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UPI Deepening & Financial Inclusion: Real Impact on Women and Rural Micro-Enterprises

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Abstract- This paper examines how the rapid expansion of India's Unified Payments Interface (UPI) has affected financial inclusion for women and rural micro-enterprises. Using official transaction statistics (NPCI) and institutional reports (RBI, NABARD, World Bank/Global Findex, Women's World Banking) along with recent empirical studies, we analyze transaction patterns, measure associations between UPI activity and credit expansion, and explore gendered differences in digital financial behaviour. Key findings indicate UPI's dramatic growth in transaction volumes and its correlation with expanded credit access among underserved borrowers. However, barriers remain: digital literacy, mobile internet access for women, and last-mile onboarding. Policy suggestions include gender-targeted digital literacy, merchant onboarding support for women micro-entrepreneurs, alternative data sharing standards for credit scoring, and targeted regulatory safeguards.

Keywords- UPI, Financial Inclusion, Women, Rural Micro-Enterprises, Digital Payments, Credit Access, India

I. INTRODUCTION

India's UPI experienced explosive growth since launch, quickly becoming the dominant retail digital payments rail in the country. This growth has coincided with policy pushes for formal financial inclusion and increased emphasis on digital delivery of government transfers and subsidies. The scale and granularity of UPI transaction data create new digital footprints for previously under-served populations, enabling lenders and marketplaces to better evaluate small borrowers and sellers. This paper investigates three linked questions: (1) how have transaction patterns changed for women and rural micro-enterprises with UPI deepening; (2) how has UPI adoption changed access to credit for these groups; and (3) what gendered behaviours and barriers mediate the impact of UPI? Official statistics and recent studies suggest a meaningful positive association between UPI intensity and credit expansion, but also show persistent gender gaps in digital access and usage that limit UPI's full inclusionary potential.

II. OBJECTIVES

1. Measure and describe transaction patterns of UPI among women users and rural micro-enterprises (volume, frequency, instrument mix).
2. Assess the relationship between UPI activity and changes in credit access for rural micro-enterprises and women borrowers.
3. Identify gendered differences in digital financial behaviour (adoption, use cases, barriers) and the role of mobile/internet access.
4. Provide evidence-based policy and operational recommendations to strengthen UPI's positive effects on gender-inclusive financial access.

III. METHODOLOGY

Mixed-methods design combining:

- Secondary quantitative analysis of official statistics (NPCI UPI product statistics) for recent months/years to document transaction patterns; RBI/NABARD institutional reports and government publications for MSME and rural finance indicators; World Bank Global Findex and Women's World Banking reports for gendered digital access measures.
- Synthesis of empirical studies that estimate UPI-credit linkages (CAFRA L/working papers, peer reviewed papers).
- Qualitative triangulation from NABARD / Microfinance Review material on SHG and women micro-entrepreneur digitalization.

Data timeframe: primary focus on 2020–2025 trends (post-COVID acceleration), using the latest publicly available official statistics (NPCI monthly/product statistics, government financial services annual report). Where original microdata is required for rigorous causal inference it is recommended as a follow-up empirical study (survey + administrative linking).

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IV. SHORT OFFICIAL DATA SNAPSHOT (SELECTED OFFICIAL FIGURES)

Table 1 — UPI Monthly Product Statistics (selected months 2025)

Month (2025)	UPI Volume (million)	UPI Value (₹ crore)
Mar 2025	661	18,301.51
Apr 2025	668	17,893.42
May 2025	673	18,677.46

Table 2 — Selected institutional findings on UPI and credit / gendered access

Source	Key finding
CAFRAL (analysis)	A 1% increase in UPI is associated with a ~0.7% increase in credit at state level — suggesting UPI footprints help lenders evaluate borrowers.
Economic Times (summary of study)	10% increase in UPI → ~7% rise in credit availability among underserved borrowers.
Women's World Banking (India report)	Women's mobile internet adoption rose to 37% in 2023 (from 30% in 2022), narrowing the gender digital gap — a key enabler for digital payments adoption by women.
NABARD (Impact Report)	Digital transformation and SHG-linked initiatives expanded digital payment acceptance among rural micro-entrepreneurs; institutional programs support onboarding.

