

## **Measuring India's Inclusion Dividend: Financial Inclusion, Digital Payments, and Macroeconomic Gains, 2014–2024**

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### **ABSTRACT**

*This paper provides a comprehensive econometric analysis of financial inclusion and digital payments in India from 2014 to 2024, with forward-looking projections to 2030. Leveraging panel data from the Reserve Bank of India (RBI), NPCI, World Bank Findex Database, and NABARD, we employ a multivariate OLS regression framework, Vector Autoregression (VAR), Granger Causality tests, and ARIMA time-series projections. Our findings confirm a statistically significant and bidirectional causal relationship between UPI-driven digital payment growth and macroeconomic indicators including GDP growth, household consumption, savings rates, and tax revenue. The Jan Dhan-Aadhaar-Mobile (JAM) Trinity is found to be the primary structural driver of financial inclusion, reducing the unbanked population from 47% in 2014 to approximately 8% in 2024. Under a baseline scenario, India is projected to process over 480 billion UPI transactions annually by FY2030, contributing an estimated ₹34.2 trillion in economic value-add. Policy implications emphasise interoperability, digital literacy, and rural infrastructure investment.*

**Keywords:** Financial Inclusion, Digital Payments, UPI, JAM Trinity, Econometrics, India, Fintech, Vector Auto regression, ARIMA

### **1. Introduction**

India's financial landscape has undergone a seismic transformation over the past decade. The convergence of aggressive government policy, technological innovation, and a demographic dividend has positioned India as a global leader in digital financial services. From the launch of the Pradhan Mantri Jan Dhan Yojana (PMJDY) in August 2014 to the meteoric rise of the Unified Payments Interface (UPI), the country has compressed into a single transformative decade what took the West several generations to achieve.

Financial inclusion broadly defined as the access and usage of formal financial services by the previously unbanked and underserved population is widely recognised as a foundational pillar of equitable economic development. The Reserve Bank of India (RBI) and the World Bank have consistently documented correlations between deeper financial access and improvements in household welfare, income smoothing, women's empowerment, and aggregate macroeconomic resilience.

Digital payments, closely intertwined with financial inclusion, represent the operational layer through which formal financial systems reach last-mile customers. India's real-time payment infrastructure the Immediate Payment Service (IMPS), National Electronic Funds Transfer (NEFT), and most prominently the Unified Payments Interface (UPI) has produced transaction volumes that now rival and surpass those of advanced economies. In FY2024, UPI alone processed over 131 billion transactions valued at nearly ₹200 trillion, making India the undisputed global leader in real-time payments volume. This article addresses three key questions:

- 1) Assess the quantifiable trends in financial inclusion and digital payments in India during 2014–2024?
- 2) Analyze the econometric relationships between these trends and key macroeconomic outcomes?
- 3) Projecting possible future paths for these indicators to 2030, and the associated implications for policy?

The acceleration of India's digital payment ecosystem has attracted international scholarly attention and policy interest from multilateral institutions. India's G20 presidency in 2023 placed financial inclusion and digital public infrastructure (DPI) at the centre of global development discourse. The IMF's 2023 Article IV Consultation noted India's digital infrastructure as a structural advantage for sustained 7%+ GDP growth trajectories.

However, even with this progress, large disparities still exist among states, income groups, genders, and between rural and urban areas. Identifying the drivers of inclusion and precisely measuring the macroeconomic benefits is crucial for guiding public investment and regulation going forward.

This work contributes in multiple ways. First, it provides an updated dataset spanning the critical 2014–2024 decade, encompassing the demonetisation shock of 2016 and the COVID-19 pandemic of 2020–21. Second, it applies a multi-method econometric strategy including OLS regression, VAR, and Granger Causality to jointly examine financial inclusion and digital payments a combination underrepresented in existing India-focused literature. Third, it produces

scenario projections through 2030 with the use of ARIMA modeling, to offer practical foresight for policy analysts and implementers.

## **2. Literature Review**

Theoretical underpinnings of financial inclusion as a means of development are grounded in various streams of economic theories. Schumpeter's (1911) finance-growth nexus advocated that financial intermediation is necessary for innovation and accumulation of capital. McKinnon (1973) and Shaw (1973) articulated the importance of financial deepening in the process of saving mobilisation and channelling savings to productive investment. Banerjee and Duflo (2007) have provided evidence from a number of randomised controlled trials showing that in the context of developing countries, availability of credit and savings products leads to tangible gains in household well-being and entrepreneurial activity.

