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Prospects and Challenges of Digital Invoice Financing for MSMEs in India: An Empirical Study

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Structure of the presentation

1. Introduction
2. Supply Chain Financing/ Digital Invoice Financing for MSMEs
3. Indian Experiment in Digital Invoice Financing: Some Stylized Facts
4. Working Models of Fintech in Invoice Financing
5. Research Gap & Objectives
6. Data & Methodology
7. Empirical Analysis & Findings
8. Conclusion & Future Research Direction

Introduction (1/4)

Role of SMEs in Economic Growth

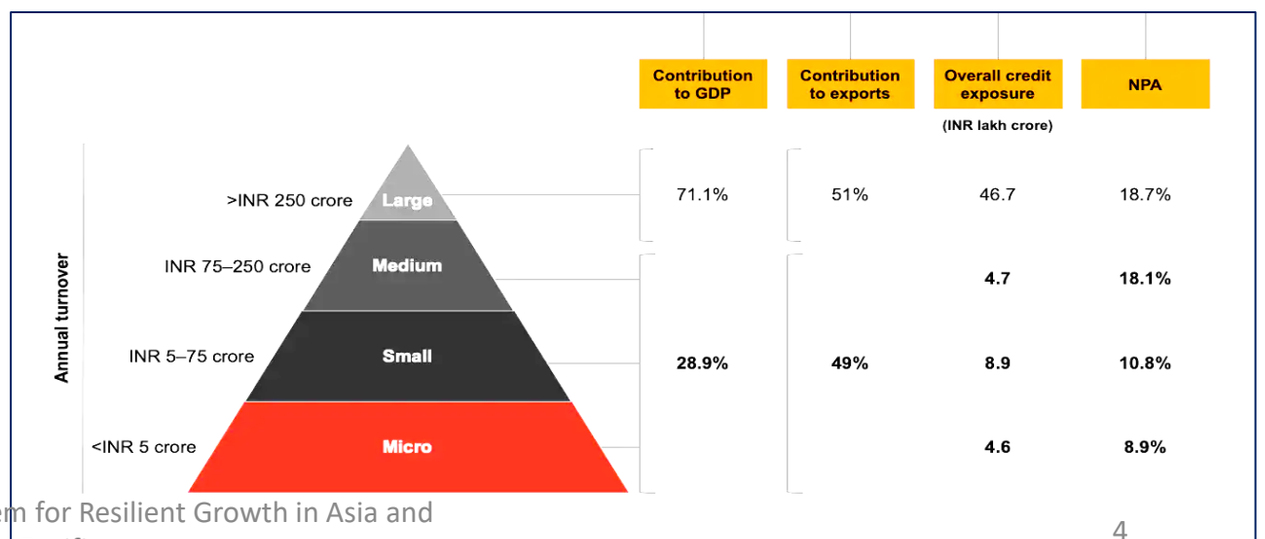
- SMEs contribute ~90% of global businesses, 50%+ employment; critical for job creation in emerging economies (World Bank, 2022).
- In India: SMEs account for ~30% of GDP, creating 11.3 million jobs and supporting inclusive industrial growth (Government of India, 2023).

Key Challenges Faced by SMEs

- Access to Formal Finance: Only 16% of India's SME debt demand met by formal sources; a significant credit gap of ~Rs 20-25 trillion (RBI, 2018).
- Cash Flow Constraints: Issues with delayed payments and insufficient liquidity hinder SME growth and stability.

Introduction (2/4)

- MSME sector - growth engine of the Indian economy - vast network of around 63.38 million enterprises – accounting for nearly 30% of GDP and 49% of total exports.
- The Government of India (GoI) aims to increase the contribution of MSMEs to India's GDP to over 50% and exports to 75% in the forthcoming years.
- The sector faces several challenges – heterogeneous and informal (>95%), infrastructure bottlenecks, poor technology adoption, access to affordable and convenient financial services, lack of human and managerial capital, poor value chain, delayed payments, legal constrains, etc.
- Among many constraints, timely and adequate access to quality finance is critical for the survival and growth of MSMEs.



