Transaction Cost Index

YEAR 1 COMPARATIVE REPORT

IPA Innovations for Poverty Action

Acknowledgments

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Photos

Front Cover: Uganda: Street shot from Uganda. ©2014

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Executive Summary

About the Transaction Cost Index

Motivation

Costs are a leading driver of take-up and usage of digital financial services (DFS), yet little work has been done to measure these costs systematically. The Transaction Cost Index (TCI) seeks to fill this gap by systematically measuring the costs of using mobile money. We consider a broad definition of cost, inclusive of official fees and taxes, informal extra fees charged by agents, and non-pecuniary costs such as the opportunity cost of time wasted on failed transactions and exposure to consumer protection risks. This report presents results from our first year of data collection.

Activities

Desk work: we systematically scraped official price lists from leading mobile money providers across 16 countries. We additionally collected information on tax treatment of mobile money transactions and regulations related to mobile money pricing. We additionally measured the ease of accessing providers' pricing information. The following countries were included in our desk review:

Bangladesh, Colombia, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Mali, Myanmar, Nigeria, Pakistan, Paraguay, Peru, Philippines, Sierra Leone, Tanzania, and Uganda.

Fieldwork: to measure costs beyond official fees, we tested three approaches to measuring the true cost of making mobile money transactions with agents, including overcharging and non-monetary costs. This work was conducted in Bangladesh, Tanzania, and Uganda.

Measuring official prices and pricing policies

Methodology

Data scraping process

We gathered official, listed transaction prices from major mobile money providers' websites across 16 low- and middle-income countries (LMICs). Where possible, automated data scraping techniques were used.

Regulatory review process

Alongside the listed prices exercise, IPA also tracked relevant regulations related to mobile money pricing to contextualize trends in providers' prices in specific markets.

Transaction types

CASH-IN AT AN AGENT

CASH-OUT AT AN AGENT

ON-NETWORK PERSON-TO-PERSON TRANSFER

OFF-NETWORK PERSON-TO-PERSON TRANSFER

Transaction values

approximation of median transaction value in each country, based on World Bank consumption data. A second value equal to half this standard reference value was used to assess the regressiveness of providers' pricing schedules

Results

Costs by country

Average transaction fee varies significantly by country and type of transaction

FIGURE 1:   Costs by country

Regressiveness

Approximately half of providers adopt a slab based pricing approach, which leads to a regressive pricing structure in most cases, where low-valued transactions incur higher fees in percentage terms. This table displays the transaction fee for cash-outs at half our standard reference value minus the transaction fee for cash-outs at our standard reference value, in percentage terms. For all countries except Côte d'Ivoire, fees are higher in percentage terms for the low-valued transaction.

FIGURE 2: Difference in cash-out fees: Low reference value minus high reference value

■ FEE EXCLUDING TAX   ■ TAX   ■ FEE + TAX (if tax rate unknown)   ⬚ TRANSACTION UNAVAILABLE

Cash-in

Cash-out

On-network transfer

Off-network transfer
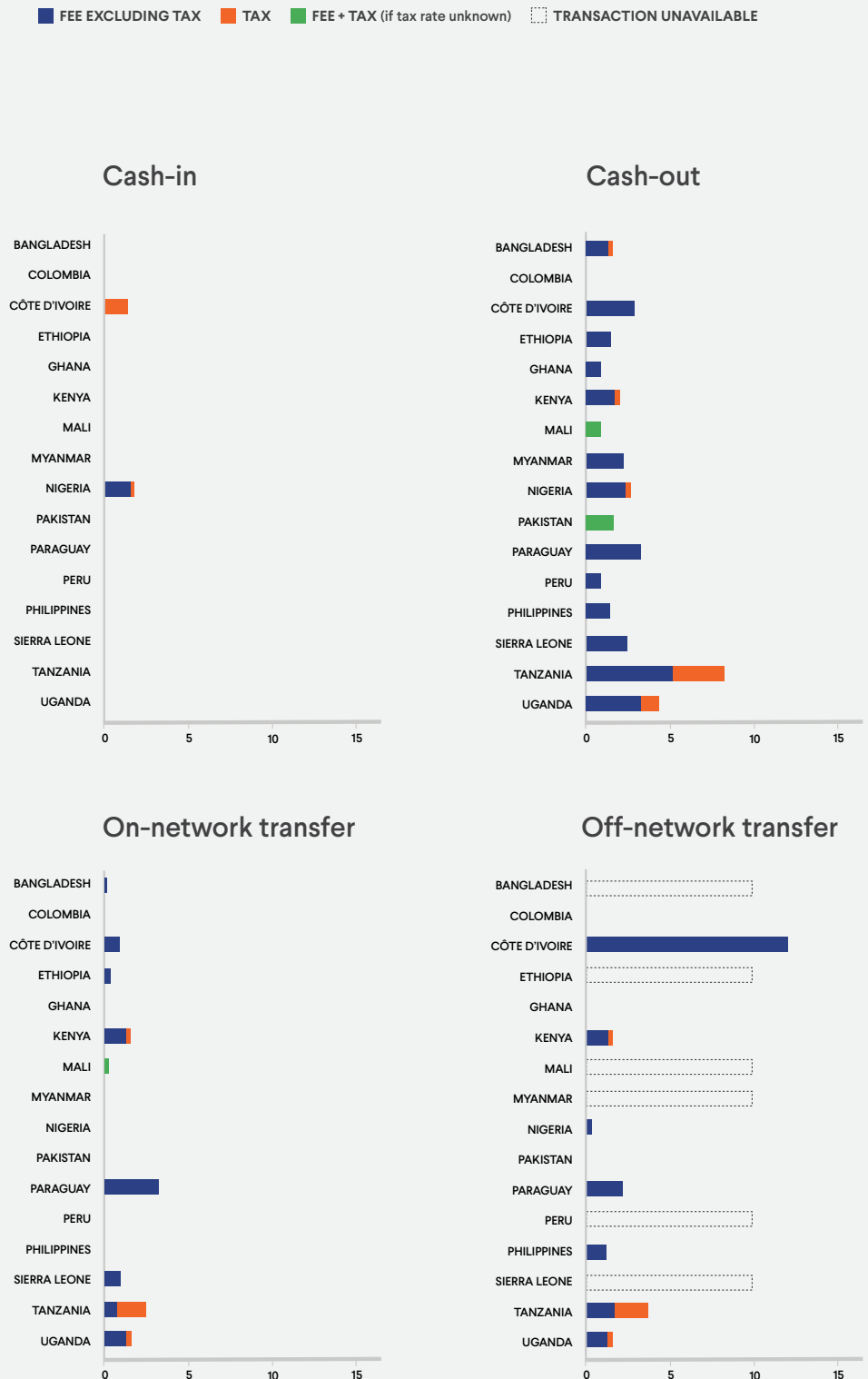
Costs by scale

Countries with high mobile money penetration tend to have higher mobile money prices than countries with lower penetration. Note: aggregate cost refers to the cost of cashing-in, transfering (on-network), and cashing-out at our standard reference value.

- 🟧 ASIA
- 🟦 LATIN AMERICA
- 🟦 EAST AFRICA
- 🟪 WEST AFRICA

Note: The aggregate cost is calculated as the sum of the fees for cash-in, cash-out, and on-network person-to-person transfer as a percentage of the transaction amount at our reference value. This represents the total "lifecycle" cost of making a typical transfer, starting and ending with cash. Mobile money penetration data is from the 2021 Global Findex Database.[1] Ethiopia is missing in this database, so it is excluded from this sample.

Costs by competition

Countries with highly concentrated mobile money markets tend to have lower prices than countries with less concentration and more competition.

- 🟧 ASIA
- 🟦 LATIN AMERICA
- 🟦 EAST AFRICA
- 🟪 WEST AFRICA

Note: Higher HHI values indicate more concentrated markets.

Within-country price dispersion

Providers in the same country tend to converge on very similar pricing structures. Most countries have maximum price differences between providers of less than one percentage point.

- 🔺 CASH-OUT
- 🔴 CASH-IN
- ➕ ON-NETWORK P2P TRANSFER
- 🟦 OFF-NETWORK P2P TRANSFER

Note: Price dispersion is defined as the maximum price difference between providers in the same country for a transaction at our reference value, reflected as a percentage of the transaction cost.

FIGURE 3: Aggregate cost by market penetration
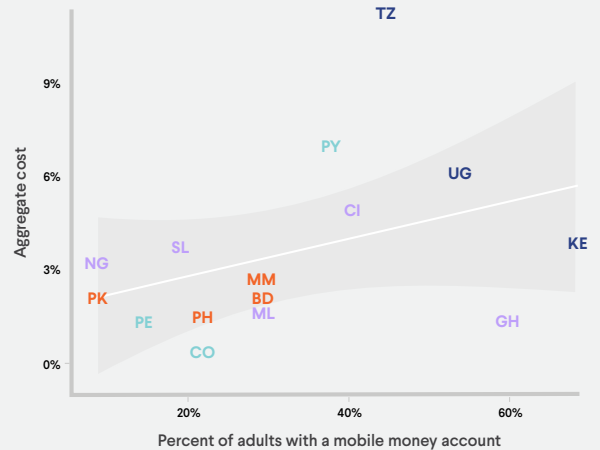
FIGURE 4: Aggregate cost by Herfindahl-Hirschman Index
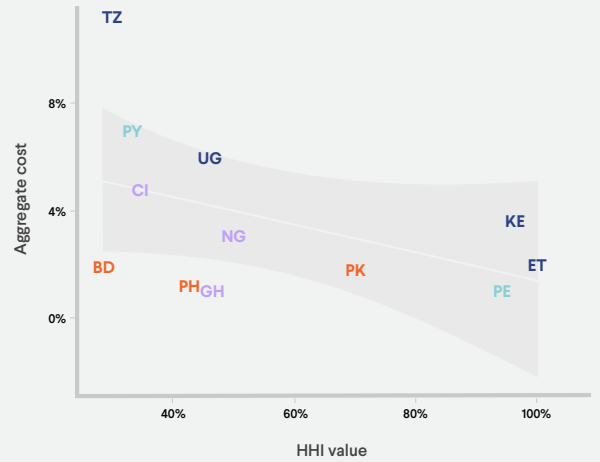
FIGURE 5: Average pricing dispersion by country
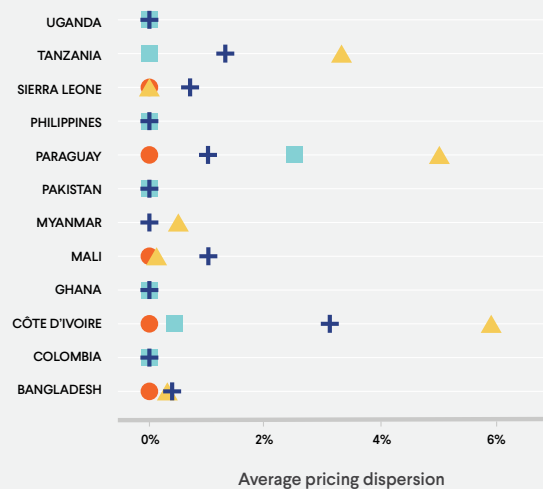
Interoperability

Countries with government-led interoperability infrastructure that facilitate transfers between providers tend to have lower fees for off-network transfers.

Off-network fee by interoperability infrastructure

- ASIA
- LATIN AMERICA
- EAST AFRICA
- WEST AFRICA

Government-led: GHANA 0.0%, PAKISTAN 0.0%, NIGERIA 0.4%, BANGLADESH 0.7%, PHILIPPINES 1.2%, UGANDA 1.6%

Private sector-led: COLOMBIA 0.0%, KENYA 1.6%, PARAGUAY 3.0%, TANZANIA 3.7%, CÔTE D'IVOIRE 12.1%
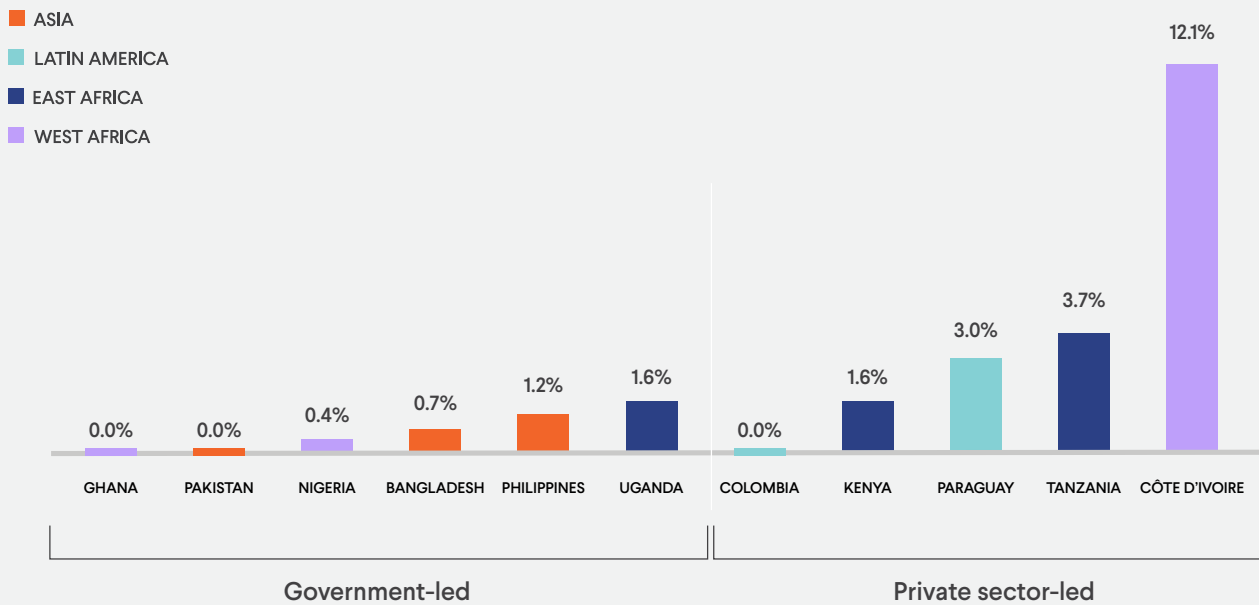
Price transparency and consumer redress

Many providers fail to make prices easily accessible, either by not posting prices on their websites, or by making price lists difficult to find.

14% 14 percent of providers did not post prices on website

Myanmar (one provider)
Tanzania (one provider)
Nigeria (all providers))

40% 40 percent of providers do not have a link to their price list on their home page

20% 20 percent of providers did not respond to a customer care enquiry

Taxation

9 of 16 countries included in our review taxed mobile money transactions in some way. Tanzania consistently has relatively high total costs (particularly for withdrawals) and very high taxes as a proportion of total costs.

FIGURE 7:   Taxes as a percent of total cost (at high reference value)
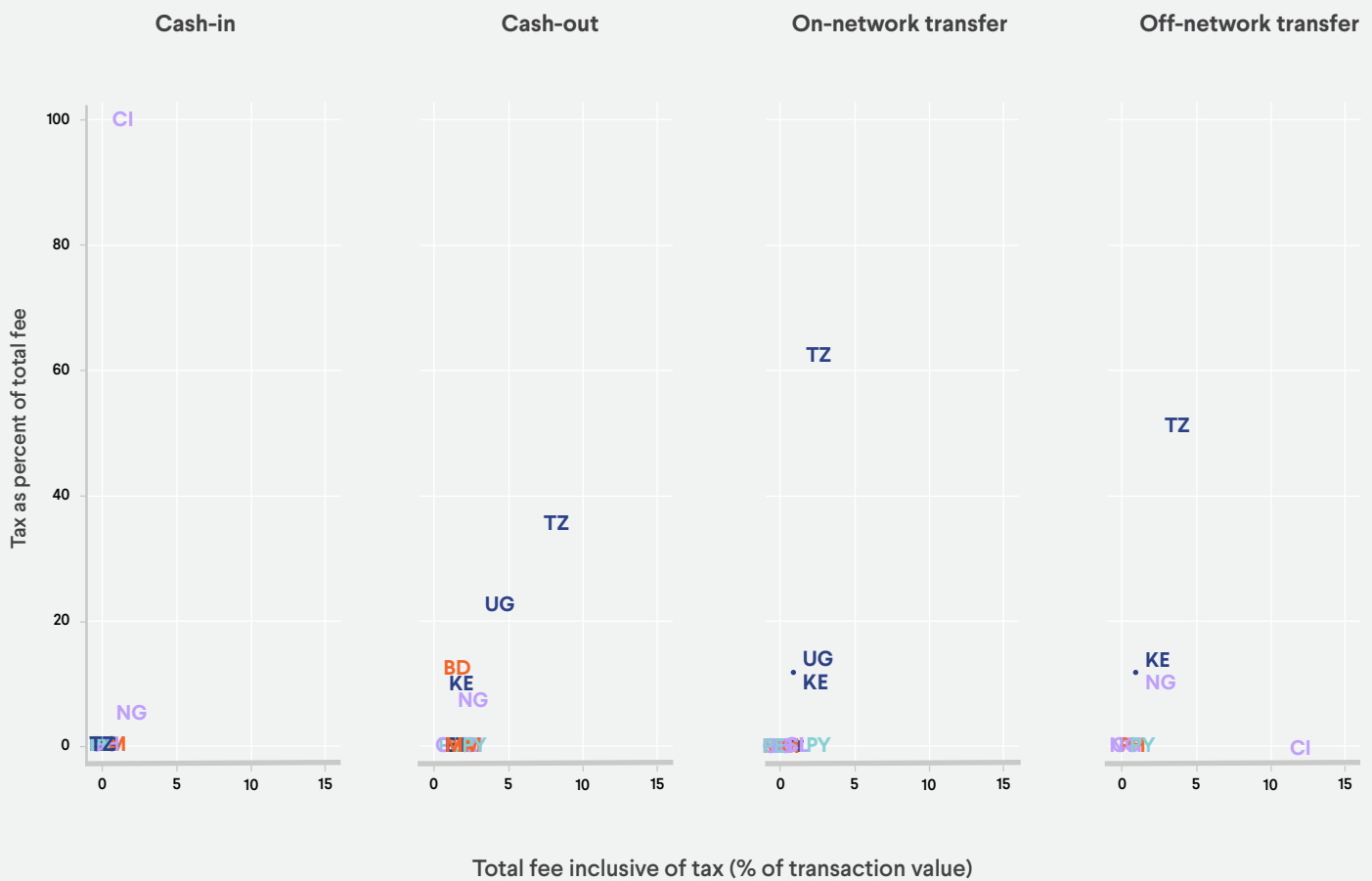
NOTES: (0;0: Bangladesh, Ethiopia, Ghana, Kenya, Myanmar, Paraguay, Peru, Philippines, Sierra Leone, Tanzania, Uganda)

NOTES: (0;1: Ghana, Peru), (0;1.5: Ethiopia), (0;1.55: Philippines), (0;2.35: Myanmar), (0;2.5: Sierra Leone), (0;2.97: Côte d'Ivoire), (0;3.33: Paraguay)

NOTES: (0;0: Ghana, Myanmar, Nigeria, Peru, Philippines), (0;0.2: Bangladesh), (0;0.5: Ethiopia), (0;1.03: Côte d'Ivoire), (0;1.15: Sierra Leone), (0;3.33: Paraguay)

NOTES: (0;0: Ghana), (0;0.4: Nigeria), (0;1.2: Philippines), (0;2.25 Paraguay)

Measuring costs when using mobile money agents

Methodology

Three methods tested to measure consumer experience with mobile money, including prevalence of overcharging and levels of reliability

1. Conducting mystery shopping visits at mobile money agent locations using trained professional enumerators;

2. Intercepting consumers outside of mobile money agent locations and surveying them about their experience with that agent; and

3. Conducting mystery shopping visits at mobile money agent locations using locally recruited consumers.

Transaction values

Similar to our desk review, reference values approximate the median transaction value in each market, and half the approximated median value.

Bangladesh: BDT 1,500 (USD $14.54) and BDT 750 (USD $7.27)

Tanzania: TZS 20,000 (USD $8.57) and TZS 10,000 (USD $4.28)

Uganda: UGX 30,000 (USD $8.06) and UGX 15,000 (USD $4.03)

TABLE 1:   Transaction types

TRANSACTION TYPES
Cash-in
Cash-out
Off-network person-to-person transfer (on-network in Bangladesh) **Note:** although person-to-person transfers can be carried out without an agent, we tested how agents respond when asked by a customer for assistance in carrying out this transaction.
Over-the-counter transfer (cash to account) **Note:** in this scenario, a customer brings physical cash to an agent and asks that it be transferred into another person's mobile money account. Although these over-the-counter transactions are often nominally not permitted, but are nonetheless relatively common.

TABLE 2:   Sample sizes

METHOD	SAMPLE SIZE		
	BANGLADESH	**TANZANIA**	**UGANDA**
Professional mystery shopping	1660 visits	1642 visits	1632 visits
	416 agents	412 agents	409 agents
Consumer intercept surveys	609 surveys	819 surveys	512 surveys
	349 agents	294 agents	284 agents
Local consumer mystery shopping	1016 visits	1771 visits	1598 visits
	100 agents	199 agents	100 agents

Comparing methods

Based on our field experience, we evaluated each data collection method along five dimensions.

TABLE 3: Comparing data collection methods

PROFESSIONAL SHOPPERS   INTERCEPTED CONSUMERS   LOCAL CONSUMER SHOPPERS

ASSESSMENT INDICATORS FOR COMPARING DATA COLLECTION METHODS	WORST	MIDDLE	BEST
Data collection affordability	high cost		low cost
Adaptability			
Reflection of real-world consumer decisions			
Data quality			
Observer effects	many observer effects		few observer effects

Results

Outcomes by country

Key reliability and overcharging outcomes show significant variation by country. Across all countries, approximately one third of attempted mobile money transactions failed, because the agent was not present or was otherwise unable to complete the transaction. Uganda's overcharging rate was highest where nearly one in five transactions involved agent overcharging.

TABLE 4: Outcome averages by country

COUNTRY	OUTCOME				
	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Bangladesh	85%	88%	72%	5%	5%
Tanzania	76%	88%	65%	7%	2%
Uganda	79%	81%	61%	19%	7%

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Outcomes by data collection method and agent relationship

Counter to expectations, in Uganda and Bangladesh local consumers are less likely to encounter agents that are open than professional mystery shoppers, perhaps suggesting that local consumers respond to their incentive structure – payment of a set rate regardless of whether the agents they visit are present.

In intercept surveys, consumers report higher success rates than mystery shoppers, suggesting that consumers make strategic decisions about with which agents they conduct transactions.

In Bangladesh and Uganda, overcharging is reported at higher rates (12-16 percentage points) in consumer intercept surveys than mystery shopping visits, perhaps suggesting that consumers' perceive overcharging rates higher than the actual incidence of overcharging.

Transaction types observed in consumer intercept surveys

Across all three countries, agents primarily provide cash-in and cash-out services, but in Bangladesh agents also commonly assist customers with person-to-person transfers, and in Tanzania and Uganda, more than one in five agent transactions is an over-the-counter transfer.

TABLE 5: Transaction types observed in consumer intercept surveys

TRANSACTION TYPE	BANGLADESH	TANZANIA	UGANDA
Cash-in	36%	44%	37%
Cash-out	46%	29%	40%
On-network transfer	11%	2%	0%
Off-network transfer	0%	1%	0%
OTC transfer (any type)	3%	23%	22%
Other	3%	0%	1%
Total	**100%**	**100%**	**100%**

Outcomes by transaction characteristics and geography

Across Bangladesh, Tanzania, and Uganda, urban agents are between 7 and 15 percentage points more likely to be present than rural agents. Urban agents also tend to complete transactions with greater success, with success rates between 8 and 21 percentage points higher than rural agents.

Liquidity constraints are a leading cause of failed transactions, and self-reported data suggests liquidity is a greater concern for urban agents than rural agents.

Overcharging is most common for cash-out transactions (between 7 and 22 percentage points more common than for cash-ins), while agent assisted account-to-account transfers and over-the-counter transfers do not have a formal set agent fee.

TABLE 6: Failure reasons by urbanity

FAILURE REASON	RURAL AGENTS	URBAN AGENTS
Agent knowledge	8%	9%
Doesn't offer service	32%	29%
Liquidity issue	46%	41%
Network or device issue	5%	4%
Other issue	8%	17%
Total	**100%**	**100%**

Outcomes by shopper and agent gender

We find relatively small and inconsistent differences in successful transaction completion and overcharging by customer or agent gender. Most gender differences are seen in interactions where the customer is a regular customer of the agent rather than one-off interactions. In Bangladesh and Tanzania, female customers are less likely to complete transactions successfully than male customers, when using their regular agent. In Bangladesh and Uganda, female shoppers using their regular agent are more likely to be overcharged than male shoppers. In Tanzania, male shoppers using their regular agent are more likely to be overcharged than female shoppers. Agent gender typically does not influence success rates or rates of overcharging with statistical significance.

Time cost

We computed the estimated time cost per successful transaction consumer face, incorporating the possibility of unsuccessful transactions. We convert these costs into monetary terms using local wage rates.

Across all three countries, time costs are significantly greater than the direct monetary cost of transactions, driven by inconsistent agent presence and limited transaction reliability.

TABLE 7: Time versus monetary cost by country

	BANGLADESH	TANZANIA	UGANDA
Average time cost	40 minutes	31 minutes	42 minutes
Average time cost (USD)	$0.69	$0.34	$0.31
Average monetary cost (USD)	$0.07	$0.19	$0.11

Price transparency

Price lists are often displayed at agent locations, with significant cross-country variation. However, agents rarely verbally disclose the cost of transactions to consumers.

Display of price lists are not correlated with lower (or higher) rates of agent overcharging, and verbal disclosure of prices is correlated with **higher** rates of overcharging, suggesting that transparency measures alone may not lead to reductions in overcharging.

TABLE 8: Price transparency indicators by country

GEOGRAPHY	BANGLADESH	TANZANIA	UGANDA
Price list displayed	99%	82%	59%
Agent informed consumer of transaction fee without prompting (before or after transaction)	4%	7%	12%

Service quality outcomes

We collected subjective ratings of agents' quality of service (along the dimensions of security, privacy, and attitude) as well as indicators of discrimination and harassment. Shoppers generally reported agents provided high quality of service and we received very few reports of discrimination or harassment. Professional mystery shoppers tended to report lower service quality scores than local consumers.

Policy implications

Pricing transparency

Low-effort improvements to disclosure formatting could lead to large benefits

Monetary costs

Regressive pricing disproportionately affects bottom-of-the-pyramid consumers.

Government-led interoperability infrastructure may lead to lower off-network transfer costs.

Changes to price and taxation structure may encourage higher DFS utilization.

Pricing and overcharging varies by country, suggesting opportunities for cross-country information sharing by regulators.

Consumer perception of overcharging is often greater than actual rates.

Formalizing over-the-counter and agent-assisted transactions would improve transparency, particularly for less financially literate consumers.

Reliability

Opportunity costs from failed transactions are much higher than monetary costs of making transactions
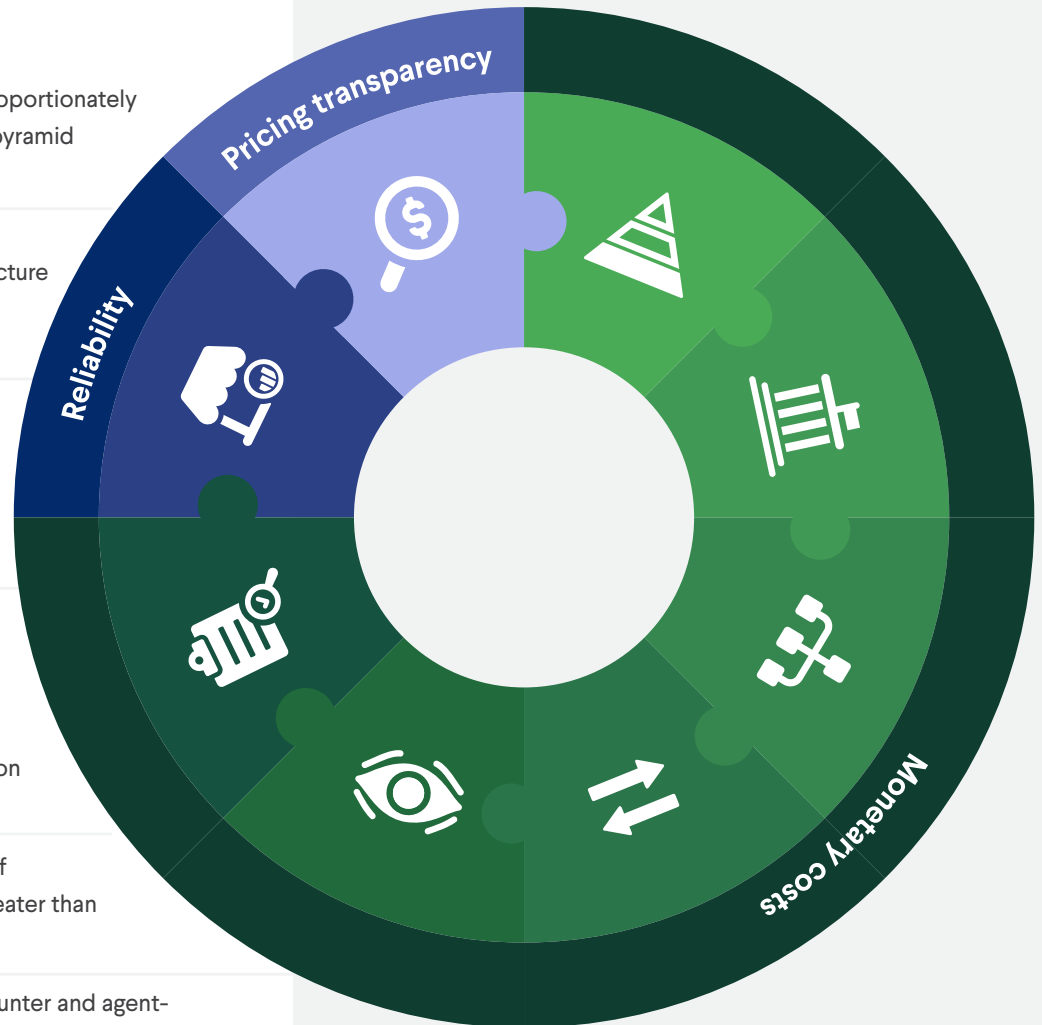
About the Transaction Cost Index

As digital financial services (DFS) become increasingly available, and access to these services has been promoted as an important factor for advancing financial inclusion and alleviating poverty—especially in low- and middle-income countries (LMICs)—we seek to answer a basic question: What costs do consumers face when using DFS?

Costs are a leading driver of take-up and usage of DFS, yet little work has been done to measure these costs systematically. The Transaction Cost Index (TCI) seeks to fill this gap by systematically measuring the costs of using DFS. We consider a broad definition of cost, inclusive of official fees and taxes, informal extra fees charged by agents, and non-pecuniary costs such as the opportunity cost of time wasted on failed transactions and exposure to consumer protection risks. This report presents the results of our first year of work and discusses the implications of these findings on our continued work to develop a robust methodology for measuring the true costs of DFS. Though we initially focus our scope on a few core countries, our hope is that this work can be expanded so that DFS prices can be measured on a regional or global scale on an ongoing, periodic basis.

Official fees charged by DFS providers can be measured through a review of price lists that providers make available on their websites, and this desk exercise comprises the first component of our work. Through a careful review of providers' websites across 16 countries, we recorded official fees that these providers charge, as well as taxes applied by the government. Beyond collecting prices themselves, this exercise allowed us to explore questions around pricing transparency. The ease of accessing clear pricing information from providers varies considerably, which we document in this report. We additionally review regulatory policies related to mobile money pricing to allow us to explore relationships between these policies and consumer prices.

DFS providers rely on a network of retail agents that consumers use to deposit funds into their digital wallets and withdraw cash. These agents also assist customers in completing other transactions, particularly for customers with low digital literacy, acting as an important foundation for a functional DFS ecosystem. For more on the importance of retail agents, see this framing paper.[2] Because agents act independently with limited oversight by the mobile money providers that employ them and consumers have limited knowledge of pricing, a principal-agent problem can arise which opens the door to agent misconduct and the potential for consumer protection failures.

To capture costs beyond official fees – informal extra fees and non-pecuniary costs incurred when using agents – fieldwork is necessary. We worked with enumerators and local consumers in Bangladesh, Tanzania, and Uganda to measure these costs by visiting DFS agents in locations from major cities to small rural communities in each country. To measure consumers' experience when making DFS transactions, we conducted mystery shopping visits with these agents – sending trained enumerators to conduct real transactions with agents and recording key outcomes. We also tested two alternative approaches: first, we conducted intercept surveys with customers who had just completed a transaction with an agent, and second, we trained local customers to conduct their own mystery shopping visits.

This report continues as follows. The remainder of Section 2 provides further explanation of the motivation for and design of the TCI study. Section 3 presents our desk review of official prices, and Section 4 presents findings from our fieldwork exploring the consumer experience when using mobile money agents. Sections 3 and 4 begin with a description of the methodology followed before presenting our results. Section 5 concludes and provides recommendations for continued development of the TCI.