Demirgüç-Kunt and Klapper (2013) present strong cross-country evidence that access to financial accounts is associated with lower income inequality and greater women's participation in the labour market. They have subsequently been twice updated (2017, 2021) and the Global Findex findings provide increasingly strong evidence for the inclusion-growth nexus in low- and middle- income countries.

The relationship between digital payment adoption and macroeconomic growth has received growing econometric treatment. Mohan (2008) analysed India's payments system evolution and argued for the complementarity between payment efficiency and monetary policy transmission. Ratan (2015) provided early evidence that mobile money adoption in India was associated with reduced transaction costs and increased household savings rates.

Globally, Zins and Weill (2016) analysed data from 37 African countries and found that digital payment access significantly explained financial inclusion outcomes, while Ozili (2018) reviewed 21 studies and concluded that fintech-driven inclusion generally improved welfare but cautioned against systemic risk accumulation in poorly regulated environments.

Most relevantly, Khera et al. (2021, IMF Working Paper WP/21/167) modelled a composite Financial Inclusion Index for India and found that the JAM Trinity Jan Dhan accounts, Aadhaar biometric ID, and mobile penetration explained approximately 68% of the variation in state-level inclusion outcomes, with strong multiplier effects on per-capita income. Their estimates suggest that moving from the 25th to the 75th percentile of the FII is associated with a 0.8 percentage point increase in annual GDP growth.

Three gaps motivate this paper. First, most existing studies on India's financial inclusion treat digital payments as a sub-component rather than an independent driver with bidirectional

causality. Second, post-COVID trajectory analysis remains sparse, with most published work using data ending in 2020 or 2021. Third, the literature lacks robust projection exercises that account for structural breaks in forecasting future inclusion and payment trajectories. This paper addresses all three gaps.

### 3. Data Sources and Methodology

This research is based on a panel data for each year during 2014–2024 period which is written from various credible sources. Data on banking and digital payments are taken from the Reserve Bank of India (RBI) and the National Payments Corporation of India (NPCI). Data on financial inclusion programmes like Jan Dhan accounts and DBT flows are from Ministry of Finance and PMJDY portal whereas Aadhaar figures are from UIDAI. Data on financial access at the household level is taken from the World Bank’s Global Findex Database, and rural financial performance measures from NABARD. The data on income and employment comes from the NSSO and PLFS, and the macroeconomic variables including GDP growth and inflation are drawn from the IMF’s World Economic Outlook Database. In addition to this, monthly NPCI releases are aggregated to annual data, and these twelve months aggregates corresponding to Indian financial year from April to March are used in this study.

The dependent variable in our primary regression is the Financial Inclusion Index (FII), a composite score ranging from 0 to 1 constructed following the methodology of Sarma (2008) and adapted to include digital payment penetration. The index aggregates three sub-dimensions: Accessibility (bank branch and ATM density, mobile banking penetration); Availability (Jan Dhan accounts outstanding, credit-to-GDP ratio, insurance coverage); and Usage (UPI transactions per capita, DBT transfers as a share of GDP).

The main explanatory variables are log of the volume of annual UPI transactions, Jan Dhan account stock, internet penetration rate, growth in mobile subscribers, adult literacy rate, lagged one period of CPI inflation, real growth of GDP, and rural public expenditure (disbursement of wages under NREGA) as an indicator for support from the government to the rural households.

The econometric framework follows a multivariate OLS regression with robust standard errors:

$$FII_t = \alpha + \beta^1 \ln(UPI_t) + \beta^2 \ln(JDY_t) + \beta^3 INT_t + \beta^4 MOB_t + \beta^5 LIT_t + \beta^6 CPI_t^{-1} + \beta^7 GDP_t + \beta^8 NREGA_t + \varepsilon_t$$

Where

- $FII_t$  denotes the Financial Inclusion Index,
- $\ln(UPI_t)$  is the log of annual UPI transaction volume,

- $\ln(JDY_t)$  is the log of Jan Dhan account stock,
- $INT_t$  is internet penetration (%),
- $MOB_t$  is mobile subscriber growth (%),
- $LIT_t$  is adult literacy rate, and  $\varepsilon_t$  is the white-noise error term. Robust standard errors correct for heteroskedasticity.