Introduction (3/4)

- The estimates of IFC on MSME lending for India shows that the supply of **formal finance is around Rs. 14.5 trillion** as against the **required demand of Rs. 37 trillion** (IFC, 2017).
- According to UK Sinha Committee (RBI, 2019) the sector has an estimated credit gap of **INR 20–25 trillion**; which accounts for around 11% of the credit to GDP gap.
- A majority of MSMEs do not have access to sufficient credit and liquidity required for daily working capital needs.
- Why MSME lending is low? – lack of effective risk mitigation mechanism, high business risk, fast-changing customer preferences, 'high-touch' approach, and other associated risks in the value chain of the business.

Introduction (4/4)

- Emerging and innovative financial technologies (Fintech) are playing crucial role in bridging the gap and enabling for better market access for MSMEs.
- Transactional and alternative data to address the conventional supply and demand side problems.
- The Fintech models such as AI/ML have has evolved with superior credit underwriting and offering unique financial products with a minimum turn-around time for MSMEs.
- The emergence of digital cash-flow based financing business models finds a robust solution through invoice discounting exchanges to cater to working capital finance of MSMEs along with the least pressure on corporates.
- In India, Tech-platforms - RXIL, A.TREDS, Mynd Solutions, KredX, lendingkart, idifi, etc., which are the major exchanges in invoice discounting models (RBI, 2014a).

Supply Chain Financing/ Digital Invoice Financing for MSMEs

The Rise of Supply Chain Financing (SCF)

- SCF offers solutions like trade credit and factoring that boost liquidity, optimize working capital, and reduce risks—transforming SME financing options (Chen, 2016; Pfohl & Gomm, 2009).

