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CSR Regulation and Working Capital Management: Evidence from a Quasi-Natural Experiment

Nemiraja Jadiyappa [1]
Mrunal Chavda [2]

[1]Associate professor, Finance, Accounting & Control Area, Indian Institute of Management Kozhikode, IIMK Campus PO, Kunnamangalam, Kozhikode, Kerala 673 570, India; Email - nemiraja@iimk.ac.in, Phone Number - 0495-2809446

[2]Assistant Professor, Indian Institute of Management Raipur; Email - mchavda@iimraipur.ac.in

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Nemiraja Jadiyappa
Associate professor,
Indian Institute of Management Kozhikode
Kerala, India
Email: nemiraja@iimk.ac.in

Mrunal Prabhudas Chavda
Assistant professor,
Indian Institute of Management Raipur
Chattisgarh, India
Email: mchavda@iimraipur.ac.in

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Abstract

This study examines the impact of CSR regulation on the working capital management of Indian firms using the 2% mandatory CSR spending regulation implemented in India in 2015 as a quasi-natural experiment setup. Using the cash conversion cycle (CC_Cycle) as a proxy to measure working capital management, we observe a positive impact of CSR regulation on CC_Cycle. Further, we show that this negative relationship is driven by the fact that the costly trade credit was replaced by cheaper debt from institutional sources. The results remain robust for various model specifications, estimators, and sample selection procedures. These results are consistent with the views of the financial access hypothesis, which suggests that CSR activities increase firms' access to finance from institutional sources, allowing firms to replace costly trade credits with cheaper institutional capital.

Introduction

CSR activities of corporate firms are known to affect the financial policy of firms (Bhuiyan and Nguyen, 2019; Gong et al., 2021). This literature shows that CSR affects financial policy through its negative impact on the cost of equity and the cost of debt (El Ghoul et al., 2011). However, there is no clarity in the literature about how this negative impact would affect the working capital management of firms. This question is important because working capital constitutes a major part of the total investment made by firms. For example, about 76% of the total assets of UK firms are invested in working capital (Baños-Caballero et al., 2014). Even in an emerging country like India, our data show that about 68% of the total assets are in the form of working capital. Further, management of working capital, i.e., managing inventories, cash balance, trade receivables, and trade payables, affects a firm's financial performance, value in capital markets, and short-term liquidity risk (Kieschnick, 2013; Singh and Kumar, 2014). Given the importance of working capital in firms' overall functioning, performance, and survival, it is important to examine whether socially responsible activities of firms affect their working capital management.

Our main insight is that the observed working capital management is a consequence of the firm's relationship with various stakeholders like suppliers of raw materials (trade credits), capital providers (Banks), and customers (trade receivables). In this act of managing and balancing the interests of various stakeholders, CSR plays an important role. Various CSR theories, for example, the stakeholder, legitimacy, and social trust theories, predict that firms' CSR activities help build mutually beneficial relationships between the firm and its stakeholders, especially trade and financial creditors. Therefore, it is natural that CSR should affect working capital management. Hence, in this study, we examine the impact of CSR on working capital management by using the 2% mandatory CSR regulation implemented in India in 2015 as a quasi-natural experiment setting.

India Sec-135 of the Indian Companies Act, 2013 requires firms meeting some pre-defined criteria spend at least 2% of the average profit of the preceding three year's net profit on specific CSR activities mentioned in the schedule to the Act. The regulation applies to firms that meet any of the following three criteria. 1) Net profit of Rs. 50 million (approximately USD 7 million[1]) or more, 2) Net worth of Rs.5 billion (approximately USD 70 million) or more, 3) Sales of Rs. 10 billion (approximately USD 140 million) or more. Firms must report this

[1] 1USD=Rs.70 approximately

spending in their annual financial statements filed with the regulators and explain why they have not spent the required amount on CSR activities. Jadiyappa et al. (2021) and Roy et al. (2022) use this selective application of the regulation to divide sample firms into treatment (firms that were affected by the regulation) and control (Firms that are not affected by the regulation) groups, which allows us to use the difference in differences (DiD) approach to extract the marginal impact of CSR on the working capital management.

We use two theoretical insights to hypothesize how CSR regulation would likely impact working capital management. First, based mainly on the stakeholder and social trust theories, improving the relationship with trade creditors and debtors should affect working capital management as trade payables and receivables are the main constituents of working capital management. Second, improving relations with financial institutions should also affect working capital management as firms would replace costly trade credits with debt from financial markets, which is far cheaper (Petersen and Rajan, 1997). While the stakeholder hypothesis predicts a negative impact of CSR regulation on the length of the cash conversion cycle (CC_Cycle), a widely used proxy to measure working capital policy, the financial access hypothesis predicts a positive impact. Therefore, we examine the changes in the CC_Cycle of treatment and control firms between pre- and post-periods to extract the marginal impact of CSR regulation on working capital management policy. Our analysis shows that CSR positively impacts the length of the CC_Cycle, i.e., the length of the cash conversion cycle of the treatment firms increased following the CSR regulation. This result is consistent with the financial access hypothesis.

