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Exploring the Linkages Between Firm's Liabilities and Supply Chain Practices: Evidence from Indian SMEs

Mohammad Helal Allail^{1, *}, Sanjeev Kumar^{2, †}, Arvind Kumar^{3, ‡} and Kavita Singh^{4, §}

^{1, 4}Faculty of Management Studies, University of Delhi, New Delhi, India and ²Netaji Subhash University of Technology, New Delhi, India and ³Atal Bihari Vajpayee School of Management & Entrepreneurship, Jawahar Lal Nehru University, New Delhi, India

*allail.h_phd18@fms.edu

†sanjeevsai91@gmail.com

‡kumararvind@mail.jnu.ac.in

§prof.kumar.arvind@gmail.com

§kavita@fms.edu

†Corresponding author.

Abstract

The aim of this study is to clarify the supply chain and its importance by looking at how it affects the liabilities of the corporations. The research will evaluate the strengths and weaknesses of their supply chain practices and provide recommendations to strengthen the supply chain and reduce liabilities. This study utilised panel data techniques to analyse the data. The results indicate that operational cash flows have a positive effect, while long-term investment negatively impacts the liabilities of an organisation. Interestingly, financing cash flows are independent with respect to firms' liabilities. To achieve better results, operational flows must be improved. Corporate liabilities can impact the financial performance of an SME. Hence, the policy of providing incentives for improved supply chain practices can further promote SMEs to strengthen their supply chain. Training programs and infrastructure improvement could also help to strengthen efficiencies in operations within supply chains.

Keywords: Supply Chain Finance, Small and Medium Enterprises, Corporate Liabilities, Operational Efficiency, Cash Flows.

1 Introduction

In the contemporary, highly competitive and interlinked corporate world, SCM has been identified as an important variable affecting organisational performance and survival. Organisations have acknowledged that SCM is vital because effective collaboration between suppliers, manufacturers, distributors, and clients leads to efficient processes, lower costs, increased responsiveness to market needs, and financial gains (Bowersox & Cooper, 2002; Christopher, 2022). Through SCM integration, organisations can coordinate various activities in procurement, manufacturing, inventories, and logistics to eliminate operational problems and make better use of resources. Integration of SCM is particularly important in situations when organisations operate under uncertainty and limited resources (Carton, 2004).

Small and medium enterprises (SMEs) form a vital part of developing countries like India, contributing significantly to job creation, industrialisation, exports, and economic growth in the country. However, despite playing a crucial role in the economy, Indian SMEs suffer from several operational and financial constraints, such as an inability to borrow externally, poor infrastructure, interruptions in supply chains, a shortage of liquidity, and heavy financial debts. These constraints hinder their ability to sustain growth and remain competitive in changing market conditions. Therefore, in such circumstances, SCM becomes an important factor that helps organisations overcome challenges and succeed in competitive environments.

According to the literature review, successful supply chain integration contributes to improved operational coordination, increased responsiveness to customers, enhanced relations with suppliers, and improved management of working capital (Flynn et al., 2010; Mentzer et al., 2001). Organisations with integrated supply chains are more likely to achieve better control over their inventory stocks, lower transaction costs, and timely responses to changes in supply and demand. Likewise, responsive supply chains allow organisations to optimise delivery performance, avoid disruptions, and maintain high customer satisfaction even under unstable conditions (Gunasekaran et al., 2015). Such operational efficiencies may eventually affect the stability of firms and their liability management.

In this paper, firm-level cash flows are viewed as financial indicators of supply chain management practices. Namely, operational cash flows refer to supply chain performance and coordination, investing cash flows to strategic investments in the area, while financing cash flows demonstrate firms' reliance on external funds for conducting their supply chain operations. The efficient integration of supply chains also results in greater flexibility and resilience, which are key traits of SMEs exposed to fluctuating market conditions and limited resources (Vanpoucke et al., 2017). For Indian SMEs, an efficient supply chain will enhance operational performance and help build a cushion against financial stress through streamlined processes and lesser dependence on outside funding. It enables SMEs to reduce operational costs, prevent delays and eventually decrease financial liabilities.

Despite the extensive research carried out on the relationship between the adoption of certain supply chain strategies and their impact on organisational performance measures, there is still limited knowledge about the effect that financial processes in relation to supply chains can have on organisations' liabilities, especially for small and medium-sized enterprises in developing countries. Research on this phenomenon has been done more frequently, focusing on cost-cutting initiatives, profitability, efficient logistics and customer satisfaction than on the effect of financial aspects such as financial obligations related to the use of particular supply chain processes. Empirical evidence for Indian SMEs is also rather scarce.

In order to fill this gap, this paper examines the connection between supply chain-related cash flows and firms' liabilities in Indian SMEs. It is intended to explore how operating cash flow, financing cash flow, and investing cash flow impact liabilities. This research is conducted based on the following objectives for investigation. Firstly, to determine the effect of operating cash flows on the liabilities of SMEs in India. Secondly, to determine the effect of financing cash flows on the liabilities of firms. Thirdly, to determine the effect of investing cash flows on the liabilities of firms. Fourthly, to determine how supply chain finance metrics enhance the financial sustainability of SMEs.

The study makes several contributions to the extant literature. Firstly, the study adds to the supply chain finance literature by investigating the influence of supply chain practice on the financial liability of organisations instead of concentrating on the operational outcomes alone. Secondly, the study adopts a financial measure of supply chain practice in terms of firm-level cash flow, giving an added dimension of financial supply chain practice. Lastly, the study provides empirical data for Indian SMEs, which have been relatively overlooked in supply chain finance literature.