V. LITERATURE REVIEW

National

1. CAFRA L / Reserve Bank / Author(s) — *Open Banking and Digital Payments: Implications for Credit* (2024). Analytical note shows a statistically significant state-level correlation between UPI expansion and credit growth. Authors estimate that a 1% uplift in UPI is associated with ~0.7% increase in credit, arguing that UPI footprints provide alternative data for underwriting, enabling fintechs and banks to expand lending to previously underserved segments. Policy implications: standardization of data sharing and privacy safeguards.
2. NPCI-UPI product statistics and ecosystem data-2021–2025).
   NPCI's official data documents UPI's rapid scaling to hundreds of millions of transactions monthly and high monetary value. This source is the definitive measure of transaction patterns in India and underpins any quantitative assessment of UPI deepening.
3. NABARD-Impact Report / Microfinance Review (2023–2024). NABARD documents case studies of digital adoption among SHGs and rural micro-entrepreneurs, including improved receipt/payout efficiency and greater market reach. Reports also highlight capacity building needs for women entrepreneurs.
4. Government of India - Ministry of Finance / Financial Services Annual Report (2024–25). The Annual Report provides macro-level indicators on formalization of micro-enterprises and growth of digital platforms (e.g., Udyam Assist, digital registration), which interact with digital payments to broaden formal credit channels for micro businesses.
5. Recent Indian empirical studies (2024–2025) UPI *and financial inclusion in rural India: A case study* (Haque, 2025). Localized empirical studies show UPI adoption increases sales receipts and reduces cash handling for micro-enterprises; adoption higher when local networks and SHG facilitation exist. Observed constraints include device access, language, and trust.

International

6. World Bank-Global Findex (2021–2025 updates).Global Findex provides cross-country measures of account ownership, digital payment usage, and borrowing. Recent updates emphasize digital financial services' role in narrowing account ownership gaps but show persistent gender gaps. The database is key for

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international comparison and gendered measures.

7. Women's World Banking - *Enabling Digital Payments for Women in India* (2024). The report identifies technology adoption trends among women, key barriers (device ownership, digital literacy), and programmatic interventions that successfully increase women's payment usage. It reports women's mobile internet adoption increases and suggests targeted digital onboarding.
8. Kim & Others-*Mobile Money and Women's Inclusion* (2021/2022 review). Cross-country evidence that mobile money systems substantially increase account use among women and can reduce poverty; however, impact depends on enabling conditions (agent networks, regulation, affordability).
9. Suri & Jack-*Effects of Mobile Money (M-Pesa)* (2016 classic). Longitudinal study of mobile money in Kenya showing improved household resilience and poverty reduction; the mechanisms include safer storage and cheaper transfers—useful comparative lessons for UPI's potential.
10. Recent comparative studies on digital payments and credit (2023–2025), *Bridging gender credit gaps* (2025) and other peer reviewed pieces. International research increasingly finds that digital payment footprints (transactions, remittances) become alternative collateral / behavioral signals that reduce information asymmetry and expand credit access — but impacts are heterogeneous and gender-sensitive.

VI. ANALYSIS & FINDINGS

6.1 Transaction patterns — Scale and use cases
NPCI data show very large, sustained monthly UPI volumes (hundreds of millions of transactions monthly, May 2025 ~673 million transactions), confirming deep penetration of the UPI rails into retail payments. Growth is broad-based: P2P, merchant payments, and small-value transactions (e.g., UPI-Lite). Macro patterns suggest rural and semi-urban uptake as agent ecosystems and local merchants adopt UPI.

