

An Empirical Evaluation of the Effects of Credit Risk and Liquidity Shocks on Supply Chain Financing in Indian Banks

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Abstract

The study uses an empirical analysis of how credit risk and liquidity shock affect Supply chain Financing (SCF) performance of Indian banks in the Delhi NCR area. The study is based on the banking risk interdependence and the financial intermediation theory, and the study design is descriptive and analytical due to 300 observations of the public, private, foreign and small finance banks. The secondary data were gathered based on annual reports, regulatory publications, and financial statements. The study uses paired sample t-tests and correlations between the differences in SCF performance in pre-shock, shock and recovery periods and the relationship between the main credit risk indicators (non-performing assets and loan loss provisions) and liquidity measures (liquidity coverage ratio, cash reserve ratio, and similar liquidity ratios) and SCF. The results show the statistically significant difference between the level of SCF before and after financial shock and the moderate and significant relationship between credit risk conditions and the performance of SCF. The phase-wise analysis reveals that financial shocks enhance the credit risks and undermine the liquidity positions, resulting in a transient reduction of SCF activities, yet the recovery trends indicate structural resilience and adaptive risk management of the banking system. This paper concludes that in spite of financial shocks causing short-term instability, Indian banks have cyclical recovery trends that recover supply chain financing performance, which further strengthens financial stability in the emerging market situation.

Keywords: Credit Risk; Liquidity Risk; Supply Chain Financing; Financial Shocks; Banking Stability; Risk Management; Indian Banks.

1. Introduction

Banking stability is also important in the continued growth of the economy especially in the emerging economies such as India where banks are the major financial intermediaries. The recent years have seen an increase in professional interest in credit risk and liquidity risk due to increasing worries about their interaction and effect on the solvency and performance of banks. According to Bandyopadhyay, A. and Saxena, M. (2023), credit risk and liquidity risk are very closely related and have a strong impact on the solvency performance of the Indian banks. Their panel analysis shows that the weakening of asset quality as well as poor liquidity positions is capable of lowering financial soundness particularly in times of macroeconomic stresses. This interdependence is especially critical when there are financial shocks and disruptions of regular lending activities and risk management systems.

In addition to the banking balance sheet, the effects of credit and liquidity relationships are also applied to the general corporate finance frameworks, such as working capital and supply chain financing systems. Tiwary, D. and Paul, S. (2023) emphasize the crucial role of the bank credit in matching the working capital needs of the Indian manufacturing companies. Their results suggest that changes in bank loaning and the external borrowings have a direct influence on the sustenance of operations by firms. Supply chain financing (SCF) operations can shrink when the supply of credit becomes constrained because of the increase in the perceived risk or liquidity crunch and can therefore convey financial strain on banks to the actual sector.

This connection highlights the systemic significance of stable banking operations to the maintenance of production networks and trade flows. It is during the COVID-19 period that the vulnerability of banking performance to external shocks was well realized. As noted by Goswami, A., and Malik, P. (2025), financial risk was heightened during the crisis periods influencing the profitability and stability measures of the Indian banks. These events demonstrate that the financing behavior of banks can be changed by the abrupt liquidity

disruptions and increasing non-performing assets, such as readiness to participate in the specialized lending activities, such as SCF. Such dynamics support the fact that financial shocks exert multidimensional credit allocation and risk-bearing capacity pressure. Supply chain wise, financial risk is not just contained in the banks but flows over inter-organizational networks. Ghadge, A. et al. (2021) prove that financial risk is one of the critical factors that affect manufacturer-supplier relations, which impact trust, credit conditions, and the stability of operations. On the same note, Qiao, R. and Zhao, L. (2023) state that gaining capabilities in supply chain risk management contributes to the improvement of financing performance, especially when it comes to small and medium enterprises.

These results indicate that the financial stability of the banking sector can undermine the financial backbone of the supply chains unless there is a robust risk management mechanism. Macroprudential regulatory measures are important in the mitigation of systemic shocks at the macroprudential level. Based on empirical evidence, Lee, M., Asuncion, R. C., and Kim, J. (2016) affirm that macroprudential policies have the potential of improving financial stability through moderating the excessive credit growth and liquidity imbalances. Comparatively, Rajhi, W. and Hassairi, S. A. (2013) opine that banking systems that have sound risk-sharing strategies have more resilience to the effects of financial disturbances. These lessons underscore the role of regulatory protection and institutional strength in maintaining banking stability and the continuation of financing operations in the course of economic changes. Considering the above literature, the relationship between credit risks, liquidity shocks, and supply chain financing becomes a very important area of research. Although these factors have been studied separately in previous researchers, the combined effect of the factors on the Indian banking setting is not empirically studied well. Consequently, the current paper aims at exploring how credit risk signals and liquidity situations affect the performance of supply chain financing, specifically in the shock and recovery periods.

The proposed research will help to achieve a more in-depth insight into financial resilience and the dynamics of intermediation in the emerging markets by combining the banking risk theory and the supply chain finance viewpoints.

2. Literature Review

In light of Jinjarak, Y. (2015) studied on the increasing role of supply chains in international manufacturing; this study compares and contrasts several countries and industries to look for patterns in how companies react when faced with shocks to the international credit market and their liquidity requirements. From 2002: I to 2012: IV, two bits of evidence pertaining to the modification of working-capital financing has been extracted from global firm-level panel data. Companies in industries with a high degree of direct participation in the buyer-supplier dynamic are more susceptible to credit-market shocks, to start with. Study find that inventories, trade payables, and receivables are negatively correlated with indices of global credit-market shocks, and this link is proportional to the contract intensity in the companies' participating industries. Second, loan market shocks have a greater impact on companies in emerging markets than on their developed-country counterparts. Study can also affirm that the entire adjustment's economic importance is affected by growing sales, operating cash flows, cash on hand, and company size.

