
The Impact of FinTech and Big Tech Firms on the Way We Pay

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Importance of Digital Payments

- Studies suggest that digital payments increase economic growth and reduce poverty
- Digital payment services serve as a gateway to other financial services such as credit, investment, and savings
- However, introducing technology may not be sufficient
 - ▶ Using a merchant survey of Indian small merchants in Jaipur, Ligon *et al.* (2019) finds non-payment factors that prevent adoption of digital payments by merchants, such as taxes

FinTech Firms (new entrants)

- Financial Technology (FinTech) firms increase competition and access to financial services
- FinTechs are now partnering or being acquired by incumbents
- Technology implementation much faster than incumbents especially app development
- A main currency for FinTechs—data collection and analysis

Big Tech Firms (New Entrants)

- Big tech firms leverage large networks and communication systems to provide payment and other financial services, e.g. Apple, Alibaba, Google, WeChat, Meta, and Amazon (varying degrees of success)
- Regulators concerned about uncoupling from traditional financial system, e.g. Diem by Meta (eventually sold to a bank)
- WeChat Pay and Alipay (tied to super apps) are successful in reaching scale and replacing cash transactions in China
- Access to credit is being provided by payment providers using payments data to assess credit risk, e.g. Alipay, see [Beck *et al.* \(2022\)](#)

