

An Analysis of the Binding Constraints on Digital Financial Inclusion in India Using a Decision Tree Methodology

Nandini Harihareswara and Howard Miller

Abstract

The past decade has seen significant innovation and growth in the volume and value of digital payments in India. However, we find that the associated gains have been heavily concentrated in favor of wealthier and urban customers and have had less impact on lower-income and rural populations. While some customers now have a far greater selection of quick, cheap, and convenient digital payments methods, as much as 65 percent of the population remains effectively excluded.

Using a decision tree framework, we test a range of factors on the supply and demand sides that could be binding constraints on further digital finance penetration.

We find that an unlevel playing field in favor of the (primarily state-owned) banking sector results in a lack of effective competition that could be inhibiting greater innovation and outreach in favor of lower-income and marginalized people. This unlevel playing field is potentially a function of institutional weakness combined with the nexus of control of the government and the banking sector, which is reinforced by the position of the National Payments Corporation of India. This control may also be viewed by the government as necessary to protect economic stability in a very dynamic market. To the extent that institutional deficiencies are the root cause of regulatory barriers to the entry of new providers and the scope of digital financial services offered, they are a binding constraint on advancing digital financial inclusion. Under this market structure, the outreach and inherent business models of digital payments and transfers do not provide sufficient perceived benefits to attract large segments of the population. Further, a lack of trust in providers combines with the perception of low benefits to generate an additional binding constraint, preventing the market from reaching a critical mass at which the bulk of the population would have the means and the incentives to use the system. Therefore, the market remains at an equilibrium below its potential.

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Any conclusions or viewpoints expressed are those of the authors, and they may or may not reflect the views of the institutions with which they work.

The authors would like to thank Anushree Deb, who provided research assistance through the development of the paper. From the Center for Global Development, Liliana Rojas-Suarez, with support from Alejandro Fiorito Baratas and Diego Castrillon, provided guidance and a critical eye. The paper has benefited from valuable discussions with and feedback from Nachiket Mor, Deepti George and Amulya Neelam (Dvara Research), Pawan Bakhshi (Bill & Melinda Gates Foundation), Leora Klapper (World Bank), and Graham Wright and Akhand Tiwari (MicroSave Consulting).

The Center for Global Development is grateful for contributions from the Bill & Melinda Gates Foundation in support of this work.

Nandini Harihareswara and Howard Miller. 2021. “An Analysis of the Binding Constraints on Digital Financial Inclusion in India Using a Decision Tree Methodology.” CGD Policy Paper 210. Washington, DC: Center for Global Development. <https://www.cgdev.org/publication/analysis-binding-constraints-digital-financial-inclusion-india-using-decision-tree>

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Abbreviations

*99#	India's feature phone-based payment system
AePS	Aadhaar Enabled Payment System
AML	anti-money laundering
ATM	automatic teller machine
BC	business (or bank) correspondent
BRSS	Bank Regulation and Supervision Survey
BSBDA	basic savings bank deposit account
CFT	countering the financing of terrorism
CGAP	Consultative Group to Assist the Poor
CICO	cash-in cash-out
CRR	cash reserve ratio
DBT	direct benefit transfer
DSP	digital service provider
FII	Financial Inclusion Insights
FY	financial year
GDP	gross domestic product
GNI	gross national income
GSMA	Global System for Mobile Communications Association
GST	goods and services tax
IMPS	Immediate Payment System
INR	Indian Rupee
IPPB	India Post Payments Bank
km	kilometers
KYC	know your customer
MDR	merchant discount rate
MFI	micro finance institutions
MNO	mobile network operator
MNREGA	Mahatma Gandhi National Rural Employment Guarantee
NBFC	Nonbank financial companies
NEFT	National Electronic Funds Transfer
NFLIS	National Financial Literacy and Inclusion Survey

NITI Aayog	National Institution for Transforming India
NPCI	National Payments Corporation of India
NUUP	National Unified USSD Platform
OVD	officially valid document
P2B	person-to-business
P2P	person-to-person
PAN card	Permanent Account Number card
PMJDY	Pradhan Mantri Jan-Dhan Yojana (National Mission for Financial Inclusion)
POS	point-of-sale
PPI	prepaid instrument
PPP	purchasing power parity
QR code	quick response code
RBI	Reserve Bank of India
RTGS	real-time gross settlement
RuPay	A domestic card payment system managed by NPCI
SACCO	savings and credit cooperative
SBI	State Bank of India
SDGs	United Nations Sustainable Development Goals
SMS	short message service
TPAP	third-party app provider
TRAI	Telecoms Regulatory Authority of India
UIDAI	Unique Identification Authority of India
UPI	Unified Payments Interface
USD	United States Dollar
USSD	unstructured supplementary service data

A note on numbering

India uses its own system for large numbers. Some sources referenced may mention *laks* and *crores*: 1 lakh = 100,000; 1 crore = 10 million.

Foreword

Financial inclusion, especially through digital means, is broadly regarded as a catalyst for development and a driver of economic inclusion. While a large number of countries have implemented policy changes to advance digital financial inclusion, results are mixed and there is a substantial divide between countries that have achieved great success and those that continue to lag behind.

To support policymakers' efforts to improve the effectiveness of their financial inclusion strategies, in early 2020 CGD published an analytical framework, *A Decision Tree for Digital Financial Inclusion Policymaking*, that allows a systematic identification of the most problematic constraints in country-specific settings. Many constraints can restrict financial inclusion, but to different degrees. Therefore, the Tree aims at diagnosing which constraints are binding, i.e., impeding significant usage of digital financial services. Without this kind of analysis, gaps in financial inclusion strategies may persist and policymakers may focus attention on non-binding constraints, obstacles whose solutions will not deliver significant improvements unless other first-order impediments are addressed.

The Tree methodology uses a deductive top-down approach to analyze various potential demand and supply causes (branches in the tree). An important feature of the analytical framework is that it calls for analysis of the observed (or shadow) prices of digital financial services to identify the most pressing (binding) constraints. Application of the methodology involves benchmarking with a wide-ranging set of indicators, including aggregate and micro-level statistics as well as survey data to reflect providers' and consumers' perceptions.

In this paper, Nandini Harihareswara and Howard Miller apply the Tree methodology to the case of India.

Despite stakeholders' concerted efforts and significant investments, over 600 million Indians remain currently financially excluded. In a country where Aadhaar has successfully achieved almost universal digital ID coverage, this outcome is particularly concerning and hard to understand.

This paper performs an in-depth assessment of digital payments and transfers' fees, as well as additional costs (e.g., cost of using cellphones) that consumers may face. Using rich domestic data sources and international comparisons of prices, Harihareswara and Miller show that, while average prices of these services are generally low in India, relative costs for low-income populations and women is high. Since their initial analysis points to potential binding constraints on both the supply and demand sides, the authors engage in a deep assessment of each branch of the Tree. To this end, they make extensive use of international and local databases and other sources of information, including reports from the Reserve Bank of India (RBI) and the National Payments Corporation of India (NCPI). A comprehensive review of the literature and a series of interviews with major stakeholders complement their work.

Harihareswara and Miller's conclusions are thought-provoking. In India, there is an unlevel-playing field that favors the primarily-state-owned banking sector, curtailing competition and limiting the provision of innovative digital payment services to reach the poor. The root cause of this environment could potentially be attributed to institutional weaknesses that perpetuate a bank-led model that has neither the agility nor the incentives to expand digital payment services to marginalized populations. Moreover, under the existing rules of the game, large segments of the population (including low-income populations and women) do not perceive significant benefits in adopting digital payments since the existing services do not meet their needs. The institutional binding constraint on the supply side and individual constraints on the demand side interrelate preventing the market to reach a critical mass that would allow for more rapid growth.

In this complex environment, the task that policymakers face is substantial. We expect that this paper will equip all stakeholders with a clear analytical framework and evidence-based evaluation that will clarify how to find the binding constraints that have stifled financial inclusion in India.

This is the first in a series of five policy papers that employ the Decision Tree methodology that my colleagues and I developed to disentangle the most pressing constraints to financial inclusion in countries where the low levels of inclusion are truly concerning and a hindrance to prosperity. The other four papers study Ethiopia, Indonesia, Mexico, and Pakistan.

To learn more about this project, find these papers, and read additional material, please visit cgdev.org/page/policy-decision-tree-improving-financial-inclusion.

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1. Introduction

Financial inclusion—and particularly digital financial inclusion—is a major priority area for the government of India. A raft of policy initiatives have been implemented to expand financial services as a tool for development, most prominently the mass expansion of bank accounts through the Pradhan Mantri Jan-Dhan Yojana (PMJDY—National Mission for Financial Inclusion). Such efforts have been underpinned by investments in infrastructure from the public and private sectors, such as Aadhaar (a national digital ID) and the rapid expansion of mobile phones and Internet services. However, despite these initiatives and the increased *access* to financial services, their *usage* remains relatively low, particularly in rural and lower-income communities.

The objective of this paper is to develop a firm understanding of why, despite many efforts and positive conditions, usage of digital financial services in India remains low. Using a decision tree framework, developed by Claessens and Rojas-Suarez¹ based on the work of Hausmann, Rodrik, and Velasco,² the paper uses a range of available data to analyze potential constraints on the supply and demand sides of the market in order to identify which of these constraints are binding. The paper focuses on digital payments and transfers as the most common entry point to broader digital financial services.

The aim of the exercise is to support policymakers and the broader Indian financial services ecosystem to address those constraints to further the expansion of inclusive financial services across India.

Section 2 describes the current landscape of digital payments and transfers in India and how their outreach remains relatively low. Section 3 describes the decision tree methodology, and section 4 breaks down the various prices of accessing and using different digital financial services. Sections 5 and 6 contain the data-driven analysis based on the decision tree framework, section 5 covering supply-side constraints and section 6 those on the demand side. The analyses in these two sections permit the identification of binding constraints. Section 7 provides the conclusion.

2. Digital payments and transfers in India: Landscape and measurements

2.1. The landscape of digital payments and transfers in India

The landscape of digital payments and transfers in India is dominated by banks. India has a large and differentiated banking system including commercial banks (public and private), payments banks, and small finance banks.^a Unlike in many countries, there is no mobile money system that runs in parallel to the banking system—*mobile money* is not a term that is widely understood.^b Mobile network operators (MNOs) are able to operate in the digital finance space only through a subsidiary payments bank (e.g., Jio Payments Bank, Airtel Payments Bank). All banks are regulated by the Reserve Bank of India (RBI).

Digital payments providers, including financial technology firms, or *fintechs* (such as PhonePe), and international technology companies (such as Google Pay) are third-party app providers that offer front-end payments services to customers, but their products are built on the infrastructure of the banking sector. In order to utilize these services, customers must first have a bank account. Banks offer a range of accounts, from standard current (called *checking* in the United States) and savings accounts to basic savings bank deposit accounts (BSBDAs) opened through the Pradhan Mantri Jan-Dhan Yojana (PMJDY, or National Mission for Financial Inclusion).³

The providers sit on top of a network of digital infrastructure. India has a unique digital ID system, Aadhaar, that allows for simple, biometric-based know-your-customer (KYC) security for account opening and transactions. Aadhaar currently covers 1.27 billion⁴ people in India, or 94 percent of the population. Digital payments infrastructure mostly sits within the National Payments Corporation of India (NPCI), a not-for-profit organization majority-owned by a consortium of India's largest banks. NPCI is responsible for a number of digital finance channels, including the Unified Payments Interface (UPI)^c as well as the National Financial Switch network of automated teller machines (ATMs), IMPS (Immediate Payment System), RuPay (a domestic debit card that competes with Visa and MasterCard), the Aadhaar Enabled Payment System (AePS), and others. Other payment systems, such as real-time gross settlement (RTGS) and National Electronic Funds Transfer (NEFT), are managed by RBI and are designed for large-value transactions. An Unstructured

^a Payments banks and small finance banks were both introduced by the RBI in 2015 in an attempt to create banking institutions focused, respectively, on payments and financing for small businesses. Other forms of banks less relevant for this paper include regional rural banks, foreign banks, and cooperative banks. India also has a large and active sector of nonbank financial companies and microfinance institutions that are active in savings and lending, but not in digital payments and transfers.

^b According to data from the Financial Inclusion Insights (FII) survey, only 7 percent of Indians had heard of the term *mobile money*, defined as “a service [that] allows a mobile phone to be used to send and receive money, make payments or other financial activities without the need for a bank account” (FII, “India Wave 6 Codebook,” London: Kantar, 2018).

^c UPI is an instant real-time payment system facilitating interbank transactions.

Supplementary Service Data (USSD) version of UPI called *99# does exist, but uptake is very low.^d

Through this infrastructure, digital payments providers offer a range of services. These include merchant payments—between the customer’s credit/debit card or mobile phone and the merchant’s point-of-sale (POS) device or quick response (QR) code—as well as person-to-person (P2P) and person-to-business (P2B) transfers through apps or online banking portals. Banks and nonbanks can also offer prepaid instruments (PPIs) that store value and can be used for low-value digital payments (but not transfers). Other financial service providers, such as microfinance institutions and savings and credit cooperatives (SACCOs), play an important role in inclusive financial intermediation but not in payments and transfers.

The nonbank digital payments space is, on the face of it, highly competitive. The largest players in terms of digital payments in the country are Paytm (a local fintech that became a payments bank), PhonePe (a local fintech), and Google Pay (a global tech company). Although official data on market share for digital payments are not published, estimates suggest that for UPI payments, the combined market share of Paytm, PhonePe, and Google Pay is more than 90 percent. The market is crowded with other players, large and small, including BHIM, a state-backed digital payments platform owned by NPCI, with the looming threats of WhatsApp (a global tech company owned by Facebook) and Jio (a local MNO), which both have large networks to leverage and have recently become connected through a strategic investment by Facebook in Jio. Table 1 provides a summary of the various types of providers and the services offered by them.

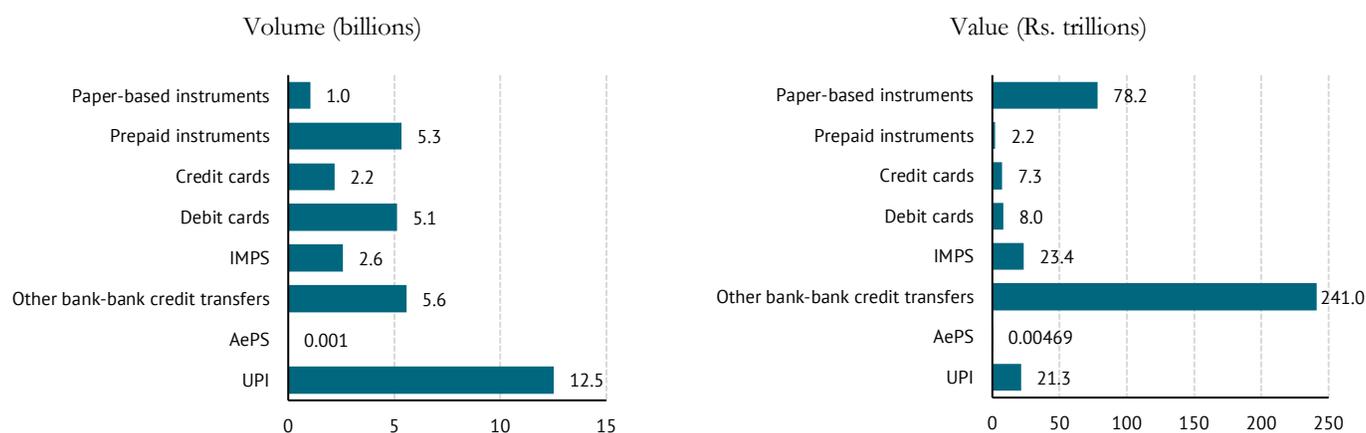
Table 1. Summary of types of providers and services offered

Type of provider	Payments and transfer services offered	Examples
Public-sector bank	<ul style="list-style-type: none"> • Credit/debit card payments • P2P and P2B transfers through many platforms, including UPI, IMPS, RTGS • PPIs 	State Bank of India
Private-sector bank	<ul style="list-style-type: none"> • Credit/debit card payments • P2P and P2B transfers through many platforms, including UPI, IMPS, RTGS • PPIs 	ICICI Bank, HDFC Bank
Payments bank	<ul style="list-style-type: none"> • Debit card payments • UPI-based P2P and P2B payments • PPIs 	Paytm Payments Bank, Airtel Payments Bank
Third-party app provider	<ul style="list-style-type: none"> • UPI-based P2P and P2B payments 	PhonePe, Google Pay

^d According to FII 2018, only 0.7 percent of the population used USSD codes to access financial services.

The graphs in Figure 1 demonstrate the relative magnitudes of selected payment offerings in financial year 2019–2020. It shows the success of UPI, which was only launched in 2016, in becoming the dominant form of digital payment by volume.

Figure 1. Volume and value of selected digital payments options



Source: RBI annual report, 2019–2020.⁵

Note: Rs. = Indian rupees.

The government of India has put forward several mandates to increase affordable financial services for low-income populations.^e BSBDA were enabled by the RBI in 2005 and had strong success. A BSBDA can be opened without any minimum balance, comes with a free ATM/debit card, and allows its account holders to make a maximum of four withdrawals in a month, including ATM withdrawals.⁶ In 2010, 73.5 million BSBDA were opened. As of 2020, 600 million accounts have been opened, according to RBI’s latest annual report.⁷

Those offerings were further bolstered by the advent of PMJDY accounts and payments bank accounts, starting in 2014 and 2016, respectively. According to PMJDY progress reports, more than 415 million accounts have been opened under the scheme as of December 2020.⁸ PMJDY accounts are a subset of BSBDA accounts and offer similar terms, with additional facilities such as a RuPay debit card, accident insurance coverage, and an overdraft facility. There has also been a small increase in the number of people with payments bank accounts, which also offer zero-minimum-balance and low-fee accounts, to about 26 million people (2 percent of the Indian population).

^e According to the RBI’s master direction on KYC, banks can also offer customers the option of opening a “small account.” A small account is an account in which the aggregate of all credits in a financial year does not exceed 100,000 rupees (Rs.), the aggregate of all withdrawals and transfers in a month does not exceed Rs. 10,000, and the balance at any point in time does not exceed Rs. 50,000. Small accounts and PMJDY accounts are counted as subsets of BSBDA (RBI, “Master Direction—Know Your Customer (KYC) Direction, 2016,” updated May 29, 2019, https://www.rbi.org.in/Scripts/BS_ViewMasDirections.aspx?id=11566).

2.2. Defining and measuring digital financial inclusion in India

Since the aim of this paper is to understand the binding constraints around greater digital financial inclusion in India, we first need to define exactly what it means to be digitally financially included. This could be done in a number of ways.

Financial inclusion is a complex topic and can mean different things to different people. An ideal indicator would reflect the evolution of thinking over time from one of access to one of usage and now, increasingly, to quality of usage, linked to financial health. This is based on a growing body of evidence (for example, high account dormancy) that expanding access to financial services is insufficient; these financial services need to have use cases and respond to the various livelihoods needs of different groups of people. This line of thinking is reflected in a 2019 report from an RBI-commissioned panel headed by Aadhaar architect Nandan Nilekani, which states that “pivoting the ecosystem from issuance to acceptance is the key to deepening digital payments in the country.”⁹

However, this focus on and measurement of usage needs to be traded off against the availability of data, particularly the need for reliable, nationally representative data from which to draw statistically robust conclusions. **For the purposes of this paper, we narrow the focus from digital financial inclusion to the usage of digital payments and transfers.** Using data on the usage of digital payments and transfers as a proxy for financial inclusion is an imperfect solution—the authors are conscious that plenty of Indians may be using savings accounts or accessing credit without making a digital payment or transfer. However, given the emphasis placed on digital payments in the government of India’s financial inclusion initiatives, the frequent role of payments and transfers as an on-ramp to other financial services, and the availability of robust, granular data from different sources, there is a compelling case to focus on digital payments and transfers in the Indian context.

The primary data source that we use to define digital financial inclusion in this case is a survey known as Financial Inclusion Insights (referenced throughout this paper as FII, 2018).^{f,10} This nationally representative survey of more than 48,000 people asks whether respondents have ever used various forms of digital transaction. We consider somebody to be digitally financially included if they have ever used any one of these forms of transaction:

- Ever made or received a payment using a mobile phone
- Ever used a payments bank or mobile money services^g

^f FII is an annual tracker survey of digital financial inclusion in 12 countries. It is a partnership between the Bill & Melinda Gates Foundation, InterMedia, and Kantar Research. In India, the survey ran annually from 2013 through 2018. The most recent data were collected between September and December 2018.

^g The FII 2018 questionnaire defined mobile money services as follows: “A mobile money service allows a mobile phone to be used to send and receive money, make payments or other financial activities without the need for a bank account” (Financial Inclusion Insights. “India Wave 6 Codebook”).

- Ever made or received a payment using a smartphone app, QR code, *99#, AePS, debit card, credit card, or RuPay card
- Sent or received money to/from someone using a bank, payments bank, post office bank, mobile money service, smartphone app, *99#, money transfer app, or AePS^h
- Paid for goods or services at a store, shop, restaurant, or other place of business using a bank, payments bank, post office bank, mobile money service, smartphone app, *99#, money transfer app or AePS, debit card, credit card, RuPay card
- Paid a bill, a fee (school, education, or training), or a payment to government (tax, fee, fine) using a bank, payments bank, post office bank, mobile money service, smartphone app, *99#, money transfer app or AePS, debit card, credit card, or RuPay card
- Received a payment from government or an employer using a bank, payments bank, post office bank, mobile money service, smartphone app, *99#, money transfer app, or AePS
- Paid for or received a payment from insurance using a bank, payments bank, post office bank, mobile money service, smartphone app, *99#, money transfer app or AePS, debit card, credit card, or RuPay card

By this definition, as of the end of 2018, 35 percent of the Indian adult population (ages 15 and older) were digitally financially included. This number approximately aligns with the result from the most recent Global Findex¹¹ study from a year earlier, in 2017, which found that 29 percent of the population had made or received digital payments in the previous year. The implication of this finding is that 65 percent of Indian adults—approximately 615 million people—are financially *excluded* by this definition.