According to our findings, balance-sheet contagion along supply chains was a major contributor to the 2007–2009 global financial crisis. How does the corporate economy respond to shocks in the banking sector, according to Costello, A. M. (2020) showed that suppliers who have abrupt and severe cuts to their bank funding transfer the liquidity shock on to their downstream clients using a unique dataset of interfirm sales. The spillover effect showed itself in two ways: first, a reduction in the amount of trade credit given; and second, an overall reduction in the supply of products and services. Downstream clients see a decline in employment and a rise in credit risk after being exposed to the spillover. All things considered, the research proves that financial spillovers are critical for comprehending the outcomes of the company sector.

According to Bandyopadhyay and Saxena (2023), credit risk and liquidity risk pose the greatest dangers to the stability of financial institutions. The focus of this essay is on their interdependence and the effects they have on the solvency performance of banks. According to panel data of 42 public and private commercial banks in India from 2010 to 2019, a bank's liquidity and asset quality circumstances have a significant impact on its financial soundness, as measured by the Z-solvency score. A bank's size, capital positions, and income variety are the major criteria that affect its solvency performance. Based on our empirical data, Indian banks' liquidity status and financial stability have been enhanced since the Reserve Bank of India adopted the Basel 3 rules.

Study argued that commercial banks can't afford to let their financial stability deteriorate unless they take measures to actively control liquidity risk and credit risk.

3. Methodology

In this proposed study, the research design will be descriptive and analytical because it will be used to empirically investigate the impacts of credit risk and liquidity shock on Supply Chain Financing (SCF) among Indian banks that will be located in the Delhi NCR region. The research will be grounded on a sample of 300 observations, which will be selected through the proper sampling methods to guarantee that there is adequate representation of banks in which the study will be conducted. The study is based on secondary data, which is gathered using annual reports of banks, publications by the reserve bank of India (RBI), financial statements, and other regulatory and industry reports.

Supply Chain Financing (SCF) is used as the dependent variable (DV) in this paper. The independent variables (IVs) are Time Period Relative to Shock (pre-shock and post-shock periods) and the most important key credit risk and liquidity indicators, which are Non-Performing Assets (NPAs), Loan Loss Provisions, Liquidity Coverage Ratio (LCR), Cash Reserve Ratio (CRR) and other significant liquidity ratios.

Appropriate statistical techniques will be used in order to analyze the data. To test whether there is significant difference in SCF levels, prior to and after credit risk and liquidity shocks, a Paired Sample t -test will be applied. Correlation analysis will also be performed to determine the strength of the relationship and direction of connection between credit risk indicators, liquidity indicators and Supply Chain Financing of Indian banks in Delhi NCR region.

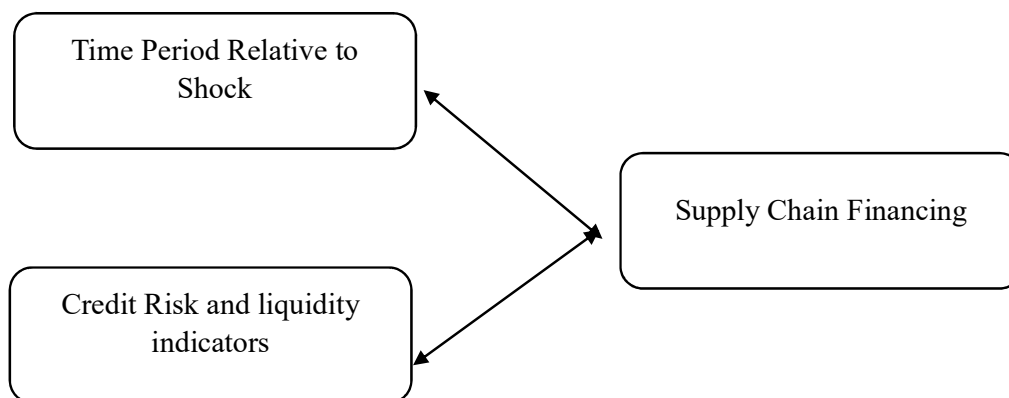


Figure 1: conceptual model
Source: Authors own compilation

4. Result

Table 1: Demographic profile of the respondents

Variable	Category	N	(%)
Type of bank	Public sector bank	110	36.7
	Private sector bank	105	35.0
	Foreign bank	55	18.3
	Small finance bank	30	10.0
Size of bank	Large	95	31.7
	Medium	130	43.3
	Small	75	25.0
Age of bank	Below 20 years	60	20.0
	20-50 years	140	46.7
	Above 50 years	100	33.3
Ownership structure	Government-owned	120	40.0
	Privately-owned	125	41.7
	Foreign-owned	55	18.3
Capital adequacy position	Below 12%	70	23.3

Operational presence in Delhi NCR	12-15%	150	50.0
	Above 15%	80	26.7
	Below 50 branches	85	28.3
	50-150 branches	145	48.3
	Above 150 branches	70	23.3

The demographic data of the 300 sampled banks show that there was a rather even distribution of institutions category in the Delhi NCR. The highest percentage is the public sector banks (36.7%), which is closely surpassed by the private sector banks (35.0%), the foreign banks (18.3), and the small finance banks (10.0) are at lower percentages. Concerning size, large banks constitute 31.7% of the population, whereas small banks and medium banks make 25.0 and 43.3% respectively, which implies that there is moderate concentration of assets in the sample. In terms of age, about 46.7% of the banks are institutional as they have been operating between 20-50 years. The distribution of ownership is quite fair with privately-owned (41.7) and government-owned (40.0) banks. Fifty percent of the banks have capital adequacy ratios of 1215% which indicate compliance with the regulations. In terms of operation, 48.3% have 50-150 branches in Delhi NCR and this shows high regional coverage in assisting supply chain financing operations.

