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ABSTRACT

We find that introduction of TReDs has largely benefited the MSMEs. Under TReDs, MSMEs have seen a significant decrease in interest expenses, averaging around 8%. This reduction is attributed to interest rates being determined by the credit rating of larger buyers rather than the MSMEs' own creditworthiness. Analyses show that as buyers' credit ratings improve, MSMEs experience lower interest costs. Notably, Micro enterprises incur higher rates than Medium ones, while Small enterprises only faced higher costs in 2025. There's a significant negative correlation between the number of bids and interest rates, indicating that more bids generally lead to lower funding costs. Additionally, higher financing unit values reduce interest costs. However, average loan tenure results varied, with longer tenures leading to higher rates in 2022-2023 and lower rates in 2024-2025.

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Determinants of Cost of Funds in TReDS: The Realm of MSME Finance

1. TReDS: Democratizing Supply Chain Finance

Micro, Small, and Medium Enterprises (MSMEs) are known as the major contributor to the GDP growth of India. However, in supply chain finance MSMEs are subject to limited availability of finance. MSMEs structurally rank below the large corporates in the pecking order of credit worthiness due to their inherent structural gaps, risk profile, and weak financials. Whatever credit is provided thus is at a higher cost compared to a better credit profile customer. To mitigate the conventional bias, the Reserve Bank of India (RBI) has introduced digital platform popularly known as the Trade Receivables Discounting System (TReDS). The introduction of TReDS not only helps in enabling the efficient discounting of invoices through multiple financiers, it also serves as a transformative tool in supply chain finance as it solves the problem of delayed payments from large corporates and government entities.

Historically, inadequate financing has hindered the growth of India's MSME sector. One report of RBI (2014) shows that only about 10% of the receivables market of MSME engages in the formal bill discounting system, while most rely on traditional cash credit or overdraft arrangements. This reliance is due to the complexities of the bill discounting process, making it difficult for MSMEs to convert trade receivables into cash, which impacts their liquidity. MSMEs are often at the mercy of larger corporates that delay payments, harming their interests. Despite various policy initiatives, delayed payments persist as a challenge due to a lack of institutional support for effective MSME financing, independent of corporate payment systems. An institutional infrastructure is needed to create an efficient and cost-effective financing process, ensuring sufficient liquidity for all stakeholders.

The introduction of TReDS significantly benefits by facilitating the quick conversion of receivables into cash through invoice discounting at competitive rates in a market-based infrastructure supported by adequate technology. This expedited access to liquidity plays a crucial role in enhancing cash flow, allowing MSMEs to run the production process seamlessly. TReDS offers a standardized, technology-driven platform for uploading, validating, and transparently financing invoices. The streamlined process minimizes the need for manual negotiations and reduces paperwork, resulting in greater efficiency in financing receivables. Additionally, the system allows for invoice discounting based on the credit rating of the buyer—typically a larger corporation or Public Sector Undertaking—rather than the seller, which lowers the risk for financiers. This reduced risk fosters increased participation from banks and non-banking financial companies (NBFCs), subsequently improving financing opportunities for smaller suppliers. Additionally, this competitive environment often leads to lower financing costs for MSMEs compared to traditional credit avenues. Furthermore, the financing procedure for MSMEs is without recourse, which means that on the due date, if the corporate defaults on its payment, banks, NBFCs, or any other financiers cannot recover the funds from the MSME.

A study by Ramakrishnan and Sanati (2025) outlines the operational framework of supply chain finance for MSMEs and compares market-based invoice financing and vendor financing within a comprehensive framework. Using the RBI database, this study shows the overall participation trend on the TReDS platform by sellers, buyers, and financiers. In the context of the current operational framework, this paper aims to examine the cost-determining factors of funding for MSMEs using the TReDS platform. Using micro-level data from one of the service providers, we aim to address the following questions: First, do funding costs vary among MSMEs? The objective of the TReDS is to provide the benefit of lower interest costs to MSMEs, depending on the creditworthiness of the large corporate. It is interesting to examine whether every MSME faces the same interest rate when they have the same buyer with same credit rating within a specified timeframe. In other words, if a small or micro enterprise submits an invoice for financing, and, for instance, Hero Motor is the large corporate buyer for both of these micro and small MSMEs, we should assess whether the interest costs paid by both MSMEs are identical. Also, we hypothesize that as the number of invoices issued on the platform increased the interest cost falls. Additionally, we examine the relationship between value of those invoices and the cast of fund. We also, try to examine how the interest rate structure changes over months for a particular period. Our analysis helps determine if the RBI's TReDS initiative has bridged the demand-supply gap for MSME financing and created a level playing field through price discovery and non-recourse mechanisms. Furthermore, our study explores how digitalizing finance via TReDS as an electronic platform has effectively facilitated the financing and discounting of MSME trade receivables through multiple financiers, such as banks and NBFCs.

The schematization of the paper is given below. The second section we discuss literature review, which broadly describes supply chain finance in a comparative framework of traditional invoice financing and TReDS system. The third section describes the evaluation from vendor finance to a market-based invoice financing system. The fourth section describes Data and Methodology. The fifth section describes recent trends on the usage of TReDS, along with depicting the descriptive statistics, which preludes our empirical model. We discuss the results of the empirical model in the 5th section and the 6th section concludes the study.