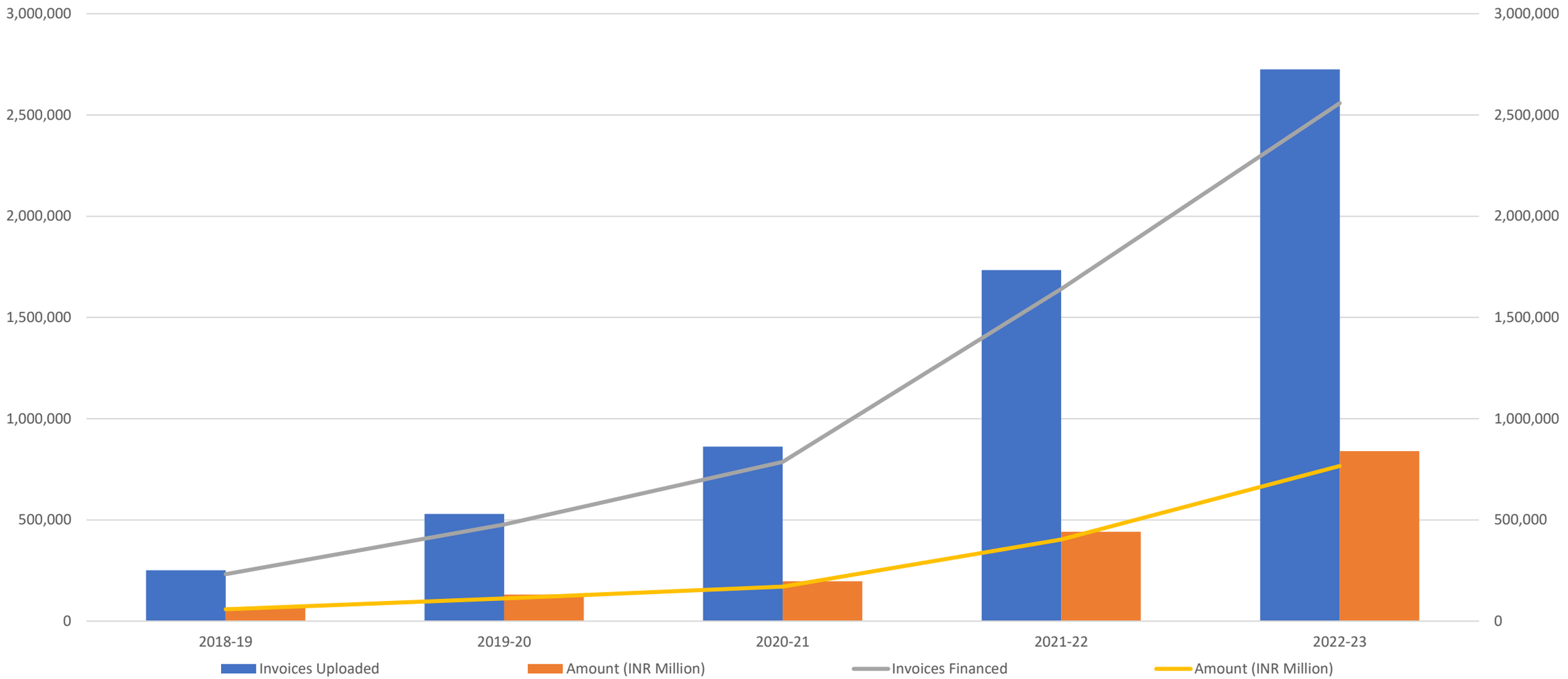
Digital Transformation of SCF

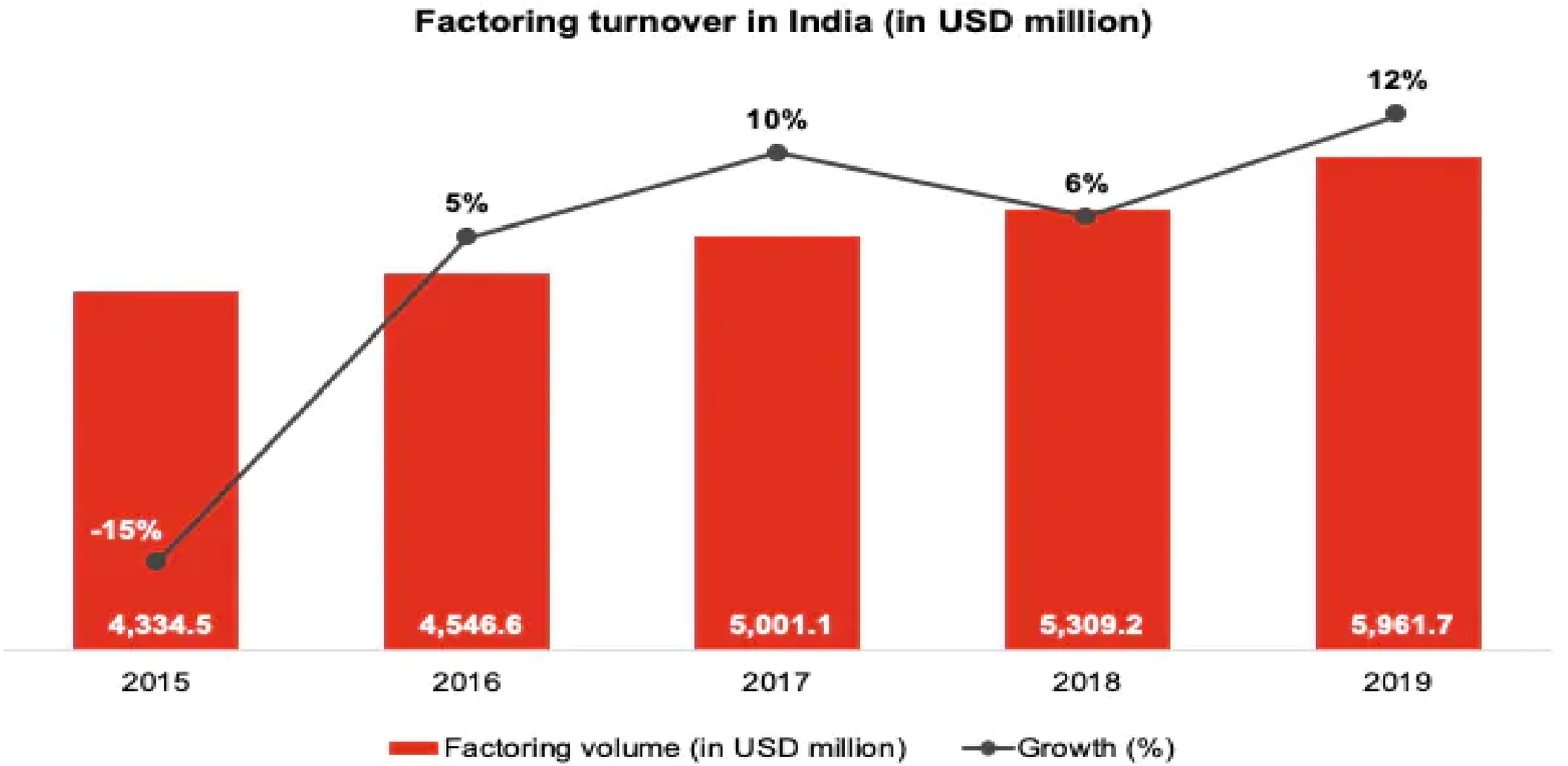
- Digitized SCF networks provide real-time information, enhanced cost-efficiency, and better risk assessment for financial institutions, addressing key SME challenges (Kindstrom & Kowalkowski, 2014; Song et al., 2016).
- SCF enhances liquidity, compliance, and collaboration within supply chains. However, barriers like limited SME awareness and traditional banking approaches persist (Swinderen & Mungai, 2015; Klapper & Randall, 2011).
- Digital invoice financing helps ease working capital constraints for SMEs, yet critical areas like price determinants and financier engagement on digital platforms remain underexplored (Wang et al., 2020; Kotios, 2022).

