

Original Article

Policy Interventions, Economic Shocks, and Financial Inclusion: Evidence from India's PMJDY (2014–2025)

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Abstract - One of the integral parts of inclusive growth in developing economies is financial inclusion. Our study examines the impact of certain policy interventions and economic shocks on the trends of financial inclusion in India. We utilize data from the Government of India's Pradhan Mantri Jan Dhan Yojana (PMJDY) scheme. We perform Interrupted Time Series Analysis (ITSA) and CUSUM tests. The trends indicate a statistically significant change between 2014 and 2025. External shocks, such as demonetisation and Covid-19, as well as the start of the second phase of PMJDY, had a positive short-term impact on financial inclusion trends. This increased the number of beneficiaries, deposits, and debit cards (RuPay card).

Over Time, this upward trend has slowed down. The CUSUM test found another structural break in late 2015, which led to stability in the growth of the number of beneficiaries, deposits, and RuPay cards. These findings underscore the need for continuous and adaptable policy interventions to maintain progress in financial inclusion, ensuring that initial advantages translate into lasting, comprehensive access to financial services.

Keywords - Accounts, COVID-19, Demonetisation, Deposits, Financial Inclusion, Interrupted Time Series Analysis, PMJDY.

1. Introduction

“Capital is a result of human effort, and its wise use can multiply the fruits of labor.” — Benjamin Franklin.

The quote above by Benjamin Franklin aptly sums up the importance of capital as a means to increase income in today's economy. However, being able to utilize capital largely depends on being able to save and borrow money, which in turn depends on accessing the formal banking system. Ironically, the groups that need the most help from capital, like low-income and marginalized people in developing countries, are often left out. The World Bank defines financial inclusion as “individuals and businesses having access to useful and affordable financial products and services that meet their needs, transactions, payments, savings, credit, and insurance, delivered responsibly and sustainably.” In developing countries, financial inclusion is now recognized as a crucial means to support economic and social growth.

A substantial body of literature supports this relationship. Banerjee et al. (2021)^[1] show that providing ultra-poor households access to financial services significantly increases income, consumption, and savings, generating lasting poverty reduction. Another study^[2] also shows that financial inclusion helps disadvantaged groups grow. Azimi (2022)^[3] asserts that this positive effect is universal, whereas Hussain et al. (2024)^[4] illustrate that the impact is especially pronounced in Asia. Other studies^[5–9] also demonstrate the importance of financial inclusion in reducing poverty worldwide.

There has been much progress around the world. The World Bank's Global Findex^[10] from 2021 reports that 76% of adults worldwide had a bank account, up from 51% in 2011. In India, this rise was even more pronounced in the 2010s, primarily due to focused public policy initiatives. However, access alone does not guarantee meaningful utilization, prompting inquiries regarding the sustainability and profundity of inclusion outcomes. In light of this, financial inclusion has become a key part of India's development policy, especially since the Pradhan Mantri Jan Dhan Yojana (PMJDY) started in 2014. PMJDY aimed to bring people without bank accounts, particularly low-income and rural families, into the formal financial system by providing them with zero-balance accounts, credit, low-cost financial services such as insurance and pensions, and educating them about personal finance. The official PMJDY website^[11] lists debit cards, overdraft facilities, life insurance, branchless banking, direct benefit transfers, and integration with welfare schemes as some of the program's most important features. There were three steps to carrying out the plan.

The first stage concerned opening accounts and the literacy associated with it. The second stage added microinsurance and pensions—the third and final stage aimed to include adults who do not have an active bank account. By September 2024, there were 535 million bank accounts, \$28 billion in deposits, and 364 million debit cards issued. Dave (2025)^[12] says that by 2025, there were more than 550 million accounts.



The PMJDY literature can be discussed at macro and micro levels. The article by Ashwath and Sachindra (2025)[13] explores the development of PMJDY into a more positive social and economic outcome. Kalawat et al. (2025)[14] analyze the position of PMJDY in the digital services through Aadhaar seeding, UPI payments, and issuance of RuPay.

According to a case study of Tumkur, Karnataka, there was an improvement in access even under the conditions of extensive account dormancy and lack of popularity of insurance and credit. Yadav et al. (2020)[16] constructed a financial inclusion index. This was in terms of districts, meaning that southern states perform better than their counterparts. The other research [17] examines the variations among states. The data envelopment analysis was used by Singh and Deep (2025)[18] as a part of the effort to conclude that the public sector banks outdo the private ones. Gupta and Mathur (2023)[19] emphasize the infrastructural problems of dormancy, inequality in the region, and lack of literacy.