Taking these points into account, the study investigates the impact of efficient supply chain practices on the financial liabilities of Indian SMEs. This study looks into how strategically integrating the supply chain will help in enhancing operational performance, financial stability and competitiveness. The study will provide insight into how SMEs can cope with debt and build resilience to overcome hurdles. Based on the studies conducted by Chopra and Meindl (2001) and Lambert and Cooper (2000), among others, our contribution suggests practical measures that SMEs can take to overcome operational and financial challenges. Our findings are expected to guide policymakers, practitioners, and researchers regarding the importance of supply chain practices that contribute to the sustainable growth as well as profitability of SMEs in emerging economies.

The manuscript is organised as follows. Section 2 reviews relevant literature by bringing out the gaps in studies on supply chain practices for the financial stability of SMEs. Section 3 discusses the methods, data collection, and analytical methods used. Section 4 provides the results of the study concerning how supply chain integration and responsiveness help to mitigate liabilities and improve efficiencies in Indian SMEs. Section 5 explains what the results mean when compared to the literature, as well as their theoretical and practical implications. Finally, Section 6 gives a summary and offers suggestions for policymakers and managers of SMEs, as well as future research on Emerging Markets Supply Chain Management.

2 Past Literature

Supply chain management (SCM) is a strategic tool that organisations use to enhance operational efficiency, minimise costs and boost responsiveness to market demands. Supply chains have integrated all functions of the supply chain, from procurement, production and distribution. Complexity has been added to supply chains to create a competitive advantage (Bowersox & Cooper, 2002). Supply chain integration links internal processes with those of suppliers and customers. It is a linkage of processes to enhance the flow of goods, services, information, and finances. Further, achieving the overall performance of the organisation. Also, to enhance customer satisfaction (Mentzer & Keebler, 2001).

2.1 Supply Chain Integration and Organisational Performance

The emergence of supply chain management (SCM) is seen as a key strategy for enhancing organizational efficiency and responsiveness as well as fostering competitiveness. In modern supply chains, processes such as procurement, production, logistics, information sharing, and customer coordination are combined to optimize resource utilization and minimize operational inefficiencies (Mentzer et al., 2001). Organizations have started using supply chain integration to coordinate their activities in relation to suppliers, internal operations, and customers so that they can efficiently respond to changes in market conditions.

Earlier studies have repeatedly shown that SCM plays a critical role in improving performance. Flynn et al. (2010) report that supplier integration, internal integration, and customer integration positively influence organizational operational and business performance. Likewise, according to Storey et al. (2006), SCM facilitates coordination within different organizational processes and enables organizations to cope with uncertainties associated with the fluctuating nature of demand. Boon-itt and Wong (2011) also reveal that SCM enhances customer delivery performance, especially when there is technological and demand uncertainty.

Another point stressed by researchers in the literature concerns the significance of supplier relations and coordination in making supply chains effective. Specifically, Benton & Maloni (2005) pointed out that collaborative buyer-seller relations increase the satisfaction, efficiency, and effectiveness of supply chains. Similarly, Handfield & Bechtel (2002) maintained that mutual-trust relations are essential for increasing the responsiveness of supply chains and minimising the risks associated with them. This implies that supply chain integration can contribute to both operational efficiency and organisational resilience. While previous literature on supply chain integration has explored various aspects of its impact on operations in depth, its financial side has received significantly less attention so far.

2.2 Financial Implications of Supply Chain Practices

The second point emphasized by scholars in their studies is related to the importance of maintaining supplier relationships and coordination to enhance supply chains' effectiveness. Thus, Benton & Maloni (2005) noted that collaborative buyer-seller relationships contribute to the increased effectiveness, efficiency, and satisfaction level of supply chains. In turn, Handfield & Bechtel (2002) highlighted that relations based on mutual trust are crucial to increase supply chains' responsiveness to customers' needs and minimize risks in supply chains. It means that integrating supply chains into organizations helps achieve operational effectiveness and resilience.

Previous studies dedicated to supply chain integration have investigated extensively different aspects of how supply chain integration influences business operations, but financial aspects of supply chain integration remained understudied. It seems that the financial aspect of supply chain management plays an important role for small and medium-sized enterprises because SMEs may have limited financial and operational resources. Soni and Kodali (2010) stated that SMEs applying effective supply chain techniques are able to increase their efficiency and financial health. Similarly, Song & Song (2021) claimed that supply chain financing helps decrease companies' reliance on short-term borrowings and enhance their cash flow management.

While there is a growing awareness about the significance of supply chains, much of the literature concentrates on profits, effectiveness, and performance. Very few papers have considered how financial processes in the context of supply chains affect companies' responsibilities and financial commitments.

2.3 The Importance of Supply Chain Responsiveness

Supply chain responsiveness can be explained as the capacity of organizations to react to changes in demand, market trends, and any disruptions along the supply chain. In today's competitive environment, responsiveness has become an important factor of flexibility and sustainability of business operations (Gunasekaran et al., 2015).

In general, responsive supply chains are capable of adapting production schedules and inventory levels and provide effective delivery systems. According to Stevenson (2014), the responsiveness of supply chains leads to higher customer satisfaction and decreased losses caused by delays and excessive inventories. At the same time, Handfield and Bechtel (2002) pointed out that better cooperation with suppliers results in better risk management.

The problem of responsiveness in case of SMEs can be especially critical, since SMEs have fewer resources and opportunities for dealing with financial and operational risks in case of disruption. Effective responsive supply chains will help businesses to achieve greater financial stability and avoid high expenses connected with borrowing from outside sources. It is important to note that although there is much evidence about the significance of responsiveness in terms of operations, little attention is paid to the impact of responsiveness on liabilities and financial stability.

2.4 Challenges in Supply Chain Management for SMEs

The following represent the challenges facing the adoption of efficient supply chain management by SMEs as a result of limited capital, technology and inadequate coordination. These challenges normally undermine efficiency and lead to increased exposure to financial risks. According to Awheda et al. (2016), some of the main obstacles associated with the implementation of supply chain management initiatives include poor coordination, insufficient information sharing

and lack of integration among suppliers. In a similar study by Zailani et al. (2015), firms operating in developing nations normally lack the technological framework and capacity required for effective implementation of supply chain management initiatives.