2. Literature Review

The first concept paper on TReDS was published by the Reserve Bank of India (RBI, 2014). It institutionalizes the payment mechanism to facilitate financing of trade receivables for MSME sellers. TReDS platforms operate as authorized payment systems under the Payment and Settlement Systems Act, 2007. To run a TReDS platform, entities must have a minimum paid-up equity capital of ₹25 crore and be deemed "fit and proper" by the RBI based on their integrity and financial history. Under TReDS, MSMEs can liquidate the receivables easily from financiers like banks and NBFCs. MSMEs have faced challenges in financing mostly because the financier's decision on financing depends on the creditworthiness of the sellers or MSMEs (Kumar 2017). Under TReDS, the financiers pay to the MSMEs considering credit worthiness of the buyers, for example, large corporate, and other buyers, including Government Departments and Public Sector Undertakings (PSUs). Invoices or bills of exchange (BE) can be uploaded into TReDS platform either by the MSMEs (factoring) or buyers (reverse factoring). So, one factoring unit (FU) may have more than one invoice or BE. Each FU represents a confirmed obligation that is to be paid by the buyer. Once accepted by the buyer, financiers place

competitive bids. In addition, to improve transparency and competitive pricing, one bidder is allowed to see the bids from all other bidders, though the names of the remain anonymous (RBI, 2023). The MSME seller is free to accept the best bid, after which funds are typically credited on a T+2 basis. The use of FUs streamlines financing for MSMEs, enabling them to convert receivables into cash immediately and minimizing the risks associated with delayed payments. The system uses the National Automated Clearing House (NACH) mechanism for settling transactions between financiers, sellers, and buyers. Historically, among all the FUs, approximately 17% remained unfinanced. The payment of these unfinanced FUs required to be settled outside the TReDS system. To resolve that RBI (2023) has made all FUs (financed or otherwise) settlement in TreDS using the NACH mechanism which is expected to improve reconciliation effectively. TReDS not only enhances the efficiency of the working capital cycle but also provides security to MSMEs, as the payment obligation under TReDS is without recourse to MSMEs. It means that on maturity, if the corporate buyer (or any other buyers) is not paying, the financiers can't go back to the MSMEs for the payment. The revised RBI report (2023) adds insurance companies as the fourth participant in the TReDS system; however, insurance premiums cannot be charged to MSMEs. Also RBI report (2023) clarifies that all entities which are allowed to undertake factoring business under the Factoring Regulation Act, 2011 are now permitted to participate as financiers. The transfer of FUs within the TReDS platform is possible as financiers can trade discounted units in the secondary markets.

There are many studies about the credit crisis faced by the MSMEs and the contribution of MSMEs in the development of the Indian economy, along with the creation of job opportunities, especially for semi-skilled and unskilled labourers (Katyal, 2015). Also, there are studies that focus on the development of the entrepreneurial culture and business innovations. The role of MSMEs has been widely researched for the development of different sectors that produce a diverse range of products and services to cater to local and global demands

Katyal (2015) explained how economic development in India had been propelled by MSMEs and the role of MSMEs in creating job opportunities for a semi-skilled and unskilled labor force. Chakrabartty (2017) described the role of MSMEs in expanding entrepreneurial culture and fostering business innovation. Studies by researchers (Garg & Walia, 2012; Slyal, 2015) clearly emphasize the importance of MSMEs across sectors of the Indian economy, which produce a diverse range of products and services to meet local and global market demands. By studying 85 MSMEs in Bangalore city across the sectors like precision tools, weavers, jewelers, food, retailers, metal works, textiles, and book shops, Singh and Wasdani (2016) conclude that MSMEs still depend on informal sources like personal and family wealth for fund and utilization of finance from formal sources like banks is insignificant. The inadequate use of funds from formal sources is due to a lack of collateral assets and financial awareness.

The OECD (2015) study shows that access to finance for SMEs remains constrained by lacklustre macroeconomic performance and ongoing bank deleveraging. Especially if the credit market faces challenges, the impact is more severe for SMEs, as they have far fewer financing alternatives than large corporates. This study also concludes that, in 2013, the majority of countries experienced a compounding decline in both the outstanding stock of SME loans and new lending to SMEs, driven by weaker overall economic demand. McKinsey (2024) reports that, presently, the productivity of

small businesses is half that of large companies, and even lower in emerging economies. It also concludes that raising MSMEs' productivity to top-quartile levels relative to large companies is equivalent to a 5 percent increase in GDP in advanced economies and a 10 percent increase in emerging economies. In the discussion of the new approach to financing the MSMEs, the OECD (2015) study has discussed two-pronged approaches which are needed to improve access to finance; one, maintaining banks' health to improve lending, as banks' finance will be important; two, SME's need to diversify the source of finance. The study also opines that broadening the range of instruments may help improve awareness and understanding among SMEs, financial institutions, and governments of these alternative financing instruments. In this context, the initiative on TReDS is a significant milestone that has the potential to substantially improve access to finance.