These studies reveal that PMJDY has been successful in enhancing access, including current challenges related to usage and equity.

The financial inclusion of India is connected with both country-specific policies and outside-country shocks. The demonetization of high-value currency notes in India in 2016 was disruptive to the monetary policy in the history of the country.

Some earlier studies [20][21][22][27][28] point out short and long-term disturbances and their effects. The process of demonetisation accelerated the utilization of digital services such as the use of RuPay cards, mobile wallets, and bank accounts. Certain experiments indicate that financial literacy led to the inclusion in the long-term during the shocks. As much as PMJDY stimulated economic growth, it was limited by dormancy, and this dormancy was rampant. The socio-economic status is closely related to the existence of literacy, access to technology, and technology acceptance. Borrowing and investing through the inclusion and adaptation of mobile financial services, and helping to bridge the gender gap. All these studies show that literacy and digital preparedness serve as inclusion enhancers that require special attention to promote equity.

The time series data regarding the PMJDY indicators are used in this work. Such indicators are factors such as beneficiaries, deposits, and RuPay cards. The aim of this work is to check whether there was an impact of structured interventions and shocks on financial inclusion. To test structural breaks, there are existing literature tests, which are the Augmented Dickey Fuller (ADF) and CUSUM tests. The Interrupted Time Series Analysis (ITSA) considers the effects of 3 major events, including 1. demonetization (2016), 2. the launch of PMJDY Phase III (2018), and 3. the emergence of COVID-19 (2020). Both shocks and interventions were found to be beneficial to inclusion

through analysis. The paper also demonstrates that specific policy formulation and execution played a role.

2. Methodology

2.1. Research Aim and Objectives

The aim of this research is to evaluate the influence of policy interventions and economic occurrences on financial inclusion in India. Research examines PMJDY variables as indicators of financial inclusion, aiming to assess immediate and trend-level impacts of targeted interventions and external shocks on these variables. This study also aims to compare the magnitude and durability of this impact across these events. The precise aims of this study are as follows:

- To examine the effect of demonetisation on the trend of financial inclusion in India.
- To assess the impact of the launch of the second phase of the Pradhan Mantri Jan Dhan Yojana (PMJDY) on the trend of financial inclusion in India.
- To analyse the effect of the COVID-19 pandemic on the trend of financial inclusion in India.
- To compare the magnitude and sustainability of impact across events.
- To identify any other event that has affected the trend of financial inclusion in India.

2.2. Research Hypotheses

Specifically, the paper tests the following null hypothesis -

- a. H_{01} : No significant change in level or trend of PMJDY indicators post-demonetisation.
- b. H_{02} : No significant change in level or trend of PMJDY indicators post launch of PMJDY 2.0.
- c. H_{03} : No significant change in level or trend of PMJDY indicators post COVID-19.

2.3. Research Design

To analyse trends in financial inclusion, the study adopts a longitudinal research design using time series data on financial inclusion variables from PMJDY. The data is analysed using an Interrupted Time Series Analysis model (ITSA). The research design spans three different interventions and three outcome variables. The first intervention analysed is Demonetisation of currency notes denominated in INR 500 and INR 2000 in 2016 (Nov 8, 2016). While this was a policy intervention by the Government, it was not explicitly targeted at promoting financial inclusion, and thus it is considered extraneous to the goal of promoting financial inclusion. The second event studied is the launch of Phase 3 of PMJDY in 2018 (Aug 15, 2018). This intervention was explicitly targeted at increasing financial inclusion in India. The last event studied is the onset of the COVID-19 pandemic (Mar 24, 2020), which was a large external shock to the economy and financial system.

2.4. Data Collection and Variables

The data on financial inclusion variables is sourced from the PMJDY website. It spans the time period from Sep 24, 2014, to Mar 26, 2025. The data is released and collected with a weekly frequency. The three main dependent

variables used as proxies for financial inclusion are the number of beneficiaries, the amount of deposits in PMJDY accounts (in lakhs), and the number of RuPay cards issued under the scheme. These variables have been specified as Num_Beneficiaries, Total_Deposits, and Rupay_Debit_Cards in the analysis. For analysis and testing, the natural Log of the above variables is also used.

The independent variables used in the analysis are Time, Post-event dummy (for each intervention), and Time $\times$ Post-event interaction term. Under the ITSA model, Time measures the trend in beneficiaries before each event. Post-event dummy measures the immediate impact of the event. Immediately after demonetization, beneficiaries increased/decreased by $b_2 \times 100$ percent. Time $\times$ Post-event interaction term measures the Post-event trend change.

