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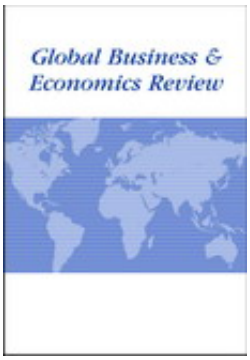

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Effectiveness analysis of largest financial inclusion schemes in India

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Abstract: The present study attempts to evaluate the effectiveness analysis of largest financial inclusion (FI) schemes named as Pradhan Mantri Jan Dhan Yojana (PMJDY) and its impact on FI in India across states. In the paper, a two-dimensional index, Jan Dhan index (JDI), was created using a number of accounts, and deposit parameters for 28 states and 8 union territories[1] from 2015 to 2020 to access the status of FI in India. The index was created using the UNDP's methodology for index and applying the min-max method of normalisation and Euclidean distance method. The JDI is a two-dimensional index that captures standardised values of Jan Dhan account and deposit dimensions on the scale of 0 to 1, where 0 indicates lowest presence of Jan Dhan scheme and 1 indicates highest presence of Jan Dhan scheme in FI. The study's finding suggests that most of the high-income states are low in JDI, except few BJP ruled states such as Gujarat and Haryana. On the other hand, the most populated states, or the low-income states such as Uttar Pradesh, Bihar, Chhattisgarh, Rajasthan, Assam, and Jharkhand are high in JDI. Bhartiya Janata Party (BJP) ruled states and union territories (including Jammu and Kashmir) have positive growth in JDI.

Keywords: financial inclusion; FI; banking; PMJDY; Pradhan Mantri Jan Dhan yojana; India.

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R. Murugesan with more than 25 years of teaching and research experience. He has many international publications with a category of SCI, ESCI, and Scopus, to his credit. He has two sponsored research projects of which one is sponsored by Indo-UK-UKIERI. His area of interest includes econometrics, industrial economics and DL techniques.

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1 Introduction

Financial inclusion (FI) can be considered as a prerequisite to improving the standard of living of poor, disadvantaged, and vulnerable groups such as farmers, rural micro and small enterprises, and other weaker sections and low-income groups (Allen et al., 2016; Dev, 2006; GoI, 2008). In the United Nation's sustainable development goals (SDGs) of 2030, FI has been explicitly included among the targets of four SDG goals–Goal 2: Zero hunger, Goal 5: Gender equality, Goal 8: Decent work and economic growth, and Goal 9: Industry, innovation, and infrastructure (UN, 2016), indicating direct benefits of FI in multiple dimensions. Also, it has been shown that FI, particularly digital financial services, can provide solutions to challenges faced in achieving all the 17 SDGs worldwide (UN, 2018). Research shows that countries with stronger GDP growth rates and lower income inequality have deeper level of FI in terms of access to affordable, appropriate financial services (Demirguc-Kunt et al., 2017; King and Levine 1993; Beck et al., 2000; Clark et al., 2006; Beck et al., 2007; Demirguc-Kunt and Levine, 2009).

India's tryst towards FI has a long history. It started with the nationalisation of Life Insurance companies in 1956 and subsequently the nationalisation of commercial banks in 1969 and 1980 (Burgess and Pande, 2005), and the nationalisation of general insurance companies in 1972 (RBI, 2020). Given that the large majority of poor reside in rural areas,[2] the drive towards FI in India is primarily geared towards the expansion of rural banking (Basu, 2006). The Indian central Bank (RBI) made a policy between 1977 and 1990 that a commercial bank can open a branch into a location only if it opens four in a locations with no bank branches and Burgess and Pande (2005) find that the Indian rural branch expansion program significantly lowered rural poverty. Later, a number of research was done to prove that micro-finance and rural banks have positive impact on minimising poverty in developing countries (Demirgüç-Kunt et al., 2017; Cull et al., 2014).

One of the important initiatives taken by the Government of India is to launch Pradhan Mantri Jan Dhan Yojana (PMJDY) on August 28, 2014 to provide universal access to banking services with a basic banking account, access to need-based credit, remittances facility, insurance, and pension to the weaker sections and low-income group. India has witnessed quick progress in FI. After the implementation of PMJDY in August 2014, much improvement has happened in the opening of bank deposit accounts. The accomplishment of opening the largest number of accounts (~18 million) under PMJDY in one week has been declared as the Guinness Book of world records. As of March 2022, the PMJDY scheme covered 450.6 million beneficiaries linked with a bank deposit of INR 1,664.59 billion.

While there is improvement in opening the bank accounts, the data reveals that the average balance in these accounts is low, and a significant percentage of the accounts are inoperative (Sinha and Azad, 2018). The major challenges to overcome financial exclusion are geographical access, high cost, inappropriate banking products, and financial illiteracy (Schuetz and Venkatesh, 2020). The recent study done by Markose et al. (2020) shows the double bind problem faced by banks as they struggle to achieve economies of scale to drive down average fixed financial infrastructure costs, while average account balances are low due to insufficient income. Due to absence of economic viability of PMJDY accounts in the majority of Indian public sector banks, it is a problematic matter in view of their extant financial fragility. Due to the above fact, it was realised that there is no comprehensive policy that the government has put in place to

achieve FI in the true sense till the time national strategy for FI was formed for 2019–2024. Delivering Universal Access to Financial Services by extending the outreach is the key foundation for a successful FI strategy (RBI, 2020).

We study the problem in the context of India for household bank account and deposit through the PMJDY of the Modi government, arguably one of the most vigorously pursued schemes that started in 2014. PMJDY follows in the wake of FI objectives pursued by successive governments in India for many decades and a number of research shows that the 2014 PMJDY initiatives have finally and substantially moved the dial on the number of registered bank account holders (Demirgüç-Kunt et al., 2015; Gunther, 2017; Sriram, 2018). Despite a good progress through PMJDY, large gaps persist in FI: across states, income, gender, and many other dimensions (Sahay et al., 2015). This study is an attempt to create the Jan Dhan index (JDI) across states in India which measure as a progress of FI schemes in India over time. The Jan Dhan scheme is analysed across states using the JDI along with the per capita income and deposit money. After briefly describing the status of Jan Dhan Yojana schemes in achieving FI and identifying the gaps in the existing literature, we cover the data sources and methodology adopted in the study. Empirical results are then presented before we conclude and present the policy suggestions based on this research.