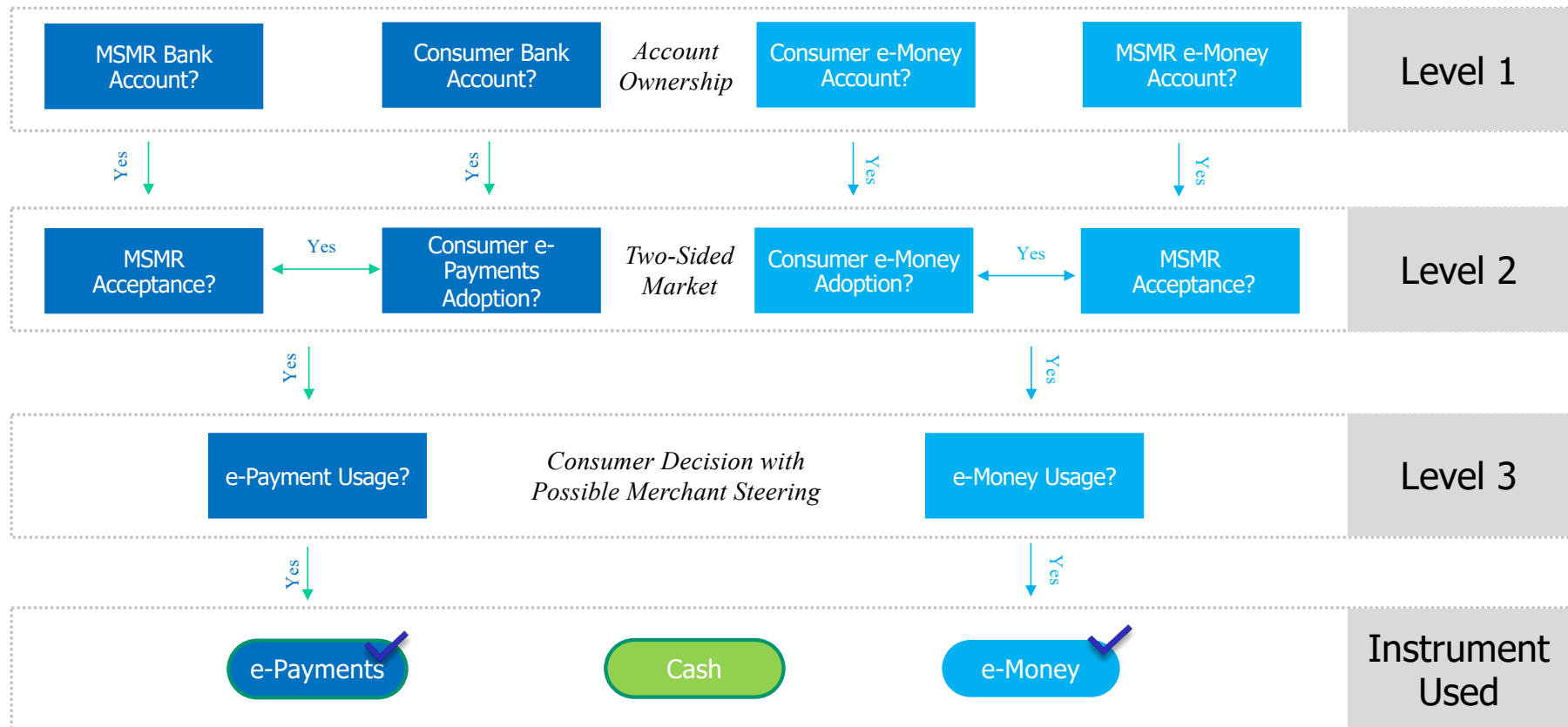
Financial Inclusion

- Global transaction account ownership from 2011 to 2021 increased from 51 percent to 76 percent of global adult population (WB Global Findex).
- FinTech and Big Tech firms increasingly extend payment and financial services to underserved consumers and businesses
- FinTech and Big Tech firms enable greater participation with traditional financial service providers
- Survival of non-financial firms is not necessarily critical to improvements because incumbents often adopt innovations and new pricing structures

World Bank Project on Digital Payment Acceptance

- Joint work with Jeff Allen, Santiago Carbo, Francisco Rodriguez and Oya Ardic
- Research Question: How to increase acceptance and usage of digital payments at micro, small, and medium (MSMRs) globally?
- World Bank (2016) estimated that micro, small and medium retailers (MSMRs) globally made and accepted \$34 trillion worth of payments annually, of which only 44 percent were made digitally.
- Two components of study:
 - ▶ Survey and qualitative analysis of public and private sector initiatives
 - ▶ Using machine learning tools, identify successful initiatives, sequencing of those initiatives, and find causal linkages

Adoption and Usage



e-Payments are debit and credit cards, ACH, Fast Payments

e-Money reside on prepaid cards or e-money wallets

Data

- Types of data used for analysis:
 - ▶ Country level data from various official sources, e.g. WB GPSS, WB Findex, WB FICP, IMF FAS, and others (106 countries with 81 variables)
 - ▶ Merchant level data from World Bank Study (7 countries, 576 merchants, 111 variables)

