378	0.2154	-24.8169	0.3350	4.2214	0.4522	12.2221	0.4236	-32.8175	0.1724
[Eid Parry]	-1.6429	0.0330	-121.2283	0.0019	-5.7274	0.4923	62.1917	0.0070	-189.1474	0.0000
[Kesar]	1.2192	0.0108	-4.8330	0.8376	5.0327	0.3293	3.9386	0.7785	-3.7389	0.8649
[Kothari]	1.8855	0.0002	-42.2537	0.0865	-4.1816	0.4347	-54.7156	0.0003	8.2802	0.7169
[Ponni]	1.1661	0.0262	-70.2619	0.0078	14.4992	0.0117	-56.4495	0.0004	0.6868	0.9774
[Rajshree]	0.3031	0.5570	-68.0559	0.0095	-3.7651	0.5046	-2.0856	0.8918	-69.7353	0.0045
[Sakthi]	-1.6771	0.0152	-133.0290	0.0002	-12.7738	0.0885	73.2470	0.0004	-219.0498	0.0000
[Sir Shadi Lal]	0.3329	0.5549	-33.5765	0.2353	-5.8351	0.3442	-3.1291	0.8518	-36.2826	0.1694
[Triveni]	-1.0263	0.1479	-81.4711	0.0227	-0.7600	0.9215	60.9327	0.0044	-143.1638	0.0000
[Ugar]	0(a)	.	0(a)	.	0(a)	.	0(a)	.	0(a)	.
[year 2010]	0.4012	0.2869	0.7078	0.9700	0.4747	0.9080	-15.9356	0.1556	17.1181	0.3301
[year 2011]	1.4144	0.0001	-22.4239	0.2106	-1.2187	0.7545	-55.5094	0.0000	31.8668	0.0576
[year 2012]	0.3125	0.3752	-28.1535	0.1121	6.9367	0.0734	-33.8652	0.0016	12.6484	0.4418
[year 2013]	0.2693	0.4379	-3.2008	0.8537	-1.1688	0.7578	-24.4793	0.0190	20.1096	0.2156
[year 2014]	0.0423	0.9012	36.4413	0.0346	-2.6089	0.4843	-3.4095	0.7366	37.2418	0.0208
[year 2015]	0.2736	0.4434	27.1137	0.1307	4.5565	0.2437	-2.1365	0.8402	33.8067	0.0442
[year 2016]	0.0160	0.9626	26.1527	0.1274	13.6482	0.0004	-0.6047	0.9524	40.4056	0.0123

	Current Ratio		Inventory Cycle		Receivables Cycle		Payables Cycle		Cash Conversion Cycle	
	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
[year 2017]	0.4757	0.1907	6.6725	0.7129	0.3780	0.9239	-24.1863	0.0263	31.2369	0.0667
[year 2018]	0(a)	.	0(a)	.	0(a)	.	0(a)	.	0(a)	.
log(TA)	1.2681	0.0002	20.4962	0.2157	10.7748	0.0034	-47.3307	0.0000	78.6017	0.0000
D/E Ratio	0.0096	0.7196	2.8544	0.0356	-0.1072	0.7151	0.2867	0.7195	2.4605	0.0476
Asset Tangibility	-4.0124	0.0000	-202.9795	0.0000	11.5983	0.1249	47.7951	0.0209	-239.1763	0.0000
Sales Growth	-0.0558	0.8139	-20.2791	0.0898	-4.6916	0.0725	2.2556	0.7491	-27.2263	0.0153
ROA	-0.1945	0.8861	-21.9231	0.7470	1.4687	0.9211	-76.6484	0.0496	56.1939	0.3759

a. This parameter is redundant.