2 Jan Dhan Yojana in achieving financial inclusion: literature review

Without being exhaustive to share extensive literature on the FI, we will discuss the relevant literature review in context of this study. A number of studies have probed the various areas of FI such as: development through FI (Ghosh, 2013; Sarma and Pais, 2011), the impact of FI on financial stability (Cull et al., 2012; Hannig and Jansen, 2010), the relationship between FI and economic growth (Kim et al., 2018; Mohan, 2006); country related FI initiatives (Mitton, 2008; Fungáčová and Weill, 2015), and the role of innovation and technology in achieving FI (Gabor and Brooks, 2017; Donovan, 2012; Ozili, 2018), among others. In India, Chakravarty and Pal (2013) reveals that social-banking policies played a crucial role in promoting FI across states during 1977 to1990 and Kumar (2013) analysed the determinants of FI in India.

The effort for FI is not a nascent idea in India. To achieve FI, the Indian central bank, i.e., RBI, actively promotes several policy measures, i.e., Basic Savings Bank Deposits (BSBD) (Dutta and Das, 2017; Sriram, 2018), a simplified KYC norm and branch authorisation policy, board approval with FI directives, and opening financial literacy centres (FLCs). The RBI had taken many initiatives like nationalisation of banks, expansion of banks and their branches, the establishment of cooperative banks, regional rural banks, etc. One of the important initiatives taken by the Government of India towards comprehensive FI is PMJDY. There are evidences of India's recent FI drive on the savings and other outcomes of rural households through the use of local agents (BCs) and usage of mobile's technology (Kochar, 2018; Sen and De, 2018). The study done by Agarwal et al. (2017) and Chopra et al. (2017) concludes that usage of PMJDY and non-PMJDY accounts seem to converge with time and regions more exposed to PMJDY program face an increase in lending and defaults on new loan.

PMJDY, a national mission on FI, envisages universal access to banking facilities with at least one basic banking account (no requirement to maintain any minimum balance) for every adult, financial literacy, access to credit, insurance, and pension

facility. The purpose of PMJDY is to provide benefits by opening one basic saving account for an unbanked person. A number of research study has highlighted the positive impact of having access to formal saving account: on savings (Aportela, 1999), on productivity (Ghosh and Sahu, 2022; Dupas and Robinson, 2009), on consumption (Dupas and Robinson, 2013; Ashraf et al., 2010), and women empowerment (Ashraf et al., 2010). In addition, interest is earned on the deposit, an overdraft (OD) facility up to Rs. 10,000, and the beneficiaries would get a RuPay debit card having inbuilt accident insurance cover of Rs. 0.1 million (enhanced to Rs. 0.2 million to new PMJDY accounts opened after 28.8.2018).

A study done by Ravi (2019) find the regional disparities in PMJDY outreach and usage of RuPay card issuance. This paper noted that Chandigarh, Chhattisgarh and Delhi show high rates of PMJDAY accounts per capita rural population. Assam, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Odisha and Manipur show high urban beneficiaries to urban population ratios. This paper also reveals that eight of every ten beneficiaries opt for the services of a Rupay card and hence greater access to the benefits of digital payments and ATM withdrawals for PMJDY beneficiaries. The study done by Singh and Naik (2018) demonstrates that the new services under the PMJDY scheme and the use of RuPay cards are not sufficient enough to promote FI among the lower end of the population. The study further noted that 90% of respondents need help in operating ATMs and internet banking, which poses substantial challenges to the digitisation of financial services and indicates the need to enhance financial literacy. Gunther (2017), based on a survey of four low-income states, observed a less substantial effect of PMJDY on the most marginalised segments of the population.

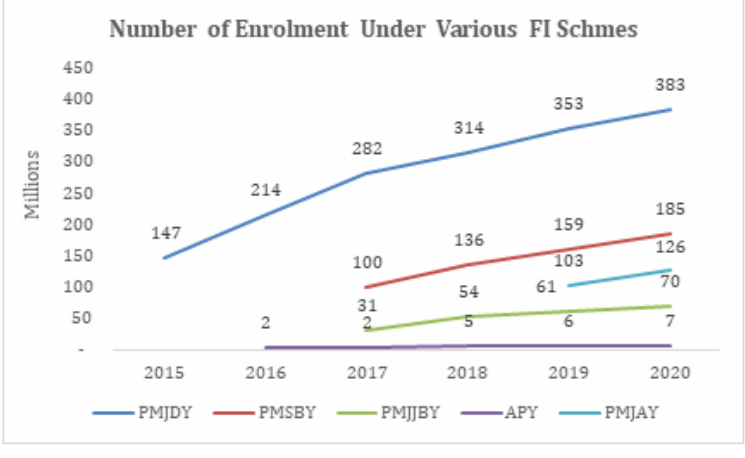
The PMJDY plan envisages channeling all Government benefits (from Centre/State/local body) to the beneficiary's account and pushing the direct benefits transfer (DBT) scheme of the Union Government. The study by Varshney et al. (2021) examines the impact of India's government assistance package (Pradhan Mantri Garib Kalyan Yojana of PM-GKY) during the Covid-19 lockdown period and found that 89%–94% of households benefited from direct cash transfers. Many times, the Reserve Bank of India (RBI) set the target incentives for banks and their allied partners to open the PMJDY's account. Although the target group of the PMJDY scheme was an unbanked person, the government has allowed banks to open new PMJDY accounts or convert old accounts into PMJDY for any individual. As per new guidelines issued by RBI, the new customer under PMJDY will have to get issued a RuPay Card in his existing account to get the benefit of insurance[3]. Implementation of PMJDY by different banks (public, private, and regional rural banks) have shown different results due to their different operating model (Titus, 2018). More nuanced and flexible implementation of the policy might be helpful to focus on objective PMJDY without driving up costs and building a portfolio of bad assets.