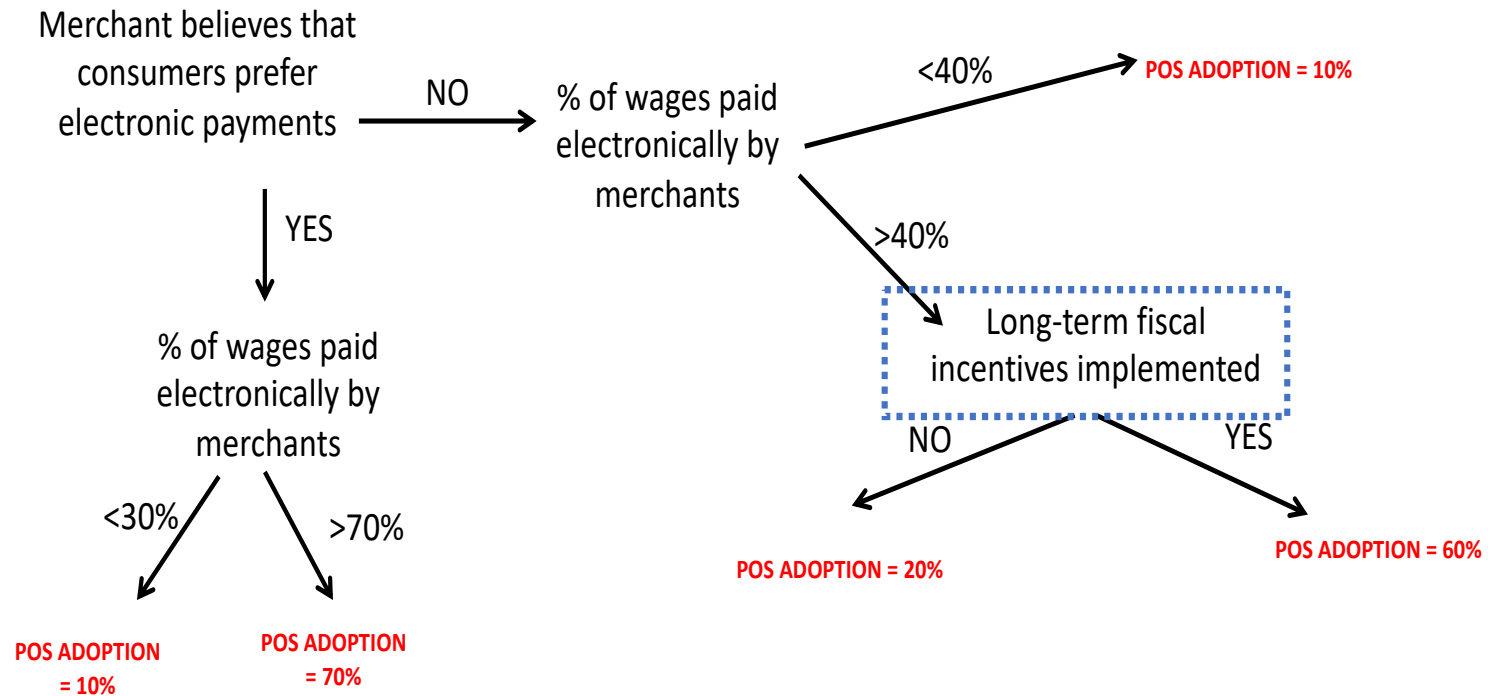
The Methodology

- Empirical analysis has a three parts
 - ▶ Part 1: Using a random forest algorithm ala Breiman (2001), we determine the most important covariates to predict changes in our two dependent variables (POS terminal adoption and share of digital P2B payments at MSMRs).
 - ▶ Part 2: Using conditional inference trees ala Hothorn *et al.*, (2006), we find strong sequential paths of adoption.
 - ▶ Part 3: Using causal forest ala Athey, Tibshirani, and Wager (2019) and Athey and Wager (2019), we find significant treatment effects of relevant incentives/initiatives on payment acceptance and usage.

Random Forest Results

| Response variable | Category | Predictor | Variable importance confirmed in: | |
|----------------------------------|--------------------------|---|-----------------------------------|-----------------------|
| | | | Country-level sample | Merchant-level sample |
| POS Terminal Adoption | Merchant Payment Chain | Share of P2B electronic payments | ✓ | ✓ |
| | | Merchants' beliefs about consumer payment preferences | n.a. | ✓ |
| | | Percentage of wages paid electronically at the merchant level | n.a. | ✓ |
| | Infrastructure | Information and Communication Technologies | ✓ | ✓ |
| | | Account ownership | ✓ | ✓ |
| | | National ID | ✓ | ✓ |
| | Institutional and Policy | Merchant fiscal incentives | | ✓ |
| | | National financial inclusion strategy | ✓ | ✓ |
| | | Wages paid into a transaction account | ✓ | ✓ |
| | | Shadow Economy | ✓ | ✓ |
| Share of P2B Electronic Payments | Merchant Payment Chain | POS terminal adoption | ✓ | ✓ |
| | | Merchants' beliefs about consumer payment preferences | n.a. | ✓ |
| | | Percentage of wages paid electronically at the merchant level | n.a. | ✓ |
| | Instruments | Previous card penetration | ✓ | ✓ |
| | Infrastructure | Information and Communication Technologies | ✓ | ✓ |
| | Institutional and Policy | Wages paid into a transaction account | ✓ | ✓ |
| | | Killer app | | ✓ |
| | Access Points | POS adoption | ✓ | ✓ |
| | | Agents of payment services providers | ✓ | n.a. |

Conditional Inference Tree Results (An Example)