This is not noncontroversial. Bank accounts are widely accessible in India, driven largely by the government’s PMJDY. Under this scheme, as of December 2020, more than 415 million bank accounts have been opened for low-income Indians.¹² According to Global Findex for 2017, 80 percent of the adult population had a bank account (2 percent of the population use payments banks, and only 1 percent use mobile money),¹³ and would be considered “included” by a broader definition of financial inclusion that relied solely on access to a bank account. Understanding the binding constraints on financial inclusion for the remaining 20 percent is important but would tell only part of the story.

^h We recognize that some of these payments can be made nondigitally, but we cannot disaggregate by those data and therefore choose to leave it in the definition.

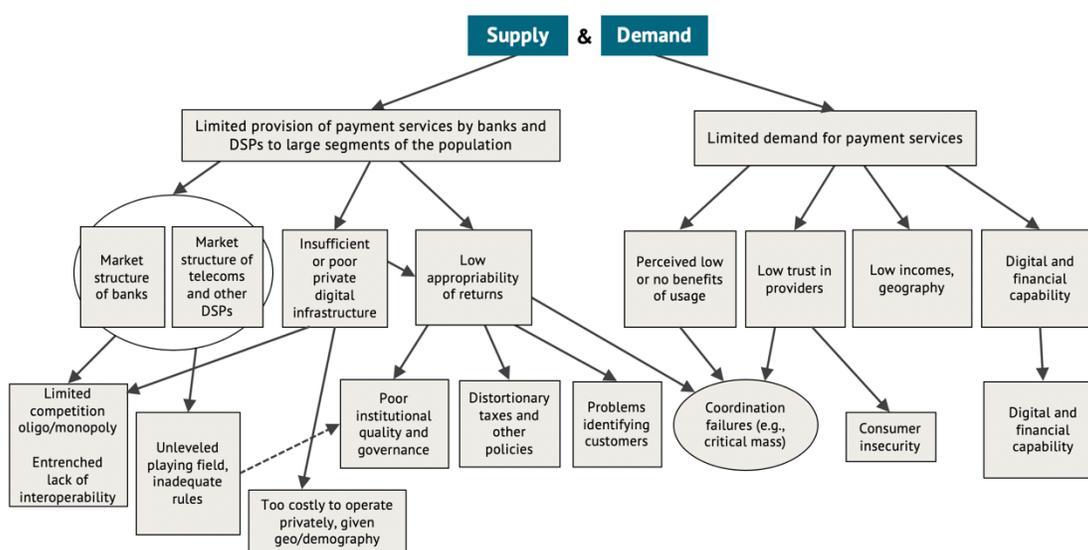
The 35 percent figure also likely underestimates the significant recent impact of UPI. FII data, collected in December 2018, suggest that only 33 million Indians had made a payment using a mobile phone and 22 million had made a payment using an app. NPCI publishes regular updates on the volume and value of UPI transactions, but this has limited utility for understanding financial inclusion—for example, we know that there were more than 2 billion transactions made through the UPI platform in October 2020,¹⁴ but data are not provided on how many unique users are using UPI. (NPCI has suggested informally that there are over 100 million users of the platform¹⁵). As there is no way of verifying the number of unique users of the platform and without adequate supply-side data, the demand-side data from FII provide a more useful indicator on which to base the analysis, even if it is not fully up-to-date. This definition of digital financial inclusion also does not take into account the acceleration of COVID-19 support payments made into low-cost bank accounts through 2020.¹⁶

Our definition may also be viewed as overly optimistic. We count as included anyone who has ever made any kind of digital payment or transfer. If we limited it to people who had used a service in the past year, the financial inclusion rate would fall to 29 percent; if we used a 30-day cutoff, it would reduce by half. Likewise, more than half of the people we consider to be included have only ever used one digital payment or transfer service; if we excluded those who are included only by virtue of having received a government payment into a bank account, the rate of digital financial inclusion would fall to 26 percent.

3. The decision tree methodology

As discussed in the introduction, this paper uses the decision tree methodology developed by Claessens and Rojas-Suarez¹⁷ to assess constraints on advancements in digital financial inclusion, and to identify—of these constraints—which are binding. The methodology follows a top-down approach, starting from documenting an aggregate outcome (in this paper, the evident low usage of digital payments and transfers in India) and then turning to the potential causes of this outcome (the upper branches of the tree). Each of these potential causes can in turn be explained by additional factors (the lower-level branches), and so on. This deductive approach serves to identify what the root causes of the problem are. This section presents an overall description of the methodology. Further details are discussed in Appendix 1. The tree divides the potential constraints between those that affect the supply side and those that affect the demand side of the financial service under analysis. Figure 2 shows the decision tree for digital payments and transfers.

Figure 2. The decision tree for digital payment and transfer services in India



Source: Claessens and Rojas-Suarez, 2020.

Note: DSPs = (nonbank) digital service providers.

The top branches of the tree identify three main factors that can potentially affect the supply of digital payments and transfers by banks and nonbanks: constraints arising from the market structure of the providers, low or poor provision of digital private infrastructure, and problems in appropriating returns from the offering of financial services. The tree also identifies four factors that can potentially affect the demand for digital payments and transfers: digital and financial capability, perceived low or no benefits of usage of services, low trust in providers, and the population’s low levels of income or difficult geographic settings.ⁱ

In turn, each of the constraints on the supply and demand sides will have different causes, depicted in the lower branches of the tree. For example, the two determinants of market structure characteristics that can impact digital financial inclusion are the degree of competition between providers and the rules under which these providers operate. Either limited competition or a regulatory environment that discriminates against some providers (i.e., an unlevel playing field) can be a major constraint on financial inclusion. Likewise, since low appropriability of returns refers to the capacity of providers to capture profits, this potential constraint can in turn be affected by (1) distortionary policies (such as taxes on digital financial transactions), (2) poor institutional quality, (3) problems identifying customers for the purpose of satisfying internal (to the financial service providers) and government-imposed KYC requirements, and (4) the presence of coordination failures,

ⁱ The Claessens and Rojas-Suarez (2020) methodology includes “financial literacy” in its decision tree for store-of-value services and “technical literacy” in its decision tree for credit services. We believe that financial and digital capability belong to the tree for payment services in India. Moreover, we have added a sub-branch for “social norms” that we think explains the lack of financial and technical literacy of a large proportion of women in India.

especially when the lack of a critical mass of customers does not allow providers to reach needed economies of scale to make the provision of digital financial services profitable.

Similarly, constraints on the demand side can have lower-branch causes. For example, low trust in the providers can be attributed to consumer insecurity due to experiences with fraud. All of the top and lower branches of the decision tree will be analyzed in this paper.

While all constraints may be relevant for explaining digital financial inclusion, the main goal of the decision tree methodology is to identify where the true root of the problem lies—in other words, of all the constraints, which are binding. To help the search for binding constraints, the methodology proposes four principles, first suggested by Hausmann, Klinger, and Wagner.¹⁸

The first, and perhaps most important, principle is that prices (fees and commissions) of digital financial services can provide powerful signals to distinguish between supply and demand constraints. The quantity of usage (i.e., the level of financial inclusion) provides some information, but low usage could be consistent with either low supply or low demand (or both). According to the decision tree methodology, if usage is low and prices are low, it would signal that suppliers are constrained in what they can charge by low demand. Conversely, low usage and relatively high prices would signal that constraints are more likely on the supply side. As indicated by Claessens and Rojas-Suarez,¹⁹ it is important to note that the relevant price determining the demand for payment services includes not only the market price but also all costs incurred in obtaining the service (such as time spent completing required documentation or the cost of traveling to reach a provider). A graphical explanation of this principle is presented in Appendix 1. Because of its importance and for the purpose of obtaining initial signals about whether the binding constraints are on the supply or the demand side, a comprehensive analysis of prices of digital payment and transfer services is presented in section 4.

A second principle to identify whether a constraint is binding is considering what happens to usage when the constraint is removed (or relaxed). If a constraint is binding, we would expect a substantial increase in the usage of the financial service when this constraint is removed or relaxed. The third principle states that an additional indication that a constraint is binding is finding evidence that agents in the economy affected by the constraint are attempting to bypass it. Finally, the fourth principle implies that a constraint might be binding if we observe that groups in the economy who are not affected by it are thriving.

Thus, to apply this methodology to the usage of digital payments and services in India, the next steps are to collect indicators to assess the relevance of each, and all of the potential constraints depicted in the decision tree and to use the four principles enunciated above to determine whether a constraint is not only relevant but also binding.

4. The prices of digital payments and transfers in India

As discussed in the methodology section, analyzing the behavior of prices of financial services can provide signals to assess whether binding constraints can be attributed to supply or demand factors. Judging whether the price of digital payments is high or low can be complicated. The direct monetary cost of a financial transaction is only one component of the true cost—a full analysis must also include the range of indirect and nonfinancial costs involved in making a digital payment or transfer. These include fixed costs, such as obtaining documentation for KYC, and variable costs, such as the financial and time costs of traveling to a financial access point. Signals of the relative price of financial services can also be gauged by making comparisons with peer-group countries. Table 2 is an international comparison of digital payment transaction ATM withdrawal fees and made across bank accounts and mobile network operators.^j The international price comparison examines the following, across several countries: (1) the fee for adding 1 percent of the gross national income (GNI) per capita to an account/wallet (we use this measure because it normalizes for country wealth and population); (2) the fee for sending 1 percent of GNI per capita to a nonregistered user;^k (3) charges for sending 1 percent of GNI per capita as a percentage of transaction amount; (4) ATM fees for withdrawal of funds; and (5) ATM fees as a percentage of transaction amount. As discussed in section 2, India has a bank-led model whereby having a bank account is a prerequisite to making digital payments and using other digital services such as mobile wallets (Paytm) and UPI. In India, one cannot make digital payments to a user if that user does not have a bank account in India.^l Note this assumes the recipient of the transfer has a bank account in India. No method of digital payment will work in India if the payee does not have a bank account.

^j Please note that this comparison involves mobile money products that are in bank-led models and some that are not. However, the chart is used simply to indicate where India's products stand compared with indicative international financial products that offer the same or similar services.

^k We define a nonregistered user as a user who does not have a registered account with any financial institution, including the one being used to send the funds by the sender.

^l While some prepaid instruments (PPIs), such as prepaid debit cards, are used, the most common way to load funds onto a PPIs is through a bank account. Therefore, the primacy of a bank account still holds true.

Table 2. International comparison of digital payment transaction fees: ATMs and transfers

Country	Indicative digital payments provider	Currency	1% of GNI per capita in local currency (USD PPP)	Charge for adding 1% of GNI per capita, PPP, to account/wallet	Charge for sending 1% of GNI per capita, PPP, to a nonregistered user in local currency	Charge for sending 1% GNI per capita, PPP, in local currency, as percentage of transaction amount	ATM fees for withdrawal in local currency (USD) ²⁰	ATM fees as percentage of transaction amount
Bangladesh	bKash ²¹	Bangladeshi taka (BT)	661 (US\$8)	0	5	1%	BT 30 (US\$0.35) on min. withdrawal of BT 2,000 (US\$24)	1.45%
Ethiopia	M-BIRR ²²	Ethiopian birr (ETB)	167 (US\$4)	0	12	7%	n/a	n/a
India	Paytm ²³	Indian rupee (INR)	1,023 (US\$14)	0 ^m	0*	0%	3 free withdrawals per month; after that, INR 20/transaction (US\$0.27 per withdrawal; US\$1.35 min. withdrawal)	20%*
	Google Pay ²⁴ (UPI)			n/a	0*	0%	n/a	n/a
	State Bank of India ²⁵ (UPI/NEFT/RTGS)			0	0*	0%	4 free withdrawals per month (including ATM withdrawals at own and other banks' ATMs). After that, INR 15 plus GST for every additional cash transaction (US\$0.21 on min. withdrawal of US\$1.35)	15%*
Kenya	M-Pesa ²⁶	Kenyan shilling (KSH)	917 (US\$8)	0	49	5%	KSH 34 (US\$0.31) on min. withdrawal of KSH 200 (US\$1.82)	17%

^m For all transactions of loading money into a mobile wallet via a credit card, 2 percent (inclusive of goods and services tax, or GST) is charged. There is no charge for loading money into the wallet through other mediums such as NEFT, UPI, or IMPS.

Mozambique	M-Pesa ²⁷	Mozambican metical (MT)	219 (US\$3)	0	20	9%	MT 10 (US\$0.13) on min. withdrawal of MT 101 (US\$1.35)	10%
Nigeria	MTN MoMo ²⁸	Nigerian naira (NGN)	3,467 (US\$9)	n/a	10	0.29%	n/a	n/a
Pakistan	Easypaisa ²⁹	Pakistani rupee (PKR)	651 (US\$4)	0	40	6%	PKR 15 (US\$0.09) on min. withdrawal of PKR 500 (US\$3.12)	3%
Rwanda	MTN MoMo ³⁰	Rwandan franc (RWF)	6,571 (US\$7)	0	700	11%	RWF 504 (US\$0.51) on min. withdrawal of RWF 1,000 (US\$1.03)	50%
South Africa	MTN MoMo ³¹	South African rand (ZAR)	527 (US\$34)	0	10	2%	n/a	n/a
Tanzania	M-Pesa ³²	Tanzanian shilling (TZS)	19,823 (US\$9)	0	2,210	11%	TZS 350 (US\$0.15) on min. withdrawal of TZS 1,000 (US\$0.43)	35%
Uganda	MTN MoMo ³³	Ugandan shilling (UGX)	26,197 (US\$7)	0	2,310	9%	UGX 1,150 (US\$0.31) on min. withdrawal of UGX 2,501 (US\$0.68)	46%
Zambia	MTN MoMo ³⁴	Zambian kwacha (ZMK)	67 (US\$3)	0	5	8%	n/a	n/a
Zimbabwe	EcoCash ³⁵	Zimbabwe dollar (ZWD)	13 (US\$0.035)	0	1.42	11%	n/a	n/a

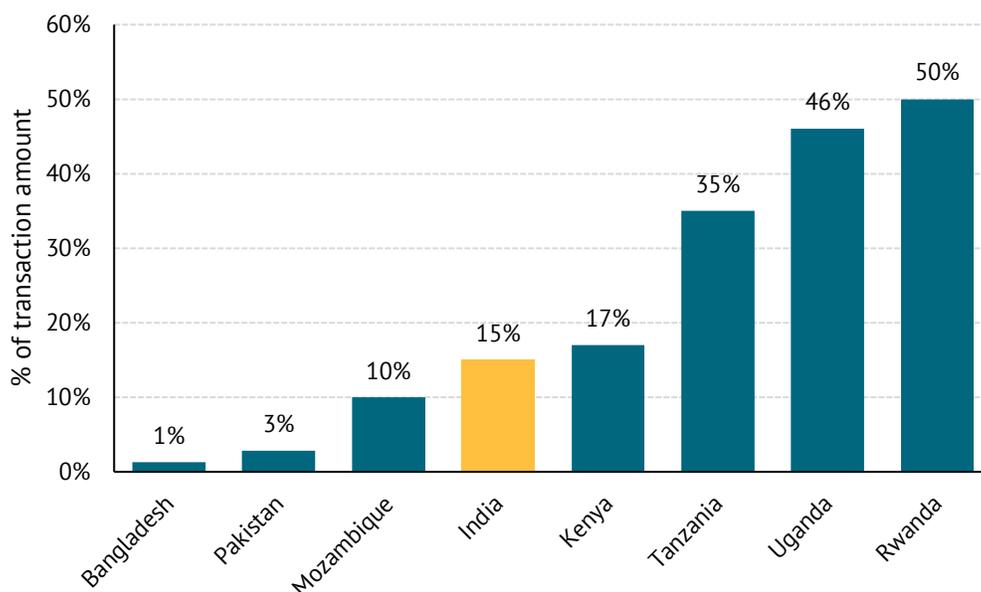
Sources as noted in Endnotes.

Note: GST = goods and services tax; PPP = purchasing power parity; USD = US dollars. * Indian digital payments allow for three or four free ATM withdrawals per month; the numbers here represent any withdrawal above that threshold.

* Indian digital payments allow for –4 free ATM withdrawals, but the numbers here represent any withdrawal above that threshold.

A first notable trend (not shown in the table) is that the fee for opening a formal financial account in all countries in this sample is zero. In India, a BSBDA can be opened without any minimum balance, is provided with a free ATM/debit card, and allows its account holders to make a maximum of four free withdrawal transactions in a month, including ATM withdrawals.³⁶ For example, the State Bank of India (SBI) provides four free withdrawal transactions a month, which includes network and nonnetwork ATM withdrawals. Customers are charged a fee only after they exceed their monthly free transaction limits.ⁿ Users can also open mobile wallets through providers of PPIs, such as Paytm, for no additional charges.³⁷ Because opening a mobile wallet and a basic bank account has no costs associated (though several costs for using these services are still applicable) and these services have become essentially free—with a push from regulators—affordability of charges (on paper) as a barrier to opening an account is almost a nonissue. So, the cost for using an ATM in India could also be zero, provided a customer does not exceed the free limits in a basic account. Figure 3 presents an international digital payment comparison of ATM withdrawal fees across countries. Figure 4 presents an international comparison of charges for sending 1 percent of GNI per capita at purchasing power parity (PPP), as a percentage of the transaction amount.

**Figure 3. International digital payment comparison:
ATM withdrawal fees as a percentage of transaction amount**

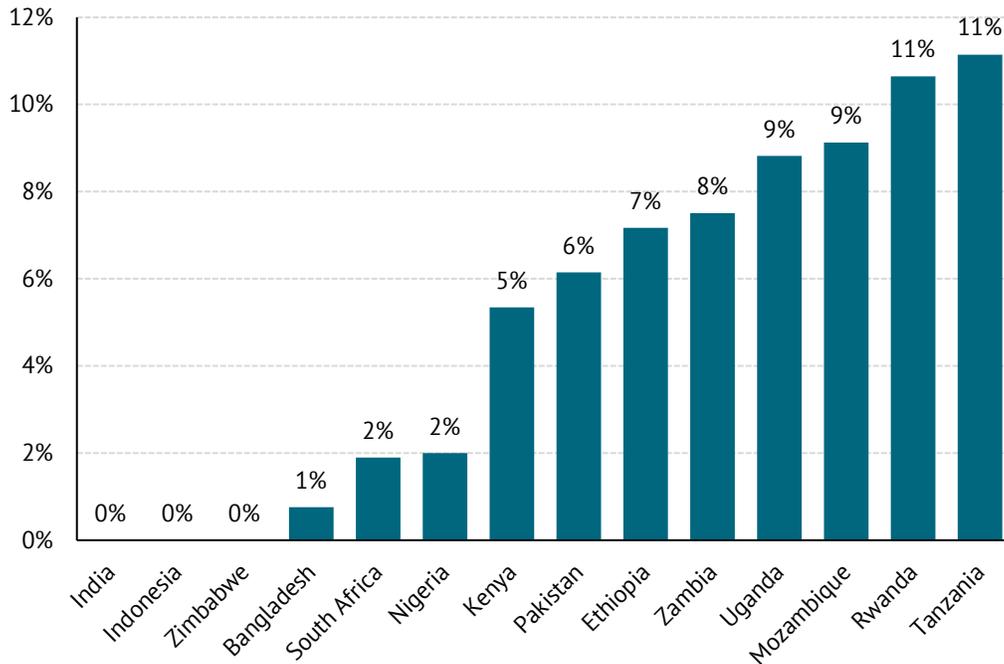


Sources the same as those noted in Endnotes in Table 2 for each country.

ⁿ Appendix 2 describes various free and fee-based ATM transactions in the Indian landscape across public and private banks.

A second trend is that in the current regulatory environment, the Indian price of sending money (within the Indian borders) to a nonregistered user using digital payments is the lowest among countries in the sample, *as long as the nonregistered user has a bank account*.

Figure 4. Charges for sending 1 percent of GNI per capita, PPP, in local currency, as a percentage of transaction amount



Sources the same as those noted in Endnotes in Table 2 for each country.

That Indian consumers face almost no charge for such a transaction is largely a function of policy. The RBI and NPCI currently mandate that payments between bank accounts are to be made for free. According to a recent circular from RBI, there will be no charges on all NEFT and RTGS transactions initiated either via mobile banking or through the Internet.³⁸ Some banks do charge a nominal transaction fee for processing such transactions when they are made in person at the bank branch, as shown in Table 3. Additionally, NPCI also removed any merchant discount rate (MDR) charges on UPI transactions beginning January 1, 2020.³⁹ Therefore, the RBI and NPCI have effectively removed transaction fees for all bank-to-bank transfers initiated online through payment systems such as NEFT, RTGS, or UPI. Table 3 describes the charges (which are quite low when they do exist) for transfers between bank accounts in India.

