

Open Payment Infrastructure and Market Participation: The Role of Interoperability in Financial Inclusion

by Meghana Ayyagari, Yuxi (Lance) Cheng, Pulak Ghosh, Nirupama Kulkarni

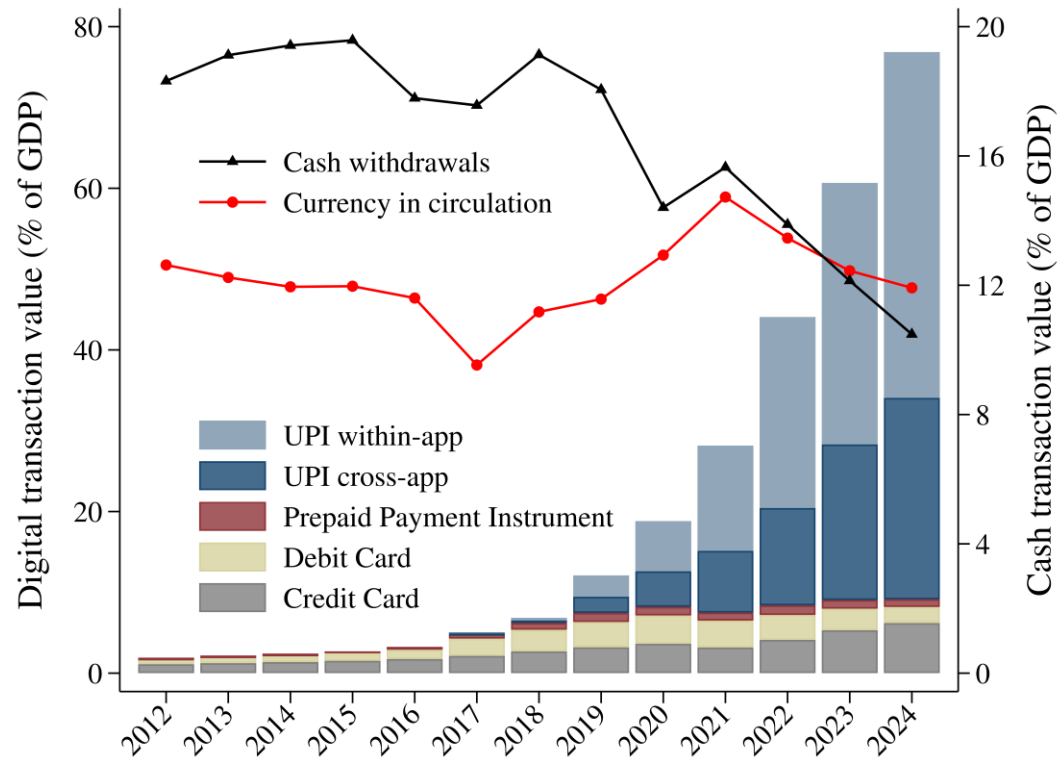
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The views expressed herein are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

Context: payments revolution in EMs

Different approaches across countries



Source: Copestake Kirti Martinez Peria Zeng (2025)

- Recent payment innovation largely in EMs:
 - Mobile money in Africa
 - Private closed-loop fintech in China
 - Open payment systems launched with public support in India, Brazil
- Interoperability and UPI's growth (Copestake Kirti Martinez Peria Zeng 2025)
 - Most transactions across two different apps
 - Estimate large impact of interoperability on demand for digital payments
- What are the broader implications of this payments revolution?

This paper: payments and financial inclusion

- Broad question: how do digital payment systems shape retail stock market participation?
- Basic intuition: to buy stocks, individual investors need to move funds to investment platforms; better payment rails could help
- Draw on great data on stock market participation
 - Data at trade level (National Stock Exchange of India, 2015-2020 Q1)
 - Can group trades at investor level
- Main specification:
 - More trades/active investors (Agarwal Ayyagari Cheng Ghosh forthcoming) in pincodes with more exposure to UPI post launch (2016 Q3)?
 - Measure UPI exposure using pincode-level deposit share at early adopter banks (Dubey Purnanandam 2023, Alok Ghosh Kulkarni Puri 2024)
 - Granular specification: pincode x month data, pincode and district x month FE

