Impact of COVID-19 on Digital Payment Habits of Indian Households*

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Economics of Payments X Conference, October 2021

*The views expressed are those of the authors and do not reflect the views of the Reserve Bank of India

Outline

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Digital Payments and COVID-19

- Digital Payments have been at the heart of central bank innovation in the recent years
- Anecdotally, the pandemic led to a shift towards digital payments in India

Motivation

- On March 24, 2020, the Government of India ordered a nationwide lockdown, limiting movement of the entire population as a preventive measure against COVID-19. Restrictions were relaxed in a phased manner.

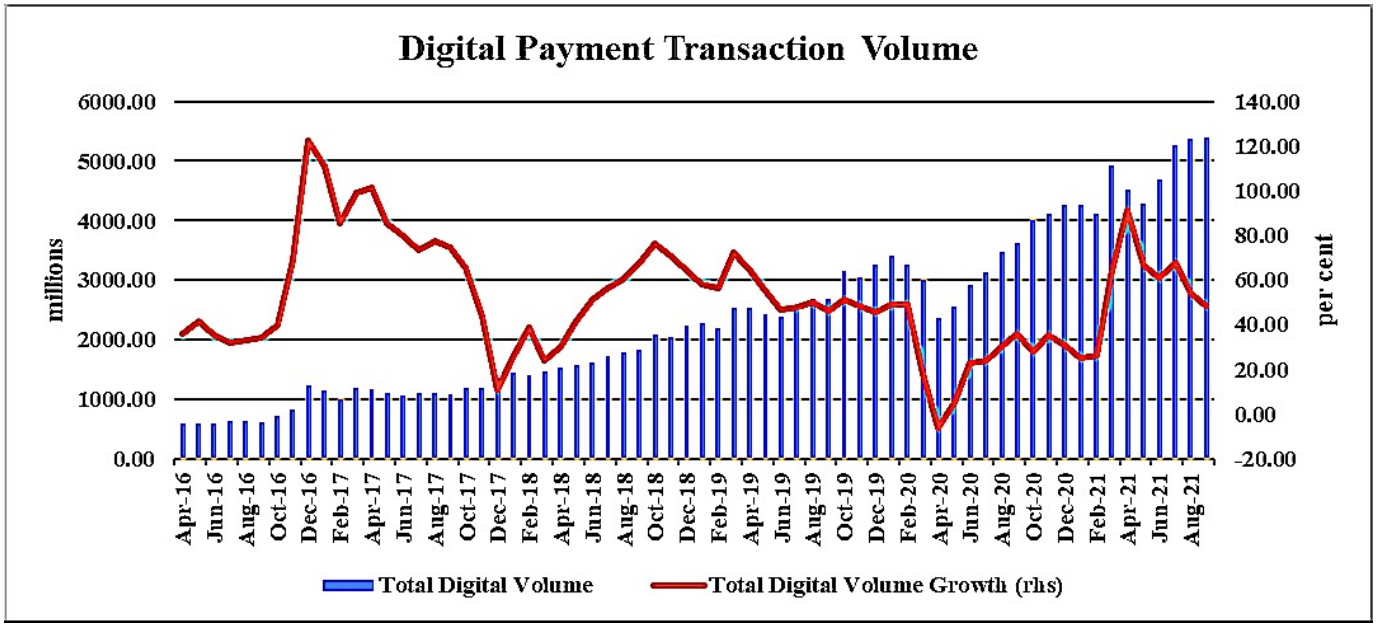
Remark

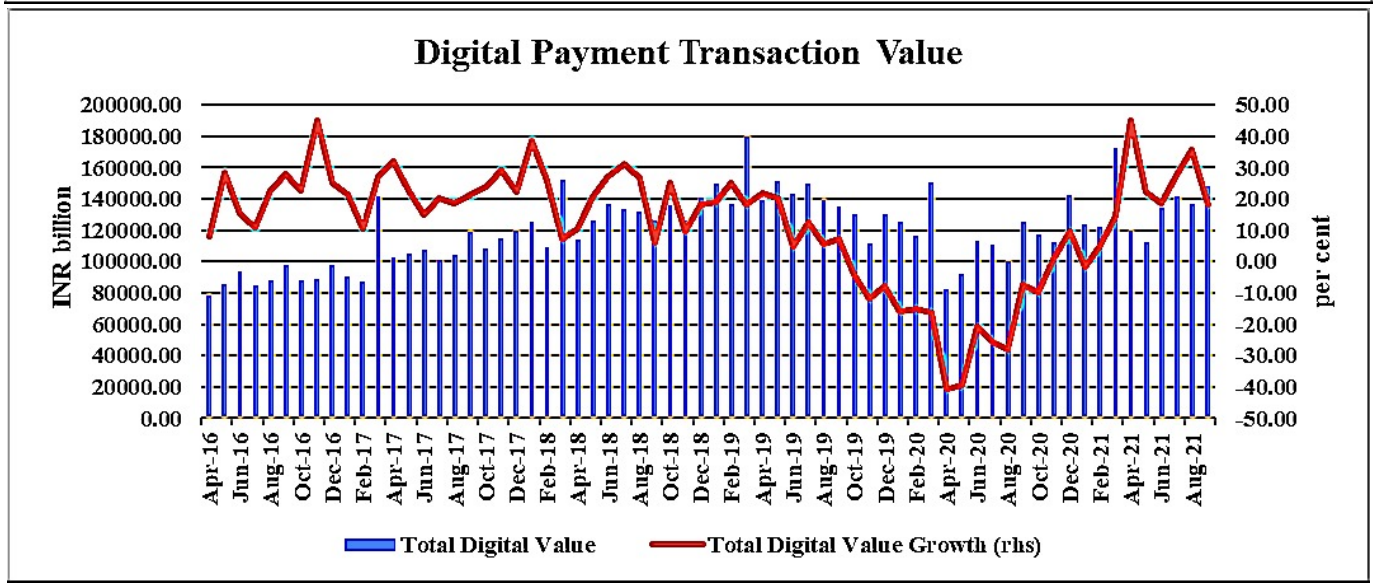
33% of respondent households used digital payments for the first time during the lockdown

- Assess the drivers of post-COVID digital adoption at the micro-level
- Find out the impact of different payment instruments (cards, mobile apps, *bank mitras*)
- Comment on the level of inclusion and sustainability of the switch to digital