An Expert Committee on MSMEs, set up by the RBI under the chairmanship of UK Sinha (2019), recommended TReDS as an effective mechanism to address delayed payments and liquidity issues for MSMEs. The Sinha Committee (2019) and the International Finance Corporation (IFC) of the World Bank Group (2021) recommend creating a pooled Application Programming Interface (API) for all TReDS platforms to help financiers assess buyers' repayment histories, thereby enhancing decision-making and preventing dual financing. The National Payments Corporation of India (NPCI) may consider developing this API. The Committee noted that reverse factoring has not gained traction on the platform and should be promoted for its benefits. Development banks and public entities, like central banks and export financing agencies, worldwide have embraced the SCF proposition to aid their development goals. Various initiatives in Asia, Latin America, Africa, Europe, and the Middle East are highlighted in the IFC (2021) guidebook which we mention below

- Nacional Financiera (NAFIN), Mexico: Cadenas Productivas;
- Banco de Inversion y Comercio Exterior (BICE), Argentina: e-Factoring
- Asian Development Bank (ADB), all Asia: Supply Chain Finance Program
- Reserve Bank of India (RBI), India: Trade Receivables Discounting System
- Credit Reference Center of the People's Bank of China (PBOC-CRC), China: Receivables Finances Service Platform
- African Export-Import Bank (Afreximbank), all Africa: Factoring promotion and plans for an SCF initiative
- European Bank for Reconstruction and Development (EBRD), Central and Eastern European countries, Middle East and North Africa: Trade Facilitation Program
- Hong Kong Monetary Authority (HKMA): eTradeConnect
- International Finance Corporation (IFC), worldwide: SCF-Related Advisory, Financing, and Investment

The main agenda of the SCF eco-system is to bring in more players, like banks, non-bank financial institutions, corporations, SMEs, fintech institutions, Promoting private and publicsector investment in SCF with de-risking instruments (for instance, in the form of cofinancing, refinancing, or subsidized guarantees/insurance instruments) that induce the private sector to participate in SCF initiatives. Also, the major change was seen in technological support, either through financing or by investing directly in infrastructure to set up the required technical infrastructure for the private sector to participate.

3. Operational Framework: From Vendor Finance to Market-based Finance

Theoretically, Supply Chain Finance (SCF) refers to the process of integrating financial flows into the physical supply chain.[1] With the rapid development in the field of SCF in the last decade or so, SCF today refers to structures and products provided by a financier to the buyer/seller to finance their payables/receivables. In the current study we focus on the transactions between MSME vendors and larger corporate buyers. Financing of the working capital of the vendor has seen a shift from the traditional working capital products such as cash credit, overdrafts etc to SCF driven products and solutions.

These SCF structures focus on a thorough and diligent credit assessment of the buyer with the buyer being the primary obligor. Receivables of the vendor are financed based on the buyer's acceptance of its repayment liability.

The performance and growth of these large corporate buyers- the Original Equipment Manufacturers (OEMs) is dependent on the MSME vendors uninterrupted supply of required quantity of components/ goods at the agreed price while ensuring the highest quality control. The MSME vendors in turn need timely access to adequate working capital to fulfil the requirements of the OEMs and at the same time ensuring their own financial stability and profitability.

Increasingly as an alternative to cash credit/overdraft-based credit delivery systems, the supply of capital to the MSMEs is gradually by way of financing of the receivables by the banker of the MSMEs. The bank, in turn, has the responsibility of ensuring the genuineness of the underlying transaction in addition to credit appraisal and monitoring of the end use and recovery if required. Supply chain finance using products such as bill discounting, factoring, and invoice financing have rapidly replaced the existing modes of finance especially using vendor and dealer finance structures.

Keeping in pace with the rapid developments in technology, Supply chain finance has evolved from a physical only mode with original invoices, transport documents being presented for financing to a system of digitization and digitalization of the underlying documents and processes.

There are three models by which SCF is used to address the financing needs of the sector.

The First model which has been around for a long time is the product model . In this model individual vendors obtain receivables finance by way of Bill discounting and

[1] S. Seuring et al. (eds.), Cost Management in Supply Chains © Springer-Verlag Berlin Heidelberg 2002

Invoice Financing by leveraging its balance sheet. Based on its creditworthiness and security/collateral it is sanctioned loan limits by its bankers. Once it sells the goods to the OEM , the vendor will submit underlying documents to the banker who will discount the bill/invoice and provide upfront funds to the vendor at the agreed rate of interest. Payment received from the buyer will be used to liquidate the loan on due date. Thus this model is totally cantered around the customer of the bank ie the vendor. Any overdues will be settled with the vendor with ethe buyer having a limited role.