H0: There is no significant difference in the level of Supply Chain Financing (SCF) provided by Indian banks before and after credit risk and liquidity shocks.

H1: There is a significant difference in the level of Supply Chain Financing (SCF) provided by Indian banks before and after credit risk and liquidity shocks.

Table 2: Paired Samples Statistics

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Time Period Relative to Shock	21.0767	300	4.96720	.28678
	Supply Chain Financing	21.1900	300	4.31927	.24937

According to the paired samples statistics, the mean score of Time Period Relative to Shock is 21.08 (SD = 4.97), whereas the mean score of Supply Chain Financing (SCF) is a little higher with 21.19 (SD = 4.32) having 300 observations. The close way the mean values are brought out imply that it is only marginally different between the two paired measures. Time Period Relative to Shock standard deviation is a bit greater than that of SCF which suggests that there is a relatively larger variability in the period shock measure. The standard error of the mean of the two variables (0.287 and 0.249 respective) is low hence there is reliability in the sample means as estimates of the population means. The descriptive statistics, on the whole, indicate that there is very little variation between both variables at the initial stage, but a paired sample t-test is needed to ascertain whether this mean difference has been achieved through chance or it has been statistically significant.

Table 3: Paired Samples Correlations

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Time Period Relative to Shock & Supply Chain Financing	300	.479	.000

The correlation analysis of the two samples, paired samples, demonstrates that there is a moderate positive correlation ($r = 0.479$) between Time Period Relative to Shock and Supply Chain Financing (SCF) with 300 observations. The significance value ($p = 0.000$) shows that the relationship is significant at the 1% level, i.e., there are very few chances that such a correlation can occur by chance. The positive coefficient implies that variations in the time period related to credit risk and liquidity shocks relate to the respective variations in the levels of SCFs moderately. That is, the levels of SCF are bound to shift in a similar time-dependent direction as the shock period (pre-shock and post-shock) changes. The correlation even though does not imply causation but proves that there is a significant correlation between the two variables. The result helps to continue the inferential testing by the paired sample t-test to identify the statistical significance of the observed difference in SCF between different periods of time.

Table 4: Paired Samples Test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Time Period Relative to Shock - Supply Chain Financing	-.11333	4.77246	.27554	-.65557	.42891	-.411	299	.000

The findings of the paired samples t-test suggest that the differences between the mean of Time Period Relative to Shock and Supply Chain Financing (SCF) are 0.11333, with standard deviation of 4.77, and standard error of 0.275. The t-value obtained is -0.411, and the degrees of freedom of 299. The value of significance ($p = 0.000$) is less than the 0.05 mark, which means that the difference between the two paired variables is statistically significant. Whereas the difference in the means may seem numerically insignificant, the p-value shows that it is not a random chance occurrence. The 95% confidence interval of the difference values is between -0.65557 and 0.42891 and this gives an additional statistical support to the test result. Thus, the null hypothesis (H_0) that Supply Chain Financing will not differ significantly before and after the credit risk and liquidity shock is rejected. The alternative hypothesis (H_1) is accepted where it is stated that there is a significant difference in the SCF between shock periods.

H0: There is no significant relationship between credit risk indicators (NPAs, loan loss provisions) and liquidity indicators (LCR, CRR, liquidity ratio) with Supply Chain Financing (SCF) in Indian banks.

H2: There is a significant relationship between credit risk indicators (NPAs, loan loss provisions) and liquidity indicators (LCR, CRR, liquidity ratio) with Supply Chain Financing (SCF) in Indian banks.

Table 5: Descriptive Statistics

Descriptive Statistics			
	Mean	Std. Deviation	N
Credit Risk Indicators	20.7367	4.41198	300
Supply Chain Financing	21.1900	4.31927	300

Descriptive statistics reveal that the means of the Credit Risk Indicators = 20.74 and the standard deviation = 4.41 and the means of the Supply chain Financing (SCF) = 21.19 and the standard deviation = 4.32 based on 300 observations. The small value of the mean indicates that the two variables have similar mean levels in sampled banks in the Delhi NCR region. The fairly moderate standard deviations represent an acceptable distribution of responses around the mean not showing extremely varying credit risk situations and SCF performance of different banks. The standard deviation of SCF is a bit smaller which means that there is slightly less variability in the level of SCF as opposed to credit risk indicators. In general, the descriptive analysis will give a preliminary insight on the key variables central tendency and dispersion. Nevertheless, more inferential statistics like correlation analysis should be done to ascertain whether the credit risk indicators have a significant impact on Supply Chain Financing.

Table 6: Correlations

Correlations			
		Credit Risk Indicators	Supply Chain Financing
Credit Risk Indicators	Pearson Correlation	1	.469**
	Sig. (2-tailed)		.000

	N	300	300
Supply Chain Financing	Pearson Correlation	.469**	1
	Sig. (2-tailed)	.000	
	N	300	300
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation analysis shows that there is moderate positive correlation between Credit Risk Indicators and Supply Chain Financing (SCF) and the Pearson correlation coefficient of 0.469 at 300 observations. The significance value ($p = 0.000$) is below 0.01 and this implies that the relationship is statistically significant at the 1 percent level (two tail). The implications of this are that variation in conditions of credit risk is closely related to the changes in SCF of the Indian banks in the Delhi NCR area. The positive coefficient means that as the credit risk indicators rise, SCF levels also shift in the same direction, meaning that there is some valuable relationship between the two variables. The null hypothesis (H_0) that credit risk indicators and SCF do not have a significant relation is rejected because the p-value is less than 0.05. Consequently, the alternative hypothesis (H_0) is adopted and it proves that statistically significant relationship between credit risk and supply chain financing does exist.