To create a universal social security system for all Indians, especially the poor and the under-privileged, three social security schemes; Pradhan Mantri Suraksha Bima Yojana (PMSBY), Pradhan Mantri Jeevan Jyoti Yojana (PMJJBY), and Atal Pension Yojana (APY) were initiated by the Government of India from May 2015. PMJDY accounts are eligible to allow the linking of these pension schemes with the bank account for the same customer. PMSBY scheme is available to cover the insurance in case of death or disability by accident, whereas PMJJBY covers life insurance in case of death due to any cause. APY is a pension scheme to provide social security for unorganised sector workers not covered under any organised pension scheme. On September 23, 2018, the

Government of India launched the largest health insurance scheme in the world, Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY), to meet SDGs. In PMSBY, there is a premium of INR 12 annum to cover the life insurance of the customers. Similarly, in PMJJY, there is a premium of INR 330 annum to cover the accidental insurance of the customers.

Figure 1 displays the number of gross enrolments in various social security schemes at country level (in million) from 2015–2020. It can be seen that there is significant positive growth across all the schemes in absolute terms over time. India has always low pension coverage post-independence and the existing pension system were unable to fulfil its purpose (Singh et al., 2015). After Atal Pension Scheme initiation, the Indian government provides primary benefits to not only families below poverty lines but working population too. As per data collected by RTI (Right to Information), the number of claims under PMSBY are 39,969 and under PMJJBY are 178,189 as of 31st March 2020. The accident insurance cover for death and permanent disability is also provided to PMJDY account holders but the latest RTI reveals that only half of the insurance claims settled (329 claims settled out of 647 claims filed) in last two years 2021–2023 (Nair, 2023). In this study, the focus is on PMJDY scheme only and its impact on FI in India. The efficiency of other pension and health schemes can be researched further.

Figure 1 Pradhan Mantri Jan Dhan Yojana accounts enrolment in India (see online version for colours)

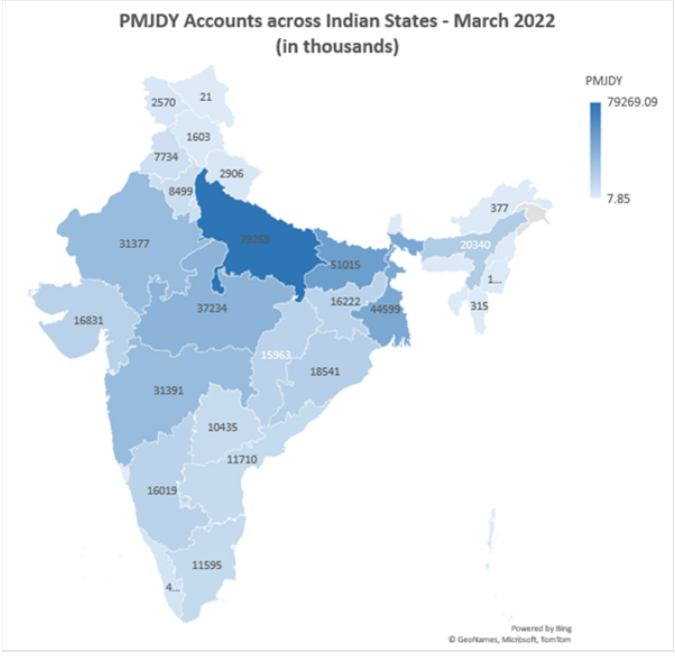


Source: RTI from Department of Finance Services, Min of Finance (GoI)

Figure 2 shows the Jan Dhan accounts across Indian states (in thousands) as of March-2022. As of March 2022, the PMJDY scheme covered 450.6 million beneficiaries linked with a bank deposit of ₹1,664.59 billion.

Highly populated states or states with low per capita income have shown drastic enrolment in Jan Dhan accounts. The state of Uttar Pradesh shows the highest number of Jan Dhan accounts (around 79.3 million) followed by Bihar (around 51.0 million). The states such as Sikkim has lowest enrolment in the Jan Dhan accounts preceded by Goa, Mizoram and Nagaland. In the Union Territories, Lakshadweep has the lowest Jan Dhan accounts preceded by newly built Ladakh.

Figure 2 Pradhan Mantri Jan Dhan Yojana accounts enrolment in India (see online version for colours)



Source: RTI from Department of Finance Services, Min of Finance (GoI)

Table 1 demonstrates the PMJDY accounts progression from 2015–2020 and distribution by various sub-segments of population. Growth of newly added PMJDY accounts shows the decreasing pattern from 2016 till 2019, which indicate that most of the target population are nearly covered under PMJDY scheme. In March-2020, the percentage of rural PMJDY account is 59.0% (226.30 million out 383.28 million accounts), and the percentage of the aggregate female account holder is approximate 53.5%. Among the total female account holders, the rural-female PMJDY percentage is around 59.2%. This indicates that the rural-female populations are benefitted most from the PMJDY accounts in contrast to the urban or rural-male population.

PMJDY scheme is making a significant contribution in creating a universal platform for financial services for every citizen of India (Nimbrayan et al., 2018). Financial literacy and efforts aimed at catalysing social influence could also play an important role in the adoption of four banking products of the scheme – withdrawal, deposit, fund transfer, and ATM usage (Singh and Prasad, 2021). These deposits and savings would be beneficial to improve the socioeconomic status of the entire economy as well as of the marginalised people of the society (Tripathi et al., 2016). Indian states or regions more exposed to this program saw an increase in lending on new loans and demand for formal credit by previously unbanked households (Agarwal et al., 2017). At the same time, the PMJDY scheme failed to improve the overall level of economic prosperity across states (Singh et al., 2021).