Main results

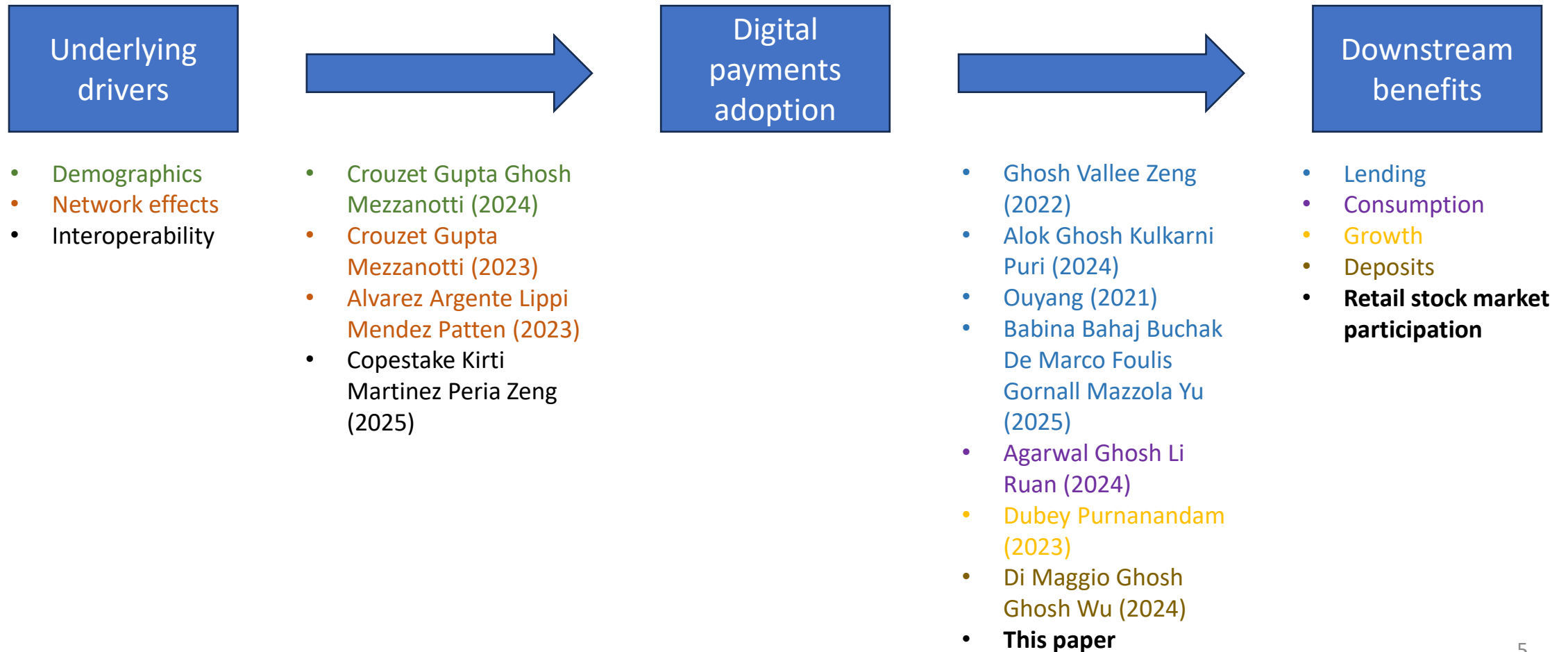
- Post launch, in pincodes with 1 SD larger exposure to UPI (Table 3):
 - 68 more transactions (6.1% of mean)
 - 7 more investors (8.6% of mean)
- Results appear specific to UPI:
 - Within-investor evidence
 - Horse race with other digital options
- Many heterogeneity exercises:
 - Internet/physical trading channels
 - Geographical variation: digital connectivity, cash reliance
 - Investor size
 - Trading around crashes

Three main comments

1. Literature
2. Interpretation
3. Mechanisms

Framing relative to prior work

First piece: digital payments adoption and downstream impact



Framing relative to prior work

Second piece: retail stock market participation

- Drivers of retail stock market participation in emerging markets
 - Literature largely focuses on advanced economies
 - Agarwal Ayyagari Cheng Ghosh (forthcoming): bank presence supports stock market participation, contribution relative to this work not discussed

Can interoperability and quality be separated?

- Goal of the paper per introduction: separate interoperability from digitalization
- Results do seem to be specific to UPI
 - Investors with multiple brokerage accounts use accounts where bank joined UPI earlier more (after investor x month FEs, Table 5)
 - Horse race with closed platform offered by large public bank (Table 4)
- Does this point to interoperability or just high-quality digitalization?
 - Public banks do not use new technology with same quality (Mishra Prabhala Rajan 2022, RBI 2024, Copestake Kirti Martinez Peria 2025)
 - Within investor results could also driven by public vs. private banks?
 - More broadly, would users make the same choices with an option with the same quality that was not interoperable?
- Two options:
 - More direct evidence to separate between interoperability and quality? May be hard
 - Could consider broader framing as in conclusion: effective payment system design can improve payment rails needed for stock market participation

Group into two main intuitive mechanisms?

- High quality digitalization enables shift to digital pipelines:
 - Growth in internet trading, not at physical locations (Table 8)
 - Better digital connectivity more useful with higher UPI exposure (Table 9)
 - Higher growth in areas more reliant on cash pre-UPI (Table 13)
- This reduces frictions for retail stock market participation:
 - More growth for small investors (Table 11)
 - Faster trading at hourly frequency around crashes (Table 10)
- Could help streamline writing in abstract/introduction

Other comments

- Many results (15 tables!), could streamline paper. Some suggestions:
 - Bank holiday results (Table 6): shouldn't hypothesis be that UPI is more useful in high exposure areas? Why should the sign flip with bank holidays?
 - Does rural/urban split (Table 12) add much to Jio triple interactions (Table 9)?
 - Drop results on return and risk (Tables 14 and 15)? Counterfactual should be return on outside options like cash rather than market return (Gennaioli Shleifer Vishny 2015)
- September 2017 shift (Figure 4) only affected which banks app providers used to connect to UPI, not users' ability to use apps across many banks to make cross-app payments
- Given evidence in Agarwal Ayyagari Cheng Ghosh (forthcoming), Table 2 should show balance on presence of bank branches
- Does continued growth in UPI post-2020 show up as large impact on aggregate retail stock market participation post-sample period?
- Presentation of magnitudes
 - Main text is clear that 6.1% growth in transactions, 8.6% growth in investors per SD of exposure is scaled by mean
 - Intro less clear, could be read as % growth relative to previous levels
- Should refer to digitalization, broader than digitization

Summary

- This paper: better digital payment rails can support stock market participation
- Suggestions:
 - Highlight two main contributions:
 - New downstream benefits of digital payments adoption
 - Digital financial infrastructure and retail stock market participation
 - More direct tests of interoperability or broader framing
 - Consider streamlining discussion of mechanisms
- Promising paper on important topic, look forward to next version

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