6.2 UPI and credit access — Evidence of linkage
Institutional analyses (CAFRA L) and media summaries of academic work find robust correlations: increases in UPI activity are associated with statistically meaningful increases in credit at state/aggregate levels (CAFRA L: 1% UPI → ~0.7% credit; other studies report 10% UPI → ~7% credit). Mechanism: transaction footprints feed fintech underwriting models and enable lenders to extend small ticket loans. No consistent evidence that default rates rose as credit expanded in the short term, suggesting responsible risk assessment when alternative data is used.

6.3 Gendered financial behaviour & constraints
Reports from Women's World Banking and Global Findex show improving mobile internet adoption among women (e.g., 37% mobile internet adoption in 2023 in India), narrowing but not eliminating the digital gender gap; women still face device access, digital literacy, and social norms that constrain adoption of digital payments. Where targeted programs (Banking Sakhis, SHG facilitation) exist, women's adoption and merchantization rises, enabling micro-enterprise receipts on digital rails.

6.4 Heterogeneity across regions and enterprises
Benefits are not uniform. Micro-enterprises with regular cash flows (daily sales, merchant customers) and those connected to formal channels benefit faster (easier adoption, more reliable transaction trails). Women-owned enterprises face additional onboarding and trust friction; group-based interventions (SHG support, fintech through community agents) mitigate these frictions.

VII. TABLES & SUGGESTED EMPIRICAL TESTS (FOR FOLLOW-UP RESEARCH)

Table 3 — Suggested regression/specification for future empirical study
Dependent variable: Credit access (binary indicator: accessed formal credit in last 12 months; or credit amount) Key independent variable(s): UPI intensity (per capita UPI transactions at district level; monthly growth rate), female user share, mobile internet penetration, control variables: district GDP per capita, MSME density, number of bank branches, SHG density, literacy, gender ratio. Use panel fixed effects to control for time-invariant district heterogeneity; instrumental variables could include rollout timing of agent networks or exogenous telecom upgrades.

VIII. POLICY SUGGESTIONS & PRACTICAL RECOMMENDATIONS

1. Gender-targeted digital onboarding programs. Scale programs like Banking Sakhis and SHG digital champions to support device-light onboarding, local language UPI education, and merchant acceptance training for women micro-entrepreneurs. Evidence from NABARD and women-focused programs shows group approaches work.
2. Expand alternative data standards & safe data access for underwriting. Formalize standards for how UPI transaction metadata (with privacy safeguards) can be accessed by regulated lenders for credit scoring, ensuring fairness and preventing discrimination. CAFRAL suggests that UPI footprints materially enable credit expansion; standards and privacy guardrails will ensure responsible use.
3. Improve women's mobile & internet access. Public-private initiatives to subsidize affordable smartphones and inexpensive data for women in rural areas (or community shared devices) will raise digital adoption. Women's World Banking documents the centrality of device/internet access.
4. Merchant & micro-enterprise support package. Combine UPI onboarding with simplified business registration (Udyam Assist), bookkeeping training, and digital invoicing, so micro-enterprise transaction trails feed into formal finance access. Government reports note the complementary role of enterprise formalization.
5. Safeguards and consumer protection. Strengthen grievance redressal (RBI & NPCI frameworks), literacy about privacy, and dispute resolution so women — who may be more vulnerable to tech fraud — adopt with confidence. NPCI and regulatory frameworks are evolving; consumer literacy is essential.

CONCLUSION

UPI deepening has produced a dramatic expansion in digital retail payments in India. Official statistics and multiple analytical studies indicate that increased UPI activity is correlated with expanded credit access for underserved borrowers and micro-enterprises, largely because transaction footprints reduce information asymmetry. For women and rural micro-enterprises, UPI presents a real pathway to inclusion, but gendered constraints — device access, internet adoption, literacy, and social norms — need programmatic remedies. Policy measures that combine targeted digital onboarding for women, safe data standards for credit assessment, and merchant support for micro-enterprises will accelerate inclusive outcomes while safeguarding consumers. The evidence base is promising; rigorous micro-level causal research (district/panel studies linking UPI records with credit outcomes and gendered household surveys) is recommended as the next step for publication-grade empirical work.

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