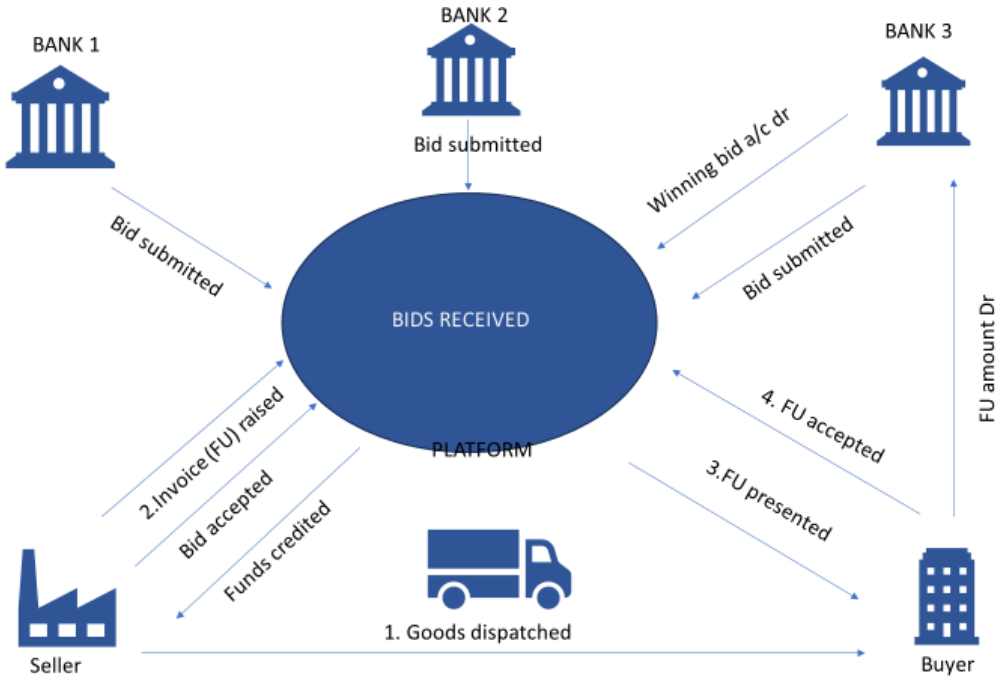
The second model is the program model. In any supply chain structure the buyer-OEM is the central figure around which the other participants operate. They are responsible for conceptualising, strategizing, implementing the ideals and plans to achieve its goals. The other stakeholders such as suppliers, logistic providers, financiers are crucial for it to achieve these goals. As the size and scale of the operations of the buyers evolved over time the buyers became more cognizant of the need to ensure the financial stability of the financial supply chain to ensure the stability of the physical supply chain. The MSME vendors with leveraged balance sheet and stretched financial often found it difficult to scale up. At the same time they would also pay a very hig rate of interest to the bank based on the banks risk assessment. In this model the OEMs approached the banks and enter into a SCF program agreement. The agreement mandated that the banks would onboard most of the vendors onto the program. The banks would carry out the required due diligence and credit assessment of the MSME vendors and collect available security/collateral. In addition they would also carry out a detailed assessment of the buyer-the OEM. In this model the default risk is predicated on the buyer. The buyer agrees to pay the bank by way of bill/invoice acceptance which forms the basis of financing of the receivables of the vendor

Though the loan is in the books of the vendor, due to the program structure , repayment risk is fixed on the buyer which leads to better rate of interest and ease of liquidity to the vendor.

The program model typically is skewed towards the OEM who can dictate terms to both the vendor and the financier. It also depends on the willingness and initiative of the OEM to create such structures. The vendors better off than the product model but are dependent on the OEM for smooth functioning of the same.

The third model known as the marketplace model shifts the controls from the OEM to the vendors. This is achieved by way of digitising an digitalisation of the documents and processes and reliance on system checks and balances. The best known example of this model is the Trade Receivables and Discounting System (TReDS). In this model in addition the buyer, seller and bank relationship, there is an authorised platform operator who is responsible for the operational aspects of the financing transaction and its repayment. This it achieves by way of digital flow of data and obligations which forms the underlying for the flow of finance to the vendor. This model offers the vendor flexibility to avail financing based on its needs with the added benefit of better rate of interest.

Operational flow of TReDS:



Source: Authors' Compilation

The participants to TReDs are given role-based access rights to a platform hosted by an independent operator who is authorised by the RBI in this regard. The OEMs are registered as buyers, the MSME vendors as sellers and the Banks and NBFCs as financiers.

There are five entities currently authorised by the RBI to operate TReDS platform.

1. The TReDS operator has the following responsibilities:

    a. To carry out the Know Your Customer (KYC) process of both the buyer and seller as per existing KYC regulations

    b. Onboard the buyers, sellers, and financiers by executing separate agreements with each of them.

    c. Provide login and access to the participants as per their role.

    d. Ensure settlement as per the settlement agreement entered into with the buyer and financier.

    e. Ensure exchange of information with the seller's bankers post-financing.

    f. Ensure information on financing, as well as due date confirmations, is shared with all participants.

2. The seller supplies goods to the buyer as per their supply agreement.

3. The seller raises the invoice on the TReDS platform for the value of goods supplied. Each such invoice is named as a factoring unit (FU).

4. The buyer, post completion of his internal inventory and bills payable process, accepts the invoice so raised by logging onto the platform.

5. The FU once accepted is made available to the financiers who are required to provide their best quote for the transaction.

6. Once the financier submits the quotes, the seller has the freedom to accept the best quote.

7. Once the quote is accepted, the FU is tagged as financed.

8. The financer with the winning bid factors the invoices and funds its account registered on the platform. The platform operator remits the loan proceeds to the vendor with a timeline of T+2 by debiting the account of the financier and crediting the seller.

