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Platform-Driven Fintech in India: SME Inclusion and Global Expansion

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ABSTRACT

This essay examines the impact of the Unified Payments Interface (UPI) on financial inclusion in India, particularly for SMEs, and ponders whether or not the service can be replicated in other countries. I apply a Vector Autoregression (VAR) model to the monthly transaction volumes between January 2020 and December 2025 in order to identify the dynamic interaction between the number of transactions, the value of transactions, and the number of transactions per day. Fundamentally, the cointegration test indicates that there is a long-run equilibrium of the three sets of series, and the Granger causality tests inform us that there is a powerful two-way causality. Stated differently, both volume and value have a strong relationship with the daily average. Due to these outcomes, it is possible to state that platform-like fintech could help to reduce the inclusion gap and make India a leader within the international digital payment landscape.



Keywords: Unified Payments Interface, fintech, financial inclusion, SMEs, VAR, digital payments, India



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INTRODUCTION

The fintech industry in India has been dramatically transformed in the past decade and has fundamentally reformed the process in which individuals and companies engage with financial services ([Reserve Bank of India, 2024](#)). The Unified Payments Interface is the epicentre of this change, which is a real-time settlement system formulated by the National Payments Corporation of India (NPCI) ([NPCI, 2024](#)). Having appeared in 2016, UPI has become one of the digital payment infrastructures that are most prolific in the world, handling billions of transactions and clearing digital finances to a broad range of income groups ([Vincent and Sivakumar, 2019](#)). In addition to the ability to execute transactions, platform-based fintech interventions serve as a critical underpinning of inclusive finance, particularly concerning SMEs that face traditional challenges in getting into formal banking institutions ([Beck et al., 2018](#), [Gomber et al., 2018](#)). The Indian economy is based on SMEs, which contribute an estimated 30% of the GDP and provide employment to over 110 million individuals, but SMEs are still struggling with inadequate credit, payment systems, and other financial services ([Ardic et al., 2012](#)). COVID-19 as an unwanted trigger hastened the shift towards contactless payments and demonstrated that online financial infrastructure is robust and resilient ([Fu and Mishra, 2020](#)). In the pandemic, UPI monthly transactions have increased by an average of 750 million in January 2020 to more than 21 billion in December 2025, creating a fertile ground into which the structural characteristics of this growth may be investigated.

I make three contributions to the literature:

- I provide a careful empirical evaluation of the behaviour of the UPI transactions with respect to state-of-the-art econometric tools.

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- I divide the causal relationships between the volume of transactions, total value, and daily averages and help illuminate the usage patterns.
- I talk about how these dynamics contribute to the inclusion of SMEs and also how to place India as a potential exporter of fintech platforms.

METHODS AND METHODOLOGY

Data Description

The analysis draws on a balanced panel of monthly UPI statistics covering January 2020–December 2025 (72 observations). Three variables are examined:

Table 1. Description of Variables Used in the Study

Variable	Description	Units
UPI_VOLUME	Total number of transactions per month	Millions
UPI_VALUE	Aggregate monetary value of transactions per month	INR crore
AVG_DAILY	Mean daily transaction count for the month	Millions

All figures are taken from NPCI's official releases and the Reserve Bank of India's periodic reports.