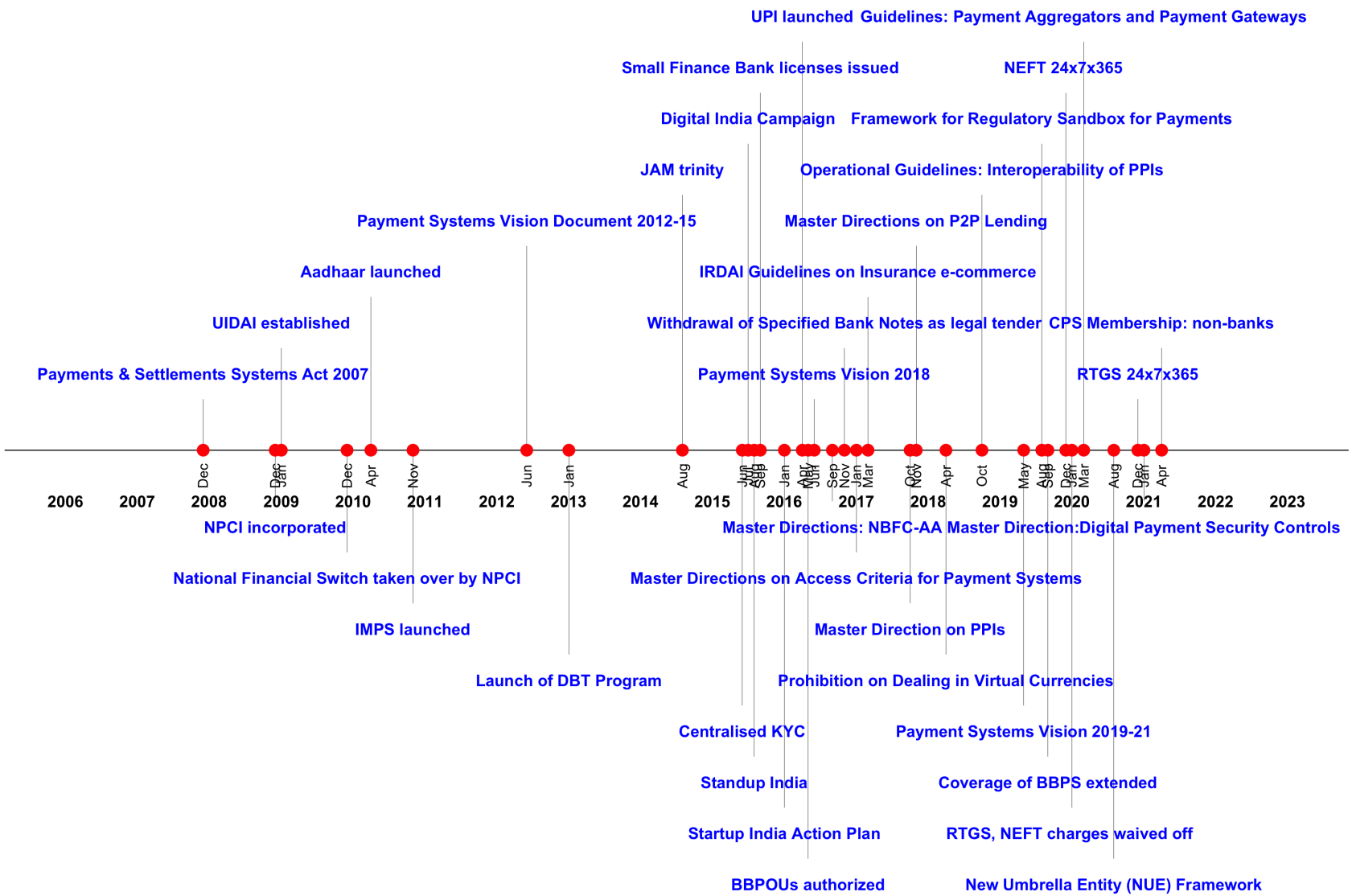
Outline

Digital Payments in India





Regulatory Timeline



Outline

Literature Review

- Digital payments are usually associated with more educated, relatively well-off and younger segments of population (Klee, 2008; Cohen and Rysman, 2013; Bagnall *et al.*, 2014; Fujiki and Nakashima, 2019)
- Other drivers of digital payments adoption include
  - Higher levels of awareness and financial literacy (Wyman, 2017; Ozili, 2018)
  - Access to smartphones (Bourreau and Valletti, 2015; Suri and Jack, 2016)
  - Proximity to bank branches (Kaur *et al.*, 2021)
  - Government transfers (Klapper and Singer, 2017; and Iazzolino, 2018)
- Evidence of the pandemic leading to enhanced digital adoption (Alber and Dabour, 2020; Al-Dmour *et al.*, 2021)

Remark

There are few household-level studies on the drivers of pandemic-induced shifting of payment choices at the ground level.

Outline

Data

- Pan-India household survey, N=5,314
- Conducted by PRICE-NPCI
- Stratified sampling from 25 states, divided into Bottom, Middle, Top income earning households
- Respondent: Member undertaking most of the household's financial decisions
- All variables are categorical

Sample Households

Household Income bracket	Rural/Urban Split		Average Household Income (Rs.)
	Rural	Urban	
Bottom (40%)	80%	20%	1,10,000
Middle (40%)	60%	40%	1,80,000
Top (20%)	45%	55%	3,60,000

Dependent Variable

Question

Did you start using any digital modes of payment for the first time for money transfer or payments after the lockdown was announced?

