# Digital Finance Retail Distribution Networks in Low- and Middle-Income Countries: A Research Agenda


## Abstract

Markets for digital financial services (DFS) – particularly mobile money and agent banking – are growing rapidly in low- and middle-income countries and being transformed by several digitization initiatives. Retail distribution and vendor networks are necessary building blocks to a robust digital finance ecosystem, due to their ability to convert money between physical cash and digital currency, and to serve as onboarding channels for a broader set of digital financial tools and services. Yet, rigorous quantitative work and evidence about the functioning and organization of vendor networks, retail vendor incentives and behavior, and interventions to expand network reach and density is limited, with many open research questions remaining. We develop a framework on these issues and propose a research agenda to inform policy and practice.



KEYWORDS: Retailing, Digital Finance, Organizations, Incentives, Entry Constraints, Growth Constraints, Interventions, Field Experiments


**VERSION: JUNE 10, 2022**

## SELECT RESEARCH QUESTIONS AND HYPOTHESIZED INTERVENTIONS

**Policy Problem**

"*Digital finance retail distribution networks matter for financial inclusion and poverty reduction but how?*"

A. Extensive Margin: Expanding viable DF retail agents reach and density.

*What interventions – public and commercial solutions – will work to expand viable DF-retail agent networks, especially to rural areas? How far into rural areas can one feasibly go? How do one introduce new retail-DF agents into brand new "virgin" markets? What efficient market forms can this take with respect to training, gender composition, location, use of existing micro-businesses, etc.?* Examples of plausible hypothesized interventions:

- 1/ Relaxing registration requirements for agents and/or creating a tiered agent registration system among regulators and/or commercial providers
- 2/ Subsidizing the profits and/or reducing the volatility of revenues via extra transaction fees, differential pricing of agents by transaction volume, etc. in low transaction volume regions
- 3/ Enabling new rural agent business models, including traveling agents, agents embedded in nodal infrastructure like health clinics, etc
- 4/ Subsidizing the start-up capital for new agents in low transaction volume regions
- 5/ Supporting more reliable power and connectivity for rural agents

B.1. Intensive Margin: Developing and growing existing retail agents, with emphasis on the organization of agent networks, incentives and behavior.

*What interventions – public and commercial solutions – will work to develop and grow existing viable DF-retail agents? What are the most efficient and effective ways to address liquidity challenges? What set of interventions are most likely to improve women's use of, confidence in,*

*and satisfaction with CICO retail networks? What is the impact of shared agent networks aka "non-exclusivity" in rural areas?* Examples of plausible hypothesized interventions:

- 1/ Improving agent access to liquidity through both subsidized and market priced credit, improved logistics, and/or improved liquidity needs forecasting
- 2/ Encouraging the recruitment and hiring of female CICO agents
- 3/ Disclosing price information and enforcing transparency initiatives
- 4/ Testing behavioural and rational marketing tools to develop rural market sizes and profits, including agent branding, advertisement, *pay-for-performance* incentives, *pay-for-quality* incentives, etc
- 5/ Supporting more reliable power and connectivity for rural agents
- 6/ Does (non) exclusivity of retail vendors affect downstream vendor competition? If so, how?
- 7/ Does platform interoperability promote competition? If, so how? What are the market impacts of agent interoperability?

B.2. Organization of Market: *Do drivers of competition (infrastructure control, economies of scale, regulation, etc.) influence service quality, prices, and profitability in markets for DFS? What are the moral hazard and adverse selection effects of tariff-posting and/or market transparency at DFS retail points? How might the vertical structure of DFS constrain retailers' competition for service quality provision and what interventions might work to eliminate such vertical market externalities? How might interoperability affect competition and general operations of DF providers, retail agents, and SMEs?*

B.3. Management Incentives: *What interventions will work to promote good supply-side behavior, either monitoring and punishment mechanisms by providers and regulator(s) or vertical incentives that make vendors residual claimants of business output? Does DFS unlock the potential of businesses, especially for those run by women and if so, how? How might vendor competition improve or worsen outcomes in the DF marketplace which is characterized by uninformed consumers, shrouded attributes and/or hidden prices?*

# I. INTRODUCTION

The introduction and rapid expansion of digital financial services (DFS)—Mobile Money, Agent Banking, Mobile Banking, Point-of-Sale (POS) Devices—represents one of the most dramatic global changes in the financial marketplace in decades. This is especially true in low- and middle-income countries (LMICs), where a significant fraction of the population has historically lacked access to mainstream finance due to various barriers such as long distances to banks and the high cost of owning a bank account.

Retail finance in LMICs can broadly be divided between bank-led and non-bank led models. Under the bank-led model, a bank issues e-money and is responsible for settlement and monitoring and relies on mobile coverage to extend reach, whereas under non-bank led, a telco or a non-bank financial institution issues the e-money and is responsible for settlement and monitoring and liaises with the bank for management of funds.

Mobile money involves customers using mobile phones to acquire e-money by paying cash to an agent, or by receiving remittances and government payments without having a bank account (GSMA 2010). Customers can use this e-money to pay bills, remit funds, or save. Agent banking, on the other hand involves branchless banking that allows traditional banks to extend their banking services in a cost-efficient manner through authorized third parties, usually, a retail agent. Both mobile money and banking agents facilitate financial inclusion without physical access to a traditional bank branch (Malady and Buckley, supra note 1 at 31). The difference between the two rests on the fact that clients who seek to use agent banking services need to have accounts with specific banks. Research has shown that although the landscape of DFS is broader than mobile money, mobile money has spearheaded the digital finance (DF) revolution we are witnessing currently, particularly in sub-Saharan Africa (SSA). This has arisen from the many users that mobile money has. For instance, globally, registered accounts grew +13% in 2020, active accounts grew +17% and transaction volume and value also grew +15% and +22%, respectively (GSMA 2021).

DFS retail distribution and vendor networks are necessary building blocks to a robust DFS ecosystem and to serve as onboarding channels for a broader set of digital financial tools and services that are key for reaching the financial excluded and underbanked. The GSMA (2019) estimates that globally there are 9.1 MM registered mobile money agents and 4.8 MM active agents, located in 5.2 MM unique agent outlets. Globally, cash-in and cash-out (CICO) transactions represented 43% of mobile money transactions by value as of December 2020. In 2019, the number of globally registered mobile money accounts was 1.04 billion, with 269 Million accounts located in SSA (GSMA 2019). However, basic comparisons between low- and high-income countries demonstrate stark inequalities in the coverage of retail financial distribution networks. For example, according to the IMF, in 2018 there were 2.9 bank branches and 0.5 ATMs per 100,000 people in Ethiopia (compared with 13.5 bank branches and 19.7

ATMs per 100,000 people in India and 32.9 branches and 173 ATMs per 100,000 people in the United States), demonstrating the lack of accessible formal financial institutions in many countries.

Experiences from the COVID-19 pandemic confirm the critical nature of CICO retail agent networks as important distribution points for social protection payments, international and domestic remittances, including aid disbursements and access to reliable information about new and unfamiliar services in underserved and uninformed communities. Beyond access to finance and information, agent banking provides alternative means of employment, which is key in times of economic disruption and job loss (FSD Africa 2021).

Given that majority of the world's financially excluded and underserved customers live in rural areas, extending rural CICO vendor networks is critical to further financial inclusion. Emerging evidence demonstrates the importance of well-functioning agent networks in driving the adoption and use of DFS. In Niger, rural households' willingness to pay for mobile money services correlate with agent density (Aker et al. 2020). In Malawi, people who lived far away from agent networks used their accounts less frequently (Aggarwal et al. 2020). There is robust evidence showing that state-led expansion of rural bank branches in India has reduced poverty (Burgess and Pande 2005), improved credit access, and health (Cramer 2022), a set of evidence that further motivates the relevance of extending retail banking and DF retailing.