To capture dynamic interdependencies between financial inclusion, digital payments, and macroeconomic aggregates (GDP growth, household consumption, tax revenue), we estimate a VAR(2) model with lag order selected by the Akaike Information Criterion (AIC). Impulse response functions (IRFs) and variance decompositions are generated over a 10-period horizon to characterise the dynamic transmission of shocks.

Granger causality tests are conducted to determine the direction of causality between UPI transaction growth and key macroeconomic outcomes. Under the null hypothesis that variable X does not Granger-cause variable Y, an F-test is applied on VAR residuals. Rejection at the 5% significance level constitutes evidence of Granger causality.

Time-series projections for UPI volumes, Jan Dhan accounts, and the FII through FY2030 are generated using ARIMA models selected by the Box-Jenkins methodology. Structural break dummies are included for FY2017 (demonetisation shock) and FY2021 (COVID-19 pandemic). The study generates three scenarios conservative, baseline and optimistic considering different assumptions on the speed of technology adoption, the regulation landscape and the macroeconomic path.

#### **4. Trend Analysis: Financial Inclusion in India (2014–2024)**

The most significant game changer in the evolution of financial inclusion in India has been the JAM trinity the convergence of Jan Dhan accounts, Aadhaar biometric identity, and Mobile telephony. Launched in August 2014, PMJDY set an ambitious target of providing bank accounts to all unbanked households. By January 2015, over 125 million accounts had been opened at the time the fastest account-opening drive in recorded history, recognised in the Guinness Book of World Records. Under the direct control of the UIDAI, Aadhaar functioned as the identity infrastructure backbone on which KYC authentication was provided at a marginal cost close to zero. By 2024, more than 1.37 billion Aadhaar numbers had been issued, covering about 98% of the adult population of India. The Aadhaar-enabled Payment System (AePS) enabled cashless transactions at rural Business Correspondent points using biometric authentication, circumventing literacy barriers entirely.

India’s mobile telephony sector, especially the entry of Reliance Jio in September 2016 brought about a pricing revolution which saw the cost of mobile data slashed from around ₹250 per GB to less than ₹10 per GB among the lowest in the world. This slashed the cost barrier to digital financial services and led to rapid proliferation of smartphones and internet even in lower-income quintiles and rural markets.

Ownership of bank accounts increased by 39 percentage points from 53% in 2014 to 92% in 2024, as indicated in Table 1 within a decade. Rural penetration went up from 39% to 76% and financial access of women rose from 43% to 89%, which reflects the conscious rural female members of the household targeting in PMJDY account and DBT welfare transfers.

**Table 1: Financial Inclusion Key Indicators — India 2014–2024**

<b>Indicator</b>	<b>2014</b>	<b>2017</b>	<b>2021</b>	<b>2024</b>
Bank Account Ownership (%)	53%	80%	88%	92%
Jan Dhan Accounts (Mn)	—	283	420	530+
Aadhaar Enrollments (Bn)	0.60	1.10	1.28	1.37
Mobile Wallets (Mn users)	28	110	290	560
Credit-to-GDP Ratio (%)	51%	55%	57%	61%
Rural Banking Penetration (%)	39%	54%	68%	76%
Women with Bank Accounts (%)	43%	77%	83%	89%

Sources: RBI, PMJDY Portal, World Bank Findex

Jan Dhan account base has risen from nil at the beginning to over 530 million accounts by early 2024, with aggregate deposits more than ₹2.3 trillion. Average balance per account, initially criticised as negligible (below ₹500), had grown to approximately ₹4,300 by 2024 signalling a transition from nominal account ownership towards genuine active usage.

The surprise demonetisation of ₹500 and ₹1,000 currency notes on 8 November 2016 invalidating 86% of India's currency in circulation while severely disruptive in the short term, produced a lasting structural shift towards digital payments. Constrained by cash shortages, merchants and households rapidly adopted mobile wallets, UPI, and prepaid instruments. Monthly UPI transactions more than doubled between October 2016 and March 2017.

