

Discussion of
**Open Payment Systems and Retail Stock Market Access:
Evidence from India's UPI**

by Ayyagari, Cheng, Ghosh and Kulkarni

André Stenzel

UAndes

Workshop on "The Micro and Macro of Financial Intermediation"

Banco Central de Chile

October 7, 2025

Summary

- ▶ assess impact of UPI on retail investor behavior
 - UPI: open protocol fast payment system in India
 - widespread adoption and use
 - arguably reduces frictions in traditional payment systems
- ▶ focus on variety of outcomes
 - overall stock market activity: $\text{UPI} \uparrow \implies \text{activity} \uparrow$
 - investors' risk bearing: $\text{UPI} \uparrow \implies \text{riskiness} \uparrow, \text{diversification} \downarrow$ (for small investors)
- ▶ three complementary mechanisms
 - reduction in transaction frictions
 - lower entry barriers
 - interoperability with existing payment networks

Assessment in a Nutshell

- + well-written paper on important topic
- + impressive data work leveraging multiple sources
- + use of different identification approaches is convincing...
 - ...but sometimes hard to follow
 - interpretation of quantitative results is hard, especially vis-a-vis dynamic impact

Comment 1: UPI exposure vs. Bartik Instrument

- paper uses two main measures to capture UPI rollout

→ UPI exposure measure: $\frac{\text{Deposits of Early Adopter Banks}}{\text{Total Deposits of All Banks}}$ (at pincode level)

→ Shift-share instrument: $\underbrace{\text{National UPI}_t}_{\text{shift}} \times \underbrace{\frac{\text{UPI}_p}{\text{GDP}_p}}_{\text{share}}$ where shares are as of September 2017 (≈ 1 y post UPI)

- measures have (very) different interpretations

→ early adopter banks: adopt before November 2016

- * idea behind measure: large presence of early adopter banks $\implies$ higher UPI adoption & use
- * “static” (long-term) impact of large presence of early adopter banks

→ Bartik-style instrument: relevance of UPI in September 2017

- * idea behind measure: high early relevance of UPI $\implies$ higher long-term relevance
- * “dynamic” impact of further UPI expansion allocated proportionally to pincodes with large early relevance of UPI

CAVEAT shares defined at level 1 year after UPI rollout $\implies$ non-standard?

Comment 1: UPI exposure/Bartik Instrument – quantitative interpretation

- ▶ What do the estimates tell us **quantitatively**?
 - **qualitative impact** is **clear**: UPI use $\uparrow \implies$ findings in paper
 - **quantitative impact**: *“The number of transactions in a month increases by 68 transactions in with one standard deviation increase of UPI Exposure in pincodes, an increase of 6.1% relative to the pre-treatment mean.”*
 - $\implies$ hard to interpret
- ▶ **Suggestion 1**: Focus on **relative impact** as dependent variable (e.g., $Y_{p,d,t} = \frac{\# \text{ transactions}_{p,d,t}}{\# \text{ transactions}_{p,d,\text{pre treatment}}}$)
 - o/w potential “bias” due to presence of early adopters in “larger” pincodes (despite controls)
- ▶ **Suggestion 2**: Try to work out the quantitative impact better
 - dynamic impact of UPI introduction is a good first step...
 - ...but not “perfect” with current measures as they by definition “exclude” late adopters
 - predominantly relevant if increased inclusion is intended to be focal point of paper

Comment 2: Identification approaches more generally...

- ▶ paper employs a **multitude of different settings** and identification approaches
 - impact on stock market participation via **exposure measure** & **shift-share** instrument
 - dynamic impact via **“event study”** around UPI adoption
 - comparison of **UPI and YONO**
 - **placebo tests** with random reassignment of exposure across pincodes and institutional investors
 - **within-investor** analysis focusing on accounts at early-adopter banks
 - identification via **regional variation** in bank holidays
 - identification via exogenous variation in **affordable mobile internet connectivity**
 - **heterogeneity analysis** of impact on stock market participation across demographic groups
 - assessment of mechanisms via **flash crashes**, comparison of small investors across Pincodes, digital infrastructure and financialization of savings
 - outcomes via **investor-level** analysis

This is a lot of different approaches that overall paint a **convincing** picture but are **in parts hard to follow...**

Comment 3: Trading data – individual investor accounts & domestic stocks

- ▶ sample restricted to individual investor accounts & trading of domestic stocks
 - by construction incomplete picture of investors' trading behavior
- ▶ interpretation of increased risk-bearing by small investors sensible, but relies on implicit assumptions
 - uncaptured investments (foreign stocks, indirect investments via institutional investors) do not overturn findings
 - particularly the unintended consequences would benefit from a discussion of this issue
- ▶ Are the effects economically significant when it comes to the “unintended consequences”?
 - point estimates of UPI Exposure are orders of magnitude lower than those of “being small”
 - * 140d-return: -0.002 for $\text{UPI} \times \text{Post} \times \text{Small}$ vs. -0.015 for Small
 - * risk-taking, diversification, trading speed: difference $\approx$ factor 50

Comment 4: Impact on investors – Institutional vs. retail

- ▶ paper uses data on **institutional investors** for placebo test
 - no impact of UPI on institutional trading patterns
- ▶ **Question 1:** How are institutional investors allocated to Pincodes?
 - does it really capture pincode-level variation in behavior or is it based on HQ Pincode
- ▶ **Question 2:** What is the impact on institutional investors' **trading volume**?
 - lack of impact on # of investors & transactions is sensible
 - but increased use of UPI could via interoperability positively affect managed (and thus traded) volume
 - Can you see the impact on fund flows from retail to institutional investors?
(data limitations likely preclude this)

Can you expand the findings from impact on small investors to **market-level** consequences?

Discussion of
**Open Payment Systems and Retail Stock Market Access:
Evidence from India's UPI**

by Ayyagari, Cheng, Ghosh and Kulkarni

André Stenzel

UAndes

Workshop on "The Micro and Macro of Financial Intermediation"

Banco Central de Chile

October 7, 2025