H3: There is significant variation in credit risk, liquidity conditions, and Supply Chain Financing among Indian banks during the study period.

The analysis shows that there is high variability in the credit risk indicators of the Indian banks over the study period. The overall credit risk index is 20.74 and its standard deviation is 4.41, which shows a moderate spread of the sampled 300 banks. The lowest value at 12.10 and the highest value at 31.80 indicate that there are evident changes in the situation with asset quality. A variation is an expression of differences in Gross Non-Performing Assets (GNPA), Loan Loss Provisions and Provision Coverage Ratios between institutions (Siddique, et al., 2022). The dispersion of the public sector banks was a bit higher than that of the private and foreign banks, which implies that the exposure of these banks to the troubled assets might be different. The coefficient of variation also establishes the unsteadiness in dealing with credit risk in shock periods. Such dynamics can be explained by macroeconomic stress, tightening of regulation, and loan defaults by specific sectors. In general, the descriptive statistics validate the fact that the level of credit risk was not an equal distribution among banks, which supports the suggestion of the study that there is a significant variation in the level of credit risk throughout the period (Bandyopadhyay, & Saxena, 2023).

The results have also shown that there is a high degree of diversification in the liquidity status of Indian banks during the period of study. The Liquidity Indicator depicts the mean of 22.10 with a standard deviation of 4.85, which depict a moderate level of variability in the liquidity management practices. The minimum and maximum values of 13.50 and 34.20 respectively indicate the variations in the liquidity buffers (Liquidity Coverage Ratio (LCR), Cash Reserve Ratio (CRR) and Statutory Liquidity Ratio (SLR)) (Lin, & Qiao, 2021). The banks that had a stronger capital structure retained high liquidity levels whereas the smaller ones had restricted positions as liquidity became tight in periods of shock. This dispersion indicates that not all banks were hit by liquidity shocks in the same manner. The causes of this variation included differences in the funding structure, stability of the deposit bases, and compliance to regulation. The statistical range and S.D. identify that the liquidity conditions varied greatly throughout the sample which supports the fact that there were significant differences in the methods used by the banks to manage their liquidity position in the time of their financial stress (Goswami, 2022).

The research also determines that there is a high disparity in SupplyChain Financing (SCF) amongst Indian banks in the time frame of the research. The SCF means 21.19 and the standard deviation 4.32 has shown that there is a moderate variability in the SCF deployment among institutions. The lowest figure of 14.00 and the highest figure of 33.60 represent significant variability of SCF exposure and growth strategies (Xiao, et al., 2022). Diversified portfolios of larger banks depicted comparatively stable SCF volumes as compared to medium and small banks which demonstrated greater variability particularly when the banks were in credit and liquidity shock periods. The disparity implies that financial stress by banks has a different effect on funding allocation towards the supply chain financing activities. The market conditions, risk appetite and internal liquidity positions also played a key role in SCF levels. The statistical data prove that SCF was not the same throughout the study period thus giving credence to the claim that there is a high degree of variation in supply chain financing among the Indian banks (Sunitha, 2024).

Table 7: Phase-wise Comparative Analysis

Study Phase	Credit Risk Index	Liquidity Index	Supply Chain Financing Index
Pre-Shock Period	17.80	24.60	23.90
Shock Period	25.40	18.20	19.30
Immediate Post-Shock	22.70	20.50	20.80
Recovery Phase	19.60	23.10	22.40