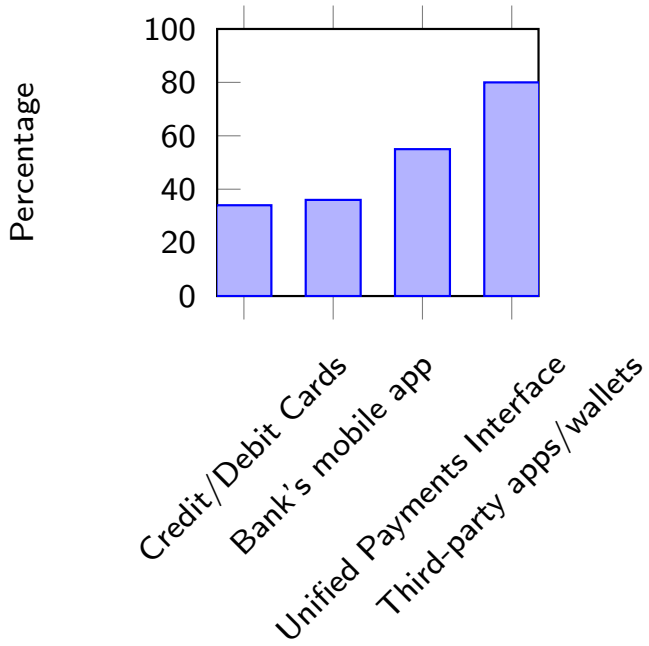


Figure: Modes of Digital Payments considered

Sample Summary

Variable	Composition
First-time digital payment users	32 %
Age	
18-40 years	41 %
40-60 years	53 %
>60 years	6 %
Gender	
Female	8 %
Male	92 %
Education	
Graduation	22 %
Matriculation (10th grade)	39 %
Primary	30 %
Uneducated	9 %
Previously abandoned digital payments	9 %

Variable	Composition
Smartphones	68 %
Feature phones	31 %
No phones	1 %
Direct Benefit Transfer (DBT)	
Pre-lockdown	53 %
Post-lockdown	54 %
Distance to the bank	
<1 km	24 %
1-2 km	29 %
2-3 km	27 %
3-5 km	11%
>5 km	9 %
Access to banking agent	56 %
Debit card ownership	76 %

Methodology

- We estimate the following logistic regression model

$$
\begin{aligned}
&\ln[\Pr(\text{1st time digital payments} = 1 \mid X)/ \\
&\Pr(\text{1st time digital payments} = 0 \mid X)] \\
&= \beta_0 + \beta_1 \text{Income} + \beta_2 \text{Age} + \beta_3 \text{Education} + \beta_4 \text{Awareness} + \\
&\beta_5 \text{Access to Smartphone} + \beta_6 \text{Access to Bank's Mobile app} + \\
&\beta_7 \text{Access to Debit card} + \beta_8 \text{Access to Bank Mitra} + \beta_9 \text{Distance to Bank} + \\
&\beta_{10} \text{Used earlier but abandoned} + \beta_{11} \text{DBT pre-lockdown} + \\
&\beta_{12} \text{DBT post-lockdown} + \beta_{13} \text{DBT pre and post lockdown}
\end{aligned}
$$

Outline

Awareness of Digital Modes of Payments

Calculating Level of Awareness

Score	Responses
0 (Nil)	"Have not heard of it"
1 (Low)	"Heard of it, but don't have it", "Have it but don't use it", "Someone in my family knows how to use it"
2 (Medium)	"Use it occasionally"
3 (High)	"Use it regularly"

$$\text{Final Awareness Score for respondent i} = \max_{j \in \{UPI, BHIM, AePS, RuPayCard\}} Score_{i,j}$$

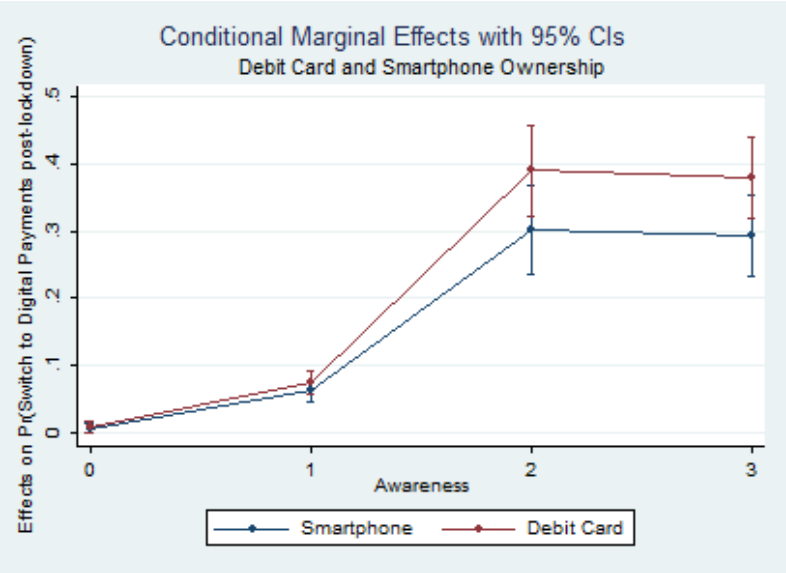
- We allow for substitutability between digital payment methods while defining "Awareness"

