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EXAMINING THE RELATION OF SUPPLY CHAIN FINANCE ON FINANCIAL PERFORMANCE OF FIRM: A PANEL DATA REGRESSION MODEL

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Abstract

This study delves into the correlation between supply chain finance (SCF) and the financial performance of the firms. It employs an observed model based on a panel data regression analysis using data from 388 Indian textile firms listed on the BSE over a decade, from 2014 to 2023. The findings were processed using STATA software. The results highlighted that SCF is related to firm performance concerning customer and supplier financing. The trade-credit to the customers and suppliers was statistically significant in the firm's performance. It was also found that size, liquidity, sales growth, and asset utilization have statistically positive associations with firms' performance. Implementing SCF brings significant benefits to both customers and suppliers, driving improved performance across firms and contributing to the advancement of the textile industry in India.

Keywords: Supply Chain Finance, firm performance, trade credit, customer financing, supplier financing, size, sales growth.

INTRODUCTION

India stands as one of the leading textile producers worldwide. The domestic clothing and textile sector significantly contributes to the country's economy, accounting for 2.3% of the GDP, 13% of industrial production, and 12% of exports. India holds a substantial 4% share in the international textile and clothing trade (investindia.gov.in). India's textile industry is a vibrant tapestry of diversity, embracing traditional hand-spun and hand-woven textiles alongside state-of-the-art, capital-intensive mills. This industry's heart lies in a robust manufacturing base that spans a wide spectrum of fibers and yarns. This includes an array of natural fibers like cotton, jute, silk, and wool and an assortment of synthetic and man-made fibers such as polyester, viscose, nylon, and acrylic. In this industry, small and medium-sized enterprises (SMEs) face significant challenges in accessing funding from banks and financial institutions. The lack of collateral and inadequate financial record-keeping hinders their ability to secure the necessary funds for growth and development. (Song et al., 2018). The effective management of working capital financing is critical for the success of this sector. (Song & Wang, 2013).

SCF has been experiencing rapid growth and increased demand as a short-term finance solution for financially restrained businesses. Economically limited enterprises must recognize their impact on the success of their SC partners, as they rely on each other for their business. SCF involves strategic planning, efficient management, and precise control of cash flows to enhance working capital for all members involved, including vendors and buyers (More & Basu, 2013). SCF optimizes inter-company financing and integrates the funding solution for the buyers, vendors, and service providers to maximize the worth of all contributing channel partners (Pfohl & Gomm, 2009). SCF is also used to mitigate the financing and risk involved in the working capital and the cash flow requirement in the firms' supply chain (SC) processes (Babich & Kouvelis, 2018). By extending funding to SC partners, businesses can unlock significant benefits such as coordinating, stabilizing, and adding value. This financial support fosters better coordination among supply chain members, improving economic and information

flows and bolstering their working capital. Proper operational and inventory management can be implemented through SCF (Wuttke et al., 2013).

SCF has become a boon for firms struggling to arrange financing, but researchers have not explored its impact on a firm's financial performance in an emerging economy like India. To address this issue, the current study examines the influence of firms' performance on the SCF requirement of Indian textile firms. The textile firms listed on India's BSE stock exchange were considered for analysis. The study's findings highlight SCF's significant contribution to the firm's performance. Furthermore, the study highlights the importance of SCF in funding, emphasizing its superiority over traditional bank loans.

REVIEW OF LITERATURE AND HYPOTHESIS DEVELOPMENT

In the textile industry, suppliers and buyers are dependent on each other. Traditionally, firms maximize profit and optimize the working capital requirement, which is used to delay the payment of the suppliers and, in the process, pass the risk to the supplier. This arrangement usually disturbs the supply chain members and puts financial pressure on them, and sometimes, they also run out of capital (Xiao et al., 2023). SCF focuses on a mutually beneficial condition for all the SC members. The buyers and suppliers, with mutual consent, decide on the trade credit terms and help finance the SC. This also improves the financial performance of the firms (Wetzel & Hofmann, 2019). One of the significant solutions of SCF is the trade credit (Asif & Nisar, 2022). At the same time, the performance of the organization improved by using SCF, and the organization's risk was substantially reduced (Liu et al., 2021).