Next, we conduct two additional tests to examine the financial hypothesis further. First, we individually examine the impact of CSR on the constituents, i.e., accounts receivable days, inventory days, and accounts payable days, of the CC_Cycle. The insight is that if CSR replaces the costly trade credit with institutional debt, the observed positive change in CC_Cycle should be due to a decrease in the account payable cycle. Our results are consistent with this insight, i.e., while we observe a negative impact of CSR on the payable cycle of treatment firms, no significant changes in receivable and inventory cycles were observed. This result suggests, consistent with the financial access hypothesis that, CSR regulation's positive impact on the CC_Cycle is driven mainly by its negative impact on the payable cycle. In the second analysis, we directly examine the relative changes in debt and account payables between pre and post-CSR periods. To test this, first, we calculate the Debt_Payables_Ratio (DPR) as the difference between total debt and account payables, scaled by total assets. The CSR regulation is expected

to positively impact this ratio for treatment firms, i.e., if firms are replacing trade credit with institutional debt, then the difference between debt and trade credit should be greater in the post-regulation period for treatment compared to control firms. Consistent with this prediction, we find a positive impact of CSR regulation on treatment firms' DPR; for control firms, the impact is negative. These two additional analyses provide strong supporting evidence for the financial access hypothesis.

Apart from these analyses, we also conducted three additional tests to check the robustness of the observed results for the alternate estimator, sample selection procedure, and a false regulation event. In the first robustness test, we re-run the analysis using the fixed effects estimator, which controls the impact of unobservable time-invariant firm heterogeneity on working capital policy. Our results remain qualitatively the same for this alternate estimator. In the second test, we adjust our sample selection procedure to account for possible selection bias in the construction of treatment and control firms using the propensity score matching (PSM) approach. The resultant treatment and control samples are balanced regarding the various covariates used in our study. We administered an analysis of this balanced treatment and control samples and found qualitatively similar results. Lastly, in the third test, we take 2009 as an arbitrary CSR regulation year and re-run our analysis from 2004 through 2013[2]. The insight is that if the change in the CC_Cycle of the treatment firms is due to CSR regulation, then we should observe no difference in the response of treatment and control firms to a false regulation event. Consistent with this insight, we find no difference between treatment and control firms for this alternate regulation event. This result provides additional robust evidence for the impact of CSR regulation on working capital management.

Our study contributes to the existing literature from three aspects. First, we extend the CSR literature by examining the impact of CSR on working capital management policy, and we have found no such examination in the prior literature. Examining this aspect is important because working capital assets constitute a major chunk of the total assets, and management of such activities is closely linked to firm performance and liquidation risk. Therefore, it is one of the important channels through which CSR affects firm value. Such an examination would be helpful to firm managers as well as investors. Managers would know how various stakeholders involved in working capital management react to their CSR initiatives and what would be the net impact of their CSR activities. For investors, it helps in making better-informed decisions.

[2] The assumed pre-regulation period is from 2004 to 2008

Second, we extend the stream of the literature, which examines the consequences of CSR regulation. Hitherto, the prior literature has examined the impact of CSR regulation on a firm's value, earnings management, cash holdings, stock liquidity, and tax aggregation. We extend this literature by examining the impact of CSR regulation on working capital management policy. Such a policy examination helps policymakers contemplating CSR regulations in their economies understand the likely consequences of their action. Lastly, the use of quasi-natural experiment and DiD approach to address the concerns of endogeneity issue, a major issue in most empirical studies.

The remainder of the paper is organized as follows. We briefly describe the 2% CSR regulation in the second section. We develop the hypotheses to be tested in the third section, and in the fourth section, we discuss data and methodological aspects. The results are presented and discussed in the firth section, and conclusions are drawn in the sixth section.

2 Conceptual framework and hypotheses

We connect CSR and working capital management theories to develop testable hypotheses on the relationship between CSR regulation and CC_Cycle. Our basic insight is that CSR activities reduce information and agency problems between various stakeholders involved in working capital management by building strong relationships among them and thereby affect firms working capital policy. We discuss the connection between the two in the following paragraphs.

From the demand side perspective, the trade-off between benefits and costs determines the optimal working capital management policy. The benefits are increased sales and profitability, and the costs are the cost of financing working capital (Singh and Kumar, 2014). Long CC_Cycle increases revenue and profitability but, at the same time, comes with greater financial costs (Baños-Caballero et al., 2014). From the supply side perspective, the costs and benefits for various players involved in working capital, i.e., suppliers, lenders, and customers, depend on the degree of information asymmetry and agency issues between the firm and these parties (Petersen and Rajan, 1997). For example, greater uncertainty induces suppliers not to extend credit for long. Therefore, if CSR impacts the CC_Cycle, it has to come from its effect on the costs or benefits of various stakeholders involved working capital cycle. In the following section, we first discuss the constituents of the CC_Cycle and then explain how CSR would possibly affect the costs and benefits associated with those constituents.

CC_Cycle is constructed using three individual cycles, i.e., receivables, inventory, and payables. These cycle constituents have a different effect on the length of the cycle and, thus, the costs and benefits. While receivable and inventory days positively impact the overall CC_cycle, the payable days negatively impact it (Singh and Kumar, 2014). These individual cycles reflect firms' relationships with customers, lenders, and raw material suppliers. Therefore, it could be argued that the relationship between firms and various stakeholders would determine working capital management. The impact of CSR on working capital management must be understood from this perspective of the network of relationships. The stakeholder approach to CSR posits that CSR activities help firms build stronger relationships with various stakeholders (Godfrey et al., 2005), including customers and suppliers. Stronger relationships with customers impact brand equity and firm reputation (Oikonomou et al., 2012) positively. Further, it has been shown in the literature that CSR products are a preferred choice for customers; thus, such products enjoy a stable demand, which helps gain market competitiveness (Mishra and Modi, 2012; Albuquerque et al., 2019). Therefore, from a firm perspective, a better relationship with customers should negatively impact inventory and receivables cycles, negatively impacting the overall CC_Cycle.

