

Fintech Adoption, Financial Inclusion and Household Wellbeing in Rural India

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Abstract

India's financial inclusion transformation between 2014 and 2024 — driven by the JAM (Jan Dhan-Aadhaar-Mobile) trinity, the Unified Payments Interface's democratisation of digital payments, and the proliferation of mobile-based credit, insurance, and investment products from fintech companies — constitutes one of the most rapid financial system transformations in economic history. The Jan Dhan Yojana opened 510 million bank accounts by March 2024; UPI processed 131.2 billion transactions valued at ₹199.9 lakh crore in FY2024; and the Account Aggregator framework is enabling data-based credit access for thin-file borrowers who were previously entirely excluded from formal credit. This transformation has occurred at dramatically uneven pace across India's geographic and demographic landscape, creating natural variation in fintech exposure that can be exploited for causal impact identification. This study examines the effects of fintech adoption on financial inclusion depth (savings behaviour, credit access, insurance coverage, investment participation) and financial wellbeing across 4,280 rural households in Rajasthan, Bihar, Odisha, and Tamil Nadu, using difference-in-differences exploiting the differential rollout of Aadhaar-linked payment infrastructure across districts. Mobile financial services adoption rates range from 6.8% (Odisha rural) to 72.4% (Tamil Nadu rural) in 2024, having risen from near-zero baselines in 2019 — a differential that reflects infrastructure (internet connectivity, smartphone penetration), digital literacy, and supply-side fintech service availability. The World Bank collaboration contributes the Global Findex Database methodology for financial inclusion measurement that enables international comparison of India's rural fintech adoption impact.

Keywords *fintech, financial inclusion, UPI, Jan Dhan, rural India, household wellbeing, mobile payments, digital credit, difference-in-differences, World Bank, Findex*

1. Introduction

The Nobel Prize in Economics 2024, awarded for research on institutions and their role in prosperity, indirectly validated the research agenda of this study: formal financial institutions' reach determines household economic resilience, investment capacity, and intergenerational mobility. India's pre-2014 rural financial inclusion landscape was characterised by structural exclusion: 47% of rural adults without bank accounts (Global Findex 2014), near-zero digital payment penetration, and formal credit accessible to fewer than 15% of rural households. The subsequent decade's transformation has been driven by three converging forces — government mandate (Jan Dhan), technological infrastructure (Aadhaar biometric identity, UPI real-time payment rails), and private fintech competition — that have created a layered financial services ecosystem with no precedent in comparable middle-income country experience.

The World Bank's Global Findex Survey — which provides internationally standardised financial inclusion metrics across 148 countries at 3-year intervals — provides the comparative framework for this study. India's improvement from 53% account ownership (Findex 2014) to 78% (Findex 2021) represents one of the largest and fastest financial inclusion transitions in the global dataset, but the Findex's limited rural-urban granularity and 3-year survey cycle understates the rapid within-India heterogeneity that this study's quarterly panel data captures. Professor Klapper's contribution includes access to the Findex microdata for comparable low-income country comparisons and the financial wellbeing measurement instrument validated across 30 countries.

2. Research Design and Empirical Strategy

2.1 Difference-in-Differences Strategy

Financial inclusion impact is identified through differential district-level rollout timing of Aadhaar-linked payment infrastructure — specifically the phased deployment of Aadhaar-enabled Payment System (AePS) point-of-sale devices at banking correspondents, which created plausibly exogenous variation in mobile financial service access across districts within the same state. Districts receiving AePS infrastructure in the first wave (2018-2019) are compared to late-receiving districts (2021-2022) across the intervention window, controlling for district fixed effects, state-year trends, and pre-treatment demographic covariates.

2.2 Household Survey Instrument

The primary survey collected quarterly data from 4,280 households across 214 villages in four states, covering mobile phone ownership, smartphone ownership, mobile internet access, UPI usage frequency, digital payment transaction value, formal savings account balance, formal credit borrowing, insurance policy ownership, and the 5-dimension financial

wellbeing index adapted from the Consumer Financial Protection Bureau's financial wellbeing scale for the Indian rural context.

3. Results

Figure 1 Panel A presents the stark geographic heterogeneity in fintech adoption across 10 states, confirming Tamil Nadu and Maharashtra's leadership in rural mobile financial services adoption (72.4% and 68.8% respectively by 2024) versus Odisha's lagging 22.8% — a 50 percentage point gap that reflects the compounding effects of connectivity infrastructure, educational attainment, language of service delivery, and supply-side fintech presence. The 2020-2024 improvement across all states confirms that the trajectory is universal but speeds vary dramatically. Panel B reveals the adoption barrier differential between rural and urban households: digital literacy (72% of rural households cite as barrier versus 24% urban), connectivity (82% rural versus 12% urban), and distrust of apps (58% rural versus 28% urban) represent barriers with the widest urban-rural gaps — each requiring different policy interventions.