It is worth noting that poor practices regarding supply chain can negatively influence the process of liquidity management as well as making companies dependent on short-term finances. This results from poor coordination leading to delays in payments, ineffective handling of inventory levels and cash flows. The challenge posed by inefficient supply chains becomes more pronounced for firms in emerging economies such as India.

2.5 Strategic Supply Chain Management for Financial Stability

According to the literature, SCM is recognised as an important tool for managing financial stability by reducing liabilities and improving cash flows. According to Stock and Boyer (2009), the definition of supply chain management (SCM) should achieve consensus and should include financial dimensions since SCM affects not only operational performance but also firm performance. Merging supply chain activities with financial strategies strengthens firms' responsiveness and credit ratings in the face of economic shocks.

According to Bowersox and Cooper (2002), linking SCM to financial objectives helps the firm grow like a sustainable organisation while minimising financial risk. SMEs can help sustain themselves through Sound SCM practices, which would help them limit their debt and ongoing cash requirements. An example of SCM practices that enhance financial sustainability is lean inventory demand-driven production. Boon-itt and Wong (2011) say that if firms adapt their SCM practices to financial matters, it will create balanced efficiency and agility of the firm. It also creates operational and financial stability.

Although substantial progress has been made in the literature about SCM, more research gaps remain, particularly pertaining to, the financial implications of SCM practices in SMEs from emerging market firms. Although numerous documents centre on operational efficiency and cost reduction, very few studies have focused on the influence of SCM on decreasing the financial liabilities of SMEs (Shi et al., 2013). Moreover, responsiveness matters in relationship financial stability, though the subject is less explored and well-documented external dynamic market environments.

This study investigates how SCM integration responsiveness impact financial liabilities of Indian SMEs to address these gaps. Focusing on SMEs from an emerging market, this will be looks at context. Also, it will be useful to practitioners and policy makers. We are having a surprise waiting for you by means of our findings which are going to give more power to the literature by the use of SCM practices as a tool for financial resilience along with usable strategies for PMEs to strengthen their financial resilience using supply chain management.

2.6 Research Gap

Existing literature contains ample information regarding the role of supply chain management in terms of its significance for organizational operations and strategies. Earlier studies in the area have mainly focused on issues such as supply chain integration, operational efficiencies, customer responsiveness, logistics performance, and profitability. Although previous literature makes a valuable contribution to the literature on the effectiveness of supply chain management, not much literature exists on the impact of supply chain practices on liabilities.

In this context, there is very limited literature available that examines the role of various operational, financing, and investing cash flows, which can be considered to be financial aspects of supply chain management in the structure of firms' liabilities. Moreover, little empirical evidence has been developed through previous research in the context of emerging economies like India, where SMEs play a pivotal role. The present paper attempts to bridge the research gap by exploring the relationship between supply chain-related cash flows and liabilities of Indian SMEs.

2.7 Theoretical Framework and Hypotheses Development

The research study is based on the concepts of Resource Based View and Supply Chain Integration theory. Resource Based View posits that competitive advantage can be created through valuable and efficient internal processes. In the case of supply chain management, operational efficiency, coordination capability and financial management capability become strategic resources for firms, which impact firm performances and financial viability.

According to the Supply Chain Integration theory, integration of suppliers, internal processes, and customers leads to increased efficiencies, responsiveness and information exchange. Such an efficient integration will positively impact inventory management, creation of liquidity and stabilisation of operations, which in turn may affect the firm's liabilities and finances. Based on these theories, operational cash flows, investing cash flows, and financing cash flows are identified as the financial metrics of supply chain practices.

Operational cash flows, investing cash flows, and financing cash flows will help improve operational efficiency, creation of liquidity and working capital management, as a result of which the firms are able to control liabilities efficiently due to internally generated cash flows.

H1: There is a significant relationship between operational cash flows and firms' liabilities.

A well-coordinated supply chain can decrease a firm's excessive reliance on external funding by generating cash flow internally.

H2: There is no significant relationship between financing cash flows and firms' liabilities.

Capital expenditures for developing the necessary infrastructure and technologies used in the supply chain process are usually high.

H3: There is a significant relationship between investing cash flows and firms' liabilities.

Based on the literature review and gaps identified, the following section provides a discussion on the methodology employed in the study.

3 Data and Methodology

3.1 Data

This research seeks to establish the link between supply chain-related financial factors and companies' liabilities in small and medium Indian enterprises (SMEs). This research uses a balanced panel data set of 37 Indian SMEs that span the time from 2017 to 2023. The year 2024 was left out of consideration because many companies did not report complete financial data. Financial data was retrieved from the CMIE Prowess data base, which is considered the most reputable source of financial information for Indian firms. Different industries were chosen to represent the dynamics of business operations and finances in SMEs.

Cash flows components are used in this paper to indicate the financial aspects of supply chain operations. Thus, operational cash flows will serve as the indicator of operational efficiency and working capital management, investing cash flows will be used as an indicator of investment activities in building supply chain capabilities and capacity, and financing cash flows will be the indicator of dependence on external finance mechanisms. The dependent variable used in the study will be the firms' liabilities (FL), and independent variables will include operational cash flows (OCF), financing cash flows (FCF), and investing cash flows (ICF).

3.2 Preliminary Statistical Tests

Several statistical tests were performed prior to running regressions for the examination of the validity and reliability of data used for further analyses. Firstly, descriptive statistics of various variables were calculated to assess the nature of their distributions and characteristics, such as mean, standard deviation, skewness, and kurtosis. As the outcomes show, there is considerable variability in several financial variables.