Motivation

Evidence suggests that DFS can reduce poverty and improve the welfare of users in Sub-Saharan Africa and Asia through a variety of causal channels.[3] For example, DFS such as mobile money can be used to transfer funds quickly and relatively inexpensively across long distances, allowing users to smooth their consumption by sharing risks across dispersed social networks – for example, of a negative health shock.[4] It also allows individuals to shift to higher-productivity employment[5] or migrate to high-wage urban centers while sending money back home.[6]

Even as the availability of DFS products expands across many LMICs, take-up and continued usage of these services lags for vulnerable groups – including rural populations, women, and the poor.[7] While there are many determinants of DFS usage, the cost of using these services is a critical factor. Aker, Prina, and Welch[8] demonstrate through a lab-in-the-field experiment in Niger that demand for mobile money transfers declines as transaction costs increase. Annan (2022) shows that reducing overpricing by retail agents dramatically increases consumers' usage of mobile money services across several low-income communities in Ghana.[9] Similarly, non-pecuniary costs can limit take-up and continued usage of DFS products, while also directly harming consumers. When users experience consumer protection challenges with DFS, such as fraud or limited pricing transparency, it can lead to breakdown in the confidence they need to entrust their funds to DFS providers. For example, a 2020 survey of DFS consumers in Uganda carried out by IPA and the Uganda Communications Commission found that consumers who had experienced issues including agent overcharging, missing money from their account, and poor quality of customer care tended to have less trust in their agents or their provider, and that 19 percent of consumers with an unresolved consumer protection challenge reduced their usage of DFS as a result.[10]

Despite the evidence that reducing the cost of mobile money and other services is key to improving financial inclusion, and that transparent pricing is a key feature of well-functioning markets, little has been done to systematically monitor the true cost of conducting DFS transactions or the

ease of finding provider's official fees. Accessing price lists can be a complicated task for consumers, which then can be incomplete or difficult to interpret, all of which raises pricing transparency concerns.

Even when official prices set by DFS providers are publicly available, the true cost consumers pay can be higher than these listed prices, raising additional consumer protection and competition concerns. A 2020 white paper by Garz et. al.[11] notes that this type of "post-contract exploitation" is one of five major consumer protection problems affecting financial inclusion.

Finally, the true cost of using DFS goes beyond the actual prices of products and transactions. The quality of service can also be a differentiating factor for DFS providers, including the quality of telecommunication channels and network connectivity, liquidity problems experienced by agents which may render transactions impossible, system outages, or agent error or misunderstanding. The TCI seeks to measure the true cost of using mobile money services through a combination of desk and fieldwork, which allows us to document not just official prices, but the full range of costs that consumers face.

With many countries encouraging the use of digital payments through a variety of policies – and with the adoption of DFS rapidly growing in developing economies, from 35 percent in 2014 to 57 percent in 2021[12] – we believe the TCI can serve as a valuable resource to support the development of thriving, responsible, and competitive DFS markets.

Study timeline and scope

The TCI project has an initial two-year timeline, with this report coming at the end of the first year. During this initial period, our focus is on the development and testing of methods that can be used to measure costs of DFS.

Data collection for our desk review of listed prices began in quarter three of 2022 and will continue with quarterly updates through quarter three of 2023. Fieldwork testing of three different approaches to measuring the true cost to consumers of using DFS agents was conducted in quarters three to four of 2022. This report includes results from our desk and field work conducted in 2022. In 2023, we will carry out an additional round of data collection, focusing our fieldwork on just one of the three methods tested in 2022. Additional reports will be published at the end of 2023 with results from the data collected during the project's second year.

The process for selecting the type of DFS providers and the countries to be included in this project is discussed below, before turning to the data collection methodologies and results themselves.

Choice of DFS sector

DFS includes a wide range of financial products, including mobile money wallets, traditional bank accounts when those accounts can be accessed digitally, and newer fintech products that make use of mobile money or mobile banking networks to offer add-on services, such as digital credit. A first-order decision when designing an approach to measuring DFS costs was to determine which of these products to include. **We decided to focus on mobile money**. Our goal is to understand the experience of the majority of DFS users, with a particular focus on consumers of lower socioeconomic status. In the markets we focus on, mobile money is the most common type of financial product, particularly for lower-income consumer segments, more common than both traditional bank accounts and newer fintech products. Focusing on mobile money was also a practical decision, as measuring the cost of all banking and fintech products would have been difficult because of the diversity and complexity of account and product types that banks and fintechs offer.

In the quickly evolving DFS space, the lines between mobile money, traditional banking, and fintech products are somewhat blurry. We relied on the International Monetary Fund's definition of mobile money,[13] with an important modification. Our definition of mobile money is as follows:

> Mobile money is a pay-as-you-go digital medium of exchange and store of value using mobile money accounts, facilitated by a network of mobile money agents. It is a financial service offered to its clients by a mobile network operator or another entity that partners with mobile network operators, independent of the traditional banking network. A bank account is not required to use mobile money services—the only prerequisite is a basic mobile phone.

We follow this definition except for the second sentence ("It is a financial service offered to its clients by a **mobile network operator or another entity that partners with mobile network operators,** independent of the traditional banking network" – emphasis added). We found this restriction to MNO-led providers (or providers that partner with MNOs) excluded many important DFS providers, particularly in countries with a "bank-led" mobile money market, such as Nigeria and Pakistan. However, we maintain the requirement that mobile money be facilitated by a network of agents beyond a bank's existing network of bank branches and ATMs.

Excluding that sentence, and adding the IMF's distinction between mobile money and mobile banking, our working definition is as follows:

> Mobile money is a pay-as-you-go digital medium of exchange and store of value using mobile money accounts, facilitated by a network of mobile money agents. A bank account is not required to use mobile money services—the only prerequisite is a basic mobile phone. On the other hand, mobile banking is the use of an application on a mobile device to access and execute banking services, such as check deposits, balance inquiry, and payment transfers. The services that offer mobile phone as just another channel to access a traditional banking product are considered mobile banking, not mobile money.

Note that this definition still leaves some ambiguity: many traditional banking providers now offer both mobile phone applications that customers can use to manage their traditional bank accounts and have a network of banking agents that help customers with cash-in/cash-out services, account opening, etc., which seemingly fulfills our mobile money requirements. In these types of situations we restricted ourselves to services that were marketed as "mobile money."

Finally, for practical reasons, we restricted our analysis to the smallest set of leading providers that make up a combined market share of at least 80 percent, which in practice covers between one and three providers per country.

Country selection

Our desk work to look at listed prices included a broad set of 16 countries: Bangladesh, Colombia, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Mali, Myanmar, Nigeria, Pakistan, Paraguay, Peru, Philippines, Sierra Leone, Tanzania, and Uganda. This set of countries provides broad geographical coverage and varying levels of mobile money penetration and mobile money-related regulatory development (based on 2021 scores produced by GSMA).[14] These countries also all either have an IPA presence or are a priority country for the Bill & Melinda Gates Foundation.

The fieldwork for the TCI was limited to a narrower subset of countries: Bangladesh, Uganda, and Tanzania. These three core countries were selected based on geography, level of DFS market development, and the strength of IPA's existing policy relationships with regulators and other stakeholders. These countries also represent markets at different stages of their DFS market development – Bangladesh has a mobile money penetration rate of 29 percent, Tanzania's rate is 45 percent, and Uganda's is 54 percent.[15]

FIGURE 9: Mobile money penetration

Mobile money penetration

BANGLADESH

TANZANIA

UGANDA
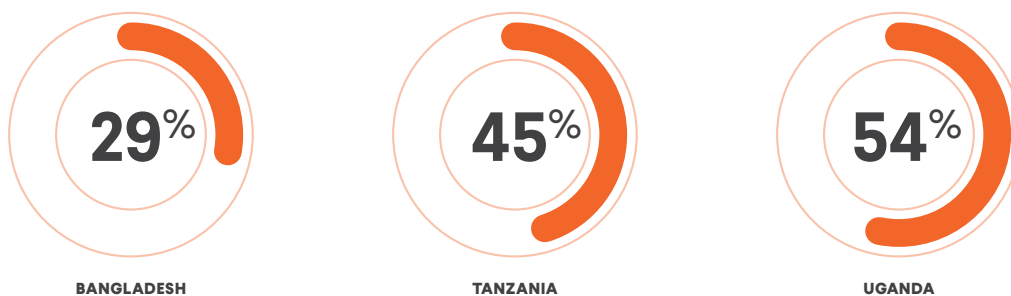
Measuring official prices and pricing policies

Official prices charged by providers are a key component of the total costs consumers face when using DFS, and one that is relatively easy to measure through a review of providers' price lists, which are generally available online. To this end, we systematically scraped these price lists from providers' websites across 16 LMIC.

Although fieldwork is necessary to understand the full cost of using DFS for consumers, including unofficial charges and non-monetary costs, a review of official prices yields important insights into how the cost of DFS varies across countries and how providers within countries set their prices. Additionally, the process of collecting this data yielded important insights into how pricing transparency and customer redress options vary across countries. To measure levels of pricing transparency and quality of customer redress channels across countries, we collected data on the ease with which we could access pricing information from providers online, and tested the speed and accuracy of customer care by submitting a standard inquiry through email and recording responses received.

Methodology

We gathered official, listed transaction prices from major mobile money providers' websites across 16 LMICs. These prices include both fees charged directly by providers and government taxes (where applicable), so fees presented here cover the full monetary cost consumers incur when making transactions, exclusive of any extra fees levied by agents. The procedure is divided into three main steps: (1) scrape providers' websites to collect price lists, (2) determine if taxes are explicitly included in provider fees, and (3) if taxes aren't explicitly included, conduct a separate review to determine the applicable tax rate. These three steps are detailed further below.

We sought to make the process of collecting mobile money prices replicable and scalable. Where possible, we automated the process of collecting price lists from providers' websites and monitoring for changes in prices. We used the programming language R to develop a process for scraping pricing data available on providers' websites. This was still a somewhat manual process because each provider presents their fee schedule differently. Many providers include their price lists only as PDFs (rather than as a html table) or as an image. We used a separate R-based process for extracting data from PDFs, but manually scraped price lists that providers share as images. We also manually extracted price information from providers that explained their fees as part of their "Frequently Asked Questions" page rather than in table form. In cases where the provider's website did not include pricing information, we instead conducted a customer care inquiry through email, online chat, or social media. If these options were unavailable, we contacted customer care representatives via phone through colleagues in countries where IPA Country Offices are present.

In countries where mobile money transactions are taxed, we noted whether provider fees and government taxes were reported separately in online price lists. If this was not the case, we noted whether there was information provided in the fee chart specifying whether taxes are included or excluded. If no information on taxes was available, we contacted customer care to ask whether listed prices included taxes. If taxes were not separately reported in providers' price lists, we conducted a review of taxation legislation to determine – to the extent possible – how taxes are applied to mobile money transactions, so that we could separately compare provider fees and taxes in each country.[16]

To help understand the extent of price transparency, when collecting mobile money pricing information during the listed prices exercise, we systematically recorded key indicators about the experience of collecting this data which yields insights into the transparency – or lack thereof – of mobile money prices. We also systematically reached out to customer care email addresses for each provider with a basic query about lost money, as a basic measure of the functioning of providers' complaints redress mechanisms.

Alongside the listed prices exercise, IPA also tracked relevant regulations related to mobile money pricing to contextualize trends in providers' prices in specific markets. IPA assessed a set of basic indicators that can be compared across the 16 countries studied. Namely, the themes covered are interoperability,[17] pricing caps, pricing transparency, redress, and taxation. This exercise compliments a similar but broader regulatory review, the GSMA's Mobile Money Regulatory Index, a larger effort to measure regulatory enablers of mobile money adoption by constructing an index that aggregates one or more relevant indicators.[18]

The regulatory review was conducted by researching the country's regulatory structure and identifying those institutions with the authority to regulate the mobile money industry, primarily the Central Bank. Next, we looked at primary sources of regulations on the government regulator' websites, which are typically their Payments Act or Electronic Money Act. Lastly, where possible, we reached out to Central Bank contacts to verify the data since not all information is available online.

The output from this work is the full price schedule for all providers, which will be released as a public dataset at the end of the project.

Transaction types

Mobile money providers often include a wide range of services that can be paid for through mobile money, such as bill payment, merchant payment, airtime purchase, e-commerce, etc. However, we limit our collection of fee information to four core mobile money transaction types:
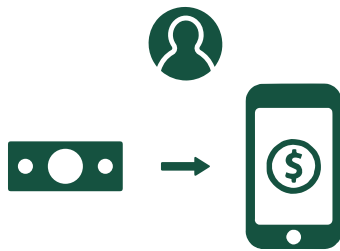
CASH-IN AT AN AGENT
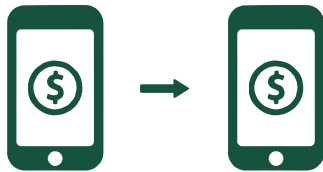
CASH-OUT AT AN AGENT

ON-NETWORK PERSON-TO-PERSON TRANSFER
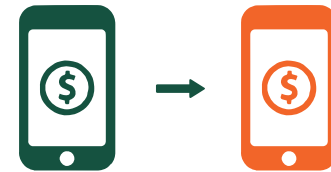
OFF-NETWORK PERSON-TO-PERSON TRANSFER

TABLE 14: Mobile money penetration

TRANSACTION TYPES	DESCRIPTION
Cash-in with an agent	depositing cash into a mobile money wallet with an agent
Cash-out with an agent	withdrawing cash from a mobile money wallet with an agent
On-network person-to-person transfer	transferring money from one mobile money wallet to another wallet with the same provider (self-serve, no agent needed)
Off-network person-to-person transfer	transferring money from one mobile money wallet to another wallet with a different mobile money provider (self-serve, no agent needed)

Reference transaction value

To compare fairly across countries, we computed the fees as a proportion of a reference value. The choice of transaction value is key because pricing structures of many providers are quite regressive, meaning that the cost in percentage terms varies significantly depending on the size of the transaction value. The simplest approach would be to set a single USD value, as is done in similar price measurement work such as the World Bank's Remittance Prices Worldwide.[19] However, our intent is to replicate the experience of the typical mobile money user in each country as much as possible. Because of differences in the economic development of each country, typical mobile money transaction sizes differ significantly across countries, meaning using reference values at set USD amounts is not ideal.

Because data on the distribution of mobile money transaction sizes is not publicly accessible in most countries, we had to find a different approach to setting reference values. Using self-reported transaction data from IPA's consumer protection surveys,[20] we found that median transaction sizes tended to equate to approximately 15 times the mean daily income per capita for the bottom 40 percent of the population. Although this is a very rough approximation, we believe it reflects the typical transaction size more accurately than a set USD value, and we tried to recreate this for each country. We implemented this approximation in the following way.

We used World Bank data on the daily mean income per capita for the bottom 40 percent of the population to approximate the median transaction size. We converted this value to local currency in 2017 using World Bank's PPP conversion factor for 2017, then inflated it to current local currency using local CPI levels. Lastly, we multiplied this income per capita in current local currency by 15 to obtain our reference value. When we analyze equity of pricing structures, this is considered the "high reference value" with the "low reference value" as half of this amount. Hence, for consistency of terminology throughout the report, we will adopt the term "high reference value" to mean our main reference value.

TABLE 15: Reference values

COUNTRY	HIGH REFERENCE VALUE (local currency)	REFERENCE VALUE (in USD)
Paraguay	PYG 300,000	$40.33
Peru	PEN 120	$31.30
Philippines	PHP 1,300	$23.54
Colombia	COP 80,000	$16.50
Nigeria*	NGN 6,000	$12.99
Bangladesh	BDT 1,400	$12.92
Kenya*	KSH 1,400	$10.95
Myanmar	MMK 23,000	$10.84
Côte d'Ivoire	XOF 6,500	$10.45
Ethiopia	ETB 550	$10.20
Tanzania	TZS 23,000	$9.80
Pakistan	PKR 2,200	$8.45
Uganda	UGX 31,000	$8.28
Mali	XOF 5,000	$8.04
Sierra Leone	SLL 120,000 (SLE 120)**	$6.08**
Ghana	GHS 75	$5.78

*The World Bank does not have data for Kenya and Nigeria on income per capita for the bottom 40 percent of the population, so we adopted Ghana's income per capita (bottom 40 percent) in the calculations as it is the most similar economy in terms of GDP per capita for these two countries.

**Sierra Leone redenominated its currency in July 2022. We used a value of 120,000 Leone which, prior to the redenomination, was approximately equal to $6.08 USD. From 2023 onwards, we will use the redenominated equivalent value of 120 Leone.

Note: Oanda.com was used to convert the values from local currency to USD. This was accessed on February 27, 2023.

Sample description

This desk review is conducted on 33 providers across 16 countries providing varying rates of mobile money maturity and characteristics (See Table 16). Using GSMA's Mobile Money Prevalence Index, 9 of the 16 countries have high to very high mobile money prevalence, a composite index of mobile money adoption, activity and accessibility; 7 countries have medium or low prevalence. Data from the World Bank Global Findex showed that at least a quarter of the population aged 15 and above used a mobile money account in 9 of the 16 countries; of which, 3 countries reported at least half of the population using a mobile money service. Nigeria and Pakistan posted the smallest mobile money markets at 8.7 percent and 8.5 percent, respectively. The number of registered mobile money agent outlets and mobile money transactions are also varied.

TABLE 16: Country-level mobile money maturity and characteristics.

COUNTRY	PREVALENCE	ACCOUNT	AGENT OUTLETS	NUMBER OF TRANSACTIONS
Kenya	Very High	68.7%	875	63,508
Ghana	Very High	59.7%	2,896	200,232
Uganda	Very High	53.8%	1,854	167,220
Tanzania	Very High	44.6%	-	-
Côte d'Ivoire	Very High	36.8%	2,140	70,240
Paraguay	High	37.7%	-	22,219
Bangladesh	High	29.0%	917	31,315
Mali	High	29.4%	2,098	48,622
Sierra Leone	High	19.0%	-	-
Colombia	Medium	21.8%	232	4,159
Philippines	Medium	21.7%	67	-
Myanmar	Medium	29.0%	-	-
Nigeria	Medium	8.7%	517	10,026
Pakistan	Medium	8.5%	399	16,991
Ethiopia	Medium	-	-	-
Peru	Low	14.3%		-

- Mobile Money Prevalence (GSMA, 2022)[21]
- Mobile money account (% age 15+), (Findex, 2021)[22]
- Number of registered mobile money agent outlets per 100,000 adults (IMF Financial Access Survey 2021)[23]
- Number of mobile money transactions per 1,000 adults (IMF Financial Access Survey 2021)[24]

3 countries reported at least half of the population using a mobile money service.

TABLE 17: Provider-level characteristics

COUNTRY	PROVIDER	MARKET SHARE (%), VARIOUS YEARS	PRODUCT AGE /YEAR SERVICE BEGAN
Bangladesh	Bkash	40%[27]	2011
	Rocket	25%	2011
	Nagad	18%	2019
Colombia	Bancolombia	-	2013
	Daviplata	-	2011
Côte d'Ivoire	Orange	40%[28]	2008
	Moov Africa	35%	2012
	MTN	25%	2009
Ethiopia	Ethio Telecom	100%	2021
Ghana	MTN	63%[29]	2009
	Vodafone	18%	2015
Kenya	Safaricom	98%[30]	2007
Mali	Moov Africa	-	2014
	Orange	-	2010
	SAMA	-	2020
Myanmar	Ooredoo	-	2017
	Wave Money	-	2016
Nigeria	Paga	52%[31]	2009
	Momo	16%	2022
	Opay	22%	2018
Pakistan	Jazz	64%[32]	2009
	EasyPaisa	54%	2012
Paraguay	Tigo	44%[33]	2010
	Personal	30%	2013
	Claro	22%	2010
Peru	Bim	97%[34]	2015
Philippines	GCash	49%[35]	2004
	PayMaya	42%	2015
Sierra Leone	Africell	76%[36]	2016
	Orange	-	2012
Tanzania	Vodacom	40%[37]	2008
	Tigo Pesa	26%	2010
	Airtel	21%	2011
Uganda	MTN	53%[38]	2010
	Airtel	42%	2010

The providers included in the study make up a combined market share of at least 80 percent in each country, which includes between one or three providers per country. To select the providers, we first look at numerical estimates of market share from both official government sources and third-party market reports. If these are not available, we use qualitative information from market reports, selecting the leading two to three providers identified as the major providers in the country. Providers are a mix of old and new players, spanning from 2008 to 2021 as the starting year.

While all providers offer cash-in, cash-out and on-network person-to-person transfers, self-serve off-network transfers are available only for 13 of the 16 countries, which have either private sector-led or government-led interoperable platforms. The section on interoperability provides more details. Various providers offer alternative transfer services (i.e. transfer via USSD[25], special customer discounts and promotions on transaction fees[26]), but for the purposes of our study, we only focus on the four types of transactions as defined previously.

NOTE: 1) Market share data came from a mix of government sources and media stories from the last 4 years. 2) Provider market share in Pakistan does not total 100 percent because the source article reports the percentage of DFS consumers using each provider rather than actual market share; because some consumers use multiple providers, the sum of market shares is greater than 100 percent. 3) Momo and Opay are excluded in the price analyses because we could not obtain their price lists, either online or through customer service.

Results

This section presents the results from our desk review of mobile money prices and regulations across 16 countries. We begin by discussing the provider fee structures, then the prices themselves and lastly, selected policy topics on interoperability, pricing caps, transparency and redress, and mobile money taxation.

Main types of fee structures

Our data shows that the pricing models can be broken down into three categories (1) slab-based fee structure (also called stairstep fee structure), where transactions within a defined range are charged a fixed fee, (2) a percentage-based fee structure, where consumers pay a fee based on a fixed percentage of the transaction amount, and (3) free, with no transaction cost incurred by the user.

FIGURE 10: Fee structures

These pricing structures have different implications. A percentage-based pricing structure is by definition proportional; the cost as a percentage of transaction value is the same regardless of the transaction amount. While a slab-based fee structure can be regressive, progressive, or proportional,[39] the slab-based pricing that providers adopt is typically regressive, meaning the costs to consumers on a percentage basis are greater for transactions of lower value than transactions of higher value. Slab-based pricing structure may be regressive in practice due to the presence of certain fixed costs to the provider in each transaction. Another reason may be to prevent customers breaking a large transaction into multiple small ones to save on total cost, which customers have an incentive to do if the slab-based fees are progressive. A potential benefit of slab-based fee structures is that costs may be easier to understand for users with low levels of numeracy as this structure does not require any calculations to determine the fee itself.

Providers in the same country tend to adopt the same pricing structure. Most of the variation occurs by region. Sub-Saharan African countries are more likely to use a slab-based fee structure, whereas percentage-based pricing is more common in Latin American countries, except for Colombia whose providers do not charge any fee for our core transaction types. Cote d'Ivoire and Mali – West African states governed by a regional central bank – and Ghana are the exceptions as providers in these countries use percentage-based pricing (or a combination of slab- and percentage-based structures). In Asia, the variation is more at the country-level. Providers in the Philippines adopted percentage-based pricing, while Myanmar and Pakistan use slab-based pricing. Bangladesh uses mostly percentage-based pricing with one provider using a combination of slab- and percentage-based structures.

TABLE 18: Mobile money providers by fee structure type

REGION	COUNTRY	PROVIDER	SLAB-BASED	PERCENTAGE-BASED	FREE
Asia	Bangladesh	Bkash	✓	✓	
		Rocket		✓	
		Nagad		✓	
	Myanmar	Ooredoo	✓		
		Wave Money	✓		
	Pakistan	EasyPaisa	✓		
		Jazz	✓		
	Philippines	GCash		✓	
		PayMaya		✓	
Latin America	Paraguay	Tigo		✓	
		Personal		✓	
		Claro		✓	
	Colombia	Bancolombia			✓
		Daviplata			✓
	Peru	Bim		✓	
Sub-Saharan Africa	Côte d'Ivoire	Orange		✓	
		Moov Africa		✓	
		MTN	✓		
	Ghana	MTN	✓	✓	
		Vodafone	✓	✓	
	Kenya	Safaricom	✓		
	Tanzania	Vodacom	✓		
		Tigo Pesa	✓		
		Airtel	✓		
	Uganda	MTN	✓		
		Airtel	✓		
	Mali	Moov Africa		✓	
		Orange	✓	✓	
		SAMA		✓	
	Sierra Leone	Africell	✓		
		Orange	✓		
	Ethiopia	Ethio Telecom	✓		
	Nigeria	Paga	✓		

Costs by transaction type

We compared the average cost for the four core transaction types across the 16 countries included in this review. Costs are averaged across providers within each country, and represent the total cost (inclusive of taxes) in percentage terms at our predefined reference value. These are weighted by the market share where available.[40] Table 19 shows the breakdown of costs per transaction type and country.

Overall, average costs in Cote d'Ivoire, Paraguay, Tanzania, and Uganda are noticeably higher than in the rest of the countries. Meanwhile, providers in Ghana, Mali, Peru, and Colombia showed lower costs, with fees for all transaction types at one percent of the transaction value or lower.

TABLE 19: Prices at high reference value by transaction type and country

COUNTRY	CASH-IN	CASH-OUT	ON-NETWORK TRANSFER	OFF-NETWORK TRANSFER
Bangladesh	0%	1.6%	0.3%	0.7%
Colombia	0%	0%	0%	0%
Côte d'Ivoire	1.5%	2.5%	0.8%	12.1%
Ethiopia	0%	1.5%	0.5%	NA
Ghana	0%	1.0%	0%	0%
Kenya	0%	2.0%	1.6%	1.6%
Mali	0%	1.0%	0.3%	NA
Myanmar	0%	2.4%	0%	NA
Nigeria	1.1%	1.8%	0%	0.4%
Pakistan	0%	1.8%	0%	0%
Paraguay	0%	3.4%	3.5%	3.0%
Peru	0%	1.0%	0%	NA
Philippines	0%	1.1%	0%	1.2%
Sierra Leone	0%	2.5%	1.2%	NA
Tanzania	0%	8.6%	2.7%	3.7%
Uganda	0%	4.4%	1.6%	1.6%

Average costs in Côte d'Ivoire, Paraguay, Tanzania and Uganda are noticeably higher.

Ghana, Mali, Peru, and Colombia showed lower costs.

NOTE: Prices are shown as a percentage of the transaction amount. Prices are as of December 31, 2022 at reference value equal to approximately 15x the mean income of the bottom 40 percent of the population. Prices are inclusive of taxes where applicable. For Paraguay, providers charge an additional rate for withdrawing money coming from an off-network transaction which will result in a higher total cost than on-network.

Cash-in

Except for Nigeria and Cote d'Ivoire, providers across most countries do not charge customers a fee for cash-in at an agent to encourage customers to use their mobile money service. Paga, which covers half of the mobile wallet market share, charges a fee for cash-in equal to 1.1 percent of the reference value. The government in Côte d'Ivoire charges a 100 CFA stamp fee, a mobile money-specific tax, which equates to 1.5 percent of our reference transaction value.

In some markets, cash-in fees follow a somewhat progressive structure in that small transaction values are free up until a certain threshold, but subsequent transactions are charged. For example, providers Gcash and Maya in the Philippines charge a fee for cash-in once the cumulative monthly threshold of Php 8,000 and Php 15,000 are reached (approximately $150 and $300 USD, respectively) – both approximately 6 to 12 times the high reference value. Similarly, Colombia's Bancolombia a la Mano makes the first 40 deposits per month free but begins charging a fee for transactions over this limit.

Cash-out

All providers charge a fee for cash-out except for those in Colombia. Providers in Tanzania, Uganda, and Paraguay charge the highest fees among all countries covered. Cash-out fees in Tanzania are between 6.1 and 9.4 percent for a weighted average of 8.6 percent. This is nearly double the average fees for Uganda and Paraguay, at 4.4 percent and 3.4 percent respectively. On the other hand, Colombia has the lowest withdrawal fees with no charge, followed by Ghana, Mali, and Peru at one percent.

On top of cash-out options via agents, some providers offer an additional option of withdrawing funds via ATM.[41] While Tanzanian providers, Bangladesh's Bkash, and Paraguay's Personal charge similar fees regardless of cash-out method, providers in other countries charge varying fees depending on the method and are largely more expensive via an ATM than via an agent. For Uganda's MTN, Kenya's Safaricom, Colombia's Bancolombia and all Pakistani providers, both agent and ATM withdrawals are available, with fees for withdrawing at an ATM higher than fees for withdrawing at an agent. Maintaining an ATM can be costly: ATMs require security, maintenance, consistent electricity, and restocking of cash. Additionally, mobile money operators typically partner with banks to provide ATM services, adding an

> Cash-out fees in Tanzania are between 6.1 and 9.4 percent for a weighted average of **8.6 percent**. This is nearly double the average fees for Uganda and Paraguay, at 4.4 percent and 3.4 percent respectively.

additional cost. While accessing mobile money accounts via ATMs adds convenience for some urban consumers, agent networks are likely to remain the lowest cost and most common means through which most consumers – particularly rural consumers – carry out CICO mobile money transactions. In our study, we consider the simplest mode of cash-out (via agent) when fees are distinguished by method. For Bangladesh's Nagad, cash-out can be done via USSD[42] or via an app, with the latter being roughly 20 percent cheaper. This may be done to recover costs of USSD sessions, but it results in consumers with feature phones (typically those of lower socioeconomic status) paying higher fees than consumers with smartphones.

For 14 of the 33 providers, cash-out fees are identical (in percentage terms) for our high and low reference values, while three providers have either missing or no record of fees.[43] The remaining sixteen providers, which all adopt slab-based pricing, have differences in fees for high and low reference values. Nearly all these providers have regressive pricing structures wherein the low transaction size incurs larger cash-out fees in percentage terms than the high transaction size. Tanzanian providers showed the largest cost difference at above four percentage points, followed by Nigeria, Myanmar, Sierra Leone, and Kenya with an at least two percentage point difference. On the other hand, Cote d'Ivoire's MTN, which also adopted a slab-based approach, is the only provider that records a higher fee in percentage terms for our high reference value than our low reference value, a sign of a progressive pricing structure. However, this appears to be a quirk specific to our choice of reference values: a move from the bracket where our low reference value falls to the bracket where our high reference value falls results in an increase in fees in percentage terms, but in most other cases, moving to a higher bracket results in a reduction of fees in percentage terms.

FIGURE 11: Cash-out fee by country

ASIA   LATIN AMERICA   EAST AFRICA   WEST AFRICA

Fee (Percentage of transaction value)

Country	Fee
TANZANIA	8.6%
UGANDA	4.4%
PARAGUAY	3.4%
SIERRA LEONE	2.5%
CÔTE D'IVOIRE	2.5%
MYANMAR	2.4%
KENYA	2.0%
PAKISTAN	1.8%
NIGERIA	1.8%
BANGLADESH	1.6%
ETHIOPIA	1.5%
PHILIPPINES	1.1%
PERU	1.0%
GHANA	1.0%
MALI	1.0%
COLOMBIA	0.0%
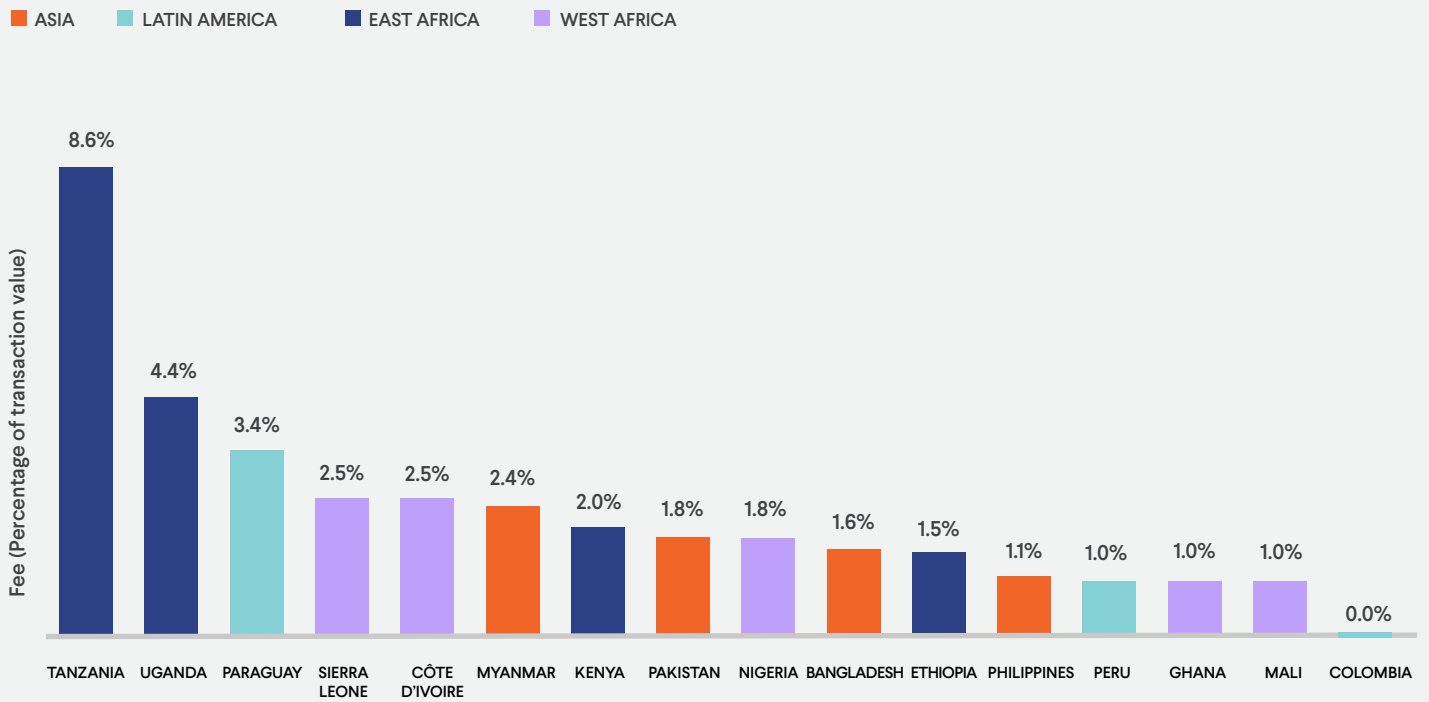
FIGURE 12: Difference in cash-out fees: Low reference value minus high reference value

ASIA   LATIN AMERICA   EAST AFRICA   WEST AFRICA

Fee difference (in percentage points)

Country	Provider	Fee difference
TANZANIA	airtel	4.8%
TANZANIA	Vodacom	4.1%
TANZANIA	tigo pesa	4.1%
SIERRA LEONE	orange	2.6%
MYANMAR	wave money	2.6%
MYANMAR	ooredoo	2.1%
KENYA	Safaricom	2.0%
PAKISTAN	easypaisa	1.8%
PAKISTAN	Jazz Cash	1.8%
NIGERIA	paga	1.8%
UGANDA	MTN	1.8%
UGANDA	airtel	1.8%
PERU	BIM	0.7%
GHANA	MTN	0.3%
GHANA	vodafone	0.3%
CÔTE D'IVOIRE	MTN	-2.3%
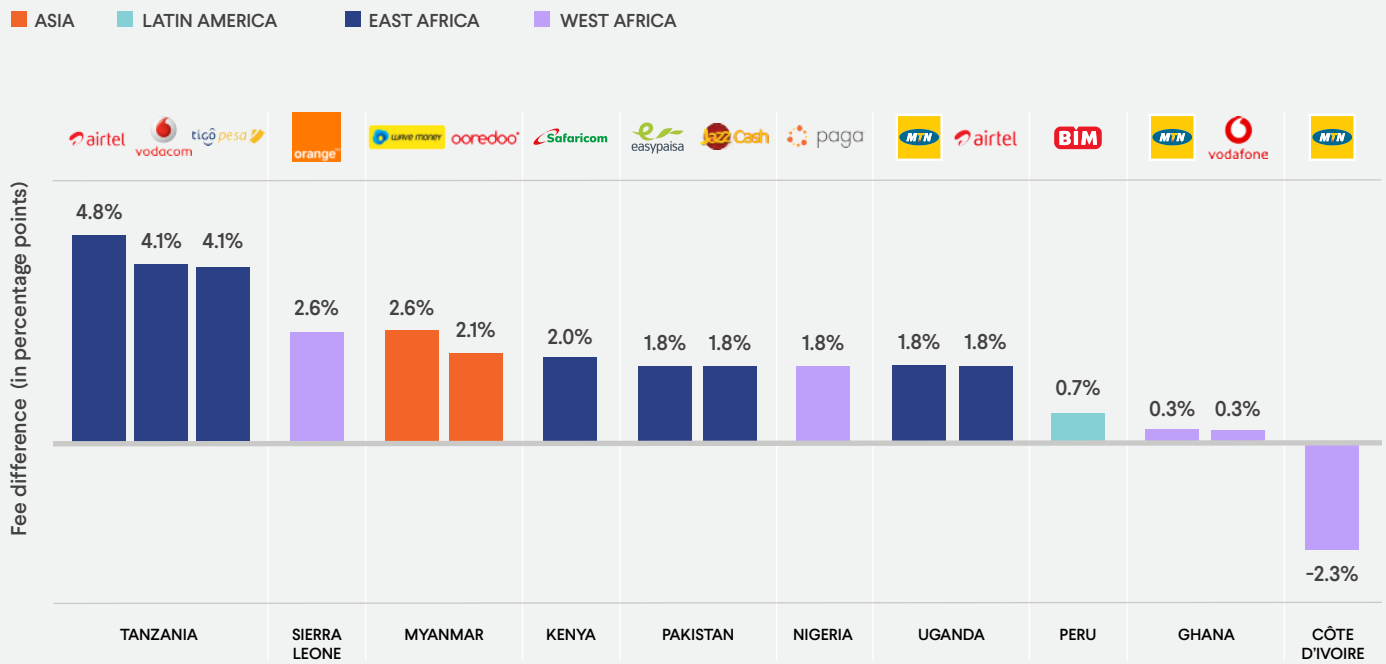
On-network person-to-person transfer

About half of the providers (17 out of 33) do not charge a fee for on-network person-to-person (P2P) transactions, an unassisted transfer of funds across wallets from the same provider. This translates to almost half of the countries (7 out of 16) not experiencing fees for on-network transfers, namely Colombia, Ghana, Myanmar, Nigeria, Pakistan, Peru, and Philippines, all of which have low to medium mobile money prevalence. Those that charge fees are typically from countries where mobile money is most widespread. Countries where mobile money prevalence is high according to GSMA[44] in Paraguay (3.5 percent), Tanzania (2.7 percent), Uganda (1.6 percent), and Kenya (1.6 percent), incurred the highest average on-network transfer fees. It could be that those providers in smaller mobile money markets charge less because the market extends beyond mobile money (i.e. Colombia, Philippines, and Nigeria,

which have a large number of banked consumers). We discuss mobile money market penetration further in the next section. Meanwhile, Ghana stood out among its peers in the "very high" mobile money prevalence category as the only country that does not charge any fee for on-network P2P transfer.