Table 3. Transaction fees across various bank transfer methods in India

Type of transaction	Medium of transaction	INR amount (USD) ⁴⁰	INR transaction fees (USD)
IMPS ⁴¹	Having a bank account is a prerequisite; transaction is initiated online	Up to INR 1,000 (US\$13.63)	INR 2.5 per transaction (US\$0.034)
		INR 1,000–INR 100,000 (US\$13.63–US\$1,363)	INR 5 per transaction (US\$0.068)
		INR 100,000–INR 200,000 (US\$1,363–US\$2,725)	INR 15 per transaction (US\$0.20)
NEFT	Having a bank account is a prerequisite; transaction can be initiated online and in person at the bank branch	NEFT (online): For all amounts	INR 0 (no charges if NEFT is initiated online versus by Internet banking and/or mobile apps of the banks). ⁴² Some banks also do not levy charges for NEFT transfers initiated in person at bank branches. ⁴³
		NEFT (at the branch): Amounts up to INR 100,000 (US\$1,363)	INR 2 per transaction ⁴⁴ (US\$0.02)
		NEFT (at the branch): Amounts greater than INR 100,000 (US\$1,363)	INR 10 per transaction ⁴⁵ (US\$0.14)
RTGS	Having a bank account is a prerequisite; transaction can be initiated online and in person at the bank branch	RTGS (online): For all amounts	INR 0 (no charges if RTGS is initiated online versus by Internet banking and/or mobile apps of the banks). ⁴⁶ Some banks also do not levy charges for RTGS transfers initiated in person through bank branches. ⁴⁷
		RTGS (at the branch): INR 200,000 (US\$2,725) and greater	INR 15 per transaction ⁴⁸ (US\$0.20)
UPI	Having a bank account is a prerequisite and needs mobile application, such as Google Pay, Phonepe, or BHIM, to operate	For all amounts	INR 0 (No MDR charges on UPI transactions continue as of January 1, 2021, irrespective of transaction amount). ⁴⁹

Sources as noted in Endnotes.

Apart from using credit cards to add funds to Paytm mobile wallets, the charge for adding money is mostly zero. The apparent implication of this low financial price of digital payments in India would be that binding constraints are likely to be on the demand side. However, to further understand the *total* cost of financial services to the customer, we need to unpack what exactly is included in that cost, as the financial price charged by the financial service provider is just one element. The cost to the customer of financial services comprises fixed and variable costs. Fixed costs are things like ownership of a mobile phone, opening a bank account or access to the prerequisites for an account, such as a national ID. Variable costs are the marginal costs associated with each transaction—things like travel to and from an access point, transaction fees paid to the financial service provider, and data charges required for using Internet-based services. Broadly speaking, access has a fixed cost; usage has marginal costs.

4.1. Cost-to-customer analysis

Table 4 and Table 5 below give a sample breakdown of the most likely fixed and monthly variable costs associated with accessing and using digital payments. Depending on how far an individual is from their bank branch, ATM, agent, or equivalent, the cost to travel to that location will increase. This also does not count for the time value of money, especially given the high rate of time scarcity/poverty of low-income populations.⁵⁰ (Appendix 2 gives a more detailed breakdown of costs associated with undertaking different transactions by accessing and using a basic bank account versus a payments bank and a mobile wallet account.)

This analysis shows that while the fee for opening and using the basic bank account is almost zero, the cost to *customers* can be higher than zero given the necessary activities to de facto access and use a bank account. An Aadhaar card is mandatory for bank accounts that receive government subsidies through DBT (Direct Benefit Transfer) under various welfare schemes run by the central or the state government. For other banking services, such as regular bank accounts, an Aadhaar is a preferred KYC document but remains optional. Customers can submit any other officially valid document (OVD) in place of an Aadhaar as prescribed by the RBI.⁵¹

A Permanent Account Number (PAN) card, however, is mandatory for opening a regular bank account but not required for BSBDA accounts, “small accounts,” and PMJDY accounts.^{52,53} According to an RBI Master Direction circular, documents such as a passport, driver’s license, Aadhaar, voter’s identity card, or Mahatma Gandhi National Rural Employment Guarantee job card count as OVDs. In cases in which a customer’s OVD does not have an updated address, utility bills—such as electricity, piped gas, water, or landline telephone—property tax receipts, pension payment orders, and letters of allotment of accommodation from employers are also valid proof-of-address documents, provided they are recent and reflect the current address.⁵⁴ All of these are requirements to open a basic bank account with most banks in India.

Table 4. Sample of fixed costs for accessing and using digital financial services

Fixed Item Cost	INR Cost Range (USD) ⁵⁵	INR Average Cost (USD) ⁵⁶	Cost as a % of GNI per capita ⁵⁷
Applying for an Aadhaar	Free enrollment ⁵⁸	0	0
Applying for a PAN Card	INR 93 ⁵⁹ (US\$1.27)	INR 93 (US\$1.27)	0.06%
SIM card ^o	Free	-	-
Mobile feature phone ^p	INR 639 ⁶⁰ –INR 1,099 ⁶¹ (US\$9–US\$15)	INR 869 (US\$12)	0.56%
Smartphone	INR 4,199–INR 8,000 ⁶² (US\$57–US\$109)	INR 6,000 (US\$83)	3.91%
Total fixed costs including a feature phone	n/a	INR 962 (US\$13.27)	0.62%
Total fixed costs including a smartphone	n/a	INR 6,093 (US\$84.27)	3.97%

Sources as noted in Endnotes.

Table 5. Sample of monthly variable costs for accessing and using digital financial services

Monthly variable item cost	INR cost range (USD) ⁶³	INR average cost (USD)	Cost as a percentage of GNI per capita ⁶⁴
Monthly mobile data pack (prepaid)	INR 48 ⁶⁵ –INR 599 ⁶⁶ (US\$0.65–US\$8)	INR 323 (US\$4)	0.18%
Monthly mobile talk time to make phone calls (prepaid)	INR 10–INR 100 ⁶⁷ (US\$0.14–US\$1.36)	INR 55 (US\$0.75)	0.03%
Traveling 5 km to financial access point	INR 10–INR 25 ⁶⁸ (US\$0.14–US\$0.34)	INR 17.5 (US\$0.24)	0.01%
Monthly travel costs (assuming travel once a month)	n/a	INR 210 (US\$3)	0.14%
Total monthly variable costs	n/a	INR 588 (US\$8)	0.37%
Total annual variable costs	n/a	INR 7,056 (US\$96)	4.52%

Sources as noted in Endnotes.

^o Providers like Airtel and Jio no longer charge separately for a SIM card and have similar low charges in other countries as well.

^p These price ranges are indicative of and applicable for India only. While these are currently the cheapest phones available, sellers usually have discounts around festivals or other offers, which can reduce the price further. A *feature phone*, unlike a *smartphone*, has a non-touch display and button-based interface.

While the cost of opening a basic bank account is notionally free, Table 6 shows that, in many cases, there are hidden costs associated with KYC. While one of the objectives of Aadhaar, the national ID system, was to reduce the costs of KYC, there remain costs associated with opening an account that may need to be considered in order to assess the overall cost of financial services.

Table 6. Costs associated with procuring KYC documents

KYC document	Application fee	Application fee (USD) ⁶⁹	Cost as ratio to GNI per capita ⁷⁰
Aadhaar	Free enrollment ⁷¹	0	0
Birth certificate	Free if registered within 21 days ⁷²	-	-
Driver's license	INR 440–INR 540 ⁷³	US\$6–US\$7.36	0.28%–0.35%
Mahatma Gandhi National Rural Employment Guarantee job card	Free ⁷⁴	-	-
PAN card	INR 93 ⁷⁵	US\$1.27	0.06%
Passport	INR 1,500 ⁷⁶	US\$20.44	0.96%
Police clearance certificate	INR 500 ⁷⁷	US\$6.81	0.32%
Ration card	INR 100 ⁷⁸	US\$1.36	0.06%
Voter ID card	Free for new users ⁷⁹	-	-

Sources as noted in Endnotes.

For comparison, Table 7 shows those same costs (as a percentage of GNI per capita) in other countries. The cost of feature phones is approximately the same, and cost of smartphones are on the lower end in India. Therefore, the cost of the “hardware” required for digital financial services is low, comparatively. The same can be said but even more so for the cost of Indian data, where talk and text charging rates are some of the lowest in the world. According to the Alliance for Affordable Internet, the price of 1GB data in India as a percentage of average income (GNI per capita) is 0.45 percent, the fourth lowest in the world.⁸⁰

Table 7. International comparison of the cost of feature phones and smartphones

Country	Country local currency ⁸¹	Cost of a Nokia 105 dual SIM feature phone (local currency)	Cost of a Xiaomi Redmi 9A smartphone (local currency)	Cost of a feature phone by GNI per capita ⁸²	Cost of a smartphone by GNI per capita
Brazil	Brazilian real	76 ⁸³	688 ⁸⁴	0.15%	1.39%
India	Indian rupee	1,299 ⁸⁵	6,999 ⁸⁶	0.84%	4.50%
Indonesia ⁸⁷	Indonesian rupiah	250,350	2,338,166 ⁸⁸	0.44%	4.13%
Nigeria ⁸⁹	Nigerian naira	6,442	60,166 ⁹⁰	0.83%	7.72%
Uganda ⁹¹	Ugandan shilling	51,500	439,000 ⁹²	1.78%	15.21%
Zambia ⁹³	Zambian kwacha	249	2,333 ⁹⁴	0.95%	8.94%

Sources as noted in Endnotes.

Note: These specific phone models are used because they are the lowest-cost and most commonly available phones across all countries.

Tables 8 and 9 select and total the costs most likely to be applicable to the average low-income Indian. The cost of accessing and using digital financial services, as compared with the average GNI per capita (US\$2,120) and compared internationally, is quite low. However, it is still unlikely to be affordable for the majority of low-income Indians because it would equate to approximately US\$9 per day. Based on the lower-middle-income-class poverty line (US\$3.20 2011 PPP per day per capita), 659.8 million people, or 50.4 percent of the population, were poor in 2020.⁹⁵ Table 8 presents phone costs as a percentage of income for the ultra-poor, poor, and lower-middle-income population segments.

Table 8. Costs as a percentage of income across income levels

	Cost as a percentage of annual income (ultra-poor: income less than US\$1.25 per day) ⁹⁶	Cost as a percentage of annual income (poor: income US\$1.25 to US\$2.50 per day) ⁹⁷	Cost as a percentage of annual income (lower-middle-income poverty line: income US\$3.20 per day) ⁹⁸	GNI per capita ⁹⁹
Daily income ⁹⁴	US\$1.25	US\$2.50	US\$3.20	n/a
Annual income ⁹⁵	US\$360	US\$720	US\$922	US\$2,120
Total fixed costs as a percentage of annual income (includes cost of buying a smartphone) ⁹⁵	23%	12%	9%	4%
Total annual variable costs as a percentage of annual income ⁹⁵	26%	13%	10%	5%

Sources as noted in Endnotes.

Table 9. Phone costs as a percentage of income across income levels

Cost item	Cost as a percentage of annual income (ultra-poor: less than US\$1.25 per day) ¹⁰⁰	Cost as a percentage of annual income (poor: US\$1.25 to US\$2.50 per day) ¹⁰¹	Cost as a percentage of annual income (lower middle-income class: US\$3.20 per day) ¹⁰²	Cost as a percentage of GNI per capita ¹⁰³
Cost of a feature phone: Nokia 105 Dual SIM feature phone	5%	3%	2%	0.84%
Cost of a smartphone: Xiaomi Redmi 9A smartphone	26%	13%	10%	4.50%

Sources as noted in Endnotes.

⁹⁴ Assuming upper bounds for calculation.

⁹⁵ Assuming 24 working days a month, totaling 288 working days in a year.

⁹⁶ See Table 4 for fixed cost calculation.

⁹⁷ See Table 5 for variable cost calculation.

The total of fixed and variable costs for an ultra-poor person could be upwards of 49 percent of annual income, which could be considered a major barrier for uptake. There is also a gender gap of 20 percent for mobile phone ownership,^u a 23 percent gender gap for smartphone ownership, and a 50 percent gender gap for Internet access.¹⁰⁴ Women have less access to mobile phones, especially smartphones, in India—this is due to several factors: affordability, digital and financial capability challenges, as well as social and cultural norms that can prevent women from having access and agency, to be discussed in section 6.4.

There is also consideration to be given to the hidden costs, especially costs to middlemen, in opening bank accounts, as described by the World Bank in 2017, with one in five adults required to pay extra fees or gifts to open a Jan-Dhan account.¹⁰⁵ The 2015 National Stock Exchange of India report “Barriers to Basic Banking”¹⁰⁶ shared the following insights (which continue to apply today) from its groundbreaking study, indicating that while policy measures exist to try to give a wide range of options for customers to meet KYC and other requirements, implementation at the bank level may remain at the most conservative level of prescribed requirements, for a variety of reasons. The report showed that a strong percentage of bank representatives misrepresented KYC requirements, often requiring proof of a PAN card (83 percent of banks) and/or a “letter of introduction from an account holder” (26 percent of banks) despite the applicant’s presenting sufficient proof of identity and address. Applicants also said they often faced a hostile environment when trying to open accounts:

The most shocking finding from this study is the extent to which bank representatives misrepresent both product availability and client eligibility, effectively denying financial access to low-income customers solely upon their discretion.... When our investigators specifically requested the BSBDA and banks acknowledged the existence of this account, this was usually followed by misrepresentation of the customer’s eligibility as well as strong verbal disincentives to open such an account.... Secondly, bank representatives were observed to exaggerate and misrepresent Know Your Customer (KYC) documentation requirements.... This misrepresentation of account features and documentation requirements is further exacerbated by the complete absence of written information made available to the customer, even upon request. Thirdly, the accumulation of both direct (transport and documentation costs) and indirect costs (customer time spent travelling, waiting at the bank and collecting documents) also represents a significant barrier to financial inclusion. We note that before having a functioning account, investigators had to visit the bank a minimum of three times. Over these visits, the investigators dedicated a total of 7 hours on average to opening each account.... Even when investigators returned

^u The Global System for Mobile Communications Association defines the gender gap in mobile ownership and mobile Internet as how much less likely a woman is to own a mobile phone (or to use mobile Internet) than a man.

to open accounts with their paperwork complete, they often faced unpredictable time costs.¹⁰⁷

What do the price and cost to the customer of digital financial services tell us about potential areas of focus within the decision tree? The average financial price of accessing and using digital financial services in India is relatively very low, when compared on an international scale. This would lead us to potentially focus on demand-side constraint elements of the decision tree. However, we have been focusing on average costs. It is, indeed, the case that the cost and/or inaccessibility of digital payments to large segments of the population is high, especially for low-income populations and women. In those cases, high costs might hint that there are supply-side constraint elements that need to be further examined.

The analysis, depending on which perspective one takes, leads to both sides of the decision tree. And as we will discover, as we do the analysis, it is the intermixing and dynamic relationship between the supply- and demand-side factors that contribute to a result of only 35 percent of Indians digitally financially included.

5. Analysis of the supply side

If the total costs (financial and nonfinancial) of using digital financial services are relatively high for large segments of the population, that points to potential binding constraints on the supply side. According to the decision tree framework, this may come down to insufficient or poor provision of private digital infrastructure, certain characteristics of the market structure of banks and other digital financial service providers, or problems faced by the providers in appropriating the returns from their investments.

5.1. Provision of private digital infrastructure

5.1.1. Mobile phones (feature phones and smartphones)

The number of smartphones per 100 people in India quadrupled between 2013 and 2018¹⁰⁸ and continues to grow as prices reduce and access expands. Data from the Financial Inclusion Insights (FII) survey allow us to test the extent to which non-ownership of a smartphone constrains financial inclusion. We do this by creating two groups—one of smartphone owners (17 percent of the surveyed population) and one of smartphone nonowners—and testing the level of financial inclusion between these groups. The data show that 55 percent of people with a smartphone are financially included, compared with just 31 percent of people without a smartphone. At first sight, it would appear that this could potentially be a binding constraint for some of the population.

To get further insight, we can analyze the impact of smartphone and feature phone penetration on financial inclusion by studying the performance of India’s feature phone–based UPI platform. Around 70 percent of the Indian population owns a mobile phone¹⁰⁹ (with significant gender disparity—women are 20 percent less likely to own a mobile phone than men^v).

India does have a USSD-based platform, variously called National Unified USSD Platform (NUUP) or *99#, that allows people to make digital payments with just a feature phone (and no Internet). It was introduced as USSD 1.0 in 2012 and incorporated into the PMJDY scheme in 2014, with the objective of expanding basic services (P2P payments, balance checking) in rural and smaller urban areas. As of December 2016, the platform was integrated with UPI and renamed USSD 2.0.

The platform started off well, with NPCI reporting 41 million transactions through USSD 1.0 in FY 2016–2017 (although the total value of these transactions, INR 140 million, implies that a lot of them were balance inquiries). However, by the following year, the volume of transactions fell by 90 percent and there was no uptick in USSD 2.0. Usage has since remained very low—the volume of transactions has hovered around 100,000 per month with very little variation for the past 2 years (average transaction size has also stayed around INR 1,700).

The low usage of this service suggests that the binding constraint on the use of UPI is not in fact lack of access to smartphones and Internet services. If this is the case, why are people not using USSD 2.0?

We can use price indicators to analyze this question. In 2016, the Telecom Regulatory Authority of India (TRAI) ventured that cost may be the reason that people were not using the USSD platform. The pricing for accessing the platform had been set at INR 1.50 per transaction, and this was reduced by two-thirds, to 50 paise per transaction, in August 2016.¹¹⁰

There is evidence that this relaxation of the price constraint had some effect on the usage of the platform. The number of transactions in FY 2016–2017 (April 2016–March 2017) was 770,000, which rose to 2.21 million in FY 2017–2018. However, the number of transactions subsequently fell to 1.5 million in FY 2018–2019 and 1 million in 2019–2020.^w The implication of this may be that for a small number of customers, there was some price sensitivity to using the platform, and the relaxation of this price barrier did indeed increase usage. However, the numbers are vanishingly small compared with the Indian population, and price alone cannot explain the low usage of USSD platforms. The price, although reduced to a low level, remained nonzero, still higher than the zero price attached to other digital payments methods. This indicates that although access to a smartphone per se might not be a binding constraint, for lower-income populations, the interaction of lower

^v The gender gap is analyzed in more detail in section 6.

^w No subsequent significant price change was identified.

smartphone penetration and lack of a widely available, no-cost feature phone-based alternative may be a binding constraint.

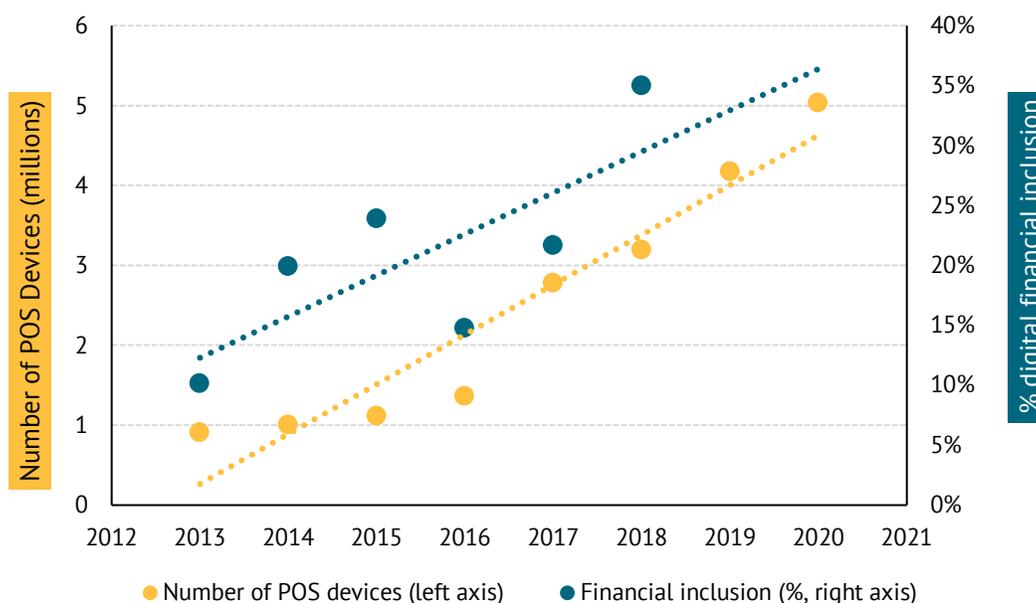
This leads us to ask, even though a service is available, why has there been very low uptake of feature phone-based digital payments? Anecdotal evidence suggests that the user interface was too complicated and insufficiently intuitive for new users. There may also be infrastructure-related constraints, for example limited cash-in-cash-out points—207 million people in India lack access to a banking outlet within 5 kilometers of their home.¹¹¹ It may also be the case that while significant resources have been invested in pushing smartphone-based UPI, through marketing, cash-back programs, and infrastructure investments, the resources devoted to feature phone-based payments have been insufficient to reach any scale. The reasons for these limited investments—and hence the binding constraints—may therefore lie in other branches of the decision tree, such as an unlevel playing field between different payment systems. An analysis by the Consultative Group to Assist the Poor (CGAP) in 2019 found that “the failure of *99# to scale may be because of the lack of incentives and the power dynamics between institutions with competing priorities” and that regulations that capped the revenues available to mobile network operators (MNOs) meant that profitable mobile money models were not possible.¹¹² This is further explored in section 5.2.

5.1.2. Point-of-sale devices, QR codes, and Aadhaar-enabled payment

The spread of point-of-sale (POS) devices is a useful supply-side indicator for the growth of digital infrastructure because POS devices are specifically and only about digital payments. Although not all digital payments require a POS device, they are a useful proxy indicator for the availability of one branch of digital payments infrastructure.

To test the availability of POS devices as a potential constraint on digital financial inclusion, we compiled time series data on the number of POS devices provided by Indian banks (public-sector banks, national private-sector banks, and payments banks). The number of devices has grown significantly, from fewer than 1 million in 2013 to more than 5 million in 2020. If the availability of POS devices were a constraint on digital financial inclusion, then we would expect that the relaxation of that constraint would lead to greater levels of financial inclusion. Figure 5 shows the trends in expansion of POS devices and digital financial inclusion.