The resource dependency theory states that the buyer and supplier mutually depend on each other and share their resources for survival and growth (Liu et al., 2021). Therefore, the supply chain members should have an optimum long-term relationship for coexistence and growth. This relationship will allow the firms to improve their profitability and meet the working capital requirement (Srinivasa et al., 2011). To secure the loyalty of upstream and downstream SC consorts, a company must strategically assign resources so that SCF can create distinctive and invaluable offerings for its suppliers and customers. This approach is essential for establishing and maintaining stability within the SC. (Lee et al., 2018). Developing strategic partnerships with SC partners is crucial for ensuring top-notch quality and on-time deliveries, ultimately leading to faster time to market and heightened customer satisfaction. These factors collectively contribute to a firm's competitive edge. This adds to the core benefit of adopting SCF solutions, reducing the risk and improving the firm's financial performance (Jahanbakhsh et al., 2023). The above literature discussed firmly proposes the following hypothesis:

HO: SCF has not positively influenced the financial performance of the firm.

HA: SCF positively influenced the financial performance of the firm.

RESEARCH METHODOLOGY

The study sample comprises the textile firms listed on the Bombay Stock Exchange (BSE), India. The data has been accumulated from CMIE Prowess IQ. Initially, 1830 firms were taken, and firms with missing data were excluded. The data was considered for ten years, from 2014 to 2023. The final sample consisted of 388 firms.

The study's dependent variable measures the financial performance of the organization, namely, return on equity (roe), and return on total assets (roa) (Liu et al., 2021). The independent variable of the study was the SCF parameters. The SCF from the SC partners, such as the customers and the suppliers, were used in the study (Wang et al., 2020; Liu et al., 2021).

Therefore, the variables used were the accounts receivable turnover ratio (scfcus), accounts payable turnover ratio (scfsup), and the net cash conversion cycle in days (scfccc), which is the difference between accounts receivable days and accounts payable days. The control variables used in the study to control the external factor impact were the firm's Size, liquidity of the firm in terms of current ratio, sales growth, and asset utilization (Pan et al., 2020; Farooq et al., 2021). The dimensions of the variables are given in Table 1.

Table 1: Measurement of Variables

Variable	Name	Code	Measure
Dependent Variable	Return on Equity	roe	Profit after tax/ total equity share capital
	Return on Assets	roa	Profit after tax / Total assets
Independent Variable	Accounts Receivable turnover ratio	scfcus	Sales/ average accounts receivable
	Accounts payable turnover ratio	scfsup	Cost of goods sold/ average accounts payable
	Net cash conversion cycle	sfcccc	Accounts receivable days - Accounts payable days
Control Variable	Firms' size	size	Logarithm of total assets
	Current Ratio	cr	Current Assets/ Current Liability
	Sales growth	sgr	Annual growth rate of sales
	Asset utilization	autl	Sales/ total assets

Source: Author

Empirical Model

A panel data regression technique has been adopted to test the hypothesis and establish the association between firms' performance and SCF. The relationship is explained in the equations given below:

$$roe_{it} = \alpha + \beta_1 scfcus_{it} + \beta_2 scfsup_{it} + \beta_3 scfccc_{it} + \beta_4 size_{it} + \beta_5 cr_{it} + \beta_6 sgr_{it} + \beta_7 autl_{it} + \varepsilon_{it} \quad ----------(1)$$

$$roa_{it} = \alpha + \beta_1 scfcus_{it} + \beta_2 scfsup_{it} + \beta_3 scfccc_{it} + \beta_4 size_{it} + \beta_5 cr_{it} + \beta_6 sgr_{it} + \beta_7 autl_{it} + \varepsilon_{it} \quad ----------(2)$$

For the model estimation, the firm effect is represented by 'i', and the time effect is represented by 't.'