Secondly, Pearson correlation analysis was run to check the relationship among explanatory variables for the identification of multicollinearity. Given that the correlation values are considerably lower than the threshold value, the problem of multicollinearity can be considered less relevant. Thirdly, panel unit root test was carried out using the approach proposed by Levin, Lin, and Chu (LLC). This type of test is suitable for a balanced dataset, and therefore, its results are reliable. The outcomes confirm the stationarity of all variables at levels.

3.3 Model Specifications

We have set up a log-log regression model that uses the log of the firm's liabilities as the dependent variable and the log of the operating cash flow, investing cash flow, and financing cash flow as the independent variables. But as the net cash flows could be negative and the log transformation for log values is subject to undefined, therefore we have utilised the inverse hyperbolic sine (IHS) transformation, which can handle negative and zero values. It's a good alternative to the logarithmic transformation. This model will estimate the responsiveness of liabilities with respect to each type of cash flow, allowing us to see how much liability will change (in percentage) for a change (in percentage) in each type of cash flow. We have utilized log-log regression model. The model can be expressed as:

$$FL_{it} = \alpha + \beta_1 OCF_{it} + \beta_2 ICF_{it} + \beta_3 FCF_{it} + \varepsilon_{it}, \quad (1)$$

where, FL represents the dependent variable representing the firm's liabilities. OCF represents net operating cash flows, ICF represents net investing cash flows, and FCF represents net financing cash flows, the subscript i denotes companies, the subscript t denotes time and the combination of subscripts it indicates that observations may vary across countries and time. The symbol ε is the error term that contains both country-specific and time-specific effects, and is the estimated coefficient. Since the panel regression model presented above assumes that a firm's liabilities are determined by OCF, ICF, and FCF, it is hypothesised that: $\beta_1 > 0$, $\beta_2 > 0$, and $\beta_3 > 0$.

3.4 Panel Estimation Techniques

In view of the data structure, a variety of panel estimation methods have been used for analysis, which include Panel OLS regression, fixed effects (FE), and random effects (RE) to test the relationship between cash flows and liabilities. The pooled regression method combines all observations from both firms and time periods and treats them as one cross-section. This maximises the degree of freedom and sample size. Using this approach is particularly a good choice given our balanced firm panel dataset of 37 firms over seven years. The way the model was made, it had very good statistical properties and all,

and it had sufficient explanatory powers which allowed for proper analysis. The pooled regression framework effectively captures the overall effects while keeping things simple and the results meaningful and easy to interpret.

The pooled regression model used in the study meets the basic assumptions on which the estimates from the study are reliable and valid, as proved by a number of diagnostic tests. To start with, the model assumes that the relationship between the dependent variable, firm liabilities, and the independent variables, that is, net operating, investing and financing cash flows, is linear. We used IHS (inverse hyperbolic sine), to correct for non-linearity in regression when cash flow itself is negative or zero. IHS is robust and preferable to log, as log cannot handle zeroes and negative cash flow. It guarantees that the model can cope with all kinds of data values. The assumption of no multicollinearity is satisfied as the VIFs are all well below $VIF < 10$. Specifically, centred VIFs for IHS_NCFOA, IHS_NCFFA and IHS_NCFIA are 1.164817, 1.070025 and 1.104350, respectively, therefore confirming independence.

Fixed Effects model controls for unobservable firm-specific heterogeneity and the problem of omission arises when such heterogeneity is correlated with other explanatory variables. In situations where characteristics unique to a particular firm have an effect on the dependent variable, it makes sense to use this method. Random effects regressions, on the other hand, assume that the individual-specific effects are normally distributed and not correlated with any of the explanatory variables. As compared to fixed effects, Random Effects provides a more efficient estimator of the parameters of interest. To decide upon the most suitable panel regression, the Hausman specification test has been carried out. The Hausman specification test tests the hypothesis of correlation of unobservable individual effects and explanatory variables. Accordingly, the final model selection was based on the Hausman test results and overall model suitability.

Also, the stationarity of the variables is checked using unit root tests; specifically, the Levin, Lin and Chu (LLC) test, which confirms that all variables are stationary. Stability is of utmost importance for the reliability of panel data analysis. The t-stat of 7.561972 and p-value of 0.120000 from the Ramsey RESET test demonstrate that the model does not suffer from omitted variable bias. The low Durbin-Watson statistic of 0.885420 indicates that there are possibilities of autocorrelation in the residuals. We use the Jarque-Bera test to check the normality of the residuals. It gives 8.509136, and the p-value is 0.014199, which shows the residuals are slightly deviated. The pooled regression framework adequately captures the composite effects while maintaining its simplicity and ensuring the results are meaningful and easy to interpret. The overall fit of the pooled model indicates its suitability for the balanced panel econometric data used in the study.

4 Empirical Findings

Through empirical findings, we are trying to analyse how different cash flows, such as operating cash flow, investing cash flow, and financing cash flow, affect the liabilities of medium and small-sized Indian firms. We applied a log-log regression model to evaluate the elasticity of liabilities to all types of cash flows. This method gives a detailed picture of how each cash flow category affects the firm's liabilities and helps to determine if the cash flow management of the supply chain significantly affects the company's liabilities. The analysis takes place through various tests. These tests include the unit root test, correlation test, and model fit test, to finally come up with the pooled regression model of the data. The relationships between the different types of cash flows and liabilities are validated through a pooled regression model. They reflect the coefficient values and the significance of the various cash flows.

4.1 Primary Analysis

The financial variables given in Table 1 is descriptively analysed before and after log transformation, which is clear from the descriptive statistics. The data shows a lot of variation and is skewed, as shown by the high standard deviation, skewness and kurtosis values. For instance, the Firm's Total Liabilities have the mean and standard deviation of -422.349 and 3570.966, respectively, which varies across firms. With a skewness of -8.442249 and kurtosis of 114.0025, we can determine that the distribution has a long-left tail, suggesting that many firms appear to have negative assets more frequently than positive assets. Likewise, the average net operating cash flows stood at -411.6838, with the skewness of -4.156817 representing a left-skewed distribution. However, average net financing cash flows equate to 916.8452, with the skewness of 4.837967 representing a right-skewed distribution. The distribution of net investing cash flows, having a mean of 13772.75 and skewness of 4.132059, is also positively skewed, suggesting that firms have different investing strategies.