In our ARIMA models, demonetisation is represented as a structural break dummy ( $D_{2017} = 1$  for FY2017-18 and beyond). The break is statistically significant ( $p < 0.01$ ) and accounts for a permanent upward shift in the UPI adoption trajectory one of the starkest structural breaks observable in any payment system data globally.

### 5. Digital Payments Ecosystem: UPI and Beyond

The Unified Payments Interface, launched by NPCI in April 2016, represents a genuinely novel contribution to global payment systems architecture. Built on IMPS rails and using virtual payment addresses (VPAs) for identity abstraction, UPI enables peer-to-peer and peer-to-merchant transactions in real time, 24x7x365, across heterogeneous bank accounts and mobile applications.

UPI, in contrast to the walled garden wallets, functions as an open interoperable layer where any licensed payment service provider (PSP) can develop applications that can be plugged into a shared national infrastructure. By 2024, more than 600 registered PSPs and banks were part of the ecosystem with PhonePe, Google Pay and Paytm having around 80% of the transaction volumes.

**Table 2: UPI Transaction Data — India FY2018–FY2025 (\* Estimated)**

Year	UPI Transactions (Bn)	Value (₹ Trillion)	Active Users (Mn)	YoY Growth (%)
2017-18	0.92	1.10	18	—
2018-19	5.35	8.77	87	481%
2019-20	12.52	21.32	152	134%
2020-21	22.33	41.04	210	78%
2021-22	46.02	84.17	320	106%
2022-23	83.71	139.10	430	82%
2023-24	131.10	199.89	530	57%
2024-25*	172.00	246.00	600	31%*

Source: NPCI Monthly Reports, RBI

As shown in Table 2, UPI's growth trajectory reflects compounding at rates unprecedented in global payments history. Transaction volumes grew from 0.92 billion in FY2018 to 131 billion in FY2024 a 142-fold increase in six years. Transaction values increased from ₹1.1 trillion to ₹99 trillion during the same period, an 181-fold increase that represents deeper penetration in high-value merchant and institutional payment segments.

While UPI takes centre stage in the digital payments discourse, India's larger payment systems are better layered than one might think. IMPS witnessed around 5.6 billion transactions in FY2024 on higher average ticket sizes, largely for institutional and salary payments. The RFID-based electronic toll collection system, FASTag, reached 98% coverage on national highways by

2023, carrying out more than 11 million transactions a day, removing the use of cash on highways almost entirely.

The Reserve Bank of India began its Central Bank Digital Currency pilot the e-Rupee (e₹) in wholesale and retail segments in December 2022. As of early 2025, the retail e₹ had signed up over 4 million users via 13 banks. Although usage is in its infancy, CBDC technology is expected to have transformative impact on financial inclusion through programmable conditional payments and offline transaction capability in remote areas.

One important consequence of digital payment adoption has been the transformation of the Indian economy from largely an informal to a formal one due to creating verifiable trails of transactions. GST collection increased from ₹7.2 trillion in FY2018 to ₹18.1 trillion in FY2024 151% growth in 7 years. Although all of this growth is not because of digital payments, the GSTN data points to the fact that entities with more digital payments tend to have a much lesser probability of under-reporting turnover.

The Finance Ministry's aggregate estimates indicate that Direct Benefit Transfer (DBT) via digital mediums has prevented around ₹ 2.73 trillion of annual welfare leakages between 2014 and 2024. The pro-cash to pro-digital DBT changeover in the NREGA wage disbursements, PM-KISAN support for income, payments for scholarships, etc., at once enhanced the financial inclusion and secreted away fiscal waste.

## **6. Econometric Results**

Table 3 reports the results of the baseline OLS estimation with robust standard errors. The high R<sup>2</sup> value of 0.913 shows that our model has good explanation power since it explains more than 91% of the variations of the Financial Inclusion Index.

UPI transaction volume carries the largest coefficient (0.487) among payment-related variables, statistically significant at the 1% level, affirming that digital payment deepening is the single most powerful driver of financial inclusion in the contemporary period. Jan Dhan account stock (0.312) and internet penetration (0.213) are the next strongest positive determinants, consistent with the JAM Trinity hypothesis.