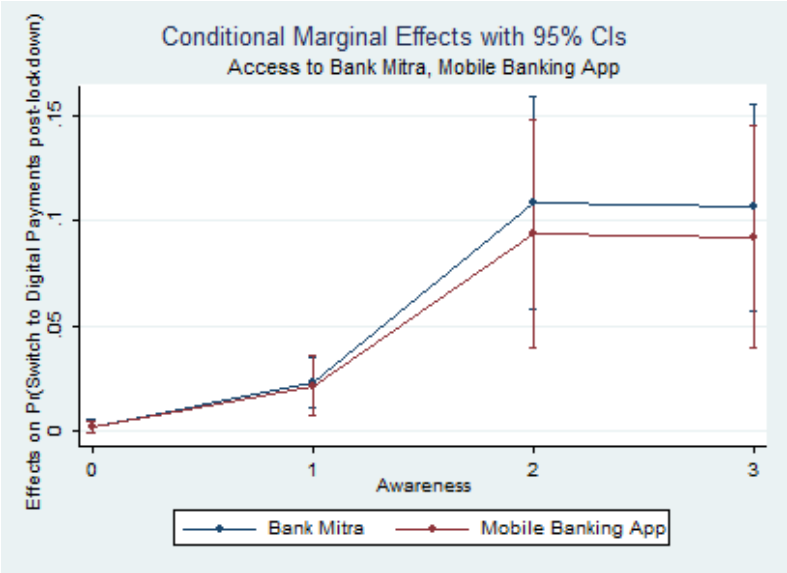
Awareness of Digital Modes of Payments

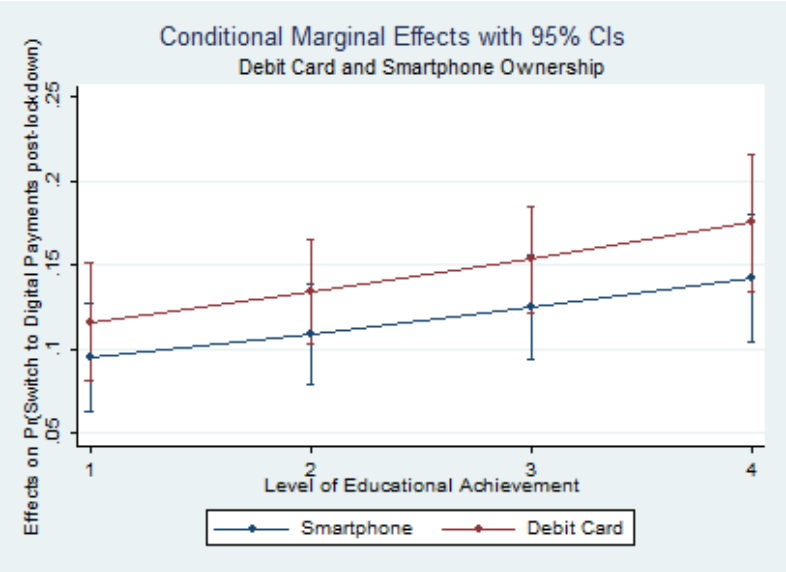
Variable	Logit Coefficients	Odds Ratio	Marginal Effect at Mean
Low Awareness	2.357***	10.56***	0.0334***
	-0.615	-6.492	-0.005
Medium Awareness	4.676***	107.4***	0.277***
	-0.619	-66.5	-0.029
High Awareness	4.608***	100.3***	0.264***
	-0.615	-61.67	-0.023
Constant	-9.609***	6.71e-05***	
	-0.794	5.33e-05	

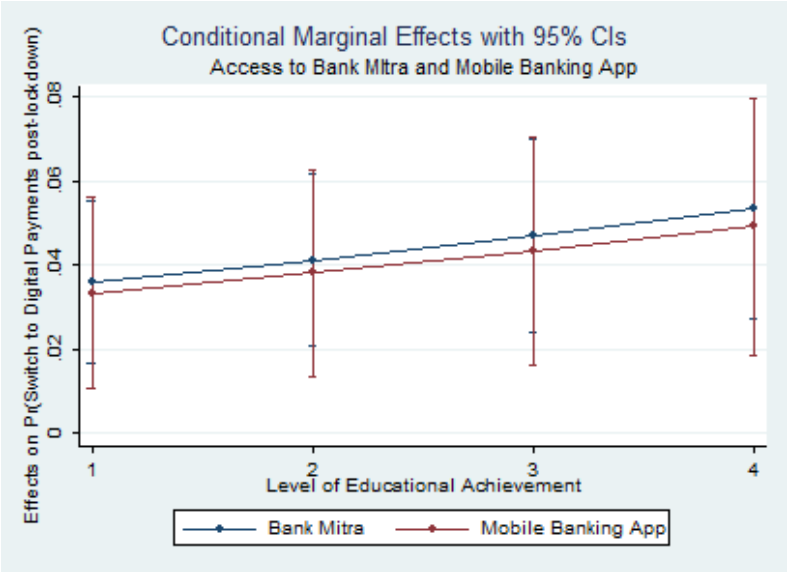
- Sharp jump in impact from low to medium awareness – even basic digital literacy campaigns can help