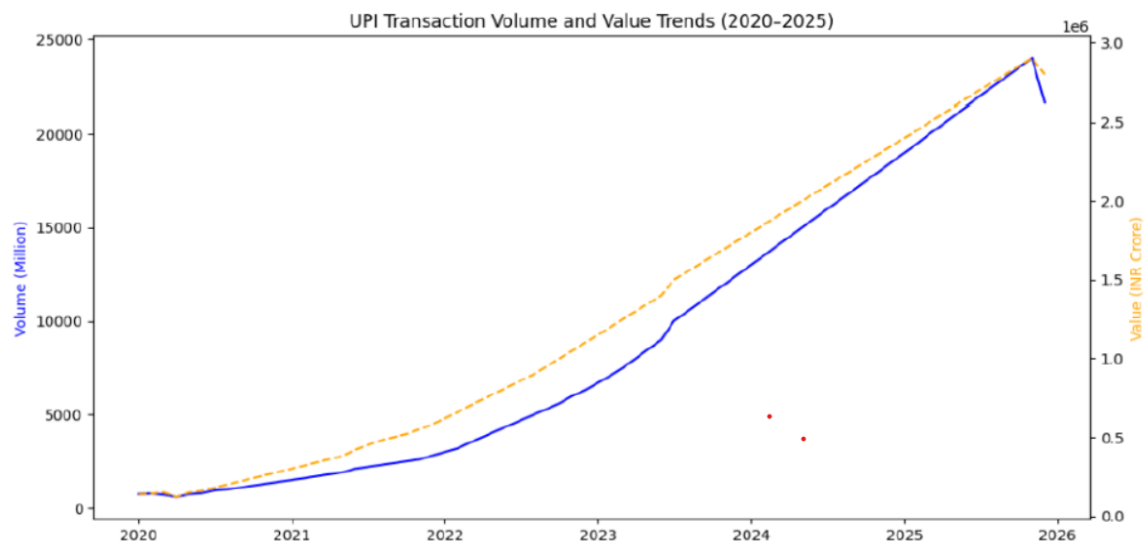


Figure 1: UPI Transaction Volume and Value Trends (2020-2025)

Unit Root Testing

I verified that I checked each time series before running the VAR according to the augmented Dickey–Fuller (ADF) test. I have done the ADF regression with an intercept and a trend term—essentially, that is an attempt to test the null hypothesis of whether or not the series has a unit root.

$$\Delta y_t = \alpha + \beta t + \gamma y_{t-1} + \delta \Delta y_{t-1} + \dots + \varepsilon_t$$

The test statistics (0.276 for UPI_VOLUME, 0.274 for UPI_VALUE, and 0.311 for AVG_DAILY) all yielded p-values > 0.97, indicating non-stationarity in levels. Consequently, we proceeded with cointegration analysis to capture long-run relationships.

Cointegration Analysis

I used the Johansen maximum-likelihood analysis method to test the application of the stochastic trend of the three series (Johansen, 1991). In other words, the conceptual framework of the Vector Error-Correction Model (VECM) is an awesome statistical device that enables us to peek into the manner in which variables change in the immediate term and yet maintain their correlations in the long run.

$$\Delta y_t = \Pi y_{t-1} + \Gamma_1 \Delta y_{t-1} + \dots + \Gamma_{p-1} \Delta y_{t-p+1} + u_t$$

The trace statistic (37.611) exceeded the 5% critical value (29.796), confirming one cointegrating vector at the 5% significance level.

Vector Autoregression Model

Since there is evidence of cointegration, I project a Vector Autoregression (VAR) model to provide the dynamic interdependence between UPI_VOLUME, UPI_VALUE, and AVG_DAILY (Lütkepohl, 2005). The information-criteria optimization was used to select the VAR(2) specification.

$$y_t = c + A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + u_t$$

In which y_t is the endogenous variable that are being studied, c is the constant, A_1 and A_2 are matrices of coefficients, and u_t is the error term, which is assumed to be white noise.

RESULTS AND DISCUSSION

Descriptive Analysis

From January 2020 to December 2025, the monthly transaction count rose from 0.75 billion to 21.64 billion, implying a compound annual growth rate (CAGR) of roughly 67%. Correspondingly, the monetary value grew from INR 137,000 crore to INR 2,797,000 crore.