2.5. Model Specification and Diagnostics

The general equation describing the ITSA model used is outlined below –

$$Y_t = \beta_0 + \beta_1 \cdot \text{Time}_t + \beta_2 \cdot \text{PostEvent}_t + \beta_3 \cdot (\text{Time}_t \times \text{PostEvent}_t) + \epsilon_t$$

Where:

Y_t = Outcome variable at time t (e.g., Log of beneficiaries, deposits, or RuPay cards)

β_0 = Intercept (baseline level at Time zero)

β_1 = Pre-event trend (slope of Y before the intervention)

β_2 = Level change immediately after the intervention (vertical shift)

β_3 = Change in slope/trend after the intervention (compared to pre-event trend)

ϵ_t = Error term (random disturbance)

In this analysis, the coefficient β_1 is interpreted as capturing the existing trend before the intervention. β_2 is interpreted as capturing the immediate jump/drop right after the event. And β_3 is interpreted as capturing whether the trend increased/decreased after the intervention (sustained Change in slope).

The model was run separately for each event and each outcome variable being used as a proxy for financial inclusion. Therefore, the above model for ITSA has been estimated for Demonetization, PMJDY- Phase 2, and COVID-19 with respect to the variables- Number of beneficiaries, Amount of Deposits, and Number of Rupay Cards issued under the PMJDY Scheme. Before implementing the ITSA model, the Augmented Dickey Fuller (ADF) Test was run to assess stationarity. It was found that all variables were stationary at the level ($p < 0.05$), a key requirement for the ITSA model. The analysis was performed using STATA version 17.

3. Results and Discussion

The paper performs a series of Interrupted Time Series Tests on weekly data pertaining to three critical variables that underpin the PMJDY scheme – number of beneficiaries, amount of deposits, and number of RuPay cards issued. The

objective of this analysis is to estimate the immediate as well as long-term impact of three events on financial inclusion trends in India as proxied by the three PMJDY variables. The results indicate that each of the events had an immediate positive impact on financial inclusion trends in India. This impact was large and statistically significant. However, the long-term effect was slightly negative but statistically significant.

3.1. Effect of Demonetisation on Financial Inclusion

Demonetisation of currency notes of INR 500 and INR 2000 denominations was a significant external shock to the financial system. With replacement currency notes in short supply, this led to a surge in demand for banking services. ITSA tests on the Demonetisation event with financial inclusion variables support this hypothesis. The time coefficient measures the trend in the particular variable before demonetization. It can be seen from the tables (Table 1,2,3) that before demonetization, the number of beneficiaries, amount of deposits, and number of RuPay cards under the PMJDY scheme were significantly increasing by 1.3 percent (0.013×100 percent), 2.7 percent (0.027×100 percent), and 1.5 percent (0.015×100 percent) every week, respectively. The introduction of demonetisation exerted a significant and positive immediate effect on financial inclusion trends in India, as captured by the post_demonetization variable. Therefore, immediately after demonetization, the number of beneficiaries, the amount of deposits, and the number of RuPay cards significantly increased by 107.2 percent (1.072×100 percent), 227.6 percent (2.276×100 percent), and 124.1 percent (1.241×100 percent), respectively. However, the coefficient on the interaction term between Time and the post-event variable implies that after demonetization, the weekly growth in the beneficiaries, deposits, and cards decreased compared to the pre-demonetization trend. The reduced growth in beneficiaries amounts to 1.1 percent (0.011×100 percent) per week, while the growth rate of the amount of deposits and the issue of RuPay cards falls by 2.3 percent (0.023 percent) and 1.4 percent (0.014×100 percent), respectively. Moreover, it has been observed from the p -values ($p < 0.001$) that the coefficient estimates for all the variables in the three models are significant at the 1 percent threshold level, showing strong statistical reliability and robustness of the results.

The demonetization of Indian high-value currency notes in November 2016 resulted in a notable surge in the adoption of digital payments^[30]. Several studies reported a substantial rise in different modes of digital transactions after demonetization. The decision of the Government to cease the legal tender of the Rs. 500 and Rs. 1000 denominations resulted in a steep increase in the cash deposits flowing into banks by the citizens of India^[31]. Individuals were rushing to the banks in an effort to exchange or deposit their cash into their bank accounts. This, in turn, increased the number of cash deposits in Indian banks. Moreover, it was noted that the rise in deposits in rural areas was much higher than that of urban areas^[32]. Along with this, demonetization motivated the public,

specifically from rural and informal sectors, who earlier depended on cash, to register for formal bank accounts. This enables them to deposit their money with security and promotes digital transactions^[33]. Furthermore, the PMJDY scheme substantially contributed, as deposits in Jan Dhan accounts exceeded ₹87,000 crore, more than doubling within 45 days following demonetisation^[11]. The rise in PMJDY accounts and digital transactions led to more use of

debit cards, especially to cut down on cash dependence^[34]. RuPay cards are the most common type of debit card linked to PMJDY accounts. To make transactions easier after demonetization, more of them were issued^[35]. So, it is clear that the Government and regulators pushed for more financial inclusion during and after demonetization by telling people to open accounts under PMJDY, get RuPay cards, and use digital payment systems like UPI.