Access Variables









Access Variables

- Debit cards >smartphones >>Bank Mitra >Mobile Banking apps
- Digital awareness has higher average marginal impact than education
- Impact of awareness most pronounced moving from Unaware (0) to Low awareness (1) and then to Medium awareness (2).
- Need to complement penetration of digital infrastructure with digital awareness for maximum benefits
- For those without smartphones, having a family member with a smartphone was an effective trigger for adoption

Direct Benefit Transfers

Variable	Logit Coefficients	Odds Ratio	Marginal Effect at Mean
Received DBT before lockdown	-2.317***	0.0986***	-0.0639***
	(0.255)	(0.025)	(0.014)
Received DBT after lockdown	-0.265	0.767	0.0841***
	(0.206)	(0.158)	(0.013)
Received DBT pre-lockdown*Received DBT post-lockdown	2.601***	13.47***	
	(0.324)	(4.367)	

- Governments used DBT based transfers at a massive scale for pandemic relief under various social assistance schemes
- Rural/Illiterate beneficiaries use Aadhaar authenticated Payment System (AePS) to pay directly from account, or withdraw cash: jumps in AePS use recorded after every disbursal of subsidy instalment
- Highly subsidy dependent recipients may have been 'forced' to switch

Prior Bad Experience

Variable	Logit Coefficients	Odds Ratio	Marginal Effect at Mean
Used Digital Payments earlier but discontinued	2.826***	16.88***	0.458***
	(0.192)	(3.238)	(0.048)
Constant	-9.609***	6.71e-05***	
	(0.794)	(5.33e-05)	

- 9 percent of respondents tried using digital payments earlier but discontinued for various reasons
- Many went back to digital payments during COVID-19
- Highest marginal impact on Pr(switch) in the model

Demographic Characteristics

Variable	Logit Coefficients	Odds Ratio	Marginal Effect at Mean
Income Category = Bottom 40%	0.17	1.185	0.0135
	(0.139)	(0.164)	(0.011)
Income Category = Middle 40%	-0.321**	0.725**	-0.0208**
	(0.131)	(0.095)	(0.009)
Level of Education	0.169**	1.185**	0.0121**
	(0.069)	(0.082)	(0.005)
Age	0.355***	1.426***	0.0255***
	(0.091)	(0.13)	(0.007)
Constant	-9.609***	6.71e-05***	
	(0.794)	(5.33e-05)	

- Higher educational attainment may translate to higher likelihood to switch to digital payments post-lockdown
- Gender not statistically significant
- The middle-aged adopted digital payments en-masse, hinting to a narrowing of age-based digital divide

Robustness Checks

- Independent sampling with large sample size (>4,000 observations)
- Model offers 87 percent classification accuracy when dataset split into training and testing sets
- No significant outliers detected using Cook's distance
- To check for multicollinearity, Generalized VIFs were calculated-within tolerable limits
- McFadden's $R^2 = 49.3\%$
- Adjusted McFadden's $R^2 = 48.1\%$

Outline

Conclusions and Policy Implications

- Digital literacy and awareness matters the most in influencing the likelihood to shift to digital
- Awareness also complements enablers of digital payments like debit cards and smartphones for availing financial services
- Banking personnel and digitally enabled family members both escalate adoption
- Was this a permanent switch?
  - COVID 'nudged' middle aged to go digital
  - Long time/ Dependent DBT support recipients
  - 'Disillusioned' came back to digital modes
- If there were underlying changes in payments penetration, infrastructure and acceptance, then the change might be sustainable. Otherwise, it may be 'forced' and things may return to normal once the pandemic subsides.