RESULTS

Table 2: Descriptive Summary

Variable	Obs	Mean	Std. Dev	Min	Max
roe	3,880	7.0761	43.13872	-21.86	25.0280
roa	3,880	3.5692	5.818	-74.9000	42.7600
scfcus	3,880	20.1643	41.7961	0.0100	224.100
scfsup	3,880	21.8365	13.7678	0.0500	79.800
scfccc	3,880	20.0063	62.2844	-7,11.651	304.775
size	3,880	3.2410	0.592634	1.0300	5.6200
cr	3,880	1.7719	2.340692	0.1400	55.1700
sgr	3,880	0.4764	6.396681	-1.0000	285.2537
autl	3,880	6.6709	15.59695	-4.7900	316.1300

Notes: Obs-Observations, Std. Dev.- Standard Deviations, Max-Maximum, Min-Minimum.

Source: Authors' work

Table 2 displays that the variable Roe has a mean of 7.0761 and Std. Dev of 43.13 with a maximum of 25.0280 and a minimum of -21.86. The next variable, roe, has a mean of 3.5692, and Std. Dev of 5.818 with a maximum of 42.760 and a minimum of 74.9. The independent variable scfcus has a mean of 20.1643 and Std. Dev of 41.79 with a maximum of 22.41 and a minimum of 0.01. The next variable, scfsup, has a mean of 21.83 and Std. Dev of 13.76 with a maximum of 7.98 and a minimum of 0.05. The third variable is scfccc, with a mean of 20.0063 and Std. Dev of 62.28 with a maximum of 304.775 and a minimum of - 711.651. The control variables size has a mean of 3.2410 and Std. Dev of 0.59 with a maximum of 5.62 and a minimum of 1.03. The variable cr has a mean of 1.7719, and Std. Dev of 2.34 with a maximum of 55.17 and a minimum of 0.14. The following variable, sgr, has a maximum of 285.25 with a minimum of -1 and a mean of 0.4764 and Std. Dev of 6.39. The variable autl has a mean of 6.67 and Std. Dev of 15.59 with a maximum of 316.13 and a minimum of -4.79.

Table 3: Correlation Analysis and VIFs

	roe	roa	scfcus	scfsup	scfccc	size	cr	sgr	autl	VIFs
roe	1									-
roa	0.3998*	1								-
scfcus	-0.0136	-0.0592*	1							1.00
scfsup	0.0125	0.0342*	0.0005	1						1.00
scfccc	-0.0056	-0.0166	-0.003	0.0012	1					1.04
size	0.0232	0.1509*	-0.0108	-0.0247	-0.0582*	1				1.06
cr	0.0218	0.1285*	0.0036	0.0306	0.0589*	-0.1499*	1			1.03
sgr	-0.0788*	-0.0720*	-0.0003	-0.006	0.1782*	-0.1118*	.0390*	1		1.04
autl	0.0389*	0.0235	-0.0028	-0.0004	-0.0059	-0.1533*	-0.0075	-0.0083	1	1.03

Notes: * 5 percent significance level, VIFs- Variance of Factors

Source: authors' work

Table 3 shows that the variable roe has a statistically significant association with roa, sgr, and autl. At the same time, it has a positive connection with roa and autl but a adverse relationship with sgr. The following variable, roa, has a positive relationship with scup, size, and cr and was statistically significant. At the same time, it has a statistically noteworthy negative relationship with scfcus and sgr. The variable scfccc has a statistically noteworthy positive association with cr and sgr. It has a statistically noteworthy negative association with size. The variable size has a statistically negative relationship with cr, sgr and autl. In contrast, cr has a statistically positive relationship with sgr. All the correlation coefficient values were found to be within the limit of 0.500.

Upon conducting a comprehensive analysis of the Variance Inflation Factors (VIFs) for all variables (Independent and Control), it was determined that each of their respective VIF values was below the threshold of 10. This indicates that there is no noteworthy issue of multicollinearity.