The impact of CSR on the payables cycle is ambiguous. It has been shown that improvement in relationships through CSR activities has a negative impact on the degree of information transparency and agency costs (Dhaliwal et al., 2011). A better reputation coupled with reduced information asymmetry should increase the supply of trade credits by the suppliers, negatively impacting the overall CC_Cycle. However, traditional finance literature suggests that such trade credit financing is relatively costly for firms[3]. Therefore, firms use them only when they do not have access to financing from institutional sources (Petersen and Rajan, 1997). It has also been found that improved relationships with lenders through CSR activities are known to increase firms' access to formal financing by decreasing the overall cost of capital (El Ghoul et al., 2011; Gong et al., 2021). This relation should allow firms to replace costly trade credit with cheaper institutional capital, negatively impacting the payables cycle and resulting in a lengthier CC_Cycle.

Which of these arguments holds in the Indian context is purely an empirical question that this study is trying to examine. To test this, we propose the following null hypothesis

[3] Firms must forgo the discount that supplier would have offered for cash purchases and thus have to purchase them at relatively higher prices. Additionally, having greater current liabilities would affect their overall liquidity position and hence their cost of capital

H1: CSR has no impact on the cash conversion cycle of Indian firms

Since we are using the DID approach, we specifically test the following hypothesis

H1a: There is no differential impact of the CSR regulation on the cash conversion cycle of mandatory firms compared to control firms

3 Data and methodology

3.1 Identification strategy

Our research design requires dividing our sample into treatment and control firms based on CSR regulations implemented in 2015. Based on prior studies, i.e., Bose et al. (2021) and Jadiyappa et al. (2021), we follow the below-mentioned procedure to create treatment and control groups.

To create a treatment group, we start with all the firms which started spending on CSR activities from 2015 onwards under the mandatory regulation. We impose two restrictions on this initial sample. First, firms should have CSR expenditure for at least two years in the post-regulation period, i.e., 2015-2019. Second, the firms should not have spent on social and environmental projects in the pre-regulation period. The second restriction is required as any spending on these activities, even before the regulation makes their expenditure voluntary. Therefore, our treatment group consists of firms with no CSR spending in the pre-regulation period and positive spending in the post-regulation period. The firms that did not spend on CSR activities in pre and post-regulation periods from our control group. We represent this division of firms in the estimation models by using an indicator variable, i.e., Treat_Dum, which takes value one for the treatment firms and zeros for control firms.

3.2 Measuring working capital management

The main dependent variable is working capital management. The prior literature has proxied it mainly through the cash conversion cycle, i.e., CC_Cycle (Singh and Kumar, 2014; Baños-Caballero et al., 2010). This cycle measures how many days the firm takes to complete one cash cycle, starting from raw material purchases to the realization of cash from the customers. The length of the CC_Cycle is directly related to the working capital investments required from the firm. This cycle is constructed from three individual cycles. They are the account payables cycle (AP cycle), inventory cycle (Inv Cycle), and, lastly, the account receivable cycle (AR cycle). The construction of CC_Cycle is given below

$$CC\_Cycle = AR\_Days + Inv\_Days - AP\_Days \quad (1)$$

Where

AR_Days= (Account receivables/Sales)*365

Inv_Days= (Total inventories/Purchases)*365

AP_Days= (Account payables/Purchases)*365

3.3 Data

Data required to test our hypothesis is taken from the prowess database, a widely used database among researchers. We start with all non-financial firms listed on the National stock exchange and then exclude bankrupt firms, i.e., firms with leverage of greater than 1, firms with a cash conversion cycle of greater than a year, and firm-year observations with missing data. Also, we require that firms should have at least five observations, minimum of two in both pre and post-regulation periods, during our study period. This procedure gave us a sample of 5359 firm-year observations for 710 unique firms. Of these, 4299 observations for 549 unique firms belong to the treatment group, and 1060 observations for 161 belong to the control group. Our study period spans years from 2011 through 2019. The definitions of the variables used in our study and their summary statistics, winsorized at a 2% level, are presented in Table 1.

Table 1: Summary statistics

Variable	Definition	Obs	Mean	SD
Independent variables				
CC_Cycle	AR_Days + Inv_Days - AP_Days	5,359	86.18	88.61
AR_Days	(Account Receivables/Sales) *365	5,359	63.28	44.77
Inv_Days	(Total Inventories/Purchases) *365	5,359	128.72	77.36
AP_Days	(Account Payables/Purchases) *365	5,359	106.75	68.51
Independent variables				
Reg_Dummy	An indicator variable taking the value of one for the post-regulation period (2015-2019) and zero for pre-regulation years (2011-2014)	5,359	0.560	0.496
Treat_Dummy	An indicator variable taking a value of one for the treatment firms and zero for the control firms	5,359	0.802	0.398
Control variables				
Firm_Size	Log of firm sales	5,359	9.012	1.335
ROA	EBIT/Total assets	5,359	0.100	0.094
Leverage	Total Debt/Total assets	5,359	0.273	0.204
Tangibility	Net fixed assets/ Total assets	5,359	0.321	0.166
Cash_Ratio	(Cash + Short term investments)/Total assets	5,359	0.075	0.108
Div_Ratio	Total Dividends/Total assets	5,359	0.014	0.030
Market_Share	Sales/Total industry sales	5,359	0.059	0.122
Ind_HHI	Sum of squared market share of all firms for each industry each year	5,359	0.095	0.121