Figure 5. Trends in expansion of POS devices and digital financial inclusion



Source: POS data from RBI;¹¹³ financial inclusion data from FII, 2018.

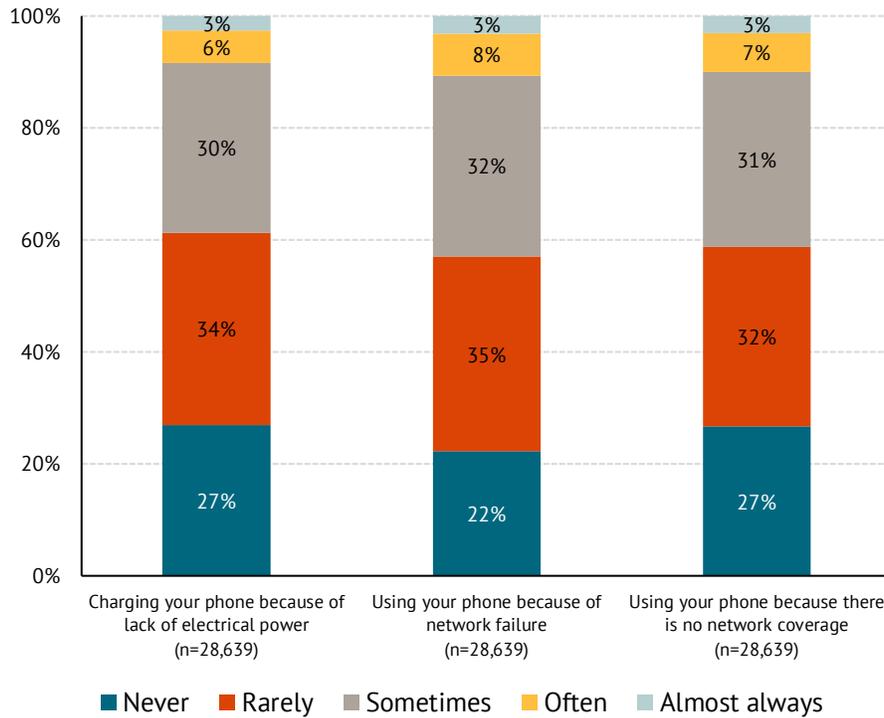
In fact, this is broadly what we see from the data. The growth of digital financial inclusion has closely tracked the expansion of the POS network. While this provides evidence only of a correlation, it could potentially indicate that this could have been a constraint and may still be one. However, given the other branches of the decision tree, it appears very unlikely that POS infrastructure could be a binding constraint on the growth of digital financial inclusion.

There are hopes that if POS infrastructure were a constraint, then lower-cost alternatives would soon remove it. QR codes can allow for acceptance of digital payments by a smartphone without the need to invest in POS hardware. The number of BharatQR (NPCI's QR code platform) codes in use has passed 3 million, and industry estimates¹¹⁴ suggest that, including QR codes of private providers, there may already be as many as 50 million QR codes being used by merchants in India. The number of micro-ATMs, which facilitate use of the Aadhaar Enabled Payment System (AePS), aimed at allowing basic digital transactions in rural areas, remain limited, with just 356,000 as of November 2020.¹¹⁵

5.1.3. Availability and reliability of electrical power and mobile networks

In order for digital payments to grow in a sustainable way, it is critical that electricity and mobile networks be both available (to make a payment) and stable (so that payments do not fail). As shown in Figure 6, of people who own a mobile phone, around 40 percent have a problem sometimes, often or almost always with lack of sufficient electrical power, lack of network coverage, or network failure. The remaining approximately 60 percent rarely or never have a problem.

Figure 6. Frequency of people facing power and network failures, 2018

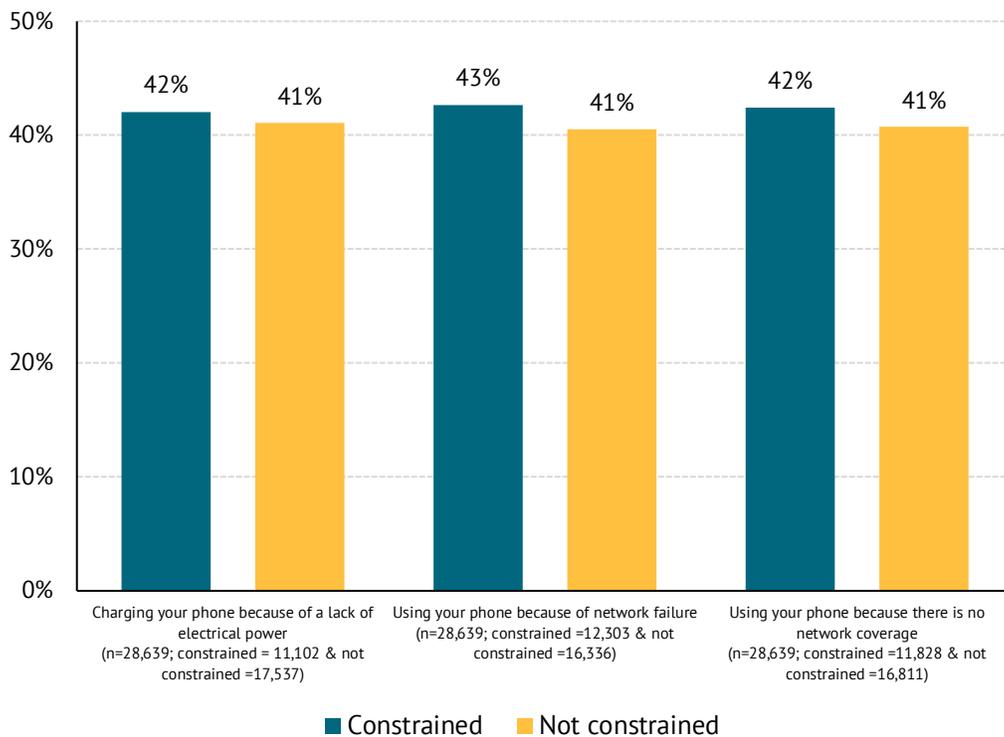


Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

For these 40 percent of the population who own a mobile phone but are constrained in some way by access to the mobile infrastructure (power, network availability, or reliability) to use that phone for payments, access to infrastructure could be a constraint on digital payments use. Are these people less likely to use digital payments? We can test this by seeing whether people who are constrained by access to infrastructure are more likely to be financially excluded. As shown in Figure 7, if the constraint is binding, we would expect people facing the constraint to demonstrate lower levels of financial inclusion than those not facing the constraint.

Figure 7. Levels of financial inclusion among groups who own a phone but have problems, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

There is no significant difference in levels of financial inclusion between people who face these constraints and people who don't. This suggests that access to power and mobile networks to operate a phone are not constraints on digital financial inclusion in India.

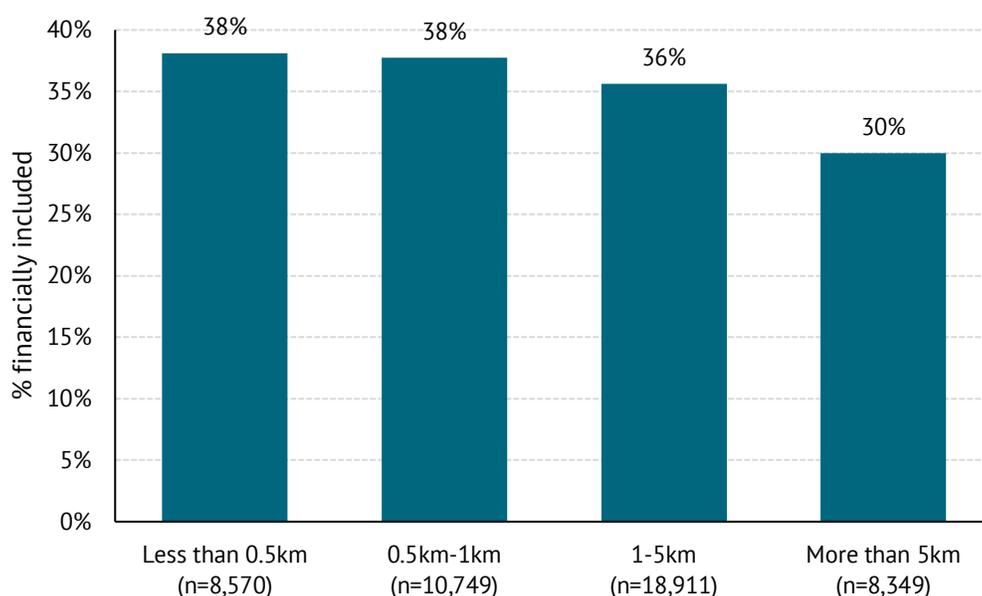
The availability of digital infrastructure as a potential binding constraint is a function of both the supply and demand sides. On the supply side, digital finance providers need to ensure that necessary infrastructure extends into more remote and rural areas in order to capture a larger market. But its utility in terms of digital finance is a function of how close it is to people and the means that people have to access the services.

One way to assess the viability of geographical proximity to services as a binding constraint is to test whether there is a significant gap in financial access between rural and urban populations. Based on the assumption that urban populations will have easier access to digital payments infrastructure, we would expect them to have higher levels of financial inclusion. FII data do show that there is a rural-urban gap, but it is small. Of urban people, 36.9 percent are financially included, compared with 33.9 percent of rural people. The relatively small gap would make it difficult to conclude that this is the binding constraint in many cases.

Using the same data set, we are also able to test in more detail the impact of proximity to financial infrastructure on financial inclusion. There is an intersection here with the demand side of the decision tree—the spread of financial infrastructure interacts with the geographical distribution of populations. These dimensions are brought together by indicators of proximity to financial access points.

The FII survey asked people how far they live from the nearest point at which they could make different types of financial transactions: bank, bank agent, ATM, post office bank, micro ATM, payments bank agent, and so on. By grouping people based on how far they live from these access points (< 0.5 km, 0.5–1.0 km, 1.0–5.0 km, > 5.0 km), as shown in Figure 8, we can test whether the constraint is consistent across the groups, or whether those closer to access points are more likely to be included.

Figure 8. Proximity to financial access point and financial inclusion, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

Figure 8 suggests that the lack of private digital infrastructure may be a binding constraint for people living further from financial access points; however, it cannot explain nonusage for most people. This may be due to the relatively high availability of electricity and mobile networks across India. According to World Bank data, in 2018, 95.2 percent of Indians had access to electricity¹¹⁶ and more than that have access to mobile networks (in 2016 it was estimated that 93.5 percent of Indians were covered by mobile networks,¹¹⁷ a number that will have likely increased since). Given these data, it is unlikely that access to infrastructure is a binding constraint for the vast majority of people.

5.2. Market structure

The structure of the market for digital payments is a function of the degree of competition between players and the rules under which providers operate. This section considers the degree of competition and the levelness of the playing field, both within the banking sector and between banks and nonbanks.

5.2.1. Competition

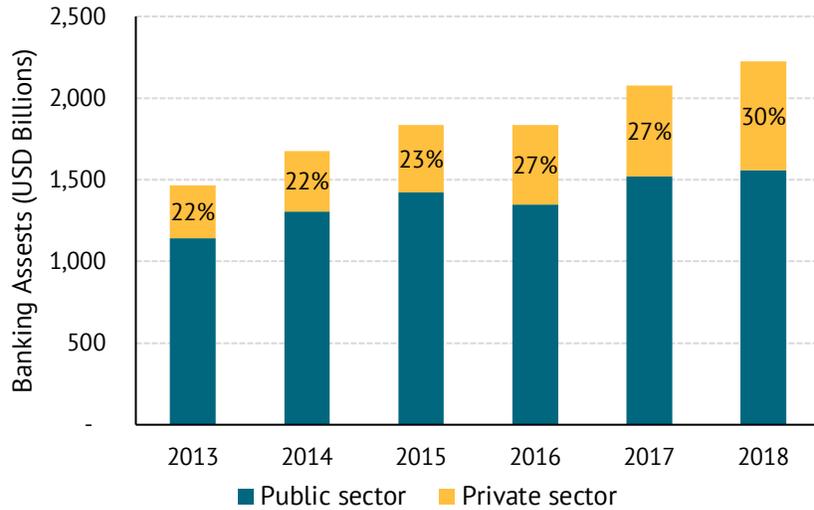
5.2.1.1. Banking-sector competition

Limited competition between financial service providers can reduce efficiency of the service. By restricting new players from entry, it also disincentivizes the expansion of services to new customers and markets. If a financial market is truly competitive, and financial service providers are seeking increased customers, and increased customer retention, they are more likely to create products that address the needs of customers, especially traditionally underserved customers. A recent study¹¹⁸ on competition in the Indian banking sector used panel data from 2005 to 2018 to assess the level of competition across the sector as a whole and within subgroups of public, private, and foreign banks. The H-statistic (a measure of the degree of competition in the banking sector) for the sector as a whole was 0.47, which is comparable to banking sectors in developed countries. Competition was found to be the highest among private-sector banks (H-statistic of 0.65), while for public banks it was 0.5.^x

Additional evidence has found that the level of competition in India's banking sector has increased over time. A recent paper¹¹⁹ found that the Lerner index (a measure of market power) in India's banking sector has decreased steadily since around 2012, indicating increasing levels of competitiveness. The increase in competitiveness is in part a function of the increased role of the private sector in Indian banking. The relative proportion of banking-sector assets owned by the private sector, compared with public-sector banks, increased from 22 percent in 2014 to 30 percent in 2018, as shown in Figure 9.

^x A third category, foreign banks, has an H-statistic of 0.46.

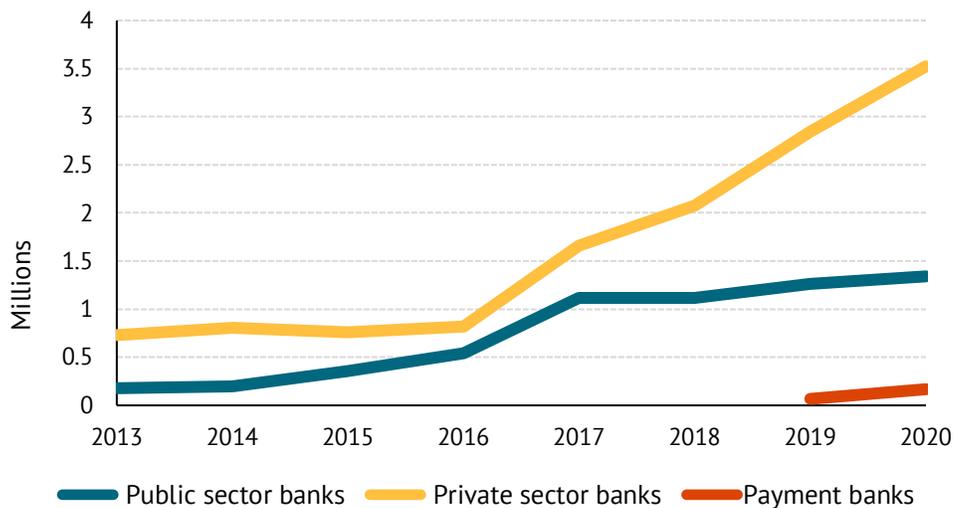
Figure 9. Banking-sector assets, public versus private banks



Source: RBI, 2020.¹²⁰

It is difficult to test the relationship between competition and financial inclusion without a logic chain that links the two. One such chain is that increased competition should push financial service providers to expand their networks in search of new customers. One useful indicator of this is the expansion of digital POS devices, used as a proxy for the investments made by banks to find new (digital) customers. As shown in Figure 10, it is clear that the growth of POS devices has been driven by the private sector, where levels of competition are higher. This is evidence that there is a relationship between the level of competition in the banking sector and the investment in digital payments outreach.

Figure 10. Growth in POS devices—public, private, and payments banks



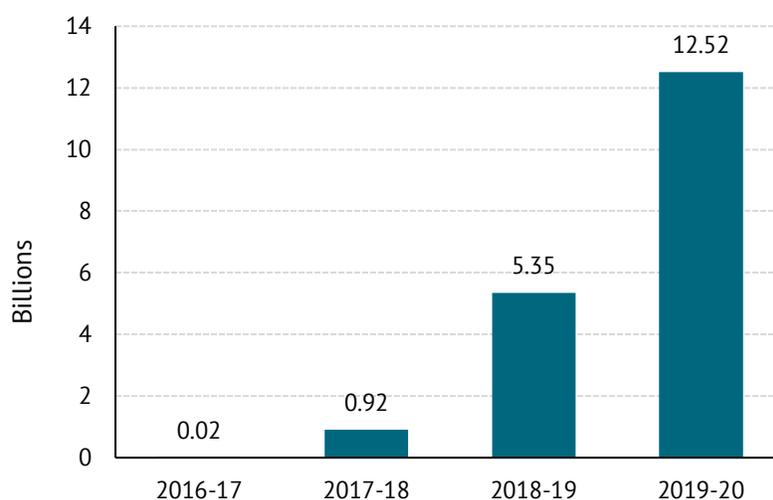
Source: RBI, 2020.¹²¹

These data provide some evidence that competition in the banking sector might have been a constraint on the growth of digital payments; however, it says less about whether it remains a constraint on digital financial inclusion. The data suggest that competition between private-sector banks is unlikely to be a binding constraint but that there may be an unlevel playing field in the competition between public-sector banks and private-sector banks. This issue is discussed further in section 5.2.2.

5.2.1.2. Competition between banks and nonbanks

India’s UPI system of digital payments interoperability is lauded internationally¹²² for the way it facilitates real-time transactions between bank accounts in a way that is accessible not only to banks but also to fintechs (e.g., PhonePe) and international technology companies (e.g., Google Pay). Such parties (called third-party app providers) do not need a license and can partner with a bank to offer UPI-based payment services. The volume of transactions through the platform has grown exponentially since its launch in 2016, as seen in Figure 11.

Figure 11. Volume of transactions through the UPI platform



Source: NPCI, 2020.¹²³

However, the prominence of nonbanks in India’s digital payments narrative can distract from the fact that payments must ultimately be processed by a bank.^y PhonePe partners with Yes Bank; Google Pay partners with Axis Bank, ICICI Bank, HDFC Bank, and State Bank of India; Paytm, Airtel, and Jio have their own payments bank licenses. Nonbanks can facilitate and expand the payments services offered by banks, but they are not in fact competing with banks on a level playing field—in other words, there is a lack of effective

^y There is one exception to this: certain prepaid instruments (PPIs) are processed wallet-to-wallet without going through a bank; however, PPIs accounted for just 0.1 percent of the value of digital payments in India in FY 2019–2020.

competition, but the root cause of this may be in the regulatory environment. The rules of the game require that banks remain central.

Although NPCI, the organization that runs UPI, does not publish data on the number of users, anecdotally the organization has suggested that there are over 100 million users of the platform.¹²⁴ However, customers' data from FII suggest that the number of users may be significantly lower—according to data from the end of 2018, only 33 million people had made a payment using a mobile phone and 22 million made a payment using an app.¹²⁵ Although these numbers are likely to have increased significantly since the FII data were collected, without hard data on the number of UPI users it is not possible to effectively estimate the impact of UPI on financial inclusion.

NPCI is incorporated as a not-for-profit entity and is owned by a consortium of India's largest banks. As of November 2020, more than 50 percent of the shares¹²⁶ were owned by publicly owned banks, with large private-sector banks accounting for most of the rest; although fintechs and payments banks have recently been allowed to come in as shareholders, none own more than 0.44 percent, and hence their influence is minimal.

Although the platforms developed by NPCI (e.g., UPI) facilitate competition from tech companies (e.g., Google Pay) and fintechs (e.g., PhonePe), the ownership of NPCI remains in the control of legacy banking institutions, particularly publicly owned ones.

This is a problem because NPCI is the sole licensed retail payments organization in India and, as such, has a monopoly position (though RBI is reportedly keen to license a competing New Umbrella Entity).¹²⁷ This monopoly effectively reinforces India's bank-led model of digital payments, which may have been very effective at innovating new payment tools for the already banked (e.g., UPI) but may be less than optimal at breeding the kinds of innovations in payment systems that are more effective at reaching the poor.

As the World Bank stated in an analysis of India's approach to digital financial services,

The growth in financial inclusion in India has been entirely led by banks. Though nonbanks can offer e-money, it was never targeted at the unbanked. Money deposited into e-money accounts cannot be withdrawn in cash at agents or at ATMs.^z They can only be used for making payments. This was clearly not suited for the needs of the unbanked; however, it was useful for some banked customers for bill payments, ecommerce and other such specific payment needs.¹²⁸

5.2.2. Level playing field

5.2.2.1. Level playing field in the banking sector

RBI has made efforts to open the digital payments market up to nontraditional financial institutions. The introduction of payments banks was part of an explicit attempt by RBI to

^z This constraint was relaxed in 2020.

introduce differentiated bank licenses to allow “a wider pool of entrants into banking” to drive an increase in the usage of digital payments. The draft guidelines for licensing payments banks stated,

The primary objective of setting up of Payments Banks will be to further financial inclusion by providing (i) small savings accounts and (ii) payments/remittance services to migrant labor workforce, low-income households, small businesses, other unorganized sector entities and other users, by enabling high volume-low value transactions in deposits and payments/remittance services in a secured technology-driven environment.¹²⁹

The introduction of a new tier of banking designed to facilitate digital payments allows us to test whether the internal structure of the banking sector was a constraint on financial inclusion. However, there is no evidence to support this. As of end of 2018, only 2.8 percent of India’s population had ever used a payments bank. Even though some payments banks have made some progress since then, the data suggest that it is unlikely that the structure of the banking system was a binding constraint.

This does also require that we ask the question, why have payments banks failed to take off? This is more difficult to do with data, but there is good anecdotal evidence relating to the viability of the business model under the regulatory requirements of the license.