Table 1. Interrupted Time Series Analysis (Number of Beneficiaries - Demonetization)

DV=Num Beneficiaries	β	S.E.	t	p
time	0.013	0.001	8.50	0.00***
post demonetization	1.072	0.111	9.65	0.00***
time_post demonetization	-0.011	0.001	-7.38	0.00***
Constant	18.18	0.111	163.83	0.00***
Mean dependent var	19.622	SD dependent var	0.476	
R ²	0.903	Number of obs	549	
F-test	5869.943	Prob > F	0.000	
AIC	-530.851	BIC	-513.618	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 2. Interrupted Time Series Analysis (Amount of Deposits - Demonetization)

DV=Amt Deposits	β	S.E.	t	p
time	0.027	0.003	8.18	0.00***
post demonetization	2.276	0.241	9.43	0.00***
time_post demonetization	-0.023	0.003	-7.12	0.00***
Constant	12.945	0.241	53.70	0.00***
Mean dependent var	15.975	SD dependent var	1.002	
R ²	0.897	Number of obs	549	
F-test	4712.020	Prob > F	0.000	
AIC	318.063	BIC	335.295	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 3. Interrupted Time Series Analysis (Number of Rupay Cards- Demonetization)

DV=Num Rupay cards	β	S.E.	t	p
time	.015	.002	6.50	0.00***
post demonetization	1.241	.17	7.28	0.00***
time_post demonetization	-.014	.002	-5.94	0.00***
Constant	17.827	.17	104.78	0.00***
Mean dependent var	19.324	SD dependent var	0.481	
R ²	0.770	Number of obs	549	
F-test	1855.163	Prob > F	0.000	
AIC	-43.922	BIC	-26.690	

*** $p < .01$, ** $p < .05$, * $p < .1$

3.2. Effect of PMJDY 2.0 on Financial Inclusion

Pradhan Mantri Jan Dhan Yojana (PMJDY), launched on August 28, 2014, is India's flagship financial inclusion scheme. It aims to provide universal access to banking services, financial literacy, insurance, pension, and credit facilities to the unbanked and underbanked population. Initially planned for four years across two phases, the scheme was extended indefinitely beyond August 14, 2018, often referred to as Phase II. This extension focused on enhancing existing features and expanding coverage from "every household" to "every adult." Unlike demonetisation, whose primary objective was to tackle terror funding, counterfeiting, and unaccounted for wealth, Phase II of PMJDY was not extraneous to the cause of financial inclusion and specifically targeted at expanding coverage and enhancing the features of the scheme^[40]. ITSA tests on

PMJDY Phase II launch support the hypothesis that it was successful in enhancing financial inclusion. It can be seen from the tables (Table numbers) that before PMJDY II, the number of beneficiaries, amount of deposits, and number of RuPay cards under the PMJDY scheme were significantly increasing by .7 percent, 1.4 percent, and .7 percent (0.015×100 percent) every week, respectively. The launch of PMJDY III had a significant and positive immediate effect on financial inclusion trends in India, as captured by the post_PMJDY2 variable. The number of beneficiaries, the amount of deposits, and the number of RuPay cards significantly increased by 84 percent, 174 percent, and 96 percent, respectively, immediately after the launch of PMJDY II. However, the coefficient on the interaction term between Time and the post-event variable implies that after PMJDY II, the weekly growth in the beneficiaries, deposits, and cards decreased compared to the pre-demonetization

trend. The reduced growth in beneficiaries amounts to .5% per week, while the growth rate of the amount of deposits and the issue of RuPay cards falls by 1.1% and .6 percent, respectively. Moreover, it has been observed from the p-values ($p < 0.001$) that the coefficient estimates for all the variables in the three models are significant at the 1 percent threshold level, showing strong statistical reliability and robustness of the results.

The second phase of PMJDY shifted its focus from account openings to sustainable financial integration. It emphasized every adult's access to banking, enhancing benefits, and deepening linkages with social security schemes. The key changes included doubling the overdraft (OD) limit to ₹10,000 (with unconditional access up to ₹2,000), extending OD eligibility age to 18-65 years, and increasing accidental insurance on new RuPay cards to ₹2 lakh. Phase 2 also prioritized financial literacy, digital adoption, and saturation drives, such as organizing camps in

2.7 lakh Gram Panchayats for KYC updates, new enrolments, and scheme linkages.