Table 1 PMJDY accounts by gender-wise, rural, and urban

Year	Rural PMJDY accounts			Urban PMJDY accounts			Total PMJDY accounts (In Mn)	Growth of PMJDY accounts (%)
	Female (%)	Male (%)	Total (Mn)	Female (%)	Male (%)	Total (Mn)		
2015	51.4%	48.6%	86.77	50.0%	50.0%	58.60	145.37	
2016	51.9%	48.1%	131.71	51.0%	49.0%	82.57	214.28	47.4%
2017	51.5%	48.5%	168.66	51.5%	48.5%	113.01	281.68	31.5%
2018	52.9%	47.1%	185.20	52.6%	47.4%	129.24	314.44	11.6%
2019	53.2%	46.8%	209.00	53.1%	46.9%	143.67	352.66	12.2%
2020	53.7%	46.3%	226.30	53.3%	46.7%	156.98	383.28	8.7%

Source: RTI from Department of Finance Services, Min of Finance (GoI)

Despite the encouraging results of PMJDY, the extent and penetration are much less than satisfactory in terms of account openings when it comes to usage by marginalised sections, people in the informal economy, and those living in remote areas (Swain and Jain, 2019). The impact study of PMJDY at the district level done by Yadav et al. (2020A) reveals that the PMJDY framework has not driven the economy towards a high degree of FI. Has the availability of PMJDY bank accounts for the poor in rural and remote areas protected them from the peril of moneylenders who charge excessive rates of interest? The available data from All India Debt and Investment Survey (AIDIS) of the National Sample Survey Office (NSSO) in 2019 shows that 17.1% of rural indebtedness was from non-institutional credit agencies, e.g., moneylenders (NSSO, 2019). The use of non-institutional debt at a high-interest rate is related to the type of expenditure for which the liability is incurred and the urgency of the financial need.

Banks have been, under Govt. and RBI direction, building up the supply side, and some work has been done, including technology. The infrastructure creation was done by banks and technology vendors but most of the Jan Dhan accounts were inoperative and/or had zero balance, evidence that demand or reasons for use was not there for the customers. Post the implementation of PMJDY in August 2014, much improvement has happened in the opening of bank deposit accounts, but digital payment among the women, rural people, and less educated people is much less than other groups of people (Barik and Sharma, 2019). This perhaps is the basic gap for which, even now, the FI accounts or PMJDY accounts are not meaningfully active. In this study, a comparative study on the performance of Jan Dhan Yojana across states and union territories is performed by creating JDI. Performance of JDI was analysed from two lenses: per capital income of the states and deposits per account.

There are a number of research have been done to create multidimensional financial inclusion index (FII) but none of the index has focused on the PMJDY. Sarma (2008) created an initial comprehensive multidimensional FII across 54 countries with three indicators: banking penetration, availability and usage. The study done by Bagli and Dutta (2012), developed an FII of 28 Indian states, shows that Goa had the highest FII and Manipur had the lowest. An FII index at district level in Tamil Nadu state of India was created by Bhuvana and Vasantha (2016). Further study to create comprehensive FII index for India was done by Gupta et al. (2012), Goel and Sharma (2017); Yadav et al. (2020b) and Singh et al. (2021).

Similarly, many studies are completed regarding the construction of FII at International level. A study by Honohan (2005) was done to develop FII across countries with various variables like payments, savings mobilisation, monitoring users of funds, and transforming risk to measure FI. Another international study was done by Yorulmaz (2013) for Turkey and the result presents that high-income regions have higher FI and vice-versa. A similar study was done by Rahman (2017) for Malaysia using accessibility, take-up rate, responsibility usages, and satisfaction level. Camara and David (2014) also developed multidimensional FII index for 82 developed countries using the principal component analysis.

Policy initiatives such as the PMJDY help to stimulate and enhance the level of FI in a country, especially for unbanked or under-banked populations. However, there is no major study done to analyse the FI through PMJDY across states using number of accounts and deposits money. Therefore, this study is an attempt to fill the gap by constructing JDI using number of Jan Dhan accounts and associated deposit money.

3 Data sources and methodology

Our main secondary data related to PMJDY is gathered through right to information (RTI) requested for each scheme from the Department of financial services, Ministry of Finance (Government of India). The annual data on PMJDY was collected using RTI to cover the number of accounts (in 0.1 million) opened under PMJDY from March 2015 to March 2020. The data was provided by the Department of financial services across states segregated by genders, rural and urban populations.

State-wise data related to per capital income, accounts and deposits at bank level are extracted from RBI's official website[4]. The deposit amount per account was calculated for March 2022 using the data extracted from RBI on both number of accounts and deposit amount. All the states and union territories in India are categorised into two categories as high income and low income with following criteria:

- High income states in India: Per capital income of the state is greater or equal than the per capita income at country level
- Low income states in India: Per capital income of the state is smaller than the per capita income at country level

Jan Dhan yojana Index was created for each state and union territories based on the two parameters:

- Number of Jan Dhan accounts (standardised): It is obvious that the larger states with the higher population will have a larger number of Jan Dhan accounts. Therefore, the parameter has been standardised by the total number of banking accounts in the state.
- Jan Dhan deposits (standardised): Same as number of Jan Dhan accounts, it was observed that the large states with low per capita incomes have a bigger deposit and therefore it was standardised by total deposits in the bank (all kind of accounts: current, saving and Term account).