Indian Experiment in Digital Invoice Financing: Some Stylized Facts

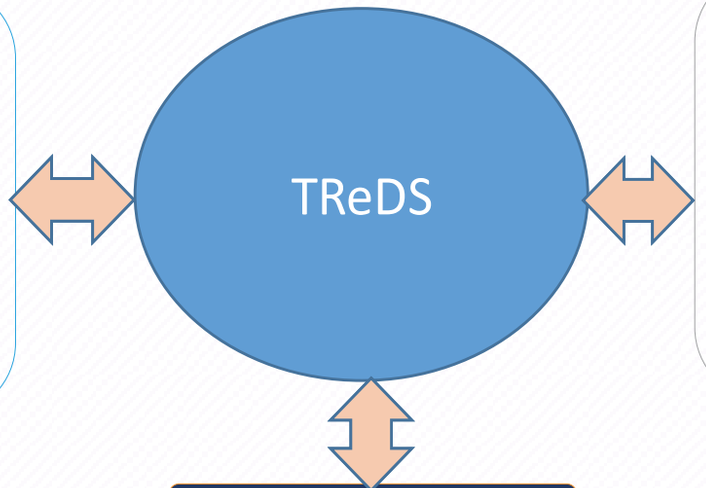
- TReDS (Trade Receivables Discounting System) is a digital platform by RBI to address delayed payments to SMEs, enabling invoice financing from multiple financiers at competitive rates through an auction-based mechanism.
- RBI licensed three fintech firms—RXIL, A.TREDS (Invoicemart), and Mynd Solutions (M1xchange)—to operate as TReDS platforms since 2017, supporting SME access to financing without extensive collateral.
- During 2018-19 and 2022-23, the number of uploaded invoices surged from 2.5 lakh to 27 lakh, and financed amounts rose from INR 58,544.8 million to INR 7,66,450 million, demonstrating a strong increase in TReDS activity and reliance on digital invoice financing.
- With a high conversion rate (~94%) from uploaded to financed invoices, TReDS provides a trusted and efficient financing solution, with significant potential for further growth under favorable economic conditions.