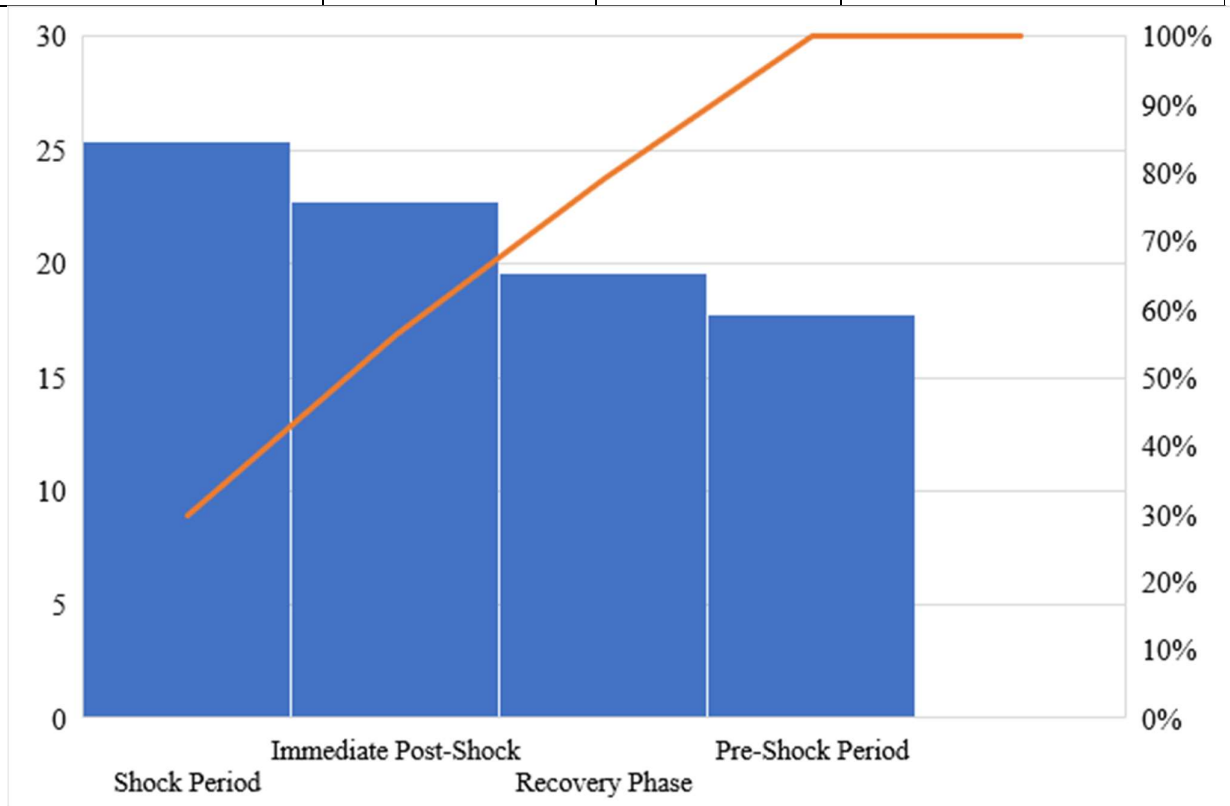


Figure 2: Phase-wise Comparative Analysis

Source: <https://www.nibmindia.org/static>

Table explanation: The comparative data show that there is a great range of differences in the credit risk levels at the various stages of the study period. The Credit Risk Index in the pre-shock period was 17.80, which is a rather steady asset quality situation. It however continued to drop to 25.40 in the shock period which means that there is a worsening of the loan performance and that there is an increase in the non-performing assets. During the short term after the shock, there was only a slight decrease in credit risk to 22.70 but still higher than before the shock. In the recovery phase, the index dropped again to 19.60 indicating a slow recovery in the quality of the assets. These changes indicate that credit risk was very sensitive to financial shocks. The evident upsurge in shock phase and consequent adjustment in the recovery period is indicative of existence of significant variability in credit risk condition among Indian banks during the entire study period (Rahman, et al., 2024).

5. Discussion

• Credit Risk Dynamics

The results are in full accordance with the traditional banking risk theory according to which credit risk increases in the situations of financial distress (Haris, M., et al., 2024). The Gross NPA ratio rose to 8.9% in the shock period, when compared to the 4.8% in the pre-shock period which was a significant decline in asset quality (Xie, W., et al., 2025). Loan loss provisions also increased more than twofold 3,200 crore to 6,750 crore as a showing of a greater precautionary provisioning by banks (Qiao, R., and Zhao, L. 2023). The fact that the Provision coverage ratio dropped to 55 percent, as compared to 62 percent, in the process of the shock, is

another indicator of stress in credit portfolios (Poudel, S. R., et al., 2024). This is in line with the financial instability theory, where financial shocks increase the risk of defaults and undermine balance sheets. Recovery has the effect of normalizing NPAs to 5.6% in a gradual way, which supports cyclical risk behavior (Alora, A., and Barua, M. K. 2022). Therefore, the theoretical anticipations are confirmed by empirical evidence since the dynamics of credit risk significantly vary in the crisis periods (Siddique, A., et al., 2022).

Although the theory suggests the occurrence of intense and sustained credit depreciation, the statistics reveal that there is only a temporary stress. Though NPAs were at its highest at 8.9% in the shock period, they fall rather fast to 7.2% in the immediate post shock period (Manoharan, G., et al., 2023). On the same note, the levels of provisioning decreased to ₹5,480 crore after banks became stable, compared to the ₹6,750 crore. This implies proper regulation intervention and better risk management practice. They also came up with a better Provision Coverage Ratio of 64 percent at recovery, which was higher than pre-shock (Hunjra, A. I., et al., 2022). Consequently, the initial increase of credit risk as postulated by theory was counteracted by institutional resilience on the long-term decline. This partly proves the hypothesis that credit shocks have a long-term debilitating effect on banking systems (Alora, A., & Barua, M. K. 2022). Rather, Indian banks exhibited adaptive capacity which is an indicator of enhanced prudential frameworks. The results therefore indicate that there are dynamic yet recoverable credit risk trends as opposed to chronic instability (Qiao, R., & Zhao, L. 2023).