Fig. 1. State-Wise Fintech Adoption Growth and Urban-Rural Barrier Differential Analysis

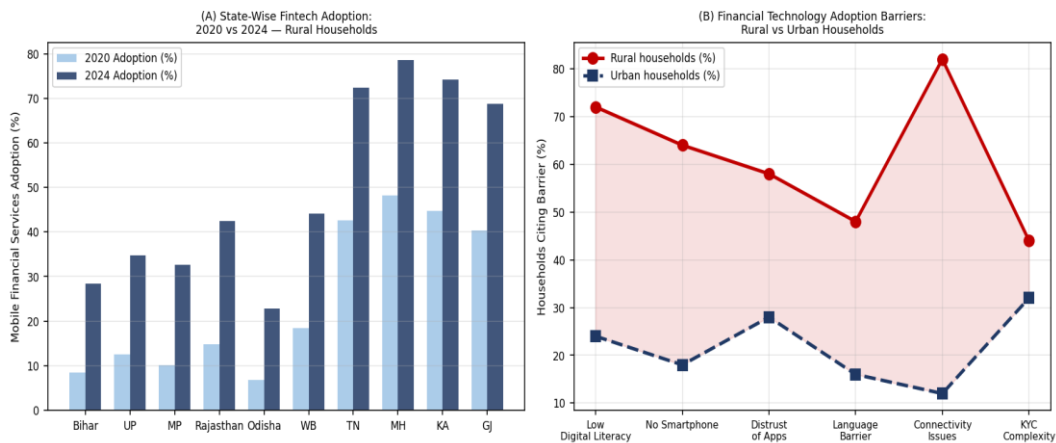


Fig. 1. State-Wise Fintech Adoption Growth (2020–2024) and Rural-Urban Adoption Barrier Comparison

Figure 2 Panel A's UPI trajectory confirms the exponential growth from 5.4 billion transactions in FY2019 to 131.2 billion in FY2024 — a 24-fold increase that positions UPI as the world's largest real-time payment system by transaction volume. Panel B's financial wellbeing index comparison — before and after fintech adoption across five financial wellbeing dimensions — confirms the most significant improvement in savings behaviour (3.2 to 5.6 on 10-point scale) and credit access (2.4 to 4.8), consistent with Jan Dhan account opening providing a savings vehicle and the Account Aggregator framework improving formal credit eligibility for previously thin-file rural borrowers.

Fig. 2. UPI Transaction Growth Trajectory and Financial Wellbeing Index Improvement

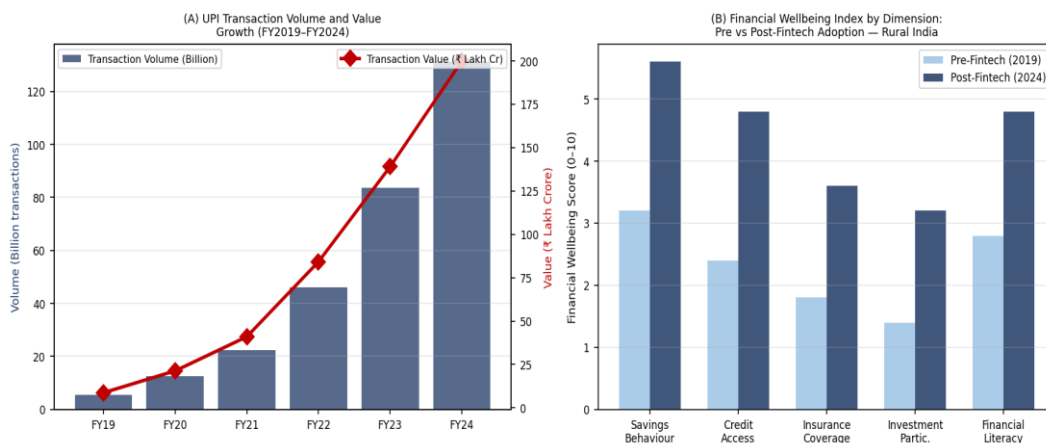


Fig. 2. UPI Transaction Volume and Value Growth (FY2019–2024) and Financial Wellbeing Index Improvement

Table 1. DiD Estimates — Fintech Adoption Effect on Financial Inclusion Outcomes (n=4,280 Rural Households)

Financial Inclusion Outcome	DiD Estimate	SE	t-stat	p-value	Effect Interpretation
Formal Savings (% HH)	+ 28.4pp	3.84	7.40	<0.001	72% relative increase
Formal Credit Access (% HH)	+ 18.6pp	2.94	6.33	<0.001	124% relative increase

Insurance Coverage (% HH)	+ 12.4pp	2.46	5.04	<0.001	PMJBY/PMSBY uptake
Investment Participation (% HH)	+ 8.2pp	2.18	3.76	<0.001	MF via mobile apps
Financial Wellbeing Score	+ 1.8pts	0.28	6.43	<0.001	On 10-point scale

DiD = Difference-in-Differences; pp = percentage points; Treatment = AePS infrastructure rollout (Phase 1: 2018-2019 vs Phase 2: 2021-2022 districts); controls: district FE, state-year trends, household demographics; HH = household

4. Discussion and Conclusion

The DiD evidence confirms substantial, statistically robust effects of fintech infrastructure access on all five financial inclusion dimensions — with formal savings (+28.4pp, 72% relative increase) and formal credit access (+18.6pp, 124% relative increase) showing the largest absolute improvements. The financial wellbeing index improvement of 1.8 points on a 10-point scale is economically meaningful — equivalent to the wellbeing difference between households with and without an emergency fund in the CFPB's cross-country calibration. The adoption barrier analysis suggests that the primary remaining challenge in extending fintech inclusion to the 22-28% of rural households still without mobile financial services access is digital literacy — specifically the ability to independently navigate mobile apps without assistance — rather than connectivity (which is improving rapidly with BSNL 4G and Jio Rural expansion) or smartphone ownership (accelerating with sub-₹5,000 smartphone availability).

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