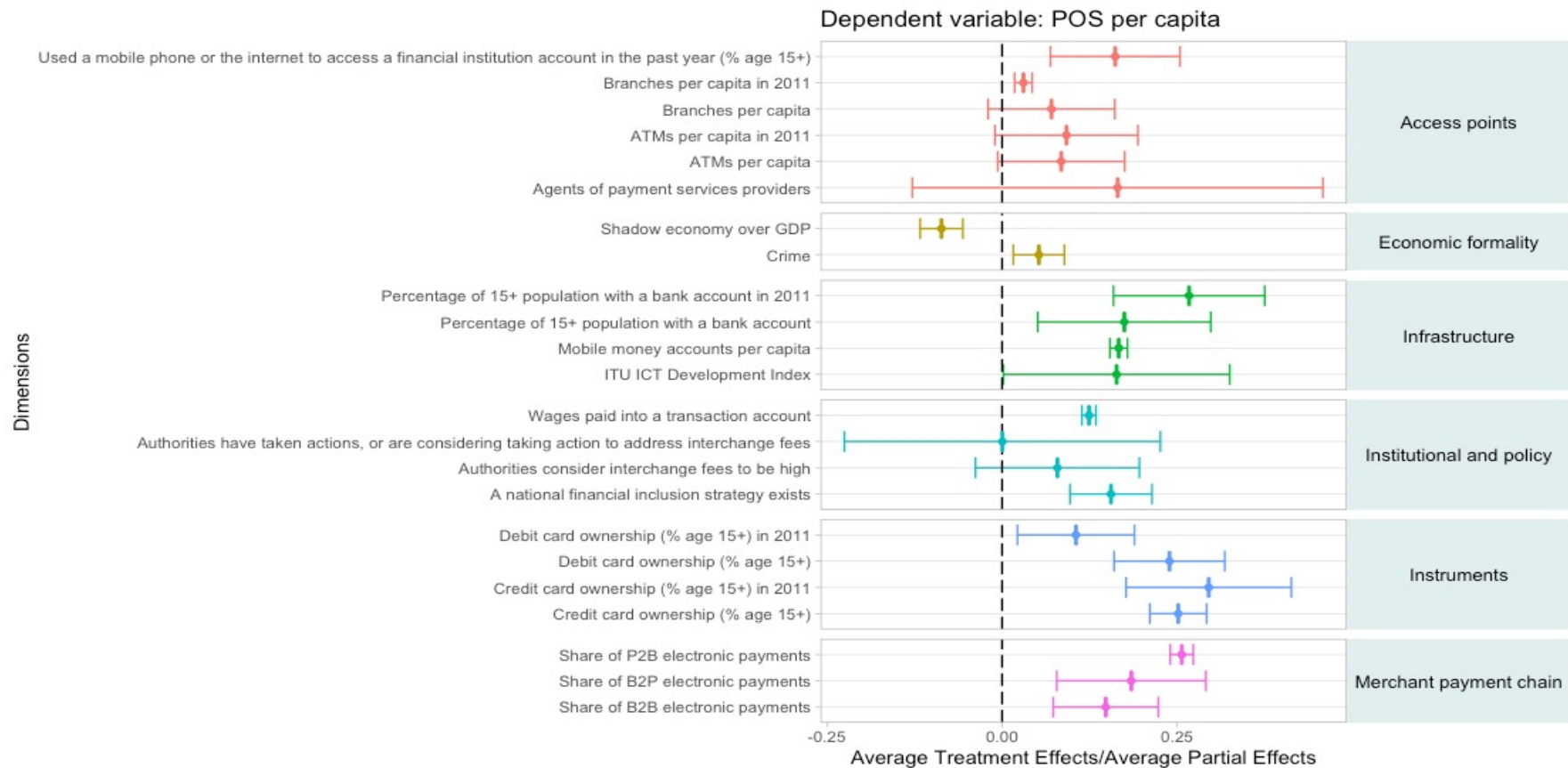
Conditional Inference Tree Results: POS Terminal Adoption

| Factors for POS Terminal Adoption | Increase in Likelihood of POS Adoption |
|---|--|
| Share of P2B electronic payments and bank account ownership is above the median country (country level) | 200 percent |
| Merchants believe consumers prefer electronic payments and wages are paid electronically (mid-high or high preference) (merchant level) | 100 percent |
| Wages are paid electronically and combined with account ownership or with ICT infrastructures above median (country level) | 100 percent |
| ICT or national ID implementation are over the median value and shadow economy below 15% (country level) | 50 percent |
| Shadow economy below 25% is combined with implementing a national financial inclusion strategy or with merchant fiscal incentives (country level) | 20 percent |