The outcomes of panel data regression were presented in Table 4. The analysis of Model-1 includes the analysis of Pooled OLS (P-OLS), Fixed effect (FE), and Random effect (RE) with the dependent variable as roe. The R square of P-OLS was reported as 0.0093. The variables sgr and autl have a statistically significant positive association with roe. The FE model of roe as the dependent variable had an R square of 0. 0074. During the analysis of the value of the independent variables, it was found that scfcus and scfsup are statistically significant and have a positive relationship with roe.

The FE model is deemed applicable with a p-value of 0.000 for the F-statistic, which is below the 5 percent significance level. Furthermore, the Wald chi-square test of the RE model generated a p-value of less than 0.05, affirming the model's relevance. The R square of the

random effect model was reported as 0.0093. It was also found that the two variables, sgr and autl, were statistically significant, with sgr and autl having a positive relationship with roe.

The Hausman test (HT), a statistical method used in econometrics, was first employed to compare the FE and RE models to determine the most appropriate model for analyzing the association between roe and the independent variables while accounting for the control variables. This test helps to ensure that the chosen model accurately captures the complex interplay between roe and the various factors influencing it. Moreover, Chi sq. test was conducted, and it was found that the P value to be 0.2602, more than a 5% significant level. Therefore, the null hypothesis was agreed upon, establishing the relevance of the RE model. Furthermore, the Breusch and Pagan Lagrangian multiplier test (B&P LM) was applied to examine whether the P-OLS model or the RE was relevant. The chi Sq. test P value was reported as 0.000. Thus, it is concluded that the null hypothesis was not agreed upon, establishing the RE model's relevance.

In Model 2, the dependent variable is roa. The R square of P-OLS was reported as 0.0566. The variable sgr has a statistically noteworthy positive association with roa and a statistically noteworthy positive relationship with size and cr. The FE model of roa as the dependent variable had an R square of 0. 0241. During the analysis of the value of the independent variables, it was found that scfcus, sgr, and autl are statistically significant and have a positive association with roa.

With a p-value of 0.000 for the F-statistic, which is below the 5 percent significance level, the FE was deemed applicable. Furthermore, the Wald chi-square test of the RE generated a p-value of less than 0.05, affirming the model's relevance. The R square of the RE model was reported as 0.0434. It was also found that the variables, scfcus, scfsup, size, cr, sgr, and autl, were statistically significant, with scfcus, scfsup, sgr, size, cr, and autl having a positive association with roa.

The HT examined which model was more appropriate to establish the association between roe and the independent variables with the control variables. Based on the findings of the Chi-square test the P Value was determined to be 0.1979, exceeding the 5% significance level. Consequently, the null hypothesis was agreed upon indicating that the RE model was relevant. Furthermore, the B&PLM test was applied to decide the suitability of the P-OLS model versus the RE model. The p-value was reported as 0.000. therefore, establishing the significance of the RE model.

Robustness check

To account for the time effect and firm effect, the panel data regression was applied, wherein the P-OLS, FE, and RE regression models were developed, and then the appropriate model was selected. Moreover, roe was used as a dependent variable in Model-1 to comprehend the firm's financial performance. Then, with the same sample, another measure of firm financial performance was used, i.e., roa, referred to as Model 2. The null hypothesis was not accepted; thus, it was found that SCF positively contributes to firms' financial performance.