Trends in Factoring & Reverse Factoring Financing Business: 2018-2022




Factoring turnover in India (in USD million)
-15%
5%
10%
6%
12%
4,334.5
4,546.6
5,001.1
5,309.2
5,961.7
2015
2016
2017
2018
2019
Factoring volume (in USD million)
Growth (%)

WORKING MODELS OF FINTECH INVOICE FINANCING



MSME suppliers

Supplying goods or services to Buyers

- Easy, fast finance of receivables at competitive rates
- Without recourse finance
- Minimum and simple documentation – one time KYC for all lenders
- Better working capital management

Buyers

Corporates, Government departments, PSUs, Others

- Optimize working capital
- Reduced Procurement Cost
- Improved Vendor management
- Lower administration cost for vendor financing, payments and settlements

Financiers

Banks, NBFC factors

- Opportunity to build quality PSL portfolio
- Reduced marketing and client acquisition cost along with improved reach to build clientele
- Ease of operation with minimum documentation
- Facility to make better decision making through key information availability

*The Government of India, vide Gazette notification S.O. 5621(E) dated 02.11.2018 instructed that all Companies **with a turnover of more than Rs. 500 crore and all CPSEs** shall be required to get themselves onboard on TReDS in order to address cash flow problems of MSMEs*

Research Focus & Objectives

- SMEs increasingly turn to alternative financing methods like invoice financing to mitigate cash flow issues (Ata et al., 2013; Ahmad, 2013).
- Digital invoice factoring helps MSMEs free up funds tied in trade credit, enhancing cash flow and debt management at a reasonable cost (Bhattacharya, B., 1989).
- Persistent payment delays by large buyers act as an obstacle to SME growth, often due to disputed invoices or avoidance tactics (Schwab et al., 2019; Bohata & Mladek, 1999).
- There is a significant gap in existing research in identifying the major determinants of key challenges MSMEs face in digital invoice financing in a fintech platform, namely delayed payments, elevated interest expenses, and extended turnaround times.
- Identifying determinants of interest rate (charged by the financers), financier participation (number of financiers participating) in digital invoice SME financing

Data & Methodology

Data

- The unique dataset on invoice financing data is collected from an Indian Fintech that is registered as a "TReDS" digital platform to lend to SMEs under the regulatory guidelines of the Reserve Bank of India (RBI).

- The data was collected from the financial year 2020-21 and 2021-22. There are a total of 115,648 factoring units (FUs) with 1.22 million invoices analyzed in this study.

Methodology

- *We develop two separate regression models as follows:*

$$INRATE_i = \alpha 1 + \beta_1 1 Log\ CCLi + \beta 1_2 MCATi + \beta_{13} MTYPi + \beta_{14} CITYi + \beta_{15} INAMATi + \beta 1_6 BIDBi + \beta 1_7 BNKTPi + \beta_{18} Log\ SELATi + \beta_{19} NINVSi + \beta_{110} BANKBIDi + \varepsilon_i \quad (1)$$

$$FINPART_i = \alpha 2 + \beta_{21} Log\ CCLi + \beta_{22} MCATi + \beta_{23} MTYPi + \beta_{24} CITYi + \beta_{25} INAMATi + \beta_{26} BIDBi + \beta 2_7 BNKTPi + \beta_{28} Log\ SELATi + \beta_{29} NINVSi + \beta_{210} BANKBIDi + \varepsilon_i \quad (2)$$

- We employed ordinary least squares (OLS) regression for estimating the coefficients within Equations (1), while a probit (censored) regression was utilized to estimate Equations (2).