Payments banks face restrictions on both the assets and liabilities sides, as well as in transactions. On the asset side, they are not allowed to lend, and so earning interest income (above what can be earned on government paper) is impossible. This is in contrast to MNO-led models elsewhere, in which the extension of the payments infrastructure has enabled value-added lending (e.g., M-Shwari in Kenya). On the liability side, their deposits are capped at INR 100,000 (approximately US\$1,300) per customer. (Payments banks also have to maintain a specified ratio of their deposits in a cash reserve deposited with the RBI. Apart from this reserve, they are required to invest a minimum of 75 percent of their “demand deposit balances” in government securities/treasury bills). And with the policy of zero merchant discount rates (MDRs), they cannot charge a commission on merchant transactions. Their revenues are therefore limited to commissions through partnerships (e.g., with utility providers) and on certain remittances. (Paytm Payments Bank has no charges for online transactions on NEFT/RTGS/IMPS/UPI transactions but charges INR 10 or 1 percent (whichever is higher) per transaction for domestic money transfer done through its banking points).¹³⁰

The India Post Payments Bank (IPPB) is an interesting example with which to test whether the lack of physical banking infrastructure is a constraint on growing digital payments and transfers. When the bank launched (to great fanfare) in 2018, it already had access to an extensive physical infrastructure, particularly in rural areas—according to FII, 57 percent of India’s population live within 5 km of an IPPB point of service (although the majority of India’s 138,000 rural post offices are run through a franchise model and may offer limited payment services). IPPB also reportedly invested heavily in its core banking system and the

necessary technology to scale a payments-based banking model—media reported that it invested US\$130 million in technology.¹³¹

However, the bank could not build a business case, and reports as of October 2019 suggested that it had developed very little business and was looking for regulatory approval to convert to a small finance bank (allowing it to earn revenue from lending). The implication here is that lack of rural touchpoints may not have been a binding constraint and instead the issue may have been the difficulty of building a sustainable payments-driven business model within the regulatory framework set by RBI—further evidence that the lack of an effective, level playing field may be a binding constraint.

This notion is supported by evidence from the 2019 State of the Industry Report of the Global System for Mobile Communications Association (GSMA), which stated,

Aditya Birla Payments Bank’s March 2019 decision to wind up its operations within 17 months of its launch has stimulated debate among payments banks, the Reserve Bank of India and other key stakeholders in the ecosystem on the regulatory validity of the payments bank model. Similarly, India Post Payments Bank has sought regulatory approval to operate under a different (more flexible) licensing category—Small Finance Bank—due to the challenges faced by payments banks.¹³²

Payments banks may still reach their objectives: Airtel Payments Bank claims to have more than 500,000 neighborhood banking points and 31 million active customers. This evidence points to a regulatory environment that places payments banks on an unlevel playing field with other financial institutions (since a recent rule changes by RBI, payments banks are now able to apply to convert their license to small finance banks¹³³ and hence develop a business model based on lending). This points to the unlevel playing field as a potential constraint on the growth of digital financial inclusion.

5.2.2.2. Unlevel playing field between banks and nonbanks

An unlevel playing field arises when, even inadvertently, rules and regulations (or the lack thereof) prevent the development of fair competition between providers of the same or functionally equivalent services. A level playing field for payment services is present when rules and policy actions do not prevent MNOs and other digital service providers from competing with banks in digital money.¹³⁴

The linkages between government and the banking sector are unusually strong in India. According to the World Bank’s Bank Regulation and Supervision Survey,¹³⁵ which compiles data on how banks are regulated and supervised across 147 countries, the percentage of the banking system’s assets that were in government-controlled banks is the highest of any country in the world (apart from the Marshall Islands). According to the latest available data,¹³⁶ government banks such as the State Bank of India account for 67.5 percent of India’s banking system assets.

It may also be the case that the position of NPCI functions to reinforce the nexus between banks and government that sustains the unlevel playing field. NPCI, which sits at the heart of the digital payments ecosystem, has been described thus: “NPCI is a competitor. It is a platform. It is a regulator. It is an industry association. It is a profitable nonprofit. It is a rule maker. It is a judge. It is a bystander.”¹³⁷ It is also not a politically neutral operator, as evidenced by the majority shareholding of public-sector banks, with minimal stake for nonbank payment companies. Leading nonbank payments companies have urged government to “ensure a level playing field between banks and nonbanks to ensure a level playing field between banks and private tech companies.”¹³⁸ This is in line with the Watal Report, commissioned by the Indian Ministry of Finance, which recommended in December 2016 to “require NPCI to be payments centric in its ownership and objectives. Ownership of NPCI should be diversified widely to include more banks and include nonbanks.... NPCI should be allowed to function independently.”¹³⁹ Although ownership of NPCI has diversified since the publication of the Watal Report, the playing field has not been leveled.

There is a possibility that weaknesses in governance arrangements in the financial sector^{aa} allow for a close relationship between government, regulators, and the banking system (in particular the state-owned banks) and that this creates an unlevel playing field in favor of these banks, which is a binding constraint on further expanding digital payments (particularly into low-income populations). The high cost structure of banks and of banking systems is not particularly well suited to high-volume, low-value transaction models. Banking business models may be better designed to make money through intermediating between savers and borrowers, and earning money on the spread, rather than to use transaction-based revenue models.

Box 1. MNO success at providing basic mobile payments services

GSMA proposes four key reasons why MNOs have been more successful than banks at providing basic mobile payments services:

1. MNOs have a number of assets they can leverage for mobile payments, including a far-reaching distribution network, brand recognition, and customer confidence.
2. They have expertise in areas central to their core business necessary for mobile payments, including mass marketing and building and managing a broad infrastructure.
3. Mobile payments can be used to cross-sell new services and compete for customers from other networks.
4. MNOs can generate some unique forms of indirect revenue from mobile payments.

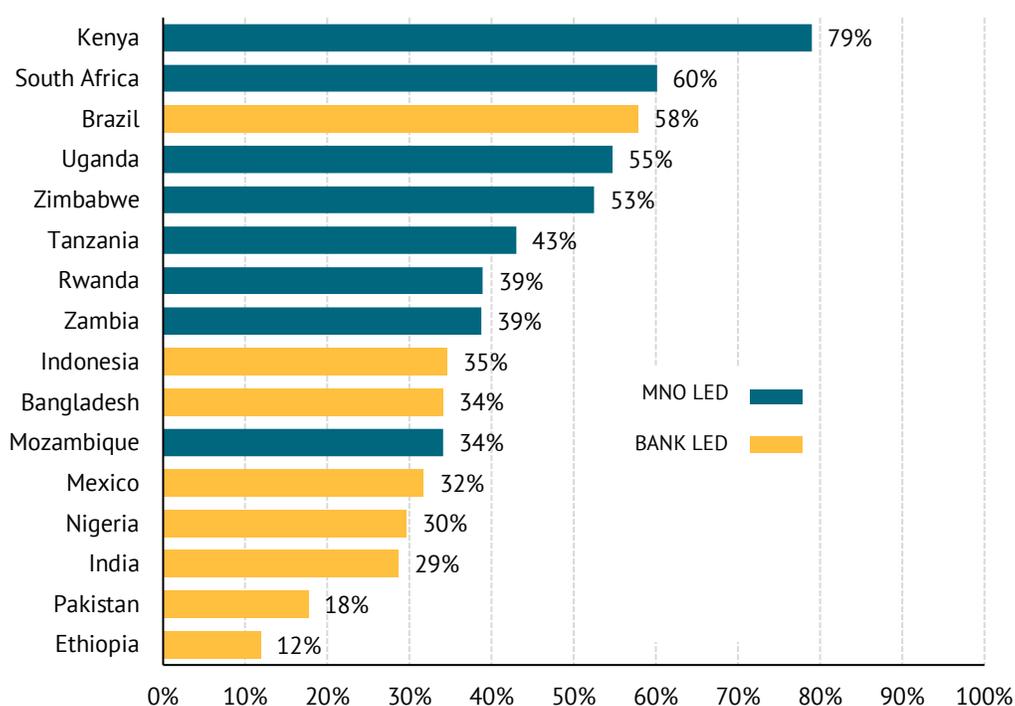
Source: MMAI (Mobile Money Association of India) and GSMA.¹⁴⁰

^{aa} Institutional quality and governance are further discussed in section 5.3.3.

It may be the case that India’s banks don’t have the incentives or the business case to go into poorer and rural areas for digital payments. The infrastructure of which they have ownership (e.g., branch networks, business correspondents, POS devices, and their majority ownership of NPCI) might be effective for high-volume, low-value urban banking models but not for low-volume rural banking. If digital finance is to reach deeper into the population, then it will need new models for low-cost, transaction-based finance. The regulatory structure, despite being avowedly designed to support digital payments and financial inclusion, may in fact be hindering the types of innovation that could more effectively deliver digital payments and transfer services to low-income populations.

It is difficult to empirically test whether the unlevel playing field in favor of banks is a binding constraint, but we can compare the situation in India with that of other countries where the playing field is more level, in terms of which institutions can provide mobile payments. If the levelness of the playing field is a binding constraint in India, we would expect to see countries with MNO-led models showing higher levels of digital payments usage.

Figure 12. Percentage of adult population who have made or received a digital payment in the past year



Source: World Bank Global Findex database, 2017.

Note: Categorization by authors based on individual country analysis.

This simple analysis in Figure 12 does indicate a trend in which mobile money–led models have generally achieved higher levels of penetration of digital payments than bank-led models. Compared with this cohort of countries, India has the highest proportion of people who own a bank account (80 percent, according to the World Bank’s Global Findex database for 2017) but one of the lowest levels of people who have made or received a digital payment. The implication of this is that an unlevel playing field may be a binding constraint on financial inclusion in India. This is consistent with the findings of a high-level panel constituted by the government of India in 2019 that “blamed the lack of a level playing field and discriminatory regulatory barriers for the high level of cash in the system and low penetration of digital payments in the country.”¹⁴¹

It is likely that the focus on banks, with rigid structures, capital requirements, and models better suited to intermediating between savers and lenders, may be less well placed than other players, such as MNOs, to increase the outreach of digital payments (MNOs have existing distribution networks and consumer engagement, ability to cross-sell, and ability to provide payments to existing customers as a value-added service, rather than signing them up for a new bank account first). While fintechs (e.g., Paytm) and global technology companies (e.g., Google) have become prominent players in digital payments, the fact that they need to work through banking infrastructure means that their outreach remains limited.

If the playing field is unlevel in favor of the banks, and in particular the public-sector banks, this may be an effective mechanism to promote access to financial services (and to facilitate distribution of government transfers), but it may be at the cost of the quality of infrastructure, products, and services, and hence the usage of these financial services. A lack of effective competition may be leading to suboptimal levels of innovation, investment, and outreach. A study from December 2020 by MicroSave Consulting for the Consultative Group to Assist the Poor¹⁴² concluded that the public sector has an outsized role in the setup and expansion of rural cash-in-cash-out infrastructure and often the agents of public sector banks are not viable, depend on subsidies and are driven by government mandates rather than underlying local economic activity.

The World Bank’s Committee on Payments and Market Infrastructures made recommendations for how payment systems can be leveraged to promote financial inclusion:

The challenge is therefore to design a legal and regulatory framework that is fair and balanced for all stakeholders, addresses risks and promotes innovation. In essence, this requires that the framework be risk-based, provider- and instrument-neutral, and forward-looking. In other words, the framework must be proportional to the risks that nonbank [payment service providers] and new products and business models might create.¹⁴³

Our analysis suggests that since India’s legal and regulatory framework for digital payments is not provider-neutral, it could, therefore, be a binding constraint on the growth of digital financial inclusion.

5.3. Appropriability of returns

A problem with the appropriability of returns may arise when there exists a wedge between the social and private returns on investment. Even if the social return on providing financial services is potentially high, digital payments providers may face difficulty appropriating those returns. This section addresses a number of potential reasons for low appropriability of returns for digital payments providers in India: distortionary taxes and other policies, problems identifying customers, institutional quality and governance, and failures of coordination.

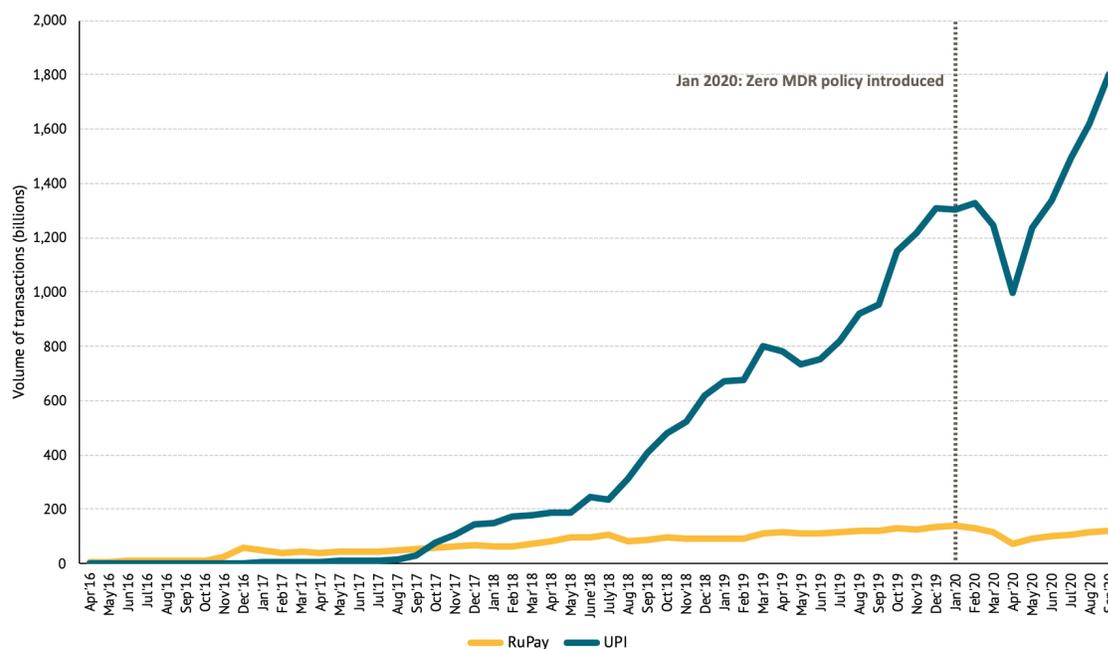
5.3.1. Distortionary taxes and other policies

The government of India has been keen to push digital payments and thus has not placed any taxes on payments and transfers as have been seen in other countries. In fact, one of the ways that providers are able to appropriate returns is by charging a fee per transaction (in India, these fees are called merchant discount rates, or MDRs). However, as of January 1, 2020, the government of India announced that businesses with revenue of more than INR 500 million (approximately US\$7 million) cannot charge MDRs on UPI- and RuPay-based transactions (both products of NPCI). This replaced a policy of government reimbursing providers for MDRs and was an effort to increase the spread of digital payments. The aim was to try to crack the critical mass issue around merchant payment acceptance by reducing the costs for merchants of accepting digital payments. However, many in the industry argued that in fact the zero MDR would disincentivize merchant acquisition, as the provider would not be able to earn revenue from transactions. Has this impacted digital payment uptake? If the inability to charge MDR were a binding constraint on financial inclusion, we would expect that as of January 2020, we would see a reduction in use of digital payments in the graph in Figure 13.

There is some evidence to support this hypothesis. The average month-over-month growth in volume of transactions through RuPay and UPI combined through 2019 was 6.3 percent per month. In January 2020, it grew by 0.2 percent and the following month by 0.8 percent. Although it is hard to isolate the impact of the zero MDR policy from the effects, beginning in March 2020, of the COVID-19 crisis and the sharp dip in economic activity that was to follow,^{bb} this does provide some evidence that low appropriability of returns linked to the inability to charge MDR could be a constraint on digital payments growth. However, the fact that transaction growth recovered starting in May 2020 suggests that this was not in fact a binding constraint.

^{bb} The subsequent uptick was likely due to the restarting of economic activity and increased aversion to cash.

Figure 13. Growth of RuPay and NPCI and imposition of Zero MDR policy



Source: NPCI, 2020.¹⁴⁴

5.3.2. Problems identifying customers

In many countries, presence (or absence) of an effective mechanism for KYC requirements is a major constraint on financial inclusion. While more important for savings and credit than for payments, KYC requirements help providers effectively recognize and target customers, and also help regulators manage their objectives around anti-money laundering and countering the financing of terrorism.

In India, the presence of Aadhaar, the national digital identification system, has effectively solved for the problem of customer identification in the context of digital payments for most of the country. As of May 2020, the Unique Identification Authority of India reported that of India's 1.37 billion people, 1.21 billion had been issued an Aadhaar.¹⁴⁵ This penetration rate of 88.6 percent suggests that problems of identification may be a constraint for a maximum of 11.4 percent of the population. As documented in section 3, there may be some additional requirements, such as the need for a PAN card, as well as issues with uneven acceptance of Aadhaar as sufficient KYC.

It is possible to test whether those who do not have Aadhaar are less likely to be financially included. According to FII, only 21 percent of people without Aadhaar were financially included, compared with 35 percent of the general population. In addition, though customer identification is a potential constraint for account opening rather than account usage, India performs very well in the number of people who have an account, but less well in how many people use an account. This suggests therefore that problems identifying customers may be a constraint, but only for a fraction of the population.

5.3.3. Institutional quality and governance

The effect of bank concentration on access to financing has been shown to be exacerbated in countries with high levels of government interference in the banking system, a higher share of government-owned banks, and more restrictions on banks' activities.¹⁴⁶ In India, the linkages between the financial sector and the state are unusually strong. As well as its ownership of the central bank,^{cc} the government of India owns majority stakes in banks that account for most of the banking sector's assets, as well as having implemented its own financial inclusion and Digital India initiatives. The public-sector banks also own a majority of NPCI, which itself has an effective monopoly in provision of customer-to-customer digital payment infrastructure.

This structure of institutional linkages is unique to the Indian ecosystem, and it may be the case that in India, government interference and the institutional framework are stifling competition that could increase the spread of digital finance. This may in part be explained by some level of risk aversion and prioritization of stability over innovation; however, it could also be explained by a form of regulatory capture.^{dd} If this were a binding constraint, it could explain many of the potential constraints identified elsewhere in the system.

The World Bank's Worldwide Governance Indicators, shown in Table 10, are not specific to the financial sector but do help to quantify the quality of India's institutional and governance arrangements. In the latest survey (2019), India was ranked below the median out of all countries in terms of regulatory quality, and only at the 35th percentile on control of corruption.

Table 10. World Governance Indicators for India

Indicator	India rank (percentile)
Voice and Accountability	57.64
Political Stability and Absence of Violence/Terrorism	21.43
Government Effectiveness	59.62
Regulatory Quality	48.56
Rule of Law	52.40
Control of Corruption	35.10

Source: World Bank, 2019.¹⁴⁷

^{cc} Though originally privately owned, since nationalization in 1949, the RBI is fully owned by the government of India (see <https://www.rbi.org.in/Scripts/AboutusDisplay.aspx>).

^{dd} *Regulatory capture*, as originally defined by George J. Stigler ("The Theory of Economic Regulation," *The Bell Journal of Economics and Management Science* 2, no. 1 (1971): 3–21), is an economic theory that says regulatory agencies may come to be dominated by the industries or interests they are charged with regulating. The result is that an agency, charged with acting in the public interest, instead acts in ways that benefit the industry it is supposed to be regulating.

While it is very difficult to use a data-led approach to identify issues with institutional quality, it is highly probable that the mutually reinforcing relationships between government, RBI, NPCI, and the primarily state-owned banking sector leads to a form of regulatory capture. Poor institutional quality and governance may mean that private banks and nonbank digital financial service providers are unable to effectively appropriate returns, thereby hindering the entry of new providers and the scope of financial services offered. The linkages between the government and the banking sector raise questions about the appropriateness of the institutional structures for promoting innovation and private-sector investment in infrastructure and services that are more effective at servicing low-income populations. To the extent that institutional deficiencies are the root cause of regulatory barriers to the entry of new providers and the scope of digital financial services offered, they are a binding constraint for advancing digital financial inclusion. Unless the constraint of institutional weakness is lifted, the other constraints will not move either.

5.3.4. Coordination failures: A constraint affecting both the supply and demand sides

Digital payments, particularly merchant payments, are a two-sided market characterized by large network effects and “chicken or egg” dilemmas. Neither side (merchants or customers) wants to be the first to adopt (merchants won’t invest in digital payments hardware if they don’t think customers want to use digital payments; customers won’t make digital payments if there’s no digital payments hardware). Because of these network effects and the sunk costs on both sides (merchants must invest in POS devices or other digital payments acceptance mechanisms; customers must have an appropriate phone, usually a smartphone), there is a critical mass issue. Digital payments don’t reach the critical mass required to grow into a sustainable high-usage equilibrium, and instead remain at a low-usage equilibrium.

Understanding whether coordination failures are a binding constraint is complex because such failures are a function of both supply and demand factors. However, we can unpack elements of the supply-demand relationship to help understand to what extent coordination is a constraint.

Customer expectations of merchant adoption are low: 83 percent of customers in the FII survey said that of the places where they regularly shop, “most” or “almost all” merchants only accept cash.¹⁴⁸

Evidence on merchants’ behavior at the national level is difficult to come by; however, a microeconomic study of 1,003 small-scale merchants in Jaipur¹⁴⁹ is instructive as it specifically studied the potential binding constraints on merchant adoption of digital payments. The authors tested several potential supply-side constraints—a bank account, an appropriate device, Internet access, profits to cover usage fees, and technological literacy—and found that none of these explain low adoption. Rather, they put low merchant adoption down to two factors: low perceived customer demand and a belief that accepting digital payments may increase tax liabilities. Similarly, a survey by the Center for Financial Inclusion¹⁵⁰ of micro-merchants in India found that a quarter of merchants cited low customer demand for digital payments as a reason for non-adoption, and 12 percent of

merchants had tried to go digital but had discontinued due to low demand, low perceived benefits, and complexity of operation.