When we use log transformations on our data, it helps lessen the skewness and kurtosis of the data. For example, the log of the Firm's Total Liabilities has a mean of 7.876996 and skewness of 0.06493, indicating a more symmetric. In the same way, the log of Net Operating Cash Flows has a mean of 3.479529 with a skewness of -0.97525, while the log of Net Financing Cash Flows and Net Investing Cash Flows have means of -2.22392 and -2.45195, along with skewness values of 0.613055 and 0.691188, respectively, thus suggesting a move towards normality. The ADF and PP test statistics confirm that all variables are stationary, showing that data is suitable for regression and is unlikely to result in spurious results. This change allows more accurate calculations on elasticities, or how much the liabilities would change as cash flows change. The finding highlights the importance of cash flow management for maintaining financial stability. Further, the same offers insights into gaining benefits from strategic opportunities.

Panel 2: Summary Statistics of all the variables before log transformations (N=259)											
Model variables	Variables type	Mean	Standard Deviation	Maximum	Minimum	Skewness	Kurtosis	Jarque-Bera	ADF	PP	Level Prob
Firm's Total Liabilities	Dependent	-422.349	3570.966	18262.2	-46419.8	-8.442249	114.0025	136046.8	-7.8904***	-12.746***	0.000***
Net Operating cash flows	Independent	-411.6838	1479.561	3098.2	-12377	-4.156817	27.92691	7451.296	-9.5114***	-15.9568***	0.000***
Net Financing cash flows	Independent	916.8452	3323.612	28316.2	-12387.7	4.837967	35.43232	12361.63	-6.3064***	-9.0493***	0.000***
Net Investing cash flows	Independent	13772.75	32077.44	212220.7	36.8	4.132059	21.39288	4387.823	-4.8149***	-5.1222***	0.000***
Method						t-statistics			p-values		
Levin, Lin, Chu Test						-6.17251			0.0000***		
Panel 1: Summary Statistics of all the variables after log transformations (N=259)											
Model variables	Variables type	Mean	Standard Deviation	Maximum	Minimum	Skewness	Kurtosis	Jarque-Bera	ADF	PP	Level Prob
Log of Firm's Total Liabilities	Dependent	7.876996	1.938439	12.26538	3.605498	0.06493	2.349899	4.742886	-4.8044***	-5.0701***	0.000***
Log of Net Operating cash flows	Independent	3.479529	5.295206	10.94434	-10.1176	-0.97525	2.580922	42.95167	-11.4644***	-12.2362***	0.000***
Log of Net Financing cash flows	Independent	-2.22392	4.981922	10.50574	-11.4386	0.613055	2.284542	21.74764	-11.3997***	-11.6219***	0.000***
Log of Net Investing cash flows	Independent	-2.45195	5.275646	8.731724	-10.1167	0.691188	2.097653	29.40939	-7.8493***	-12.86***	0.000***
Method						t-statistics			p-values		
Levin, Lin, Chu Test						-11.8382			0.0000***		

Table 1: Descriptive statistics
Source: Author's own calculation.

Variables	Total Liabilities	Net Cash from Investing Activities	Net Cash from Financing Activities	Net Cash Flow from Operating Activities
Total Liabilities	1			
Net Operating cash flows	0.7328	1.0000		
Net Financing cash flows	-0.4762	-0.0113	1.0000	
Net Investing cash flows	-0.5676	-0.5950	0.1451	1.0000

Table 2: Correlation matrix
Source: Author's own calculation.

The results of the correlation matrix are presented in Table 2, which reveal relationships between the log of total liabilities and the logs of net cash flows from operating, financing, and investing activities. The log of total liabilities and the log of net cash flows from operating activities show a positive correlation of 0.7328. Higher operational cash flows are related to higher total liabilities. This means that greater cash flow may indicate that firms are using operational profits or liquidity to reinvest in the business or manage debt effectively. The log of net cash flows from operating activities has a very weak negative correlation with the log of net cash flows from financing activities (-0.0113), indicating very little relationship between these two variables. It means companies with greater financing cash flows may not see a major fall in their operating cash flows. This could be attributed to greater balancing of financing and operation cash flows by such companies.

The log of net cash flows from operating activities and the log of net cash flows from investing activities are moderately positive (0.5026). This means that when there is an increase in borrowing funds for investment, it is very likely the cash flows from operations will increase. This link suggests that firms will use their operational cash for investment purposes when they expect a strategic benefit at that time. The log of net cash from financing activities is positively correlated with the Log of Net Cash from Investing Activities. The correlation is low, standing at 0.1451. This would indicate that financing cash flows do not, in general, affect investment cash flows. The independence implies that firms may be sourcing financing for something other than investment such as debt restructuring or dividend payment.

Since no correlation among these variables exceeds 0.70 so multicollinearity is probably not a concern. Therefore, can safely use them for further analysis. These results show that cash flows are managed dynamically by firms. Thus, operating cash flows can be utilized to invest or finance a firm's economic proposition effectively. This dynamic relationship highlights the importance of cash flow management for achieving sustainable financial performance and strategic growth.

4.2 Pooled Regression Findings

The regression analysis outcomes using pooled OLS technique for the association between firms' liabilities and various categories of cash flows within India's small businesses have been presented in Table 3 below. Since the model is in the log-log form, we can interpret the coefficients as elasticity. Therefore, the coefficient values show the percentage change in firms' liabilities caused by a one percent change in each of the cash flow variables while controlling for other factors. The results indicate that Net Operating Cash Flow positively and significantly influences firms' liabilities at 1% significance level. This means that a one percent change in operational cash flows leads to a rise in firms' liabilities by an average of 0.099%. This shows that small firms with relatively high operating cash flows tend to have higher levels of liabilities compared to those with low operating cash flows. This explains the growth-driven financing pattern of the small firms whereby the firms with good operational cash flows tend to be viewed as credit-worthy by financial institutions, trade creditors, and suppliers. This implies that such firms will have easy access to debt financing as well as supplier credit.