9. On the due date of the loan , the platform operator debits the account of the buyer, and the financier is credited, thereby completing the transaction.

10. Since TReDS is a non-recourse factoring, the seller is not affected by any buyer default. Disputes regarding quality, etc., are also kept out of the platform.

A critical feature for smooth functioning of the TReDS platform is the addressing the settlement risk between the financier and the vendor in the 1st leg and the OEM and the financier in the 2nd leg. Timely settlement is ensured in the first leg at T+2 basis and on due date in the 2nd leg. Payment obligation files are generated by TReDS platform and sent in any of the agreed payment settlement system.

TReDs is governed by the regulatory framework put in by RBI under the Payment and Settlement Systems Act(PSS Act).

4. Data and Methodology

4.1 Data

The empirical analysis in this paper is based on monthly micro-level transaction data from one of the largest TReDS platform providers in India. While aggregate, entity-wise information on TReDS usage is publicly available through the Reserve Bank of India (RBI) on a monthly basis, such aggregate data are not suitable for examining firm-level heterogeneity in financing costs. Therefore, for the econometric analysis, we rely on proprietary microdata obtained from a leading platform operator.

The dataset covers the period from April 2022 to March 2025 and includes detailed information on financing transactions undertaken by registered MSME sellers on the TReDS platform. The unit of observation is a firm–month, where each MSME may have multiple factoring units (FUs) financed within a month. Since multiple invoices can be bundled under a single FU, the data capture both transaction intensity and value effects.

The dataset includes information on: MSME characteristics, including firm size classification (Micro, Small, and Medium), Interest rate (cost of funds) paid by the MSME

on financed invoices, Value of factoring units (FUs) accepted by buyers, Number of bids received per FU, capturing the degree of competition among financiers, Buyer credit rating rank, which reflects the creditworthiness of the obligor, Average tenure of financing, Number of factoring units accepted by buyers, and Time identifiers (month and year). The MSME size classification follows the official definition under the MSME framework and is treated as a categorical variable. In our empirical specification, Medium enterprises are taken as the reference category, while Micro and Small enterprises are included as indicator variables.

After data cleaning and removal of incomplete observations, the final balanced panel consists of over 200,000 firm–month observations, covering more than 30,000 distinct MSMEs. This rich panel structure allows us to exploit both cross-sectional and intertemporal variation in financing costs on the TReDS platform.

4.2 Methodology

To examine the determinants of the cost of funds for MSMEs on the TReDS platform, we employ a panel data regression framework. The dependent variable is the interest rate (cost of funds) paid by MSMEs for financing their receivables through TReDS.

Our primary variable of interest is firm size, as the central objective of TReDS is to create a level playing field for MSMEs by pricing credit based on buyer creditworthiness rather than seller characteristics. Since firm size is largely time-invariant and constitutes a key explanatory variable, we estimate a Random Effects (RE) panel model. The RE specification allows us to retain the firm-level size indicators while accounting for unobserved heterogeneity across firms.

In addition, we include year fixed effects to control for macroeconomic conditions, regulatory changes, and time-specific shocks affecting interest rates over the sample period. Robust standard errors are used to address potential heteroskedasticity.

The baseline panel data specification is as follows:

$$\text{Interest}_{it} = \alpha + \beta_1 \text{Micro}_i + \beta_2 \text{Small}_i + \beta_3 \text{BuyerRating}_{it} + \beta_4 \text{FUValue}_{it} + \beta_5 \text{Bids}_{it} + \beta_6 \text{AvgTenure}_{it} + \beta_7 \text{FUNumber}_{it} + \gamma_t + u_i + \varepsilon_{it}$$

where: Interest_{it} is the interest rate paid by MSME i in month t, Micro_i and Small_i are firm size dummies (Medium is the reference category), BuyerRating_{it} denotes the credit rating rank of the buyer, FUValue_{it} is the value of the factoring unit accepted, Bids_{it} captures the number of competitive bids received, AvgTenure_{it} is the average financing tenure, FUNumber_{it} is the number of factoring units accepted, γ_t represents **year fixed effects**, u_i is the firm-specific random effect, and ε_{it} is the idiosyncratic error term. To further understand how the impact of MSME size and other determinants evolves over time, we also estimate the model separately for individual years. This allows us to capture temporal changes in pricing behavior on the TReDS platform. Overall, the panel data approach enables us to rigorously assess whether MSME size continues to influence financing costs even within a market-based, buyer-rating-driven system such as TReDS, while controlling for transaction characteristics, buyer credit quality, competition among financiers, and time effects.

4.3 Descriptive Evidence on Interest Rate Patterns on TReDS

Figures 1 and 2 present descriptive evidence on the evolution of interest rates on the TReDS platform across MSME size categories and over time. These patterns provide useful preliminary insights into pricing behavior prior to the multivariate analysis.

Figure 1 plots the average interest rate faced by Micro, Small, and Medium enterprises over the period 2022–2025. Two salient features emerge. First, interest rates increase sharply between 2022 and 2023 for all MSME categories, reflecting a broader tightening of financial conditions during this period. Second, and more importantly, there is a clear and persistent size-based gradient in borrowing costs. Micro enterprises consistently face the highest average interest rates, followed by small enterprises, while medium enterprises enjoy the lowest rates in every year.