Nine providers had prices which were higher for the low reference value than for the high reference value, marginally lower than the gap observed in cash-out. These providers that showed regressive pricing are from Uganda, Tanzania, and Mali, all of which adopted a slab-based fee structure. BKash from Bangladesh and Safaricom from Kenya, also adopters of slab-based pricing, followed at below half a percentage point gap. While Paraguay providers recorded the highest on-network P2P fee, their charges for small and large transaction values are the same as it adopts a percentage-based pricing.

FIGURE 13: On-network P2P fee by country
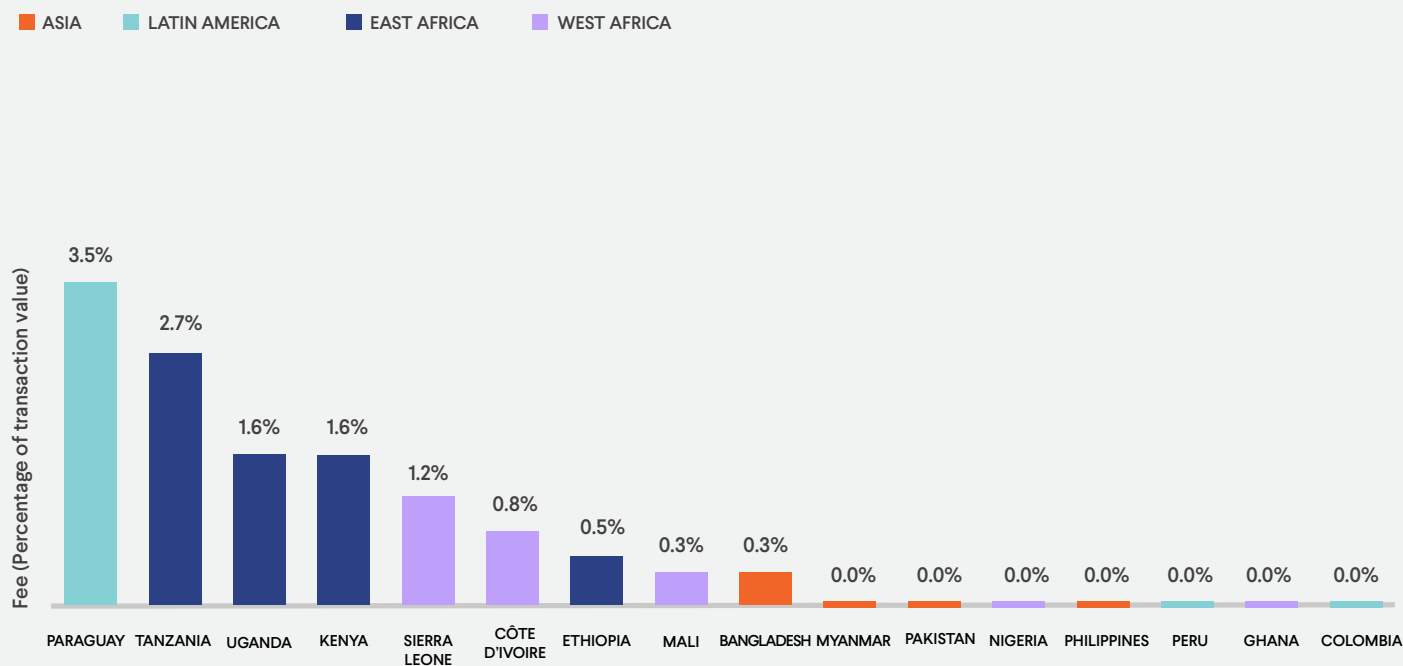
FIGURE 14: Difference in on-network P2P fees: Low reference values minus high reference value

■ ASIA   ■ LATIN AMERICA   ■ EAST AFRICA   ■ WEST AFRICA
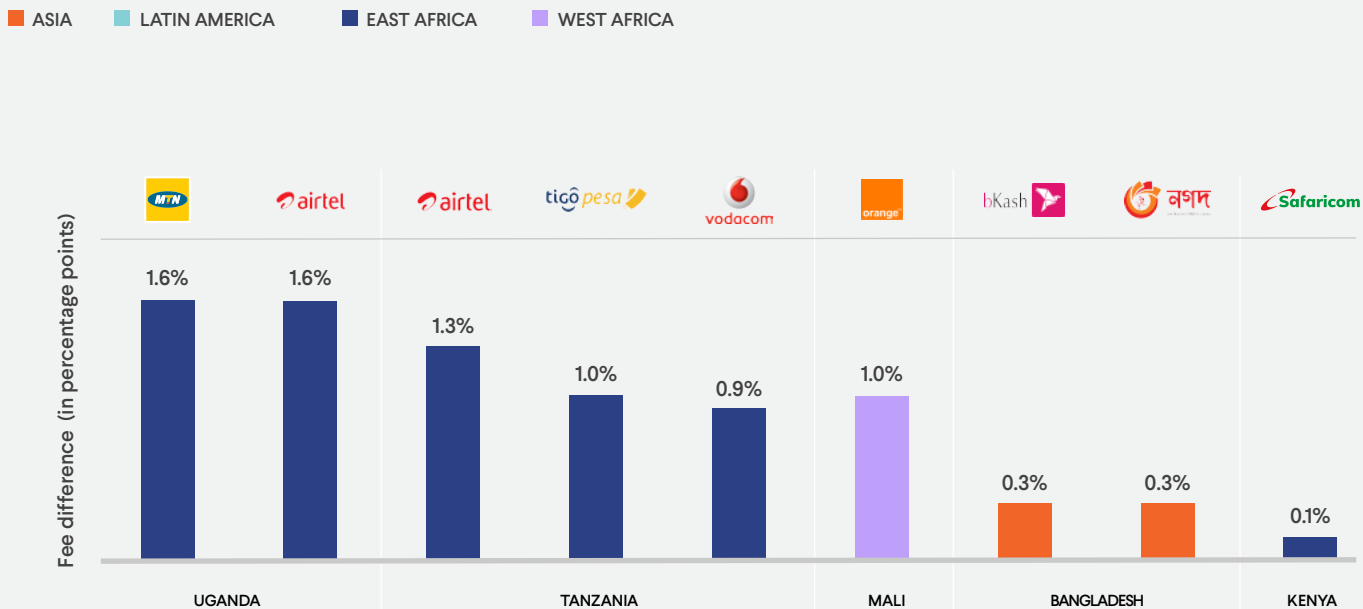
Off-network P2P transfer

21 of the 33 providers recorded having an off-network P2P transfer service, which allows transfer of funds between mobile money wallets of different providers. Similar to on-network P2P transfer, the highest costs are seen in countries wherein mobile money is widespread, with the highest fees mostly observed in areas with "very high" prevalence. Cote d'Ivoire posted the largest off-network P2P transfer fees at 12 percent on average: a transaction at the reference value of 6500 XOF incurs a fee of 800 XOF (12.3 percent) in MTN and 775 XOF (11.9 percent) in Orange. Tanzania and Paraguay followed with average fees of 3.7 percent and 2.9 percent, respectively. Currently, interoperability in Cote d'Ivoire is private-led, though there are plans from the Central Bank of West Africa Economic and Monetary Union to launch a cross-domain interoperable payment system that has the capacity to facilitate transfers domestically as well as regionally. Meanwhile, the Philippines, Bangladesh, Nigeria,

Colombia, and Pakistan have lower or zero fees for off-network transactions, perhaps partly driven by incentives to increase mobile money membership base and achieve economies of scale. Ghana is an exception as despite its "very high" mobile money prevalence, it offers zero off-network fees for up to GHS 100 (or 1.3 times the reference value). See further discussion of the relationship between cost and scale of mobile money markets in the subsequent section.

Providers from Uganda, Tanzania and the Philippines, which adopt varying fee structures, had prices that were higher for the high reference value than the low value at more than one percentage point, about similar in terms of magnitude from on-network P2P and less than difference from cash-out. Again, Cote d'Ivoire's MTN observed the opposite trend, meaning the low transaction size incurred a smaller charge than the high transaction size.

FIGURE 15: Off-network P2P fees by country
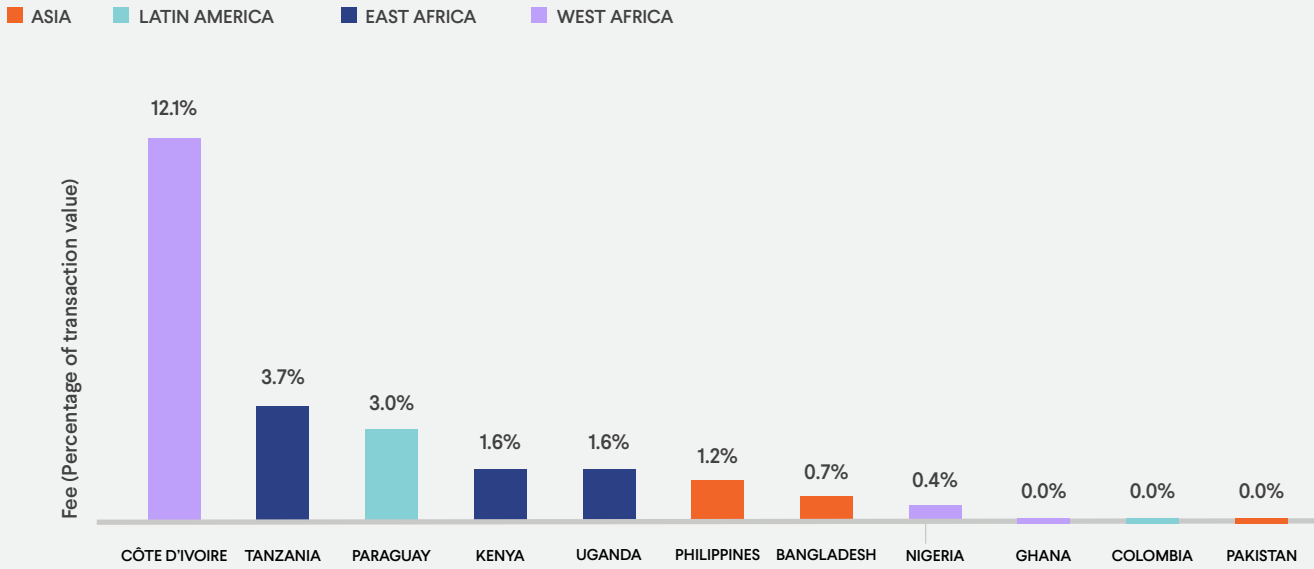
FIGURE 16: Difference in off-network P2P transfer fees: Low reference value minus high reference value (in percentage points)
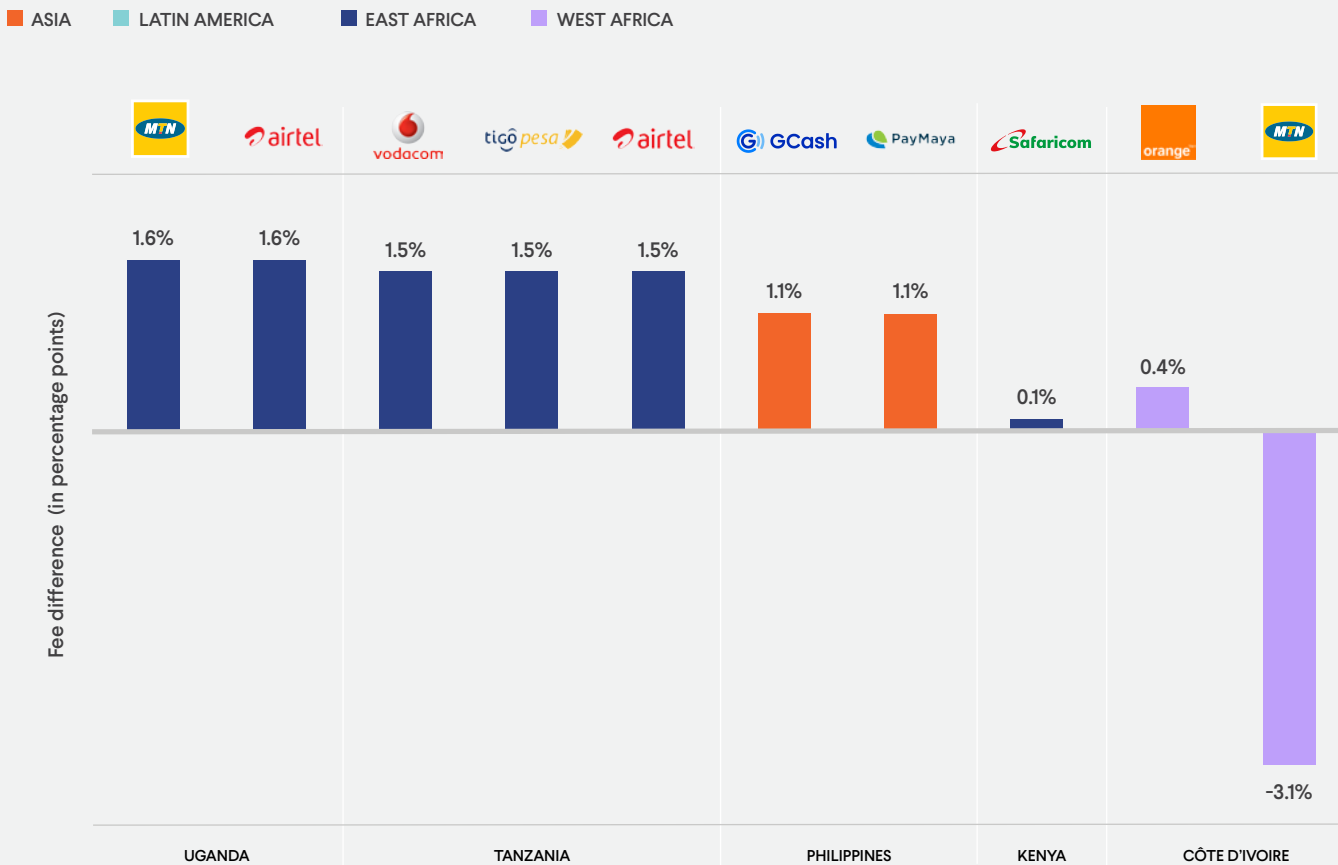
Costs by Scale of Mobile Money Market

We explored the relationship between mobile money pricing and data from the 2021 Global Findex Database on mobile money penetration at a country level. Economies of scale would suggest that higher penetration of mobile money would lead to lower costs as operations become more efficient. The data shows the opposite; **countries with high mobile money penetration tend to have higher mobile money prices than countries with lower penetration**. Uganda, Tanzania, and Paraguay – which each fall in the top six largest shares of population that use mobile money in our sample – have significantly higher costs compared to the other 12 countries, all above five percent on average. (Ethiopia is missing data on mobile money prevalence so is excluded for this analysis.) Conversely, the aggregate cost in Kenya, the country with the largest mobile money market in our sample, is around the average of 3.6 percent. Ghana, the second highest, has aggregate costs far below the average at 1 percent. As we have seen in the previous sections, this positive relationship between mobile

money penetration and costs is more distinct for on-network and off-network P2P transactions. As a robustness check, we conducted the same analysis using GSMA data on mobile money prevalence and found similar results.[45]

As mentioned earlier, a potential explanation for the positive correlation between costs and market penetration is that the relevant market covers not only mobile money providers, but all DFS providers. For example, in bank-led economies like Nigeria, Peru, Philippines, and Colombia, prices are low even when mobile money penetration is low, potentially because the existing banking sector provides external competitive pressure to mobile money providers. Relatedly, a plausible confounding factor is the underlying economic development of the country. MM penetration is highest among less developed countries, perhaps because MM fills a gap in access to formal financial products most present in less developed countries. Because the cost of doing business is often higher in less developed countries, providers in these countries may charge higher prices by necessity.

FIGURE 17: Aggregate cost by market penetration
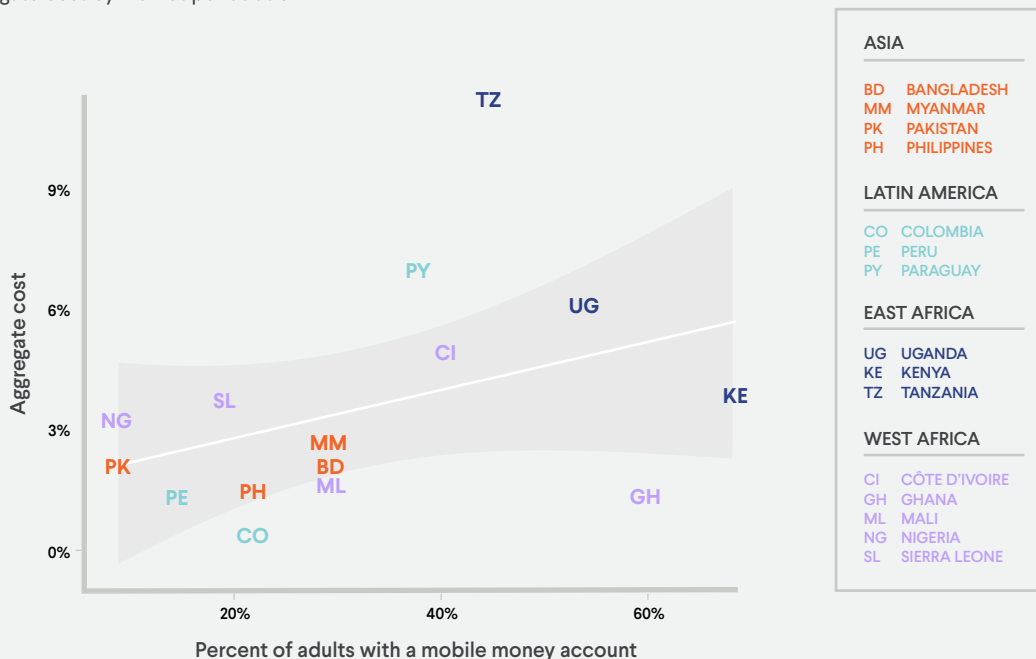
Note: The aggregate cost is calculated as the sum of the fees for cash-in, cash-out, and on-network person-to-person transfer as a percentage of the transaction amount at our reference value. This represents the total "lifecycle" cost of making a typical transfer, starting and ending with cash. Mobile money penetration data is from the 2021 Global Findex Database46. Ethiopia is missing in this database, so it is excluded from this sample.

Cost by Market Competitiveness

Next, we explore the relationship between mobile money prices and the level of competition in the mobile money market across the countries included in our review. Theory suggests that high market concentration with limited competition leads to higher prices. Figure 10 plots the aggregate cost by country in percentage terms against each country's Herfindahl-Hirschman Index (HHI), a standard measure of market concentration where larger values indicate a more concentrated market Our data reveals results contrary to theory: **Countries with highly concentrated mobile money markets tend to have lower prices than countries with less concentration and more competition.** Tanzania, Paraguay, and Uganda have higher costs compared to the other 9 countries, though these countries are in the top six of the lowest market concentration. Conversely, the aggregate cost in Kenya, Ethiopia, and Peru,

countries exhibiting high market concentration with one dominant mobile money provider each, is 3.6 percent, 2.0 percent and 1.0 percent, respectively. This ability to set low prices despite the higher market concentration may be attributed to the ownership structure of the three providers in these 3 countries, which is partially or completely state-owned or state-initiated: the government of Kenya owns 35 percent of Safaricom, Ethiopia's Telebirr is state-owned, while Peru's BIM is part of the "Peru Model for Unbanked" initiative spearheaded by PDP, a service provider established by Peru's government, financial institutions, telcos and other stakeholders and is co-owned by the Association of Banks of Peru (Asbanc).[47] Another related factor could be that the presence of one large provider leads to efficiency gains in these sample countries as it is able to reduce costs (i..e. maintaining infrastructure, agent networks, service distribution, etc) through economies of scale.

FIGURE 18: Average cost by Herfindahl-Hirschman Index

ASIA

BD BANGLADESH
PK PAKISTAN
PH PHILIPPINES

LATIN AMERICA

PE PERU
PY PARAGUAY

EAST AFRICA

ET ETHIOPIA
KE KENYA
TZ TANZANIA
UG UGANDA

WEST AFRICA

CI CÔTE D'IVOIRE
GH GHANA
NG NIGERIA
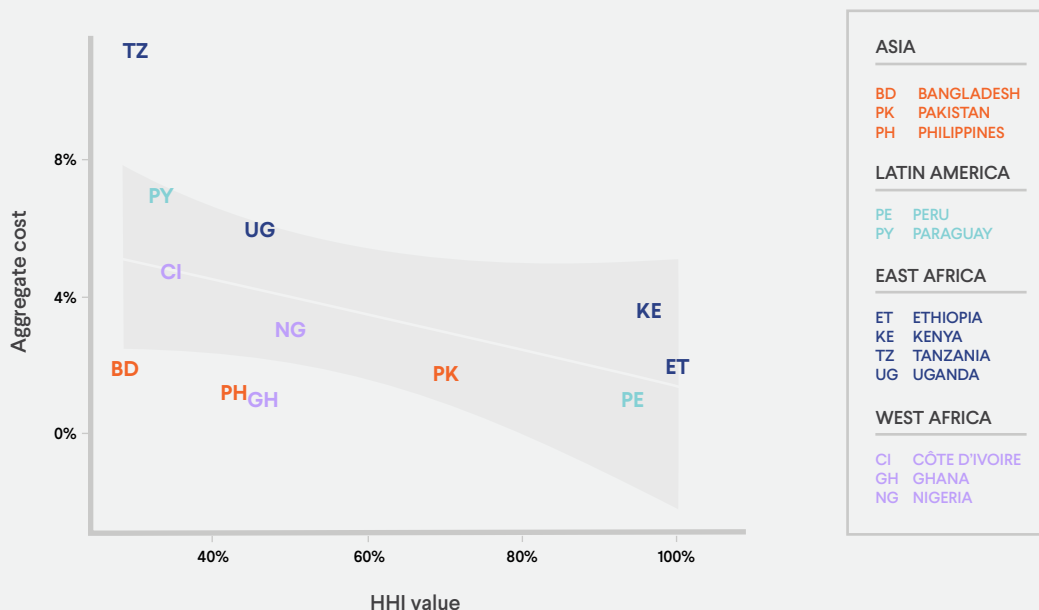
Within-country price dispersion

Within each country, we created a measure of price dispersion by calculating the maximum range of fees charged by different providers for each transaction type at our reference transaction value, which is summarized in the table below. Our data shows that providers within the same country tend to converge on prices. If the pricing structure is percentage-based, competitors tend to price transactions at the same rate. If the pricing structure is slab-based, competitors use similar delimitation of slabs and charge similar fees per slab (see appendix for discussion on pricing structure).

With the exception of Côte d'Ivoire, Paraguay, and Tanzania – which each have maximum pricing differences greater than 1 percentage point – the large providers in the remaining countries have differences less than 0.4 percent. Providers in Colombia, Ghana, Pakistan, and Uganda notably price the same at the reference value for all transaction types. While Pakistan has pricing caps that require banks to provide free digital fund transfer services, none of the other countries have regulation that would create price convergence for the transaction types.

FIGURE 19: Average pricing dispersion by country
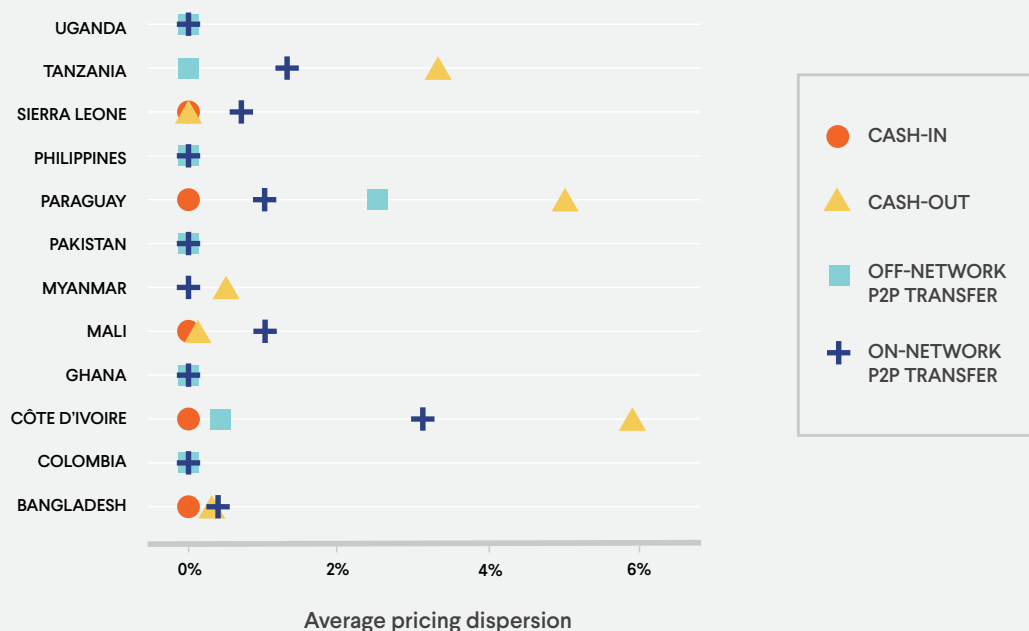
NOTE: Ethiopia, Kenya, Nigeria, and Peru are excluded because we collected data from only one provider in these markets. Ethiopia, Kenya, and Peru have one large provider each which covers our requirement of at least 80 percent market share, while for Nigeria we had difficulties obtaining data from other providers: Opay and MTN. Price dispersion is defined as the maximum price difference between providers in a given country from our reference value and is represented as a percentage of the transaction value.

Interoperability

We define interoperability as the ability to use your phone to send money off-network, from an account at one mobile money provider to an account at another mobile money provider, which is commonly classified as platform-level interoperability.[48] As part of our desk review, we collected information about the presence of a "central switch" that mobile money providers use to facilitate these off-network transfers.[49] The summary of infrastructures shown in Table 20 may cover domains beyond mobile money to mobile money transfers, such as bank to bank or bank to mobile money, but all are ensured to meet the basic level of platform-level interoperability required for this study. Moreover, we distinguish whether the interoperability infrastructure is private-led or government-led: private-led means either a privately run multi-party switch or a series of bilateral arrangements, while government-led means a recognized national switch exists that may be owned by the government at some level or none at all. The main distinction lies in the switch being recognized as a national payment switch for off-network transactions. Consider the *government-led* case of the Philippines' Instapay wherein the Central Bank mandates it as the national payment switch, but does not have ownership of it. This differs from the *private-led* switch PesaLink in Kenya also owned by a group of banks- though it is endorsed by the Central Bank as a legal switch, it is not considered as the sole national switch, and the government is not directly involved in the governance as in the case of Philippines' Instapay.

13 of the 16 countries included in our review have an interoperability platform that allows the transfer of funds across different mobile money wallets; six countries are government-led, five countries are private-led, and two countries have a combination of both switches. Mali's country's interoperability infrastructure could not be determined through our desk review, while two countries – Myanmar and Sierra Leone – do not have any interoperability platform as of our study period but have plans to put in place a centralized government switch. For countries that are private sector-led, Paraguay and Kenya do not have plans to develop a government switch, while four countries – Cote d'Ivoire and Mali (through the regional West Africa central bank), Colombia, and Tanzania – have plans to develop a centralized government-led switch. Given the widespread adoption of interoperability platforms, which is almost always treated as a cornerstone of mobile money payments in our sample, we find no evidence of correlation between the presence of such platforms and mobile money concentration or HHI. An interoperability platform either exists or will exist in our sample of countries, including those highly concentrated markets such as Kenya, Ethiopia, and Pakistan.

Off-network transfers fees are recorded for 11 of 13 countries with either type of interoperability infrastructure; for the other two countries, Peru and Ethiopia, it cannot be confirmed whether the providers' on-network P2P fee is the same as the off-network fee.

TABLE 20: Summary of interoperability infrastructure

🏛 GOVERNMENT-LED   👤 PRIVATE SECTOR-LED   🏛➕ PLANS IN PLACE FOR A GOVERNMENT-LED INTEROPERABILITY?   💲 HAVE DATA ON OFF-NETWORK TRANSACTION FEES?