Thus, albeit with limited information, the evidence suggests that there are important coordination failures regarding the adoption of digital payments in urban settings: merchants mostly accept only cash as they perceive that customers have a strong preference for cash, and customers are not interested in the usage of digital payments because of their experience with merchants not accepting them.

This is strong evidence for coordination failures as a potential binding constraint in urban settings. We find that in order to get over the hump associated with coordination failures, incentives need to be provided for both merchants and customers to adopt digital payments.

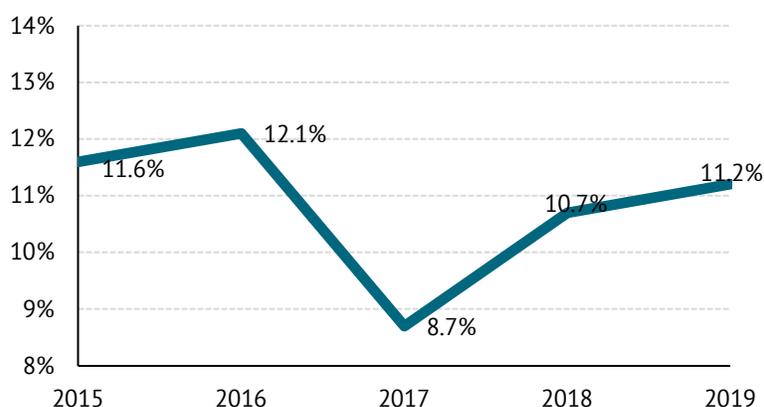
5.3.5. Preference for cash

An entrenched preference for cash can create an obstacle for digital financial service providers to reach the critical mass of customers required to be profitable and reach the poor.¹⁵¹ India is regularly referred to as an economy with a strong preference for cash. This section examines whether this is true.

As cash payments mostly take place untracked in the informal economy, it is not possible to measure precisely to what extent there is a preference for cash over digital transactions; however, we can track currency in circulation relative to GDP as an imperfect proxy for the amount of cash demanded by the Indian population. A cross-country analysis published by RBI found that on the ratio of currency in circulation to GDP, India ranked 4th out of 20 countries.¹⁵² Tracking this ratio over time may provide some insight, as a decrease in this ratio could indicate a movement away from cash transactions toward digital forms of payment.

In Figure 14, data from RBI show that (accounting for a dip in 2017 due to demonetization) the demand for cash has barely changed since 2015 and in fact may be on the increase.

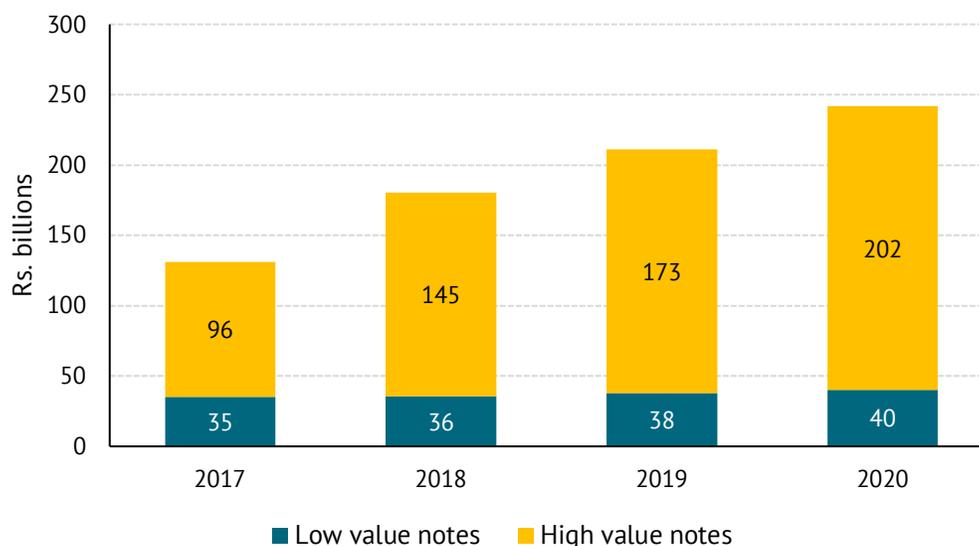
Figure 14. Currency in circulation/GDP



Source: RBI annual report, 2019–2020.

Cash is useful for a number of things, but two key use cases for cash are as a means of transaction and as a store of value. If the growth in cash is driven by an increase in demand for cash as a store of value, we would expect to see more growth in higher-value notes (INR 500 and INR 2,000); if the demand is for cash as a means of transaction, we would expect the growth to be driven by lower-value notes (INR 200 and smaller). In fact, RBI data (Figure 15) show that the increase in currency in circulation since 2017 is driven primarily by higher-value notes but that lower-value notes have also increased in quantity.

Figure 15. Growth in total value of low- and high-value notes



Source: RBI annual report, 2019–2020.

From 2017 through 2020, the nominal value of low-value notes in circulation increased by 14 percent, while the value of high-value notes increased by 110 percent. This is a strong indication, first, that cash is increasingly used by Indians as a store of value, but second, that people are still demanding cash for transactions, supporting the notion that we are not yet at a tipping point at which enough Indians consider it sufficiently beneficial to move away from cash to digital payments mechanisms.

6. Analysis of the demand side

As suggested by the analysis of price and cost to customers, as well as referenced in the previous coordination subsection in the discussion on demand, it is important to examine the barriers on the demand side of the decision tree. In this section, we analyze the roles that customers' perceptions of the benefits of digital payments, trust in providers, low incomes, and digital and financial capability, as well as social and cultural norms, potentially play as constraints and binding constraints on digital financial inclusion in India.

6.1. Perceived benefits

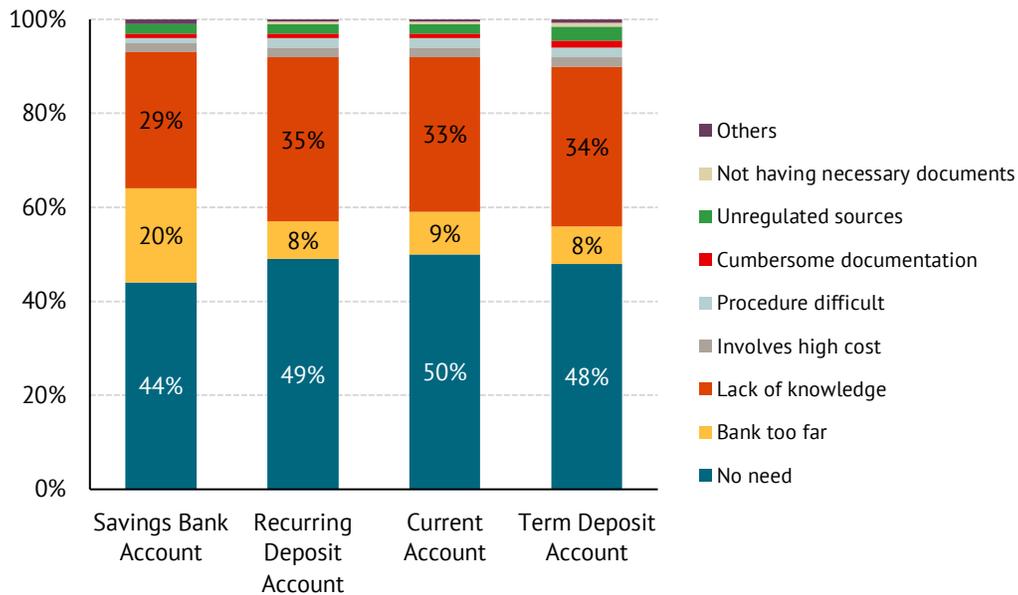
Low perceived benefits of financial services are a potential constraint on financial inclusion. While difficult to measure directly, it is possible to examine data on proxy indicators, such as the number of people who state “no need” as a reason for not using financial services. We acknowledge that a “no need” opinion can reflect a perception that the benefits of financial services are insufficient, or it could also mean a belief that a person has insufficient funds to need an account, or potentially both. In this analysis, we focus on individuals who have exclusively given the “no need” response. Because both the Global Findex for 2017 and the FII 2018 survey give respondents an option of “insufficient funds” or “you don’t have enough funds to use the account,” we assume that the survey respondent would exclusively say yes to only the low income-related questions if that is the primary constraint to their use of a bank account. This is how we aim to primarily address the perceived benefit question, and not the low-income question through this analysis.

In the population of financially excluded people (again using the definition described in section 1) from the FII 2018 data set, 26 percent said “no need” was one of the reasons they did not own a bank account. Of all financially excluded people, only 5 percent stated “no need” as the only reason for why they did not have a bank account. By examining the relationship between this response to the question (“no need”) and their financial exclusion, we may be able to find some relationship between low perceived benefit and financial exclusion.

A perception that customers “do not need” a bank account could reflect a perception that the benefits of the existing array of formal^{ee} financial services do not meet the needs of certain parts of the population. Figure 16, from the 2019 National Financial Literacy and Inclusion Survey (NFLIS) report,¹⁵³ represents the percentage of people who stated “no need” as the reason for not holding a bank account. Because having a bank account is a necessary condition for being digitally financially included, this is a useful component of the financial inclusion equation. Across different account types—savings bank account, recurring deposit account, current account (also known as a demand deposit or checking account), and term deposit account—“no need” is stated as the most common reason for people not to own one of these accounts, by 44–50 percent for almost every account type. There is a large differential here between the FII 2018 exclusive “no need” response of 5 percent and the NFLIS exclusive response of about 50 percent. More research must be done to understand this differential, but it definitely points us in the direction of considering it as a constraint on Indian financial inclusion.

^{ee} We define “formal” financial services to be those that are regulated, while “nonformal” financial services are not regulated.

Figure 16. Reasons for not holding a bank account—by type of account



Source: NFLIS, Financial Literacy & Inclusion in India Report 2019.

The data depicted in Figure 16 could imply that up to half of the people who do not have a bank account (20 percent of the Indian population, according to Findex¹⁵⁴) do not have one because they do not see the need. The corollary of this is that for approximately 10 percent of India’s population, not seeing the need for a bank account may be a binding constraint on financial inclusion. This might be due to coordination challenges between the supply and demand side, not allowing for business models that can sustainably create financial products that address the needs of those financially excluded by competing with the benefits of cash-based transactions.

We also test to see whether there is a difference in perceived benefits between urban and rural populations and by regional geography, or between women and men. Geography plays a strong role in financial inclusion in many countries, as those who live in rural areas tend to be less digitally and financially included than those in urban areas. We test to see whether perceived benefits have a strong impact specifically on those living in rural areas. We might expect that people who say they do not have a bank account because of “no need” are more likely to be rural. When examining those urban respondents who are currently financially excluded, of those who answered the question as “no need,” 7 percent exclusively stated “no need” as the reason for not having a bank account. This number was 4 percent for the same analysis of rural respondents. While there is a small difference, this does not strongly indicate that lack of perceived benefits is a constraint for rural populations more than urban.

Last, we take a gendered lens to those financially excluded and those who exclusively said “no need” as the reason for not having a bank account. Of all the women who are financially excluded and answered this question, 6 percent exclusively said “no need” was the reason they didn’t have a bank account. This number was 4 percent for the same analysis of men

respondents. This analysis does not show perceived benefit as a significantly stronger constraint for women than men.

In summary, perceived benefit does seem to be a potential constraint for certain groups, specifically those for whom access to a bank account is a limiting factor, but not significantly more or less for any specific segment of the population when compared with their counterparts. It is likely to be a binding constraint, but as a result of coordination issues mentioned in section five, which result in a lack of business models that can create perceived and real benefit to Indian customers.

6.2. Trust in providers

One of the most important elements of financial services is trust. Customers are placing a vote of confidence in a financial service and institution, as well as an ecosystem, when they deposit their funds into a bank, expecting it to remain safe and secure. They must trust that a digital payment system will not “lose” their money, even if mobile connectivity drops for a minute.

First, we can test the potency of trust: if people who say that they do not trust financial services are less likely to be financially included, then trust could be a constraint. Using the FII 2018 data, we examined the number of people who answered yes when asked the question, “Is this a reason why you do not have a bank account: you don’t trust banks?” When we measure this group’s financial inclusion, we find that only 9 percent are financially included.^{ff} This points us to the possible conclusion that trust in banks may be a constraint on digital financial inclusion. Given that bank accounts are the critical path to digital finance for most Indians, their lack of trust also informs the nature of its role as a constraint on digital financial inclusion.

We then test the idea that if instances of fraud have diminished over time, there has been an increase in overall financial inclusion. Table 11, from the RBI, reports the number of fraud cases by area of operations. The growth rate of fraud cases has been erratic, as has the growth rate of card/Internet cases, which would be most relevant for digital payments. At the same time, there has been increased financial inclusion^{gg} over time (see Figure 17). The available data does not indicate that there is a significant relationship between instances of fraud and levels of financial inclusion.

^{ff} These respondents to the FII 2018 questionnaire may be financially included (using our definition in section 1) because they are using other people’s accounts to make payments and transfers, not their own.

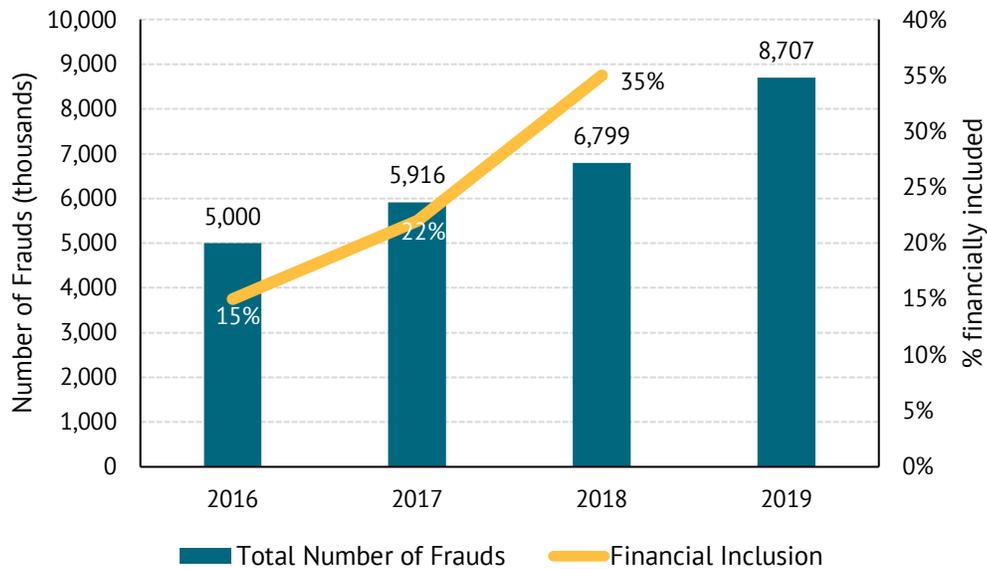
^{gg} Using the same definition of financial inclusion given in section 1.

Table 11. Number of fraud cases by area of operations

Area of Operations	Number of Fraud Cases 2017–2018	Number of Fraud Cases 2018–2019	Number of Fraud Cases 2019–2020
Advances	2,525	3,604	4,610
Off-balance-sheet	20	33	34
Forex transactions	9	13	8
Card/Internet	2,059	1,866	2,678
Deposits	697	593	530
Interbranch accounts	6	3	2
Cash	218	274	371
Checks, Demand drafts, etc.	207	189	202
Clearing accounts, etc.	37	24	22
Others	138	200	250
Total number of fraud cases	5,916	6,799	8,707
Growth rate from previous year	18%	15%	28%

Source: RBI annual report, 2019–2020, p. 150.

Figure 17. Total number of fraud cases and financial inclusion over the years

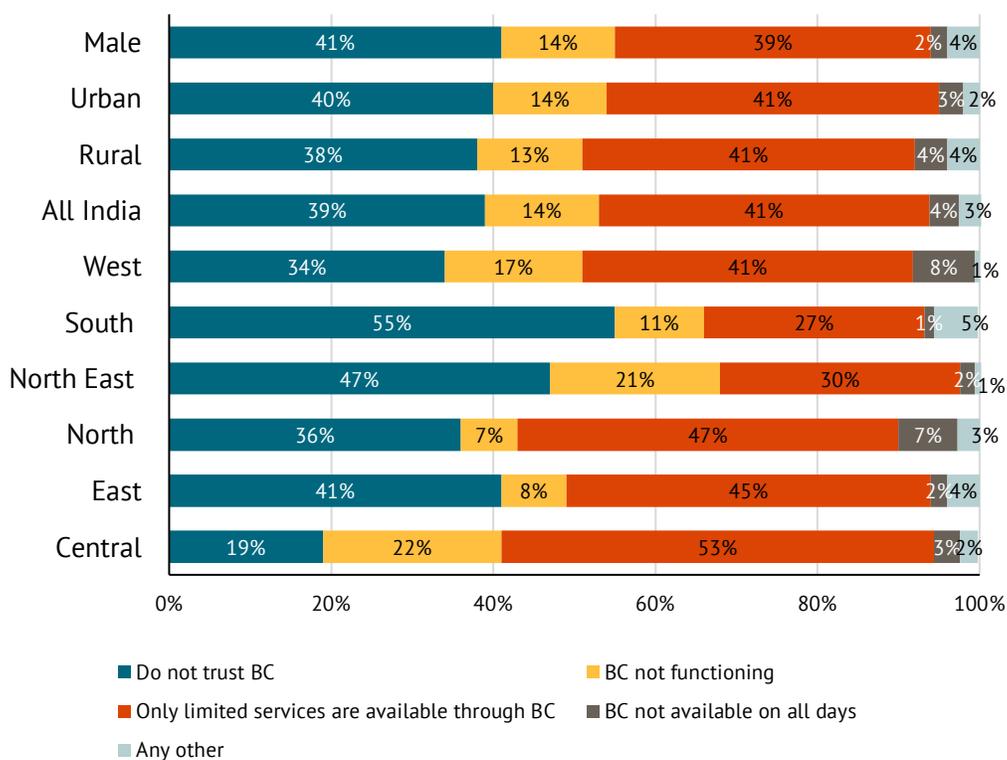


Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

However, there is evidence that trust is a constraint specifically in relation to bank agents (commonly referred to in India as “business correspondents,” “banking correspondents,” or “BCs”), who were used as a financial access point for 5.6 percent of those surveyed in FII 2018. According to the 2019 National Financial Education and Inclusion Survey, across geography and gender, the largest reason that people did not avail BC services was because they “do not trust BCs.” This could be for many reasons, but one of them particularly highlighted is that “for many consumers, the kirana [grocery] store is not a desirable agent. This is because storekeepers are often key influencers of village gossip or are at its epicenter. Thus, a storekeeper who acts as the local agent presents a risk of loss of confidentiality within the community. Moreover, many households borrow from the store in times of need, so a storekeeper who is an agent creates a very real risk that the money they cash out may be commandeered to pay off debts.”¹⁵⁵ Lack of trust in BCs seems to be especially strong in southern and northeastern India, as seen in Figure 18. Further research is required to determine the reasons for this.

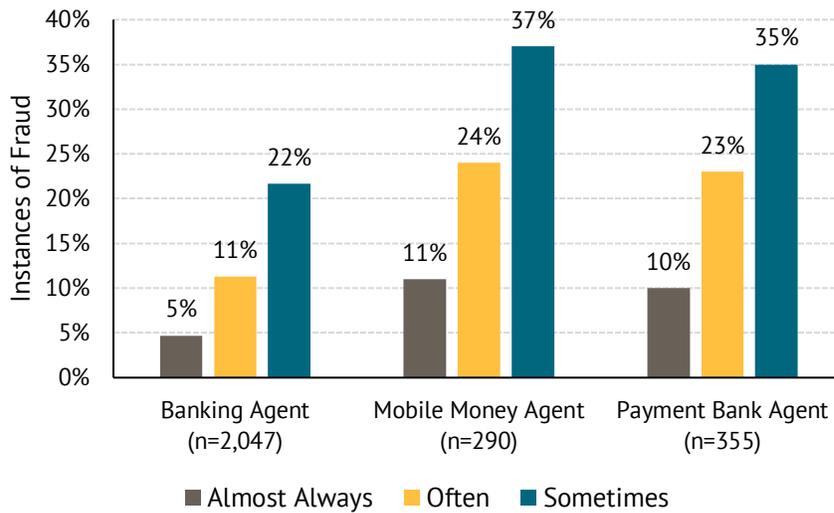
Figure 18. Reasons for not using services of BCs



Source: NFLIS, 2019.

Using FII 2018 data as per Figure 19 below, testing all those that have used banking correspondents, up to 22 percent have at least faced some form of fraudulent activity sometimes, 11 percent have at least faced some form of fraudulent activity often and 5 percent have almost always faced a fraudulent activity. Fraud seems to occur more often for payment banking and mobile money agents than banking correspondents.