[Figure 1]

The size differential is modest in 2022 but becomes more pronounced from 2023 onwards. For instance, in 2023 and 2024, micro enterprises pay noticeably higher interest rates than medium enterprises, despite operating within the same platform and benefiting from buyer-based credit assessment. Although average interest rates stabilize somewhat in 2025, the relative ordering across MSME sizes remains unchanged. This descriptive pattern foreshadows the regression results by suggesting that seller size continues to matter for pricing, even within a system designed to neutralize seller-specific credit risk.

[Figure 2]

Figure 2 examines the monthly evolution of average interest rates from 2022 to early 2025. The figure highlights considerable variation over time, with a clear upward trend during 2022, where interest rates rise steadily from April through December. This period coincides with post-pandemic normalization and tightening monetary conditions, which likely influenced overall financing costs on the platform. In contrast, interest rates in 2023 appear relatively stable, fluctuating within a narrow band around a higher mean level. This stability suggests that once the macro-financial adjustment was absorbed, pricing on TReDS became more predictable. A similar pattern persists in 2024, where interest rates remain clustered around a slightly elevated but stable range, indicating maturation of the platform and possible convergence in bidding behavior among financiers. The limited observations for 2025 suggest a continuation of this stable pricing regime. The figures suggest three broad descriptive conclusions. First, average borrowing costs on TReDS increased sharply during the initial adjustment period but subsequently stabilized. Second, despite operating within a competitive, buyer-risk-based framework, micro enterprises consistently face higher interest rates than larger MSMEs. Third, the persistence of these differentials over time indicates that platform-based financing, while effective in reducing overall costs, does not entirely eliminate heterogeneity across firm sizes.

While the descriptive evidence highlights clear time variation and persistent differences in average borrowing costs across MSME size categories, these patterns do not account for differences in buyer creditworthiness, transaction size, financing tenure, or the degree of competition among financiers. Moreover, the observed size-based

differentials may partly reflect compositional changes in buyers or transactions over time rather than intrinsic pricing behavior on the platform. To disentangle these effects, the next section employs a panel regression framework that exploits firm-level variation over time to examine whether MSME size continues to influence financing costs after conditioning on buyer characteristics, transaction attributes, and time effects.

5. Empirical Findings

Tables 2 and 3 report the results from random-effects panel regressions examining the determinants of borrowing costs faced by MSMEs financing their receivables through the TReDS platform. The specifications include year fixed effects and heteroskedasticity-robust standard errors. The estimates exploit both cross-sectional and intertemporal variation in firm-level financing outcomes, while allowing time-invariant characteristics most notably MSME size to enter the model.

Across all specifications in Table 2, the estimated coefficients are stable and precisely measured, indicating that the results are not driven by omitted transaction characteristics or changes in the composition of firms using the platform. A consistent finding is the presence of size-based differences in borrowing costs. Relative to medium enterprises, micro enterprises face significantly higher interest rates even after controlling for buyer creditworthiness, transaction value, competition among financiers, financing tenure, and time effects. The magnitude of this differential is economically meaningful and persists across increasingly saturated specifications. In contrast, the estimated effect for small enterprises is weaker and generally loses statistical significance once buyer and transaction-level controls are included, suggesting that residual pricing differentials are concentrated among the smallest firms.

These results indicate that while TReDS substantially weakens the traditional linkage between MSME creditworthiness and borrowing costs, it does not fully eliminate size-related heterogeneity. The persistence of a micro-enterprise premium may reflect higher perceived operational risk, smaller and more fragmented invoices, or informational frictions that remain salient to financiers even within a buyer-risk-based pricing framework.

At the same time, buyer creditworthiness emerges as the most quantitatively important determinant of financing costs. Higher buyer credit ratings are associated with significantly lower interest rates across all specifications, with large and stable coefficients. This finding provides strong empirical validation of the institutional design of TReDS, which shifts the locus of credit risk assessment from sellers to buyers. The robustness of this relationship suggests that financiers systematically anchor pricing decisions to buyer risk, consistent with theoretical models of supply chain finance where the buyer is the primary obligor.

Transaction-level characteristics further underscore the role of market mechanisms in shaping borrowing costs. The number of bids received per factoring unit has a strong and negative association with interest rates, indicating that increased competition among financiers translates directly into lower borrowing costs for MSMEs. This result offers direct evidence of effective price discovery on the TReDS platform and suggests that the marketplace design functions as intended. Similarly, larger factoring unit values are associated with lower interest rates, consistent with scale economies in

receivables financing, whereby fixed processing and monitoring costs are spread over larger transactions.

The year fixed effects reveal a systematic decline in borrowing costs over time, conditional on firm and transaction characteristics. This pattern likely reflects increasing platform maturity, deeper participation by financiers, improved information flows, and learning effects on both sides of the market.