COUNTRY	INFRASTRUCTURE	OFF-NET FEES LISTED	BRIEF DESCRIPTION
Bangladesh	🏛	💲	Government-led: Interoperable Digital Transaction Platform (IDTP) called Binimoy. It was launched in November 2022 and ran by Bangladesh government's ICT Division and Bangladesh Bank.[50]
Colombia	👤🏛➕	💲	• Government-led: Planning stages. • Private sector-led: Daviplata. It was launched by Banco Davivienda in 2011.[51]
Cote d'Ivoire	👤🏛➕	💲	• Government-led: Planning stages (regional switch) • Private sector-led: Proprietary payment solutions such as Flash International[52]
Ethiopia	🏛👤		• Government-led: Ethswitch. It was launched in October 2021. The National Bank of Ethiopia facilitated its establishment and owns 46 percent stake in the company, while commercial banks own the rest. It is recognized as the country's national payment switch.[53] • Private sector-led: Ethio Telecom, currently not onboarded with Ethswitch, has bilateral agreements with other banks to interconnect transactions.[54] • No confirmation whether P2P transfer fee also applies to off-net.
Ghana	🏛	💲	Government-led: Mobile Money Interoperability (MMI) system called GhIPSS. It was launched in May 2018 by the Bank of Ghana.[55]
Kenya	👤	💲	Government-led: None Private sector-led: 1) Person-to-Person Interoperability launched in 2018 by Safaricom, Airtel and Telkom[56][57] 2) PesaLink launched in 2017. This is jointly owned and operated by the Integrated Payment Services Limited (IPSL), a subsidiary firm of the Kenya Bankers Association.[58]
Mali	🏛➕	N/A	Government-led: Planning stages (regional switch)
Myanmar	🏛➕	N/A	• Government-led: Planning stages[59][60] • Private-led: Planning stages[61]
Nigeria	🏛	💲	Government-led: Nigeria Interbank Settlement System (NIBSS) Instant Payment. It was launched in 2012 and jointly owned by the Central Bank of Nigeria and all licensed banks.[62]
Pakistan	🏛👤	💲	• Government-led: RAAST. It was launched in 2022 by the State Bank of Pakistan. [63] • Private sector-led: 1Link. It was launched in April 2006 and it is owned by a consortium of 11 major banks in Pakistan.[64]
Paraguay	👤	💲	• Government-led: None • Private sector-led: Partnerships with providers of financial services and payments[65]
Peru	🏛		• Government-led: BIM. It was launched in 2016. The project was spearheaded by Peruvian Digital Payments (PDP), a service provider established by Peru's government, financial institutions, telcos, and other stakeholders. PDP is co-owned by the Association of Banks of Peru (ASBANC) as well as many of its member banks and electronic money issuers.[66] • No confirmation whether P2P transfer fee also applies to off-net.
Philippines	🏛	💲	Government-led: InstaPay. It was launched in 2018 under the Bangko Sentral ng Pilipinas (BSP)'s National Retail Payment System. It is governed by an industry-led body known as the Philippine Payment Management, Inc under the oversight of the BSP.[67][68]
Sierra Leone	🏛➕	N/A	Government-led: National Payment Switch launched in April 2023[69] (after the report's reference period)
Tanzania	👤	💲	• Government-led: Tanzania Instant Payments System (TIPS) is still in planning stages • Private sector-led: Multilateral arrangements among a group of e-money issuers. Terms were defined in a set of shared scheme rules, but no separate legal entity was formed.[70]
Uganda	🏛	💲	Government-led: Uganda National Interbank Settlement (UNIS). It was launched in February 2005. It is owned and operated by the Bank of Uganda.[71]

As discussed in the cost by transaction type section, off-network transfer fees are highest in Cote d'Ivoire, Tanzania, and Paraguay, all of which have interoperability infrastructure that is private sector-led. This arrangement entails mobile network operators and e-money issuers negotiating directly with each other through direct bilateral agreements. With the increased adoption of Tanzania's TIPS, we expect changes in the costs when the transition to the government-mandated central switch is completed in 2023. It is also worth mentioning that there may be pricing changes in Cote d'Ivoire and Mali as they integrate into the regional switch that includes providers from the 8-member states served by the Central Bank of West African States. It's planned cross-domain regional interoperable payment system (IPS) has the capacity to switch domestically and regionally.

Of the 21 providers that have off-network service 11 offer equal fees for both on- and off-network P2P transfers, including providers in Kenya, Uganda, Colombia, Ghana, and Pakistan. Most of these countries have a relatively advanced government-led interbank payment and settlement system. For example, Kenya, Uganda, and Ghana are the early players among its Sub-Saharan African peers in setting up interoperable systems having launched in 2018, 2005, and 2018, respectively, and have since undergone upgrades to meet the changing payment requirements. While its private-led switch has been operating for a longer time, the Central Bank of Pakistan launched its government-led switch called RAAST in 2021 enabling free small-value payments to any mobile money provider in real time. Paraguay offers a unique case: on-network fees are more expensive than off-network fees, though there is a second

fee of roughly 1.5 percent for withdrawing funds received from off-network transactions, making the total cost of transfer plus withdrawal of funds more expensive if funds are sent off-network than if they are sent on-network.

Overall, the evidence suggests that countries with government-led central switches tend to have lower off-network fees than countries with off-network transactions facilitated by private sector agreements. That said, though the private-led facilitation of off-network transactions leads to higher costs, this is arguably better than the comparison point of no interoperability infrastructure at all (e.g. Myanmar, Sierra Leone), which may result in larger total transaction costs given the multi-sim-, OTC- and voucher-based alternatives that consumers in these countries are left with. SIM multiplicity, partly driven by the dispersion in quality of service across operators, requires a physical device that can handle multiple SIM cards – otherwise, they have to manually replace the sim card in device – and entails difficulties in managing balances across accounts. For OTC and voucher-based options, customers face the opportunity cost of time – one has to visit the agent to make a transfer, instead of doing it on one's device – and risks of overcharging with the OTC option. We should also be aware of the potential medium-term and long-term effects of interoperability on profitability of connected institutions and investment in financial sector infrastructure, including expansion of the mobile money network. Brunnermeier, Limodio, and Spadavecchia (2023) show that the introduction of interoperability reduced network coverage by mobile network operators, potentially reducing the reach of mobile money in rural areas.[72]

FIGURE 20: Off-network fee by interoperability infrastructure

ASIA   LATIN AMERICA   EAST AFRICA   WEST AFRICA

Government-led: GHANA 0.0%, PAKISTAN 0.0%, NIGERIA 0.4%, BANGLADESH 0.7%, PHILIPPINES 1.2%, UGANDA 1.6%

Private sector-led: COLOMBIA 0.0%, KENYA 1.6%, PARAGUAY 3.0%, TANZANIA 3.7%, CÔTE D'IVOIRE 12.1%
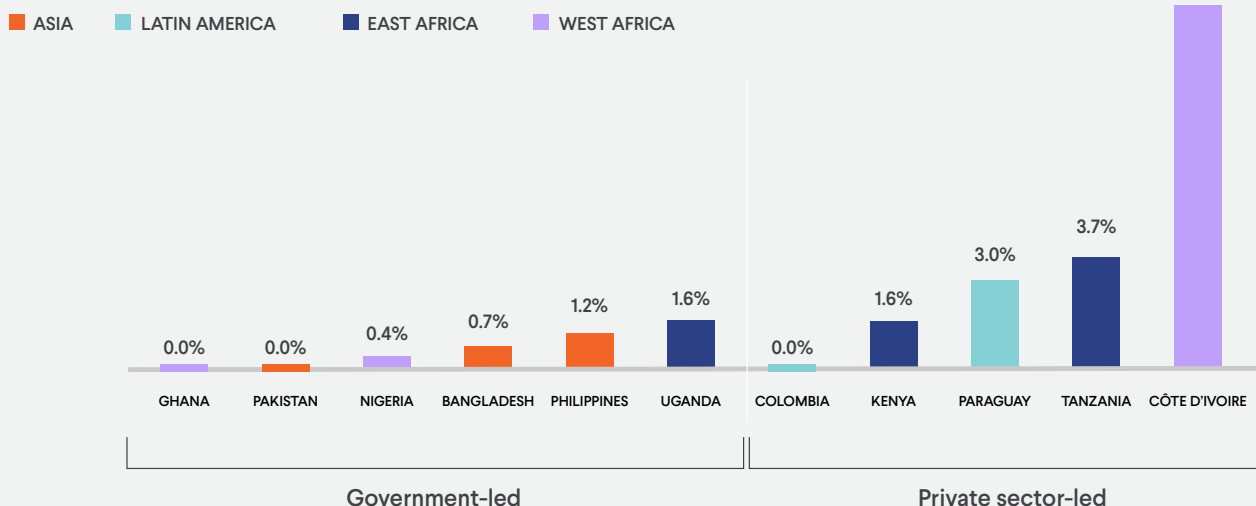
Price caps

Price caps set a limit on the prices that a provider can charge. On one hand, these caps are intended to make services affordable to users; on the other hand, they can hinder competition at the market level if all firms adjust their prices to match the price cap, even if some firms can offer a lower price (so the price cap essentially aids providers in tacitly colluding on their pricing), and can reduce incentives for market expansion and innovations.

In our sample, we find that only four countries – Ghana, Nigeria, Bangladesh and Pakistan – put a cap on prices for certain types of transactions.[73] Regulators mostly adopt the approach of competitive-based pricing, which gives providers freedom to set the prices. This is in line with the understanding that promoting and ensuring effective competition is central to promoting financial inclusion. Effective competition helps ensure that consumers will have access to high-quality, innovative, value-for-money products and services, which, in turn, will promote increased uptake and use of mobile financial services (Mazer & Rowan, 2016).

For Bangladesh and Ghana, price caps are specified for off-network transactions only. In Pakistan, equivalent regulations extend to both on-network and off-network transfers, while regulations in Nigeria are the most extensive as it prescribes price caps for all transaction types. Further on off-network transfers, the experience in the Philippines and Uganda shows that pricing caps do not immediately follow with government-led interoperability. That is, there may be fixed prices for off-network transfers using the switch, but providers are free to charge consumers more or even less than (if they wanted) this rate.

Price caps are considered to have a practical effect if such caps are the binding constraint. This typically happens when the corresponding listed prices are equal to the cap - when the price cap is lifted, prices would likely increase. In our sample, price caps come in a variety of structures: Bangladesh uses a percentage-based cap, Ghana and Pakistan use a slab-based cap, while Nigeria has a mix of both. The practical effects are easier to assess for percentage-based caps, while it requires more careful consideration for slab-based caps, as it involves zero price caps for an initial set of transactions.

In Bangladesh, the practical effect differs per provider: bKash, the largest player, charges exactly the price cap while Rocket, another provider, charges higher than the cap. In effect, the pricing cap has a practical effect for the former, while the latter shows a case of non-compliance.

In Ghana, after the waiver of fees for transactions below GHS 100 (approximately USD $9, or 1.3 times our high reference value[74]), the pricing cap of 1 percent for off-network transfers has no practical effect as providers charge fees that are always below the government caps due to competitive pressures. As a result, MTN – the dominant provider – starts charging fees after the transaction limit, though these are still below the price cap for off-network transactions of 1 percent; Vodafone offers off-network transactions free of charge even beyond the waiver limit.

In Pakistan, price caps can have a practical effect depending on the type of switch. Following a slab-based structure like Ghana, the government sets transactions up to Rs 25,000 (approximately USD $85) per account per month (or 11.4 times our high reference value) as free-of-charge and fees for succeeding amounts of P2P transfers are capped at 0.1 percent or Rs200. Beyond the transaction limit, providers charge lower than the cap if funds are transferred via the government switch RAAST;[75][76] in this case, it has no practical effect mainly due to the nature of the RAAST platform which is designed to be a zero-cost digital payment channel regardless of the transaction amount, to promote adoption of digital financial services in the country. On the other hand, if the private switch is used, providers charge exactly the cap, which means the pricing cap is a binding factor and it has a practical effect.

> Price caps are considered to have a practical effect if such caps are the binding constraint.

In Nigeria, evidence shows largely no practical effects and non-compliance. For cash-in and off-network transfers, Paga adopts a tiered or slab-based pricing of up to the cap, which means that most transactions' fees are lower than the cap. For on-network transfers, Paga does not charge consumers despite a non-zero price cap. The data suggest that pricing caps for these transaction types do not have a practical effect due to competitive pressures. **We found one instance of a provider charging in excess of the government-mandated price cap**: Paga charges a set N100 (approximately USD $0.22) for cash-outs, despite the government's mandate that prices for cash-outs be capped at zero.[77] In line with this finding, another audit study carried out by IPA (Blackmon & Mwesigwa, 2022) found that some providers in Nigeria charge above the price cap for some transaction amounts.[78]

Overall, evidence from the four sample countries that implement price caps shows no clear trend on its practical effects, which can be nuanced depending on the provider, type of switch and pricing structure. The binding constraint can be pricing caps for some countries like Bangladesh, competitive pressures for Ghana and Nigeria, or a mix of both like in Pakistan. Few providers in Bangladesh and Nigeria also showed evidence of non-compliance with the pricing caps; in particular, providers charge more than the prescribed cap.

TABLE 21: Summary of interoperability infrastructure

COUNTRY	PRICING CAPS	BRIEF DESCRIPTION
Bangladesh	✅	Price caps are set for off-network transactions. It is capped by the national switch at 0.5 percent per transaction.
Colombia	❌	No price caps set by the regulator.
Cote d'Ivoire	❌	No price caps set by the regulator.
Ethiopia	❌	No price caps set by the regulator.
Ghana	✅	The government has guaranteed a waiver for transactions below GHs 100 a day. In addition, price caps are set for off-network transactions. It is capped by the national switch at 1 percent per transaction.
Kenya	❌	No price caps set by the regulator.
Mali	❌	No price caps set by the regulator.
Myanmar	❌	No price caps set by the regulator.
Nigeria	✅	Guidelines on agent-initiated and self-service, customer-initiated transactions under mobile money operators prescribe N100 fee for cash-in via agent, minimum of N50 subject to 1 percent of transaction value or N500 (whichever is lower) for cash-out borne by the sender, N100 for off-network transfer. Due to competition, most mobile money operators charge zero fee for on-network transfer and cash-in. For off-network transfers, providers mostly adopted the NIBSS instant payment transfer which is tiered as follows: 0-N5,000: N10, N5,001-N50,000:N25 and above N50,000:N50.
Pakistan	✅	Guidelines indicate that banks are to provide free of cost digital fund transfer services to individuals for up to Rs25,000 per account/wallet a month. However, the SBP said, banks may charge individuals a transaction fee of no more than 0.1 percent or Rs200 for fund transfer exceeding the aggregate limit of Rs25,000.
Paraguay	❌	No price caps set by the regulator.
Peru	❌	No price caps set by the regulator.
Philippines	❌	No price caps set by the regulator.
Sierra Leone	❌	No price caps set by the regulator.
Tanzania	❌	No price caps set by the regulator.
Uganda	❌	No price caps set by the regulator.

Price transparency

As we collected listed prices, we also recorded key indicators about the experience of collecting this data, which provide insights into transparency of mobile money prices. We also contextualized this with the country's policies on transparency as it is interlinked with the practices that we observe.

With the exception of countries under the Central Bank of West African States (Cote d'Ivoire and Mali) and a few Latin American countries (Peru, Paraguay) in which we could not access mobile money regulations, all countries require that prices be listed with variations in platforms specified. It is more common for regulations to require that prices be posted at agent locations (8 out of 16 countries) than websites (5 out of 16 countries), suggesting that the former is likely a more popular point of contact for customers in developing countries and that governments are possibly unable to keep up with digital developments. In our data, 86 percent of providers, or 30 out of 35 providers, do list prices on their website; 60 percent (21 providers) publish a link to prices directly from the homepage. Myanmar's Wave Money, Tanzania's Tigo, and 3 Nigerian providers do not provide price lists, at least on their main websites during the data collection period (January-August 2022[79]). Despite these price lists not being posted, a closer look at the regulations in these 3 countries reveal that they are within regulatory bounds: Nigeria and Myanmar only require that prices be displayed at agent locations and customer service points, while Tanzania only indicated to disclose fees to customers without any specific locations mentioned. Moreover, most price lists were easy to find, averaging 1-2 minutes starting from when we began searching the provider's website and ending when we found the price list. For 13 percent of providers it took 5 minutes or more of searching. The time for the average consumer to find price lists is likely longer than the times our highly trained, highly digitally literate researcher recorded to find these price lists.

Further to price transparency, while it is standard for mobile money regulations to require providers to list their prices, the breakdown of fees between provider, charges, and taxes in listed prices is not typically specified. Of 19 providers in countries where mobile money transactions are taxed, 10 (53 percent) separated the charges from the government fees. These are providers in Cote d'Ivoire, Ghana, Nigeria, Tanzania and Uganda. However, for countries like Uganda and Tanzania, where there are multiple types of taxes, providers would separate or note the mobile money levy but not the other types like excise and VAT. Further discussion on mobile money taxation is in the next section.

Except for the same countries as above, all sample countries included a customer protection or redress section in their DFS regulations, mostly requiring a dedicated phone line for complaints that are not necessarily toll-free and with varied workaround times for an average of 5 to 60 working days from receipt. In our data, only Tanzania did not specify explicitly a telephone requirement as a medium to receive complaints, though it provided general guidelines on redress and complaints handling mechanisms. To assess customer care response, we identified customer care email addresses and emailed a request for support for a hypothetical problem with a transaction.[80] Results from our email inquiries showed a wide variation in the timeliness and quality of responses. 17 percent of providers did not list an email dedicated to customer inquiries (though they generally did have phone numbers and social media handles where customers could go for support); 20 percent never responded to our request; 34 percent responded within the hour; 23 percent responded within the day; and 6 percent took more than 24 hours to respond. Those that responded generally provided helpful information: 51 percent offered
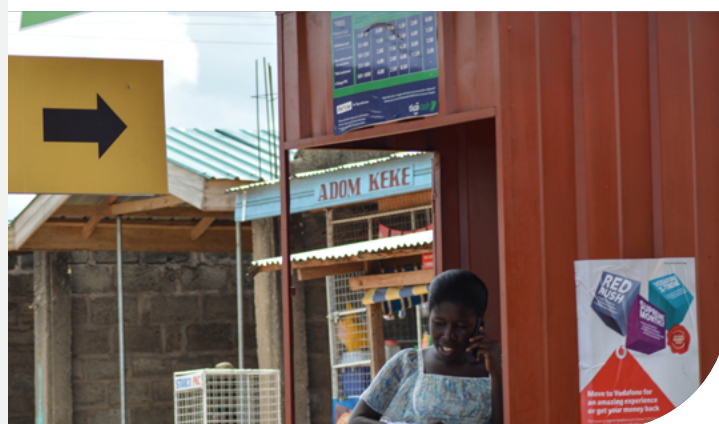
guidance on how to resolve the specific issue we raised. When compared against the regulations on customer redress, the 63 percent providers that responded are within the prescribed workaround time in their respective country's regulations, while the 20 percent of providers that never responded to our request did not follow this prescribed time. Meanwhile, among those providers that did not have a customer care email, there was evidence of non-compliance (Bangladesh's

Rocket, Uganda's MTN, Philippines' Gcash), but a few (Mali's Moov Africa and Orange) showed an unclear relationship to regulatory compliance as regulations were unknown. That being said, while we relied on emails out of convenience, it is unlikely the most common channel used to reach customer care in these markets. For example, in Uganda, 97-99 percent of customer care inquiries to mobile network operators were made by phone.[81]

TABLE 22: Hours for customer services to provide reply to email inquiry (n=35 providers)
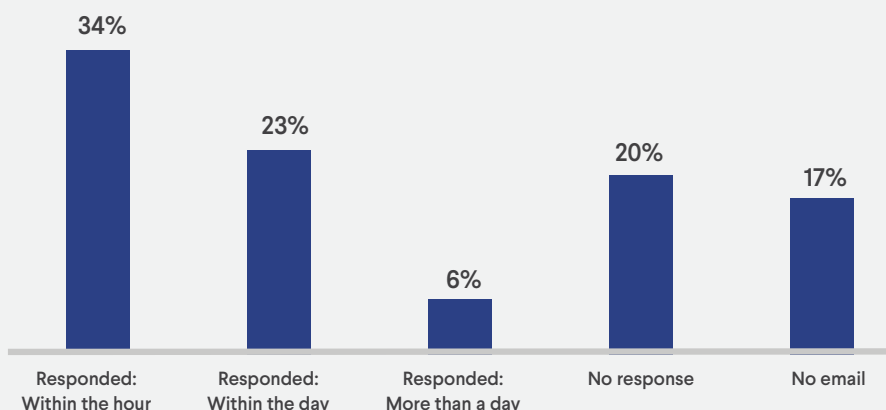
Expanding this further, the data shows no relationship between customer redress and price transparency: providers that performed worse in responding to the hypothetical redress question do not necessarily come from those that performed worse in price transparency. Of the 7 providers that had no responses to the customer care inquiry, 5 providers had a fee list on their websites, while the other 2 did not.

Lastly, providers that are present in multiple countries, primarily those in Sub-Saharan Africa, largely behave the same way for price transparency but exhibit variations in customer redress.

For price transparency, all of the 4 providers that exist in at least 2 countries – MTN, Orange, Vodacom and Airtel – have a fee list in provider websites, and only 3 of these providers have a link to the fee list on the homepage. For customer redress, differences are observed in the presence of email address for customer care (i.e. Uganda's MTN and Mali's Orange provide no email addresses, but the same providers in other countries do), and the time it takes to respond to inquiry (i.e. Vodacom responds 4.5 hours faster in Tanzania than Ghana; Airtel also responds 3 times faster in Tanzania than in Uganda)

TABLE 23: Price transparency and customer redress indicators by country

COUNTRY	PROVIDER	PRICE TRANSPARENCY			CUSTOMER REDRESS	
		FEE LIST ON PROVIDER WEBSITES	LINK TO FEE LIST ON PROVIDER HOMEPAGE?	NUMBER OF MINUTES TO FIND FEE LIST ON PROVIDER WEBSITE	TIME FOR CUSTOMER CARE TO RESPOND TO INQUIRY*	OFFERED GUIDANCE ON HOW TO REVERSE TRANSFER SENT IN ERROR?
Bangladesh	Bkash	Yes	Yes	1	3 minutes	Yes
	Nagad	Yes	No	20	10 minutes	No
	Rocket	Yes	No	2	-	N/A
Colombia	Bancolombia	Yes	Yes	1	20 minutes	Yes
	Daviplata	Yes	No	5	-	N/A
Côte d'Ivoire	Moov Africa	Yes	Yes	1	No Response	N/A
	MTN	Yes	Yes	2	1 day	Yes
	Orange	Yes	Yes	3	No Response	N/A
Ethiopia	Ethio Telecom	Yes	Yes	2	No Response	N/A
Ghana	MTN	Yes	Yes	1	2 days	No
	Vodafone	Yes	Yes	1	5 hours	Yes
Kenya	Safaricom	Yes	No	3	5 hours	Yes
Mali	Moov Africa	Yes	No	2	-	N/A
	Orange	Yes	No	5	-	N/A
	SAMA	Yes	Yes	1	No Response	N/A
Myanmar	Ooredoo	Yes	Yes	1	1 hour	Yes
	Wave Money	No	N/A	N/A	1 hour	Yes
Nigeria	Paga	No	N/A	N/A	1 hour	Yes
	Opay	No	N/A	N/A	No response	N/A
	Momo	No	N/A	N/A	No response	N/A
Pakistan	Jazz	Yes	Yes	1	4 hours	No
	EasyPaisa	Yes	Yes	3	1 day	Yes
Paraguay	Claro	Yes	Yes	1	5 minutes	Yes
	Personal	Yes	Yes	1	10 minutes	Yes
	Tigo	Yes	Yes	1	15 minutes	Yes
Peru	Bim	Yes	Yes	1	10 minutes	Yes
Philippines	GCash	Yes	No	2	-	N/A
	PayMaya	Yes	No	10	3 hours	No
Sierra Leone	Africell	Yes	Yes	2	3 days	Yes
	Orange	Yes	Yes	1	No response	N/A
Tanzania	Airtel	Yes	Yes	1	8 hours	Yes
	Tigo	No	N/A	N/A	30 minutes	Yes
	Vodacom	Yes	Yes	1	30 minutes	Yes
Uganda	Airtel	Yes	No	3	1 day	Yes
	MTN	Yes	Yes	1	-	N/A

NOTE: Price transparency data was collected from January to August 2022, while price scraping was conducted from September to December 2022 (Q3 and Q4, 2022). Tanzania's Tigo, Myanmar's Wave and Nigeria's Paga only had price lists at the latter period, so they were included in the main sample. However, Nigeria's Opay and Momo were part of the original list as they comprised at least 80 percent of the market share, along with Paga, but they still did not have listed prices at the time of price scraping so they are excluded in the main sample.

TABLE 24: Selected transparency and redress indicators

COUNTRY	REQUIRED TO LIST PRICES AND WHERE	REQUIRED TO HAVE DEDICATED PHONE LINE FOR COMPLAINTS AND TURNAROUND TIME	REFERENCE
Bangladesh	Yes; all retail outlets, customer care centers and websites	Yes; resolved within 10 working days	Bangladesh Mobile Financial Services (MFS) Regulations, 2022
Colombia	Yes; prior conclusion of contract, website, quarterly in national and regional newspapers	Yes	Circular Externa 052 / 2007 Law 1328 / 2009
Cote d'Ivoire	Unknown		
Ethiopia	Yes; at premise of agent in a visible manner	Yes; not more than 30 working days from date of complaint	Regulation of Mobile and Agent Banking Services
Ghana	Yes; at head office, branches as well as premises of its agents	Yes; resolved within 5 working days of lodging and an additional 10 working days is permitted provided customer is informed	Bank of Ghana's Guidelines for E-money Issuers in Ghana
Kenya	Yes; upon opening their e-money accounts	Yes; address complaints within a period of 60 days from receipt of complaint	Central Bank of Kenya's E-money Regulation 2013
Mali	Unknown		
Myanmar	Yes; at all customer service centers as well as premises of its agents	Yes; resolve within 5 business days from the date of receipt of complaint	Central Bank of Myanmar's Regulation on Mobile Financial Services
Nigeria	Yes; at agents	Yes; not later than 48 hours from date of reporting	Central Bank of Nigeria's Regulatory Framework for Mobile Money Services in Nigeria
Pakistan	Yes; at all branches/agent locations/website	Yes; receiving and processing customers' complaints 24 hours	State Bank of Pakistan's Branchless Banking Regulations.
Paraguay	Unknown		
Peru	Unknown		
Philippines	Yes; in public domains (e.g., websites)	Yes; processing and resolution within 7 days for simple complaints and 45 days for complex complaints	Bangko Sentral ng Pilipinas' Regulations on Financial Consumer Protection
Sierra Leone	Yes; at mobile money account opening. 30 days notice to consumer (including SMS), at a conspicuous place	Yes; within 10 working days of the complaint	Guidelines for mobile money services Guidelines for agents
Tanzania	Yes; display and disclose charges and fees for its services to its customers and any changes thereof (no locations mentioned)	No explicit mention of phone line; address complaints within 21 days from receipt of complaint	The Bank of Tanzania's The National Payment Systems Act 2015 or the Electronic Money Regulations 2015
Uganda	Yes; a schedule of fees or charges availed to a consumer, materials displayed at the licensee's office, social media pages or website; or in any other document as the licensee may determine	Yes; within 21 working days from the date of lodging the complaint	The Bank of Uganda's National Payment Systems (Consumer Protection) Regulations 2022

Time Series Analysis

FIGURE 21: Between July and December of 2022, we observed the following changes in prices:

UGANDA

Effective December 17, 2022 MTN's prices for on-network person-to-person transactions reduced and converged with Airtel's. MTN also reduced its rates for wallet-to-bank transfers to be significantly lower than Airtel's when the rates were previously significantly higher for low transaction value. Off-network person-to-person transfers between MTN and Airtel also reduced to be the same rate as on-network person-to-person transfers.

ETHIOPIA

In November 2022, Tele Birr began to charge its consumers an average fee of 0.7 percent for cash-in when it was previously free of charge. Cash-out fees increased by a percentage point, from 1.5 percent to 2.5 percent for the median transaction value. Average on-network person-to-person transfer fee decreased slightly from 0.09 percent to 0.05 percent. The overall fee increase results in the pricing structure becoming more regressive.

PHILIPPINES

Cash-in fee, applicable for transaction value exceeding 10,000 Pesos, reduced from 2 percent to 1.5 percent.

COLOMBIA

Bancolombia increased the per transaction limit from 700,000 to 1,000,000 Pesos.

TANZANIA

In June 2022, the government announced in July 2022 a 43 percent reduction in the mobile money levy in Tanzania through the Finance Act 2022, and was effective in July 2022. Later in September 2022, Tanzania's Finance and Planning Minister announced a further reduction in mobile money transaction levies effective in October 2022. All large providers in the country reflected these reductions in their pricing schedules. In addition, for the second round of reduction, all providers' revised listed prices included overall reduction in provider fees across all transaction types.

Mobile money taxation

Governments directly influence the prices consumers pay for mobile money through the decisions they make regarding the taxation of mobile money. Governments are faced with a difficult decision: taxes that are too high can make mobile money transactions unaffordable, leading to detrimental effects on financial inclusion goals, yet taxing mobile money offers an opportunity for governments to collect significant revenue, even from economic activity that remains otherwise largely informal and untaxed. In this section, we discuss the various ways that mobile money is taxed across the 16 countries included in our desk review and the level of influence taxation has on the total price consumers pay for mobile money transactions.

Mobile money taxes can be divided into two categories, consumer taxes and mobile money operator taxes. While consumers are indirectly affected by mobile operator taxes (i.e. corporate income tax indirectly passed on to consumers through fees), for simplicity this study focused on government taxes directly charged to consumers.

Two broad types of consumer taxes can apply to mobile money transactions, depending on the country. First, broad-based taxes including sales tax and value-added tax (VAT) are applied to most goods and services in an economy, including mobile money transactions. These broad-based taxes are typically applied to the fees FSPs charge consumers for completing mobile money transactions. Second, targeted taxes apply to only a segment of transactions in the economy. Targeted taxes that are applied to mobile money transactions in the countries we reviewed include excise taxes, stamp duties, and mobile-money specific levies. The tax base for these targeted taxes can either be the transaction fee or the value of the transaction itself.

The level of tax disclosure also varies significantly by country. Some countries do not impose any type of tax on mobile money transactions; of those that do tax mobile money, providers will do one of the following: (a) exclude taxes from their price lists, leaving it up to consumers to determine how much extra they will be charged in taxes, (b) include taxes in their listed prices, but without separating the taxes and the direct provider fees, or (c) include taxes in their listed prices, separating out the taxes and the direct provider fees.

In Table 25 below, we summarize the types of taxes applied to mobile money transactions and how providers report taxes by country. Note that in many countries (e.g., Mali and Pakistan), while our desk review revealed some information about the country's tax policies, we did not receive definitive information from providers or regulators that would allow us to calculate an exact tax rate. The rightmost column of Table 25 notes whether we were able to determine the total tax rates applied to mobile money transactions.

TABLE 25: Mobile money taxation by country

COUNTRY	MOBILE MONEY TAXED?	BROAD-BASED TAXES?	TARGETED TAXES?	LISTED PRICES INCLUDE TAX?	LISTED PRICES SEPARATE TAX AND FEES?	TCI ABLE TO DETERMINE TAX RATES?
Bangladesh	Yes	VAT: 15% of transaction fee	None	Yes	No	Yes
Colombia	Yes	None	"4X1000 tax:" 0.4% of transaction value for amounts exceeding approximately $598 per month	No	No	Yes
Côte d'Ivoire	Yes	None	Stamp fee: 100F charged for deposits over 5000 FCFA.	Yes	Yes	Yes
Ethiopia	No	None	None	N/A	N/A	Yes
Ghana	Yes	None	E-levy: 1.5% of transaction amount for transfers only (not cash-in or cash-out).[82] First 100 cedi per day are excluded.	Yes	Yes	Yes
Kenya	Yes	None	Excise tax: 12% of the transaction fee	Yes	No	Yes
Mali	Unknown	Unknown	Unknown	Yes	No	No
Myanmar	No	None	None	N/A	N/A	Yes
Nigeria	Yes	VAT: 7.5% of transaction fee	Stamp duty: N50 on all transactions above N10,000	No	No	Yes
Pakistan	Yes	Unknown	Unknown	Yes	No	No
Paraguay	Unknown	Unknown	Unknown	Unknown	No	No
Peru	Unknown	Unknown	Unknown	Unknown	No	No
Philippines	No	None	None	N/A	N/A	Yes
Sierra Leone	No	None	None	N/A	N/A	Yes
Tanzania	Yes	VAT: 18% of transaction fee	Excise tax: 10% of transaction fee Mobile money levy: Variable, slab-based	Yes	Partially	Yes
Uganda	Yes	None	Excise: 15% of transaction fee Mobile money levy: 0.5% of transaction amount for withdrawals only.	Yes	Partially**	Yes

*For Bancolombia a la Mano, fees reported by the customer service are higher than the website, but they cannot confirm how much the tax charge is.

**In Uganda, customers pay exactly the prices listed on the price sheet. However, the taxes were not indicated in the listed prices: Airtel doesn't mention both excise tax and MM levy for cash-out, while MTN only mentions the MM levy.

Nine of the sixteen countries included in our review imposed some taxes on mobile money transactions. Four did not impose any tax on mobile money transactions, and for three countries we were unable to definitively determine whether any consumer taxes were applied to mobile money transactions.

Three countries impose broad-based VAT taxes on mobile money transaction fees, while most (seven of nine) countries that impose taxes on mobile money transactions include at least one type of sector-specific tax. (In Pakistan, we know that mobile money transactions are subject to taxes, but were unable to determine the nature of those taxes.) VAT and excise taxes are applied as a percentage of the transaction fee, meaning that they follow providers' often regressive pricing scheme. Three countries, Colombia, Ghana, and Uganda, apply a mobile money-specific levy as a percentage of the transaction amount (only for transfers in Ghana and withdrawals in Uganda), while Tanzania imposes a slab-based mobile money levy based on the transaction amount (restricted to transfers and withdrawals). Cote d'Ivoire and Nigeria impose a "stamp duty," a set fee for all transactions above a certain value. Two other countries, Colombia and Ghana limit their taxes to transactions that are above a monthly or daily threshold, respectively.

Of the nine countries that impose taxes on mobile money, six apply only one form of tax. Nigeria and Uganda apply two forms of taxes, while Tanzania applies three distinct taxes on mobile money transactions, creating a complex layered tax application that yields some of the highest total tax rates in our sample of countries.

In countries that tax mobile money, most providers list prices inclusive of all applicable taxes, though Paga (Nigeria) and Airtel (Uganda) listed only the pre-tax costs, leaving it to the consumer to determine their total actual cost. All providers in Tanzania and MTN in Uganda separately list mobile money-specific taxes (but not other types of taxes applied to mobile money transactions).

Including countries with no mobile money taxes, we were able to determine mobile money tax rates for 12 countries. Additional work, including discussions with regulators to understand taxation policies, would be required to determine tax rates for the remaining four countries. Figure 22 displays total fees at our high reference value for each country, broken down by transaction type. Note that our high reference value is below the thresholds at which some taxes are applied in Colombia, Ghana, and Nigeria. In our 12 countries where tax rates are known, we plot fees excluding taxes (blue) and taxes (orange) separately. In countries where tax rates are unknown, we plot the total price inclusive of taxes in green.