Figure 19. Instances of fraud faced by those using agents, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

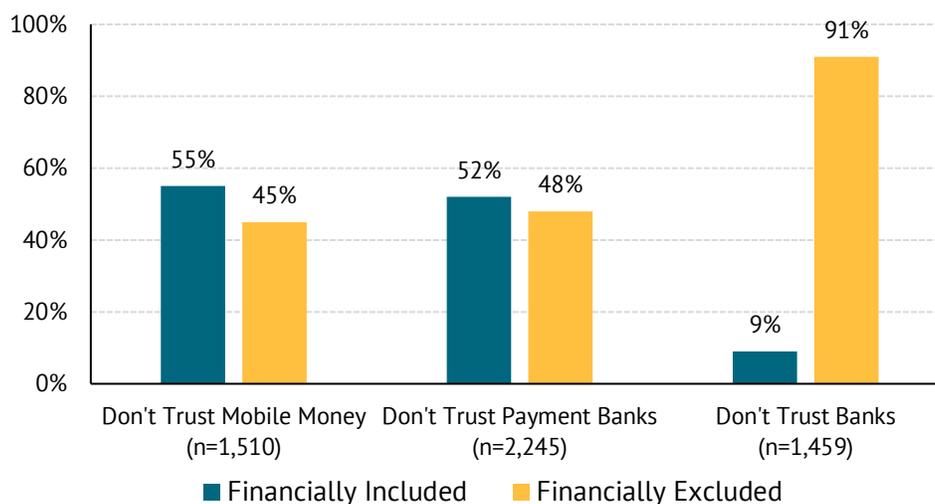
However, as mentioned earlier in this section, only 5.6 percent of people use BCs, business agents, payments bank agents, and mobile money agents, so it is difficult to ascertain whether trust related to agents is truly a constraint for a large percentage of the Indian population.^{hh} Nevertheless, use of BCs is on the rise, especially due to COVID-19-related mobility restrictions.¹⁵⁶ Median foot traffic and transactions for rural BCs have increased to almost 50 percent during COVID times.¹⁵⁷ So this constraint may become more important as the digital finance industry begins to rely on it more for the success of its “last mile” efforts. It is important to note that trust in BCs/agents could be more of a constraint for certain population sub-segments, especially those living in the South and North East.

While those financially included and those excluded do not differ much in their use of mobile moneyⁱⁱ and payments banks, there is a significantly large differential for those who do not trust banks, as shown in Figure 20. Given that 82 percent of holders of any kind of financial institution account are bank account holders, and the system is a bank-led model, it could be that an individual who does not trust banks does not have many formal alternatives and is therefore not formally financially included. In addition, there have been several instances of questionable, unchecked bank conduct¹⁵⁸—this can also lead to a lack of trust by customers. This indicates that trust could be a potential constraint on financial inclusion for the larger Indian population.

^{hh} A low usage rate of BCs could also be a supply-side constraint.

ⁱⁱ FII 2018 defines mobile money this way: “A mobile money service allows a mobile phone to be used to send and receive money, make payments or other financial activities without the need for a bank account.” This classification is as of 2018, when services such as Vodafone M-Pesa were offered. But it is important to note that even in 2018, mobile money usage was very low.

Figure 20. Distrust in financial services, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

As a 2016 survey report described the situation this way:

Heightened awareness and concern about banking-related fraud in India has produced a general mistrust of digital financial services. Heavy media coverage, extensive hearsay, and precautionary communications from banks have amplified this mistrust as consumers hear stories about impersonations, ATM fraud, and other scams. When asked, many people admit that it has never happened to them, but they have either heard about it through a trusted source or seen it in the news.¹⁵⁹

In summary, lack of trust could be a binding constraint both for those who have bank accounts and for those who rely on BCs.

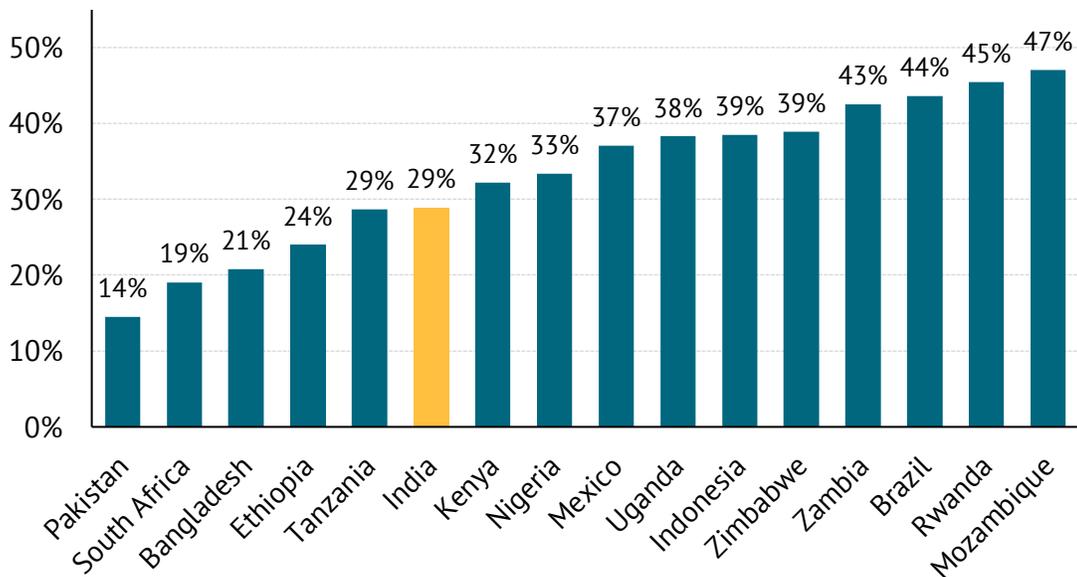
6.3. Low incomes

One constraint that can limit use of (digital) financial services is the income of certain populations, especially the lowest-income populations. If the income of an individual is very low, they may not feel they have the need for a financial service. According to the World Bank, in 2015, 175.8 million people in India, or approximately 13.4 percent of the population, were poor according to the international poverty line, living on less than US\$1.90 per day, 2011 PPP, per capita. Based on the lower-middle-income-class poverty line (USD US\$3.20, 2011 PPP, per day per capita), 659.8 million people, or 50.4 percent of the population, were poor. Seen across population segments, 9 percent of the urban population was poor, as compared with 15 percent of the rural population.¹⁶⁰

In most nationally representative surveys, such as Findex 2017 and FII 2018,¹⁶¹ factors that relate to low income serve as major constraints on Indians’ financial inclusion. While the relationship between low income and financial inclusion is not covered directly by the surveys, there are some proxy indicators that tell us something about the role of income as a constraint: *Having insufficient funds* is one of the reasons why a person without a financial account states why they do not have an account in 54 percent of cases in Findex 2017. About 9 percent give *having insufficient funds* as the *exclusive* reason for not having an account. Similarly, when examining the population of financially excluded people from FII 2018, the response to the following question in FII 2018: “*Is this a reason why you do not have a bank account? You don't have enough money to use the account,*” Thirty-six percent listed this as one of the reasons, and 10 percent listed it as the *only* reason. In Findex 2017, of the 20 percent of the population who didn’t have accounts, 50 percent stated lack of funds to be a reason. This is an indication that there is a sizable population for whom low income is a constraint on accessing formal financial services.

If the entire population, regardless of income level, had similar levels of financial inclusion, we could conclude that income cannot be a constraint on financial inclusion. However, we know that there is a general trend that as segments of the population have lower incomes, they are less likely to be financially included. Using Findex 2017 data, it relates the percentage of the adult population who have made or received digital payments in the last year by the richest 20 percent and the poorest 20 percent and shows the difference between those two populations in selected countries. There is always a financial inclusion gap related to income levels, for every country in the sample. This is the same as you dive deeper into the highest and lowest quintiles across countries, as described in Figure 21.

Figure 21. Gap between the richest 20 percent and poorest 20 percent in making or receiving digital payments, selected countries, 2017

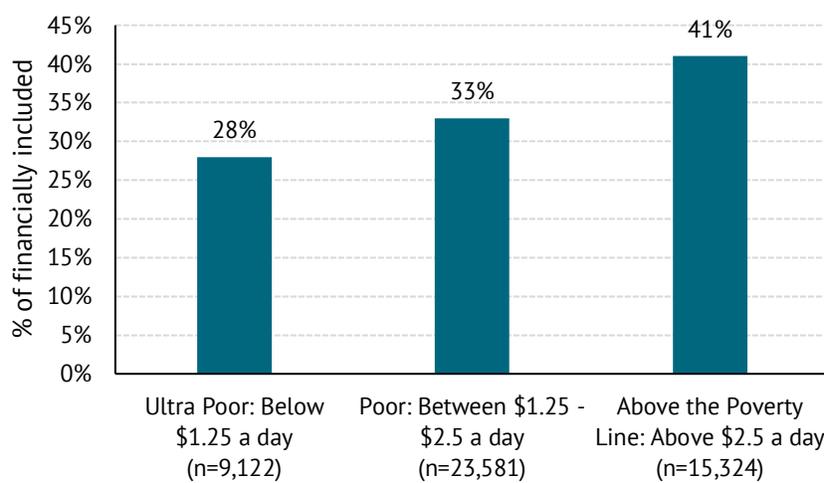


Source: Data from Global Findex database, 2017.

The FII 2018 data allow us to dig deeper into this gap in India. Figure 22 uses FII 2018 data to divide the population into three groups:

- Above the \$2.50/day poverty line (32 percent of the sample)
- Poor (earning between US\$2.50 and US\$1.25 a day) (49 percent of the sample)
- Ultra-poor (earning less than US\$1.25 a day) (19 percent of the sample)

Figure 22. Financial inclusion by income level, India, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

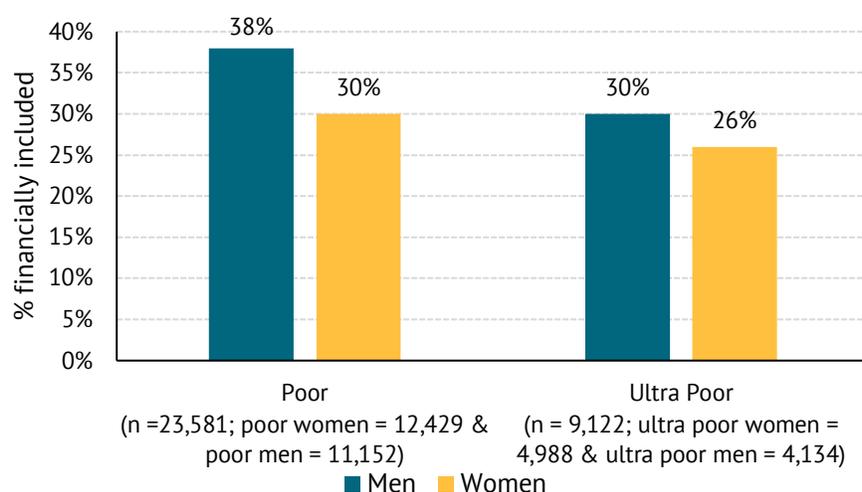
The data here show that, as in other countries, the poorer you are, the less likely you are to be financially included. However, given that 28 percent and 33 percent of the poor and ultra-poor populations, respectively, *are financially included*, for at least one-third of the poorest population, income may not be a constraint. The fact that financial inclusion does increase with income implies that, at least for the poorest, low income is a potential constraint on financial inclusion. It is also important to note that since COVID-19, the government has increased support payments to the poor and ultra-poor income segments, and this may have led to an increase in the number of people financially included since the FII data in 2018. In 2018, 16 percent of ultra-poor and 17 percent of poor people were digitally financially included only due to receiving direct benefit transfer from the government.

6.3.1. Low income—analyzing gender and geography dimensions

To better understand for whom low income may be a constraint, it is possible to divide up the poor and ultra-poor populations by gender and geography. First, we ask two questions: Is there a larger gender gap between poor and ultra-poor populations with respect to their financial inclusion? and Are women significantly less likely to be financially included if they are ultra-poor? Figure 23 depicts the percentage of adult men and women who are poor or ultra-poor and their respective financial inclusion rates. Poverty seems to impact women more than men if they are poor (income of US\$1.25–US\$2.50 a day) rather than ultra-poor

(less than US\$1.25 a day). Therefore, low income is more likely to be a binding constraint for poor women than ultra-poor women. It could be that at the ultra-poor level, men and women experience the same levels of financial exclusion, as they simply do not have enough money to use financial services. However, once they move to the poor status, men may have the advantage and are the first to begin to access financial services, while it may not be viewed as a priority for the family or community for women to have access to financial services. There is some evidence to imply that “men’s well-being is determined significantly by income along with some other factors, while women’s well-being is not determined largely by income but by other non-income dimensions.”¹⁶² This is further supported by the challenge many women face globally, including in India, that “money is the domain of men. Society doesn’t view it as her role to earn money or her right to make financial decisions.”¹⁶³

Figure 23. Financial inclusion by gender and poverty level, 2018

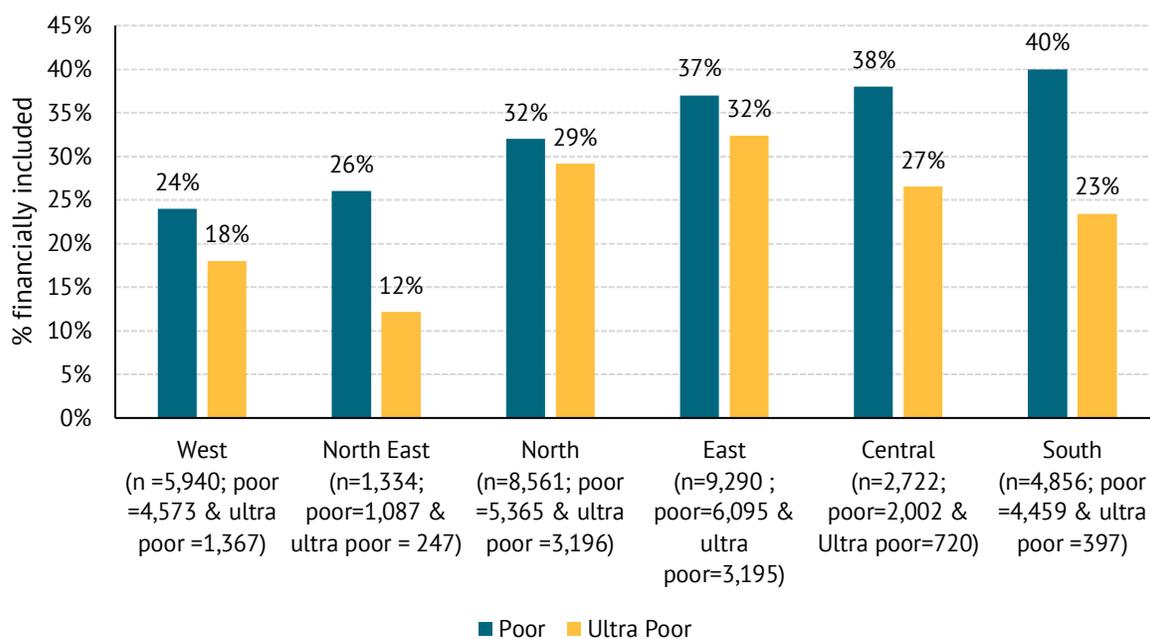


Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

Using FII 2018 data, Figure 24 interacts the percentage of the population who are considered poor and ultra-poor with the region of the country they live in and their level of financial inclusion. What we find is that while the ultra-poor are always less financially included than their poor counterparts in every region, this *difference* is much more *extreme* in certain regions of the country—especially in the Central (11 percent), North East (14 percent), and South (17 percent). Therefore, low income may be a stronger constraint for ultra-poor populations living in those regions of India. Based on India’s index on the UN Sustainable Development Goals (SDGs), compiled by NITI Aayog, the government’s National Institution for Transforming India, there are clear regional differences in poverty, with the northeast and central regions having high poverty rates.¹⁶⁴ Regional differences in resource endowments, investments in infrastructure, and in other socioeconomic parameters are possible explanations as to why historically poor states (the so-called BIMARU states of Bihar, Madhya Pradesh, Rajasthan, and Uttar Pradesh) continue to fare poorly despite making progress.¹⁶⁵

Figure 24. Financial inclusion by region and poverty level, 2018



Source: FII, 2018.

Note: N = 48,027; fieldwork conducted September–December 2018.

In summary, low income may be a constraint for specific population subsegments, especially poor women, as well as ultra-poor populations in the South, Central and North East regions. The implication of this result is that for the ultra-poor population in some areas of India, moving up in the income scale is the first order condition to get them financially included (i.e., the “root of the problem for them”). Relaxing other constraints won’t help until this one is relaxed.

6.4. Digital and financial capability

Customers must have both digital and financial capability, the skills and confidence to use and apply digital financial products to their daily financial needs.ⁱⁱ We take these two constraints from the “tree for store-of-value services” and “tree for credit services” in Claessens and Rojas-Suarez’s decision tree framework.¹⁶⁶

ⁱⁱ We have added this potential binding constraint in response to feedback from several stakeholders in the Indian digital finance community.

To determine the skills of Indians to use digital financial services, we examined their response to the question in FII 2018, “How much ability do you have to perform the following activity with a mobile phone? Make a financial transaction such as send or receive money, or make a payment, or a bank transaction.” Overall, only 8 percent of those surveyed reported having “complete ability.” Within financially excluded populations, (1) both men and women had comparatively low ability, and (2) the gender gap in the ability to use a mobile phone for financial transactions was strong, with only 4 percent of women reporting complete ability as compared with 7 percent men.

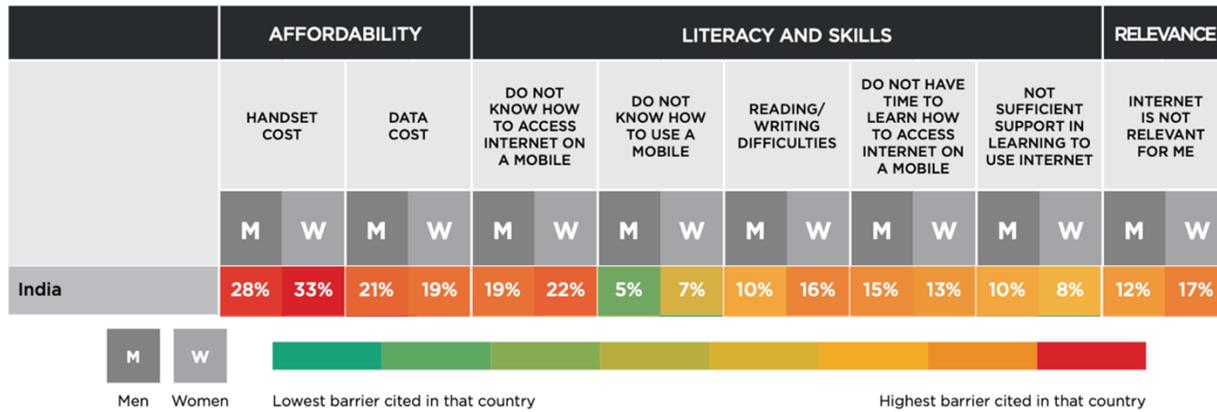
To determine the confidence of Indians in using digital financial services, we examined the response to the question, “How easy or difficult is it for you to complete a transaction without assistance from anyone when using a mobile phone to make or receive a payment?” Overall, 40 percent found it “very easy.” Similar to the results above, the gender breakdown of the overall population for the respondents to this question had 44 percent of males finding it “very easy” and 32 percent of females.

It is interesting to note that overall, the *confidence* of Indians is higher than what they deem their actual ability is to use digital financial services. This is further supported by the NFLIS report findings that only 27 percent of the Indian population are financially literate, while their “financial attitude” is much stronger, at 89 percent.¹⁶⁷

However, we must determine whether this lack of digital and financial capability is a binding constraint for digital financial inclusion. Given that smartphone-based digital payments are one of the most popular digital payment types in India, we can use data examining the barriers to Internet use to determine whether this is a binding constraint. Based on the GSMA Global Mobile Gender Gap Report 2020 (see Figure 25), the most important barriers to using mobile Internet seem to be focused on handset cost and data cost for both men and women. Digital and financial capability challenges may play an additional (but not binding) role in constraining digital financial inclusion for men and women in India.

There is, however, a large gender gap in mobile Internet usage, of 50 percent (the gender disparity in mobile phone ownership is discussed above, in section 5.1.1). Given that digital capability is very much reliant on the ability to access and use the Internet, especially with respect to Indian digital payments, it is important to examine the reasons behind this disparity.

Figure 25. Important barriers to mobile internet use*



Source: GSMA, 2020.¹⁶⁸

Note: * Percentage of mobile Internet nonusers who are aware of mobile Internet but do not use it, and who identified the following as a main barrier to using mobile Internet.

For the subsegment of women, especially low-income women (see section 6.31), the root cause of low digital and financial capability may be social and cultural norms, which take on a stronger role as a binding constraint given that these norms that can prevent women from having digital literacy, accessing a phone, or using it. A meta-analysis of global research done on factors determining barriers for women’s financial and digital financial inclusion by the International Center for Research on Women showed that social and cultural norms play a strong role in accessing, usage of, and outcomes of financial and digital financial inclusion for women.¹⁶⁹ This is further supported by evidence from the Harvard “A Tough Call” study across five Indian states, where across all geographies, women’s use of mobile phones challenges traditional gender norms. “After marriage, norms dictate that a woman’s primary responsibility is to take care of her family and household. This home-centric role leaves women with few opportunities to use the phone for socially acceptable, ‘productive’ purposes.”¹⁷⁰ Holding demographic and economic factors constant in its regression analysis, the study found that women’s phone use increases by 10.6 percentage points between the 1st and 10th decile of women’s empowerment. This indicates that social norms, measured as “women’s empowerment,” play a strong role in a women’s ability own and learn how to use a mobile phone.¹⁷¹ Even for Indian women who have access to a smartphone, some internalize perceptions that access to and use of a smartphone can lead to sexual harassment and extramarital affairs, so they “self-restrict” even if they have a smartphones, becoming “dark users”—who do not access the Internet at all (which would be required for most digital payment applications).¹⁷² This analysis would suggest that social and cultural norms are a binding constraint for some Indian women on their financial inclusion.