The organization and quality of agent networks is varied and have impacts on the demand for retail agent services (Balasubramanian and Drake 2015). Experimental work in Ghana has shown that mobile money agents misconduct themselves by overcharging payment and account services, which decreases consumer trust and overall use of digital payment services (Annan [2020; 2021]). Similar agent misconduct can be found in many other countries such as Uganda and Nigeria (see, Blackmon, Mazer and Warren [2021] for a cross-country survey evidence) and may be driven by incentives that DF retail vendors face due to lack of retail vendor competition (Annan 2022), including illiquidity of vendors, and lack of market transparency (Klein, Lambertz and Stahl 2016). Ongoing work about competition and entry in DFS markets highlights high entry capital requirements, low literacy of informal microentrepreneurs, and poor network infrastructure as potential constraints to crowding in new agents in low-income environments (Annan 2022). Seemingly solvable liquidity issues constrain agent activities with early evidence from a study in Myanmar suggesting that digital loans to retail agents can boost short-term revenues, though the persistence of the effect remains to be determined (Toth 2021). In Tanzania, there is evidence that in-person training improves agents' liquidity and inventory management (Acimovic et al. 2020).

Yet, rigorous quantitative work and evidence about the functioning and organization of vendor networks, vendor behavior, and interventions to expand network reach and density is limited,

with many open research questions remaining. We develop a review framework for these issues and outline a research agenda to study retail CICO agent networks. We organize our framework around four key themes: (i) the organization of retail-DF, (ii) vendor incentives and behavior, (iii) constraints to expansion of DF retail distribution networks, and (iv) policy and practice, respectively. Where applicable and based on identified open research questions, we use relevant theory to propose hypotheses for scalable LMIC public policy and commercial interventions to drive expansion of distribution networks for retail finance, which warrant rigorous empirical examination.

## II. ORGANIZATION OF MARKETS FOR DFS

**II.1 Market Structure:** The players in the mobile money and agent banking ecosystem have evolved from different sectors including the financial sector and the tech sector. These players operate in an oligopolistic, vertical market, where a group of companies and customers are linked around a specific niche service. In this vertical market structure, there are upstream players (DFS providers) who set up downstream players (agents; vendors; super-vendors). These downstream players work as distribution retailers on behalf of the upstream players and earn commissions as profit in return. The vertical structure may create incentives and externalities that influence vendor behavior, aggregate DF business outcomes, and consumer welfare (Tirole 1988, Chapter 4; Annan 2021). Other relevant players in the DFS marketplace include consumers, lenders, and regulators.

### II.2 DFS Providers

The DFS providers consist of banks and MNOs, although third-party services, value-added services and adjoining players such as retailers and companies can also be part of the system. These providers are primarily responsible for providing the platform for both agent banking and mobile money services. Two broad models of DFS operated by different countries may be distinguished (CGAP 2006): one led by banks (bank-led) and the other led by non-banks, primarily, MNOs (MNO-led). The type of model chosen can potentially drive efficiency, profitability, and service quality. This is because while the MNO-led organizations are able to attract the masses (CGAP 2018), the bank-led organizations are able to target a specific group of people due to the way they are structured. Although in the real world we are not strictly restricted to bank-led and MNO-led frameworks, they provide useful framework for creating broad groupings for comparison. Alternative DFS models may operate through other financial institutions like PayPal led, where the use of mobile phones is a convenient alternative to cards or coupons. In common models of DFS, the customer deposits cash with an agent to buy e-money, agent collects cash and issues e-money on behalf of the provider. The provider maintains balance, facilitates different types of transactions, and maintains equivalent funds in a bank float.

Transactions may include payment for airtime, purchases, bill payment, and transfer of money to family and friends. Below, we discuss the two major DFS models in turn.

**Bank-Led Organizations—**Countries that operate the bank-led models require key DFS to be offered largely by banks. The bank performs the key functions such as deposit holding, e-money issuing and payment services. Examples of countries that are more absolute in applying the bank-led model are Bangladesh, Pakistan and India (CGAP 2018). The MNO's role in a bank-led system is limited to providing the communication network needed to offer financial services to the user, but many countries have facilitated the entry of MNOs in bank-led systems through partnerships, investment in bank subsidiaries and specialized license windows. Pakistan for instance, operates a bank-led model, however, the regulatory framework allows MNOs to buy large shares in financial institutions or set up new financial institutions to assist them in providing DFS. This has been made easier because Pakistan allows other financial institutions such as microfinance institutions that have relatively lower capital requirements to offer DFS. Bangladesh also operates a bank-led model but operates in an entirely different environment from Pakistan. Unlike Pakistan, Bangladesh precludes non-bank financial institutions from establishing independent entities for DFS provision. At the same time, the law guiding DFS operation in Bangladesh restricts the provision of DFS to specific commercial banks and prevents MNOs from buying stakes in banks. Despite this, MNOs have still found ways of entering the Bangladesh DFS market through guidelines that allow banks' subsidiaries to operate digital financial services.

**MNO-led Organization—**In the MNO-led system, in addition to providing its core service, which is communication network or GSM, the MNOs also undertake certain pertinent roles that include issuing e-money, managing the agent network and customer relationship, and providing payment services. Depending on the financial regime, the MNO can partner with a financial institution, where the agent may deposit the cash collected from the customers. The e-money provided to the customer is backed by the funds deposited in the partner bank. Example of a country operating an MNO-led system is Kenya.

**Organization of Provider Partnerships —**In many LMI countries, the MNOs that operate in the DFS market are large, foreign companies with presence in several countries. On the African front for example, MNOs like Airtel (India), Essar (United States), Etisalat (United Arab Emirates), Millicom-Tigo (Sweden), MTN (South Africa), Orange (France) and Vodafone (United Kingdom)—dominate the telecommunications market, with many of these telcos leading the provision of DFS in their respective host countries. In addition to the major international players, there are some MNOs offering DFS which were previously state-owned, such as Cameroon Telecommunications (known as Camtel) in Cameroon, mCel in Mozambique and Uganda Telecom in Uganda, although typically they tend to have smaller market shares and are less aggressive in the DFS marketplace. Interestingly, in almost every country in the LMI

regions, only one or two of these telcos dominate the DFS market (IPA 2022), giving the market a *purely oligopolistic structure*. The banks involved in the DFS provision are usually more than the MNOs, although these banks are also very large. However, unlike the MNOs, there are more local banks involved than foreign banks as the very large foreign banks are not interested in the DFS market. Their focus is usually on the *high-end* clients who have the potential to drive their profits.

The competition challenge is less intensified when providers (banks, MNOs) try to use some infrastructure they control, economies of scale, and regulations to prevent other DFS market entrants. For example, in some MNO-based systems, technology giants can capitalize on the structural dependence of some DFS providers who may be potential competitors and hinder their access to some vital services through pricing and some other strategic means. In Zambia, one of the major ICT service providers, Airtel, sought to protect its DFS subsidiary by limiting airtime for other DFS providers. Also, in Kenya, one of the major telecoms, Safaricom, restricted USSD services to some other DFS providers until regulators intervened. In both cases, there is an inherent conflict of interest where the provider of DFS competes with other DFS providers' products and service delivered through the same channel. An important question, that raises an issue and requires management by relevant authorities should be confronted - *When is it beneficial to compete and when is it beneficial to co-operate?* Most providers engage in partnerships and co-opetition, which is a combination of cooperation and competition. At the initial stages of DFS provision, MNOs will require banks to hold their funds for them and banks will also require MNOs to give them short codes so that their clients can access their account through mobile phones. As the market advances, the partnership intensifies such that other secondary products can be developed, while at same time these partners may compete among themselves.