Table 2 Key input variables to compute Jan Dhan index

State	*PCI Rank*	*BJP Ruled State***	*Jan Dhan Accnt. # (n)*	*Jan Dhan deposit (d) (INR Mn)*	*Banking Accnt. # (N)*	*Banking deposit (D) (INR Mn)*	*Jan Dhan Accnt STDZ and (n/N)*	*Jan Dhan deposit STDZ and (d/D)*
Goa	1	Yes	170,402	1,319	6013367	928,995	0.028	0.001
NCT of Delhi	2	No	5334160	22,498	57770996	14899299	0.092	0.002
Andaman and Nicobar	3	Yes	46,495	313	608150	67,727	0.076	0.005
Sikkim	4	Yes	85,535	454	1152756	124,106	0.074	0.004
Puducherry	5	BJP	164,215	712	3245201	245,524	0.051	0.003
Gujarat	6	Yes	16830997	75,170	108522063	9284677	0.155	0.008
Chandigarh	7	Yes	282,403	1,360	4526153	897,385	0.062	0.002
Haryana	8	Yes	8499466	46,126	60376428	6140139	0.141	0.008
Tamil Nadu	9	No	11595108	33,475	158085491	11174118	0.073	0.003
Maharashtra	10	Yes	31390727	108,732	233188807	34919877	0.135	0.003
Himachal Pradesh	11	No	1603481	11,484	15319423	1236718	0.105	0.009
Kerala	12	No	4905123	22,063	83172705	6702895	0.059	0.003
Uttarakhand	13	Yes	2905904	16,250	21882622	1807842	0.133	0.009
Telangana	14	No	10434957	29,650	74587894	6389491	0.140	0.005
Karnataka	15	BJP	16019278	64,896	133941008	13825517	0.120	0.005
Tripura	16	Yes	855,118	4,182	6099956	313,042	0.140	0.013
Andhra Pradesh	17	No	11709526	36,560	98507220	3858810	0.119	0.009
Mizoram	18	No	315,215	1,457	1587447	131,017	0.199	0.011
Nagaland	19	BJP	344,535	920	1717794	145,793	0.201	0.006
Punjab	20	No	7734261	33,707	67768161	5101380	0.114	0.007
Arunachal Pradesh	21	Yes	376,540	1,946	1946181	241,212	0.193	0.008
West Bengal	22	No	44598971	156,072	172418288	9781853	0.259	0.016

Notes: # – number of Jan Dhan accounts; and – standardised with no unit because of ratio conversion; * – not available; ** – union territories are governed by Union Government in part or in whole.

Source: RTI from min of finance, GoI and author's calculation

Table 2 Key input variables to compute Jan Dhan index (continued)

State	*PCI rank*	*BJP ruled state***	*Jan Dhan Accnt. # (n)*	*Jan Dhan deposit (d) (INR Mn)*	*Banking Accnt. # (N)*	*Banking deposit (D) (INR Mn)*	*Jan Dhan Accnt STDZ and (n/N)*	*Jan Dhan deposit STDZ and (d/D)*
Rajasthan	23	No	31377411	135486	107916435	5306339	0.291	0.026
Jammu and Kashmir	24	Yes	2570319	15694	23121962	1532289	0.111	0.010
Madhya Pradesh	25	Yes	37234491	92498	119624584	5103130	0.311	0.018
Odisha	26	No	18540664	72685	73806889	4214126	0.251	0.017
Chhattisgarh	27	No	15963131	50020	44757758	1972504	0.357	0.025
Meghalaya	28	Yes	619098	3441	3338442	294407	0.185	0.012
Jharkhand	29	No	16221564	60087	52988029	2829891	0.306	0.021
Assam	30	Yes	20340337	47465	51977238	1894828	0.391	0.025
Manipur	31	Yes	1020734	2138	3471552	138132	0.294	0.015
Uttar Pradesh	32	Yes	79269087	337742	305323727	13941765	0.260	0.024
Bihar	33	No	51015484	176399	153926494	4424169	0.331	0.040
DNH and Daman and Diu	NA*	Yes	212124	1194	1631456	132101	0.130	0.009
Ladakh	NA*	Yes	20632	264	585589	74548	0.035	0.004
Lakshadweep	NA*	Yes	7850	134	91566	12304	0.086	0.011
Total	-		*450615343*	*1664592*	*2254999832*	*170087951*	-	-
Overall mean	-		*12517093*	*46239*	*62638884*	*4724665*	*0.200*	*0.010*

Notes: # – number of Jan Dhan accounts; and – standardised with no unit because of ratio conversion; * – not available; ** – union territories are governed by Union Government in part or in whole.

Source: Source: RTI from min of finance, GoI and author's calculation

Given that both the parameters are in decimals, all parameters are normalised using the min-max method of normalisation:

$$Xi(Normalised) = \frac{Xi - X(\min)}{X(max) - X(\min)} * 100$$

Xi value implies a particular parameter for the state '*i*', *X*(*min*), and *X*(*max*) represent minimum and maximum value for the specific parameter observed across all states. Normalisation transforms the data for every parameter into a scale of 0 to 1; 0 indicates the lowest adoption of the Jan Dhan yojana and 1 indicates the highest adoption of the Jan Dhan yojana. The normalised parameter indices are free of units and dimensions and are easily aggregated.

Our method is akin to the methods used by the United Nations Development Programme (UNDP) for estimation of recognised development indices such as the Human Development Index (HDI), Human Poverty Index (HPI), etc., except for the two changes. Unlike the UNDP's methodology of using an average, our index is built basis on the distance from the ideal point. The Euclidean Distance Method, also known as Displaced Ideal method (Zeleny, 2004), is based on the inverse of the Euclidian distance from the ideal and used to assess the distance between any two points in an n-dimensional space. The linear average method assumes perfect substitutability among the indices whereas using Euclidean distance method, a given increment in any one dimension, with other dimensions remaining constant, has a greater significance for the index at a lower level than a higher level.

In this study, we have computed Jan Dhan Yojana index based on derived values from the accounts and deposits parameters.

$$JDI = 100 - \frac{\sqrt{100 - (n/N)^2 + (100 - (d/D)^2}}{\sqrt{2}}$$

where *n* denotes number of Jan Dhan accounts across states, *N* denotes total number of accounts in schedule commercial banking across states, *d* represents deposits in Jan Dhan accounts across states and *D* represents total deposits in the schedule commercial banks across states.