FIGURE 22: Fees and taxes by country and transaction type (at high reference value)

FEE EXCLUDING TAX ■ TAX ■ FEE + TAX (if tax rate unknown) ■ TRANSACTION UNAVAILABLE ⬚
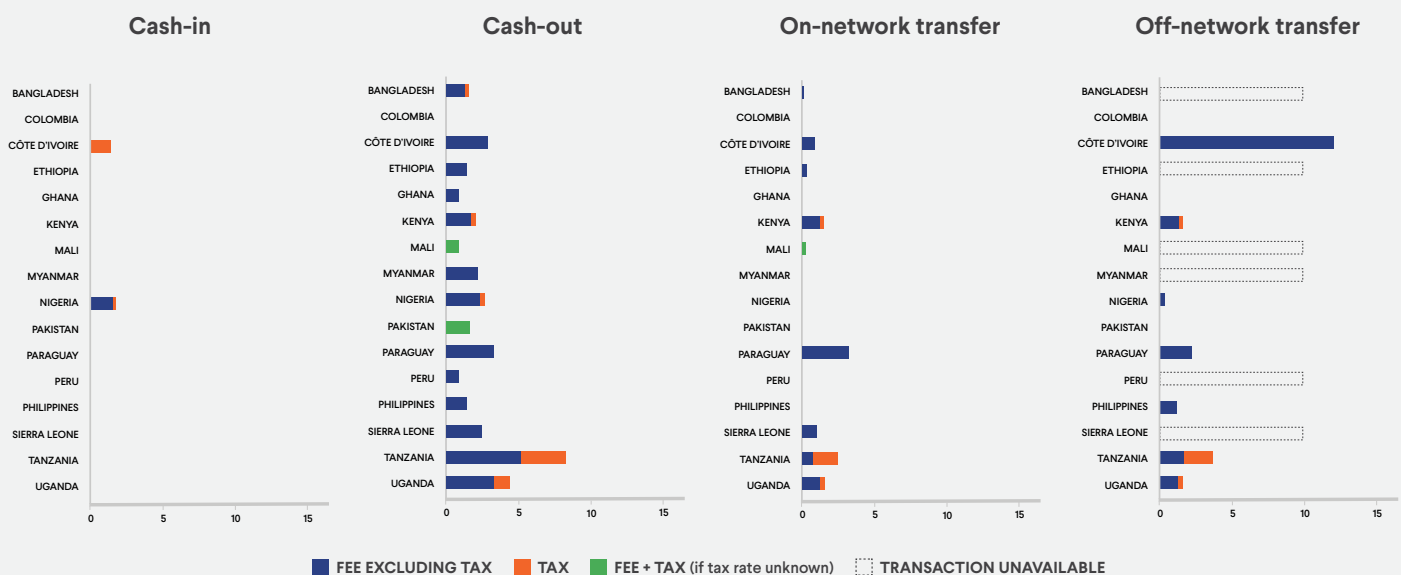
Figure 23 presents the same information restricted to countries where tax rates are known. Here the vertical axis represents the tax burden (at our high reference value) as a percent of the total cost. The horizontal access plots the total price of each transaction, as a percent of the transaction value.

FIGURE 23: Taxes as a percent of total cost (at high reference value)
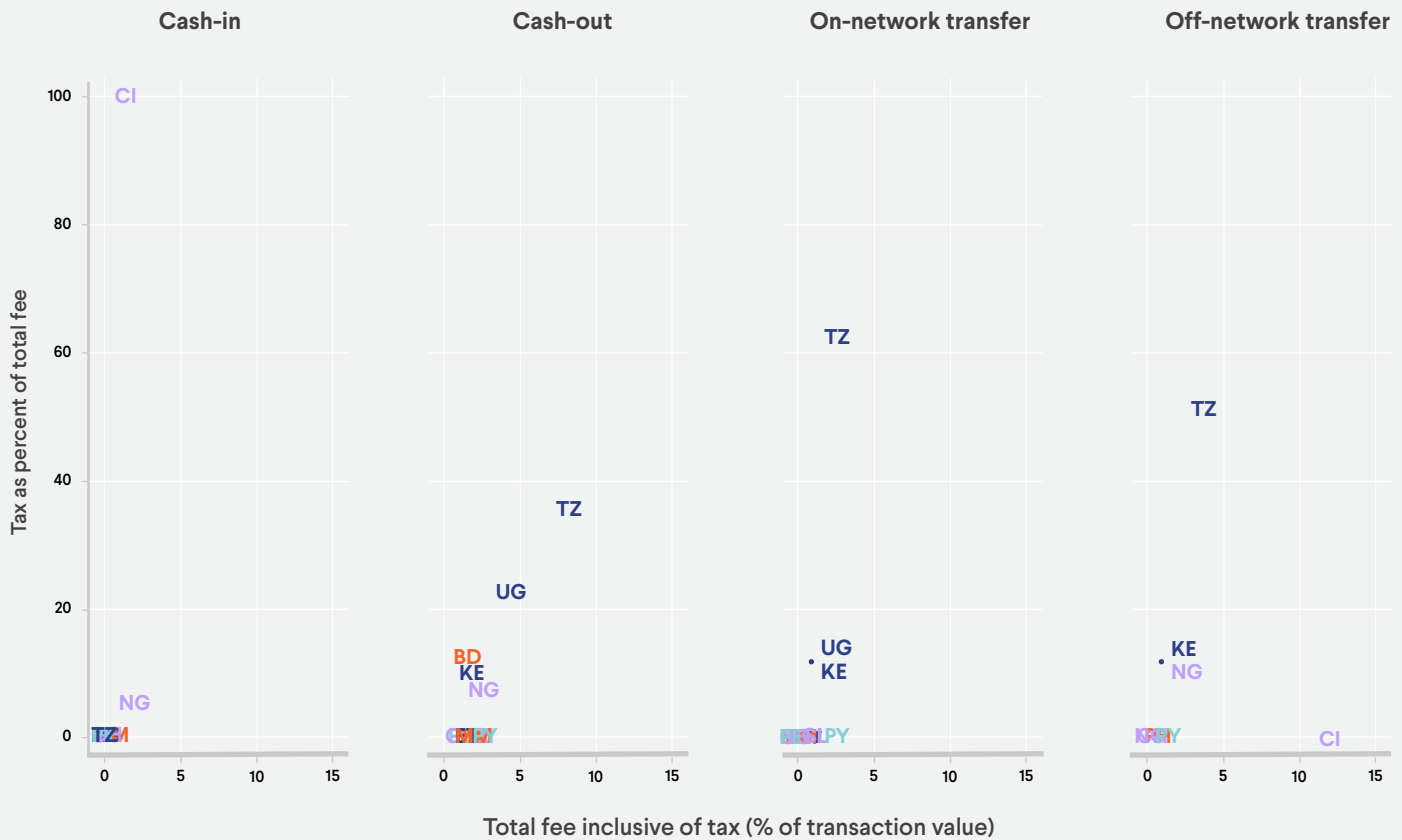
NOTES: (0;0: Bangladesh, Ethiopia, Ghana, Kenya, Myanmar, Paraguay, Peru, Philippines, Sierra Leone, Tanzania, Uganda)

NOTES: (0;1: Ghana, Peru), (0;1.5: Ethiopia), (0;1.55: Philippines), (0;2.35: Myanmar), (0;2.5: Sierra Leone), (0;2.97: Côte d'Ivoire), (0;3.33: Paraguay)

NOTES: (0;0: Ghana, Myanmar, Nigeria, Peru, Philippines), (0;0.2: Bangladesh), (0;0.5: Ethiopia), (0;1.03: Côte d'Ivoire), (0;1.15: Sierra Leone), (0;3.33: Paraguay)

NOTES: (0;0: Ghana), (0;0.4: Nigeria), (0;1.2: Philippines), (0;2.25 Paraguay)

A few countries stand out: **Tanzania consistently has relatively high total costs (particularly for withdrawals) and very high taxes as a proportion of total costs**. In Tanzania, taxes make up more than half the cost of on- and off-network transfers, and more than one third of the cost of withdrawals. Cote d'Ivoire is also unique in that it is one of only a few countries that impose a fee for cashing-in, which is exclusively made up of a stamp tax (no provider fees).

Bangladesh, Kenya, Nigeria, and Uganda also have notable proportions of their fees consisting of taxes, though significantly lower than Tanzania's rates.

Measuring costs when using mobile money agents

This section presents our approach to measuring the true cost of conducting DFS transactions with agents, testing three distinct data collection methods. These three methods can briefly be described as traditional mystery shopping using professional shoppers; intercept surveys from consumers after a transaction has been made; and mystery shopping using recruited consumers. We begin by describing key design decisions common to all methods, then describe each of the three data collection methods in detail. For more technical details on the methodology beyond what is included in this section, refer to Appendix. We also discuss lessons learned regarding the feasibility and accuracy of each method based on the experience testing these methods in the field. Finally, we present our first year results from Bangladesh, Tanzania, and Uganda.

Methodologies

This section lays out our key design decisions common to all methodologies tested, then covers each of the three methods in detail.

Agent selection

To maximize the comparability across methods, each was carried out at the same set of agent locations, with the exception of local consumer mystery shopping which was conducted only in urban locations. We selected a set of "markets" where agents are located, split evenly between urban and rural locations. In urban locations, our markets were actual markets where food and other goods are sold, while in less dense locations our markets would typically span a town central area or an entire village. Rural markets were chosen using a geospatial analysis approach that allowed for variation in population density. See the Appendix for

details. Individual agents were identified through an in-person census of selected markets. In Tanzania and Uganda, 15-18 percent of locations selected through geospatial analysis had no agents and so were excluded from the study.

In Bangladesh, we relied on a recent census of agents carried out by IPA as part of a randomized controlled trial, so some design protocols were adjusted in this market to accommodate this collaboration.[83]

TABLE 27: below shows the number of urban and rural markets and agents included for each country. We targeted a minimum of 400 agents per country, split between urban and rural locations.

COUNTRY	URBAN MARKETS			RURAL MARKETS		
	NUMBER OF MARKETS	MEAN NUMBER OF AGENTS PER MARKET	TOTAL NUMBER OF AGENTS	NUMBER OF MARKETS	MEAN NUMBER OF AGENTS PER MARKET	TOTAL NUMBER OF AGENTS
Bangladesh	19	10.9	207	60	3.5	210
Tanzania	10	20	200	31	6.8	210
Uganda	10	20	200	39	5.1	200

Transaction types

For both the consumer and professional mystery shopping activities, each mystery shopper carried out four types of transactions:[84]

TABLE 28: Transaction types

TRANSACTION TYPES	DESCRIPTION
Cash-in	Depositing physical cash into a mobile money account.
Cash-out	Withdrawing physical cash from a mobile money account.
Over-the-counter cash-to-account transfer	Mystery shopper brings physical cash and asks the agent to send it to the recipient's mobile money account.
Off-network account-to-account transfer	Mystery shopper asks the agent for assistance in transferring electronic funds from their mobile money account to the recipient's account with a different mobile money provider. In Bangladesh, off-network transfers were not available at the time of data collection, so on-network transfers were used instead (sending money to someone with an account at the same provider).
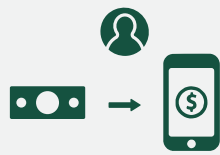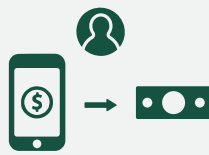
CASH-IN **CASH-OUT** **OVER-THE-COUNTER CASH-TO-ACCOUNT TRANSFER** **OFF-NETWORK ACCOUNT-TO-ACCOUNT TRANSFER**
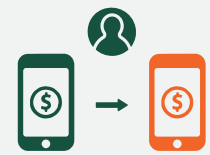
Cash-in and cash-out are core functions of mobile money agents, who serve primarily as "human ATMs." Data from our consumer intercept surveys shows that the vast majority of transactions consumers conduct with agents are cash-in or cash-out (Bangladesh: 83 percent; Tanzania: 74 percent; Uganda: 77 percent).

Agents also assist customers who would like to send money but don't have a mobile money account (or don't have enough balance on the account). Of all transactions in our consumer intercept surveys, 17 percent were these "over-the-counter" transactions (though only 3 percent of transactions in Bangladesh).

Finally, agents may assist customers in making standard P2P transfers between accounts. These types of transactions are considered "self-serve" because they can be carried out directly by consumers using their mobile device without an agent. However, agents do commonly provide assistance to customers in making these transactions (for example because a consumer's device is not working or because of digital literacy limitations). Of all transactions in our consumer intercept surveys, 5 percent were P2P transfers. Although off-network transfers are less common than on-network transfers, we chose to include off-network transfers because of the importance of off-network pricing to the growth of interoperable payment systems.

We chose to conduct each of these four transaction types with two transaction values. These values roughly approximate the median transaction value in each market (our "high value") and half of the median transaction value (our "low value"). We used the same procedure to select the large transaction value as was used to define our reference values for our listed prices work.[85]

The low value was set at half the primary reference value to allow us to measure the experience of those that conduct smaller-than-average transactions, typically those of lower socioeconomic status. The following transaction values were used:

BANGLADESH: BDT 1,500 (USD $14.54) and BDT 750 (USD $7.27)

TANZANIA: TZS 20,000 (USD $8.57) and TZS 10,000 (USD $4.28)

UGANDA: UGX 30,000 (USD $8.06) and UGX 15,000 (USD $4.03)

Within each market, agents were assigned to one transaction value, split evenly between high- and low-value transactions. This allowed us to measure differences in outcomes depending on transaction size while maximizing the potential for liquidity constraints among agents assigned to high-value transactions. All mystery shopping visits (professional and local consumer) were conducted with the agent's assigned transaction value.

Official fees are used to calculate when overcharging has occurred – when the total actual fees incurred exceeds the official fee. When calculating our official fee, we use the lowest-cost option for processing a transaction available to consumers and consider situations where agents use other more expensive options as a means of overcharging. While cash-in and cash-out transactions are relatively straightforward, off-network and over-the-counter transfers are more complex. Both of these transaction types involve activity by agents that is not fully compensated through official commissions (off-network transfers involve no agent commission, and over-the-counter transfers only involve a cash-in commission), so for these types of transactions agents have a particularly strong incentive to charge extra informal fees to consumers. Appendix shows the official fees for each transaction type in each country.

Off-network transfers

Off-network transfers are "self-serve," meaning they can be completed by a consumer using their own device without the assistance of an agent. When agents are asked to help consumers complete these transactions, they have a choice: they can guide the consumer through the process of making the transfer on the consumer's own device, or the agent can make the transfer through their own account (i.e. the agent can process a withdrawal from the customer's account but keep the cash and transfer funds from their own account to the intended recipient). Making the transfer on their own device is the least expensive option for consumers, so our official rate is based on that modality. In Bangladesh and Tanzania, 98-99 percent of transfers (on-network, in Bangladesh) were carried out directly on the customer's device (the lowest-cost option), but in Uganda 62 percent of these transfers were carried out via a withdrawal, at extra cost to the customers – and extra commission to the agent.

Over-the-counter transfers

Over-the-counter transfers involve the sending of funds from the customer to another user's account. In this scenario, the customer's funds begin in cash, rather than in their mobile money account (so the transfer involves a physical handing "over the counter" of cash to the agent). Unlike on- or off-network account-to-account transfers, over-the-counter transfers necessarily involve an agent who is needed to convert the physical cash into electronic money.

Though these transactions are technically not permitted, they are an important and relatively common transaction particularly for customers who want to make use of mobile money to send money across long distances but don't have their own account or device. A total of 16 percent of transactions recorded in our consumer intercept surveys were a form of over-the-counter transfer. Over-the-counter transfers can be completed in a few different ways, but for all three countries in this study over 98 percent of these transfers we completed were processed as "remote deposits." With this approach, agents use their standard deposit process, however, they list the recipients' number in place of the customer's own number, so funds are "deposited" in the recipient's account rather than the customer's account. This bypasses the FSP's transfer fees but is difficult for them to detect. Because this approach was used almost exclusively to complete over-the-counter transactions in all countries, we set our "official" fees for these transfers at zero, same as the cost of making a deposit.

FIGURE 24: "Remote deposit" over-the-counter transfer process

Agent "deposits" the cash, using the recipient's phone number instead of the sender's.

CUSTOMER BRINGS CASH TO AN AGENT

RECIPIENT RECEIVES FUNDS IN THEIR MOBILE WALLET

TABLE 29: Transaction types and official fees by country

COUNTRY	TRANSACTION TYPE	VALUE	OFFICIAL FEE
Bangladesh	Cash-in	BDT 750	Free
		BDT 1,500	Free
	Cash-out	BDT 750	BDT 13.88*
		BDT 1,500	BDT 27.75*
	On-network transfer	BDT 750	BDT 5
		BDT 1,500	BDT 5
	Over-the-counter transfer	BDT 750	Free
		BDT 1,500	Free
Tanzania	Cash-in	TZS 10,000	Free
		TZS 20,000	Free
	Cash-out	TZS 10,000	**BEFORE OCTOBER 1, 2022** AIRTEL: TZS 1,350 TIGO & VODACOM: TZS 1,578 **OCTOBER 1, 2022 AND AFTER** AIRTEL: TZS 1,324 TIGO & VODACOM: TZS 1,552
		TZS 20,000	**BEFORE OCTOBER 1, 2022** AIRTEL: 1700 TIGO & VODACOM: TZS 2,233 **OCTOBER 1, 2022 AND AFTER** AIRTEL: TZS 1,623 TIGO & VODACOM: TZS 2,156
	Off-network transfer	TZS 10,000	**BEFORE OCTOBER 1, 2022** TZS 623 **OCTOBER 1, 2022 AND AFTER** TZS 597
		TZS 20,000	**BEFORE OCTOBER 1, 2022** TZS 923 **OCTOBER 1, 2022 AND AFTER** TZS 846
	Over-the-counter transfer	TZS 10,000	Free
		TZS 20,000	Free
Uganda	Cash-in	UGX 15,000	Free
		UGX 30,000	Free
	Cash-out	UGX 15,000	UGX 775
		UGX 30,000	UGX 1,030
	Off-network transfer	UGX 15,000	UGX 700
		UGX 30,000	UGX 880
	Over-the-counter transfer	UGX 15,000	Free
		UGX 30,000	Free

Note: Providers in Bangladesh and Uganda charged identical fees for all transaction types, so only one fee is listed per transaction in these countries. A reduction in taxes in Tanzania on October 1, 2022 led to a slight change in fees.

*In Bangladesh, the mobile money provider bKash offers reduced cash-out fees at a single agent location that customers pre-select as their "Priyo agent." This reduced fee is not considered in our official fee calculations. While this does not affect our professional mystery shopper results because professional mystery shoppers did not use this "Priyo agent" option, results from our consumer intercept and local mystery shopping may show some apparent undercharging caused by this promotion.

Data collection methods

We carried out three competing approaches to measuring consumer costs when using agents to make DFS transactions:

TABLE 30: Transaction types

TRANSACTION TYPES	DESCRIPTION
Professional mystery shopping	Enumerators hired and trained by IPA visited agent locations, made a set of standard transactions, and recorded the outcome of that visit (e.g., if transaction was successful and what fees were incurred).
Consumer intercept surveys	Enumerators stationed themselves outside agent locations and conducted surveys with consumers who had just completed a transaction. Surveys covered the same types of outcomes as recorded by mystery shoppers.
Local consumer mystery shopping	Similar to the professional mystery shopping method, but carried out by local consumers rather than trained enumerators.

Each of these methods is described in more detail below.

Professional mystery shopping

IPA enumerators conducted mystery shopping visits with each agent in our sample. We attempted to conduct four mystery shopping visits per agent, each with a different enumerator. Two enumerators were female and two were male to allow for gender comparisons. Each enumerator's mystery shopping visit included one of the four transaction types, so each agent received each of the four transaction types. Our target per country was 1,600 professional mystery shopping visits – 400 agents, each with four visits. In terms of visits where we were able to attempt a transaction, we achieved 1,579 in Bangladesh, 1,321 in Tanzania, and 1,523 in Uganda. These values are below 1,600 because many agents (particularly in Tanzania) were not present even after repeated visits, preventing us from attempting to make transactions.[86]

Consumer intercept surveys

IPA enumerators conducted "intercept" surveys with consumers outside of all agent locations in our sample. We included the same basic set of questions as in the mystery shopping data collection including questions about the success of the transaction, fees incurred, and quality of service received. Because these represented real-world transactions carried out by consumers rather than mystery shopping transactions, we could not control the types or size of the transactions

conducted. This did, however, allow us to measure the types and sizes of transactions that consumers naturally use in each market.

We attempted to conduct two intercept surveys per agent location, for a total target sample size of 800 per country. In Tanzania, we attempted extra consumer intercept surveys at urban agent locations as part of an experimental study added on to the core TCI work in Tanzania. We achieved 669, 843, and 531 consumer intercept surveys where the customer had attempted a DFS transaction in Bangladesh, Tanzania, and Uganda, respectively. In Uganda, low survey numbers were mainly the result of agents' customer bases. A large share of locations had very low traffic with few customers coming and going. Many agents also run other businesses and only provide agent services as a side business. Many customers would visit an agent for other services, for example to make a purchase at an agents' shop or to charge their phone battery. Enumerators were instructed to wait for a maximum of 2 hours outside of each agent location, after which they moved on to the next agent even if the two surveys had not been completed. They then made three additional attempts on different days. In urban areas, this protocol was later adjusted to a maximum of 2-4 hours waiting time with no reattempts. For low-traffic agents, these protocols still did not help in finding enough customers to intercept.

Local consumer mystery shopping

The final method we used to measure the true cost to consumers of using mobile money agents involved mystery shopping by regular consumers who live in the study areas rather than by trained enumerators employed by IPA. Local consumers – a subset of consumers interviewed as part of the consumer intercept surveys discussed above – were trained by IPA enumerators to conduct mystery shopping visits very similar to the professional mystery shopping visits described above. Each consumer was asked to complete eight mystery shopping visits: four visits (each using one of the four transaction types) to the agent they were intercepted at, and one visit to four other agents they did not have experience using in the past. This approach allowed us to explore differences in treatment by agents between known customers and customers that are transacting with an agent for the first time.

Local consumers were compensated for their time, following standard compensation rates provided to research participants. This compensation tended to be lower per completed observation than for trained enumerators. Shoppers were compensated a set amount per attempted mystery shopping visits, regardless of the outcome or actual costs they incurred to complete the transaction. This compensation structure ensured that shoppers were not incentivized to over-report fees they incurred.

In the first phase of this activity, enumerators trained local shoppers in person and guided them through the post-visit survey for the first few rounds of mystery shopping. The second phase of this work will involve completing a "remote" version of this exercise, where the same set of local shoppers are given mystery shopping assignments via phone call and/ or SMS and are asked to complete the mystery shopping visits independently. To test the feasibility of this remote option, it needs to be carried out at least a few months after the initial in-person work. This will allow us to explore whether consumers are able to recall the mystery shopping process without the need for additional in-person refresher training. Because of the need for separation between the in-person and remote phases of this work, we report results only from the in-person phase of the local consumer mystery shopping method in this report, but will include results from our local consumer mystery shopping work in our next report.

We conducted local consumer mystery shopping only with urban agents. During piloting, we determined that it was quite difficult to find local consumers in rural areas with smartphones and the digital literacy needed to complete phone-based surveys after completing mystery shopping visits. This is a significant limitation to this approach: in its current design, we can only measure consumer costs in urban areas.

> Each consumer was asked to complete eight mystery shopping visits: four visits (each using one of the four transaction types) to the agent they were intercepted at, and one visit to four other agents they did not have experience using in the past.

We selected approximately half of urban agents (100 agents per country) for local mystery shopping. We attempted to recruit two local mystery shoppers per selected agent, balanced on gender (three in Tanzania, to accommodate an add-on experimental study) and asked each to complete a total of eight mystery shopping visits, for a total of 1600 visits in Bangladesh and Uganda and 2400 visits in Tanzania. In terms of visits where the agent was actually present, we achieved sample sizes of 768 in Bangladesh, 1368 in Tanzania, and 1106 in Uganda. These were significantly below our targets, particularly in Bangladesh, where we struggled to recruit local shoppers (achieving just 126 of our target of 200). Across all countries, agents were not present during our local mystery shoppers' visits between 20-30 percent of the time. While professional mystery shoppers were asked to reattempt visits when the agent was not present on different days and times, this was not possible for local mystery shoppers who were able to dedicate only limited time to this work. Because of this limitation, local shoppers completed an average of 5.5 (Uganda), 5.6 (Tanzania) and 6.1 (Bangladesh) of their eight assigned mystery shopping visits, excluding visits where the agent was not present.

Comparing methods: lessons from the field

Traditionally, mystery shopping by trained enumerators has been considered the gold standard for collecting accurate data on frontline service provider conduct, including overcharging and other misconduct by DFS agents.[87] A central goal of the TCI is to explore alternative methods and their advantages and disadvantages relative to professional mystery shopping.

When comparing the accuracy of each method, we evaluate each method's ability to capture the cost of a typical

transaction in the market – a transaction carried by a local consumer with an agent that they use regularly.[88]

Table 30 summarizes the advantages and disadvantages of each method across five dimensions: data collection affordability, adaptability, reflection of real-world consumer decisions, data quality, and observer effects. Each dimension is then discussed in more detail below.

TABLE 31: Comparing data collection methods
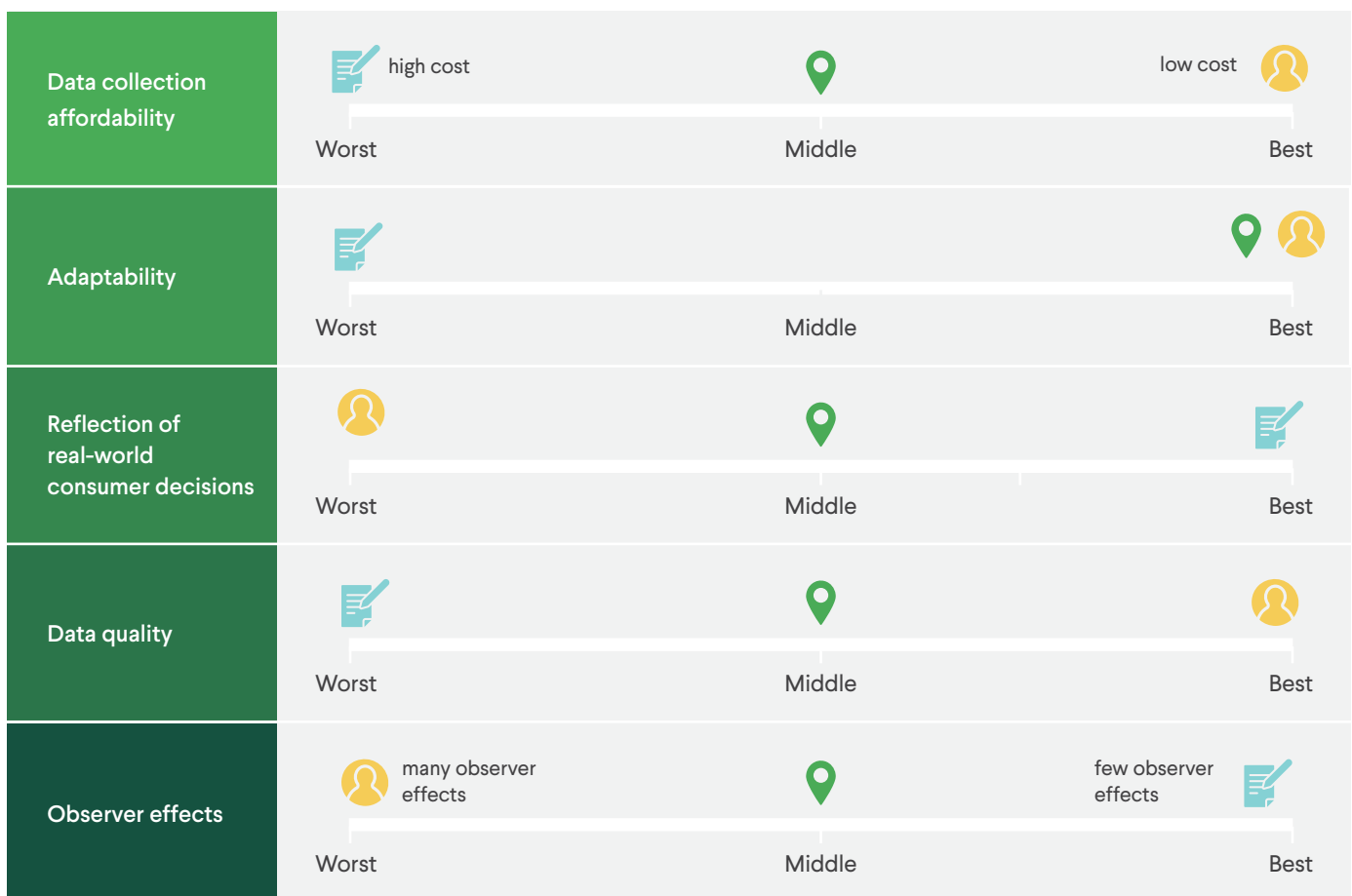
Data collection affordability	high cost		low cost
	Worst	Middle	Best
Adaptability			
	Worst	Middle	Best
Reflection of real-world consumer decisions			
	Worst	Middle	Best
Data quality			
	Worst	Middle	Best
Observer effects	many observer effects		few observer effects
	Worst	Middle	Best

PROFESSIONAL SHOPPERS   INTERCEPTED CONSUMERS   LOCAL CONSUMER SHOPPERS

Innovations for Poverty Action

Data collection affordability

The cost of data collection is a key metric when evaluating our various methods. Professional mystery shopping is often considered the gold standard for collecting information on agent misconduct, but an approach that is quite costly. However, as Figure 25 shows, across all countries, **we found professional mystery shopping to be the least costly method tested**, followed by local consumer mystery shopping. Consumer intercept surveys were the most expensive method in each country.

We separate direct field costs and management costs. Management costs include in-country Research Associate and Research Manager time. All other costs are considered direct field costs. Overhead and other shared costs (such as in-country office space costs) are allocated proportionally to management and field costs. Management costs are directly tied to the ratio of management to field staff. In a scaled version of the TCI with larger teams and less focus on developing novel data collection methods, management costs likely decrease.

FIGURE 25: Data collection cost per observation, by method and country

Cost per observation by method and country

FIELD COSTS ■ MANAGEMENT COSTS

PROFESSIONAL MYSTERY SHOPPING

CONSUMER INTERCEPT SURVEY

LOCAL CONSUMER MYSTERY SHOPPING
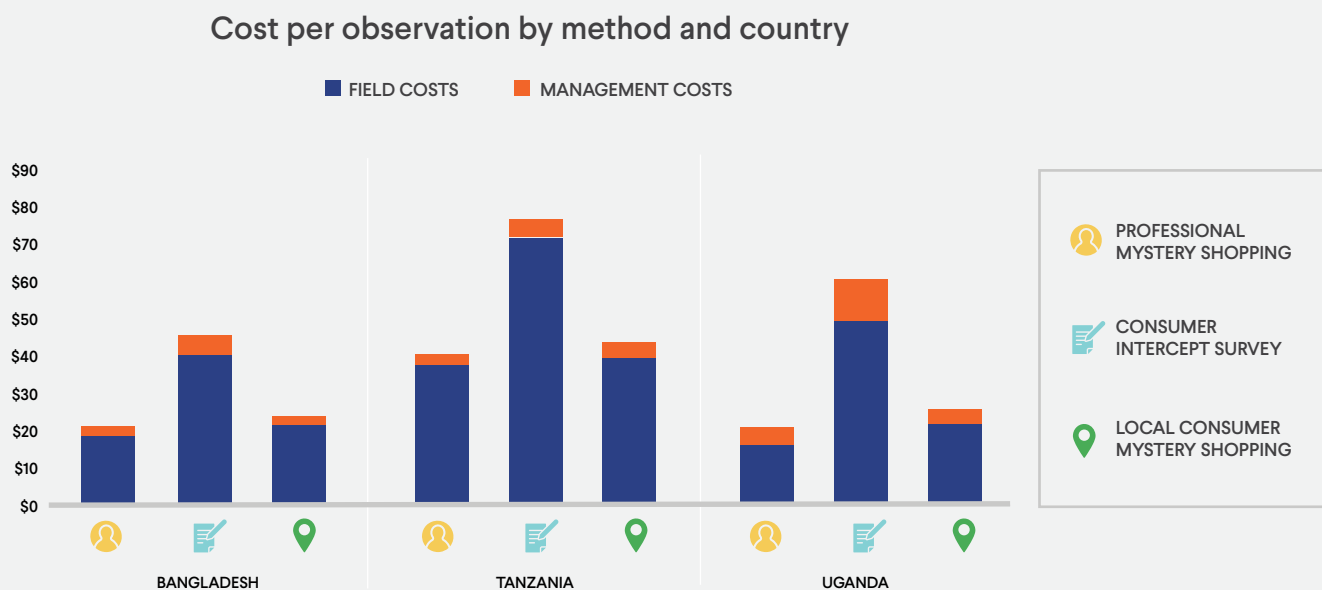
NOTE: Costs in USD. Costs are per "complete" observation – defined as a mystery shopping visit where an agent was present or a consumer intercept survey where the consumer reported attempting a mobile money transaction with the agent. Costs exclude expenses related to study design, piloting, and census activities. Costs are estimated based on scenarios where each method is carried out independently (whereas in reality we realized some cost savings by completing fieldwork for multiple methods simultaneously). Costs include shared support staff costs and other overhead but exclude principal investigator and global management staff's time.

Consumer intercept surveys are costly because recruiting customers can be extremely slow. Enumerators were able to average only 2-3 consumer intercept surveys per day, compared to the 4-6 mystery shopping visits per day they were able to complete (or facilitate, in the case of local consumer mystery shopping). Particularly in Tanzania and Uganda, and especially in rural areas, agents receive very few customers per day. Many are not dedicated agents and also operate a shop or other business, so waiting for customers that made a mobile money transaction (as opposed to a shop purchase) was quite time consuming, as shown in Table 31. Anecdotally, we also found it difficult to recruit consumers, particularly in urban areas, because shoppers in busy markets either don't have the time to complete a survey or are reluctant to share information about their financial dealings with a stranger.