In practice, where MNO's have entered the DFS market on their own, they have been more successful in terms of scalability than when banks have had to go alone. This is because MNOs have built experience in reaching out to the very low-end customers. In addition, since MNOs have a larger outreach than banks, MNO-led models are better in promoting financial inclusion in terms of breadth. However, when it comes to the depth of financial inclusion, bank-led models outperform MNO-led models since MNOs have limited space of financial services they can provide.

### II.3 Retail Agents and Market Features

**DF-Retail Basics—**An increasing number of LMI countries have permitted banks and non-bank institutions to provide DFS through downstream agents. Agents are small business outlets, representing MNOs and banks that send financial services to the doorsteps of their clients with the intention of reaching the unbanked through reduced costs – e.g., low transaction fees and short distance to nearby retail outlets in theory. These agents are responsible for retailing basic

financial services–primarily, account opening and CICO payment services (Annan 2021). They exchange cash for e-money and earn commissions based on the transactions they perform. Retail vendor commissions are typically set as a percentage of transaction volumes or charges; however, in practice, there is "poor transparency" in vendor commission structures and can vary across providers and contexts (IFC 2018; IPA TCI 2022). The charges on the use of agent-involved services are determined ex-ante by the providers and therefore agents are not allowed to marginalize or to put any extra fees on the provider-set official charges. Indeed, relying on agents, can be a *double-edged* sword. On the one hand, agents often assist DFS customers with transactions and transaction problems, which can build consumer trust and confidence to try something new in DF. On the other hand, agent-assisted transactions can expose inexperienced customers to risks if retail outlets and their employees have insufficient capacity (for example, thin commissions and liquidity), training, and support or are even dishonest (Garz et al. 2021). Thus, DFS providers face difficult trade-offs in optimizing service quality while building out an agent network with substantial reach.

**DF-Retail Entry—**To start agency business, vendors need to meet certain criteria and these criteria are country dependent. Annan (2021; 2022) document that vendorship in practice requires formal documentation (i.e., formalization) and must meet some structural and monetary/ capital requirements to be onboarded on the DFS retail network. As a result, potential entrants will have to evaluate the *cost of formalization* against the *perceived benefit* of becoming a retail vendor. In Ghana, mobile money vendors are required to have a minimum of GHS 4000 (=~$700) as initial capital to start the retail business. In Nigeria, agents must also meet some fit-and-proper criteria such as a good reputation in the community, healthy financials and no criminal records. Some countries, for example Rwanda and Nigeria also require agents to have appropriate human resources to provide a smooth service for their clients. As much as these criteria ensure retail agents have the needed capacity (formalization, capital, etc.) and integrity to operate, they create barriers to market entry. This phenomenon, coupled with the level of concentration in specific areas gives the downstream DFS retail market an oligopolistic structure. While some countries like Ghana, Rwanda, and India allow individuals to become agents with less restrictions, others like Nigeria and Tanzania have more restrictions. In Nigeria for example, regulators preclude non-profit entities from becoming agents. The requirement that agents are legal entities ensures continuity in the agency business. Some countries, for example Kenya and Uganda also require agents to have a separate line of business in addition to provide financial services.

**Bundling of DFS-Retail—**Perhaps and, arguably, due to thin commissions and market size and shares, including several retail vendor incentives discussed in Section III, it is common practice for DFS-retail agents to *bundle* basic DFS services with non-DFS product services. Agents thus operate multi-service (DFS and non-DFS) retail outlets. To illustrate, Annan (2021) shows that the vast majority (=75%+) of retail vendors operate as a bundled store in Ghana, bundling

mobile money with other services (e.g., groceries and provisions, photocopying and typesetting, electric prepaid credit, etc). This reflects a context where sales revenue from non-mobile money product services represents about 7% of sales revenue from mobile money services. Indeed, this is an important DFS-retail feature in the sense that it does not only have the potential to guarantee steady flow of overall business income; it can generate differential incentives for agents with meaningful effects on DFS inclusion. This may depend on whether the market for non-DFS product services complements or substitutes the DFS services. If liquidity is fixed and non-DFS services are plausibly relatively more profitable, then agents may have the incentive to allocate their liquidity to non-DFS services, leading to the prevalence of DFS transaction declines and overall poor consumer confidence in DFS. However, *if* non-DFS services generate more profits and consumers find it easier to conduct both DFS and non-DFS transactions at the same retail outlet, then agents may have the incentive to allocate liquidity to DFS services, thereby leading to less prevalence of DFS transaction declines and better consumer confidence in DF. Of course, other considerations, like the need to generate and maintain a good reputation may balance the use of liquidity across DFS and non-DFS transactions (Annan 2021).

**Tariff-Posting at DF-Retail and Price Transparency—**Most markets often lack transparency (Klein, Lambertz and Stahl 2016, Grennan and Swanson 2020), a phenomenon that extends to markets for DFS which are usually characterized by *uninformed consumers*, *shrouded attributes* and / or *hidden prices* (Annan [2020; 2021]; Garz et al. 2021). This can harm consumers and make the market inefficient, with implications for consumer protection and aggregate welfare. As a result, it is common for DFS providers and regulators to mandate tariff-posting at retail vendor outlets. Yet, enforcement of such transparency policies can be difficult in practice due to limited oversight of providers into the behavior of their agents downstream. In a series of random audit visits, Annan (2020; 2021) document that mobile money vendors in rural Ghana are just 40% of the time likely to post provider-approved tariffs at retail outlets. This exemplifies the difficulty of enforcing tariff-posting in a context where it is most required. In an environment where consumers are poorly informed about market activities and services, lack of tariff-posting at DFS-retail outlets can incentivize hidden vendor behavior or moral hazard. An important example of such hidden behavior is vendor misconduct or overcharging of DFS services, an issue we turn to in Sections III and IV. Similarly, exploitative retailers of DFS can enter into the market and drive out good retailers, leading to adverse selection and inefficient market outcomes.

Surveys from South Asia and East Africa reveal that lack of transparency is common in markets for DFS. In Uganda and Bangladesh, consumers indicate that fee structures are not displayed at retail agent shops; and, in Tanzania, customers indicate that while agents display fee charts, they often display the old charts (Intermedia 2014; Kantar 2017). In developing countries where the literacy rate may be relatively low, pricing transparency may be particularly limited. Women are often more disadvantaged than men when it comes to understanding the structure of the formal

financial system for a variety of reasons, including limited experience with actual transactions (Garz et al. 2021). Opaque pricing could limit consumer adoption of DFS if customers incorrectly perceive the services as more expensive than they are in practice. Limited ability for price comparison could also reduce competitive pressure on providers to offer value for money and innovative products and service (Annan 2021). The terms for DFS, especially more complex allied services, such as credit or insurance, may be poorly disclosed by both agents and providers. According to (InterMedia 2015; Kantar 2017), in Rwanda, only 50% of borrowers report knowing their loan terms and the interest they pay on loans (Giné and Mazer 2022). In Kenya, the M-Shwari savings and credit product provides the terms and conditions through a web link even though many users lack access to the internet. In Tanzania, consumers report confusion about the relationship between mobile money and non-financial services offered by telcos.

### II.4 DFS Providers-Retail Agents Interactions

**Forms of Interaction—**The relationship between DFS providers and retail agents are defined by regulations and for many countries, these relationships are bound by written agreements. This suggests that the rules of engagement of agents may vary from one country to another. Agent regulations are based on three main approaches; *institutions-based*, *account-based*, and *activity-based*. Institution-based approaches regulate the type of DFS an agent can serve. India, Kenya and Pakistan operate an institution-based approach. Account-based approaches mandate which accounts the agents serve, that is, either bank account or e-money account. Bangladesh operates an account-based approach. The activity-based approach mandates the type of service agent provides. Ghana and Rwanda are examples of countries that operate an activity-based approach. In other countries like Malaysia and Tanzania, the rules prevent DFS providers from engaging agents whose only activity is agent banking. Although this requirement may deter entities that have the ability to generate profit for a successful business from becoming agents, it also ensures that there is enough liquidity to cover operating expenses. This criterion is especially useful in environments where the principal does not provide any means of liquidity to the agent and liquidity constraints are significant.