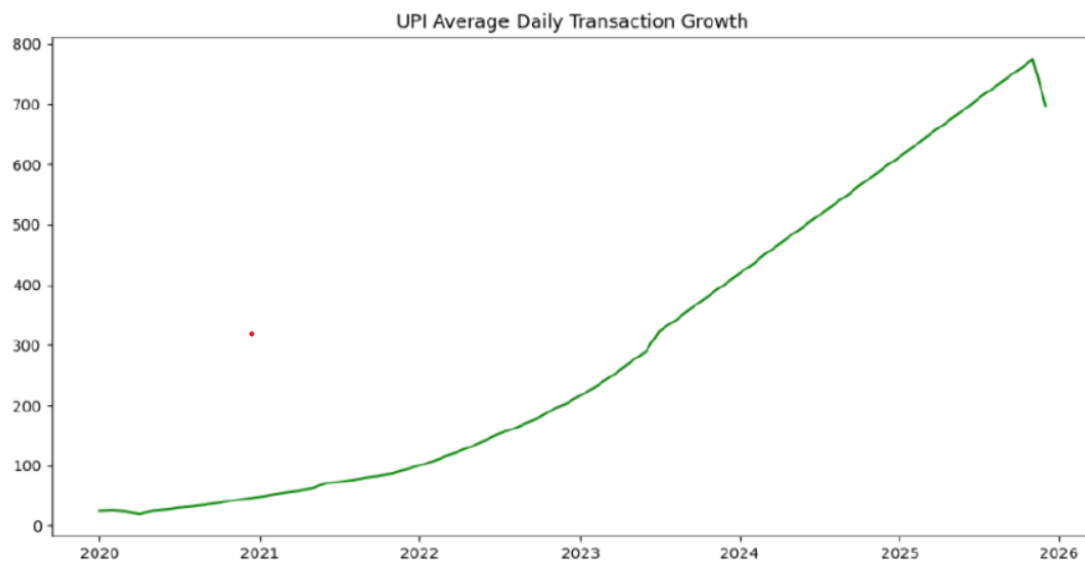


Figure 2: UPI Average Daily Transaction Growth (2020-2025)

Correlation Analysis

The correlation matrix reveals strong positive relationships among all variables. UPI_VOLUME and AVG_DAILY exhibit the highest correlation (0.999), followed by UPI_VOLUME and UPI_VALUE (0.972). These high correlations suggest that the variables move together systematically, supporting the cointegration findings.

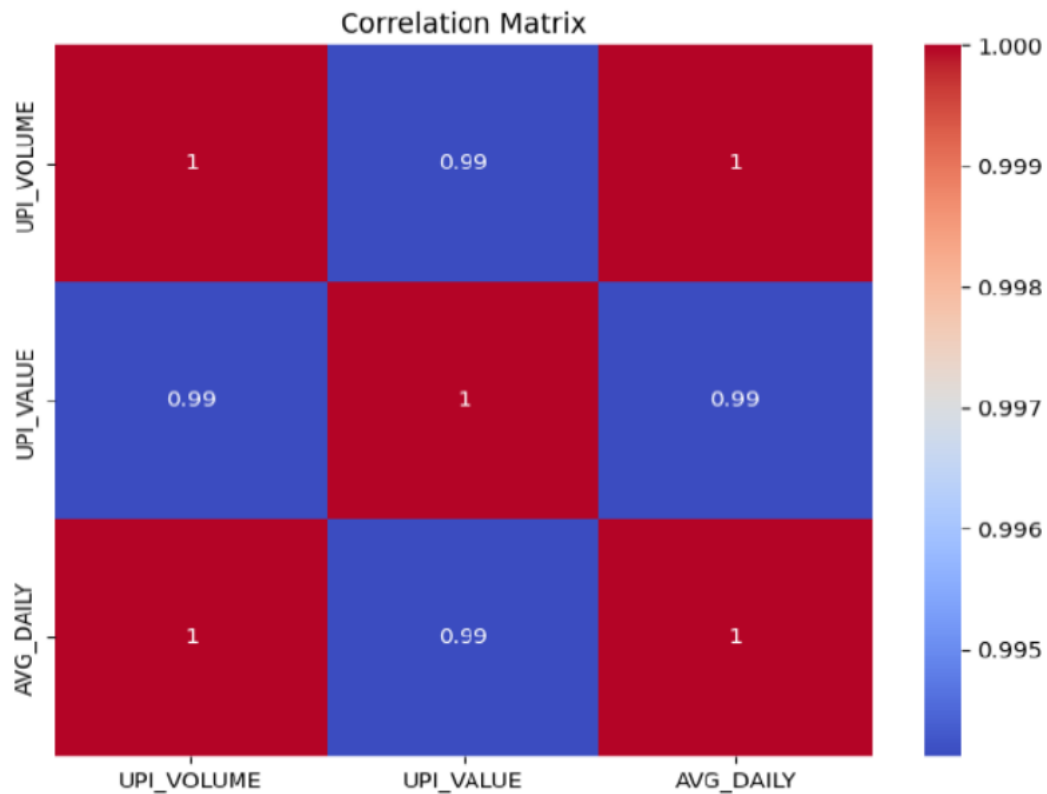


Figure 3: Correlation Matrix of UPI Transaction Variables

VAR Model Results

Table 1 presents the significant coefficients from the VAR(2) model. In the UPI_VOLUME equation, the first lag of UPI_VOLUME ($\beta = 2.569$, $p < 0.001$) and the first lag of AVG_DAILY ($\beta = -92.764$, $p < 0.001$) are both statistically robust, indicating strong persistence and cross-effect. The model explains 43.7% of the variance in volume, 62.6% in value, and 60.0% in daily averages.