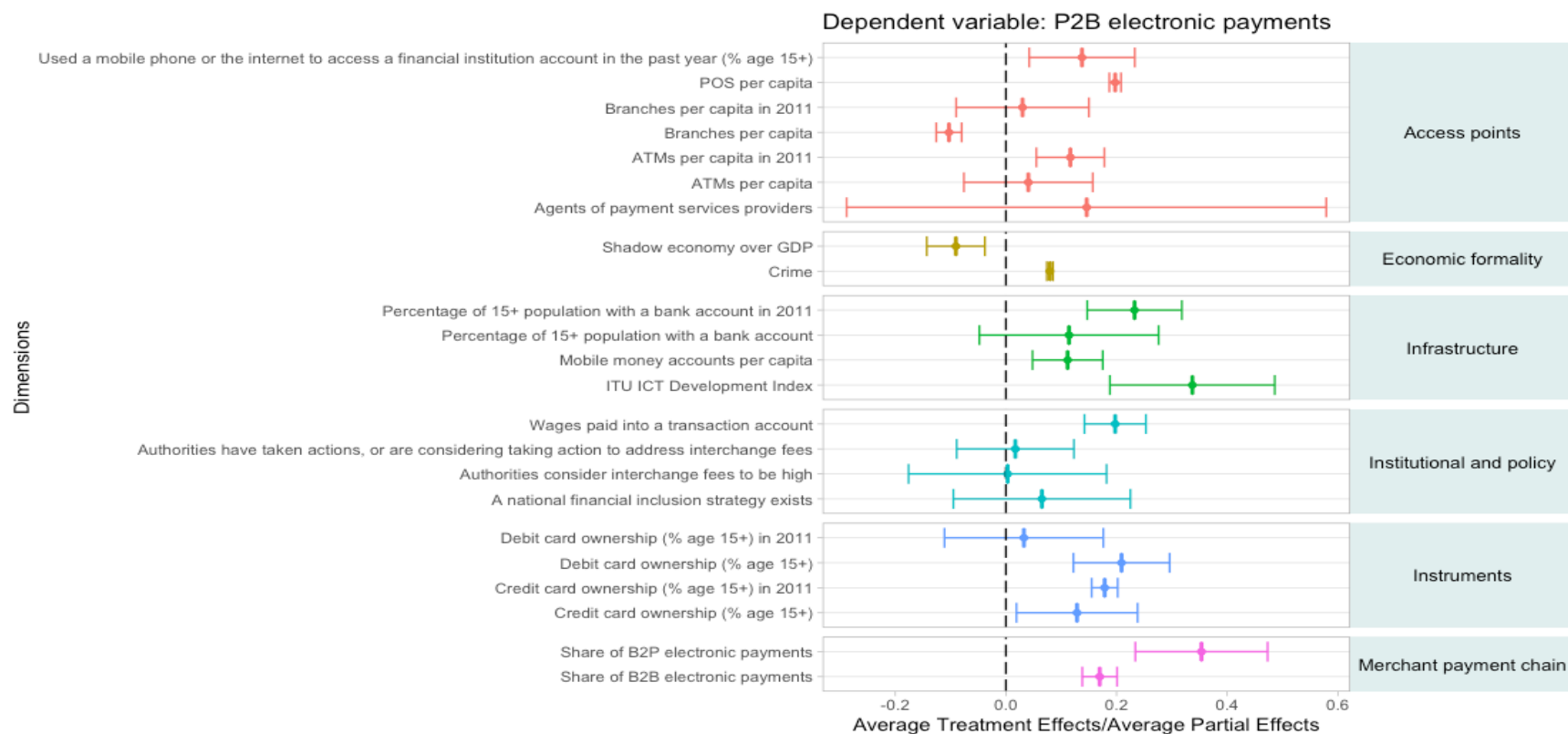
Conditional Inference Tree Results: Share of Electronic P2B Payments

| Factors for P2B Electronic Transactions | Impact on P2B Electronic Share |
|---|--------------------------------|
| Wages paid electronically and card penetration in previous 5 years are over median value (country level) | 100 percent |
| POS terminal adoption is mid high or high (country level) | 60 percent |
| ICT above median is combined with killer apps or with a significant use of agents of payment services providers (country level) | 50-60 percent |
| Merchants believe consumers prefer electronic payments and electronic payments to suppliers above median value (merchant level) | 30 percent |