Phase 2 has managed to drive exponential growth in banking access, deposits, and service utilization, particularly among marginalized sections of society^[36, 37]. From approximately 32 crore accounts in 2018, the total has risen to over 56 crore by mid-2025^[38], with deposits surging from around ₹90,000 crore to ₹2.68 lakh crore^[11]. This growth showcases a rise in active usage, with average deposits per account rising 3.7-fold since 2015 to about ₹4,768 in 2025. With 67% rural accounts and 13.55 lakh Bank Mitras^[39], Phase 3 has also minimized geographic barriers, especially in remote areas^[40]. Therefore, under phase 2, there was a major thrust for financial inclusion from the household level to the individual level, coupled with financial literacy programs and a targeted push to reduce the number of dormant accounts. This seems to explain the sharp jump in financial inclusion variables immediately after the launch of PMJDY II.

Table 4. Interrupted Time Series Analysis (Number of Beneficiaries - PMJDY 2)

DV= Num Beneficiaries	β	S.E.	t	p
time	.007	.001	12.16	0.00***
post_PMJDY2	.842	.075	11.30	0.00***
time_post_PMJDY2	-.005	.001	-9.42	0.00***
Constant	18.477	.074	248.42	0.00***
Mean dependent var	19.622	SD dependent var	0.476	
R ²	0.861	Number of obs	549	
F-test	7559.438	Prob > F	0.000	
AIC	-334.683	BIC	-317.451	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 5. Interrupted Time Series Analysis (Amount of Deposits - PMJDY 2)

DV=Amt Deposits	β	S.E.	t	p
time	.014	.001	11.94	0.00***
post_PMJDY2	1.743	.16	10.89	0.00***
time_post_PMJDY2	-.011	.001	-9.23	0.00***
Constant	13.57	.16	84.96	0.00***
Mean dependent var	15.975	SD dependent var	1.002	
R ²	0.852	Number of obs	549	
F-test	6402.751	Prob > F	0.000	
AIC	516.797	BIC	534.029	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 6. Interrupted Time Series Analysis (Number of Rupay Cards - PMJDY 2)

DV=Num Rupay Cards	β	S.E.	t	p
time	.007	.001	8.19	0.00***
post_PMJDY2	.964	.112	8.58	0.00***
time_post_PMJDY2	-.006	.001	-6.99	0.00***
Constant	18.225	.112	162.50	0.00***
Mean dependent var	19.324	SD dependent var	0.481	
R ²	0.700	Number of obs	549	
F-test	1426.892	Prob > F	0.000	
AIC	101.097	BIC	118.329	

*** $p < .01$, ** $p < .05$, * $p < .1$

3.3. Effect of COVID-19 on Financial Inclusion

The onset of COVID-19 was a massive external shock to the economy. Moreover, lockdowns and restrictions on individual mobility in response to the pandemic severely impacted the ability of a large segment of the population to undertake financial transactions physically. It has been

hypothesised that with increasing difficulties associated with using cash during the pandemic, digital transactions, as well as access to the financial system, became critical. ITSA tests on COVID-19 as an event support this hypothesis that financial inclusion became more important during the COVID-19 pandemic, and financial inclusion

variables in PMJDY showed an uptick in response to the pandemic. It can be seen from the tables (Table numbers) that before COVID-19, the number of beneficiaries, amount of deposits, and number of RuPay cards under the PMJDY scheme were significantly increasing by .5 percent, 1 percent, and .5 percent every week, respectively. COVID-19 had a significant and positive immediate effect on financial inclusion trends in India, as captured by the post_covid variable. The number of beneficiaries, the amount of deposits, and the number of RuPay cards significantly increased by 73 percent, 154 percent, and 82 percent, respectively, immediately after the onset of COVID-19. However, the coefficient on the interaction term between Time and the post-event variable implies that after COVID-19, the weekly growth in the beneficiaries, deposits, and cards decreased compared to the pre-demonetization trend. The reduced growth in beneficiaries amounts to .3% per week, while the growth rate of the amount of deposits and the issue of RuPay cards falls by .7 percent and .4 percent, respectively. Moreover, it has been observed from the p-values ($p < 0.001$) that the coefficient estimates for all the variables in the three models are significant at the 1 percent threshold level, showing strong statistical reliability and robustness of the results.