Once agents are recruited, they serve as the interface between the providers and the consumers. By delegating providers' financial services to downstream retail agents, the agents' actions reflect on the image of the provider and financial product. This makes it important for providers to perform appropriate oversight responsibilities by recruiting devoted agents. To employ and keep high quality agents, it is important for providers to offer incentives. This is especially true for markets where most agents are non-exclusive. Stronger incentives appear to be effective at retaining agent loyalty and productivity. IFC (2018) survey data suggests that bank agents invest more in convincing customers to use the services of providers who offer the highest agent commission. Evidence from Indonesia, however, demonstrates that getting incentives right can be tricky. Specifically, Deserranno and León-Ciliotta (2021) demonstrate that offering bank

retail agents higher commissions for onboarding new customers only increases the take-up of new financial services when the incentive payments are unknown to prospective clients. In other words, providers must balance incentives for agents with consumers trust and experience more generally.

Emergency policy responses to the COVID-19 pandemic further highlight the need to balance agent and consumer welfare. During the early months of the pandemic, many governments passed regulations that effectively reduced the transaction fees providers could charge for payments and transfers (World Bank 2021), which many analysts suggest drove a surge in usage of DFS (Economist 2021). However, others cautioned that this downward shock to agent-supported transaction pricing could disable the agent business case and counter-intuitively undermine the specific pandemic-related policy goal of supporting the healthy functioning of the DFS ecosystem.

**Exclusivity of DF-Retail—**Many countries including Ghana, Kenya, Nigeria and Tanzania allow agents to serve multiple DFS providers "non-exclusively." In Ghana, non-exclusivity applies to all types of retail agents, but in Nigeria, Kenya, Tanzania, non-exclusivity applies to just banking agents. Non-exclusivity makes it easier for agents to work with multiple principals and generate enough revenues to make the agency business successful, which may benefit existing agents and encourage entry by new agents. Non-exclusivity also has the potential to enable multiple DFS providers to enter the DFS market even when agents are limited in supply, creating potential competition among providers and greater options for consumers. This might foster competition among DFS providers as they have to provide better services and vendor commissions to be able to attract customers and retail agents, respectively. Competition among providers is further intensified in the DFS market with non-exclusivity because providers are unable to control retail distribution outlets and hence, providers ability to provide excellent services is what will make them thrive.

But *can exclusivity of retail agents, in which case the upstream provider dictates that it will be the sole service provider for downstream retailer, be anti-competitive*? On one hand, the Chicago School answer is "no". In a model, they argue that reduced competition means higher wholesale price at the upstream which implies lower profits for retailers and vice versa. But since signing up for exclusive dealing is voluntary, the retailer would never voluntarily enter into a relationship with lower profits. This means rational firms would not engage in this practice for anti-competitive reasons. On the other hand, exclusivity can have anti-competitive effects. Alternative models (see e.g., Aghion and Bolton [1987]; Rasmussen, Ramseyer and Wiley [1991]; Segal and Whinston 2000) made reasonable alterations to the Chicago School model to show that exclusive contracts constitute a profitable strategy for excluding rivals, and thus can act as a barrier to entry with a potential negative effect on aggregate welfare. Overall, these theoretical results are somewhat fragile, making questions about exclusive vs non-exclusive DF

retailing important empirical questions. Interoperability could help address some of the issues associated with vendor exclusivity vs non-exclusivity, but not all DF ecosystems in LMI countries have this kind of service.

**II.5 OPEN RESEARCH QUESTIONS:** Open questions related to market structure include:

- Do drivers of competition (infrastructure control, economies of scale, regulation, etc.) influence service quality, prices, and profitability in markets for DFS?
- How enforceable are the requirements demanded of retail agents (startup liquidity, tariff posting / transparency, etc.) by the providers and regulators? Do these lead to better agent performance?
- What are the moral hazard and adverse selection effects of tariff-posting/ market transparency at DFS retail points?
- What are the potential impacts of different transaction fee structures, different vendor commission structures, and non-exclusive organizational arrangements on DF-retail vendor expansions and competition?
- How might the vertical structure of DFS constrain retailers' competition for service quality provision and what interventions might work to eliminate such vertical market externalities?

## III. MANAGEMENT INCENTIVES WITHIN RETAIL DF

### III.1 Nature of Direct Competition and Incentives

Competition in markets for DFS takes different forms and horizontally occur among upstream providers and downstream retail agents. We discuss these two sets of competition, which might also jointly interact in a vertical way.

**III.1.1 Providers and Upstream Competition—**At the upstream market, large mobile phone network operators compete amongst themselves and also with some banks which offer similar services through POS devices. In DFS markets, effective competition upstream can improve financial inclusion and consumer welfare in several ways (Mazer and Rowan 2016). First, to attract customers and businesses into their fold, MNOs compete by pursuing cost efficiency strategies to drive prices down (Balasubrumanian and Drake 2015). Second, competition also stimulates providers to ensure that the products and services they offer are high quality to sustain the interest of customers to continually use the service and help the provider maintain its dominance. Third, the introduction of new and innovative DFS by providers is also driven by effective competition with the view of promoting increased uptake by various categories of consumers including the poor (Hanouch and Chen 2015). Fourth, with the variety of options increased through competition, the quality of both the telecommunication network and DFS

being provided also improves. This helps service providers to reduce the incidence of consumer switching (McKee, Kaffenberger and Zimmerman 2015).

Despite the potential benefits of competition, there are key competition issues for DFS especially at the upstream. These include access to the channel for delivery of DFS, transparency of DFS products, interoperability, data sharing and the role regulatory authorities play in competition (Mazer and Rowan 2016). First of all, in the upstream market where the players are few, one of these players may also double as the main provider of the channel for the delivery of DFS. In Kenya and Tanzania for example, the main technology for delivery of DFS is USSD which is managed by dominant firms. Whilst it cost the lead firm very low amounts to use this front-end infrastructure, it may cost other institutions such as banks several times to use the channel. This price differential for different upstream operators disincentivizes competition since some providers may not be able to access certain markets. Price transparency has the potential of fostering competition through lower search costs for consumers. However, since there is lack of transparency, in many instances, consumers are presented very little information which gives them few provider options.

The interconnection of mobile money services either between service providers or with external parties, referred to as *interoperability*, reduces negative network effects which restricts consumers' switching freedom (di Castri 2013), allows flexibility and enhances competition since agents may more easily be able to serve multiple DFS (Kumar and Tarazi 2012) and individual DFS channels become more accessible to third parties. Despite the benefits of interoperability, in markets where the market shares of the main players are skewed in favor of one player, competition may be hindered. Data sharing issues of DFS may also hinder competition. Data generated through DFS operations could serve as valuable information for the creation of new and more innovative products to promote competition. The lack of information sharing could create barriers to entry. Regulation around the safe and effective sharing of such data can help drive competition and predict agents' revenue streams. If existing regulations do not cover all DFS and their products, there are sometimes ambiguities which hiders competition.

**III.1.2 Retailers and Downstream Competition—**Retial mobile money and agent banking services have been dubbed 'bridges to cash' (Eijkman, Kendall, and Mas 2010), to describe the use of mobile phones together with a network of human 'agents' to replicate the functionality of the ATM or bank branch. Vendors or agents of DFS are the foot soldiers of DFS providers and thus interface with customers directly. As profit maximizing businesses, retail agents are primarily concerned about the volume of sales, which in turn is driven by demand for their services. For customers to demand services in a competitive retail finance environment, *service*

*quality* is key. This will be of prime importance if competition becomes apparent in the agency market.