Independent Variable Definitions

Variables	Definition/description
Buyer's current credit limit (CCL)	The Corporates/buyers current credit limit from banks/financial institutions (in INR Million)
Buyer's Rating (CBRAT)	Corporate (Buyers) Rating is a categorical variable. 1= Prime Rating (rating with AA+; AA, AA-); 2= Upper Medium Grade (rating with A+, A, A-=2) and 3= Lower Medium Grade (rating with BBB+, BBB) and 4= Lower Grade (below BBB)
Type of MSMEs by size (MCAT)	Type of MSMEs based on investment in plant and machinery or services. Categorical variable; 1= micro-enterprises, 2= small enterprises and 3= medium enterprises
MSME industry categories (MTYP)	MSME industry categories are based on manufacturing or services. The dummy variable equals 1 if the Manufacturing enterprise; 0 if it is services enterprises
Size of the City of origin of MSMEs (CITY)	Size of city of origin of SMEs ranges from 1 to 6 (1 =Tier 1 city; 2 =Tier 2 city; 3 =Tier 3 city; 4 =Tier 4 city; 5 =Tier 5 city; 6 =Tier 6 city)
Amount in the factoring units (FU) (INR Million) that are floated (INAMT)	The amount in the factoring units (INR Million) that are floated for financing in the digital platform by the seller/buyer (converted into log amount).
Number of financiers biding the particular set of FU (FINPART)	The number of financiers biding the particular set of FUs. 1= one financier bidding a FU, 2= two financiers bidding a FU, 3= three financier bidding and 4= four and more than 4 financier bidding a FU.
Types or categories of bank financing in digital platforms (BNKTP)	Types of bank financing in the digital platform, categorical variable, 1=Public sector bank; 2= private sector bank; 3= NBFC factoring and 4= foreign bank
FUs amount (INR Millions) that are financed (SELAT)	FUs amount in INR Millions that are finally financed by the financers and money received by the MSMEs (sellers)
Number of Invoices bundled in FUs (NINVS)	Number of Invoices bundled in the Factoring Units (FUs)
Turnaround time in number of days, after uploading in platform (TATDAY)	Turnaround time in number of days, after the invoices are uploaded into the electronics platform.
Factoring (uploaded by buyers) or reverse factoring (uploaded by sellers) (UPLIN)	Factoring or reverse factoring. The dummy variable equals to 1 if the Invoices are uploaded by the buyers (Factoring); and 0 it the invoices are uploaded by the Seller (reverse factoring).

Determinants of Interest rate for Fintech Factoring Financing

Independent Variables	Dependent Variable: INRATE
	Model 2 (Robust Std. Error)
CBRAT (Base: Prime Rating)	
Upper Medium Grade	0.108*** (7.64)
Lower Medium Grade	1.323*** (130.34)
Lower Grade	3.175*** (180.44)
CCL	-0.146*** (-32.35)
MCAT (Base: Micro Enterprises)	
Small enterprises	0.00726 (1.85)
Medium enterprises	0.00330 (0.38)
MTYP (Base: services enterprises)	
Manufacturing enterprise	0.406*** (44.92)
CITY (Base: Tier 1)	
Tier 2	0.374*** (34.75)
Tier 3	0.155*** (-20.71)
4 =Tier	0.0504*** (5.13)
5 =Tier	0.0254* (2.49)
6 =Tier	0.130*** (17.57)
FUAMT	0.0752*** (27.00)

Independent Variables	Dependent Variable: INRATE
FINPART (Base: one financier bidding a FU)	
Two financier bidding a FU	0.541*** (78.81)
Three financier bidding	-0.657*** (-90.89)
Four and more than 4 financier bidding a FU	0.789*** (-93.03)
BNKTP (Base: Public sector bank)	
Private sector bank	-0.0106 (-8.83)
NBFC factoring	1.049*** (50.68)
Foreign bank	0.419*** (79.89)
SELAT	0.0752*** (27.00)
NINVS	-0.00395*** (-36.76)
UPLIN (Base: Reverse Factoring)	
Factoring	0.428*** (45.21)
TATDAY	0.0148*** (0.021)
Constant	7.643*** (77.80)
Number of observations	115648
F- Test	13051.37 ***
Adj R-squared	0.63

Note: ***- significant at 1% level; ** - significant at 5% level and * - significant at 10% level; Standard and robust standard error in parentheses.

Determinants of Interest Rates in Fintech Factoring

1. Credit Rating and Interest Rates: Lower credit ratings for borrowing firms are associated with higher interest rates, highlighting the impact of borrower risk on financing costs, consistent across both OLS models.

2. Impact of SME Type: Medium-sized enterprises generally receive lower interest rates than small enterprises, likely due to better financial stability and creditworthiness.

3. Industry Type and Geographic Location: Manufacturing firms face higher interest rates than service firms, and firms in Tier 2 and Tier 3 cities experience higher rates than those in Tier 1, indicating the influence of industry and location on borrowing costs.

4. Financier Bidding and Interest Rates: A higher number of financiers bidding can lead to higher interest rates, suggesting increased competition for higher-risk borrowers, with NBFCs charging significantly higher rates compared to foreign and public sector banks.