With the onset of COVID-19, lockdowns necessitated contactless methods, leading to a surge in digital transactions. For example, UPI transactions grew tremendously, with some periods seeing volumes rise by

more than 200%. By September 2021, the Reserve Bank of India's Digital Payments Index had risen to 304. During the crisis, more than 80 million adults made their first payment to a digital merchant. One-third of adults in developing economies (including India) paid their utility bills digitally for the first Time after the crisis started^[10]. Programs like Pradhan Mantri Garib Kalyan Yojana (PMGKY) used PMJDY accounts to send money directly to over 20 crore women, totaling ₹30,000 crore. During lockdowns, the Aadhaar Enabled Payment System (AePS) grew by 140% to 200%, making it easy to get direct benefits for social assistance. Digitizing payments saved almost \$40 million a year by making fraud and leaks less likely and making things run more smoothly. This led to more accounts being activated, as 70% of account holders opened theirs to get paid or get government benefits^[10]. The difference between men and women in 2011 was 22 percentage points, but by 2021, it was almost nothing. The difference in income also got smaller^[41]. Microfinance institutions (MFIs) adopted digital tools like mobile apps for repayments and complaints, accelerating virtual connectivity. Remittances and digital payments in developing economies, including India, have transformed, increasing access for low-income groups. The results, therefore, support the hypothesis that the need to have access to the formal financial system for transactions, receiving Government support, and the ability to access microcredit could be the main drivers for the sudden jump in inclusion variables immediately after the onset of COVID-19.

Table 7. Interrupted Time Series Analysis (Number of Beneficiaries - COVID-19)

DV=Num Beneficiaries	β	S.E.	t	p
time	.005	0	15.05	0.00***
post_covid	.737	.059	12.44	0.00***
time_post_covid	-.003	0	-10.60	0.00***
Constant	18.64	.059	315.22	0.00***
Mean dependent var	19.622	SD dependent var	0.476	
R ²	0.825	Number of obs	549	
F-test	10675.819	Prob > F	0.000	
AIC	-207.531	BIC	-190.298	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 8. Interrupted Time Series Analysis (Amount of Deposits - COVID-19)

DV= Amt Deposits	β	S.E.	t	p
time	.01	.001	14.51	0.00***
post_covid	1.541	.128	12.05	0.00***
time_post_covid	-.007	.001	-10.20	0.00***
Constant	13.928	.127	109.34	0.00***
Mean dependent var	15.975	SD dependent var	1.002	
R ²	0.813	Number of obs	549	
F-test	5441.872	Prob > F	0.000	
AIC	646.583	BIC	663.815	

*** $p < .01$, ** $p < .05$, * $p < .1$

Table 9. Interrupted Time Series Analysis (Number of Rupay Cards - COVID-19)

DV=Num Rupay Cards	β	S.E.	t	p
time	.005	0	10.56	0.00***
post_covid	.824	.086	9.60	0.00***
time_post_covid	-.004	0	-8.46	0.00***
Constant	18.388	.086	214.58	0.00***
Mean dependent var	19.324	SD dependent var	0.481	

R²	0.666	Number of obs	549
F-test	3801.167	Prob > F	0.000
AIC	161.066	BIC	178.298
*** $p < .01$, ** $p < .05$, * $p < .1$			

3.4. Comparative Insights

The analysis reveals several insights about financial inclusion in India. First and foremost, the study confirms that financial inclusion is impacted both by external shocks (Demonetisation, Covid-19) that are not targeted at it as well as targeted policy interventions (PMJDY 3) in a meaningful way. While Demonetisation had the largest impact on financial inclusion variables, the launch of PMJDY 3 had a bigger immediate impact on financial inclusion than COVID-19. Also, while both external shocks and targeted policy interventions saw a tapering off in the trend post the event, this decline was highest for demonetisation and lowest for PMJDY 3 on average, implying that targeted interventions may have a more lasting impact on financial inclusion. From a policy standpoint, this Outcome underscores the need for relentless monitoring and assessment of financial inclusion variables to ensure that financial access remains pronounced within the intended demographic.

Another finding from the analysis is that financial inclusion variables were different for each of the three events. The largest shifts in trends were noticed in the

number of deposits and the number of Rupay cards issued across three events. The smallest trend shift was noticed in the number of beneficiaries. This points to a worrying aspect of financial inclusion in India. The amount of deposits and the number of Rupay cards issued can be broadly treated as proxies of the intensity with which PMJDY accounts are used, while the number of beneficiaries under PMJDY is a clear proxy for the breadth of coverage of the scheme. The analysis shows that the impact of both external shocks and targeted measures seems to be highest for the intensity of usage of PMJDY accounts but much lower for the breadth of coverage of PMJDY. This implies that despite its success, PMJDY may still need a much stronger and targeted policy push to ensure that coverage improves along with the intensity of usage.