Table 1: VAR(2) Model Coefficient Estimates

Variable	Coefficient	Std. Error	t-statistic	p-value
UPI_VOLUME Equation				
L1.UPI_VOLUME	2.569	0.559	4.596	0.000
L1.AVG_DAILY	-92.764	17.080	-5.431	0.000
L2.UPI_VOLUME	2.148	0.723	2.974	0.003
UPI_VALUE Equation				
L1.UPI_VOLUME	-109.314	23.894	-4.575	0.000
L1.UPI_VALUE	-0.434	0.116	-3.750	0.000
L1.AVG_DAILY	4100.904	730.128	5.617	0.000

Granger Causality Analysis

Granger causality tests reveal significant bidirectional relationships among the variables. Notably, AVG_DAILY strongly Granger-causes both UPI_VOLUME ($F = 16.833$, $p < 0.001$) and UPI_VALUE ($F = 13.783$, $p < 0.001$), suggesting that daily transaction patterns provide predictive information for aggregate monthly metrics.

Conversely, UPI_VOLUME significantly Granger-causes UPI_VALUE ($F = 9.137$, $p < 0.001$), indicating that volume shocks transmit to value dimensions.

Table 2: Granger Causality Test Results (2 Lags)

Null Hypothesis	F-statistic	p-value	Decision
UPI_VALUE does not cause UPI_VOLUME	1.193	0.310	Not Rejected
AVG_DAILY does not cause UPI_VOLUME	16.833	0.000	Rejected***
UPI_VOLUME does not cause UPI_VALUE	9.137	0.000	Rejected***
AVG_DAILY does not cause UPI_VALUE	13.783	0.000	Rejected***
UPI_VOLUME does not cause AVG_DAILY	29.204	0.000	Rejected***
UPI_VALUE does not cause AVG_DAILY	1.485	0.234	Not Rejected

Variance Decomposition

The Forecast error variance decomposition analysis that we are discussing in the context of our class indicates the relative values of the contribution each variable makes to the forecast error variance of the other variables. In the case of UPI_VOLUME, UPI_VOLUME has its own shocks accounting for approximately 69 per cent of variance at the 10-month aspect, and AVG_DAILY represents approximately 29 per cent. All this basically points to the fact that the dynamics of daily transactions are central to comprehending overall volume dynamics.