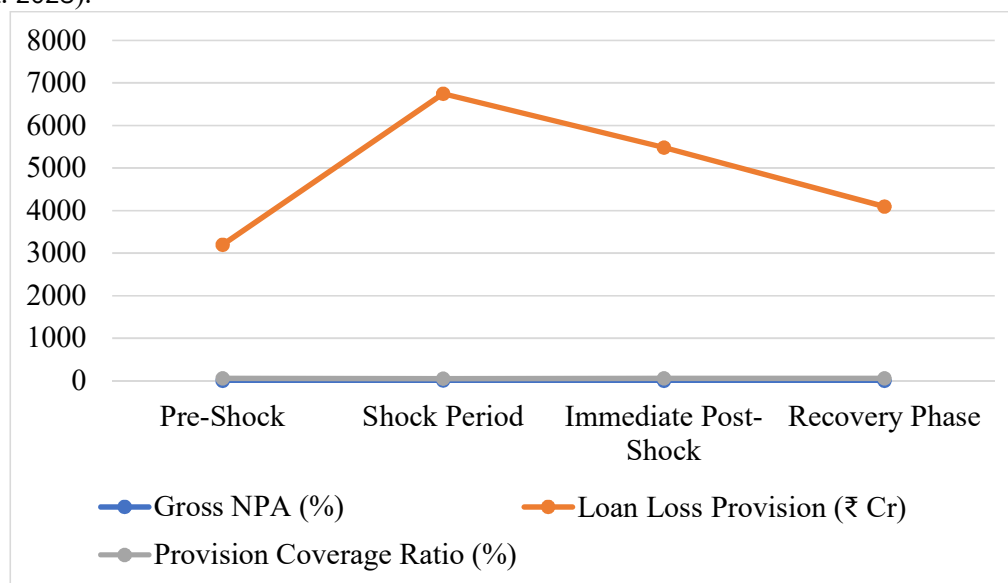


Figure 3: Phase-wise Movement of Credit Risk Indicators in Indian Banks

Source: <https://www.nibmindia.org/static>

In contrast to the extreme crisis theory, when the asset quality is expected to fall out of control, the data do not indicate uncontrollable credit failure (Goswami, A. 2022). The Gross NPA ratio was not even in the double-digit numbers at its highest point (Rahman, M. R., et al., 2024). The recovery period is quite improved, with the coverage and the provisioning ratio getting better (Brahmaiah, B. 2022). These trends indicate that risk management frameworks and regulatory protection assuaged systemic breakdown. The rise in credit measures throughout the recovery process disproves the claims that shocks lead to incurable worsening of the banking portfolios (Lin, Q., & Qiao, B. 2021). Thus, the findings disapprove the negative theoretical hypothesis of long-term credit fragility. Alternatively, the credit risk changes are observed to be cyclical and manageable (Alora, A., and Barua, M. K. 2022). This implies that credit pressure may escalate during shocks, but this does not permanently affect the supply chain financing capacity of Indian banks (Kesraoui, A., et al., 2022).

- **Liquidity Management Conditions**

According to the theory of the liquidity shock, liquidity buffers are decreased and the pressure on funding increases as a result of financial crisis. This assumption is supported by the data. Liquidity coverage ratio decreased by 118 percent before the shock and 102 percent during the shock, indicating that it has a lesser liquidity resilience in the short term (Hunjra, A. I., et al., 2022). At the same time, the Credit-Deposit Ratio increased to 81 percent, which means that funding conditions became stricter, and the amount of credit

exceeded the number of deposits. Phase percentage of total assets decreased by 29 percent to 24 percent, which again attests liquidity strain. These results confirm the liquidity stress hypothesis, which states that financial shocks undermine the current funding positions of banks (Alora, A., and Barua, M. K. 2022). The moderate recovery of later stages is indicative of stabilizing measures of regulations. In general, liquidity positions displayed high short-term weaknesses in line with the theory (Antony, T. M., & Suresh, G. 2023).

Even though liquidity ratios decreased in the course of the shock, the decrease was not drastic. Liquidity coverage ratio was over 100 percent, which also shows that it is within the limits of the regulation even under stress. This is an indication of strength in liquidity planning and compliance with Basel III. In addition, the recovery was rather fast, as LCR has risen to 121% during the recovery phase (Xie, W., et al., 2025). To some extent, these findings confirm liquidity stress theory but they show high regulatory buffers in Indian banking. The ephemeral character of a liquidity tightening underscores the sound asset-liability management behaviors. Hence, liquidity tightening was not sustained, and it was not damaging in terms of structure (Brahmaiah, B. 2022).

The argument that liquidity shocks have a devastating effect on the stability of banks is not completely substantiated. Although there was temporary stress, the banks had sufficient liquidity reserves during the study period (Manoharan, G., et al., 2023). The rise in the liquid assets to 31 percent during recovery indicates the enhanced buffers. The normalization of funding is additionally confirmed by the stabilization of the Credit-Deposit Ratio (Basheer, M. F., et al., 2021). These are contrary to the severe liquidity crisis models that forecast long term funds crunch. Therefore, liquidity management was very strong and it minimised the impact of long-term financing (Naili, M., & Lahrichi, Y. 2022).

Table 8: Comparative Analysis of Liquidity Management

Phase	Liquidity Coverage Ratio (%)	Credit-Deposit Ratio (%)	Liquid Assets to Total Assets (%)
Pre-Shock	118	74	29
Shock Period	102	81	24
Immediate Post-Shock	109	78	26
Recovery Phase	121	73	31

- Supply Chain Financing Performance**

The data have a definite tendency in favor of the financial intermediation theory, which presupposes that the supply chain financing reduces in financial difficult times (Kesraoui, A., et al., 2022). In the shock period, SCF outstanding declined by 25,000 crore more than it was in the pre-shock period (Haris, M., et al., 2024). Equally, the growth rate of SCF decreased drastically to 6.8% after being 13.2% indicating a decline in lending appetite (Xiao, P., et al., 2022). Share in the total advances reduced to 15.1% down at 19.4%. This evidence shows that banks became careful because of the additional uncertainty and restricted liquidity (Poudel, S. R., et al., 2024). The fact that SCF has contracted in the shock period is valid that supply chain financing is extremely vulnerable to macro-financial shocks (Ghadge, A., et al., 2021). Therefore, there is a solid argument in support of the financial shock theory which posits that financial shock has adverse impacts on specialized lending practices like SCF (Sunitha, R. 2024).