5. Model Robustness and Explanatory Power: Both models (using standard and robust errors) show high explanatory power, with adjusted R-squared values around 0.63-0.64, indicating that the model variables account for a substantial share of the interest rate variation.

Determinants of Financier Participation in Fintech Factoring Financing

Independent Variables	**Dependent Variable: FINPART**
	Model 2 (Robust Std. Error)
CBRAT (Base: Lower Grade)	
Prime Rating	0.808*** (0.31)
Upper Medium Grade	1.735*** (0.28)
Lower Medium Grade	0.928*** (0.27)
CCL	-0.206*** (0.006)
MCAT (Base: Medium enterprises)	
Micro Enterprises	0.008*** (0.013)
Small enterprises	-0.184*** (0.11)
MTYP (Base: Manufacturing enterprise)	
services enterprises	0.109*** (0.012)
CITY (Base: Tier 1)	
Tier 2	-0.127*** (0.014)
Tier 3	-0.227* (0.015)
4 =Tier	-0.018 (0.016)
5 =Tier	0.259*** (0.016)
6 =Tier	0.095*** (0.012)
FUAMT	-0.132*** (0.041)
BNKTP (Base: Foreign bank)	-0.712*** (0.11)
Public sector bank	-0.981*** (0.018)
Private sector bank	-1.02*** (0.021)
NBFC factoring	
SELAT	0.271*** (0.041)
NINVS	0.005*** (0.003)
UPLIN (Base: Factoring)	
Reverse Factoring	-0.165*** (0.011)
Constant	3.207*** (0.137)
Number of observations	
F- Test	1254.27***
Pseudo R2	0.0597

Determinants of Financier Participation in Fintech Factoring Financing

Credit Rating and Financier Participation: Higher credit ratings (Prime, Upper Medium, and Lower Medium Grades) significantly increase financier participation, indicating a preference for borrowers with better creditworthiness.

Borrower Characteristics and Participation: Higher credit line usage ("CCL") deters participation, likely due to concerns over financial stability. Additionally, micro and small enterprises show lower financier interest than medium-sized enterprises.

Industry Type and Location Impact: Manufacturing firms attract more participation than service-based firms, and borrowers from Tier 2 and Tier 3 cities see reduced financier engagement compared to those in Tier 1 cities.

Influence of Financier Type and Factoring Arrangement: Public sector banks show moderate participation, while foreign and private sector banks exhibit lower participation. Financiers favor traditional factoring over reverse factoring, highlighting preferences in financing structure.

Comparison of Empirical Results and Major Findings (1/3)

Independent Variables/ Dependent Variable	Interest Rate: OLS Model (Standard Error)	Interest Rate: OLS Model (Robust Standard Error)	Financier Participation: Probit Model (Standard Error)	Financier Participation: Probit Model (Robust Standard Error)
Buyer's current credit limit (CCL)	Significant negative relation	Significant negative relation	Significant negative relation	Significant negative relation
Buyer's Rating (CBRAT)	Significant positive relation	Significant positive relation	Significant positive relation	Significant positive relation
Type of MSMEs by size (MCAT)	Non-significant positive relation for small enterprises and a significant negative relation for medium entrepreneurs	Non-significant positive relation	Significant positive relation with micro and negative relation with small Enterprises	Significant positive relation with micro and negative relation with small Enterprises
MSME industry categories (MTYP)	Significant positive relation for manufacturing enterprises	Significant positive relation for manufacturing enterprises		

Comparison of Empirical Results and Major Findings (2/3)

Independent Variables/ Dependent Variable	Interest Rate: OLS Model (Standard Error)	Interest Rate: OLS Model (Robust Standard Error)	Financier Participation: Probit Model (Standard Error)	Financier Participation: Probit Model (Robust Standard Error)
Size of the City of origin of MSMEs (CITY)	Significant positive relation for all tier cities	Significant positive relation for all tier cities	Significant negative relation for 2,3 and 4-tier and positive relation with 5 and 6-tier cities	Significant negative relation for 2,3 and 4-tier and positive relation with 5 and 6-tier cities
Amount in the factoring units (FU)(INR Million) that are floated (FUAMT)	Significant positive relation	Significant positive relation	Significant negative relation	Significant negative relation
Number of financiers biding the particular set of FU(FINPART)	Significant negative relations for all numbers of financiers	Significant negative relations for all numbers of financiers	Not Applicable	Not Applicable