3.5 CUSUM Test and Trend Stability

The next part of the analysis uses a CUSUM (Cumulative Sum Control) test to check for trend stability and shifts in the time series mean of the financial inclusion variables from PMJDY. The results from the test are outlined below.

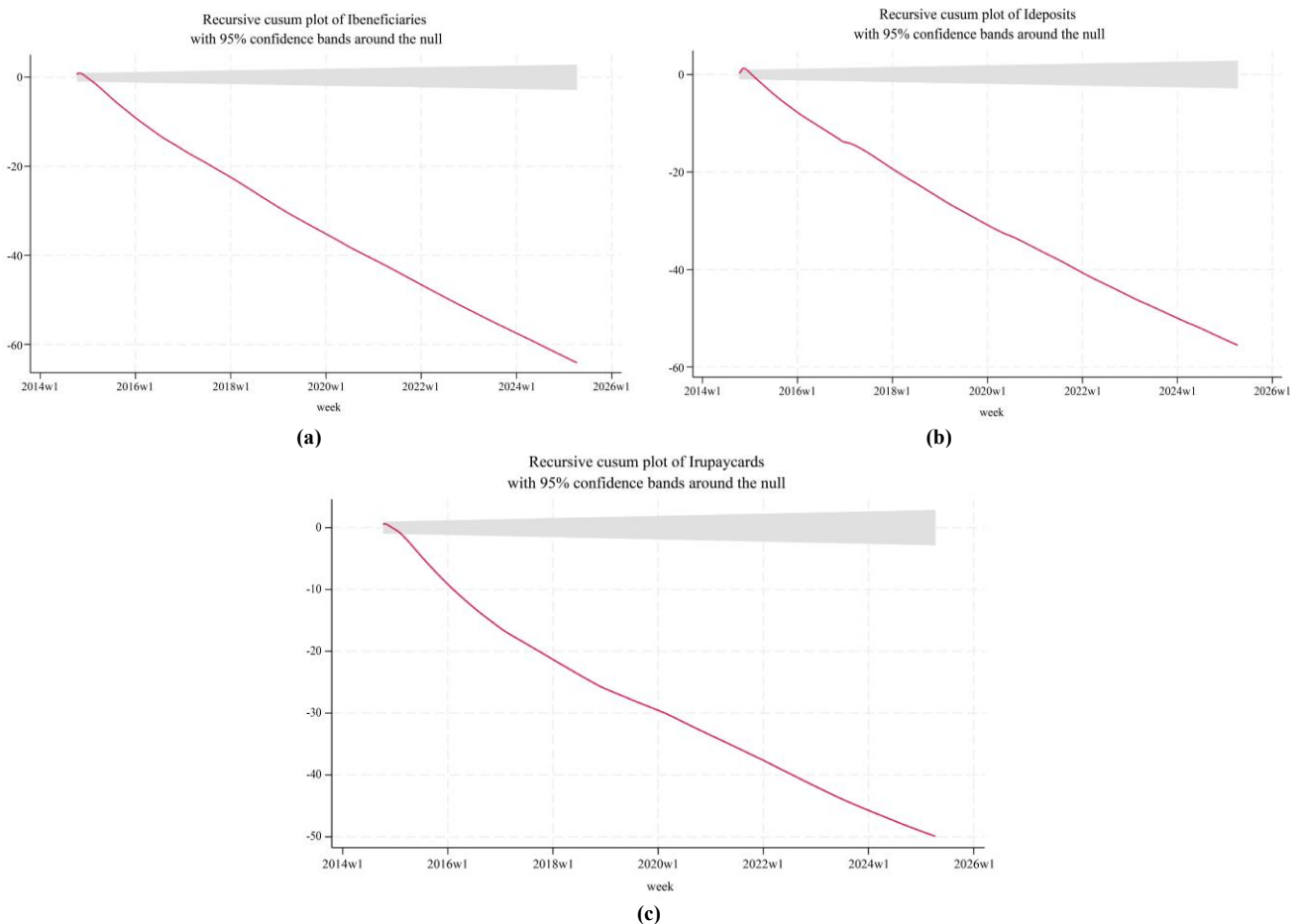


Fig. 1 CUSUM Plots for Num_Beneficiaries, Total_Deposits and Rupay_Debit_Cards (2014-2015)

The CUSUM test (Cumulative Sum Control Chart test) is a statistical method used primarily for detecting changes or shifts in the mean of a time series or sequential data process. It is widely applied to identify structural breaks, anomalies, or shifts in data patterns over Time. This paper uses the CUSUM test to estimate break points in the time series of financial inclusion variables under PMJDY. Graphically, if the cumulative sum (red line) departs from the bands (highlighted area in the figure), then that point of intersection is considered the structural shift.