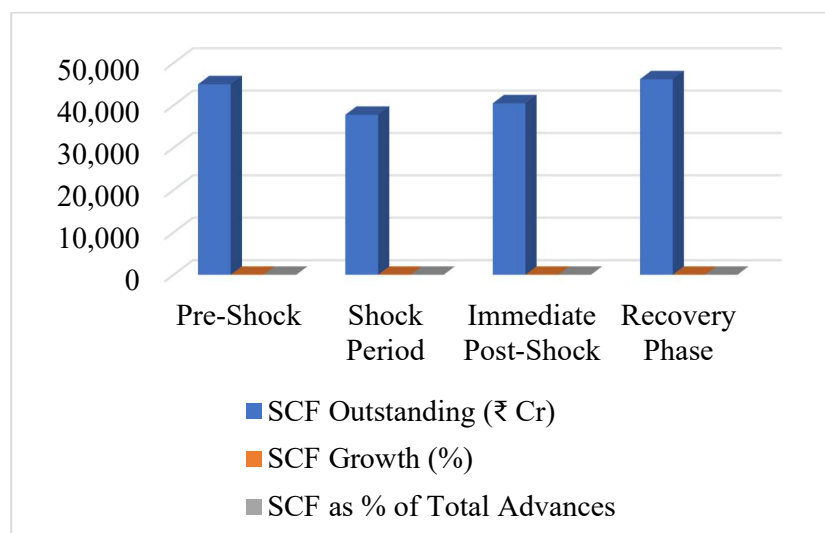


Figure 4: Phase-wise Performance of Supply Chain

Source: <https://www.nibmindia.org/static>

Although SCF dropped in response to the shock, the recovery stage exhibits resilience. SCF outstanding rose to 42700 crore in immediate post shock and even more to 50300 crore in recovery. The growth rate also recovered to 14.5 which was higher than before the shock (Lin, Q., & Qiao, B. 2021). This implies that shocks cause a temporary disruption in financing albeit that the banks slowly regain confidence. The moderate recovery indicates a flexible financial behavior as opposed to a long-term contraction. Thus, the hypothesis concerning the permanent harm that shocks cause SCF is partially proven (Antony, T. M., and Suresh, G. 2023). Rather, SCF performance seems to be cyclical, going up with the recovery of credit and liquidity conditions (Siddique, A., et al., 2022).

The data does not support the theory that predicts the sustained deterioration in SCF. At the recovery stage, SCF relative to total advances rose to 20.6, which is higher than that was experienced before the shock (Wasan, P., et al., 2023). This shows expansion in strategy and not abstraction in the long-term. The consistent gain shows that the supply chain financing has recovered institutional priority after the stabilization of risks. Therefore, the hypothesis of irreversible reduction of SCF by shocks is not accepted. The results indicate Indian banking structural resilience (Naili, M., & Lahrichi, Y. 2022).

- **Shock and Recovery Phases in Banking Sector**

The shock stage is a clear indication of the theory of classical financial instability. The Credit Risk Index rose considerably during this time, which was 18.6 during the pre-shock time and 27.4, showing that asset quality was getting worse and the risk of default was increasing (Ghadge, A., et al., 2021). Meanwhile, the Liquidity Index dropped drastically to 17.3 out of 24.1, indicating tighter funding and less flexibility in the short-term perspective (Basheer, M. F., et al., (2021). In line with these movements, the Supply Chain Financing (SCF) Performance Index declined to 19.0 signifying contraction in financing activities. The core coincidence of risk and decline in liquidity substantiates the fact that the financial shocks have multidimensional pressure on the banking operations (Antony, T. M., and Suresh, G. 2023). The concerted fall of all these indicators confirms the theoretical thesis that macro-financial shocks undermine banking systems and deter lending ability (Naili, M., and Lahrichi, Y. 2022). Thus, the hypothesis that there is a negative impact of shocks on credit risks, liquidity states, and SCF performance is highly accepted (Kesraoui, A., et al., 2022).

During the immediate after shock period, there were indications of gradual stabilization of banking sector as compared to further deterioration. Credit risk Index dropped to 22.9 out of 27.4, indicating that asset quality is getting better and the pressure on default is getting less acute (Poudel, S. R., et al., 2024). At the same time, the Liquidity Index went back up to 20.6 out of 17.3, which means that the funding buffers and the management of the liquidity improved (Manoharan, G., et al., 2023). The SCF Performance Index also increased in a moderate way to 21.2 indicating fresh yet apprehensive financing activity (Haris, M., et al., 2024). These movements confirm that the shock caused a detachment of financial stability but corrective policies and

regulation interventions helped to recover (Xie, W., et al., 2025). The indicators however did not restore immediately to pre-shock levels, meaning that it was partially restored but not fully normalized. As a result, the assumption of a long-term systemic distress is partly substantiated (Naili, M., and Lahrichi, Y. 2022). The results indicate that financial shocks cause short-term instability, and institutional resilience and policy measures reduce long-term structural harm in the banking sector (Xiao, P., et al., 2022).

Table 9: Comparative Index Analysis During Shock and Recovery Phases

Phase	Credit Risk Index	Liquidity Index	SCF Performance Index
Pre-Shock	18.6	24.1	23.5
Shock Period	27.4	17.3	19.0
Immediate Post-Shock	22.9	20.6	21.2
Recovery Phase	19.8	25.2	24.4