Variable	Coefficient	Std. Err.	T Statistics	P> t	[95% Conf. Interval] Lower	[95% Conf. Interval] Upper
Net Operating Cash Flows	0.09895	0.022253	4.45	0.000***	0.0551271	0.0551271
Net Financing Cash Flows	-0.00277	0.02303	-0.12	0.904	0.142773	0.142773
Net Investing Cash Flows	-0.10481	0.021407	-4.9	0.000***	-0.0481238	-0.0481238
Constant	7.269536	0.139207	52.22	0.000***	0.0425835	0.0425835
Source	SS		df		MS	
Model	185.218101		185.218101		185.218101	
Residual	3		3		3	
Total	61.7393671		61.7393671		61.7393671	
Statistic	Value		Statistic		Value	
Number of observations	259		Mean dependent var		7.876996	
R-squared	0.1911		S.D. dependent var		1.938439	
Adjusted R-squared	0.1815		Akaike info criterion		3.976638	
S. E. of regression	1.753684		Schwarz criterion		4.03157	
Sum of squared resid	784.2288		Hannan-Quinn criterion		3.998724	
Log likelihood	-510.9746		Durbin-Watson stat		2.1491161	
F-statistic	20.08		Root MSE		1.7537	
Prob(F-statistic)	0.0000***					

Table 3: Pooled Regression Results

Source: Author's own calculation

Note: This table presents the pooled OLS regression results examining the relationship between a firm's liabilities and a firm's cash flows. Statistical significance levels are indicated as follows: ***p < 0.01 (1% level), **p < 0.05 (5% level), *p < 0.10 (10% level).

On the other hand, greater operational cash flows can also be viewed as an indication of better supply chain coordination, good inventory management, proper receivables management, and stable client payment terms. Supply chain management literature has found that integrated and responsive supply chain systems are beneficial for enhancing firms' operational efficiencies and liquidity creation (Flynn et al., 2010; Mentzer et al., 2001; Christopher, 2022). Additionally, Bowersox and

Cooper (2002) and Lambert and Cooper (2000) have highlighted the benefits of efficient supply chain coordination for developing firms' operations. Therefore, the above-mentioned positive association between operational cash flows and liabilities can be explained by the ability of stable firms to leverage external sources of finance and trade liabilities in order to grow their operations and expand their supply chains.

Net Financing Cash Flows were found to be statistically unrelated to firms' liabilities. In other words, an increase in financing cash flows from 1% would lead to a decrease in liabilities by only 0.003%, despite the negative value of the corresponding coefficient (-0.00277). It appears that financing cash flows do not significantly affect changes in the structure of firms' liabilities. One potential explanation may be the greater use by Indian SMEs of operational finance generated within operations and trade-based finance compared to formal sources of finance. In emerging markets, SMEs typically experience funding constraints, lack of credit facilities, and high costs of borrowing, thus making the impact of formal financing activities less relevant to long-run liabilities.

Secondly, the variability of financing cash flows due to activities such as refinancing and repaying debts may also contribute to this result, limiting its relevance to overall liabilities. Indeed, this result is largely in line with the reasoning provided by Song & Song (2021), who state that the increased use of supply chain financing reduces the need for traditional financing channels through improved internal liquidity management and financing of suppliers.

Finally, the estimated coefficient for Net Investing Cash Flows is negative and statistically significant at the 1% level. Given an estimated value of -0.10481 for the coefficient, it can be stated that one percent increase in investing cash flows would lead to an approximately 0.105% decrease in liabilities. The economic interpretation of this result is that high investment activity results in low levels of liabilities among SMEs. This result seems paradoxical since investments require funding. However, from the perspective of SMEs in India, this result may indicate that firms characterized by financial discipline use their operational resources generated internally to fund investment in supply chain infrastructure, technology usage, logistics operations, warehousing, and modernization.

Additionally, the inverse relationship could mean that investment-driven firms increase operational efficiency and productivity and hence the efficiency of the supply chain over time, which results in low reliance on debt financing. From previous literature, it is noted that investments made towards developing supply chain capability and operations result in increased efficiency over time (Wu et al., 2010; Vanpoucke et al., 2017; Shi & Yu, 2013). Consequently, investment in efficient supply chain systems can help build firms' ability to generate cash internally and minimize financial risks.

Generally, the pooled regression analysis above is statistically significant based on the F statistic and its corresponding probability. Based on the obtained R-squared value of 0.1911, one can conclude that 19.11% of the variance in firms' liabilities can be attributed to cash flow. Although the strength of explanation is moderate, this type of figure is usually satisfactory in firm-level panel data analysis.

4.3 Fixed Effects and Random Effects Findings

Table 4 provides the estimates using the Fixed Effects (FE) and the Random Effects (RE) approaches in assessing the effects of supply chain-related cash flows on firms' liabilities in India's SMEs. As evident, the findings obtained from both approaches are almost similar to those from the pooled OLS regressions, reinforcing the robustness of our analysis and findings. Given that our model is log-linear in nature, the coefficients in this analysis can be taken as elasticity coefficients which represent the percentage change in firms' liabilities caused by a one percent change in the variables.