Comparison of Empirical Results and Major Findings (3/3)

Independent Variables/ Dependent Variable	Interest Rate: OLS Model (Standard Error)	Interest Rate: OLS Model (Robust Standard Error)	Financier Participation: Probit Model (Standard Error)	Financier Participation: Probit Model (Robust Standard Error)
Types or categories of bank financing in digital platforms (BNKTP)	Significant negative relations for public sector and foreign banks and positive relation for NBFSC Factoring	Significant negative relations for public sector and foreign banks and positive relations for NBFSC Factoring	Significant negative relations for public sector, foreign banks, and NBFSC Factoring	Significant negative relations for public sector, foreign banks and private sector banks
FUs amount (INR Millions) that are financed (SELAT)	Significant positive relation	Significant positive relation	Significant positive relation	Significant positive relation
Number of Invoices bundled in FUs (NINVS)	Significant negative relation at a 1% level	Significant negative relation	Significant negative relation	Significant negative relation
Turnaround time in number of days, after uploading in platform (TATDAY)	Significant positive relation	Significant positive relation	Significant positive relation	Significant positive relation
Factoring (uploaded by buyers) or reverse factoring (uploaded by sellers) (UPLIN)	Significant positive relation for factoring	Significant positive relation for factoring	Significant positive relation for reverse factoring	Significant positive relation for reverse factoring

Conclusion (1/2)

Fintech Transformation: Fintech is reshaping financial services, with fintech factoring allowing businesses to access funds by selling receivables at a discount. This research delves into the intricate determinants of interest rates and financier participation in this evolving financing model.

Interest Rate Determinants:

- Credit Rating: Firms with lower ratings face higher rates, aligning with risk-return principles.
- Firm Size & Industry: Medium-sized enterprises gain better rates, while manufacturing faces higher costs compared to services.
- Geographical Impact: Lower-tier cities experience higher rates due to local lending dynamics.
- Type of Financier: NBFCs and foreign banks apply varied influences on rates.

Financier Participation Factors:

- Credit Rating & Credit Line Utilization: Higher ratings enhance participation, while heavy credit use reduces it.
- Firm Size & Location: Smaller firms and those in smaller cities see limited financier involvement.

Conclusion (2/2)

- Bank Type: Public banks take conservative stances, while private and foreign banks show selective participation.
- Factoring Type: Traditional factoring attracts more financiers than reverse factoring.

Implications for Stakeholders:

- Businesses: Improve creditworthiness and adopt tailored industry strategies to optimize rates and engagement.
- Financiers: Embrace detailed risk assessments and diversify portfolios with creditworthy firms.
- Policymakers: Encourage transparency and inclusivity in fintech to support small business growth.

Future Research

- Economic Factors: Explore broader economic impacts.
- Borrower-Fintech Relationships: Investigate dynamics affecting participation.
- Macroeconomic Influence: Assess fintech factoring's role in the financial ecosystem.

Thank You !

Annexure

Empirical Analysis and Findings

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
CBRAT	115648	2.394	0.758	1	4
CCL	115648	117800000	9503612	300000	500000000
MCAT	115648	1.968	0.677	1	3
MTYP	115648	1.183	0.386	1	2
CITY	115648	2.589	1.921	1	6
FUAMT	115648	1507285.8	2248077.9	1770	61632391
BIDB	115648	2.082	1.036	1	7
INRATE	115648	6.599	1.37	4.35	12
BNKTP	115648	1.781	1.201	1	4
SELAT	115648	1421406	1808130.8	1750.71	9985698.6
NINVS	115648	10.621	24.89	1	295
UPLIN	115648	0.548	0.498	0	1
TATDAY	115648	4.676	4.663	1	55

Note: The variables CCLMT, IAMNT and SELAMT are in the logarithm form in the regression.