GDP growth exerts a significant positive coefficient (0.261), consistent with a bidirectional feedback loop: inclusion promotes growth, and growth expands the economic participation base from which further inclusion gains can be realised. The lagged inflation (CPI) has a large negative coefficient (-0.127), indicating that the macroeconomic instability breaks down the inclusions progress — this may happen through the channel of real saving rates and the informal

inflation hedging instruments, such as gold and house, may become more attractive than formal financial instruments.

**Table 3: OLS Regression Results Dependent Variable: Financial Inclusion Index (FII)**

Variable	Coefficient	Std. Error	t-Stat	Significance
Constant ( $\alpha$ )	2.341	0.412	5.683	***
UPI Transactions (ln)	0.487	0.063	7.730	***
Jan Dhan Accounts (ln)	0.312	0.051	6.118	***
Internet Penetration (%)	0.213	0.048	4.438	***
Mobile Subscriber Growth (%)	0.178	0.041	4.341	***
Literacy Rate (%)	0.094	0.038	2.474	**
Inflation (CPI, lagged)	-0.127	0.043	-2.953	**
GDP Growth Rate (%)	0.261	0.058	4.500	***
NREGA Rural Expenditure (ln)	0.089	0.044	2.023	*

Source: The Author. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$  | Adj.  $R^2 = 0.913$ , F-stat = 84.2

While significant and positive at 5%, the literacy rate coefficient (0.094) is considerably smaller than that of the technology-related variables. It implies that intuitive digital payment apps, biometric authentication and voice-enabled UX have mitigated literacy traveling obstacles – a dazzling feat of financial inclusion by means of design.

The findings of the Granger causality test in Table 4 indicate the existence of a two-way causality between the UPI transaction volume growth and the GDP growth, which suggests that the growth in these two variables is mutually reinforcing growth nexus as theoretically expected. Financial inclusion Granger causes household consumption ( $F = 6.328$   $p = 0.006$ ), implying that ownership of accounts leads to real consumption increase via better consumption smoothing and access to consumption credit.

**Table 4: Granger Causality Test Results | VAR(2) Framework**

Null Hypothesis	F-Statistic	P-Value	Decision
UPI does NOT Granger-cause GDP Growth	8.421	0.002	Reject $H_0$ ***
GDP Growth does NOT Granger-cause UPI	3.174	0.041	Reject $H_0$ **
FI does NOT Granger-cause Household Consumption	6.328	0.006	Reject $H_0$ ***
Digital Payments does NOT Granger-cause Tax Revenue	7.109	0.003	Reject $H_0$ ***
Jan Dhan does NOT Granger-cause Savings Rate	4.887	0.017	Reject $H_0$ **

Source: The Author. Note: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$

The causal link from digital payments to tax revenue ( $F = 7.109$ ,  $p = 0.003$ ) supports the formalisation hypothesis. Jan Dhan accounts are found to Granger-cause savings rates ( $F = 4.887$ ,  $p = 0.017$ ), consistent with the theory that formal account ownership enables household savings mobilisation even at low income levels.

The VAR impulse response functions reveal that a one-standard-deviation shock to UPI transaction volume produces a positive and statistically significant response in GDP growth peaking at period 3 (approximately three years post-shock) and dissipating by period 7. Transmission through these channels of household consumption, acceleration of SME activity and increase of tax revenues is likely responsible for the medium-term effects.

Results from variance decomposition show that shocks to UPI transactions account for about 24 percent of the forecast error variance in GDP growth after 10 periods, which is the second largest contributor after own-shocks confirming the substantive macroeconomic importance of evolving digital payment ecosystem.

## **7. Challenges and Structural Constraints**

Overview: India's digital financial inclusion success conceals stark subnational disparities, although aggregate progress has been phenomenal. The BIMARU bloc (Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh) along with the northeastern states, continue to trail the national average FII by 18-25 percentage points. Rural internet accessibility while vastly enhanced after Jio's intrusion, is still qualitatively subpar with higher latency, less bandwidth and frequent blackouts that affect the reliability of real-time payments.

The 'last-mile problem' is not just about connectivity, but also one of agency: the 1.3 million-strong Business Correspondent (BC) network is stricken with high attrition, fraudulent practices, and poor float management. Nearly a third of banking touchpoints in sub-district areas are dormant at any point in time, according to the 2023 BC Committee Report of the RBI, pointing to a substantial difference between nominal financial access and effective financial access.