[Table 1]

[Table 2]

Table 3 complements the pooled analysis by allowing the determinants of borrowing costs to vary across years. The year-wise estimates reveal notable dynamics in pricing behavior as the platform evolves. Size-based differentials are relatively weak in the early years but become more pronounced from 2023 onwards, with micro enterprises consistently facing higher interest rates relative to medium enterprises. This temporal pattern suggests that as participation expands and competition intensifies, financiers increasingly differentiate among MSMEs within the same buyer-rating category. Rather than converging to uniform pricing, the market appears to develop finer risk segmentation over time.

In contrast, the relationship between buyer credit rating and interest costs remains strong and stable across all years, with the magnitude of the coefficient increasing in absolute value in later years. This indicates that pricing has become progressively more tightly aligned with buyer credit risk as the platfoarm matures. The negative effect of the number of bids on interest rates is also persistent across years, reinforcing the conclusion that competition remains a central feature of the platform. The association between factoring unit value and borrowing costs strengthens over time, consistent with improved matching and market depth.

The effect of financing tenure exhibits a structural shift. In the earlier years, longer tenures are associated with higher interest rates, reflecting conventional term premia. In later years, however, longer tenures are associated with lower borrowing costs. This reversal may reflect improved liquidity conditions, increased financier comfort with longer-duration exposures, or strategic bidding behavior in a more mature and competitive marketplace.

Our results provide robust evidence that TReDS has fundamentally reshaped the pricing of MSME finance by anchoring borrowing costs to buyer creditworthiness and fostering competition among financiers. At the same time, the persistence and in some cases strengthening of size-based pricing differentials highlights the limits of platform-based market design in fully neutralizing firm-level heterogeneity. More broadly, the findings contribute to the applied literature on digital financial infrastructure and supply chain finance by demonstrating that market-based platforms can substantially reduce, though not entirely eliminate, traditional frictions in MSME credit markets.

[Table 3]

6. Conclusion

There is a substantial reduction in the interest cost paid by the MSME. It is on an average 8% and the reduction was possible as the cost of interest is determined subject to the buyer's (usually the large corporate) credit rating and not on the MSMEs credit worthiness. The Correlation analysis shows that interest rate charged to Micro, Small and Medium sectors are negatively correlated with the buyer's credit rating. Over 2022 to 2025 the negative relationship is strengthen. Similarly, the regression result shows that as buyers credit rating increases the MSMEs are paying lesser interest cost (Table 1 and Table 2). Our result is robust as all the models show this relationship which are statistically significant. Interestingly, although there is a substantial fall in the interest cost paid by the MSMEs compared to the rates they would have otherwise be charged, there exists a differential in interest cost paid by MSMEs among themselves. It has been observed that Micro sector has been paying relatively higher interest rate compared to medium sector (Table 2), especially true when we analyse it across all the years from 2022 to 2025 (Table 3). Additionally, it is observed that small sectors have paid higher interest cost only in 2025 (Table 3). As expected, we find statistically significant and negative coefficient between the number of bids and the interest cost (Table 2 and Table 3). It necessarily means that for one FU if the number of bids is high the cost of fund for MSMEs falls significantly. Moreover, we find negative and significant coefficient value between the interest cost and the accepted FU values by the buyers. It means as the value of FUs is higher MSMEs would pay lower interest cost. It may be noted that multiple invoices are clubbed under the same FUs. However, average tenure provides a mix results over the last four years. The results shows that in 2022 and 2023 the interest cost were high for the longer tenure loan and in the 2024 and 2025, the interest cost are low for the longer tenure of the loan.

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Table1
Variables description

Variables	*Description*	*Remarks*
Medium	Value takes 1 if the firm belongs to the medium sized category	Reference Category
2.msme_size	Value takes 2 if the firms belong to Micro Sector	
3.msme_size	Value Takes 3 if the firms belong to Small Sector	
Buyinv_val	Factoring Unit (FU) value accepted by the Buyers	There are 14 ranks for the buyers creditworthiness. Highest Credit worthiness is ranked as 14; As buyer's credit rating increases the interest charged to the seller (MSME) is expected to be reduced.
Bids	Number of bids received by one FU	As the FU value increases the interest cost is likely to fall
Avg_tenure	Average Tenure for which MSME is paid for	As the number of bids increases, interest cost is expected to fall
Buy_Inv_No	FU no accepted by the Buyers	Average tenure as increases the interest rate will increase
2023.Year; 2024.year; 2025.year	Time Dummy. 2022 is taken as the base year	