6.5. Summary of demand-side analysis

The constraints that seem to be most relevant to digital financial inclusion in the Indian context from the demand side of the decision tree are low perceived benefit and lack of trust, especially for those who own a bank account (about 80 percent of the population, according to Findex 2017 data). Low income may be a constraint to specific population subsegments, especially poor women, as well as ultra-poor populations in the South, Central and North East regions. Digital and financial capability can also be a binding constraint for some Indian women, driven by social and cultural norms.

7. Conclusion

The analysis presented in this paper attempts to provide policymakers with an improved understanding of where the binding constraints are for the further expansion of digital financial services. Despite the strong efforts of both government and the private sector, we have yet to reach a “tipping point” of financial inclusion, especially in serving the needs of large parts of low-income populations. The initial analysis based on prices points to potential binding constraints on both the supply and demand sides.

7.1. Supply-side binding constraints

On the supply side, the available data indicate that India’s regulatory framework that mandates a bank-led approach has created the most critical binding constraint for digital financial inclusion: an unlevel playing field that restricts competition between banks and nonbanks. While this market structure has led to plenty of innovation in payment systems to reach the already-banked through smartphones, very little innovation to reach lower-income, feature phone users has materialized. We cannot be sure of the reasons for this unlevel playing field: It could be due to risk aversion on the part of government and the regulator. It could also, however, signal a form of institutional deficiency and regulatory capture, through which government, RBI, and the large state-owned banking system mutually reinforce each other’s power, to the detriment of potential new entrants, new business models, and innovation. Whatever the underlying reasons, the indicators signal that a bank-led model will have neither the agility nor the incentives to expand digital payments to lower-income, more remote, less digitally enabled, and otherwise marginalized populations.

Other supply-side constraints may also be binding for certain population groups. Where digital infrastructure is lacking, particularly in poorer and more rural areas, digital payments and transfers are likely to grow in lockstep with the expansion of technologies such as POS devices and smartphones. Due to coordination failures, the further expansion of digital payments and transfers is unlikely to be linear—we would expect to see rapid expansion in areas that have reached critical mass and slow growth in areas still characterized by coordination failures. However, the fact remains that under a different regulatory system, it is very possible that a digital payment system less reliant on smartphones may have achieved scale already.

It is also important to note here, however, that a model that is effective at expanding digital payments is not necessarily the same thing as a model that is effective at creating real and sustained livelihood benefits through a range of financial services. A regulator is always responsible for the delicate balance of allowing for innovation while creating stability and protecting the customer. India's regulatory framework may place a strong emphasis on stability, which is understandable for a country of India's magnitude and all the related aspects of the fragile stability of that system. However, the choice to emphasize stability might be at the cost of digital payments growth. That emphasis on stability might also reflect a strong difference in how policy is written, and then how policy is implemented by the private sector (e.g., KYC requirements sometimes being more stringently implemented at a bank branch level when the national policy allows for a more relaxed KYC policy).

7.2. Demand-side binding constraints

Under the rules of the game created by an unlevel playing field and the resulting lack of effective competition, the conditions are not in place for large-scale adoption of digital payments. Here, for certain populations, demand-side constraints can also bind. The constraints that appear to be most relevant in the Indian context from the demand side of the decision tree are low perceived benefit from using digital financial services and lack of trust in the providers. These two constraints are also very much related. Low perceived benefit can be very much tied to low trust in the system, and therefore people may choose to use alternatives to banks. People may perceive benefit from working with formal financial services for large amounts of money but for their daily lives, even the savviest customer may choose to use informal, nondigital forms of financial services to suit their needs. In addition, digital payments may not be "women-friendly" in India, especially to poor women, given challenging social and cultural norms and the large digital and financial capability gaps between women and men.

7.3. Interconnected binding constraints

The supply-side and demand-side constraints are, of course, connected. If there lacks a strong regulatory framework that is provider-neutral, there advances a limited competition environment where financial services providers may not be battling for every last customer. The inability of financial service providers to adequately understand the needs of underserved populations, design for their needs, and deliver effective services is an acknowledged problem in the financial inclusion literature. The ability of India's financial sector to understand and respond to these needs and behaviors could also be a subconstraint on financial inclusion, and thus potential policy responses around financial-sector training and capacity may be required.

As a result of these supply- and demand-side constraints, retail customers, especially those most difficult to serve, are not availed financial services that suit their needs, and therefore there is low perceived benefit of those services. In the same vein, with a limited competitive environment, the battle to reach, gain, and keep the trust of customers may not be as strong as it is in other markets, as evidenced by some of the data on trust discussed in section 6.

The institutional constraints on the supply side and individual constraints on the demand side are compounded by a coordination constraint, which means that in many places (particularly smaller towns and rural areas) providers and users of digital payments and transfers have not yet reached a critical mass that would allow for more rapid growth. This manifestation of the subscale trap means that growth is likely to be stalled in some areas and will take a coordinated effort from policymakers and the private sector to get the supply and demand sides to critical mass.

7.4. Recommendations

The government of India is active and a leader in the digital financial inclusion space, as reflected in its National Financial Inclusion Strategy, and some of these constraints are already being tackled. There are numerous government efforts to increase the financial inclusion and economic empowerment of Indian citizens, especially those traditionally marginalized. For example, the bid to introduce a new pan-India umbrella entity focusing on retail payment systems¹⁷³ should help to deconstruct the monopoly currently held by NPCI. Similarly, a recent discussion to allow corporations to take significant stakes in banks may lead to a policy that allows for greater innovation and competition in the sector. In this vein, as the digital payments space has evolved, the debate on the “bank model” versus the “MNO model” has also evolved—in many markets, one is seeing that it is not the best company that necessarily succeeds but the best partnership. Partnerships that are able to leverage the assets from both companies—for instance, distribution network (MNOs) and credit decision making (banks and microfinance institutions)—have been producing some of the most innovative, useful products for low-income customers worldwide. This should be considered as regulators, banks, and other determinants of the current system consider the future.

There should be an effort to provide a supply-side analysis of the market based on transactions. In writing this paper, we found that determining the spread of assets across financial institutions was straightforward but determining the number of active customers and volume of transactions across financial institutions was quite challenging. However, if transaction-based business models are key to addressing digital financial inclusion, availability of data on active usage is critical.

The Indian financial services ecosystem should strive to understand why Indian customers perceive low benefit from using digital financial services and have low trust in the providers, and work to design the marketing and structure of financial products to better suit the needs and earn the trust of these people who are financially excluded. Recent studies are quite enlightening. For example, the most recent report in the Garment Worker Diaries series, “A Thousand Cuts: Life as a Garment Worker in Bangalore,”¹⁷⁴ found that poor Indians, even when paid into bank accounts, withdraw their full amount in cash and use informal financial services to manage their financial lives. Omidyar Network and Dalberg Global Development Advisors “Currency of Trust” report¹⁷⁵ describes most even financially savvy customers as preferring to use banks only for large transactions; as one interviewee put it, “I save money in a special box at home labeled ‘sister’s wedding.’ I have a bank account, but who wants to

go to the bank to deal with the hotchpotch? We are illiterate and happy with our way.” Sone, street hawker, shuttles between Patna and Champaran village, Bihar.” Given that one of the biggest use cases for digital payments is a safe place to store funds, these reports illustrate the work that the Indian financial services ecosystem has to do to overcome this perceived benefit challenge.

The government of India may want to consider what this means for the services it has mandated that have, no doubt, increased access to and usage of financial services, especially the PMJDY accounts. However, perhaps even after the opening of those accounts, the country’s very basic financial services (digital and nondigital) continue not to meet the needs of many Indians. What the government has put into policy “on paper” may not always be implemented at the local bank branch level, thereby leaving a gap between the intention of the government and reality for the (poor) Indian citizen. This is a challenge for many markets.

One of India’s many assets is its large population. Being able to find/leverage a business model that can utilize high-transaction/low-cost financial services all but beckons and calls out to the Indian financial services ecosystem. However, as discussed in section 5 of this paper, if the prevailing regulatory environment doesn’t allow for flexibility in non-bank-led models, this opportunity may continue to sit on the shelf, collecting dust.

As discussed in section 3, the decision tree we have presented is one way of examining publicly available data to determine what potential constraints and binding constraints on advancing digital financial inclusion exist in the market. Our choice of the definition of financial inclusion, use of the decision tree, and data points are one of many ways to determine binding constraints. Given the COVID-19 related drive toward digital and “contactless” payments within India, this is a critical moment to better understand the constraints discussed in this paper and have a public-private discussion on how to best leverage India’s digital revolution for those who need it the most.

Appendix 1. The decision tree methodology: Further details

This appendix extends the discussion in section 3 by providing additional details regarding the methodology used in this paper. The complete analytical framework, the principles of the methodology, and numerous examples can be found in Claessens and Rojas-Suarez's 2020 paper "A Decision Tree for Digital Financial Inclusion Policymaking."¹⁷⁶

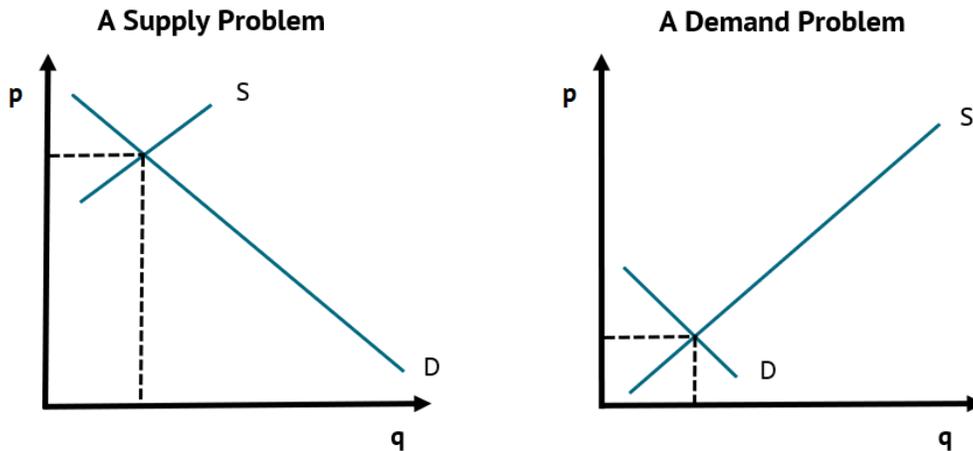
The methodology is inspired by Hausmann and coauthors' work on growth diagnostics (the 2005 "Growth Diagnostics" and the 2008 "Doing Growth Diagnostics in Practice"),¹⁷⁷ which created a decision tree to identify the binding constraints on growth in developing economies—that is, the factors that are preventing countries from reaching their growth potential. The motivation behind this framework is to offer a diagnostic tool that will help policymakers to prioritize policy in areas where actions are needed the most and can have a larger impact. Many factors can be constraints; indeed, all the branches in the decision tree are determinants of financial inclusion, but the methodology seeks to find those that are *binding*.

Hence, the decision tree for digital financial inclusion outlines a set of potential constraints that analysts have to evaluate in order to determine which are binding, in the sense that they are the root cause limiting the expansion of financial inclusion. Claessens and Rojas-Suarez offered three different trees for payment, store of value, and credit services, though some constraints are naturally common for the three trees. These trees have served as a guide in the search for the binding constraints to digital payments and transfers in India.

The decision tree for digital payments and transfers is presented in Figure 2 in section 3. We evaluate all the branches (and sub-branches) of the tree to identify the binding constraints to financial inclusion, applying the following principles:

1. ***Prices of financial services are key indicators to determine whether binding constraints are (likely) on the demand or the supply side.*** Observing low quantities (low usage) does not indicate whether the constraints are affecting providers or consumers. Analysts can get an *initial* idea of whether binding constraints are on the supply or demand side by considering prices, though they should evaluate all the branches in the tree individually. Generally, if the price of a service is relatively high compared with either another similar service or the (properly adjusted) customary price charged in other countries with similar levels of development, it indicates the existence of supply-side constraints (left graph in Figure A1.1). This suggests that providers are willing to supply the service only at a high price (due to high costs or other distortions related to supply-side constraints). These high prices, as a result, exclude significant proportions of the population, who cannot afford the service. On the other hand, if the price is relatively low, this would indicate a demand-side problem, since users are unable or unwilling to use the service despite its low price (right graph in Figure A1.1).

Figure A1.1. Distinguishing between supply and demand problems



Source: Claessens and Rojas-Suarez (2020), taken from Hausmann et al (2008).

Note: S and D represent, respectively, the supply of and demand for a financial service, and p and q represent, respectively, the price and quantity used of that service. Actual usage occurs at the intersection of both curves.

In addition, in many cases, it is necessary to consider a broader definition of prices, accounting for potential unobserved shadow prices and other factors, such as opportunity costs, that affect the market equilibrium. A clear example of this is geographical constraints, where the opportunity cost of displacement is built in for customers and might cause low demand.

The three other principles indicate that a constraint is likely binding:

2. ***If relaxing the constraint results in a significant change in usage*** or other relevant behaviors. For example, if reducing or eliminating certain taxes to payment services causes a sharp rise in the usage of the service
3. ***If agents are trying to overcome or bypass the constraint*** by using either alternative equivalent services such as informal lending (when analyzing credit markets) or a combination of other, less efficient, financial instruments
4. ***If agents less intensive in that constraint are thriving***—that is, if the constraint affects only a subpopulation and those not affected by it are largely financially included. For example, in countries where institutional and governance quality is low, the ability to use financial services may depend on factors other than those driving the sound conduct of business, such as political connections. If so, one should observe that those with privilege to use the services do better than what is expected given their capacities.

Further considerations to take into account when using the decision tree methodology include these:

- ***When assessing whether a constraint (branch in the tree) is binding, analysts need to consider as many indicators as possible, including hard data as well as surveys reflecting perceptions.*** Claessens and Rojas-Suarez suggested possible indicators to use on each of the branches, but analysts should select a set of indicators based on the specific characteristics and context of both the services and the country under study. Data should encompass both aggregate and microlevel statistics.
- ***Keep in mind that removing nonbinding constraints might be necessary to expose a binding constraint.*** For instance, allowing mobile money to operate by law can ease a constraint but, while necessary, it might not be sufficient to improve financial inclusion. Relaxing this constraint might instead help to uncover a truly binding constraint, such as the lack of a critical mass of customers (a coordination problem).
- ***Acknowledge that branches can interrelate.*** In some cases, to fully evaluate a branch requires analyzing others. Analysts should draw these connections and assess which indicators to use in each of the branches to evaluate them.

Appendix 2. Further details on costs and prices

Table A2.1. Banking costs: Basic savings bank deposit account (BSBDA)

Cost	State Bank of India (Public Bank) ¹⁷⁸ (USD) ¹⁷⁹	Axis Bank ¹⁸⁰ (Private Bank) (USD)
Cash withdrawal	Maximum 4 free cash withdrawals in a month including ATM withdrawals at own and other banks' ATMs, cash withdrawal at branch channel, AePS cash transactions.	4 free withdrawal transactions (includes branch cash, Axis/other ATM cash withdrawal, POS, micro-ATM, NEFT/RTGS, demand draft/PO, ECS/SI debit transactions)
Cash withdrawal fees beyond free limit (network/non-network ATMs)	INR 15 + GST (US\$0.20) for every additional cash transaction	INR 20 per transaction (US\$0.27)
Checkbook	No checkbook facility available	1 checkbook free per quarter. Over free limit, chargeable at INR 3 per check
Debit card	Basic RuPay ATM/debit card will be issued free of cost and no annual maintenance charge will be applied	RuPay debit card with no issuance or annual maintenance fee
Domestic transfer	Receipt/credit of money through electronic payment channels like NEFT/RTGS will be free	No transaction charges via RTGS/NEFT at bank branch and online
Passbook issuance	First passbook free. Duplicate passbook INR 100 (US\$1.36)	Free
Physical statement fee at branch, for prior quarters	Information not available	INR 100 (US\$1.36)

Sources as noted in Endnotes.

Note: ECS = electronic clearing system, GST = goods and services tax, PO = pay order, SI = standing instruction.

Table A2.2. Costs associated with payments banks and mobile wallets

Cost	Paytm Payments Bank and Mobile Wallet ¹⁸¹ (USD) ¹⁸²	Airtel Payments Bank and Wallet ¹⁸³ (USD)
Cash deposit	Free through banking point or home visit service.	Free through Internet banking/mobile app. Through banking points, INR 10,000–INR 50,000 (US\$136–US\$682): 0.5% of the deposit amount. Greater than INR 50,000 (US\$682): 0.75% of the deposit amount
Cash withdrawal	3 free ATM transactions every month, after that INR 20/transaction (US\$0.27)	INR 0–INR 5,000 (US\$68) (cumulative transactions per month): Free. Greater than INR 5,000: 0.65% of withdrawal amount
Checkbook	INR 100 for a 10-check book (US\$1.36) INR 150 for a 25-check book (US\$2.05)	n/a
Debit card	Physical card issuance charges: INR 250 (US\$3.41) Annual subscription fee: INR 150 (US\$2.05)	n/a
Funds transfer from payments bank to another bank (IMPS, UPI, NEFT, Internet banking, mobile app, USSD)	Free unlimited	1% of amount transferred for savings bank customers using IMPS
Mini statement, balance check, PIN change	INR 8 per transaction (US\$0.11)	n/a
Online passbook and email statements	Free	n/a
SMS alerts	INR 10 (US\$0.14) per quarter. Charges applicable for credit below INR 500 (US\$6.82) for bank and wallet, debit below INR 50 (US\$0.68) for wallet	INR 10 (US\$0.14) (exclusive of GST) half yearly for savings bank customers.
Wallet-to-bank transfer: Self	Wallet-to-bank transfer rate for all customers for all transactions will be 5%	3% of transaction amount (only for full KYC customers)

Sources as noted in Endnotes.

Note: GST = goods and services tax.

Table A2.3. International comparison of charges for sending 0.5% GNI per capita, PPP

Country	Indicative financial service provider	Currency	GNI PPP/capita in local currency	0.5% of GNI per capita, PPP, in local currency	Charges for sending 0.5% GNI per capita, PPP, to a nonregistered user in local currency	Charges for sending 0.5% GNI per capita, PPP, in local currency as % of transaction amount
Bangladesh	bKash	Bangladeshi taka	66,147	331	5	2%
Ethiopia	M-BIRR	Ethiopian birr	16,723	84	12	14%
India	Paytm/Google Pay/State Bank of India	Indian rupee	1,02,263	511	0	0%
Kenya	M-Pesa	Kenyan shilling	91,732	459	45	10%
Mozambique	M-Pesa	Mozambique metical	21,919	110	20	18%
Nigeria	MTN MoMo	Nigeria naira	3,46,680	1,733	10	1%
Pakistan	Easypaisa	Pakistani rupee	65,144	326	40	12%
Rwanda	MTN MoMo	Rwandan franc	6,57,057	3,285	600	18%
South Africa	MTN MoMo	South African rand	52,667	263	10	4%
Tanzania	M-Pesa	Tanzanian shilling	19,82,333	9,912	1,150	12%
Uganda	MTN MoMo	Ugandan shilling	26,19,686	13,098	1,880	14%
Zambia	MTN MoMo	Zambian kwacha	6,665	33	5	15%
Zimbabwe	EcoCash	Zimbabwe dollar	1,297	6	1	10%

Sources the same as those noted in Endnotes in Table 2 for each country/provider.

Table A2.4. International comparison of charges for sending 0.1% GNI per capita, PPP

Country	Indicative financial service provider	Currency	GNI PPP/capita in local currency	0.1% of GNI per capita, PPP, in local currency	Charges for sending 0.1% GNI/capita, PPP, to a nonregistered user in local currency	Charges for sending 0.1% GNI/capita, PPP, in local currency as % of transaction amount
Bangladesh	bKash	Bangladeshi taka	66,147	66	5	8%
Ethiopia	M-BIRR	Ethiopian birr	16,723	17	12	72%
India	Paytm/Google Pay/ State Bank of India	Indian rupee	1,02,263	102	0	0%
Kenya	M-Pesa	Kenyan shilling	91,732	92	0	0%
Mozambique	M-Pesa	Mozambique metical	21,919	22	8	36%
Nigeria	MTN MoMo	Nigeria naira	3,46,680	347	10	3%
Pakistan	Easypaisa	Pakistani rupee	65,144	65	40	61%
Rwanda	MTN MoMo	Rwandan franc	6,57,057	657	250	38%
South Africa	MTN MoMo	South African rand	52,667	53	10	19%
Tanzania	M-Pesa	Tanzanian shilling	19,82,333	1,982	375	19%
Uganda	MTN MoMo	Ugandan shilling	26,19,686	2,620	940	36%
Zambia	MTN MoMo	Zambian kwacha	6,665	7	5	75%
Zimbabwe	EcoCash	Zimbabwe dollar	1,297	1	0.68	52%

Sources the same as those noted in Endnotes in Table 2 for each country/provider.

Endnotes

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- ¹⁷⁷ Available at <https://growthlab.cid.harvard.edu/publications/growth-diagnostics-0> and <https://growthlab.cid.harvard.edu/files/growthlab/files/177.pdf>.
- ¹⁷⁸ SBI. “Basic Savings Bank Deposit Account.”
- ¹⁷⁹ Exchange rate as of January 8, 2021: USD 1.00 = INR 73.38.
- ¹⁸⁰ Axis Bank. “Fees and Charges.”
- ¹⁸¹ Paytm. “Rates & Charges.”
- ¹⁸² Exchange rate as of January 8, 2021: USD 1.00 = INR 73.38.
- ¹⁸³ Airtel Payments Bank. “Schedule of Charges: Min KYC and Full KYC Wallets.” Accessed November 2020. <https://www.airtel.in/bank/bank-charges>.