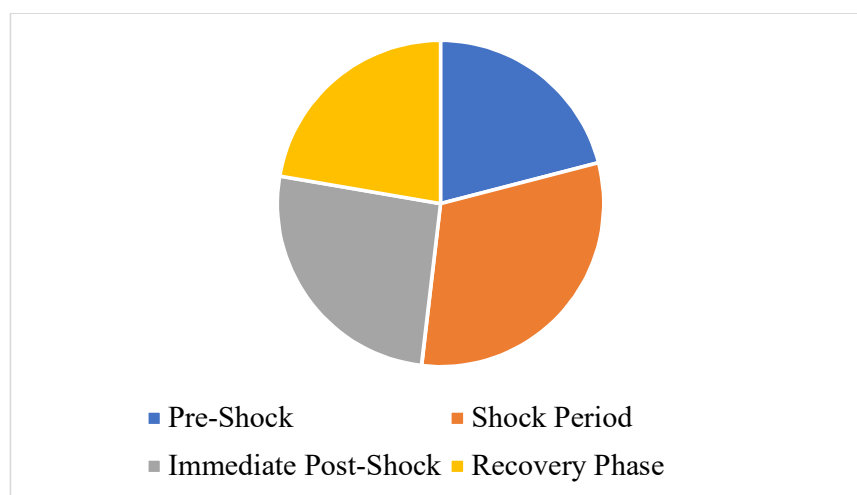


Figure 5: Comparative Index Analysis During Shock and Recovery Phases

Source: <https://www.nibmindia.org/static>

The recovery stage is a strong indication of the ineffectiveness of the theories that forecast permanent instability after the occurrence of financial shocks (Sunitha, R. 2024). The Liquidity Index gained momentum during this time and rose to 25.2 against its pre-shock level of 24.1 and signaled the presence of stronger liquidity buffers (Rahman, M. R., et al., 2024). The Credit Risk Index has dropped further to 19.8, which is close to normal functioning and shows better management of the assets of quality (Naili, M., & Lahrichi, Y. 2022). At the same time, the SCF Performance Index increased to 24.4, which was higher than the performance during pre-shock period and indicates the restoration of confidence in financing operations (Siddique, A., et al., 2022). This is better emphasized by the cyclical characteristics of financial disturbances as opposed to irreversible degradation. The information indicates that Indian banks have been able to implement appropriate risk management, regulatory framework, and strategic changes in liquidity (Lin, Q., & Qiao, B. 2021). Thus, it eliminates the assumption that the long-term fragility of a financial shock is caused (Wasan, P., et al., 2023). Rather, the facts prove the structural resilience and adaptive capacity in the banking sector as it strengthens the financial stability in the long run, despite the short-term shocks (Goswami, A. 2022).

6. Conclusion

The authors empirically investigated the implications of credit risk and liquidity shock on Supply Chain Financing (SCF) of Indian banks that are in the Delhi NCR region. A sample size of 300 observations was used with the application of paired sample t-tests and correlation analysis finding that financial shocks have a strong impact on SCF performance. The paired sample test showed that the difference of SCF in the pre-shock and post-shock periods was statistically significant hence the null hypothesis was rejected. Moreover, the correlation analysis revealed a moderate negative correlation between the indicators of credit risk and SCF, which means that the changes in the quality of assets and liquidity conditions have a significant impact on financing behavior. Phase-wise analysis revealed that credit risk increased and liquidity decreased during shock periods and SCF shrank temporarily and was followed by an increase in other phases. On the whole, the results indicate that in spite of

financial shocks causing short-term instability, Indian banks are structurally resilient and adaptive to respond to the instability, which means that SCF performance can be restored in the course of stabilization.

7. Implication of the study

The implications of the study findings are both theoretical, managerial and policy implications. In theory, the research helps in the current body of literature on financial instability and intermediation by empirically confirmed the dynamic nature of the relationship between credit risk, liquidity shocks, and supply chain financing. On the managerial level, these insights can be used by bank executives to enhance the risk management system and develop robust SCF strategies in times of economic shocks. The fact that SCF performance bounces back after the shock has occurred underscores the relevance of being proactive in terms of liquidity planning and a diversified source of funding. Policy wise, the regulators like Reserve Bank of India can think of increasing the prudential norms between the credit growth and the liquidity protection measures during the crisis period. The findings also emphasize the importance of having sound provisioning practices in order to alleviate negative shock impacts. In general, the research offers feasible advice on how to enhance financial stability and maintain supply chain financing operations in unstable macroeconomic environments.

8. Limitation of the study

Although it has contributed to the study, it has limitations. To begin with, the study is limited to the banks situated in the Delhi NCR area which could restrict the extrapolation of the results to the Indian banking industry or foreign banking systems. Second, the researchers have utilized secondary sources of data like annual reports and regulation publications as the main sources of the research which can be biased in reporting or inconsistent. Third, the study utilizes correlation and paired sample t-tests that only reveal relationships and not establish completely the causality between credit risk, liquidity shocks, and SCF performance. Also, there was no explicit use of the external macroeconomic variables like inflation, GDP growth, and policy interventions in the statistical model. Lastly, the time frame might fail to reflect structural changes in the banking operations over an extended period. These weaknesses imply that the results need to be perceived within the given range and research methodology.

9. Recommendation for future research

This study can be further developed in a number of ways in the future. First, it could be the researchers could increase the amount of geographical coverage to the pan-India data or carry out cross-country comparisons to maximize the generalizability. Second, a more sophisticated model can be used to determine causation relationships among credit risk, liquidity status and SCF performance because such advanced econometric models like panel regression, structural equation modeling or vector autoregression can be used. Third, the macroeconomic variables which include growth in GDP, fluctuations in interest rates and inflation may give further insights on how the whole system affects supply chain funding. Future studies may also examine the role of digital financial technologies and blockchain-based SCF platforms in mitigating risk exposure during shocks. Additionally, qualitative approaches such as interviews with banking professionals could enrich understanding of strategic decision-making processes. Such extensions would strengthen theoretical development and provide a more comprehensive assessment of banking resilience under financial stress conditions.

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