Source: Authors' Compilation

Table 2
Panel Regression with Robust Standard Error

	(1)	*(2)*	*(3)*	*(4)*
VARIABLES	*Model 1*	*Model 2*	*Model 3*	*Model 4*
2.msme_size	0.168***	0.135***	0.141***	0.136***
	(0.0171)	(0.0116)	(0.0116)	(0.0114)
3.msme_size	0.0325*	0.0127	0.0169	0.0116
	(0.0173)	(0.0114)	(0.0113)	(0.0111)
buy_rat_rank		-0.337***	-0.337***	-0.330***
		(0.00465)	(0.00465)	(0.00454)
buyinov_val		-0.00497***		-0.00716***
		(0.00158)		(0.00160)
Bids				-0.113***
				(0.00211)
avg_tenur				-0.000547***
				(8.39e-05)
2023.year	0.713***	0.676***	0.675***	0.682***
	(0.0101)	(0.00937)	(0.00938)	(0.00895)
2024.year	0.638***	0.583***	0.582***	0.572***
	(0.0123)	(0.0113)	(0.0113)	(0.0108)
2025.year	0.559***	0.512***	0.511***	0.498***
	(0.0133)	(0.0121)	(0.0121)	(0.0116)
buy_inv_no			0.00124**	
			(0.000550)	
Constant	7.684***	10.60***	10.60***	10.77***
	(0.0180)	(0.0442)	(0.0442)	(0.0458)
Observations	204,362	193,084	193,084	193,084
Number of id_n	31,818	29,852	29,852	29,852
Year FE		Yes	Yes	Yes
Firm FE		Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' Estimation

Table 3
Panel Regression with RE Model

	(1)	*(2)*	*(3)*	*(4)*
VARIABLES	*2022*	*2023*	*2024*	*2025*
2.msme_size	-0.0338	0.101***	0.146***	0.138***
	(0.0354)	(0.0195)	(0.0133)	(0.0133)
3.msme_size	-0.0649**	-0.0143	0.00931	0.0295**
	(0.0321)	(0.0177)	(0.0127)	(0.0131)
buy_rat_rank	-0.336***	-0.277***	-0.328***	-0.373***
	(0.00940)	(0.00629)	(0.00519)	(0.00346)
buyinov_val	0.000743	-0.00695***	-0.00281*	-0.00227*
	(0.00662)	(0.00176)	(0.00147)	(0.00134)
Bids	-0.0928***	-0.110***	-0.0936***	-0.113***
	(0.00690)	(0.00283)	(0.00228)	(0.00397)
avg_tenur	0.00605***	0.00121***	-0.00128***	-0.00182***
	(0.000359)	(0.000144)	(0.000103)	(0.000112)
Constant	10.28***	10.81***	11.35***	11.76***
	(0.100)	(0.0631)	(0.0509)	(0.0372)
Observations	20,236	46,434	91,602	34,812
Number of id_n	5,232	10,908	21,307	18,028
Year FE		Yes	Yes	Yes
Firm FE		Yes	Yes	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' Estimation

Figure 1

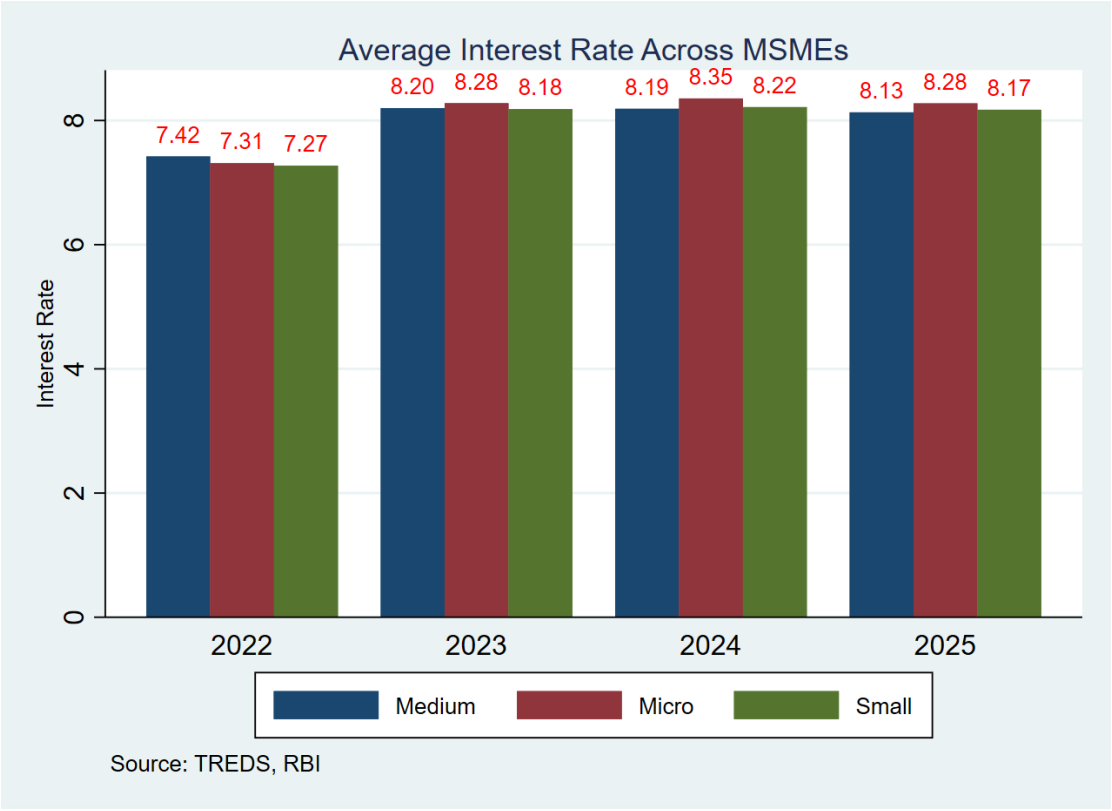


Figure 2