TABLE 32: Comparing data collection methods

COUNTRY	MEAN WAIT TIME IN MINUTES (standard deviation in parentheses)	
	RURAL	URBAN
Bangladesh	28 (28)	20 (16)
Tanzania	62 (55)	66 (37)
Uganda	70 (48)	46 (30)

Our local mystery shopping costs are lower than the cost of consumer intercept surveys, but more expensive than mystery shopping by professionals. While we save on enumerator costs because enumerators do not need to shadow every local mystery shopping visit (and payments to local shoppers is lower than our enumerator salary), we incur sizable costs associated with recruiting these local shoppers (which are included in the total costs presented above). Recruitment suffers from the same productivity challenges as consumer intercept surveys, which is only compounded by the additional eligibility requirements for local mystery shoppers such as smartphone ownership and digital literacy.

We report here the costs of the first, in-person round of local consumer mystery shopping. The costs of remote, phone-based local consumer mystery shopping are likely to be significantly lower, potentially significantly less expensive than professional mystery shopping. The key question in terms of cost is regarding attrition: if we are able to maintain contact with our local shoppers and they agree to carry out visits for us without in-person support by enumerators, this will prove to be a cost-effective method. If our attrition rate is high, cost savings from removing in-person enumerator fieldwork may be less important than the increase in per-observation cost caused by our reduction in sample size.

Adaptability versus reflection of real-world consumer decisions

Mystery shopping methods – by professionals or local consumers – allow researchers to directly control the types of scenarios tested. In our study, we set the type and size of transaction to be conducted and the mobile money provider to be used. We also directly controlled the characteristics of the mystery shopper. We chose to focus on the gender of our mystery shoppers and their relationship with the agent (i.e., long time regular customer versus brand new customer) for local consumer mystery shopping, but mystery shopping can also explore other actual or assumed traits such as level of financial sophistication. By controlling these variables, we can either ensure differences in outcomes aren't driven by these factors by holding them constant (e.g., by using standard transaction values) or vary them in a controlled manner to understand how they impact agent behavior (e.g., by varying shopper gender to explore potential gender discrimination). In contrast, consumer intercept surveys can only reflect the actual scenarios that consumers make, which naturally vary much more widely than tightly controlled scenarios run during mystery shopping visits.

While mystery shopping offers researchers the ability to adapt scenarios to their needs, this comes at a cost: by directly controlling the types of scenarios tested, mystery shopping does not reflect consumers' real-world decisions as well as intercept surveys of consumers.

Imagine, for example, a market with just two agents. Agent A is known to prefer making cash-in transactions and will refuse any request to make cash-out transactions, while Agent B prefers cash-outs and will refuse cash-ins. Local consumers will quickly learn to make cash-ins with Agent A and cash-outs with Agent B, and refusal rates will be relatively uncommon. Consumer intercept surveys will reflect this relatively low failure rate, while mystery shoppers that attempt high- and low-value transactions with Agent A and B – ignoring the agents' preferences – will significantly overestimate actual failure rates. Mystery shopping approaches allow researchers to adapt and control scenarios to their research needs at the expense of gathering real world decisions. Whilst consumer intercept surveys reflect real world decisions, but come at the price of losing control of some aspects of an interaction.

Data quality

A crucial objective of this work is to assess the accuracy of data collected by each of the three methods tested and to determine how well they reflect the actual experiences of consumers. To measure overcharging by agents, we are asking enumerators and local consumers to complete a difficult task. Fees and charges come in various forms – official provider fees are typically automatically deducted from mobile money accounts, and an agent may ask for an extra unofficial fee to be paid in cash, or may deduct the extra fee directly from a customers' account. While we used a variety of methods to support enumerators and respondents in reporting accurate information (e.g., through guided account balance checks before and after transactions where possible, training, and practice scenarios), determining the total amount charged can be difficult.

Although we know data quality is likely to be an issue, it is quite difficult to pin down where issues are occuring. Because each method has pros and cons in terms of its theoretical ability to measure the true consumer experience and unique practical difficulties, we have no true gold standard to compare our methods against.

One way to explore data quality, however, is to compare what enumerators or respondents tell us they were charged directly by the provider (as opposed to by the agent) with what the provider lists on their website as their official fee. In most cases, these should match,[89] giving us one data point on potential data quality issues. Figure 26 shows significant variation in this consistency rate by country and method. Figure 26 shows these consistency rates by country and method, where a score of 100 percent means that the reported amount always matched the official fee.

FIGURE 26: Reported vs official provider fees by country and method

Consistency between provider fees and official fees varies considerably by method and country. In Bangladesh, both professional and local consumer mystery shoppers usually report provider fees that match official fees, while intercept surveys result in lower consistency rates. Consumer intercept surveys may be expected to have more data quality issues because they require respondents to recall information about

a transaction they completed without being trained in advance on the outcomes they need to be focused on. We might have been able to reduce some of these recall issues if enumerators reviewed consumers' transaction histories on their devices, but we concluded this would be too invasive particularly given consumers are (rightfully) quite wary of sharing sensitive financial information.

Tanzania has a similar pattern with relatively poor consistency in consumer intercept surveys relative to mystery shopping data, though mystery shoppers achieved consistency rates of just above 90 percent, and local shoppers actually recorded higher consistency than professionals. Tanzania experienced a price change midway through data collection because of a tax reduction that came into effect on October 1, 2022. As

Figure 27 shows, providers appear to have not immediately adjusted their prices to reflect the tax change, which explains nearly all of the professional mystery shoppers' inconsistency, rather than a data quality issue. An alternative explanation does involve data quality: providers may have immediately changed their prices but enumerators continued to misreport the old fees for a few days.

FIGURE 27: Tanzanian reported vs provider fees over time

OCTOBER 1:
Official fees reduced due to tax change

PROFESSIONAL MYSTERY SHOPPING

CONSUMER INTERCEPT SURVEY

LOCAL CONSUMER MYSTERY SHOPPING
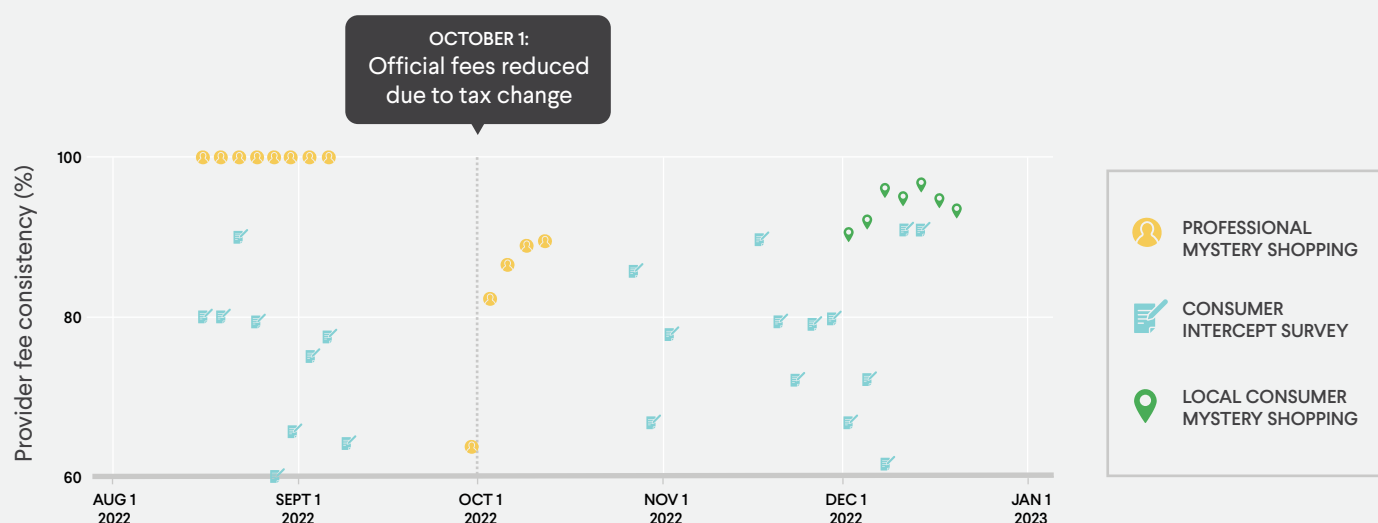
Note: Three-day moving averages reported.

In Uganda, professional mystery shoppers had consistent results about 90 percent of the time. As in other countries, consumer intercept surveys fared worse, achieving only a 72 percent consistency rate. However, unlike in Bangladesh and Tanzania, Ugandan local mystery shoppers recorded provider fees consistent with official fees in only 56 percent of visits. Across all countries, many local mystery shoppers faced challenges recording responses to questions about fees, particularly in differentiating different types of fees (provider fees, taxes, extra fees by agents). These challenges were exacerbated in Uganda by a decision we made there to use a WhatsApp-based survey platform for local consumer mystery shopping, instead of the

purpose-built survey program IPA typically uses. WhatsApp-based surveys are in theory easier for respondents to use without enumerator training; it uses an application already widely used by consumers so installing any new software onto respondents' phones is not necessary and technical training on the user interface is much faster.

However, the WhatsApp approach offers far less survey customization than a purpose-built survey application. In our case, this meant we were unable to easily add "constraints" that ask respondents to reconsider when they input a value that is out of range or different from the expected value.

Observer effects

Beyond data quality issues due to enumerator or respondent mistakes in reporting fees, observer effects (also known as Hawthorne effects) can impact the behavior of agents in a way that could skew our findings away from the experience of typical consumers. Conceptually, agents can be expected to behave differently if they become aware that they are being monitored (directly through mystery shopping or indirectly through consumer intercept surveys). Agents that became aware of our research work may have reduced their misconduct – including overcharging, but also other service quality indicators such as keeping customer information private – particularly if agents perceived our work to be associated with their mobile money service provider or a government agency, both of which could take enforcement action based on any observed misconduct. Mobile money agents are particularly well suited to detecting mystery shoppers because they tend to be on the lookout for suspicious behavior as scams and robberies are relatively common occurrences at mobile money agent locations.

Like data quality, observer effects are difficult to measure. As shown in our results section, we see wide differences in overcharging and other outcomes by data collection method. However, it is difficult to determine how much of these differences are driven by observer effects versus data quality issues. Experience from our field teams suggests that agents regularly detect mystery shoppers, particularly professional mystery shoppers and especially in rural areas. While we designed our fieldwork with the intention of minimizing detection, two fundamental issues worked against us.

First, we made multiple similar transactions at the same agent location, which is unusual, particularly in rural areas where agents typically only receive a few customers per day. Visiting the same agent and conducting a standard set of transactions allowed us to more directly measure the potential effects of various components of those transactions (such as the transaction size or the gender of the customer) while controlling for other factors. Additionally, multiple visits with the same agent is much more cost effective per visit than making a single visit per agent, because of the travel costs that would be needed to visit more agents. Spreading out our visits over

multiple days partially mitigated this effect, though field teams anecdotally report agent detection remained common. In a few uncommon cases where agent detection was widespread in a market to the extent that it posed a potential security risk to enumerators, we replaced these markets with new ones, but otherwise did not adjust visits where agents appeared to be suspicious of our activities.

> Mobile money agents are particularly well suited to detecting mystery shoppers because they tend to be on the lookout for suspicious behavior as scams and robberies are relatively common occurrences at mobile money agent locations.

Second, enumerators were often easy to detect as "outsiders," again particularly in rural areas. For budgetary reasons enumerators often arrived at study locations in groups and would stay in the area for multiple days to complete all research activities. The arrival of a group of strangers can be difficult to miss in small rural communities. Additionally, these strangers made decisions that to an outside observer would appear strange, for example, waiting hours for an agent to arrive so they could complete a transaction with that particular agent rather than going to a nearby agent that was already open. Enumerators were required to speak the local language in the areas they worked and were instructed to dress in ways that allowed them to blend in with local populations as much as possible. Enumerators were also instructed to disembark their vehicle (or motorbike) out of sight of agents. Despite these efforts, enumerators often stood out – as mystery shoppers themselves, but also while conducting consumer intercept surveys and guiding local mystery shoppers.

Key outcomes

Having considered the theoretical and practical constraints of each method, we now turn towards the results themselves, first introducing our key outcomes of interest. Our consumer outcomes can be broadly categorized into four groups: reliability, monetary cost (including overcharging), pricing transparency, and service quality.

Reliability measures how consistently consumers can successfully complete a transaction with a given agent. Reliability is influenced by the rate at which an agent is present, and the rate at which attempted transactions are successful. When mystery shoppers visit agent locations – even during standard business hours – agents are often not present. This could be because the agent is out rebalancing their float by visiting the nearest bank or bank agent, or they are simply otherwise engaged. Transactions can also fail for a variety of reasons, including lack of agent liquidity, network or other technical issues, or limited agent knowledge.

Monetary costs include official fees charged by providers (which may also include government taxes) and extra fees imposed directly by agents. As described in more detail below, we report this in two ways, looking at both the extensive margin (is any overcharging occurring?) and the intensive margin (how much are agents overcharging customers?).

Price transparency includes two indicators: whether the agent location has a posted price list, and whether the agent disclosed the transaction fee to the consumer prior to completing the transaction.

Service quality indicators include outcomes such as perceived levels of privacy and security, harassment or inappropriate behavior by agents, and any overt discrimination by agents. These indicators were used to generate a service quality index as described below. We only collected comprehensive service quality indicators from the professional mystery shopping and consumer intercept surveys. We did not include these indicators for our local mystery shoppers in an effort to minimize the length of the survey local shoppers needed to complete on their own.

Our core regression analysis focuses on reliability and monetary cost outcomes as these are the most significant types of costs that consumers face. We discuss pricing transparency and service quality in their own sections. We also include a section that estimates the total time cost to make a successful transaction based on travel time, queueing time, and the time to complete the transaction itself, taking into account the likelihood an agent is not present and a transaction is not successful.

The five key outcomes related to reliability and monetary costs that we discuss in the following section are:

Agent present

Was an employee present at the agent location when the mystery shopper attempted a transaction? Binary variable reported as a proportion. Note that this outcome is measured only in the professional and local consumer mystery shopping activities; consumer intercept surveys were only conducted at agent locations where an employee was present.

Success
(conditional on agent being present)

Was the attempted transaction successfully completed, conditional on an agent being present? Binary variable reported in as a proportion.

Success (unconditional)

Was the attempted transaction successful, regardless of whether the agent was present? Binary variable reported as a proportion. This is equal to the product of outcomes #1 and #2. Like outcome #1, this outcome is not reported for consumer intercept surveys.

Overcharging rate (extensive margin)

Conditional on a transaction being completed successfully, were the total fees reported by the mystery shopper or intercepted consumer greater than the official fees listed by the provider (plus tax, if applicable)?[90] Binary variable reported as a proportion.

Overcharging amount
(intensive margin)

Conditional on any overcharging, what is the value of the total excess fees paid above the official fee. Continuous variable reported as a percentage of the transaction amount.

Results

This section lays out the results from our work measuring the cost of using agents to conduct mobile money transactions. First, we cover the demographics of our shoppers, including professional enumerators, shoppers who completed our consumer intercept surveys, and our local consumer mystery shoppers (who are a subset of our consumer intercept survey respondents).

Next, we discuss our key reliability and overcharging outcomes by country, noting differences in results seen in Bangladesh, Tanzania, and Uganda. The following section covers variation in outcomes by data collection method and relationship between the shopper and agent (regular or new customer). We then discuss differences in outcomes by transaction type, transaction size, and geography – urban versus rural. Next we explore gender effects, both in terms of the shopper's gender and the agent's gender.

Finally we have three separate sections that discuss time cost, price transparency, and service quality indicators. We conclude with a brief comparison between the cost of this data collection and the total cost to consumers of agent overcharging.

Shopper demographics

Consumers' experience when using mobile money agents may depend in part on shoppers' own demographic characteristics and level of experience using mobile money. Our sample of shoppers varies somewhat by data collection method along these dimensions. Each of our data collection methods utilizes a sample of shoppers that also differ from the typical shopper in each country. We quantify these differences in this section.

Table 32 lays out a few key characteristics in terms of demographics, use of digital financial services, and challenges and redress when using agents. These variables are segmented by country and data collection method: professional shoppers, intercepted consumers, and local consumer shoppers. Local consumer shoppers represent a subset of intercepted consumers. Where possible, we compare these characteristics with the typical mobile money user, based on Findex 2021 data.

TABLE 33: Shopper demographics

	FINDEX MM USERS	PROFESSIONAL SHOPPERS	INTERCEPTED CONSUMERS	LOCAL CONSUMER SHOPPERS

	BANGLADESH				TANZANIA				UGANDA			
	Findex	Prof	Intercept	Local	Findex	Prof	Intercept	Local	Findex	Prof	Intercept	Local
Demographics												
Female (%)	36.2%	50.0%	26.3%	40.0%	47.0%	50.0%	32.7%	54.9%	52.6%	61.9%	34.6%	25.5%
Median age (years)	35	26	26	25	30	32	28	27	27	33	28	26
Secondary education or more (%)	66.9%	100.0%	92.2%	90.4%	31.3%	100.0%	68.7%	73.2%	62.9%	100.0%	–*	–*
Median distance from home (minutes)	NA	–^	16	7	NA	–^	16	16	NA	–^	16	16
DFS Usage												
Median duration of MM account ownership (years)	NA	4	–***	–***	NA	12	–&	–&	NA	12	5	6
Mean frequency of agent transactions (last 90 days)	NA	–&	6.5	6.8	NA	–&	7.7	47.3	NA	–&	6.4	55.4
Conducted any transactions independently on their own device in last 90 days (%)	55.4%#	96.9%	96.4%	100.0%	37.0%#	100.0%	77.7%	81.5%	24.7%#	100.0%	80.9%	85.9%
Ever received wage payments via mobile money (%)	12.5%	59.4%	–&	–***	12.9%	68.8%	–&	–&	24.6%	85.7%	26.3%	41.0%
Challenges & redress												
Experienced challenge while using a mobile money agent in last 90 days (%)	NA	15.6%	1.1%	1.3%	NA	25.0%	21.6%	19.2%	NA	28.6%	16.6%	15.4%
Agent solved problem, conditional on experiencing challenge (%)	NA	60.0%	42.9%	100.0%	NA	75.0%	36.2%	32.9%	NA	50.0%	45.9%	50.0%

* Variable added in survey after Uganda data collection was complete

^ Does not apply to professional shoppers who carried out mystery shopping visits in locations far from their home.

& Inadvertently not measured due to survey programming error

Findex asks about usage at least twice in a typical month.

Demographics

By design, **we attempted to balance our pool of professional mystery shoppers by gender** and achieved parity in Bangladesh and Tanzania. In Uganda, staffing changes meant our enumerator pool had slightly more women than men. In contrast, our consumer intercept survey respondents and local consumer mystery shoppers skewed male. Findex data shows that mobile money users are nearly balanced by gender in Tanzania and Uganda, but skews male in Bangladesh. This suggests that our consumer intercept surveys somewhat over-represent male consumers perhaps due to higher refusal rates by female consumers.

Across all countries, the **median local consumer was in their mid-to-late twenties**, with only small differences in the median age of consumers. In Tanzania and Uganda, professional shoppers tended to be a bit older, with the median enumerator in their early thirties. In Bangladesh, enumerators are typically in their mid-twenties, similar to local consumers. The median mobile money user is 35 years-old in Bangladesh, 30 in Tanzania, and 27 in Uganda.

Our sample of shoppers has more years of education, on average, than the typical mobile money user. All our professional shoppers have at least completed secondary school. More than 9 in 10 intercepted consumers and local shoppers in Bangladesh also had completed secondary school, compared with two-thirds of mobile money users. In Tanzania, approximately two thirds of intercepted consumers and local shoppers had at least a secondary education, compared with less than one third of mobile money users nationally. In Uganda, 63 percent of mobile money users nationally have a secondary education, but we do not have data on local consumers' educational attainment (because this question was added after consumer intercept data collection was complete in Uganda).

Across all countries, intercepted consumers tend to live about 16 minutes from the agent at which they were recruited. This distance is the same for local shoppers in Tanzania and Uganda, but local shoppers in Bangladesh tend to live closer, with the median shopper living 7 minutes from the agent at which they were recruited.

Shopper demographic visual reference:
See table 32 for notes and details

● FINDEX MM USERS   ● INTERCEPTED CONSUMERS
● PROFESSIONAL SHOPPERS   ● LOCAL CONSUMER SHOPPERS
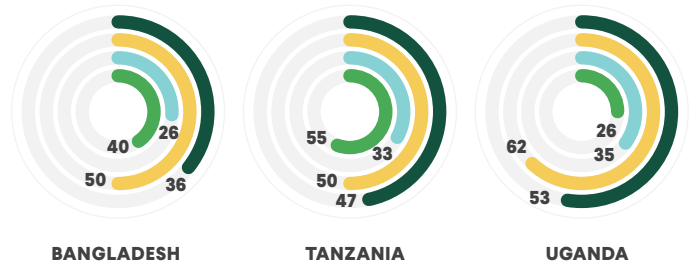
Female (%)

BANGLADESH: 40, 26, 50, 36
TANZANIA: 55, 33, 50, 47
UGANDA: 62, 26, 35, 53

Median age (years)

BANGLADESH: 35, 26, 26, 25
TANZANIA: 30, 32, 28, 27
UGANDA: 27, 33, 28, 26

Secondary education or more

BANGLADESH   TANZANIA   UGANDA

Median distance from home (minutes)

BANGLADESH (BD)   TANZANIA (TZ)   UGANDA (UG)
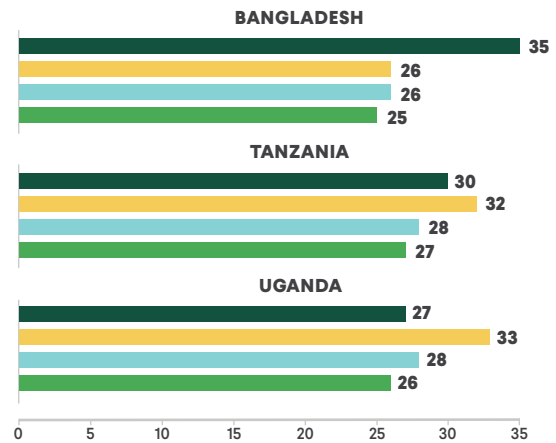
BD, TZ, UG — 16 MILES
TZ, UG — 16 MILES
BD — 7 MILES
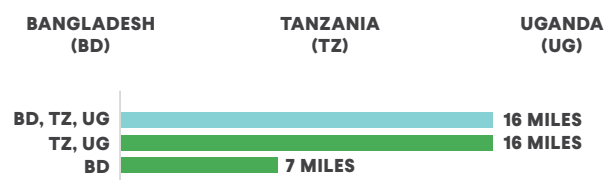
DFS Usage

Professional shoppers tend to be experienced mobile money users. In Bangladesh, where mobile money is a newer innovation, the typical professional shopper has had a mobile money account for 4 years, compared with 12 years for professional shoppers in Tanzania and Uganda. Information on length of account ownership is only available for local consumers in Uganda because of a survey programming error, but these consumers report account ownership of 5-6 years on average.

Intercepted consumers visit agents an average of 6.4 times every 90 days in Uganda, 7.7 times in Tanzania, and 6.5 times in Bangladesh. Local consumers selected for mystery shopping visited an agent 6.8 times every 90 days in Bangladesh, but for Tanzania and Uganda these numbers were dramatically higher, averaging 47.3 and 55.4 visits over the same time period, respectively. This difference may be due to the eligibility requirements used to select consumers for mystery shopping recruitment, including the requirement that consumers be regular users of the agent at which they were recruited (three visits or more over the last 90 days) as well as using a smartphone and passing a digital literacy test. These eligibility requirements may have had less of a filtering effect in Bangladesh, where intercepted consumers that conducted mystery shopping visits for us were similar to those that did not. We also found that both professionals and local consumers were more likely to have completed mobile money transactions on their own than the typical mobile money user, with professionals more likely than local shoppers. Similarly, payment of wages via mobile money is much more prevalent among professional shoppers than the typical mobile money user (this data is not consistently available for our local consumers due to a survey programming error).

Challenges and redress

Finally, we explored two consumer protection indicators: whether the shopper had recently experienced a challenge when using a mobile money agent, and, if they had, whether the agent was able to resolve the issue. Just 1 percent of local consumers reported experiencing challenges in Bangladesh, compared with 15 and 22 percent of local

consumers in Tanzania and Uganda respectively. Similarly, recent surveys of DFS consumers in Bangladesh and Uganda found that 5 percent of Bangladeshi consumers and 31 percent of Ugandan consumers reported overcharging by an agent as a recent challenge.[9192] Across all three countries, **professionals were more likely to report experiencing challenges than consumers**, perhaps driven by their higher usage of agents and their better ability to identify challenges when they occur. Three quarters of professional shoppers were able to have their issue resolved in Tanzania compared with just one third of local consumers. In Uganda, professionals and local consumers both had their issues resolved about half the time, while 60 percent of professionals in Bangladesh resolved their issue. Because very few local consumers in Bangladesh reported challenges, resolution rates are quite imprecise for this group.

...typical professional shopper has had a mobile money account for 4 years, compared with 12 years for professional shoppers in Tanzania and Uganda.

Just 1 percent of local consumers reported experiencing challenges in Bangladesh, compared with 15 and 22 percent of local consumers in Tanzania and Uganda respectively

Outcomes by country

The following sections present results from our five core outcomes: agent presence, transaction success (conditional on agent presence), transaction success (unconditional), overcharging rate, and overcharging amount. Most results are presented in a regression framework which allows us to measure differences by a particular transaction, shopper, or agent characteristic while holding all other factors constant. However, we begin by sharing outcomes averages by country, using all available observations in Table 33.

TABLE 34: Outcomes by country

COUNTRY	OUTCOME				
	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Bangladesh	85%	88%	72%	5%	5%
Tanzania	76%	88%	65%	7%	2%
Uganda	79%	81%	61%	19%	7%

NOTE: Mean values by country, including all observations from all methods, with the following exceptions. Consumer intercept survey data is excluded from means of agent presence and unconditional success because consumer intercepts by definition are conducted only when an agent is present. Local mystery shopping data from Uganda relating to overcharging outcomes is excluded because of known data quality issues stemming from the use of WhatsApp-based surveys.

Table 34 shows our key results again by country, but now in a regression framework. Bangladesh serves as the reference group, with coefficients for Tanzania and Uganda showing differences from Bangladesh. P-values testing the significance of differences between Tanzania and Uganda are also presented. All regressions control for data collection method, transaction type, and transaction value.

We see wide variations in reliability across countries. Across all countries, agents are present in 83 percent of visits. Uganda has the highest rate of agent presence, 2 percentage points higher than Bangladesh. Bangladesh falls in the middle, while Tanzania's agents are least likely to be present, 8 percentage points less likely than Bangladesh's agents. Conditional on agent presence, about 86 percent of transactions succeed. Transactions in Bangladesh are most likely to be successful, with Tanzania

falling in the middle (2 percentage points less successful than Bangladesh) and Uganda faring worst (6 percentage points less successful than Bangladesh). Taking into account agent presence and transaction success, attempted visits are most likely to be successful in Bangladesh, with Tanzania and Uganda's success rate 4 and 7 percentage points lower, respectively.

In terms of overcharging, across all countries approximately 15 percent of successful transactions resulted in reported overcharging. Bangladesh had the lowest rate of overcharging. Tanzania's overcharging rate was only slightly higher than Bangladesh's (2 percentage points), while Ugandan visits had by far the highest rate of overcharging, 13 percentage points greater than Bangladesh's rate. The amount of overcharging (standardized as a percent of the transaction value) averaged 5 percent and did not vary significantly across countries.

TABLE 35: Cross country variation in outcomes

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Country					
Bangladesh (ref. Category)					
Tanzania	−0.0770***	−0.0184**	−0.0701***	0.0155**	−0.786
	(0.00992)	(0.00854)	(0.0121)	(0.00737)	(2.049)
Uganda	0.0210*	−0.0590***	−0.0444***	0.125***	1.384
	(0.0125)	(0.0100)	(0.0153)	(0.00888)	(2.182)
Controls					
Data collection method	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]	[Included]	[Included]
P-val: local consumer mystery shopping, known=new	0	5.89e-05	0.0914	0	0.272
Observations	7,721	8,244	7,721	7,142	632
Mean value of dependent variable	0.832	0.858	0.714	0.150	5.388

NOTES: Standard errors in parentheses. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping. Local mystery shopping data from Uganda relating to overcharging outcomes is excluded because of known data quality issues stemming from the use of WhatsApp-based surveys.

*** P<0.01, ** P<0.05, * P<0.1

Outcomes by method and agent relationship

Table 35 compares our key outcomes by data collection method and relationship between the shopper and the customer. Professional mystery shopping visits serve as the reference group, while we report coefficients for consumer intercept surveys, local consumer mystery shopping visits to agents that the consumers used regularly ("known agents"), and local consumer mystery shopping visits to agents that the consumer did not use regularly ("new agents"). Regressions control for transaction type, transaction value, and provider.

Note that consumer intercept surveys do not measure agent presence (or therefore unconditional success rate) because by design intercept surveys were conducted only at locations where agents were present.

Regressions are run separately for each of our three countries. In Uganda, where we initially tested local consumer mystery shopping using a WhatsApp-based approach, we encountered significant data quality issues with variables used to determine overcharging rates and amounts. Because of this known data quality issue, Uganda local mystery shopping data was not included for our two overcharging regressions.

TABLE 36: Outcomes by method and relationship

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Bangladesh					
Method (ref. category: professional mystery shopping)					
Consumer intercept survey		0.190***		0.163***	29.65
		(0.0237)		(0.0128)	(23.91)
Local consumer mystery shopping, known agent	-0.196***	0.0350*	-0.140***	0.000636	28.66
	(0.0199)	(0.0190)	(0.0243)	(0.0106)	(29.85)
Local consumer mystery shopping, new agent	-0.170***	0.0476**	-0.106***	0.00175	9.482
	(0.0204)		(0.0249)	(0.0107)	(28.53)
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	1,843	1,799	1,843	1,594	51
Mean value of dependent variable	0.838	0.886	0.727	0.0320	12.80

NOTES: Standard errors in parentheses. Results restricted to urban locations only. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping. Local mystery shopping data from Uganda relating to overcharging outcomes is excluded because of known data quality issues stemming from the use of WhatsApp-based surveys.

*** p<0.01, ** p<0.05, * p<0.1

TABLE 37: Outcomes by method and agent relationship

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Tanzania					
Method (ref. category: professional mystery shopping)					
Consumer intercept survey		0.129***		-0.0572***	3.198***
		(0.0182)		(0.0152)	(0.728)
Local consumer mystery shopping, known agent	-0.0295	0.0674***	0.0288	-0.0883***	1.921**
	(0.0198)	(0.0164)	(0.0223)	(0.0138)	(0.841)
Local consumer mystery shopping, new agent	-0.0953***	0.00421	-0.0767***	-0.0766***	1.402
	(0.0210)	(0.0176)	(0.0236)	(0.0151)	(0.857)
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	2,569	2,591	2,569	2,315	179
Mean value of dependent variable	0.789	0.893	0.692	0.0773	1.727
Uganda					
Method (ref. category: professional mystery shopping)					
Consumer intercept survey		0.141***		0.119***	-0.408
		(0.0288)		(0.0268)	(1.116)
Local consumer mystery shopping, known agent	-0.270***	-0.0474**	-0.258***		
	(0.0198)	(0.0209)	(0.0234)		
Local consumer mystery shopping, new agent	-0.247***	-0.0238	-0.222***		
	(0.0198)	(0.0207)	(0.0235)		
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	2,404	2,097	2,404	854	170
Mean value of dependent variable	0.949	0.862	0.780	0.199	2.701

NOTES: Standard errors in parentheses. Results restricted to urban locations only. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping. Local mystery shopping data from Uganda relating to overcharging outcomes is excluded because of known data quality issues stemming from the use of WhatsApp-based surveys.

*** p<0.01, ** p<0.05, * p<0.1

Results are discussed separately for each outcome of interest, beginning by laying out hypotheses for how each outcome might vary by data collection method and customer-agent relationship and then using our data to confirm or refute these hypotheses.

Agent present

Agent presence is recorded only for mystery shopping visits. Local mystery shopping customers had some control over when they conducted visits, so our expectation would be that local shoppers visiting known agents would have higher success rates than professional shoppers, with local shoppers visiting new agents falling somewhere in between. Local shoppers presumably know when agents they use regularly operate, so they should be able to align their visits to times when the agent is open for business. Local consumers may have some knowledge of when other agents are open, even for those they don't use regularly.

Our results do not confirm this hypothesis. In fact, in Bangladesh and Uganda we see that local shoppers record agents being present significantly less than professional shoppers (between 17 and 27 percentage points less), with no significant difference in agent presence between local shoppers visiting known versus new agents. Tanzania's results somewhat align with our hypotheses: among local shoppers, visits to new agents result in lower agent presence than visits to known agents. But like in Bangladesh and Uganda, professional shoppers in Tanzania are more likely to find an agent present than local shoppers visiting new agents (and are similarly likely to find an agent present as local shoppers visiting a known agent).

What might cause these unexpected findings? The most likely driver seems to be a data quality issue. **Local shoppers were paid a set rate for completing their attempted mystery shopping visits regardless of whether the agent was present, so they faced little incentive to accurately report if the agent was present.** In fact, by reporting that the agent was not present, they could avoid answering subsequent questions about the visit, giving them a small incentive to misreport that the agent was

not present, or perhaps simply use their local knowledge to purposefully complete visits when they know agents are not present. This issue of incentive incompatibility may affect other data points from local mystery shoppers. **To improve accuracy of local mystery shopping data collection, particular importance should be placed on ensuring that local shoppers' incentives align with providing accurate information.** For example, shoppers could be paid a higher rate for mystery shopping visits where an agent is present, which would incentivize shoppers to visit agents at times when they are most likely to be open and able to complete a transaction (though this could result in bias in the opposite direction, encouraging local shoppers to over-report agent presence, even if this would be more difficult as shoppers would need to 'fake' an entire set of responses).