This approach of aggregation, contrasted with the averaging method, meets some properties of a development index, viz. normalisation, symmetry (or anonymity), monotonicity, proximity, uniformity, and signalling (collectively termed NAMPUS) (Nathan et al., 2008).

In addition to JDI across state, a comparison of deposits amount (deposits per account) was performed between Jan Dhan account vs. all account types across states by extending the scope of comparative study so that the results can be helpful in the policy recommendation.

4 Empirical results

Table 2 presents the cross-section data for the key variables used in the Jan-Dhan Index across states in March-2022. All 28 states and eight union territories in India are sorted in their per capital income in 2021 except for Ladakh, Lakshadweep and Dadar-Nagar Haveli and Daman-Diu due to data unavailability. Number of Jan Dhan accounts (n) and

associated deposits (d) are standardised by total number of banking accounts (N) and total banking deposits (D) across states in percentage terms. Also, this is important to look at the ruling party in each states and analyse if the political party 'Bhartiya Janata Party (BJP)', ruling Union Government since 2014, is same as state ruling party for better implementation of the schemes. The Indian political system is a federal structure where any national schemes are implemented by coordination between union and state Government both. As per Indian constitution, state government has power to accept or deny the national schemes at state level. It should be noted that BJP is ruling party (or part of coalition Government) in 14 states out of 28 states (excluding eight Union Territories such as NCT of Delhi, Chandigarh, Puducherry, Jammu and Kashmir, DNH Daman and Diu, Ladakh, Lakshadweep and Andaman and Nicobar Islands).

Table 3 Jan Dhan index for high income states (March-2022)

State	*PMJDY index (2022)*	*Per capita income (PCI) rank*	*Jan-Dhan deposits (d/n) (INR)*	*Overall deposits (D/N) (INR)*
Tripura	*0.917*	16	4,891	51,319
Uttarakhand	*0.713*	13	5,592	82,615
Gujarat	*0.688*	6	4,466	85,556
Haryana	*0.645*	8	5,427	101,698
Himachal Pradesh	*0.629*	11	7,162	80,729
Telangana	*0.477*	14	2,841	85,664
Karnataka	*0.450*	15	4,051	103,221
Maharashtra	*0.383*	10	3,464	149,749
Sikkim	*0.270*	4	5,312	107,660
Tamil Nadu	*0.235*	9	2,887	70,684
Kerala	*0.198*	12	4,498	80,590
Goa*	*0.000*	1	7,738	154,488

Notes: * – Goa has both lowest Jan Dhan account (= 170,402) and lowest Jan Dhan deposit (= 16,645.9 million INR).

Source: Author's calculation

The presence of Jan Dhan accounts in absolute terms (non-standardised) is already discussed in Section 2 but the standardised value of Jan Dhan accounts and deposits can be evaluated here based on Table 2. Although the top six major states such as Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Maharashtra, and Rajasthan have total 0.27 billion Jan Dhan accounts with coverage of the 61% of the total Jan Dhan accounts (0.45 billion as of March-2022) but total banking coverage is around 48% (1.09 billion out of 2.25 billion accounts). In terms of standardised Jan Dhan accounts (n/N), 25% of total banking accounts are covered by Jan Dhan accounts by top 6 states in compared to average 20% coverage at India level.

In addition to the Jan Dhan accounts, it is essential to analyse the absolute Jan Dhan deposits and standardised deposits across states. The same top 6 states (Uttar Pradesh, Bihar, West Bengal, Madhya Pradesh, Maharashtra, and Rajasthan) have Jan Dhan deposits of 1.00 trillion INR with coverage of 60% of the total Jan Dhan deposits (1.66 trillion INR of March-2022). These 6 states have total banking deposits of 43% around

(73.47 trillion INR out of 170.08 trillion INR). In India, the total Jan Dhan deposits contribute 1% of the total banking deposits (1.66 trillion INR out of 170.08 trillion INR) and state such as Bihar, Rajasthan, Uttar Pradesh, Assam, Chhattisgarh, Jharkhand contribute more than 2% in Jan Dhan deposits.

Table 4 Jan Dhan index for high income states from 2022 to 2022

State	*JDI-2022*	*JDI-2021*	*JDI-2020*	*JDI-2019*	*JDI-2018*	*JDI-2017*	*JDI-2016*	*JDI-2015*	*% Change* (2022–2015)
Tripura	0.917	1.000	1.000	1.000	0.290	1.000	0.498	0.645	*0.272*
Uttarakhand	0.713	0.583	0.471	0.463	0.264	0.524	0.356	0.433	*0.279*
Gujarat	0.688	0.550	0.464	0.429	0.259	0.505	0.339	0.416	*0.272*
Haryana	0.645	0.554	0.466	0.474	0.250	0.508	0.352	0.425	*0.220*
Himachal Pradesh	0.629	0.495	0.347	0.309	0.246	0.416	0.277	0.343	*0.287*
Telangana	0.477	0.411	0.355	0.292	0.202	0.383	0.246	0.311	*0.166*
Karnataka	0.450	0.364	0.325	0.254	0.193	0.344	0.223	0.281	*0.169*
Maharashtra	0.383	0.354	0.310	0.193	0.169	0.332	0.181	0.252	*0.130*
Sikkim	0.270	0.267	0.251	0.226	0.124	0.259	0.174	0.215	*0.055*
Tamil Nadu	0.235	0.208	0.175	0.143	0.110	0.191	0.126	0.158	*0.077*
Kerala	0.198	0.180	0.131	0.103	0.094	0.155	0.098	0.126	*0.072*
Goa*	0.000	0.000	0.000	0.013	0.000	0.000	0.007	0.003	*–0.003*

Source: Author's calculation

High income states

Table 3 introduces the JDI for high income states along with their performance in terms of deposits per account. The two states Tripura and Goa are at extreme side of JDI scale (from 0 to 1) and have extreme PCI rankings too. Tripura has the highest JDI of 0.917 among the high-income group but has the lowest PCI ranking at 16 in India. Goa has the highest per capital income in India and also highest Jan Dhan deposit per account (7,738 INR) but the lowest JDI among the high-income states. This shows that the states with higher per capita income have a smaller number of population who are unbanked or under-banked. States such as Gujarat and Haryana have relatively better per-capita rank and have performed better in Jan Dhan Yojana also. This can be justified by the ruling party because the state and union government both are ruled by the same political party BJP. Telangana shows the lowest Jan Dhan deposit per account at 2,841 INR preceded by Tamil Nadu (2,887 INR). Both Goa and Maharashtra have highest overall deposits per account in turn (INR 154,488 and INR 149,749 respectively), but Maharashtra has not shown Jan Dhan deposit per account as high as Goa which indicates that the income inequality is higher in Maharashtra than Goa.