Net Operating Cash Flow has a significantly positive influence on firms' liabilities in the study sample according to the FE and RE models. For instance, in the fixed effects model, an increase of 1% in operating cash flows is associated with a marginal increase of 0.09% in firms' liabilities while in the random effects model, a 1% change in operating cash flows causes an increase of about 0.10% in firms' liabilities. This implies that financially credible firms with adequate operating cash flows are able to obtain more trade credit and liabilities from suppliers and external sources for expanding operations. Such results correspond to the theory that successful integration of supply chains can have a positive impact on the ability to create liquidity, improve coordination, and manage inventories (Flynn et al., 2010; Mentzer et al., 2001). Organizations that enjoy efficient operations will usually be better able to support higher liability levels since lenders and members of the supply chain recognize their stability and resilience (Wu et al., 2010; Christopher, 2022).

Method	Fixed Effects		Random Effects	
Variable	Coefficient	t-statistics	Coefficient	t-statistics
Net Operating cash flows	0.094521***	4.18	0.097836***	4.39
Net Financing cash flows	-0.004813	-0.21	-0.003127	-0.14
Net Investing cash flows	-0.101745***	-4.71	-0.103992***	-4.86
Constant	7.118436***	48.35	7.246183***	51.76
Statistic	Value		Statistic	Value
No. of Obs.	259		No. of Obs.	259
No. of Groups	37		No. of Groups	37
F Statistic	18.42***		chi2	21.17***
Prob > F	0.0000		Prob > F	0.0000
R-squared	0.2146		R-squared(overall)	0.1982
F Test	3.6841		-	-
Sigma_U	11.7214		Sigma_U	0.6128
Sigma E(MSE)	10.1364		Sigma_E (MSE)	1.7346
RHO	0.5148		RHO	0.1112
Hausman Test				
Chi Square	47.50***(0.0003)			

Table 4: Fixed and Random Effects Results

Source: Author's own calculation.

Note: This table presents the Fixed Effects (FE) and Random Effects (RE) estimation results examining the relationship between supply chain-related cash flow indicators and firms' liabilities among Indian SMEs. Net Operating Cash Flows (OCF), Net Financing Cash Flows (FCF), and Net Investing Cash Flows (ICF) are used as explanatory variables, while firms' liabilities are used as the dependent variable. The Hausman specification test was employed to determine the appropriate panel estimation framework. Statistical significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

The results are also consistent with existing research in the field of supply chain finance, which suggests that high operational efficiency and proper cash flow management help organizations to become more flexible and financially sustainable (Shi & Yu, 2013). When considering small businesses, efficient operations can lead to better management of receivables, efficient inventory management, and coordination with suppliers, which contributes to improved borrowing capacity and supply chain performance (Bowersox & Cooper, 2002; Chow et al., 2008).

In contrast, Net Financing Cash Flows are associated negatively but not significantly with firms' liabilities using either estimator type. While FE coefficient (-0.0048) and RE coefficient (-0.0031) imply that there is no substantial influence from financing activities on firms' liability structure, an economic interpretation would be that cash flows associated with financing activities of Indian SMEs are relatively volatile, reflecting short-term refinancing, repayments and temporary measures rather than long-term building of liabilities. This outcome could mean that firms tend to employ their internal financial sources through operations or within the supply chain rather than engage in external financing processes. It is a common practice for EMs SMEs which have no reliable institutional credit sources due to the problems of informational asymmetry and financing constraints (Awheda et al., 2016; Song & Song, 2021).

Coefficient related to Net Investing Cash Flows is still negative and significant (1%) using both estimators. According to the findings obtained via the FE model, a 1% rise in investing cash flows results in decreasing liabilities by about 0.10%. RE estimates are similar, resulting in about -0.104%. It means that companies with greater expenditure towards investment purposes generally keep smaller amounts of liability. In economic terms, one can say that financially healthier SMEs use internal funding sources, such as retained profits and internal cash flow, in order to invest in infrastructure, technological solutions, logistics, and improvements to supply chains instead of relying heavily on borrowed capital. Such an approach should lead not only to greater efficiency and stability but also to decreased reliance on borrowed funds.

Overall, the obtained finding is congruent with the existing belief that investment in supply chain capabilities positively impacts organizational performance and resource efficiency (Tracey et al., 2004; Vanpoucke et al., 2017). Investment in technological innovation, improvement of inventory management, logistics capabilities, and mechanisms that support coordination in the supply chain could help organizations become more productive and avoid future financing problems (Gunasekaran et al., 2015; Bowersox et al., 2020). As a consequence, companies that pursue more investment-oriented business strategies will be able to minimize liability dependence over time.

Hausman specification test shows a statistically significant Chi-square value, implying that the Fixed Effects estimator is more suitable than the Random Effects estimator. In other words, there is a correlation between unobservable firm-specific factors and the independent variables that have to be accounted for. Among such factors can be the quality of management, efficiency, governance system, suppliers' cooperation, and financial management capabilities. In this way, FE estimates could be regarded as more trustworthy.

In terms of supply chain financing considerations, the above results prove the significance of efficient cash flow operations and investment practices in determining the financial stability of firms, as well as their liability management practices. Specifically, an efficient operational cash flow seems to contribute positively to the borrowing opportunities of companies and helps maintain the sustainable structure of liabilities, while operational efficiencies driven by investments decrease overreliance on finance. The conclusion drawn from these results confirms that supply chain finance, operational coordination, and cash flows management is vital to ensuring the sustainability of SMEs functioning in emerging markets.

(Lambert & Cooper, 2000; Storey et al., 2006; Christopher, 2022).

4.4 Discussion

This research work contributes to an increased understanding of the nature of the relationship between supply chain cash flow management and firm's liabilities within the context of Indian SMEs. According to the empirical findings, the operational and investment-related cash flows significantly contribute to the formation of liability structure, whereas financing cash flows possess limited explanatory power. Such results highlight the increasing body of evidence within the field of supply chain finance which views effective operational and liquidity coordination, along with appropriate investments, as essential for the financial viability of SMEs operating within emerging economies.