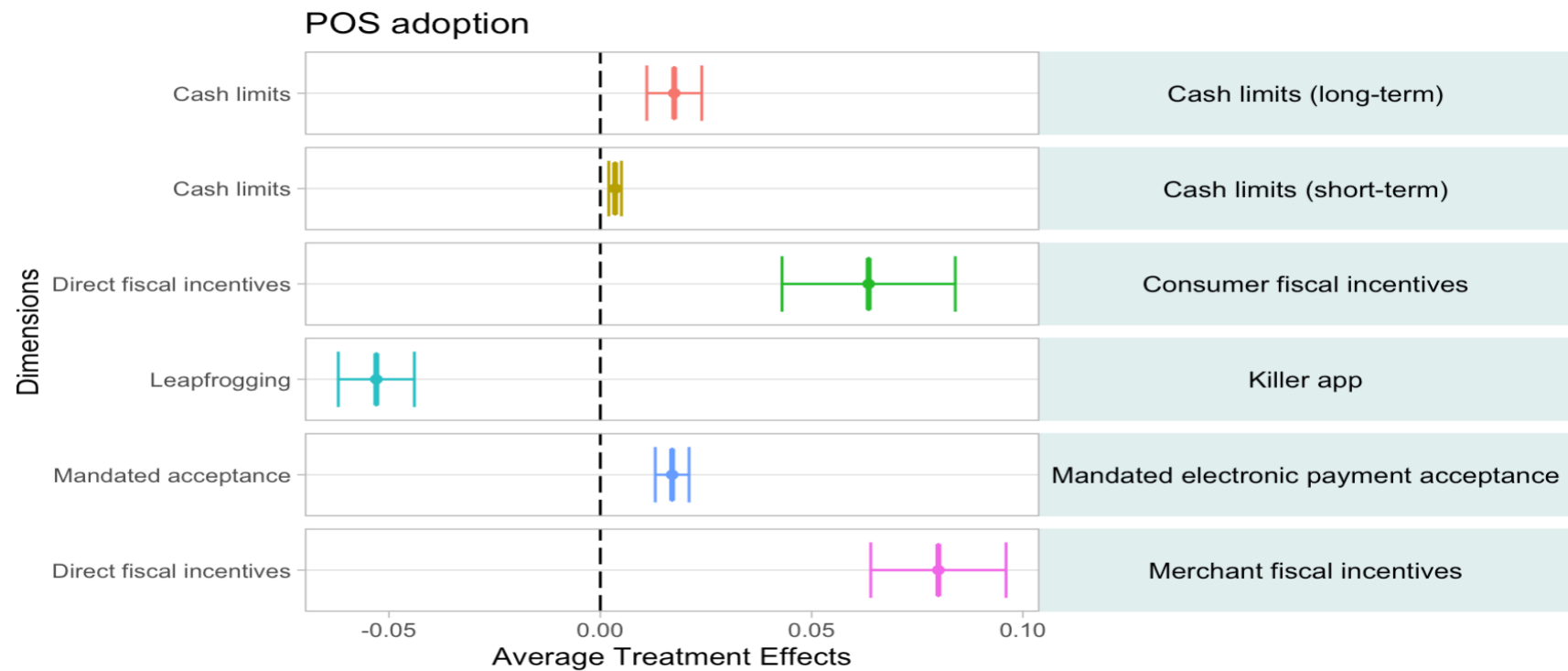
Treatment Effect Results: POS Terminal Adoption (Country-Level)