Elements of service quality are often viewed through a customer trust lens. However, customer trust may be two-dimensional: (i) benevolence, that is, the customer believes that the firm or agent will behave in a way that benefits the two parties and (ii) competence, that is, customers believe that the firm could deliver the service without flaws (Singh and Sirdeshmukh 2000). In the benevolence sense therefore, consumers using mobile money services expect the agents to display prices/fees, and the absence of these clearly displayed fees could reduce consumer trust. Similarly, a customer will have competence trust if they believe the agent has the knowledge and ability to conduct the MFS. For instance, the agent knows the correct daily transaction limits, identification or KYC requirements, and other operator policies regarding the use of mobile money. When these two dimensions of trust exist, as has been found in other businesses, customer loyalty to retail agents also increases (Sun and Lin 2010). Thus, agents who possess these qualities can capture a larger share of the market and lead to a competitive environment.

In a competitive setting, where customers have a choice between one agent and their competitors, agents are faced with the risk of customers switching retailers and sales of individual agent firms are expected to fall. For example, some studies have found that increased competition decreases dealers' sales in the auto industry in the US (Olivares and Cachon 2009). As DF retail agents increase in a specific location, we expect demand for an individual agent to decrease (*if* aggregate demand does not change). Under such circumstances where competition reduces the agent's sales, an agent who is conscious of promoting benevolent trust through the transparent display of prices and competence in the delivery of the service is more likely to get customer loyalty and attract more demand for his/her services. In an agent's catchment area where retail competition is extremely high, each agent may hold undesirable levels of inventories and these levels could also rise further if the individuals who live in the area are poor and rarely withdraw cash (Balasubramanian and Drake 2015), particularly if external remittances are low. To survive this intense competition and ensure that unsustainable inventories are avoided, agents may offer a combo of services which may go beyond simply providing DFS, but also the sale of groceries, for example. We refer to such agent reactions as "innovation equilibrium", whereby the agent innovates by adding other lines of business rather exiting the market when faced with competition. The benefit of doing this is for customers who come in to purchase their groceries or non-DF products and may also need some money to use the cash-out services.

But *does entry and increased competition always lead to better DF outcomes (e.g., service quality)*? Most retail DF markets are arguably characterized by low to modest retail competition: the density of active mobile money agent network averages 3 agents per 11K population in

Ghana (Annan [2020; 2021]) versus 2.3 agents per 10K population globally (GSMA 2019). We appeal to both rational and behavioral theories to speculate the potential market effects of increasing competition. On one hand, increasing retail competition allows new entrants to acquire some of the existing customers, which might incentivize desirable behavior (invest in service quality, etc.) of DF retailers because customers now have outside options to seek for exchangeable services and retailers might be worried that customers may switch to competitors (*market share effect*; see Becker 1990; Autor 1998; Matsa 2011). On the other hand, increasing the number of DF retailers can either increase consumer search costs (i.e., the cost of discovering non-fraudulent and trustworthy vendors; see Satterthwaite 1979; Rosenthal 1980, Ellison and Wolinsky 2012) or increase consumer switching costs given that customers now have more switching offers (i.e., *procrastination effect*; see Farrell-Klemperer 2007; Ericson 2020; Heidhues and Kőszegi 2018; Heidhues, Kőszegi and Murooka 2021). In contrast to market share effect, the effects of increased search cost and switching cost/procrastination might incentivize undesirable behavior of DF retailers. We argue that the effects of competition are ambiguous in markets for DFS, making issues of retail competition important empirical questions.

### III.2 Indirect Competition and Incentives

DF-retail agents are surrounded by local businesses and nearby merchants that may directly accept "interoperable" digital payments for goods and services in the marketplace. As point of sale (POS) devices become common and more businesses accept mobile money, bank cards and QR codes as forms of payment for services rendered, the demand for cash-out services from agents' outlets may go down. This has the potential to exert competitive pressure on vendors, especially when these cash out services have higher profit or commission margins. With time, we have seen small businesses display their personal phone numbers and/ or merchant IDs to be used for receiving payments for goods sold or services rendered, promoting efficiency in payment system. Hitherto, customers would have gone to an agent first, effect a cash-out, and then use the hard currency to effect payment. Agents working in a vicinity or a locality where nearby businesses accept digital payments directly are likely to see a reduction in their income and profits. As a result, DF-retail agents may respond, example, by onboarding additional lines of business, to survive. This perhaps correlates with why the bundling of DF services with non-DF product services is a common market practice. We note that such indirect impacts on vendors and vendor reactions are likely to follow *if* central bank digital currencies (CBDCs)–which are currently being discussed and piloted in LMI countries—are eventually implemented.

### III.3 Potential for DFS to Improve Microfinance

The lack of physical collateral, the cost and challenges of repossessing collateral in LMICs has made it extremely difficult for traditional financial institutions to lend to poor households in remote communities in the Global South. Default rates have been characteristically high and the legal frameworks available for incentivizing borrowers to repay are sometimes weak. Thus,

creating a state where lending arrangements which have worked in the USA and Western Europe to fail in the developing world. In the 1990s, there was a strong belief that microfinance arrangements of various forms and nature could address the issue of providing group sureties for the provision of finance to poor households and firms which come together to form cooperatives. After two to three decades of experimenting, we are yet to see considerable progress in terms of how far microfinance can extend the possibilities of lending to the poor in developing countries.

The question is, *can mobile and digital financial services help circumvent the collateral barrier to credit access by the poor?* A recent experiment by Gertler et al. (2021) which seeks to advance the idea of what the study terms "digital collateral" has shown a lot of promise. That is, a new form of secured lending utilizing "digital collateral" is emerging in LMI countries. Digital collateral relies on "lockout" technology, which allows the lender to temporarily disable the flow value of the collateral to the borrower without physically repossessing it. Borrowers who fail to pay their loans based on the agreed terms are refused access to the service being provided by a good they have bought on credit. Mobile phone infrastructure and programming allows the system to automatically cut off a customer temporarily until payments of the loan are made. The loan amount the MNOs give are relatively low because there is no way to ensure repayment. While various digital currencies are making inroads into the financial space, it is important for agents to find alternative ways of making money to make up for the expected shortfalls in revenue. One way is to expand their loan portfolio. However, this will be difficult with the reliance on the traditional modes of granting loans. Digital collateral can enhance the loan portfolio of MNOs. Testing the effect of digital collateral on a school-fee loan product offered by Fenix International, a solar home system technology company operating in Africa, Gertler et al. (2021) document that securing a loan with digital collateral reduces default rates by 19% and increases the lender's rate of return by 38%. The plausibility and effects of alternative digital loan and credit programs for small businesses remain to be examined.

### III.4 Exclusivity and Within-Vendor Incentives

As mentioned in Section II, non-exclusivity of DF-retail outlets has several advantages, but such organizational arrangements can generate differential vendor incentives with mixed implications for DF inclusion. Non-exclusivity allows vendors to provide retail services for multiple providers. When the marginal commissions that vendors receive vary across providers, then vendors will have the incentive to invest and promote more the providers that offer higher profits (Deserranno and León-Ciliotta 2021). DF services for "low-commission" providers may be plagued with illiquidity challenges and transaction declines, which can erode consumer confidence in overall DFS, including even for the services of "high-commission" providers. Such within-vendor incentives are unique to DF-retail agents, in contrast to traditional ATMs – where providing financial services for multiple providers can emerge as a response to market competition (Bianchi et al. 2021). If DF service charges and marginal commissions to vendors

are equalized across all competing providers, then similar responses can be achieved under DF-retail agents.