Table 4 presents the JDI for high income states from 2015 to 2022 to see the progress and changes over the time. Most of the states have positive changes from 2015 but most significant changes can be seen in Himanchal Pradesh and Uttarakhand. It should be noted that both states were ruled by BJP during 2017 to 2022.

Low income states

Table 5 shows the Jan-Dhan Index for low-income states with their deposits per account as of March 2022. Bihar has lowest per-capita income, but the state has performed highest in the JDI index. Uttar Pradesh has second lowest per-capita income, but JDI index is lower than few states such as Bihar, Assam, Chhattisgarh, Rajasthan, and Jharkhand. In term of per capita, Punjab stands at 20 out 36 states/union territories in India but the state has low performance in JDI, equal to 0.004. Meghalaya has highest Jan Dhan deposit ratio and Manipur has lowest Jan Dhan deposit. Both Arunachal Pradesh and Meghalaya have highest overall deposits per account in turn (INR 123941 and INR 88187 respectively), but Arunachal Pradesh has not shown Jan Dhan deposit per account as high as Meghalaya which reveals that the income inequality is higher in Arunachal Pradesh than Meghalaya.

Table 5 Jan Dhan index for low income states (March-2022)

State	*PMJDY index (2022)*	*Per capita income (PCI) rank*	*Jan-Dhan deposit ratio (d/n) (INR)*	*Overall deposit ratio (D/N) (INR)*
Bihar	0.847	33	3,458	28,742
Assam	0.688	30	2,334	36,455
Chhattisgarh	0.682	27	3,133	44,071
Rajasthan	0.604	23	4,318	49,171
Jharkhand	0.551	29	3,704	53,406
Uttar Pradesh	0.529	32	4,261	45,662
Madhya Pradesh	0.498	25	2,484	42,660
Manipur	0.429	31	2,094	39,790
Odisha	0.404	26	3,920	57,097
West Bengal	0.393	22	3,499	56,733
Mizoram	0.220	18	4,622	82,533
Meghalaya	0.207	28	5,558	88,187
Arunachal Pradesh	0.161	21	5,168	123,941
Nagaland	0.142	19	2,669	84,872
Andhra Pradesh	0.055	17	3,122	39,173
Punjab	0.004	20	4,358	75,277

Source: Author's calculation

Table 6 presents the JDI for low-income states from 2015 to 2022 to see the progress and changes over the time. The top seven low-income states have shown positive changes from 2015 and Bihar has the highest presence of JDI. It should be noted that Bihar has a coalition Government from 2017 to 2022 supported by BJP. The three of the Northeastern states have shown marginal negative changes from 2015 such as Manipur, Mizoram and Arunachal Pradesh. The most significant changes can be seen in Himanchal Pradesh and Uttarakhand. It should be noted that both states were ruled by BJP during 2017–2022. The two other major low-income states, such as Punjab and Andhra Pradesh, have consistently shown a low presence of JDI where Bhartiya Janta Party is not part of ruling state government.

Table 6 Jan Dhan Index for low income states from 2015 to 2022

State	*JDI-2022*	*JDI-2021*	*JDI-2020*	*JDI-2019*	*JDI-2018*	*JDI-2017*	*JDI-2016*	*JDI-2015*	*%Change (2022–2015)*
Bihar	0.847	0.874	0.877	1.000	0.285	0.876	0.494	0.632	0.215
Assam	0.688	0.726	0.769	0.909	0.259	0.747	0.472	0.586	0.102
Chhattisgarh	0.682	0.724	0.724	0.893	0.258	0.724	0.470	0.577	0.104
Rajasthan	0.604	0.614	0.614	0.653	0.239	0.614	0.409	0.501	0.103
Jharkhand	0.551	0.537	0.525	0.565	0.225	0.531	0.372	0.446	0.106
Uttar Pradesh	0.529	0.494	0.466	0.531	0.218	0.480	0.356	0.414	0.115
Madhya Pradesh	0.498	0.514	0.499	0.607	0.209	0.506	0.375	0.437	0.061
Manipur	0.429	0.502	0.672	0.787	0.186	0.579	0.405	0.484	–0.055
Odisha	0.404	0.429	0.443	0.492	0.177	0.436	0.316	0.373	0.031
West Bengal	0.393	0.370	0.444	0.489	0.173	0.406	0.312	0.357	0.036
Mizoram	0.220	0.230	0.259	0.360	0.103	0.244	0.221	0.232	–0.013
Meghalaya	0.207	0.228	0.124	0.312	0.098	0.175	0.198	0.186	0.021
Arunachal Pradesh	0.161	0.208	0.195	0.276	0.077	0.201	0.171	0.186	–0.025
Nagaland	0.142	0.138	0.147	0.205	0.068	0.143	0.134	0.138	0.003
Andhra Pradesh	0.055	0.040	0.026	0.291	0.027	0.033	0.149	0.089	–0.034
Punjab	0.004	0.000	0.020	0.191	0.002	0.010	0.092	0.050	–0.046

Source: Author's calculation

Union territories

Table 7 describes the Jan-Dhan Index for union territories in India with their deposits per account as of March 2022. The union territory Dadar and Nagar Haveli and Daman and Diu (DNHDD) has the highest JDI performance and a newly performed Ladakh has lowest JDI performance. Per capita income is not available for the states such as DNHDD, Lakshadweep and Ladakh but most of the union territories such as Delhi, Andaman and Nicobar, Puducherry, and Chandigarh are in top 10 PCI rank. In terms of Jan Dhan deposit ratio, Lakshadweep has the highest deposit followed by Ladakh (INR 17,032 and INR 12,815 respectively). NCT of Delhi has highest banking deposit per account, INR 257,903, but the Jan Dhan deposit per account is lowest at 4,218 INR, implies that income inequality is greatest among union territories.