Table 4: Fixed-Effects Panel Regression Results

	Total Assets Turnover Ratio		Fixed Assets Turnover Ratio		Inventory Turnover Ratio		Receivables Turnover Ratio		Payables Turnover Ratio	
	F Stat	p-value	F Stat	p-value	F Stat	p-value	F Stat	p-value	F Stat	p-value
Corrected Model	24.4763	0.0000	13.8366	0.0000	7.8838	0.0000	10.0764	0.0000	1.9559	0.0084
Intercept	152.0939	0.0000	54.9577	0.0000	0.0421	0.8378	12.0557	0.0007	0.9185	0.3400
company	14.1229	0.0000	5.8943	0.0000	9.2077	0.0000	10.3742	0.0000	1.2285	0.2658
year	3.3426	0.0019	3.6965	0.0008	2.6931	0.0097	1.7235	0.1011	2.5512	0.0139
log(TA)	103.7163	0.0000	26.6660	0.0000	0.3903	0.5335	9.9550	0.0021	3.0158	0.0853
D/E Ratio	8.9213	0.0035	0.6179	0.4336	2.8906	0.0920	0.1546	0.6950	0.1950	0.6597
Asset Tangibility	6.8233	0.0103	39.5023	0.0000	8.5986	0.0041	0.9541	0.3309	2.3108	0.1314
Sales Growth	44.8626	0.0000	18.2166	0.0000	0.2772	0.5996	0.1074	0.7438	0.0053	0.9424
ROA	0.0021	0.9633	4.3770	0.0388	0.0037	0.9513	4.6760	0.0328	0.0598	0.8074
R²	86.10%		77.70%		66.50%		71.80%		33.00%	
adj R²	82.50%		72.10%		58.10%		64.60%		16.20%	
	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
Intercept	8.1777	0.0000	8.1948	0.0000	-1.9531	0.5607	151.0050	0.0006	-12.1368	0.4039
[Balarampur Chini]	1.2191	0.0000	1.7170	0.0001	-0.9008	0.4972	42.1590	0.0142	-8.2527	0.1522
[Bannari Amman]	0.3893	0.0491	0.7365	0.0314	-0.9780	0.3713	14.5101	0.3000	-4.5595	0.3356
[Dalmia Bharat]	0.4875	0.0139	0.7979	0.0196	-0.7858	0.4709	24.3701	0.0822	-10.6455	0.0255
[DCM Shriram]	0.6188	0.0000	1.3090	0.0000	0.5735	0.4661	-8.7785	0.3833	-7.3827	0.0318
[Dhampur Mills]	0.8596	0.0001	1.2504	0.0006	-0.9366	0.4145	15.0648	0.3052	-11.4357	0.0227
[Dharani]	-0.1727	0.2567	0.5133	0.0524	0.4684	0.5800	-6.7487	0.5330	-1.8404	0.6153
[Eid Parry]	0.8611	0.0002	1.2677	0.0015	1.4390	0.2535	19.5326	0.2257	-9.6938	0.0768
[Kesar]	-0.7775	0.0000	0.0722	0.7642	1.1683	0.1343	-12.7806	0.1997	-3.1828	0.3444

	Total Assets Turnover Ratio		Fixed Assets Turnover Ratio		Inventory Turnover Ratio		Receivables Turnover Ratio		Payables Turnover Ratio	
	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value	coeff	p-value
[Kothari]	-0.7991	0.0000	-0.2101	0.4014	1.1574	0.1530	-15.1653	0.1433	1.5851	0.6497
[Ponni]	-1.2346	0.0000	-0.2112	0.4262	1.8524	0.0320	-28.6962	0.0098	0.0663	0.9857
[Rajshree]	-0.0018	0.9904	0.5749	0.0310	0.8808	0.3013	-4.5972	0.6725	-4.2158	0.2533
[Sakthi]	0.4919	0.0161	1.2033	0.0008	5.6386	0.0000	23.0353	0.1110	-9.9851	0.0419
[Sir Shadi Lal]	-0.1521	0.3623	0.5869	0.0435	0.8513	0.3601	84.6515	0.0000	-2.9033	0.4705
[Triveni]	1.0356	0.0000	1.8448	0.0000	0.3227	0.7815	16.3559	0.2730	-8.8198	0.0820
[Ugar]	0(a)	.	0(a)	.	0(a)	.	0(a)	.	0(a)	.
[year 2010]	-0.4899	0.0000	-0.8358	0.0000	0.6565	0.2904	-7.9433	0.3171	1.4664	0.5846
[year 2011]	-0.3775	0.0005	-0.6292	0.0008	1.6909	0.0047	1.0812	0.8856	7.7966	0.0027
[year 2012]	-0.3237	0.0024	-0.6453	0.0005	1.3469	0.0218	-5.2093	0.4830	3.4293	0.1737
[year 2013]	-0.2393	0.0213	-0.6638	0.0003	0.5486	0.3381	8.0403	0.2726	2.7248	0.2719
[year 2014]	-0.1104	0.2753	-0.5314	0.0028	-0.4424	0.4318	11.8431	0.1015	-0.3338	0.8908
[year 2015]	-0.1091	0.3023	-0.5257	0.0046	0.0334	0.9546	1.7202	0.8190	0.0724	0.9773
[year 2016]	-0.1985	0.0511	-0.4861	0.0061	-0.1388	0.8048	-5.4782	0.4464	-0.2349	0.9230
[year 2017]	-0.2083	0.0540	-0.2638	0.1560	0.6433	0.2824	8.0956	0.2902	5.8743	0.0246
[year 2018]	0(a)	.	0(a)	.	0(a)	.	0(a)	.	0(a)	.
log(TA)	-0.9907	0.0000	-0.8677	0.0000	0.3385	0.5335	-21.8665	0.0021	4.0725	0.0853
D/E Ratio	-0.0237	0.0035	-0.0108	0.4336	-0.0751	0.0920	0.2220	0.6950	-0.0844	0.6597
Asset Tangibility	-0.5303	0.0103	-2.2041	0.0000	3.3163	0.0041	14.1282	0.3309	-7.4399	0.1314
Sales Growth	0.4690	0.0000	0.5163	0.0000	0.2054	0.5996	1.6349	0.7438	0.1223	0.9424
ROA	-0.0185	0.9633	1.4481	0.0388	0.1367	0.9513	61.7306	0.0328	2.3612	0.8074

a. This parameter is redundant.