As can be seen, in the three graphs, the recursive cumulative (red line) exits the confidence bands in late 2015. This structural break in the trend line of financial inclusion variables cannot be attributed to demonetisation, as it took place in November 2016. This seems to be driven by the launch of the PMJDY scheme phase 1, which was active from Aug 15, 2014, to Aug 14, 2015. Following the launch, banks, in coordination with the Department of Financial Services (DFS) under the Ministry of Finance, organized extensive camps across urban and rural areas. These camps were aimed at households without bank accounts, especially in areas that do not get enough services. They used simplified Know Your Customer (KYC) rules to open accounts with no money in them. There were more than 1,000 camps across the country, and they included public sector banks, regional rural banks, and cooperative banks. Around 3.98 crore accounts had been opened by September 2014, and the total amount of money in those accounts was more than ₹1,500 crore^[11].

Business Correspondents, known as Bank Mitras, were sent to remote and rural areas to act as banking agents and help people open accounts, make transactions, and learn about money. By the end of 2014, thousands of Bank Mitras were working in villages with populations of over 2,000. Aadhaar number was linked to PMJDY accounts so that DBT could be used for government benefits like MNREGA wages and LPG subsidies under the PAHAL scheme. This cut down on leaks and made sure that money went directly to people who needed it. By the beginning of 2015, Aadhaar had been added to millions of accounts, setting the stage for JAM Trinity (Jan Dhan-Aadhaar-Mobile) for smooth financial transactions. At the end of Phase 1, there were 17.74 crore accounts opened and about ₹22,000 crore in deposits. The plan covered almost all households, which cut down on the number of people who did not have a bank account. 60–65% of accounts were in rural areas, and women held a large share (about 50%), which helped to close the gap between men and women in terms of access to money. These factors that lead to financial inclusion are probably what caused the CUSUM test results^[11].

4. Conclusion

This study aimed to analyze the influence of targeted policy interventions and external economic shocks on the progression of financial inclusion in India, specifically through the framework of Pradhan Mantri Jan Dhan Yojana

(PMJDY). Results, which used Interrupted Time Series Analysis (ITSA) and CUSUM tests on weekly data from 2014 to 2025, show that major events like demonetisation, the launch of Phase II of PMJDY, and the COVID-19 pandemic each caused large and statistically significant short-term increases in key indicators of financial inclusion, such as the number of beneficiaries, deposits, and RuPay card issuances. Nonetheless, in every case, long-term trends exhibited indications of tapering, highlighting that even though shocks and interventions can create momentum, maintaining access requires ongoing effort and flexible strategies.

The study presents certain policy implications. The primary policy implication from the study is that both extraneous events and target schemes can influence the trend of financial inclusion in the economy. This means that external shocks can be a useful amplifier of financial inclusion, as was seen during COVID-19 or demonetisation. Therefore, policymakers should be proactive during periods of shock and leverage the disruption to push greater financial inclusion. Secondly, while both external shocks and targeted policy intervention improve financial inclusion trends in the short term, long-term trends are harder to shift. This implies that policymakers should view financial inclusion as an ongoing exercise and not withdraw the impetus given to it after a prolonged period of success.

Thirdly, the study reaffirms the success of major, nationwide interventions such as the PMJDY in significantly transforming the financial inclusion landscape in developing countries like India. Financial inclusion requires a holistic approach with all organs of the state acting in concert to be successful, and this can only be achieved with large-scale interventions such as PMJDY. Lastly, this study also highlights that such interventions to promote financial inclusion should be flexible and adapt to the changing landscape, as PMJDY did with phase 3. While Phases 1 and 2 were successful in achieving their coverage objectives, Phase 3 focused more on the quality of financial inclusion and not just on coverage. This, in turn, boosted overall financial inclusion in the economy, again reaffirming the importance of adopting a flexible but holistic policy approach to financial inclusion.

This is the first study to undertake a time series analysis of trends in financial inclusion and events that shape them, and seeks to fill a critical gap in the literature on the evolution of financial inclusion trends in a developing economy like India. It seeks to serve as an empirical bridge between policy implementation and its results. It also motivates several other research questions and improvements, such as a cross-sectional analysis of the drivers of financial inclusion with control variables, the drivers of regional differences in financial inclusion, and the differences in the role of private and public sector banks in the PMJDY scheme.

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