Table 7 Jan Dhan Index for low income states (March-2022)

State	*PMJDY index (2022)*	*Per capita income (PCI) rank*	*Jan-Dhan deposit ratio (d/n) (INR)*	*Overall deposit ratio (D/N) (INR)*
DNH and Daman and Diu	0.862	-	5,628	80,971
Jammu and Kashmir	0.852	24	6,106	66,270
Lakshadweep	0.670	-	17,032	134,375
Andaman and Nicobar	0.381	3	6,721	111,365
NCT of Delhi	0.239	2	4,218	257,903
Puducherry	0.155	5	4,337	75,658
Chandigarh	0.132	7	4,816	198,267
Ladakh*	0.102	-	12,815	127,305

Note: * – Ladakh was recognised as Union Territory on 31-Oct-2019.

Source: Author's calculation

Table 8 Jan Dhan Index for high income states from 2022 to 2022

State	*JDI-2022*	*JDI-2021*	*JDI-2020*	*JDI-2019*	*JDI-2018*	*JDI-2017*	*JDI-2016*	*JDI-2015*	*% Change (2022–2015)*
DNH and Daman and Diu	0.862	0.974	1.000	0.514	0.286	0.981	0.389	0.568	0.294
Jammu and Kashmir	0.852	0.843	0.840	0.328	0.285	0.841	0.306	0.497	0.355
Lakshadweep	0.670	0.521	0.458	0.334	0.255	0.489	0.294	0.383	0.286
Andaman and Nicobar Islands	0.381	0.456	0.471	0.327	0.168	0.463	0.244	0.344	0.037
NCT of Delhi	0.239	0.230	0.243	0.185	0.111	0.237	0.147	0.191	0.048
Chandigarh	0.132	0.130	0.136	0.143	0.064	0.133	0.102	0.117	0.014
Ladakh*	0.102	0.117	0.117	0.000	0.050	0.117	0.025	0.070	0.033

Source: Author's calculation

Table 8 presents the JDI for eight union territories from 2015 to 2022 to see the progress and changes over the time. All the union territories have shown positive changes from 2015. It should be noted that Jammu and Kashmir has shown significant positive changes in JDI from 2020 onwards. One of the potential reason for significant positive changes might be that Jammu and Kashmir become a union territory with effect from 31st October 2019 after the Jammu and Kashmir Reorganisation act and ruled by Union Government now.

5 Conclusion and policy implications

In this paper, we have developed a JDI – a two-dimensional index, consistent with development index such as HDI, HPI and GDI. The JDI can be used to compare the presence of Jan Dhan account and associated deposits across different states in India. It can be used to measure as a progress of FI schemes in India over time. There is a problem of heterogeneity in the effectiveness of PMJDY and it is observed that the rural-female populations are benefitted most from the PMJDY accounts. PMJDY is prevalent across all states in India, but the presence and implementation are not smooth across states Considering that the Pradhan Mantri Jan Schemes is initiated by Union Government of India, ruled by BJP, the effectiveness of Jan Dhan Scheme is higher in BJP ruled states.

The JDI values estimated for all Indian states indicate that various states are at various level of the largest FI schemes in India known as PMJDY. While high-income states are low in JDI but there are few exceptions such as Gujarat and Haryana. Similarly, the most populated states or the low-income states such as Uttar Pradesh, Bihar, Chhattisgarh, Rajasthan, Assam, and Jharkhand are high in JDI. Thus, JDI and per capita income levels tend to move in the opposite direction, although there are some exceptions.

This paper analysed the PMJDY, the government's flagship FI largest scheme, by creating multidimensional index over the time and across states. This study has certain limitations too. Due to data constraints, we have not incorporated other dimension to consider the affiliated benefits linkage of various insurance policies with PMJDY scheme. The PMJDY scheme to achieve FI in India has not transpired at the demand-side of the value-chain since the access to financial facilities, affordable healthcare, transparency, and ease of doing business are not achieved (Yadav et al., 2020; Deepti and Vaidhyasubramaniam, 2018).

The establishment of good digital infrastructure in the rural area, opening of more FLCs, and extension of credit to the vulnerable group can help to fulfill the true essence of FI in India. Channelling of direct benefit transfer (DBT) to Jan Dhan accounts by Government, is a nice step for improving the demand, and also any fund transfer into the accounts will increase the purchasing power of the account holder, which will lead to some usage of account and make the person comfortable in being financially included. This study helps to understand the geographic disparity in the effectiveness of PMJDY schemes in terms of accounts deposits both which can help to the Government and financial institutions to keep in view going ahead to maximise the benefit of FI. The future of PMJDY will be determined by refinement of the strategy and policy intention to the successful banks and support by policy and regulatory incentives.

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Notes

1 A union territory is a type of administrative division in the Republic of India. Unlike the states of India, which have their own governments, union territories are federal territories governed, in part or in whole, by the Union Government of India. (Source: https://en.wikipedia.org/wiki/Union_territory).

2 Rural India has been traditionally housing three-fourths to four-fifths of India's poor (Niti Aayog, 2021).

3 https://sbi.co.in/web/faq-s/faq-pradhan-mantri-jan-dhan-yojana-pmjdy.

4 https://dbie.rbi.org.inNewDelhi.