The growth of digital payments has far outstripped the development of consumer protection schemes. Cases of UPI fraud have increased as per the data provided by NPCI, rising from 0.02% of transactions in FY2020 to 0.04% in FY2024, though still minuscule, it meant around 52,000 fraud cases happened daily in absolute terms by FY2024. The rise of vishing (voice phishing), SIM-swap fraud and fake UPI apps that target low-financial-literacy users represent real welfare and reputational risks to the ecosystem.

Trust deficits continue to impede deeper usage. Census of India-Chronic questionnaire 2.0: The case of financial inclusion: A report by NABARD in 2022 revealed that 34 percent of Jan

Dhan account holder had not carried out a single digital transaction in the last one year with fear of frauds and weak mechanisms for redressal of grievances as major dissuaders.

The UPI market is highly concentrated: PhonePe and Google Pay together account for about 80% of transaction volumes. NPCI’s suggested 30% market share cap, first announced in 2020 but postponed time and time again, signals the frictions between competitive neutrality and the network effects so pivotal to its rapid adoption. Should it go unchecked, the regulatory receding from market concentration inescapably engenders systemic dependencies that weaken the strength of a pivotal national infrastructure — the financial system.

Owning an account doesn’t mean having access to credit. But even with 92% account penetration, less than 25% of the poor have access to formal credit. MUDRA Yojana disbursed more than ₹22 trillion in cumulative loans by 2024 and has come under the scanner over rising NPAs in the sub-prime segment, indicating that the dynamics of quantity-over-quality may not translate into sustainable financial empowerment in the absence of financial literacy.

**8. Future Prospects: Projections to 2030**

We use ARIMA(p,d,q) models, selected by AIC, to produce the end of the forward looking estimates of the UPI volume and value, as well as the Financial Inclusion Index till FY2030. Models are estimated on the 2017–2024 sample with structural break dummies for FY2017-2021. Three scenarios are based on distinct assumptions:

- Conservative: Internet usage growth hits ceiling at 70%, regulatory barriers to cross-border UPI integration remain, cyber security incidents shake user confidence by 5–8%
- Baseline: Continuation of trend with improvements in digital literacy and expansion of BC network, GDP growth of 6.5% per annum
- Positive: Faster CBDC adoption, UPI internationalisation to 20+ countries, AI-enabled credit scoring for SME credit inclusion, 7.5%+ growth of GDP

**Table 5: Baseline Scenario Projections Digital Payments & Financial Inclusion Index, FY2026-30**

Year	UPI Vol (Bn)	Value (₹ Tn)	FI Index	Projected GDP Boost (₹ Tn)
2025-26	210	300	0.72	12.4
2026-27	268	380	0.76	16.8
2027-28	330	470	0.80	21.5
2028-29	400	575	0.83	27.3
2029-30	480	695	0.87	34.2

Source: Authors' ARIMA estimates

Under the baseline scenario, UPI transaction volumes are projected to reach approximately 480 billion annually by FY2030, representing a CAGR of approximately 22% from FY2024 levels. Transaction values are projected to reach ₹695 trillion roughly double current GDP reflecting deepening penetration into high-value institutional payment segments. The Financial Inclusion Index is projected to reach 0.87 by FY2030, approaching the high-inclusion threshold of 0.90 used in comparative global metrics.

The projected GDP contribution of digital financial deepening estimated at ₹34.2 trillion by FY2030 under the baseline is derived from our regression coefficient on UPI volumes (0.487) applied to projected transaction value growth, channelled through three transmission mechanisms: increased consumption multiplier, enhanced SME credit allocation efficiency, and improved tax-GDP ratio through economic formalisation.

Several emerging forces are likely to accelerate trajectories beyond the baseline. First, UPI internationalisation represents a transformative opportunity: NPCI International has already launched UPI acceptance in Singapore, UAE, UK, France, and several other jurisdictions. Bilateral UPI corridors with the top-10 remittance destination countries could generate \$5–7 billion in annual welfare gains for the Indian diaspora through near-zero transfer costs.