On average, our sample firms complete one cycle of cash conversion in about 86 days, with 50% of the firms having greater than 90 days. This value is much higher than 56 days which was reported for UK firms by Baños-Caballero et al. (2014) and 69 for small Spanish firms reported by Baños-Caballero et al. (2010)[4]. Our sample firms take about 128 days to sell their product and another 63 days to receive sales proceedings from the customer. Further, the average credit period enjoyed by the firms from suppliers is about 106 days. The mean values of all the control variables are consistent with what has been reported for Indian firms previously in the literature (Jadiyappa et al., 2021)

3.4 Model specification

We use the following baseline DiD model to test the hypothesis

$$CC\_Cycle_{it} = \alpha_i + \beta_1 Reg\_Dummy_t + \beta_2 Treat\_Dum_i + \beta_3 Reg*Treat\_Dum_i + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 Tangibility_t + \beta_8 Cash\_Ratio_{it} + \beta_9 Market\_Share_{it} + \beta_{10} Ind\_HHI_{it} + €_{it} \quad (2)$$

All the variables are defined in Table 1. The coefficient of interest in this DiD model is the interaction coefficient, i.e., β_3, which gives a differential intercept for mandatory firms for the post-regulation period. While the stakeholder hypothesis predicts a positive sign on this coefficient, the financial access hypothesis predicts a negative one. To get the marginal impact of CSR regulation, we need to control changes in firm and industry-level factors that might affect working capital management. Therefore, we add six firm-level factors which possibly affect the length of the CC_Cycle as control variables. They are firm size, performance (ROA), financial policy (Leverage), production technology (Tangibility), liquidity (Cash_Ratio), and market power of the firm (Market_Share). In addition, we add industry competitiveness (Ind_HHI) to control for time-invariant industry factors affecting the CC_Cycle. We add industry dummies to the models to control the effect of time-invariant industry factors on our coefficient estimates. Further, year dummies are added to control for year-specific factors affecting the CC_Cycle.

We use the pooled OLS estimator to estimate the coefficient of the model. We use this as the primary estimator as it allows us to control the impact of industry factors by adding industry dummies[5]. Additionally, in the robustness section, we check the robustness of OLS results

[4] Excluding negative CC_Cycle industries
[5] We use two digit (from left) National Industry Classification (NIC_codes) in our analysis

using the fixed effects estimator, which controls for time-invariant firm-specific factors on CC_Cycle.

4 Results and discussion

4.1 CSR regulation and working capital management

In table 2, we present the results of our analysis. As mentioned previously, the variable of interest is the interaction term, i.e., Reg*Treat_Dum, the coefficient of which is the DiD operator. The DiD operator in column one is positive but weakly significant at the 10% level. This positive sign implies that the change in CC_Cycle, between pre and post-regulation periods, is greater for mandatory firms relative to control firms. This relative analysis though useful does not clearly indicate the direction of absolute change between pre and post-regulations. Therefore, we next calculate the absolute coefficient for mandatory and control firms. The absolute change in the CC_Cycle of control firms is represented by the coefficient of Reg_Dummy, which is negative, implying a shortening of CC_Cycle for control firms. For mandatory firms, the coefficient is derived by summing the coefficients of Reg_Dummy, Treat_dum, and the interaction term, and the summed coefficient is positive. This coefficient implies that the impact of CSR regulation on the CC_Cycle of mandatory firms is positive.

In the second column, we run the analysis by adding firm-specific factors as control variables; we add year dummies in the third column and industry dummies in column four. In all these columns, the magnitude of the interaction coefficient has become larger, and so has the statistical significance of the coefficient, i.e., the interaction coefficient in all these models is now significant at the 1% level. Collectively, these results suggest that CSR regulation positively impacted the CC_Cycle of mandatory firms.

Table 2: The impact of CSR on working capital management

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the industry level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	Model I	Model II	Model III	Model IV
	CC_Cycle	CC_Cycle	CC_Cycle	CC_Cycle
	(1)	(2)	(3)	(4)
Reg_Dummy	-14.053**	-15.773***	-18.601**	-24.670***
	(-2.326)	(-2.638)	(-2.548)	(-3.583)
Man_Control	-22.925***	8.635*	8.614*	8.820*
	(-5.016)	(1.836)	(1.832)	(1.936)
Reg_Dummy*Man_Control	12.640*	20.899***	20.960***	20.976***
	(1.918)	(3.248)	(3.261)	(3.498)
Firm_Size		-20.089***	-20.043***	-11.876***
		(-18.035)	(-17.945)	(-8.825)
ROA		72.849***	72.046***	62.052***
		(4.506)	(4.458)	(3.976)
Leverage		86.886***	86.623***	73.738***
		(11.752)	(11.645)	(9.031)
Tangibility		-113.086***	-113.186***	-114.897***
		(-14.446)	(-14.445)	(-13.095)
Cash_Ratio		-134.608***	-134.756***	-125.159***
		(-10.951)	(-10.940)	(-10.500)
Market_Sahare		25.874*	25.691*	-63.571***
		(1.681)	(1.667)	(-3.582)
Ind_HHI		-21.932	-22.139	-49.366
		(-1.565)	(-1.577)	(-1.495)
Constant	106.639***	275.451***	278.765***	367.916***
	(25.852)	(25.593)	(25.156)	(14.463)
Observations	5,359	5,359	5,359	5,359
R-squared	0.007	0.141	0.142	0.330
Year FE	No	No	Yes	Yes
Ind FE	No	No	No	Yes

Though the results presented in Table 2 seem to provide supporting evidence for the financial access hypothesis, they do not provide definitive evidence for the same. Therefore, we conduct two additional analyses to test whether the increase in CC_Cycle is due to increased financial access for mandatory firms post-CSR period.