Non-exclusivity of retail agents introduces another meaningful tradeoff: Suppose an incumbent provider bears the initial cost to train and establish DF-retail vendors. A new provider is then faced with the decision of either crowding in new microenterprises as entrant vendors or using the existing retail agents to expand their new DF services. It costs more to train and operate new microenterprises but may yield less negative incentives even if their commission is relatively lower. However, it costs less to operate on incumbent vendors but may yield more negative incentives. In the latter case, there is another possibility for a mutual benefit—agent liquidity can be exchanged across provider accounts whenever possible to deliver retail agent services. This has implications on the incentives for providers to deploy more retail agents and thus in deepening DF-retail distribution networks (in the sense of whether to be a "leader" or a "follower"). We note that this implication might also generalize to incentives that apply to the expansion of DF network infrastructure especially in rural "small market" areas, and perhaps explains why some places are still not deeply connected to the DF grid.

### III.5 Externalities and Vendor Incentives

The vertical nature of markets for DF creates incentives for both vertical and horizontal externalities, which may be inefficient (Tirole 1988, Chapter 4). *Vertical externalities* arise when downstream retail agents over-price transactions (Annan 2021; Blackmon, Mazer and Warren 2021) relative the price set by the upstream DF service provider. Indeed, over-pricing is more likely when there is limited oversight into the behavior of agents and / or there is market power in the retail agent market, and thus over-pricing can be thought of as vendors exercising their market power, without loss of generality. This leads to a version of the well-known double marginalization problem and implies higher consumer prices, lower aggregate demand for DFS or sales revenue, and lower aggregate profits (see Annan [2021] for relevant evidence in markets for mobile money). Next, *horizontal externalities* arise if retail agents cannot fully appropriate for themselves the benefits of expenses they incur to provide quality DF retail services (e.g., advertise DFS to crowd in more customers) but instead see some of the benefits accrue to their downstream retail competitors. This is well-known as the free-rider problem (Mathewson and Winter 1986; Riordan 1998), which in turn incentivizes hidden retail agent behavior, poor / under-investment in DF services, and eventually lower consumer demand and trust. In theory, potential interventions to correct such horizontal externalities (i.e., downstream retail agents moral hazard) amount to the general principle of making agents residual claimants (e.g., *tying* retail agent commissions and profits to good customer service activities or customer reviews, etc), similar to incentive mechanisms for managing franchise contracts (Lafontaine and Raynaud 2002). In practice, however, the effectiveness of such interventions and their effects on markets for DF are yet to be explored.

### III.6 DFS unlock Businesses

Firms in developing countries have often been slow to adopt new technologies (Verhoogen 2021; Alfaro-Serrano et al. 2021), a phenomenon that extends to their take-up of DFS. In theory, DFS have the potential to benefit "existing" firms in LMI countries by improving their ability to manage their finances (Bloom and Van Reenen 2010; Bloom et al. 2019), access credit (De Mel, McKenzie and Woodruff 2008), access new markets (Atkin, Khandelwal and Osman 2017) through digital marketing and/ or e-commerce, overcome theft which a significant challenge faced by many firms (World Bank 2020), etc. However, firms may not have the incentive to adopt these seemingly beneficial DFS because of important frictions such as high capital requirements, lack of knowledge, perceived future tax implications, or because they are uncertain of DFS returns and consider it risky. This reasoning motivates several empirical works on SMEs about digital marketing (McKenzie, Osman and Rahman 2020), electronic payments and digital loans (Dalton et al. 2018), information and new markets (Burga et al. 2021), and more recently, the network and equilibrium effects on businesses (Annan, Giné and Blackmon 2022). Building on the unique feature that businesses "do not operate in a vacuum", (Annan, Giné and Blackmon 2022) implement a field experiment to evaluate both the equilibrium effects of digitizing business payments along the supply chain and the network effects on neighbouring businesses. The short-, medium- and long-term effects for most of these interventions remain to be determined.

**III.7 SOME OPEN RESEARCH QUESTIONS:** Open questions include:

- What interventions will work to promote good supply-side behavior, either (i) monitoring and punishment mechanisms by providers and regulator(s) vs (ii) vertical incentives that make vendors residual claimants of business output?
- What are the impacts of vendor entry on business outcomes (transparency, service quality, revenues, profitability, etc.) and consumer welfare (adoption of DFS, trust, inclusion, etc.)?
- Can agents survive in the absence of bundling DFS with other non-DF retail product services?
- How might vendor competition improve or worsen outcomes in the DF marketplace which is characterized by uninformed consumers, shrouded attributes and / or hidden prices?
- How has interoperability affected competition and general operations of DF providers, retail agents, and SMEs?
- How and to what extent has the emergence of non-DFS retailers/SMEs accepting DFS influenced the profitability and services of DFS retailers? How have (will) the emergence of digital currencies influence(d) the activities of DFS retail agents? Should vendor

commissions be regulated in a market characterized by shrouded attributes and / or hidden prices?

- Could differential incentives at the vendor level lead to price convergence or homogeneity in the market and likely induce better vendor conduct and supply-side market growth?
- Could this matter in provider expansion decisions (e.g., crowd in new microenterprises vs use existing DF-retail vendors to expand DFS)?
- Does DFS unlock the potential of businesses, especially for those run by women? If so, how?
- What are the tradeoffs between digitization/DFS and taxation, and how does this constrain the overall adoption of DFS by M/SMEs in LMI countries?
- Is DF the intervention itself (i.e., create new businesses or startups via DF retailing)? Or is DF the vehicle to unlock the growth of existing businesses (i.e., encourage businesses to accept DF payment services)? Or both (bundle DFS and non-DF product services)?

## IV. CONSTRAINTS TO ENTRY AND GROWTH

**IV.I Background:** A number of hypotheses have been advanced to explain why agents are sparse, absent or small in regions that have active or latent demand for DFS or would otherwise benefit from access to DFS. Without rigorous experimental or quasi-experimental variation in the market, however, it will remain difficult to ascertain which of these hypothesized constraints are most binding and what solutions are effective and practical. We discuss potential constraints that agents face and how these constraints limit agents reach, density, and growth.

### IV.2 What Factors Constrain *entry* into Retail-DF?

According to Bain (1956), factors like economies of scale, product differentiation, and absolute cost advantage serve as barriers to entry into markets. From the perspective of economic theory, these factors are based on how an industry structure can favour incumbents at the expense of new entrants. Yet, the features of various markets determine the degree to which entry is permissible. For example, in pure monopoly markets and oligopolistic markets, there exists a range of low to high entry barriers, whereas monopolistic competitive and perfectly competitive markets have free entry and exit. Given that DFS providers and retail agents have an oligopolistic structure, there certainly exists some barriers to entry in the industry.

There are several reasons to believe that entry barriers exist in the DFS provider and agency markets. First, both incumbent DFS providers and agents are likely to enjoy economies of scale and benefit from the learning curve effects in the DFS market. Second, service or product differentiation by incumbents also serves as a barrier to entry (Bain 1956; Bass et. al 1978). Theory suggests that, established firms can distinguish themselves and have customer loyalties

either because they were first to enter the market, they have advertising capabilities, provide good customer services, or exhibit differences in products.

Third, perceived customer switching costs and procrastination, which make it difficult for the consumers to switch DFS providers and retailers, impede entry into the DFS market (McFarlan 1984). For countries like Ghana and Nigeria that allow "network portability" at no cost, customers keep their numbers when switching from one network to another. This enables customers to switch easily to networks that provide better services. For such countries, service providers and their agents who wish to enter the market may not face hinderances arising from switching cost so long as they enter with the notion of improving their services and making them cheaper. In relation to interoperability and "portability" of DF services, countries that do not permit agent interoperability are likely to discourage agent entry as this may reduce how much commission agents make.