Second, AI/ML-driven alternative credit scoring is progressively dismantling the collateral-dependence constraint on formal credit access. UPI transaction history, utility payment records, and e-commerce behaviour are enabling lenders to extend credit to 'thin-file' borrowers previously excluded by traditional bureau-based assessments. CIBIL data suggests alternative data models reduce credit decisioning errors for first-time borrowers by approximately 35%.

Third, the Account Aggregator (AA) framework India's consent-based financial data-sharing architecture with over 500 million linked accounts as of early 2025 has the potential to halve SME loan underwriting costs by enabling real-time financial data portability, fundamentally restructuring information asymmetries in India's credit markets.

## **9. Policy Recommendations**

Bridging the digital divide thus calls for continuing Rs billion (US\$ billion) public funding for broadband infrastructure under BharatNet Phase III to provide high-quality connectivity to all gram panchayats. Spectrum allocation policies need to be pro-rural affordable connectivity and telecom licensees in unserved blocks need to be mandated with a minimum service obligation for payment-grade connectivity.

Financial literacy programmes need to be integrated in the formal school curriculum under National Education Policy 2020 for students of Class 6 and above. Digital literacy at the

community level through Self-Help Groups (SHGs) and Anganwadi networks have shown a scalable impact in NABARD pilot evaluations and merit national scale-up with earmarked budget allocation.

The RBI's regulatory sandbox regime may also be extended by bringing insurance, pension and investment products in its ambit. Proportionate KYC norms for low-value accounts, based on video-KYC and Aadhaar-based eKYC, will ease onboarding for low literacy customers. A specific Financial Inclusion Regulatory Review should be instituted to ensure that prudential regulations do not inadvertently become barriers to serving the low-income segment.

The mechanism of Digital Payments Ombudsman with fast track resolution of complaints (resolution within 7 working days, maximum) may be made operational with adequate manpower and infrastructure for publicizing the availability of this mechanism. Compulsory fraud insurance of up to ₹10,000 per incident would go a long way in allaying trust deficits among new-to-digital users. NPCI should make real time fraud detection APIs mandatory for each bank in UPI eco system.

The e-Rupee CBDC pilot may be fast-tracked and the offline transaction feature, important for use in areas with poor connectivity must be emphasized. Programmable e-Rupee with conditional smart contract welfare transfers could bring further Reduction in DBT leakages. A phased plan for making CBDC interoperable with UPI, IMPS and the Account Aggregator (AA) framework may be released to ensure regulatory clarity for the ecosystem players.

## **10. Conclusion**

The paper studied the developments, sustainable econometric relationships, challenges and future prospects of financial inclusion and digital payments in India during 2014–2024 with projections through 2030. Synthesis of the evidence The evidence points to a phenomenal and historically unprecedented transition: in one decade, India has transformed from an overwhelmingly cash-based and financially excluded country to one of the world's largest real-time digital payments ecosystems spanning over 92% of its adult population.

Our econometric results confirm that this transition is highly macroeconomically beneficial. In our OLS framework, UPI transaction volumes is the most important single predictor of the Financial Inclusion Index ( $\beta = 0.487$ ,  $p < 0.01$ ), and Granger causality tests confirm two-way dynamics between digital payment growth and GDP growth, household consumption, saving rates, and tax revenue. The JAM Trinity is vindicated as the structural foundation for enabling such a transformation.

The path forward based on our baseline scenario is about 480 billion UPI transactions a year by FY2030, a Financial Inclusion Index of close to 0.87, and an additional GDP value add of around ₹34.2 trillion from sustained digital financial deepening. These are all realistic objectives, dependent on continuing policy focus on digital infrastructure, consumer protection, last-mile connectivity, and inclusive fintech regulation.

What remains are real issues – last-mile connectivity barriers, the credit inclusion deficit, cyber security vulnerabilities, and platform concentration risks, all of which require proactive policy engagement. But the structural momentum is now firmly in place. India's journey toward digital financial inclusion is both a model and a warning for developing countries around the world: strategic public investment in interoperable digital infrastructure, paired with forward-looking regulation and demand-side literacy efforts, can condense decades of financial evolution into a few years of transformative change. The next “finish the line” chapter of inclusion for the most difficult-to-reach populations will require that same level of purposefulness, but turned now to addressing the margins as opposed to the mainstream.

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