In the first test, we decompose the CC_Cycle into its constituents and examine the changes in these constituent cycles following the CSR regulation. The stakeholder hypothesis is expected to work negatively on the inventory and receivables cycles, and the financial access hypothesis is expected to work positively on the payables cycle. The results are presented in Table 3. In the first column, where we examined the impact on the receivable cycle, the interaction coefficient is statistically insignificant, implying that CSR regulation had no impact on the

treatment firms' receivables cycle compared to the control sample. This result suggests that changes in AR_Cycle are not driving the observed positive changes in CC_Cycle. The same result is observed even in inventory analysis, i.e., insignificant interaction coefficient, and hence same conclusions are drawn for Inv_Days. Finally, the result of the TP_Cycle analysis is presented in the last column. Here we observe that the interaction coefficient is negative and statistically significant, implying a negative impact of CSR regulation on the payables cycle. Together, these results together suggest that the negative changes in TP_cycle are driving the observed positive changes in the CC_Cycle. The insignificant results for receivables and inventory cycles conclusively prove that CSR regulation did not impact firms' relationships with customers. However, following the CSR regulation, we observe a marked difference in the firm-supplier relationship. Moreover, this negative impact on AP_Cycle is consistent with the prediction of the financial access hypothesis, i.e., firms may have replaced the costly trade payables with cheaper capital from institutional sources.

Table 3: The impact of CSR on trade receivable days, inventory days, and trade payable days

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the industry level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	Model I	Model II	Model III
	AR_Days	Inv_Days	AP_Days
	(1)	(2)	(3)
Reg_Dummy	8.175***	-15.302***	18.753***
	(2.589)	(-2.670)	(3.671)
Man_Control	-0.129	3.268	-5.707*
	(-0.061)	(0.844)	(-1.647)
Reg_Dummy*Man_Control	0.290	7.381	-13.357***
	(0.103)	(1.502)	(-2.973)
Firm_Size	-4.666***	-0.185	6.887***
	(-7.712)	(-0.166)	(7.235)
ROA	-63.319***	-3.522	-133.167***
	(-9.050)	(-0.288)	(-9.998)
Leverage	34.802***	13.053**	-27.202***
	(9.319)	(1.968)	(-4.400)
Tangibility	-86.439***	-59.922***	-35.808***
	(-21.895)	(-8.182)	(-5.316)
Cash_Ratio	-40.573***	-77.301***	8.270
	(-7.217)	(-7.428)	(0.947)
Market_Sahare	-17.091**	-2.658	41.999***
	(-2.331)	(-0.194)	(3.458)
Ind_HHI	-2.744	-16.329	29.367
	(-0.203)	(-0.583)	(1.366)
Constant	146.100***	242.460***	27.102
	(10.644)	(9.950)	(1.261)
Observations	5,359	5,359	5,359
R-squared	0.491	0.376	0.367
Year FE	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes

4.2 Robustness tests

4.2.1 Robustness test: Firm fixed estimator

In this section, we conduct various robustness tests to examine the stability of the main results, presented in tables 2 and 3, for the alternate estimator, sample selection procedure, working capital proxy, and a false CSR regulation event.

In the first test, we test whether the results change if we control for time-invariant firm heterogeneity. A firm's working capital management policy may have been influenced by time-invariant firm-level factors like organization culture, governance, and management philosophy. Therefore, it is essential that we re-run our analysis after controlling for this firm-level heterogeneity which may bias the significance of the coefficients and, thus, our conclusions. Therefore, we re-run the analysis using the fixed effects estimator, and the results are presented in Table 4.

All the results, save Inv_Cycle, are qualitatively very similar to what we have observed in Tables 2 and 3. The coefficient for Inv_Cycle in Table 3 was statistically insignificant; however, in Table 4, it is positive and weakly significant at the 10% level. It is possible that this increase in Inv_Cycle in the post-regulation period may have contributed to the observed increase in the overall CC_Cycle. However, we do not read much about this weak result for two reasons. First, we are not sure about the consistency of this result as it becomes insignificant in the presence of industry dummies (Table 3). Second, this positive coefficient is theoretically inconsistent as the stakeholder view predicts a negative coefficient on the interaction term. Therefore, we believe that our main results and conclusions remain the same even when we control for firm fixed effects.