Fourth, capital requirement can obstruct entry. Although DFS providers and their agents aim to lower cost through their automation of services, it is generally very expensive to establish an enterprise. High fixed costs and sunk costs involved make it difficult for start-ups to compete with incumbent firms that have scale efficiencies. For example, agents in many countries require some minimum capital requirements before setting up businesses. In Ghana, agents require a minimum of 4000GHS (=~$700) to start their retail business (Annan 2021). Some countries require some documentation and clearance before agents can set up. The need to invest large financial resources to enter a market creates barriers to entry and this barrier to entry is higher in capital intensive markets like the DFS market. This may be especially true in low-income environments and for females who tend to operate businesses that are usually small scale and perhaps correlates with why there are relatively few agents in rural areas and less female-run DF-retail vendors (Giné, Goldberg and Vandewalle 2020).

Excessive regulations obstruct entry into markets. The costs of compliance are sufficient enough to deter new products or firms from entering the market. Compliance costs are disproportionately burdensome to smaller firms. A large-cap financial services provider does not have to allocate as large of a percentage of its resources to ensure it does not run into trouble with regulators compared to a smaller firm, like DF retail agents. Despite these impediments, firms still try to enter markets, and some even become more successful than the incumbent firms. Porter (1980) argues that firms use three major entry strategies: (i) entry through internal development, which involves the creation of a new business entity in an industry, (ii) entry through acquisition, and (iii) sequenced entry, which entails initial entry into one group and subsequent mobility from group to group. In many DFS markets, entry of both providers and agents is defined by the regulations that pertain in a particular country (Bianchi et.al. 2021).

Fees charged by different providers for services rendered can serve as an impediment to the penetration and density of the agency market since the fees charged by the provider constitute the revenue for the DFS and forms the basis for which agents' commission are determined (Hahm 2008). Different providers set their transaction fees in different ways. CGAP (2017) outlines three formats: (i) no fees, (ii) slab pricing (where transactions within a given range have the same fee but fees vary across slabs) and (iii) percentage-based pricing (where the fee charged is a percentage of the transactions carried out). No fee pricing and slab pricing serve as a disincentive for potential vendors when vendor profits are perceived to be low, and even with incumbent vendors, these forms of pricing can lead to vendor misconduct (Annan [2020; 2021]) as retail vendors may stagger payments to clients, particularly in areas where consumers are poorly informed about prices. Fees may also vary based on whether the transaction is an on-net or an off-net one. Where agents are only permitted to charge flat fees regardless of the volume of transactions, it may deter other agents from entering the market leading to a few agents on the market. Insufficient agents can suggest a lack of nearby agent or lack of capacity to meet customer demand, leading to long queues and potential illiquidity challenges.

Moreover, the presence of barriers to entry enables incumbents to have above-average profitability (Yip 1982). Davidson and Leishman (2016) support this view by suggesting that over-saturation of the agency market means agents will be exposed to fewer transactions and not earn enough to compensate them for their investment. Agents in an over-saturated market will be unable to maintain floats and thus unable to meet their demands, leading to interruption in their services. Infrequent use of agents will result in agents forgetting how to render their services, even when they have liquidity, leading to low competence trust from the perspective of DF consumers.

### IV.3 What Factors Constrain *expansion or growth* of Retail-DF?

Previous studies have emphasized several barriers to firms' productivity and growth, such as lack of managerial skills, limits to borrowing, illiquidity, working capital (Hina et.al. 2014), firm size (Gaio and Henriquez 2018), lack of capital (De Mel, McKenzie and Woodruff 2014), inter-business relationships (Cai and Szeidl 2017), market access or lack thereof (Atkin, Khandelwal and Osman 2017), information (Jensen and Miller 2018), and more recently (inefficient) vendor misconduct in markets for DFS (Annan 2021).

**Management—**Bloom and Van Reenen (2010) and Bruhn, Karlan and Schoar (2018) document that poor management practices impede production in developing countries. Bloom et al. (2013) examine how differences in managerial skills can explain differences in productivity of large Indian textile firms, finding that improvement in management practices improves firm productivity. In the DFS market, where the providers have good oversight on the activities of the retail agents, these agents are likely to attract more clients and thus, translate into expansion and

growth of DFS providers. Providers make it mandatory for retail agents to post their tariffs (Annan [2020, 2021]). However, as to whether agents will comply with this rule will depend on the managerial ability of providers. Where providers carry out their oversight roles carefully, agents are able to keep clients. We note that some clients lose their funds to mobile money fraudsters, so the ability of providers to resolve these problems in the shortest possible time helps build confidence and trust which foster growth in provider and agent businesses. In cases where the fraudsters have been noted as employees of the providers or even retail agents, the ability of DFS providers to act swiftly on this can influence growth of the providers.

**Business Relationships—**Agent collaboration, be it far or near geographically, can be useful for the expansion of DFS market through liquidity access during emergency need for e-cash. Agents who acknowledge and nurture these relationships and networks can smoothen their e-cash needs. Cai and Szeidl (2017) emphasize that network frictions may hinder business relationships and impede the provision of information, training, referrals, intermediate inputs, and other services which are potentially crucial for business growth. Their results suggest that firms with extensive networks and dynamic training programs improve firm performance substantially among Chinese firms. In markets for DFS, training is standardized and dependent on the policies and set regulations of the provider. Poorly trained agents may blame their inadequacies on network issues rather than admit they cannot provide a service and as a result, decline DF transactions. First time customers that experience this may never return to the agent, resulting in a loss of business for the retail agent and potentially crowd out aggregate DFS adoption.

**Illiquidity—**Rampant illiquidity issues with DF-retail agents can impede the growth of agent business. Research conducted by the Helix Institute's Agent Network Accelerator in 2017 highlights four key challenges to the effective management of liquidity. These challenges include (i) inability to predict and respond to fluctuations in demand for liquidity, (ii) distance to rebalancing points (typically banks), (iii) shutting their businesses to rebalance and (iv) lack of resources to buy sufficient float to keep their businesses running. Out of these challenges, illiquidity was cited as the key challenge for retail agents. Indeed, Intermedia (2015) reports that 22%, 55%, 23%, 32% and 37% of Ghanaian, Kenyan, Rwandan, Tanzanian and Ugandan mobile money users respectively are unable to complete transactions due to insufficient agent liquidity. Such illiquidity effects are likely to be more significant in rural areas (Annan [2020; 2021]).

Aside from few countries such as Bangladesh and Pakistan—where representatives of the providers go around and provide e-float or cash to agents—most providers see liquidity management as the responsibility of the agents. Lately, some providers are deploying "Super Agents" such as banks, MFIs and supermarkets to provide balancing points to help agents manage their liquidity. This approach provides a useful way of ensuring liquidity in the urban areas. However, in the rural areas where these super agents remain uncommon and far-flung, agents' ability to manage liquidity remains a problem as they are less likely to receive effective

support. Most of the transactions done in the rural areas involve cash-out of P2P transactions sent from urban areas, which makes agents in the rural areas less liquid (as they accumulate *e*-float). In a series of real transaction exercises, Annan (2020; 2021) document that mobile money vendors in *rural* Ghana are 39% likely to decline transactions due to insufficient liquidity—an evidence that exemplifies the pervasiveness of illiquidity challenges in rural environments.

Illiquidity in agent businesses makes service unreliable and leads to mistrust in services by customers, decreasing uptake of DFS and profitability for agents and providers. Nanda and Panda (2018) show strong positive relationship between liquidity and firm performance. The problem of illiquidity is exacerbated in countries where interoperability is non-existent. In such economies, non-exclusive agents carry the extra burden of maintaining separate silos for each network, compelling agents to spread their working capital across networks and reducing the amounts for each. Hina et.al. (2014) show there exists a considerable influence of a firm's working capital management on its profitability and that companies can improve their profitability level through management of working capital. Insufficient agent liquidity can also compromise the confidentiality of customers' personal information. Some agents fall on other agents for support, provide the customer's PIN, have the other agent complete the transaction, and then reconcile the amounts later (CGAP 2014). This sharing of private information, which is also a data security issue, can leave customers vulnerable to fraud and undermine trust that their financial matters are handled confidentially. In addition, agents in many markets are targeted for robbery because of the cash they hold, making them to hold less. Fraudsters also target agents and their digital currency, which creates incentives for agents to keep less float in their account (Wright 2013; McKee, Kaffenberger and Zimmerman 2015) and reducing agents' liquidity.