One potential alternative or additional driver could be that professional shoppers waited for an agent to appear rather than immediately marking agents as not present, while local shoppers simply marked the agent as not present.[93]

Success rate

We would expect that success rates (conditional on agent presence) would be highest for consumer intercepts and perhaps somewhat higher for local consumer mystery shoppers – particularly visits to known agents – than for professional mystery shoppers. Consumer intercepts represent real-world decisions that consumers make about which transactions to make with which agents at what times. If consumers are optimizing these decisions, intercepts should yield higher success rates than professional mystery shopping visits and local mystery shopping visits to new agents, which are done at random. Local mystery shopping visits to known agents are still defined by the research team so they do not reflect real-world consumer decisions, but local consumers may optimize the time of day that they attempt a transaction (e.g., perhaps completing a cash-out earlier in the day if they know their agent often runs out of cash float in the afternoons).[94]

As predicted, across all three countries, we find that consumer intercept surveys yield success rates significantly greater than professional mystery shoppers' visits (between 13 and 19 percentage points). In Bangladesh and Tanzania, we find that local mystery shopping visits to known agents yield higher success rates than professional visits, and, somewhat surprisingly, in Bangladesh local shoppers visiting new agents also yield higher success rates than professional visits. However, in Uganda the opposite is true: local shoppers' visits to known agents are less successful than professional visits, while local shopper visits to new agents are not statistically different from professional visits. This could be driven by the same incentive compatibility issue that we posit may be affecting our agent presence outcome, though it is not clear why that would be an issue only in Uganda.

...local consumers may optimize the time of day that they attempt a transaction

Overcharging

Overcharging may differ depending on the data collection method and customer-agent relationship through a few potential mechanisms. Agents may choose to overcharge professional and new local shoppers because they view those as one-off interactions while keeping costs lower for regular customers to reward them for their loyalty (and encourage them to continue to make use of their services). Alternatively, agents could lower costs for new shoppers as a "teaser rate" to encourage these shoppers to begin using their shop. We shouldn't expect large differences between consumer intercept surveys and local mystery shopping visits to known agents unless consumers optimize at which agent they make particular types of transactions based on how individual agents overcharge, in which case intercepts should yield lower rates of overcharging.

In contrast to our expectations, in Bangladesh and Uganda we see that consumer intercept surveys report much higher rates of overcharging than professional mystery shopping visits (16 and 12 percentage points higher in Bangladesh and Uganda, respectively). No other differences are significant in Bangladesh, and Uganda lacks high quality data on overcharging from local mystery shopping visits. One potential explanation is that **consumers report paying higher fees than they actually incur, resulting in overstated overcharging rates.** If this is due to misperceptions by consumers, this has important policy implications. Perceptions of overcharging (and other misconduct) are important drivers of trust in digital financial products and ultimately continued usage of these products, so closing the gap between real and perceived overcharging (for example through price transparency improvements) should be a policy goal alongside reducing actual rates of overcharging.

The story is quite different in Tanzania, where consumer intercepts and local shoppers all report lower rates of overcharging than professional mystery shoppers. This is almost certainly due to an unusual aspect in the timing of our professional mystery shopping visits in Tanzania. Midway through professional mystery shopping in the country, the Government of Tanzania reduced a tax applied to mobile money transactions, which immediately lowered the official

fee for making transactions. However, providers were slow to adjust the fees that they automatically deducted from customers' accounts, leading to very short-term overcharging in the days after the tax change unrelated to agent behavior. We do see in Tanzania that reported overcharging rates are higher in consumer intercept surveys than local mystery shopping visits ($p=0.03$ when comparing consumer intercepts with local shoppers visiting known agents).

Overcharging amounts generally did not vary significantly across methods or consumer-agent relationships, though in Tanzania consumer intercepts and local mystery shoppers reported higher overcharging amounts than professional shoppers (not significantly different for local consumers visiting new agents). This is likely to be driven by the same tax issue that drove our overcharging rate results in Tanzania. While rates of overcharging reported by professional shoppers were driven up by the tax change, the tax changes led to only small amounts of overcharging, pulling down the average amount of overcharging that professionals reported.

> Agents may choose to overcharge professional and new local shoppers because they view those as one-off interactions while keeping costs lower for regular customers to reward them for their loyalty.

Outcomes by transaction characteristics and geography

Table 37 explores variation in outcomes by transaction type, transaction value, and geography (urban versus rural). Our five core outcomes remain the same (agent present, success conditional on agent present, unconditional success, overcharging rate, and overcharging amount). We display coefficients for transaction type: cash-out, account-to-account transfer, and over-the-counter transfer, with cash-in as our reference category. We also display coefficients for high-valued transactions (versus low-value transactions) and urban locations (versus rural locations). We include only professional mystery shopping and consumer intercept surveys in these regressions to allow comparison between urban and rural locations. Local consumer mystery shopping visits were conducted only in urban areas.

TABLE 38: Outcomes by transaction characteristics and geography

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Bangladesh					
Transaction type (ref. category: cash-in)					
Cash-out	−0.00438	−0.0554***	−0.0928***	0.197***	
	(0.0204)	(0.0168)	(0.0290)	(0.0133)	
On-network account-to-account transfer	0.0239	0.165***	0.149***	0.0879***	5.991
	(0.0204)	(0.0210)	(0.0290)	(0.0164)	(17.34)
Over-the-counter cash-to-account transfer	0.0171	0.109***	0.0919***	0.0887***	14.98
	(0.0204)	(0.0210)	(0.0290)	(0.0167)	(17.41)
High transaction value (BDT 1500, ref. category BDT 750)	−0.0252*	0.00889	−0.00971	−0.0178*	−12.53***
	(0.0144)	(0.0135)	(0.0205)	(0.0106)	(3.955)
Urban	0.0707***	0.0161	0.0786***	−0.0198*	16.94***
	(0.0144)	(0.0134)	(0.0205)	(0.0106)	(3.896)
Controls					
Data collection method	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	1,660	2,087	1,660	1,841	130
Mean value of dependent variable	0.903	0.882	0.755	0.0706	5.157

NOTES: Standard errors in parentheses. Local mystery shopping visits excluded to allow comparison between rural and urban agents. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping.

*** p‹0.01, ** p‹0.05, * p‹0.1

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Tanzania					
Transaction type (ref. category: cash-in)					
Cash-out	0.000378	0.0425**	0.0715**	0.216***	-4.660***
	(0.0297)	(0.0181)	(0.0328)	(0.0156)	(1.359)
On-network account-to-account transfer	0.0220	0.188***	0.181***	0.0635***	-2.285
	(0.0297)	(0.0227)	(0.0328)	(0.0194)	(1.546)
Over-the-counter cash-to-account transfer	0.0126	-0.000304	0.0178	-0.0207	
	(0.0297)	(0.0187)	(0.0328)	(0.0164)	
High transaction value (TZS 20000, ref. category TZS 10000)	-0.0368*	-0.0384***	-0.0664***	0.0326***	-0.415
	(0.0210)	(0.0141)	(0.0232)	(0.0122)	(0.624)
Urban	0.148***	0.0583***	0.190***	0.121***	-1.750
	(0.0215)	(0.0148)	(0.0237)	(0.0129)	(1.114)
Controls					
Data collection method	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	1,642	2,057	1,642	1,802	151
Mean value of dependent variable	0.754	0.876	0.619	0.0838	1.892
Uganda					
Transaction type (ref. category: cash-in)					
Cash-out	-0.00932	0.0177	0.0159	0.0713***	-38.41***
	(0.0217)	(0.0215)	(0.0313)	(0.0222)	(4.629)
On-network account-to-account transfer	-0.0117	-0.224***	-0.204***	0.524***	-28.92***
	(0.0218)	(0.0254)	(0.0313)	(0.0298)	(5.211)
Over-the-counter cash-to-account transfer	-0.00495	-0.00915	-0.00966	0.285***	-26.69***
	(0.0218)	(0.0230)	(0.0313)	(0.0241)	(4.576)
High transaction value (UGX 30000, ref. category UGX 15000)	-0.00145	-0.0365**	-0.0352	-0.0402**	-3.312
	(0.0155)	(0.0165)	(0.0223)	(0.0177)	(2.128)
Urban	0.118***	0.121***	0.217***	0.0258	-3.577
	(0.0156)	(0.0168)	(0.0224)	(0.0183)	(2.384)
Controls					
Data collection method	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	1,632	1,962	1,632	1,601	299
Mean value of dependent variable	0.889	0.816	0.678	0.187	7.242

NOTES: Standard errors in parentheses. Local mystery shopping visits excluded to allow comparison between rural and urban agents. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping.

*** p<0.01, ** p<0.05, * p<0.1

Agent present

Agent presence should not be affected by the type or size of transaction that the mystery shopper intended to complete. We would expect variation by geography however. Cost of maintaining a business, as well as cost of living, is higher in urban areas, suggesting that agents may face more pressure to keep their business open consistently in order to maintain business viability. Rebalancing of float is likely less time consuming in urban areas where travel time to the nearest bank or super-agent[95] is lower than in rural areas. Additionally, at rural agent locations where there are fewer customers per agent than in urban areas,[96] servicing an agent location may only be more productive than engaging in other activities (e.g., other business or farming) during certain times of the day when the agent is likely to see more customers. For these reasons, we would expect agents' presence to be higher in urban locations than in rural areas.

Our results generally support these hypotheses. We see only small and marginally significant differences in agent presence by transaction value in Bangladesh and Tanzania, but otherwise transaction characteristics do not appear to influence agent presence, as expected. **As expected and across all three countries, urban agents are significantly more likely to be present than rural agents** (7 percentage points more likely in Bangladesh, 15 percentage points in Tanzania, and 12 percentage points in Uganda).

Success rate

Success rate could be impacted by the type and size of transaction as well as agent location through a variety of mechanisms. Cash-in and cash-out are most likely to be affected by liquidity constraints: cash-ins will fail if an agent does not have enough e-float, while cash-outs will fail if the agent is low on physical cash float. Similar to cash-ins, OTC transfers require agents to have enough e-float to complete the transaction. Account-to-account transfers only require technical assistance from the agent, so liquidity is not a concern for this type of transaction.

Agents receive commission for cash-in, cash-out, and OTC transfers, but not account-to-account transfers. Lack of commission may disincentivize agents from completing transactions. Agent support for account-to-account

transactions is also relatively uncommon: consumer intercept data shows that a small fraction of transactions that agents facilitate are account-to-account transfers (11 percent in Bangladesh, 3 percent in Tanzania, and 0 percent in Uganda). See Table 38. Because support for these transfers is uncommon, some agents may not be familiar with how to facilitate this type of transaction.

Finally, though OTC transactions are technically prohibited in each of our three countries, they are quite common, particularly in Tanzania and Uganda (see Table 38). Risk averse agents may choose to decline to make these transactions if they fear repercussions from the financial service provider.

Transaction size would be expected to influence success rate through the liquidity channel: larger transaction sizes put a greater strain on an agent's liquidity, which should lead to lower success rates. In terms of geography, success rates are likely to be higher in urban areas than rural locations. Network connectivity is likely to be weaker in rural areas which could lead to failed transactions. Rural agents may also carry smaller float accounts which could cause more failures due to liquidity constraints.[97]

TABLE 39: Transaction type by country (consumer intercept surveys)

TRANSACTION TYPE	BANGLADESH	TANZANIA	UGANDA
Cash-in	36%	44%	37%
Cash-out	46%	29%	40%
On-network transfer	11%	2%	0%
Off-network transfer	0%	1%	0%
OTC transfer (any type)	3%	23%	22%
Other	3%	0%	1%
Total	100%	100%	100%

Our data show quite different success rates by transaction type, perhaps suggesting that the importance of these factors differs between countries. In Bangladesh, cash-in and cash-out transactions are less likely to be successful than both types of transfers, while in Tanzania cash-out and account-to-account transfers are more successful than cash-ins or OTC transfers. Finally, in Uganda, account-to-account transfers are less successful than the three other transaction types, which fare similarly.

As expected, higher transaction values are associated with lower success rates, though the difference is only significant in Tanzania where moving from a TZS 10,000 transaction to a TZS 20,000 transaction reduces success likelihood by 7 percentage points. Again as expected, urban agents tend to complete transactions with greater success than rural agents, with effects ranging from 8 percentage points in Bangladesh to 19 and 21 percentage points in Tanzania and Uganda, respectively.

We can further investigate failures by examining the reasons agents provide for why a transaction fails, as shown in Table 39 (broken down by transaction type) and Table 40 (broken down by geography). These responses are self-reported and should be viewed with some caution; agents may, for example, be reluctant to admit to lack of knowledge. With that caveat, interesting patterns still emerge.

Liquidity constraints are the dominant apparent cause of failures, except for account-to-account transfers, which do not require agent liquidity. Across all types of transactions – even cash-in and cash-out – about one third of agents report "not offering the service" which may mask other issues. Network outages or technical failures are only cited in about 5 percent of failed transactions.

TABLE 40: Failure reasons by transaction type

FAILURE REASON	CASH-IN	CASH-OUT	ACCOUNT-TO-ACCOUNT TRANSFER	OTC TRANSFER
Agent knowledge	8%	9%	39%	8%
Doesn't offer service	32%	29%	38%	30%
Liquidity issue	46%	41%	6%	48%
Network or device issue	5%	4%	6%	4%
Other issue	8%	17%	10%	10%
Total	100%	100%	100%	100%

NOTE: Results from all failed transactions aggregated across all methods and countries.

TABLE 41: Failure reasons by geography

Counter to expectations, urban agents are more likely to cite liquidity issues when a transaction fails than rural agents, while network outages are more commonly cited by rural agents, as expected (though the difference is relatively small).

FAILURE REASON	RURAL AGENTS	URBAN AGENTS
Agent knowledge	8%	9%
Doesn't offer service	32%	29%
Liquidity issue	46%	41%
Network or device issue	5%	4%
Other issue	8%	17%
Total	100%	100%

NOTE: Results from all failed transactions aggregated across all countries. Results restricted to professional mystery shopping and consumer intercept surveys, because local consumer mystery shopping occurred only in urban locations.

Overcharging

Like success rate, overcharging is likely to vary by transaction type for a variety of reasons. Agents earn no formal commission for account-to-account transfers that they merely assist with, so overcharging might be expected to be higher for this type of transaction. OTC transactions are nominally free for customers as they are treated as a cash-in, circumventing standard account-to-account transfer fees. Because agents are helping customers circumvent these fees and incurring some risk by breaking providers' rules, we might also expect high rates of informal fees for this type of transaction as well. Finally, overcharging for withdrawals may be more likely than for deposits for behavioral reasons. Because deposits are officially free, consumers may be more likely to be concerned by an extra charge on deposits, both because the official fee – zero – is well known by consumers and because of the "zero-price effect:" shifting from free to a non-zero fee is more salient than shifting from a non-zero fee to a somewhat higher non-zero fee.

Overcharging may also vary by transaction size, though again many mechanisms may be at play. Agents could assume that consumers making larger transactions are less price sensitive than customers that make lower valued transactions, so might choose to overcharge more on larger valued transactions. Alternatively, if agents feel that their formal commissions for low-value transactions don't adequately compensate them for their time, they might choose to add informal fees to lower-valued transactions.

Finally, urban agents could overcharge more or less than rural agents. On one hand, rural agents face lower costs of living and of doing business so might not feel as much of an economic imperative to overcharge as urban agents. On the other hand, higher competition in urban locations could drive prices down, while more dispersed rural agents could charge monopoly rents.

Our data shows that as expected, cash-outs are more likely to be overcharged than cash-ins (by 7 percentage points in Uganda, 20 percentage points in Bangladesh, and 22 percentage points in Tanzania). **In Bangladesh and Tanzania, cash-outs are the most likely type of transaction to be overcharged**. Also as expected, transfers incur higher rates of overcharging than cash-ins (except OTC transfers in Tanzania, which have similar rates of overcharging to cash-ins).[98]

In Uganda, OTC and account-to-account transfers are significantly more likely to be overcharged than either cash-ins or cash-outs, with account-to-account transfers a massive 52 percentage points more likely to be overcharged than cash-ins. As seen in Table 41, agent assistance with account-to-account transfers is relatively uncommon in each of our markets, but in Uganda this type of transaction with an agent is extremely uncommon; in fact it is never recorded in any of our consumer intercept surveys.

Table 41 shows that agents approach these requests for assistance in making an account-to-account transfer quite differently in each country. In Bangladesh, two thirds of agents explain to the customer how to make the transactions, but let the customers actually complete the transaction themselves. The remaining one third take the customers phone and complete the transaction on their behalf. In Tanzania the pattern is similar, though more than 4 in 5 agents explain how to complete the transaction. In Uganda, however, more than 6 in 10 interactions resulted in agents processing a cash-out but retaining the cash and sending the funds to the recipient from their own account. This allows agents to earn a cash-out commission (and perhaps an extra fee on top of the official commission), but leads to higher costs to consumers compared with sending the money directly from their own account.

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Our data shows that as expected, cash-outs are more likely to be overcharged than cash-ins

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TABLE 42: Account-to-account transfer methods

TRANSFER METHOD	BANGLADESH	TANZANIA	UGANDA
Agent explained how to make transaction, but customer completed it him/herself	65%	82%	17%
Agent used the customer's phone to complete the transaction on the customer's behalf	34%	15%	16%
Agent processed a cash-out and then sent the money from his/her device	0%	2%	62%
Other	1%	1%	6%
Total	100%	100%	100%

Overcharging rates vary only slightly by transaction size, suggesting that the mechanisms discussed are small or cancel each other out. Compared with low valued transactions, high valued transactions are 4 percentage points less likely to be overcharged in Uganda, 2 percentage points less likely to be overcharged in Bangladesh, and 3 percentage points more likely to be overcharged in Tanzania. Urban agents overcharge at similar rates to rural agents in Bangladesh (2 percentage points less than rural agents) and Uganda (no significant difference). In Tanzania, urban agents overcharged more than rural agents by 12 percentage points. However, this effect is likely driven by the taxation change in Tanzania which temporarily drove up overcharging rates and occurred during our urban data collection.

Outcomes by shopper and agent gender

Table 42 explores variation in outcomes by shopper and agent gender. We report coefficients for Shopper Female, Agent Female, and the interaction of the two. We then interact these three variables with whether the agent is known to the shopper to allow for differences in gender discrimination depending on the relationship between the shopper and the agent. We restrict our analysis to urban locations to allow inclusion of local consumer mystery shopping data. Transaction type, transaction value, and provider are controlled for.

TABLE 43: Outcomes by shopper and agent gender

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Bangladesh					
Shopper female	0.0595***	–0.0345**	0.0419*	–0.0135	–29.04
	(0.0187)	(0.0166)	(0.0224)	(0.00958)	(18.09)
Agent female		0.155		–0.109	
		(0.311)		(0.168)	
Shopper female X Agent female					
Shopper female X Known agent	–0.161***	0.0410	–0.147***	0.0542***	33.21*
	(0.0294)	(0.0251)	(0.0352)	(0.0145)	(18.75)
Shopper female X Known agent					
Shopper female X Agent female X Known agent					
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	1,843	1,799	1,843	1,594	51
Mean value of dependent variable	0.838	0.886	0.727	0.0320	12.80

NOTES: Standard errors in parentheses. Results restricted to urban locations only. Consumer intercept surveys are excluded from regressions where agent presence or unconditional success is the independent variable because consumer intercepts by definition are conducted only when an agent is present. Transaction values for consumer intercepts were assigned depending on whether the transaction was above or below the midpoint between the assigned high and low values used for mystery shopping. Agent gender (and any interactions involving this variable) excluded from regressions predicting agent presence and unconditional success rate because agent gender is unknown when the agent is not present. Local mystery shopping data from Uganda relating to overcharging outcomes is excluded because of known data quality issues stemming from the use of WhatsApp-based surveys. Known agent is set to 1 for consumer intercept surveys, set to 0 for professional mystery shopping visits, and varies for local mystery shopping visits.

*** p<0.01, ** p<0.05, * p<0.1

	AGENT PRESENT	SUCCESS RATE (CONDITIONAL ON AGENT PRESENT)	SUCCESS RATE (UNCONDITIONAL)	OVERCHARGING RATE (EXTENSIVE MARGIN)	OVERCHARGING AMOUNT (INTENSIVE MARGIN, PERCENT OF TRANSACTION VALUE)
Tanzania					
Shopper female	−0.0191	−0.0411**	−0.0278	0.0140	−0.844
	(0.0181)	(0.0184)	(0.0204)	(0.0158)	(0.779)
Agent female		−0.0224		0.0102	−1.568
		(0.0239)		(0.0203)	(1.094)
Shopper female X Agent female		0.0417		−0.00120	1.983
		(0.0337)		(0.0288)	(1.445)
Shopper female X Known agent	−0.00533	0.128***	0.0614**	−0.0443**	1.609
	(0.0231)	(0.0223)	(0.0259)	(0.0185)	(1.061)
Shopper female X Known agent		0.0568**		−0.0332	3.349**
		(0.0274)		(0.0230)	(1.392)
Shopper female X Agent female X Known agent		−0.112**		0.0315	−3.379
		(0.0443)		(0.0371)	(2.176)
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	2,569	2,591	2,569	2,315	179
Mean value of dependent variable	0.789	0.893	0.692	0.0773	1.727
Uganda					
Shopper female	0.0962***	0.0106	0.109***	−0.0627	−0.0421
	(0.0195)	(0.0348)	(0.0228)	(0.0457)	(1.190)
Agent female		−0.00399		0.0182	0.360
		(0.0242)		(0.0365)	(0.942)
Shopper female X Agent female		0.0205		0.00130	−0.00191
		(0.0430)		(0.0551)	(1.402)
Shopper female X Known agent	−0.207***	−0.0476	−0.221***	0.330***	−4.088**
	(0.0332)	(0.0551)	(0.0386)	(0.0804)	(1.968)
Shopper female X Known agent		0.0143		0.0712*	0.0950
		(0.0252)		(0.0423)	(1.268)
Shopper female X Agent female X Known agent		0.0681		−0.252**	4.822**
		(0.0701)		(0.101)	(2.397)
Controls					
Transaction type	[Included]	[Included]	[Included]	[Included]	[Included]
Transaction value	[Included]	[Included]	[Included]	[Included]	[Included]
Provider	[Included]	[Included]	[Included]	[Included]	[Included]
Observations	2,404	2,097	2,404	854	170
Mean value of dependent variable	0.949	0.862	0.780	0.199	2.701

Innovations for Poverty Action

Agent present

Agent presence should not be affected by the gender of the shopper attempting a transaction. Agent presence could vary depending on the agent's gender (for example if women have more household duties than men, they might be less able to maintain regular agent hours than men), but we are unable to observe this outcome because agent gender is identifiable only if the agent is present.

Contrary to expectations we do find differences in agent presence depending on shopper gender in Bangladesh and Uganda, but not in Tanzania. Among shoppers visiting new agents in Bangladesh and Uganda, women tend to report that agents are present more than male shoppers. The opposite is true for visits to known agents: women tend to report agents present less than men.

Success rate

Success rates could conceivably be affected by the gender of the shopper and the gender of the agent. Presumably discrimination, if present, is more likely to affect rates of agent overcharging than agents' willingness to complete transactions, though if agents have limited float and can only complete some transactions, it is possible one might see gender discrimination on our success rate outcome. Success rates could differ by agent gender if for example, male and female agents differed in terms of the amount of liquidity they maintained or the quality of their devices used to complete transactions.

Our data shows that when visiting agents that customers don't know well, female shoppers experience lower success rates than male shoppers in Bangladesh and Tanzania. When visiting known agents, female shoppers have higher success rates in Tanzania, but no difference in Bangladesh. When visiting known agents in Tanzania, male shoppers are more likely to succeed if the agent is female, but female shoppers are more likely to succeed if the agent is male.

Shopper and agent gender have no significant impact on success rates in Uganda.

Overcharging

Gender discrimination, if present, is likely to appear in our overcharging outcomes. Other mystery shopping work found differences in treatment of female and male consumers driven by agent discrimination and/or differences in consumer's levels of agency. Similar mystery shopping visits carried out in Ghana found that female shoppers were overcharged more than male shoppers, perhaps because of assumptions held by agents about female consumers' level of financial sophistication or because female consumers have less agency to protest against overcharging. The same study finds that female agents overcharge more than male agents, potentially driven by lower revenue of female agents which makes them more dependent on extra charges as a source of income.[99]

Across all three countries, we find that the gender of shoppers and agents only impact overcharging if the agent is known to the customer, not one-off interactions with a new agent. Restricting ourselves to interactions where the agent and customer know each other, we find in Tanzania that male shoppers are more likely to be overcharged than women. In Bangladesh and Uganda, the opposite is true: female shoppers are overcharged more than men. In Uganda, this extra overcharging of female consumers only occurs when the agent is male, though on average female agents overcharge more than male agents. Bangladesh has very few female agents, while in Tanzania the gender of the agent has no significant effect on overcharging.

Time cost

When customers make mobile money transactions with agents, they incur the opportunity cost of time along with a monetary fee. In this section we estimate the opportunity cost of time to complete a transaction, compare it with the magnitude of monetary costs that consumers incur, and explore variation in time cost by country, geography, and customer gender.

We define our time cost outcome as the estimated total opportunity cost of time for a consumer to complete a successful transaction at a particular agent.[100] Travel time is the primary component of our time cost calculation, but we also include the relatively short amounts of time spent queuing and the time spent completing a transaction (which have median values of 2 and 1 minutes, respectively).

Our calculation takes into account the fact that agent visits are not perfectly reliable: agents may not be present and transactions may fail (e.g., because of liquidity constraints). We make the conservative assumption that if a particular visit is unsuccessful, then the consumer returns home and tries again later, spending additional time traveling to and from the agent location. In fact, many customers may visit another nearby agent to complete the transaction rather than going home and re-attempting the transaction later , so our time cost estimate should be considered an upper bound (intercepted consumers report using an average of 2.4 agents in the vicinity of the agent at which they were recruited, including the agent where they were recruited). Each unsuccessful visit where the agent is present includes the wait time along with the travel time. Only successful transactions include the transaction time itself.

Finally, time costs are first converted using average local wage rates to convert from time to money, and then converted to USD using nominal exchange rates.

The estimated total time cost to complete a transaction is calculated using the following formula:

$$\text{Estimated total time cost} = \left[\frac{T_V}{(P_P P_S)} + \frac{T_W}{P_S} + T_T \right] * W * FX$$

WHERE:

Estimated total time cost = Total expected time cost in USD

T_V = Travel time to the agent (minutes)

T_W = Wait time at the agent location before completing the transaction (minutes)

T_T = Transaction time (minutes)

P_P = Probability agent will be present

P_S = Probability agent will successfully complete the transaction, conditional on being present

W = Median wage rate (local currency per minute)

FX = Nominal exchange rate, local currency to USD (on January 1, 2023)

We calculate time cost at the catchment area level because many agents have PP or PS equal to zero which would prevent us from calculating time cost for these individual agents. Gender differences can be calculated by separately calculating catchment-area level time costs using data exclusively from female or male shoppers.

In USD terms, time costs are highest in Bangladesh, about twice as high as the average time cost in Tanzania and Uganda, which are similar. As shown in Table 43, across all countries, **time cost is significantly larger than the monetary cost of completing a transaction**, which includes both official fees and extra charges imposed by agents. The difference is largest in Bangladesh, where time cost is nearly 10 times the monetary cost, compared with nearly 3x in Uganda and nearly 2x in Tanzania.

TABLE 44: Time versus monetary cost by country

	BANGLADESH	TANZANIA	UGANDA
Average time cost	40 minutes	31 minutes	42 minutes
Average time cost (USD)	$0.69	$0.34	$0.31
Average monetary cost (USD)	$0.07	$0.19	$0.11

Within each country, we compared the time costs incurred by urban and rural consumers as well as female and male consumers, displayed in Table 44.

Access to financial services has been a persistent challenge for rural consumers due to the limited number and geographic dispersion of financial access points. However, we find relatively limited variation in time cost between urban and rural consumers. In Bangladesh, rural consumers' time cost is slightly greater than that of urban consumers, but the reverse is true in Tanzania, and time costs are the same in Uganda. This may be in part due to selection, however. We observe travel times based on the customers we intercepted. Because rural consumers who happen to live close to an agent probably use agents more than those that live far from an agent, our time cost estimates likely bias towards the experience of these nearby consumers.

We also tested whether time costs varied by customer gender. Our findings across all three countries indicate that **women tend to incur significantly higher time costs than men (34-50 percent), driven by higher reported travel times.**

TABLE 45: Time cost by consumer segment and country

GEOGRAPHY	BANGLADESH	TANZANIA	UGANDA
Urban	$0.67	$0.41	$0.31
Rural	$0.70	$0.31	$0.31

GENDER	BANGLADESH	TANZANIA	UGANDA
Female	$0.86	$0.39	$0.39
Male	$0.63	$0.29	$0.26

Price transparency

We included two key outcomes related to pricing transparency in our consumer intercept and mystery shopping data collection: presence of a price list at the agent location and whether the agent verbally disclosed the transaction fee to the customer without prompting. As Table 45 shows, price lists are normally displayed, though this varies significantly by country. In contrast, **agents typically do not verbally inform customers of the transaction fee**. When fees are disclosed, they are disclosed prior to the transaction in 80 percent of observations. While agents may rely on the posted price list to inform customers, verbal disclosure of prices can be beneficial, particularly for less literate consumers.

TABLE 46: Price transparency indicators by country

GEOGRAPHY	BANGLADESH	TANZANIA	UGANDA
Price list displayed	99%	82%	59%
Agent informed consumer of transaction fee without prompting (before or after transaction)	4%	7%	12%

Pricing transparency is an important component of a well-functioning DFS market that allows consumers to make informed decisions and encourages competition. Our findings suggest that Uganda and Tanzania have room to improve in terms of encouraging the posting of price lists at agent locations. Regulations appear to only sometimes be an effective approach; Bangladesh Bank requires that DFS providers "ensure prominent display of the rates of charges in all their retail agent outlets to inform all customers," a regulation that is largely followed, as we record that 99 percent of agents in Bangladesh have a price list visible.[101] Ugandan and Tanzanian regulations require that providers list prices but do not specify where prices must be displayed. Agent posting of price lists is less common in these countries: 82 percent in Tanzania and just 59 percent in Uganda. Review of providers websites as part of our desk review revealed that all providers in Bangladesh and Uganda posted prices, but Tanzania's Tigo Pesa did not have a price list available online at the time of data collection. None of the three countries include regulations regarding verbal agent disclosure of prices to customers, and verbal disclosure was unusual across all countries.

If overcharging occurs primarily because agents exploit lack of consumer pricing awareness, then price transparency should serve as a deterrent to overcharging, and we should see a negative correlation between transparency indicators and overcharging. Tables 32 and 33 explore this question through a regression analysis. Separately for each country, we run regressions that predict overcharging rates, controlling for data collection method, transaction type, and transaction value. Table 32 uses the presence of a price list at the agent location as the independent variable of interest, while Table 33 uses disclosure of the fee by the agent as the independent variable of interest.

We find that **price lists do not have a significant correlation with overcharging** in any country, after controlling for other factors. Counter to expectations, we find that **agent disclosure of fees is more likely when an agent overcharges than when they do not overcharge in Bangladesh and Uganda**. This suggests that information asymmetry is not a primary mechanism through which agent overcharging occurs. Instead, agents appear to be explicit with consumers about any informal fees they charge. While pricing transparency is beneficial to consumers in other ways, these findings suggest that **improvements in pricing transparency will not necessarily lead to reductions in mobile money agent overcharging**.

TABLE 47: Influence of price lists on overcharging

	BANGLADESH	TANZANIA	UGANDA
Price list	0.050	–0.006	0.006
	(0.051)	(0.012)	(0.018)
Controls...			
Data collection method	[Included]	[Included]	[Included]
Transaction type	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]
Observations	2579	3063	1635
Mean value of dependent variable	0.054	0.065	0.187

* p‹0.05, ** p‹0.01, *** p‹0.001.

Dependent variable is the overcharging rate. Price list is an agent-level indicator variable equal to 1 if the majority of shoppers reported seeing a price list when visiting the agent. Uganda local consumer mystery shopping data is excluded. Outlier observations have been dropped where the reported fee was greater or equal to the transaction value.

TABLE 48: Influence of agent disclosure of fee on overcharging

	BANGLADESH	TANZANIA	UGANDA
Agent verbal disclosure of fee (unprompted, before or after transaction)	0.068**	–0.014	0.342***
	(0.033)	(0.027)	(0.038)
Controls…			
Data collection method	[Included]	[Included]	[Included]
Transaction type	[Included]	[Included]	[Included]
Transaction value (high/low)	[Included]	[Included]	[Included]
Observations	1561	1997	1100
Mean value of dependent variable	0.208	0.076	0.229

* p‹0.05, ** p‹0.01, *** p‹0.001.

Dependent variable is the overcharging rate. Agent disclosure of fee is an indicator variable equal to 1 if the agent informed the shopper of the fee at any point during the visit (unprompted). Agent disclosure of fee is only available when visits were successful and shoppers incurred a non-zero fee. Uganda local consumer mystery shopping data is excluded. Outlier observations have been dropped where the reported fee was greater or equal to the transaction value.

Service quality outcomes

Along with our core outcomes measuring reliability and overcharging, we included a set of questions measuring the quality of service that agents provided to customers along with questions asking about discrimination or harassment by agents. These questions were included as part of the consumer intercept and professional mystery shopping visits, but not for the local consumer mystery shopping instrument in an effort to reduce the length of that self-administered questionnaire.

Our service quality indicators included questions on security, privacy, and attitude of the agent, self-reported by the shopper on a scale from one to ten (ten being best). Our questionnaire also inquired about discriminatory practices by the agent based around age, gender, and ethnicity through binary variables. Similarly, we also took into account incidents of the shopper feeling harassed, with binary questions asking about invasiveness, rudeness, suggestiveness, and teasing by the agent during the transaction. Table 34 presents these results by country and method. We also created indices (using principal component analysis) for each domain – service quality, discrimination, and harassment – and include these indices in Table 35 as well. Column 3 displays differences in means

between results reported by professional mystery shoppings and intercepted consumers, testing for statistical significance.