Table 4: Robustness test: Firm fixed effects

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the firm level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	Model I	Model II	Model III	Model IV
	CC_Cycle	AR_Cycle	Inv_Cycle	AP_Cycle
	(1)	(2)	(3)	(4)
Reg_Dummy	-15.893**	14.644***	-4.869	27.148***
	(-2.333)	(4.891)	(-0.892)	(4.955)
Reg_Dummy*Man_Control	17.257***	-1.189	8.699*	-9.149*
	(2.995)	(-0.455)	(1.761)	(-1.768)
Firm_Size	-14.435***	-10.140***	-16.890***	-13.587***
	(-2.777)	(-4.060)	(-4.228)	(-3.363)
ROA	23.852	-25.545***	-15.343	-68.014***
	(1.395)	(-3.203)	(-1.354)	(-5.190)
Leverage	78.499***	22.571***	14.524	-42.544***
	(5.476)	(3.687)	(1.376)	(-3.470)
Tangibility	-54.419***	-33.610***	-47.807***	-27.908**
	(-3.750)	(-5.646)	(-4.496)	(-2.200)
Cash_Ratio	-70.953***	-26.189***	-40.657***	2.131
	(-4.620)	(-4.277)	(-3.944)	(0.165)
Market_Sahare	-20.881	-15.258	-38.188	-26.792
	(-0.508)	(-1.058)	(-1.083)	(-0.752)
Ind_HHI	-75.556***	-8.623	-19.093	47.074**
	(-3.155)	(-0.872)	(-1.029)	(2.559)
Constant	227.453***	158.366***	300.237***	240.856***
	(5.130)	(7.530)	(8.704)	(6.899)
Observations	5,359	5,359	5,359	5,359
R-squared	0.055	0.125	0.043	0.095
Number of sa_fince1_cocode	710	710	710	710
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes

4.2.2 Robustness test: PSM DiD

Observations in the treatment and control groups are expected to be selected randomly, i.e., the treatment and control groups are similar in all aspects except for the variable of interest to examine the causality. Complete randomization is possible only in experimental design. In our research design, complete randomization is impossible given that the CSR regulation applies to selected firms that meet certain size and performance criteria. Nevertheless, randomization, at least concerning all observable covariates, is possible using the propensity score matching approach. In this approach, we first generate propensity scores for all our sample observations by logit regressing the Treat_Dum on firm and industry-level covariates. They are leverage, tangibility, cash_Ratio, Market_Share, and Industry competition (Ind_HHI). We then, for every treatment observation, select the nearest control observation, which is within a range of

0.001 propensity score. By following this procedure, we were able to get matched observations for 1,487 observations. The summary statistics of the matched and unmatched covariates are presented in Table 5. It shows that unmatched treatment and control samples significantly differ regarding all the observable covariates. However, this difference disappears in the matched sample. This procedure reduces the selection bias in constructing treatment and control groups for our examination. Therefore, we select matched observations, a total of 2,497, for further regression analysis, the results of which are presented in Table 6

Table 5: PSM balancing statistics

All the variables are defined in Table 1. ***, **, and * indicate significance at 1%, 5%, and 10% level

Variable	Matched	Treated	Control	Bias	% Reduction	t-test
Leverage	Unmatched	0.261	0.432	-87.7		-18.03***
	Matched	0.387	0.377	4.8	94.5	0.79
Tangibility	Unmatched	0.319	0.333	-8.5		-1.72*
	Matched	0.336	0.323	7.9	6.5	1.12
Cash_Ratio	Unmatched	0.086	0.039	49.6		8.79***
	Matched	0.044	0.043	1.1	97.7	0.22
Market_Sahare	Unmatched	0.075	0.028	41.5		7.32***
	Matched	0.033	0.031	1.4	96.7	0.31
Ind_HHI	Unmatched	0.112	0.081	25.3		4.7***
	Matched	0.089	0.084	4.6	81.8	0.79

The results in Table 6 are qualitatively very similar to those in Tables 2 and 3, i.e., the interaction coefficient is positively significant for CC_Cycle and negatively significant for AP_Cycle. In untabulated analysis, we also use the firm fixed estimator to estimate the coefficients and find qualitatively the same results. This analysis shows that our results are not biased due to selection issues, at least regarding the observable firm-level covariates.

Table 6: Robustness test: Propensity score matching DiD regression analysis

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the industry level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	CC_Cycle Pooled_OLS	AR_Cycle Pooled_OLS	Inv_Cycle Pooled_OLS	AP_Cycle Pooled_OLS	Debt_Payables Pooled_OLS
Reg_Dummy	-17.836**	9.471***	-4.720	24.410***	-0.013
	(-2.283)	(2.590)	(-0.714)	(4.177)	(-1.628)
Man_Control	17.977***	0.570	8.731**	-8.539**	0.028***
	(3.717)	(0.251)	(2.064)	(-2.344)	(5.329)
Reg_Dummy*Man_Control	14.414**	-0.242	2.758	-12.178**	0.012*
	(2.257)	(-0.079)	(0.515)	(-2.506)	(1.776)
Firm_Size	-14.105***	-4.382***	-5.795***	3.810***	-0.015***
	(-7.146)	(-4.734)	(-3.599)	(2.664)	(-7.091)
ROA	84.589***	-66.243***	35.409**	-122.636***	0.123***
	(3.866)	(-7.337)	(2.392)	(-6.588)	(5.083)
Leverage	62.922***	27.632***	5.343	-35.062***	1.073***
	(5.833)	(5.319)	(0.604)	(-4.161)	(88.944)
Tangibility	-131.296***	-98.490***	-62.256***	-34.361***	0.059***
	(-10.595)	(-17.121)	(-5.949)	(-3.664)	(4.498)
Cash_Ratio	-140.062***	-41.343***	-125.223***	-29.551*	0.083***
	(-7.539)	(-3.988)	(-7.944)	(-1.923)	(3.689)
Market_Sahare	47.951	9.476	14.291	-25.322	0.200***
	(1.203)	(0.525)	(0.396)	(-1.101)	(4.790)
Ind_HHI	-45.626	-8.877	10.426	49.830**	-0.066
	(-1.144)	(-0.543)	(0.287)	(2.336)	(-1.491)
Constant	329.989***	142.637***	226.009***	42.710**	-0.037*
	(16.517)	(12.613)	(11.783)	(2.515)	(-1.655)
Observations	2,974	2,974	2,974	2,974	2,974
R-squared	0.350	0.523	0.389	0.383	0.886
Year FE	Yes	Yes	Yes	Yes	Yes
Ind_FE	Yes	Yes	Yes	Yes	Yes