Table 4: Panel Data Regression Analysis

Dependent	Model-1: roe						Model- 2: roa					
	P-OLS		FE		RE		P-OLS		FE		RE	
	Coefficient (B)	t-statistics	Coefficient (B)	t-statistics	Coefficient (B)	z-statistics	Coefficient (B)	t-statistics	Coefficient (B)	t-statistics	Coefficient (B)	z-statistics
scfcus	-0.0014	-0.8300	-0.0018	-1.0600	0.0015*	-0.9400	-0.0008*	-3.7000	0.0009*	-4.9100	0.0009*	-4.8500
scfsup	0.0037	0.7400	0.0006	0.1100	0.0025*	0.5000	0.0014	2.1400	0.0003	0.5000	0.0005*	0.8400
sfcccc	0.0006	0.5100	0.0010	0.8000	0.0007	0.6300	-0.0001	-0.3400	0.0000	0.3600	0.0000	0.2300
size	1.8800	1.5700	-1.0267	-0.1900	1.7755	1.1900	1.7251*	10.9200	0.7795	1.3300	1.4019*	5.0000
cr	0.5201	1.7400	0.3023	0.6800	0.4551	1.3800	0.3900*	9.9200	-0.0232	-0.4900	0.0950*	2.2000
sgr	0.5265*	-4.7800	0.4574*	-4.0900	0.4976*	-4.5900	0.0518*	-3.5700	0.0347*	-2.9000	0.0347*	-2.9000
autl	0.1173*	2.6200	0.1024	1.5900	0.1140*	2.3100	0.0190	3.2200	0.0201*	2.9200	0.0199*	3.1300
constant	-0.5349	-0.1300	9.4069	0.5300	-0.0469	-0.0100	-2.8289*	-5.2100	0.9770	0.5100	-1.2522	-1.3300
R^2	0.0093		0.0074		0.0093		0.0566		0.0241		0.0434	
Test	F	0.000*	F	0.000*	Wald chi Sq.	0.000*	F	0.000*	F	0.000*	Wald chi Sq.	0.000*
HT	Prob > chi sq. = 0.2602						Prob > chi sq. =0.1979					
B&P LM test	Prob > chibar sq. = 0.0000						Prob > chibar sq. = 0.0000					

Source: Authors' work

DISCUSSION

The study aims to establish a clear connection between the SCF parameters and the firm's financial performance. To achieve this, a panel data regression has been implemented. The financial performance of the firms was assessed using roe and roa. The SCF parameters were the independent variables, namely scfcus, scfsup, and scfccc, while size, cr, sgr, and autl were control variables. All variables are comprehensively presented in Table 1. The findings of the panel data regression are exhibited in Table 4. Out of the three SCF parameters, two variables scfcus and scfsup have a statistically significant relationship with firms' performance, mainly roa. This highlights the importance of a firm's focus on assisting customers and suppliers with payment terms to nurture long-term associations with SC members (Ma et al., 2020). SCF focuses on a mutually beneficial situation for all the SC members. The consumers and suppliers, with mutual consent, decide on the trade credit terms and help finance the SC. This also improves the financial performance of the firms (Wetzel & Hofmann, 2019). This further demonstrates the extent customers rely on the company's financial performance (Kim & Henderson, 2015). Trade credit plays a crucial role in stabilizing the firm's SC. (Ersahin et al., 2023). The control variables size, cr, SGR, and auto positively influence the organization's financial performance.

CONCLUSION

The study examines the connection among SCF and the firm's financial performance. For this purpose, data from CMIE Prowess IQ of 388 textile firms listed on the BSE, India, were collected. The data was considered for ten years, from 2014 to 2023. To test the hypothesis and examine the time effect and firm effect, a panel data regression was applied. The study's findings indicated that the variables scfcus and scfsup were statistically significant with the performance of the textile firms. The findings also indicated the time and firm effects, as the random effect model was the applicable empirical model. Firms can achieve positive performance and boost sales by sharing financial resources with their customers and suppliers. Credit sales and other incentives increase sales volume and foster customer loyalty, reducing supply chain uncertainties and inefficiencies. This approach builds long-term relationships and trust, ultimately leading to improved performance. At the same time, maintaining better credit terms with the suppliers also solves the problem of arranging finance. The variables size, cr, sgr, and autl positively affect firms' financial performance. Overall, the study tries to achieve

its objectives and establishes the association between the SCF and the financial performance of the firm.

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