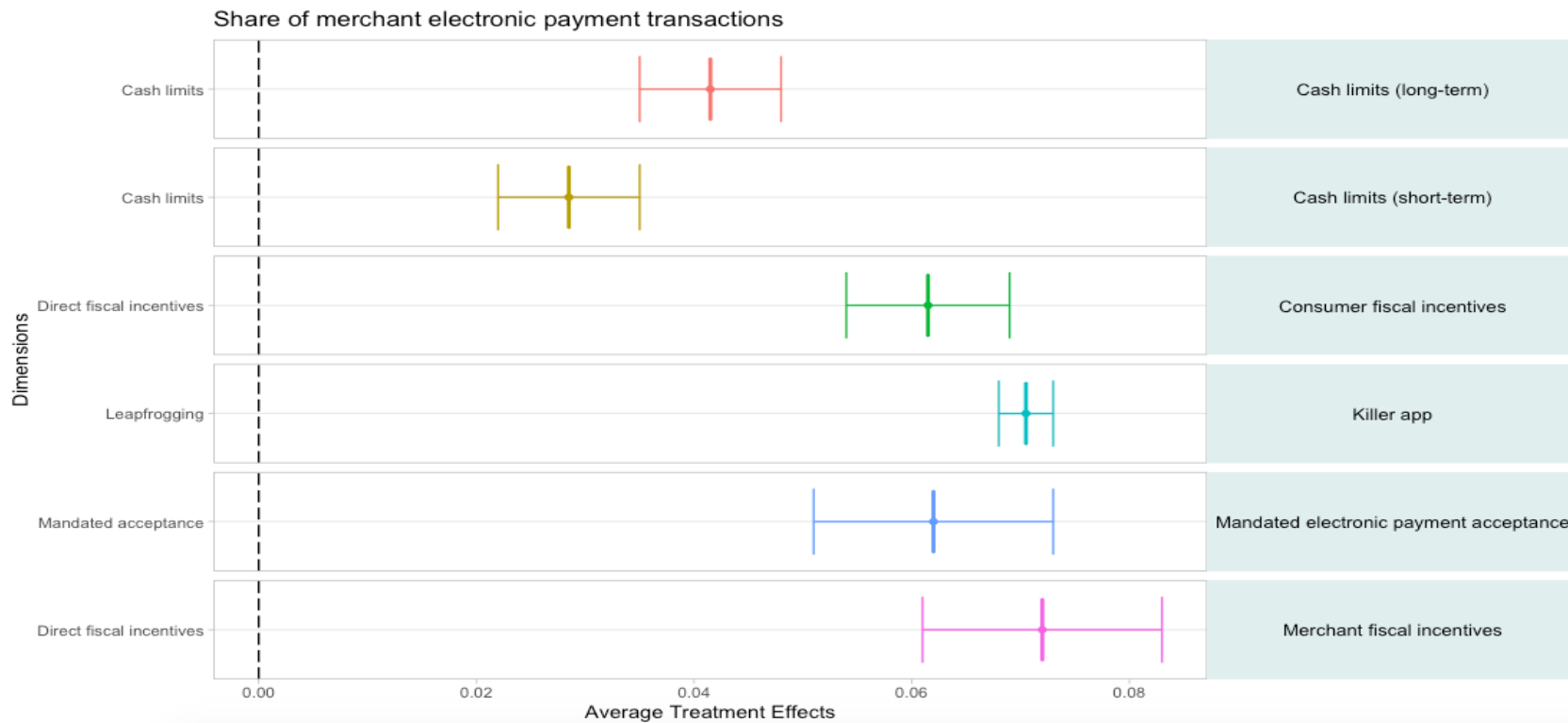
Treatment Effect Results: Share of P2B Electronic Payments (Country-Level)



Treatment Effect Results: POS Terminal Adoption (Merchant Level)



Treatment Effect Results: Electronic Share of Merchant P2B (Merchant Level)



Policy implications/Conclusion

1. Policies to increase financial inclusion - especially those that target greater transaction account ownership - are a critical first-step to increase EPA and usage)
2. Investment in ICT infrastructures are likely to increase adoption and usage of bank and non-bank-based payment instruments
3. Governments could encourage private sector firms to pay their workers digitally and mandate digital payments
4. Leveraging mobile phones to deliver payment services may enable leapfrogging of card acceptance infrastructure using less expensive QR technology for merchant acceptance
5. Policies that reduce taxes paid by are effective to increase EPA and usage
6. Government policies targeted at reducing the shadow economy are effective tools to increase EPA and usage