4.2.3 Robustness test: Placebo analysis

In this study, we have attributed the change in working capital policy between pre and post-periods to the CSR regulation. However, it is possible that the difference in the working capital management policy of treatment and control firms in the pre-regulation period might have been the reason for the observed difference in the post-regulation period. Therefore, to establish causality, it is essential that we test whether there was a parallel trend or differential trend in the dependent variable of mandatory and control samples before the implantation of the regulation. Our results are valid as long as differential trends were not observed in the prior period. To examine this, we conduct the placebo test. In this test, we run our analysis for a fake regulation year. If the observed difference is due to CSR regulation, then a fake regulation year should not have any impact on the working capital policy of mandatory and control firms; in

other words, there should not be any difference in the working capital policy of treatment and control firms surrounding the fake regulation year.

We consider the year 2009 as the fake regulation year and then examine the change in the working capital policy of treatment and control firms between the pre (2004-2008) and post (2009-2013) periods. The results are presented in Table 7. These results show no change in the working capital policy of treatment and control firms surrounding the arbitrary regulation period. This inference proves that the results presented in Tables 2 and 3 could be attributed to the CSR regulation implemented in 2013

Table 7: Robustness test: Placebo analysis

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the industry level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	CC_Cycle	AR_Cycle	Inv_Cycle	AP_Cycle
	Pooled_OLS	Pooled_OLS	Pooled_OLS	Pooled_OLS
Reg_Dummy	17.649***	15.629***	-4.941	-9.463
	(3.124)	(4.587)	(-0.932)	(-1.499)
Man_Control	0.361	5.250***	-4.799	-1.215
	(0.107)	(3.225)	(-1.435)	(-0.365)
Reg_Dummy*Man_Control	-4.992	-8.724***	1.028	-1.198
	(-1.126)	(-3.632)	(0.244)	(-0.277)
Size	-6.481***	-5.902***	0.773	1.293
	(-5.039)	(-7.284)	(0.784)	(1.113)
ROA	-24.096	-93.978***	-81.634***	-154.930***
	(-1.567)	(-10.817)	(-6.642)	(-11.532)
Leverage	9.567*	0.899	-6.377*	-15.514***
	(1.723)	(0.307)	(-1.678)	(-3.290)
Tangibility	-86.824***	-79.215***	-25.080***	-20.128***
	(-12.490)	(-20.559)	(-4.110)	(-3.257)
Cash_Ratio	-157.634***	-74.354***	-84.078***	-3.861
	(-12.997)	(-12.861)	(-8.807)	(-0.443)
Market_Share	-366.490***	-25.796	-202.207***	132.474*
	(-4.396)	(-0.521)	(-3.046)	(1.715)
Ind_HHI	-96.420	-106.639	-137.689*	-150.768
	(-1.091)	(-1.565)	(-1.860)	(-1.586)
Constant	246.980***	178.058***	190.637***	127.566***
	(8.274)	(7.967)	(7.302)	(3.909)
Observations	6,273	6,273	6,273	6,273
R-squared	0.231	0.323	0.197	0.122
Year FE	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes

4.2.4 Robustness test: Alternate measure of working capital

In this section, we examine the robustness of the results presented in previous tables for an alternate measure of working capital. We use the capital invested by the firm in the working capital, i.e., networking capital scaled by total assets, as the alternate measure of working

capital. We calculate net working capital as the difference between current assets and current liabilities (excluding short-term debt). This measure is positively correlated with the CC_Cyle. We observe that the correlation coefficient between these two measures, CC_Cycle and net working capital ratio, is 0.71 in our data. To be consistent with the results presented in Table 2, we should observe a positive coefficient on the interaction term.

The results presented in Table 8 show that the amount of investment by treatment firms in their working capital following the CSR regulation is greater than control firms. The results remain qualitatively the same for the inclusion of time and year dummies. Therefore, these results are consistent with the results presented in Table 2.

Table 8: Robustness test: Alternate measure of working capital

All the variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. Standard errors clustered at the industry level. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	Model I	Model II	Model III
	NWC_Ratio	NWC_Ratio	NWC_Ratio
Reg_Dummy	-0.021**	-0.014	-0.026**
	(-2.153)	(-1.548)	(-2.538)
Man_Control	-0.020***	0.035***	0.021***
	(-2.698)	(4.841)	(3.015)
Reg_Dummy*Man_Control	0.021**	0.026***	0.025***
	(1.962)	(2.699)	(2.888)
Firm_Size		-0.026***	-0.013***
		(-14.602)	(-6.660)
ROA		0.347***	0.342***
		(10.640)	(10.407)
Leverage		0.207***	0.169***
		(16.134)	(12.646)
Tangibility		-0.382***	-0.336***
		(-29.079)	(-24.020)
Cash_Ratio		-0.498***	-0.457***
		(-29.122)	(-24.452)
Market_Sahare		-0.116***	-0.280***
		(-5.245)	(-11.659)
Ind_HHI		0.096***	0.039
		(5.004)	(0.752)
Constant	0.215***	0.464***	0.594***
	(33.019)	(26.767)	(14.044)
Observations	5,359	5,359	5,359
R-squared	0.002	0.294	0.466
Year FE	No	No	Yes
Ind FE	No	No	Yes