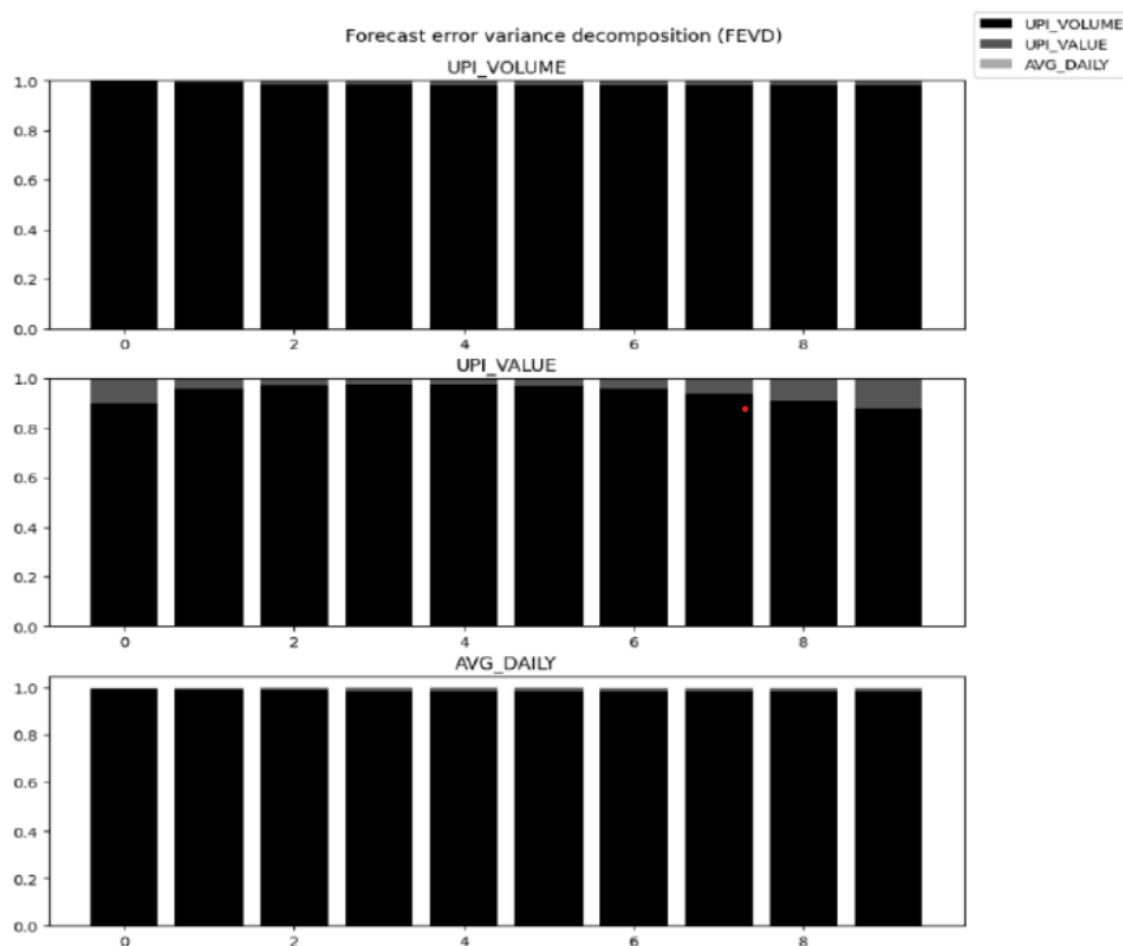


Figure 4: Forecast Error Variance Decomposition for UPI Volume

Implications for SME Inclusion

The empirical evidence has a serious implication for financial inclusion in SMEs. It predicts the high predictive ability of daily transaction patterns, which implies that SMEs are becoming more integrated users of UPI, making daily business transactions, paying suppliers, and collecting payments from customers on the platform ([Diouf et al., 2020](#); [Ozili, 2018](#)). The two-way causality that exists between the volume and value shows that SMEs are more than just handling the small-value transactions, but are also engaged in the formalized financial ecosystem ([Arner et al., 2022](#)). Moreover, the dynamics of growth of the platform make India a possible exporter of digital payment infrastructure. The UPI model, which is interoperable, has low transactional cost and real-time settlement, and provides a model that other developing economies can emulate in an attempt to promote financial inclusion ([D'Silva et al., 2019](#); [Rastogi et al., 2021](#)).

CONCLUSION

In this research, there are complete empirical findings regarding the dynamic relationships of the growth of the UPI platform in India. The VAR modelling structure establishes a great correlation between volume, value, and daily averages of the transactions, and the Granger causal relationships between them are significant, which reflects some predictable patterns in using the platform. The long-run equilibrium relationships are proven by the Johansen cointegration test, which allows stating the sustainability of the observed growth trend. The results indicate that fintech solutions built on platforms can be an effective point of intervention in financial inclusion issues, especially those of SMEs, which have in the past encountered barriers to formal financial services. Daily transaction pattern predictive power points to the fact that UPI is highly integrated into the business operations, and the bidirectional relationship points to a maturing ecosystem where the volume and value growth are

reinforced by one another. Policy-wise, these conclusions will motivate further investment in digital payment infrastructure and imply that the Indian model can become an important case study in other emerging economies. SME inclusion in the platform makes India a prospective global fintech exporter, and the UPI framework was the global paradigm of digital financial transformation. Future studies must focus on the distributional effects of the UPI adoption by various segments of the SMEs and geographical areas, and how the platform contributes to the cross-border transactions, with India having the global expansion goals.

AUTHOR DECLARATIONS

Credit Author Statement / Author contributions

Rhythm Mittal: Conceptualization, Methodology, Formal Analysis, Investigation, Writing (Original Draft), Writing (Review and Editing), Visualization, Supervision, Project Administration.

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