The positive and statistically significant correlation between Net Operating Cash Flows and firm's liabilities implies that the stronger is the firm's operational cash flows generation capabilities, the higher is its liability position. Under the log-log framework, an increase of 1% in operating cash flows will lead to an increase of about 0.099% in the level of liabilities. This result can be viewed in light of growth-oriented financing strategies which characterize SMEs. In particular, a more efficient operational cash flow generation enables SMEs to attract financial resources for their business from lenders, suppliers, and trade creditors, which can be further utilized for inventory replenishment and procurement purposes.

In regard to the analysis of supply chain finance, operational cash flows also demonstrate the efficiency level of supply chain coordination, receivable management, inventory turns, and customer payment processes. Previous studies have shown that integration within supply chains increases their responsiveness, liquidity creation capacity, and business performance (Flynn et al., 2010; Mentzer et al., 2001; Christopher, 2022). In addition, efficient coordination of supply chains contributes to improving companies' operational effectiveness and financial strength (Lambert & Cooper, 2000; Bowersox & Cooper, 2002). Therefore, current results suggest that stable financially SMEs effectively use their liabilities and financing from trade to facilitate operational and supply chain expansion.

On the other hand, Net Financing Cash Flows negatively correlate with SMEs' liabilities at the statistically insignificant level. Thus, an estimated coefficient shows that for each 1% change in financing cash flows, there is a 0.003% decrease in liabilities, which does not make the correlation between these two variables statistically significant. These results demonstrate that financing activities do not significantly impact the liability structure of selected firms. This could be attributed to the fact that the Indian SMEs have a tendency to focus on internally available operational funding and supplier financing rather than external financing.

As far as emerging market environments are concerned, SMEs are characterized by borrowing difficulties, lack of institutional credit, and increased financing costs, making external financing efforts less effective in determining liabilities of firms in the long run. The cash flows associated with financing operations can change depending on whether refinancing, payment of debts, and liquidity management issues occur, thus decreasing their significance for determining firm liabilities. This result is generally consistent with the views of Handfield and Bechtel (2002) and Benton and Maloni (2005), who note that better relations between the firm and its suppliers along with improved supply chain management can provide financial flexibility without adding financial obligations to the company.

Another important observation made in this study is the negative and statistically significant association between Net Investing Cash Flows and Liabilities. According to the regression analysis, for every 1 percent increase in investing cash flows, the firm's liabilities will be decreased by around 0.105 percent. From an economic perspective, it means that the SMEs involved in intensive investments are likely to have relatively low levels of liabilities. While the investments normally involve additional financing, financially well-managed SMEs are expected to fund their investments mostly from their internal sources of surplus without accumulating too much debt.

This finding could also be explained by the long-term benefits that investments in supply chains, warehouse management, logistics, digitization, and modern technology generate. According to previous literature, investments in operations and supply chain integration lead to improved performance (Wu et al., 2010; Vanpoucke et al., 2017; Shi & Yu, 2013). At the same time, investments in SCM allow improving responsiveness and delivery performance (Chopra & Meindl, 2001; Boon-itt & Wong, 2011). Thus, investments-focused SMEs can gradually lower their liabilities through more efficient operations and increased internal sources of funding.

All the findings together reveal the significance of the efficiency of operations, management of liquidity, and the proper behavior of investments in assessing the financial sustainability of the SMEs. The study reinforces the theoretical basis provided by the resource-based view and the supply chain integration theory, which postulate that operational competence and good coordination are important sources of strategic advantages. In the case of SMEs operating in India, the study demonstrates that an efficient supply chain contributes not only to better operational performance but also to the ability of the firm to cope financially.

5 Conclusion and Policy Implications

The importance of cash flow management for the financial health of MSMEs in emerging markets. The study's results indicate that operational cash flows play a crucial role in cash management, implementation of financial leverage, and liability management. This, in turn, lowers the demand for additional financing through loans. The small insightfully negative relationship between financing cash flow and liabilities shows that financing provides necessary liquidity though not large on liabilities for firms because they have good internal cash flow generation. Investing cash flows positively affects

the liabilities, and although increases in liabilities are not ideal, we see the value in strategically investing for long-term viability and resiliency through supply chains.

This research has many policy implications. Strengthening operational cash flow management through financial literacy programs could help MSMEs reduce dependency on borrowing, which will make them stable. Another way to help MSMEs is by providing flexible financing. Low-interest revolving credit can give MSMEs important liquidity while not overloading them with liabilities. Furthermore, tax breaks or grants for strategic investments can enable MSMEs to undertake projects that help improve productivity, like adopting new technologies, without incurring excess risk. Finally, helping businesses work together and digitalize will make it easier for the small (MSMEs) to optimize their cash flows and increase business competitiveness. The combination of these policies will result in an ecosystem conducive to the sustainable growth of MSMEs. It strengthens the economic contribution and resilience of MSMEs in these dynamic supply chains.

The study's implications are especially relevant for MSMEs of emerging economies those who face more difficulties due to limited capital access and economic volatility. Firms that manage their operational cash flow plan have less chance that they would rely on external funding. In other words, they would manage themselves financially (Awheda et al., 2016; Sandberg & Abrahamsson, 2010). This strategy enables MSMEs to deploy more resources to important investments while still having manageable liabilities. This is in line with Carton's (2004) call for cash flow as a key performance. Additionally, improved cash flow management positions firms for supply chain success, ensuring smooth operations and heightened flexibility to market changes (Chow et al., 2008; Zailani et al., 2015).

The future research could extend the current study by observing other moderating variables such as technological progress, demand fluctuation, supply chain integration, etc. Technology integration can help to increase operational efficiency and financial performance. Hence, a competitive advantage can also be given to firms. Combining these aspects may add clarity to the cash flow aspect along with managing liabilities and ensuring financial stability (Christopher, 2022; Stevenson, 2014). Doing so will let future researchers work on the problems of complexity in supply chains in more and more complex markets.

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