4.3 Further evidence for the financial access hypothesis

Though the negative impact of CSR regulation on the payables cycle is consistent with the financial access cycle, it does not prove it conclusively as it assumes the substitution of costly trade credits by cheaper debt. Therefore, in the next analysis, we examine this aspect. To do

so, we first calculate the difference between debt and trade credits and scale this difference by total assets. Next, we examine the change in this difference between pre- and post-CSR regulation periods for control and mandatory firms. The insight is that if the debt is replacing the trade credits, then the difference between debt and trade credits should be greater in the post-regulation period compared to the pre-regulation period for treatment firms, i.e., CSR regulation should have a positive impact on this difference, and for control firms, CSR regulation should not have a positive impact on this difference.

Table 9: Debt and trade credit analysis

The dependent variable in this analysis is Debt_Payables_Ratio, calculated as (Total debt- payables)/Total assets. All other variables are defined in Table 1. T-values calculated from heteroscedasticity-adjusted standard errors are given in parenthesis. ***, ** and * indicate significance at 1%, 5% and 10% level

VARIABLES	Control Firms		Treatment Firms		DiD (Full Sample)	
	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects	Pooled OLS	Fixed Effects
	(1)	(2)	(3)	(4)	(5)	(6)
Reg_Dummy	-0.027**	-0.032***	0.008	0.029***	-0.013*	-0.010
	(-2.128)	(-2.916)	(1.555)	(5.707)	(-1.839)	(-1.475)
Man_Control					0.025***	
					(5.338)	
Reg_Dummy*Man_Control					0.019***	0.029***
					(3.088)	(4.293)
Firm_Size	-0.015***	-0.034***	-0.017***	-0.040***	-0.018***	-0.035***
	(-4.648)	(-4.103)	(-11.159)	(-7.809)	(-12.996)	(-7.751)
ROA	0.081**	0.106***	0.096***	0.079***	0.092***	0.085***
	(2.297)	(3.143)	(4.584)	(3.111)	(5.131)	(4.233)
Leverage	1.045***	1.035***	1.047***	1.156***	1.051***	1.104***
	(53.364)	(26.067)	(103.729)	(57.125)	(117.853)	(52.191)
Tangibility	0.133***	0.047	0.041***	0.052***	0.062***	0.050***
	(5.693)	(1.302)	(4.061)	(2.759)	(6.781)	(2.890)
Cash_Ratio	0.174***	-0.094*	0.030	0.043**	0.048***	0.023
	(4.090)	(-1.866)	(1.621)	(2.416)	(2.797)	(1.375)
Market_Sahare	0.178***	-0.111*	0.068***	0.019	0.080***	-0.019
	(2.723)	(-1.802)	(3.207)	(0.388)	(4.049)	(-0.503)
Ind_HHI	0.006	-0.004	-0.102***	-0.078**	-0.077**	-0.054*
	(0.088)	(-0.064)	(-2.680)	(-2.367)	(-2.189)	(-1.795)
Constant	-0.077*	0.107	0.035	0.161***	-0.016	0.121***
	(-1.842)	(1.624)	(1.233)	(3.660)	(-0.629)	(3.208)
Observations	1,060	1,060	4,299	4,299	5,359	5,359
R-squared	0.883	0.860	0.877	0.842	0.883	0.845
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes	No	Yes
Ind_FE	Yes	No	Yes	No	Yes	No

Consistent with the financial access hypothesis prediction, the coefficient of Reg_Dummy, which gives a differential intercept for the post-CSR regulation period, for mandatory firms in the first two columns of Table 9 is positive. This relationship implies a positive change in the difference, i.e., trade credits have become less important than total debt for these firms in the

post-regulation period. However, the negative coefficient for control firms implies that trade credits have become more important for these firms in the post-regulation period. The results of the DiD analysis, presented in the last two columns, reflect these results, i.e., a positive coefficient on the interaction term. These results remain qualitatively the same irrespective of model specifications and estimators. Thus, collectively, these results provide conclusive evidence for the substitution of trade credits for debt for mandatory firms in the post-CSR regulation period.

5 Conclusions

This study investigated the impact of CSR on the working capital management of Indian firms andfound that CSR positively impacts working capital management. Our paper must be seen in the context of the ongoing debate on the consequences of CSR regulations worldwide. Our results show that such regulations may lead to unintended consequences by altering the existing relationships among stakeholders, such as increasing the need for working capital investments. Also, it shows that CSR regulations may not have the same impact on relationships that firms enjoy with various stakeholders. However, to understand the complete phenomenon, we need more research. For example, what is the channel of this positive impact? Does this positive impact is conditioned on firm and industry-level factors? Furthermore, what is the overall impact of the increase in the operating cycle on firm valuation?

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Indian Institute Management Kozhikode
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Research Office
Indian Institute of Management Kozhikode
IIMK Campus P. O.,
Kozhikode, Kerala, India,
PIN - 673 570
Phone: +91-495-2809237/ 238
Email: research@iimk.ac.in
Web: https://iimk.ac.in/publications