We found that both professional mystery shoppers and intercepted consumers reported relatively high service quality and low rates of discrimination and harassment. Service quality was reported to be somewhat higher in Bangladesh and Tanzania where individual question means were nearly always eight out of ten or higher than in Uganda where security and privacy scores averaged between 7.6 and 7.9 (attitude scores in Uganda were above eight, similar to Bangladesh and Tanzania).

Our discrimination and harassment questions yielded very little variation, with means of one percent or lower for all questions across all countries and methods.

We found that consumers responding to intercept surveys generally reported higher quality of service from their agents and lower rates of discrimination and harassment than professional mystery shoppers. Exceptions are Bangladesh where reported rates of harassment were extremely low in both groups, so no significant difference was detected, and Uganda where differences in the service quality index were not significant.

This trend could be driven by differences in perceptions of service quality by professionally trained shoppers as compared with intercepted consumers, perhaps because professional shoppers find these issues more salient after being trained on the survey instrument. Alternatively, agents could treat their regular customers better than new customers perhaps because agents want to preserve long-term relationships with their regular customers, while viewing the costs of misconduct as lower for one-off interactions with new customers.

TABLE 49: Service quality outcomes

	1. PROFESSIONAL MYSTERY SHOPPERS	2. CONSUMER INTERCEPTS	3. PROFESSIONAL MS MINUS CONSUMER INTERCEPTS (1 - 2)
Bangladesh			
Security	8.093	8.271	−0.178***
	(0.028)	(0.043)	
Privacy	8.014	8.289	−0.275***
	(0.029)	(0.041)	
Attitude	8.068	8.424	−0.355***
	(0.029)	(0.041)	
Service Quality Index	**0.062**	**0.365**	**−0.303*****
	(0.029)	**(0.041)**	
Discrimination for Gender	0.000	0.003	−0.003**
	(0.000)	(0.002)	
Discrimination for Age	0.000	0.002	−0.002
	(0.000)	(0.002)	
Discrimination for Ethnicity	0.000	0.002	−0.002
	(0.000)	(0.002)	
Discrimination Index	**−0.052**	**0.079**	**−0.132****
	(0.000)	**(0.104)**	
Invasiveness	0.001	0.000	0.001
	(0.001)	(0.000)	
Suggestiveness	0.001	0.000	0.001
	(0.001)	(0.000)	
Teasing	0.001	0.000	0.001
	(0.001)	(0.000)	
Rudeness	0.002	0.000	0.002
	(0.001)	(0.000)	
Harassment Index	**−0.037**	**−0.082**	**0.045**
	(0.019)	**(0.000)**	

	1. PROFESSIONAL MYSTERY SHOPPERS	2. CONSUMER INTERCEPTS	3. PROFESSIONAL MS MINUS CONSUMER INTERCEPTS (1 - 2)
Tanzania			
Security	8.038	8.586	−0.548***
	(0.045)	(0.062)	
Privacy	7.463	8.044	−0.581***
	(0.054)	(0.076)	
Attitude	8.259	8.716	−0.457***
	(0.042)	(0.056)	
Service Quality Index	**−0.080**	**0.514**	**−0.594***
	(0.045)	**(0.060)**	
Discrimination for Gender	0.000	0.002	−0.002*
	(0.000)	(0.002)	
Discrimination for Age	0.000	0.005	−0.005**
	(0.000)	(0.002)	
Discrimination for Ethnicity	0.000	0.001	−0.001
	(0.000)	(0.001)	
Discrimination Index	**−0.052**	**0.102**	**−0.154***
	(0.000)	**(0.066)**	
Invasiveness	0.005	0.002	0.003
	(0.002)	(0.002)	
Suggestiveness	0.001	0.002	−0.002
	(0.001)	(0.002)	
Teasing	0.000	0.005	−0.005**
	(0.000)	(0.002)	
Rudeness	0.000	0.005	−0.005**
	(0.000)	(0.002)	
Harassment Index	**−0.046**	**0.098**	**−0.144***
	(0.017)	**(0.080)**	

	1. PROFESSIONAL MYSTERY SHOPPERS	2. CONSUMER INTERCEPTS	3. PROFESSIONAL MS MINUS CONSUMER INTERCEPTS (1 - 2)
Uganda			
Security	7.714	7.945	-0.232***
	(0.043)	(0.081)	
Privacy	7.701	7.648	0.053
	(0.045)	(0.082)	
Attitude	8.039	8.211	-0.172**
	(0.044)	(0.073)	
Service Quality Index	**-0.207**	**-0.069**	**-0.138**
	(0.045)	**(0.078)**	
Discrimination for Gender	0.000	0.004	-0.004**
	(0.000)	(0.003)	
Discrimination for Age	0.001	0.006	-0.005**
	(0.001)	(0.003)	
Discrimination for Ethnicity	0.000	0.002	-0.002*
	(0.000)	(0.002)	
Discrimination Index	**-0.042**	**0.164**	**-0.206**
	(0.010)	**(0.139)**	
Invasiveness	0.007	0.010	-0.003
	(0.002)	(0.004)	
Suggestiveness	0.000	0.004	-0.004**
	(0.000)	(0.003)	
Teasing	0.001	0.006	-0.005**
	(0.001)	(0.003)	
Rudeness	0.004	0.008	-0.004
	(0.002)	(0.004)	
Harassment Index	**-0.008**	**0.197**	**-0.204**
	(0.020)	**(0.140)**	

Data collection costs versus total cost to consumers of agent overcharging

Finally, we address the question of whether this type of data collection, regardless of methodological choice, is worthwhile. If, for example, the cost of collecting this data exceeds the total cost consumers in our focus countries face when using mobile money agents, then perhaps resources dedicated to monitoring these costs would be better spent directly compensating consumers (ignoring, for the moment, the practical challenges with carrying out such an undertaking). To answer this question, we calculated an extremely approximate estimate of the total annual cost to consumers of agent overcharging based on results from our work. This relies on a series of simplifying assumptions and so these values should be taken as only an order-of-magnitude approximation. Table 35 shows that the total cost of overcharging estimates vary significantly by country, from USD $3 million in Bangladesh annually, to USD $84 million in Uganda. These do not include the opportunity cost

> Overcharging estimates vary significantly by country, from USD $3 million in Bangladesh annually, to USD $84 million in Uganda.

of time lost due to failed transactions, which we estimate to be larger than the monetary cost consumers face.

In comparison, the cost of carrying out a mystery shopping visit is estimated to be lower than USD $50 in each country, so the cost of collecting a sample of 1000 mystery shopping visits on an annual basis would be conservatively estimated to be USD $50,000, or about 1.6 percent of the total estimated monetary cost of agent overcharging in Bangladesh, and much less than 1 percent in Tanzania and Uganda.

TABLE 50: Total annual monetary cost of agent overcharging

GEOGRAPHY	BANGLADESH	TANZANIA	UGANDA
Overcharging rate	0.6%	9.0%	16.8%
Average overcharging amount	1.0% of transaction amount	0.4% of transaction amount	2.7%
Total mobile money transaction volume per year	USD 113 billion[102]	USD 72 billion[103]	USD 45 billion[104]
Proportion of transactions carried out with agents	41.9%[105]		
Order of magnitude estimate of annual cost of mobile money overcharging	USD 3.1 million	USD 10.7 million	USD 83.9 million

NOTES: based on professional mystery shopping data, averaging across all transaction types, transaction values, providers, and locations. These calculations make the simplifying assumptions that all transaction types have equal likelihood of being overcharged (and overcharge amount) and that all transactions are at risk of overcharging.

Discussion

In its first year of work, the Transaction Cost Index developed methodologies for measuring the true cost to consumers of using mobile money, including scraping price lists from providers' websites, conducting mystery shopping visits at agent locations by trained professionals, intercepting local consumers at agent locations, and recruiting local consumers to carry out their own mystery shopping visits. In this section we discuss key policy implications as well as avenues for further research, building off lessons learned from both the desk review and fieldwork components of this study. Policy implications are discussed first, followed by a discussion of research methods.

Policy implications

Policy implications are separated into three broad categories: pricing transparency, monetary costs, and reliability.

Pricing transparency

Low-effort improvements to disclosure formatting could lead to large benefits

We measured indicators of pricing transparency in both our listed prices work and our mystery shopping fieldwork. In most countries included in our listed prices work, we found that regulators required some form of price disclosure as part of their DFS consumer protection regulations, though many were silent on whether prices needed to be posted online, at agent locations and/or verbally before completing a transaction. Most providers did have price lists readily available online, with a few exceptions of providers with difficult-to-find price lists, or no price lists at all. Of all the providers that include price lists on their website, 30 percent don't include a direct link to the price list from their home page.

In our fieldwork, we found that the majority of agents posted listed prices, with significant country variation (from 99 percent in Bangladesh to 59 percent in Uganda). Both Bangladesh and Uganda have regulations requiring the posting of fees at agent locations. In contrast, we found that agents very rarely verbally disclose prices to consumers (4 percent in Bangladesh, 7 percent in Tanzania, and 12 percent in Uganda).

There are relatively low-effort improvements to pricing disclosure that, if implemented by FSPs and agents, would allow for easier price monitoring by regulators and comparison shopping by consumers. Regulators could require FSPs to list prices (inclusive of all taxes) in a standardized, visually engaging format online, which would ease consumer comprehension of what are currently often quite complex and difficult to interpret

pricing structures; see for example Table 36. Regulators could also mandate the prominent display of prices at agent locations in a similar structure to online disclosures. Regulators could also mandate the verbal disclosure of prices by agents prior to completing transactions. Regulators (and responsible FSPs themselves) could monitor for compliance with these regulations by periodically reviewing FSP websites and conducting mystery shopping visits of agents to confirm that prices are posted and agents verbally disclose fees. Because many of these transparency requirements run counter to the financial interests of FSPs and agents,[106] regular monitoring is important.

In addition, regulators could require that providers make their price list available online in a consistent machine-readable format. Our experience with price scraping demonstrated that truly automating the scraping of price lists is difficult because of the wide ranging and constantly shifting set of formats that providers use to display their prices. Requiring the posting of a standardized machine-readable price list would allow regulators to carry out periodic reviews of DFS prices in a low-effort, automated manner. It would also allow governments or private entities to develop real-time comparison tools that consumers could use to quickly check the costs of carrying out a transaction with various providers, enhancing competition and improving outcomes for consumers. Use of machine-readable price lists has been implemented in other contexts – for example to improve pricing transparency in the U.S. medical field. Although compliance has been low and effects on pricing are not yet well known,[107] private firms have used this data to help consumers make informed decisions about the health care costs they incur.

Pricing transparency may not be the most effective tool for reducing overcharging

Price listing is not correlated with rates of overcharging: agents with prices posted are statistically no more or less likely to overcharge their customers than those that do not have posted price lists. Agent disclosure of prices is positively correlated with overcharging: an agent is more likely to disclose the cost of a transaction if they are overcharging a customer than if they are not.

This suggests that, at least in the contexts where TCI fieldwork was carried out, pricing transparency may not be the most effective tool for reducing overcharging, though further research is warranted into the potential mechanisms through which price transparency may affect overcharging that cannot be detected through agent-level correlations. For example, if agents in the same market coordinate to fix their fees above official rates, price lists at individual agent locations would not correlate with reduced rates of overcharging, but a high overall prevalence of publicly posted prices could reduce agents' ability to fix prices at the market level. Further research could include additional analysis of descriptive data similar to what was collected as part of the TCI, or experimental work where researchers exogenously vary the posting of price lists and measure impacts on consumers, including overcharging.

Contrary to our findings, recent experimental work in Ghana found that improved price transparency led to reductions in agent overcharging.[108] However, the price transparency intervention was much more extensive than simply posting price lists and included multiple in-person visits with consumers to explain transaction prices as well as visits with agents to make them aware that their consumers were being provided with this pricing information.

TABLE 51: Many price lists are complex and difficult to interpret.

Customer Price List

Modified on: Mon, 23 May, 2022 at 11:43 AM

Transaction Type	Txn Amount (N)		Txn Fee	Card Fee		Bank Fee	VAT	Card Source Txn Limit
	Min	Max		Local Cards	Int. Cards			
Account funding via card or bank debit	1	5,000,000	Free	1.50%	3.50%	Free	7.5%	N/A
Money Transfer (Free P2)	1	5,000,000	Free	1.50%	3.50%	50	7.5%	No Limit
Deposit to Bank — 1st to 30th transactions within a month are charged applicable txn fee while 31st transactions and above are charged N150 fee per transaction	1	5,000	10	1.50%	3.50%	50	7.5%	No Limit
	5,001	50,000	25	1.50%	3.50%	50	7.5%	No Limit
	50,001	5,000,000	50	1.50%	3.50%	50	7.5%	No Limit
Merchant Payment (Bill Pay) — Non-Express Checkout, e-pay, paymePage, or Paga connect	1	100	10	Free	Free	Free	7.5%	No Limit
	101	200	20	Free	Free	Free	7.5%	No Limit
	201	400	30	Free	Free	Free	7.5%	No Limit
	401	500	40	Free	Free	Free	7.5%	No Limit
	501	5,000,000	100	Free	Free	Free	7.5%	No Limit
Express Checkout, e-pay, paymePage, or Paga connect	1	5,000,000	Free	Free	Free	Free	0.0%	No Limit
Airtime or Data	50	5,000,000	Free	Free	3.50%	Free	7.5%	KYC 1 -N3k, KYC 2 - N100k, KYC 3 - N1m
Withdraw from Agent	1	1,000,000	100	N/A	N/A	N/A	7.5%	No Limit
Withdraw to own/linked bank account — 1st to 10th transactions within a month is free while 11th transactions and above are charged applicable Deposit to Bank txn fee	1	5,000,000	Free	N/A	N/A	N/A	7.5%	N/A

Source: Paga (Nigeria).

…recent experimental work in Ghana found that improved price transparency led to reductions in agent overcharging.

Monetary costs

Regressive pricing disproportionately affects bottom-of-the-pyramid consumers

Analysis of official prices scraped from provider websites demonstrates that many mobile money price structures are highly regressive. 18 of 33 providers included in our price list used regressive slab-based pricing structures, with the remaining providers using a proportional, percentage-based structure (or a mix of slab and percentage-based structures), or charged zero fees. When governments charge taxes as a percentage of the transaction fee (which is common for VAT and excise taxes), taxes follow the same often regressive structure as the fees themselves. More work is needed to understand providers' cost base, including the costs of processing transactions within and across networks and of compensating agents in a way that allows them to stay profitable. If there are opportunities for pricing structures to be made less regressive while maintaining providers' business viability, regulators could encourage such adjustments. Separately, governments could adjust the way taxes are levied on mobile money transactions to be based on the transaction amount, rather than the transaction fee, which would allow governments to have more direct control over the progressivity of the taxes on mobile money that they collect.

> If there are opportunities for pricing structures to be made less regressive while maintaining providers' business viability, regulators could encourage such adjustments.

Government-led switches may lead to lower off-network transfer costs

Scraped data on official prices also show that prices vary significantly across countries. Costs differ both because of differences in direct provider fees and variations in how mobile money transactions are taxed. Tanzanian consumers face the highest total cost of making mobile money transactions of the 16 countries included in our review, with the most expensive cash-outs and second most expensive on- and off-network transfer fees. Tanzania also has the total highest tax rate on mobile money transactions across all countries included in our review. Côte d'Ivoire also stands out as having high prices, particularly for off-network transfers. Off-network transfer costs are typically lowest in countries with a government-led interoperable switch, and highest in markets where interoperability is achieved through private, bi-lateral agreements among FSPs. Efforts to expand the implementation of centralized switches to facilitate low-cost off-network transfers are likely to yield direct consumer benefits as well as promote the growth of competitive mobile money markets.

Changes to price and taxation structures may encourage higher DFS utilization

Most countries make cash-ins free to encourage consumers to move funds onto mobile money networks, with the exception of Nigeria and Côte d'Ivoire. In Nigeria, providers charge a fee for cash to be deposited into mobile money accounts, while in both countries, the government taxes these deposits. Governments in these countries could consider adjusting their tax schedules to avoid taxation of cash-ins which would help promote expanded use of DFS. Providers may also benefit by reducing cash-in fees if this results in more money in circulation on their networks, because of the interest that accrues on these funds.[109]

Pricing and overcharging varies by country, suggesting opportunities for cross-country information sharing by regulators

Further research into the country-level drivers of mobile money prices, both in terms of provider costs and taxation policies, would be beneficial. Facilitating cross-country information sharing could help jurisdictions learn from peer countries who have achieved relatively low costs of mobile money (such as Ghana, Mali, Peru, and Colombia) and progressive pricing structures (such as the Philippines and Colombia).

We also find significant variation in agent overcharging by country, with overcharging most prevalent in Uganda, followed by Tanzania. Bangladesh has the lowest rates of overcharging among the three countries where fieldwork was conducted. The causes of these country-level differences are in need of further investigation. For example, are there differences in agent monitoring by FSPs or regulators across countries? Does overcharging correlate with a country's overall level of perceived corruption?[110]

Consumer perception of overcharging is often greater than actual rates

Fieldwork data suggests that consumers' perceptions of the fees they incur is often greater than actual prices they pay. After controlling for other transaction characteristics, data from consumer intercept surveys suggest overcharging rates 16 and 12 percentage points higher than results from professional mystery shopping visits in Bangladesh and Uganda, respectively[111]. Although additional research is needed to confirm these findings more directly and rule out any methodological explanations, this suggests consumers may overestimate the costs they incur when using agents.

Perceptions of overcharging – and other misconduct – is perhaps even more important than the true incidence of these issues as consumer perception of misconduct affects consumers' trust in DFS, which in turn affects take-up and continued usage of these services. Addressing this perception gap should be a policy goal alongside reducing actual rates of overcharging. Efforts to improve pricing transparency – for example training agents to verbally disclose prices to customers and enforcing this policy through mystery shopping visits carried out by FSPs themselves – could help with this perception challenge.

Formalizing over-the-counter and agent-assisted transactions would improve transparency, particularly for less financially literate consumers

Although less common than cash-in and cash-out, OTC transfers made up more than 20 percent of transactions recorded in Tanzania and Uganda, and agent-assisted account-to-account transfers made up 11 percent of recorded transactions in Bangladesh. Both these types of transactions are most common for less financially literate consumers. However, neither have clear official fees because OTC transactions are not formally permitted and account-to-account transfers are meant to be self-serve without agent involvement or commission. Since both these types of transactions occur relatively commonly, providers and regulators may consider creating formal mechanisms for customers to carry out OTC and agent-assisted transfers, including official agent commissions and set prices for consumers. There are other considerations impacting the status of OTC transfers including anti-money laundering/combating the financing of terrorism (AML/CFT) requirements, but given that – despite official prohibitions – OTC still is relatively common, formalization could be an alternative to prohibition which would lead to improved oversight. This would improve price transparency and ensure consumers paid a set rate for these services rather than paying unofficial commissions that vary from agent to agent. There are tradeoffs; most consumers receive free assistance from agents to complete their transaction and pay nothing for OTC transfers, circumventing providers' transfer fees, so formalization would lead to consumers paying higher (but less variable) prices for these transfers. Ideally, providers and agents would compensate for this additional revenue by reducing other fees, though it is possible they would use this formalization to simply increase their total revenue, harming consumers. A careful cost-benefit analysis would be helpful in weighing the tradeoffs of formalizing these types of services.

Reliability

Opportunity costs from failed transactions are much higher than monetary costs of making transactions

Results from our fieldwork show that consumers are often unable to complete mobile money transactions they attempt with agents, either because the agent is not physically present or because the agent is unable to successfully carry out the transaction. Across our three focus countries, 29 percent of attempted mystery shopping transactions failed. In 17 percent of mystery shopping visits, the agent was not present, and when the agent was present, 14 percent of transactions still failed. Agent absence was highest in Tanzania and lowest in Uganda, while failure rates when the agent was present was highest in Uganda and lowest in Bangladesh. More research is warranted to explore the issue of inconsistent agent presence. For example, does promotion of non-dedicated agents (that is, agents that run a separate business at the same location) lead to agents that are more consistently available to serve customers' mobile money needs?

Estimates quantifying the opportunity costs of time lost by these failed transactions suggest that this non-monetary cost is much larger than the direct monetary cost of making a transaction, even including overcharging by agents. The difference is largest in Bangladesh, where time cost is nearly 10 times the monetary cost, compared with nearly 3x in Uganda and nearly 2x in Tanzania. This finding mirrors results from demand-side surveys. For example, work by Economist Impact finds that consumers cite proximity (53 percent) and reliability (33 percent) as the two greatest factors influencing user's choice of cash point, compared with affordability at just 9 percent.[112]

When a transaction failed, we collected information from agents about the cause of the failure. Although the self-reported nature of this data requires us to interpret the results with some caution, we find that liquidity constraints are the leading apparent cause of failed transactions, accounting for between 41 and 48 percent of cash-in, cash-out, and OTC transfer failures. FSPs and regulators can both help address agent liquidity constraints, for example by supporting products that allow agents to access loans that help them manage their liquidity needs, or the promotion of super-agent models that help agents rebalance their float without physically traveling to a bank branch.

Measurement of consumer costs

We tested three distinct approaches to measuring the consumer experience when using mobile money agents: mystery shopping by trained professionals, intercept surveys of mobile money consumers, and mystery shopping by local consumers. We believe this measurement is important and worthwhile; an order-of-magnitude comparison (see "Data collection costs versus total cost to consumers of agent overcharging" section) suggests that data collection costs represent less than 2 percent of the annual cost to consumers of agent overcharging in Bangladesh, less than 0.5 percent in Tanzania, and less than 0.1 percent in Uganda.

Assessing which of these methods is "best" will be important for policymakers and researchers interested in expanding the work the TCI has begun to other markets and beyond the TCI's two-year timeframe. It is also a necessary step as the TCI moves into the second phase of its work, focused on further refining a single selected method.

Results from these three methods often differed quite substantially for key outcomes of interest such as transaction success rate and prevalence of agent overcharging, suggesting that measurement of consumer outcomes when using mobile agents is difficult and sensitive to the data collection method used. Because each method has theoretical advantages and disadvantages in terms of its ability to capture accurate results, we do not have a single set of "ground truth" data points that we can compare our methods against to determine each method's suitability.

Given this limitation, we know that an ideal data collection method should mirror as closely as possible the most common types of mobile money transactions. From our consumer intercept data, we know that the modal transaction is carried out by someone that lives in the area and that uses their agent fairly regularly. This suggests that among our methods tested, consumer intercept surveys or mystery shopping by local consumers visiting agents they use regularly should most accurately reflect real world conditions, if other concerns can be addressed including data quality and observer bias.

Among these two options, mystery shopping by local consumers is preferred from a cost perspective. Consumer intercept surveys are relatively expensive because they require enumerators to wait for customers outside agent locations for often longer periods of time, whereas a single recruited local consumer can make many mystery shopping visits at relatively low cost. We are also currently finalizing fieldwork that deployed local consumer mystery shopping visits remotely via phone calls, further reducing cost.

Data quality and observer bias issues are both significant challenges to local consumer mystery shopping, but ones that can be at least partially addressed through careful design of research protocols. Based on our experience carrying out these local consumer mystery shopping visits, we have developed recommendations for how to minimize these issues. These include recommendations regarding the design of training protocols and data collection instruments to minimize misunderstanding by local consumers, design of mystery shopping visit scenarios to minimize detection by agents, and development of compensation structures for local shoppers to ensure their incentives are aligned with the collection of accurate data. We will continue to assess the benefits and drawbacks of each method, incorporating results from our phone-based local mystery shopping work once completed. Our Year 2 report will further discuss our recommended data collection approach.

> …we know that an ideal data collection method should mirror as closely as possible the most common types of mobile money transactions.

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40   Colombia, Mali, Myanmar and Sierra Leone did not have market share data available and a simple average was used.

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70   Negre, Alice, and Will Cook. 2021. "Interoperability in Digital Financial Services." CGAP.
      https://www.cgap.org/sites/default/files/publications/2021_01_Technical_Note_Interoperability_Digital_Financial_Services.pdf.

71   "Uganda National Interbank Settlement (UNIS)." n.d. Bank of Uganda. Accessed June 22, 2023.
      https://archive.bou.or.ug/archive/opencms/bou/payment_systems/Uganda_National_Interbank_Settlement_UNIS.html.

72   Brunnermeier, Markus K., Nicola Limodio, and Lorenzo Spadavecchia. 2023. "Mobile Money, Interoperability and Financial Inclusion | Igier." Innocenzo Gasparini Institute for Economic Research.
      2023. https://igier.unibocconi.eu/research/working-papers/mobile-money-interoperability-and-financial-inclusion.

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73   In the desk review, we could not find fixed prices for off-network transactions using the government-led switches in Uganda and Kenya, if available. For the Philippines, providers are free to set their own interbank fees and are required to submit their fees to the central bank to be made available on the website for transparency and to foster competition among service providers.

74   Oni, Ophelia, and Arianna Gasparri. 2022. "Ghana Announces Electronic Levy: Possible Scenarios on the Progress of Digital Financial Inclusion." UNCDF (blog). January 17, 2022. https://www.uncdf.org/article/7408/ghana-electronic-levy.

75   "RAAST – Pakistan's First Instant Payment System." 2023. JazzCash. 2023. https://www.jazzcash.com.pk/shop/money-transfer-shop/raast-pakistans-first-instant-payment-system/.

76   "Transfer Money via Raast." 2021. Easypasia. 2021. https://easypaisa.com.pk/send-money-through-raast/.

77   Financial Policy and Regulation Department. 2020. "The Guide to Charges by Banks, Other Financial and Non-Bank Institutions." Central Bank of Nigeria. https://www.cbn.gov.ng/out/2020/ccd/approved%20reviewed%20guidelines%20for%20licensing%20and%20regulation%20of%20payment%20service%20banks%20in%20nigeria-27aug2020.pdf.

78   Blackmon, William, and Brian Mwesigwa. 2022. "Measuring Fees and Transparency in Nigeria's Digital Financial Services." Innovations for Poverty Action.

79   As of the time of this writing, Myanmar's Wave Money, Tanzania's Tigo and Nigeria's Paga now list their prices on their websites. Only Nigeria's Opay and Momo do not (yet), so we excluded them in the main provider sample.

80   Email text: "Hi, If I accidentally send money to the wrong phone number, can you tell me what I should do to correct it? Would it be possible to get my money back? Thank you."

81   Bird, Matthew, Kyla Longman, and Rafe Mazer. 2021. "Leveraging Customer Complaints Data to Monitor Consumer Protection in Mobile Services in Uganda." Innovations for Poverty Action. https://www.poverty-action.org/sites/default/files/publications/UCC-IPA-MNO-Complaints-Data-Analysis-Final-Report-September-2021-FINAL.pdf.

82   Reduced to 1% in 2023.

83   Gine, Xavier, Jessica Goldberg, Carlotta Nani, Anusuya Sivaram, and Lore Vandewalle. n.d. "Engaging Women in Mobile Money Markets in Bangladesh | IPA." Poverty-Action.org. Innovations for Poverty Action. https://poverty-action.org/engaging-women-mobile-money-markets-bangladesh.

84   Consumer intercept surveys do not allow the researcher to control the type of transaction conducted, so we recorded any type of transaction the consumer had just completed for these surveys. The advantage of this approach is that we obtain the actual distribution of transactions.

85   Values used in our mystery shopping work vary slightly from our listed prices reference values. Mystery shopping transaction values were rounded to the nearest round number for fieldwork practicality and to avoid suspicion by agents.

86   Our professional mystery shopping protocol called for making up to three attempts on an agent that was not initially present. However, to match our protocol used for local consumer mystery shopping visits, all subsequent attempts on the same agent were dropped from our analysis.

87   Giné, Xavier, and Rafael Mazer. 2022. "Financial (Dis-)Information: Evidence from a Multi-Country Audit Study." Journal of Public Economics 208 (104618). https://doi.org/10.1016/j.jpubeco.2022.104618.

88   Data from our consumer intercept surveys reveal that 80 percent of consumers have used the agent they were intercepted at before (83 percent in Bangladesh, 81 percent in Tanzania, and 73 percent in Uganda).

89   There are some relatively unusual exceptions, such as when agents use non-standard means of completing transactions (e.g., processing a withdrawal as a merchant payment).

90   To avoid counting very small differences due to rounding as overcharging, the total reported fee must be greater than the official fee by at least 1% of the official fee.

91   Financial Inclusion Program. 2022. "Bangladesh Consumer Protection in Digital Finance Survey." Innovations for Poverty Action. https://poverty-action.org/sites/default/files/publications/IPA-Bangladesh-Consumer-Protection-in-Digital-Finance-Survey-Report-June-2022.pdf.

92   Bird, Matthew and Rafe Mazer. 2021. Uganda Consumer Protection in Digital Finance Survey.

93   Although this would be a violation of our protocol, professional shoppers might have felt an incentive to wait that local shoppers did not feel. Professional shoppers were instructed to return to agents that were not present and re-attempt mystery shopping visits up to three times, while local shoppers were only required to make one attempt. (We subsequently decided to drop follow-up attempt data from professional shoppers from our analysis so that professional and local shopper protocols would be identical.) Professional shoppers may have felt it was easier to simply wait for the agent to return if they suspected that the agent was away only for a short time, rather than having to re-attempt the visit on a different day.

94   Another potential driver could be differential refusal rates by consumers recruited to complete intercept surveys. Customers whose transactions failed might have refused to complete the survey at higher rates than customers whose transactions succeeded (perhaps because they felt low on time as they needed to find another agent to complete their transaction). If so, this would artificially inflate our apparent success rate in our consumer intercept data. Consumer intercept refusal rates varied significantly by country. In Tanzania and Uganda refusal rates were quite low (3% in Tanzania and 1% in Uganda), so this effect, if present, is small. In Bangladesh, where consumers were much more reluctant to speak with enumerators, we experienced a 31% refusal rate, so this effect could be a significant driver.

95   Super-agents exchange cash for e-money and vice versa for agents, eliminating the need to visit a bank branch to re-balance their float accounts. Super-agents may be employed by the provider or a third party that charges agents for this service.

96   This appears to be true based on the longer wait times our enumerators encountered when intercepting customers at rural agent locations, versus urban locations.

97   Note that mystery shopping visit scenarios used the same transaction sizes in urban and rural locations.

98   For more on the zero-price effect, see:
Hossain, M. T., & Saini, R. (2015). Free indulgences: Enhanced zero-price effect for hedonic options. International Journal of Research in Marketing, 32(4), 457-460.
Shampanier, K., Mazar, N., & Ariely D. (2007). Zero as a special price: The true value of free products. Marketing Science, 26, 742-757.

99   Annan, Francis. 2022a. "Gender and Financial Misconduct on Fintech: Experimental Evidence from Mobile Money in Ghana." SSRN Electronic Journal. https://doi.org/10.2139/ssrn.3534762.

100   The time cost is calculated at the agent level; PP and PS correspond to the probabilities computed across all attempted transactions at a particular agent.

101   Bangladesh Bank, Payment Systems Department. 2022. "Bangladesh Mobile Financial Services (MFS) Regulations, 2022." https://www.bb.org.bd/mediaroom/circulars/psd/feb152022psd04e.pdf.

102   Mobile Financial Services." 2023. Bangladesh Bank. https://www.bb.org.bd/en/index.php/financialactivity/mfsdata.

103   "Communications Statistics Report: Quarter Ending December 2022." 2023. Tanzania Communications Regulatory Authority. https://www.tcra.go.tz/uploads/text-editor/files/2nd%20Quarter%20Communications%20Statistics%20Report%202022-2023%20(1)_1675441316.pdf.

104   "Mobile Money Stats." 2023. Bank of Uganda. https://www.bou.or.ug/bou/bouwebsite/bouwebsitecontent/PaymentSystems/DataStatistics-/2023/Mobile-Money-Stats-W.xlsx

105   We use global GSMA data and assume only cash-ins and cash-outs occur with agents: Awanis, Aramé, Christopher Lowe, Simon K. Andersonn-Manjan, and Dominica Lindsey. 2022. "State of the Industry Report on Mobile Money." GSM Association. https://www.gsma.com/sotir/wp-content/uploads/2022/03/GSMA_State_of_the_Industry_2022_English.pdf.

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106 Giné, Xavier, and Rafael Mazer. 2022. "Financial (Dis-)Information: Evidence from a Multi-Country Audit Study." Journal of Public Economics 208 (104618). https://doi.org/10.1016/j.jpubeco.2022.104618.

107 Jiang, John Xuefeng, Ranjani Krishnan, and Ge Bai. 2023. "Price Transparency in Hospitals—Current Research and Future Directions." JAMA Network 6 (1). https://doi.org/10.1001/jamanetworkopen.2022.49588.

108 Annan, Francis. 2022. "Misconduct and Reputation under Imperfect Information." Research Gate. April 2022. https://www.researchgate.net/publication/345110909_Misconduct_and_Reputation_under_Imperfect_Information.

109 Many regulators stipulate how providers may use interest earned on funds held in their customers' accounts. For more details, see: Dias, Denise, and Mehmet Kerse. 2021. "Regulatory Approaches to the Interest on E-Money Float Accounts." CGAP. https://www.cgap.org/sites/default/files/publications/2021_05_Technical_Note_Interest_Float_Accounts.pdf.

110 For example, Transparency International's Corruption Perceptions Index: https://www.transparency.org/en/cpi/2022

111 In Tanzania, professional mystery shopping results are affected by a taxation change that occurred midway through data collection, but consumer intercept survey data suggests overcharging rates 2-3 percentage points greater than results from local consumer mystery shopping.

112 "Beyond reach: developing a holistic measurement of cash-in cash-out networks." Economist Impact. 2023. https://impact.economist.com/new-globalisation/cash-point-diagnostic-tool/