**Services—**Retail agent networks suffer from specific service level issues. Few DFS providers manage so many branches which in turn manage agents. However, it is costly and exhaustive to manage such large agent network. Thus, most providers struggle to efficiently service and manage agent networks. Liquidity management practices are outdated and most agents have to travel long distances to rebalance their float. Unpredictable fluctuations in demand and time spent at the rebalancing point lead to issues in liquidity management. Low education for some agents and lack of financial literacy also makes it difficult for agents to appreciate the functions of DFS. In many countries, mobile money menus are in English, creating a barrier for consumers who are illiterate or understand only colloquial language. The challenges related to agents in the rural areas are even more serious. This discourages providers from expanding to these areas and explain why agent networks seem to be limited in the rural areas where they are most needed. Sparse populations lead to reduced revenues per customer, with lower transaction sizes and volumes compared to urban settings. At the same time, limited consumer DFS awareness and ID coverage require more effort and costs to onboard customers. Poor infrastructure, low agent density and poor connectivity make it harder and costlier to onboard and manage agents. Providers face hefty investment to set up agent networks before transaction volumes can guarantee a financial return.

**Vendor Misconduct—**Markets for DFS are characterized by imperfect information, vendor misconduct (illegal price mark-ups on transactions), and "miscalibrated" customers–poor consumer knowledge of official charges, consumer mistrust, and misperceived / upwardly-biased beliefs about agent misconduct. These are common and robust features DFS markets. Yet, vendor misconduct may be a dominated action—it raises the marginal cost of transactions (increasing prices) and reduces firm activities (decreasing quantities) if consumers (mis)perceive any wrong doing leading to inefficient outcomes (Annan 2021).

Recent cross-country consumer protection surveys of DF users conducted by the Innovations for Poverty Action (IPA) show significant rate of vendor misconduct and overcharging against consumers in Kenya (=3%), Uganda (=32%), and Nigeria (=42%) (Blackmon, Mazer and Warren 2021). Other surveys demonstrate that DF retail agents may intentionally manage their liquidity in a way that can result in customers being unable to transact. For example, in Kenya, some agents lie to customers about liquidity shortages to maximize revenue from each transaction or to help other agents nearby (a form of vendor misconduct), refusing to conduct certain transactions even when they do in fact have sufficient float (Jumah 2015; McKee, Kaffenberger and Zimmerman 2015). Instances of overcharging, poor fee transparency, and registration for unwanted services that deduct daily charges from customers are common in retail finance. In Uganda, for example, inadequate fee transparency has led some customers to believe all fees charged by agents are fraudulent (InterMedia 2014). In Russia, poor transparency of fees and conditions is in the top four concerns limiting DFS uptake (Imaeva et al. 2014; Lyman et al. 2013). In theory and as a rational strategy, agents have the incentive to decline low-commission transaction types (e.g., cash-ins) and conduct high-commission transaction types (e.g., cash-outs), especially under dire liquidity situations, though such effects remain to be rigorously evaluated in practice.

**Dimensions of Vendor Misconduct —** Misconduct and opaque pricing can thrive in a retail DF market environment, especially when vendors have high salvageable production costs (Klein and Leffler 1981), there is lack of competition, and consumers are poorly informed about market activities (Annan 2021). In contrast to retail agents, customers receive little to no information about transaction charges when they sign up for DF services, rendering consumers poorly informed about prices relative to retail agents.

Retail-DF vendor misconduct may occur along several dimensions. First, vendors can split a single transaction into multiple transactions to increase commissions. For example, an agent may tell a customer that s/he does not have enough float and advise the customer to return later to complete the transaction, especially when the agent network is thin. This can result in extra fees for customers, who may or may not understand what is at stake. Research in Kenya showed some agents conduct partial transactions to manage their float and maximize revenues (Jumah 2015; McKee, Kaffenberger and Zimmerman 2015). Second, an agent may access other agent's logbook used to record transactions and use that information for fraudulent purposes. Third,

agents can charge unauthorized fees (see e.g., Annan [2020, 2021], Blackmon, Mazer and Warren 2021). Unauthorized fees, particularly for OTC transactions, are commonly reported in many markets. In practice, this can take multiple forms such as agents charging extra fees when conducting transactions and charging for services that should be free. Even when mobile money business processes are set up to deduct the correct fees electronically, for example, agents can overcharge customers by requiring extra fees paid in cash for cash-in or by short-changing the customer on cash-out. In Uganda, DFS users report retail agents charging for registration, even though there should be no registration fee (InterMedia 2014). Ugandan customers report agents charging for deposits and say agents charge differing fees for the same services, leading them to suspect many of the fees are improper (Ogwal 2015; McKee, Kaffenberger and Zimmerman 2015). In Tanzania, DFS users also suspect agents of charging improper fees, and many claim the fees agents charge do not match the fee posters in agent shops (InterMedia 2014). Evaluating the nature and influence of consumer beliefs and expectations about vendor misconduct, including retail competition are poorly understood issues.

**Gender and Vendor Misconduct—**Research indicates strong gender differences in financial misconduct with effects on welfare (see, for example, Egan, Matvos and Seru [2019] for evidence in the market for financial advisors; Annan [2020, 2021] for evidence in the market for mobile money). In theory, gender-based misconduct can lead to poor and inefficient outcomes if resources are allocated from a more productive group to a less productive group and these outcomes are expected to have large impacts in areas where the financial system is unable to attract the marginalized in society. GSMA (2015) finds that a "lack of knowledge and confidence in their ability to use mobile financial services" is a critical barrier to broader uptake among women. Similarly, Annan (2020) finds that female users are perceived to be less sophisticated. Thus, if females decide to use DFS, they are more likely to be victims of agent misconduct as they have limited awareness about the DF products they are using and their functions.

**IV.4 SOME OPEN RESEARCH QUESTIONS:** Open questions include:
*What interventions – public and commercial solutions – will work to expand viable DF-retail agent networks, especially to rural areas? How far into rural areas can one feasibly go? How do one introduce new retail-DF agents into brand new "virgin" markets? What efficient market forms can this take with respect to training, gender composition, location, use of existing micro-businesses, etc.?* Examples of plausible hypothesized interventions:

- Relaxing registration requirements for agents and/or creating a tiered agent registration system among regulators and/or commercial providers
- Enabling new rural agent business models, including traveling agents, agents embedded in nodal infrastructure like health clinics, etc

- Subsidizing the start-up capital (via grants or subsidized credit) for new agents in low transaction volume regions
- Encouraging the recruitment and hiring of female CICO agents
- Enabling shared "dual-homing"/"non-exclusive" agents in rural areas to serve multiple providers through negotiated commercial partnerships, subsidized POS technology, and/or regulatory exceptions
- Changing the min/max agent density guidelines both among regulators and internally among commercial providers
- Encouraging entry and competition in retail-DF
- Testing behavioural and rational marketing tools to develop rural market sizes and profits, including agent branding, advertisement, *pay-for-performance* incentives, *pay-for-quality* incentives, etc

*What interventions – public and commercial solutions – will work to develop and grow existing viable DF-retail agents? What are the most efficient and effective ways to address liquidity challenges? What set of interventions are most likely to improve women's use of, confidence in, and satisfaction with CICO retail networks? What is the impact of shared agent networks aka "non-exclusivity" in rural areas?* Examples of plausible hypothesized interventions:

- Subsidizing the profits and/or reducing the volatility of revenues via extra transaction fees, differential pricing of agents by transaction volume, etc. in low transaction volume regions
- Improving agent access to liquidity through both subsidized and market priced credit, improved logistics, and/or improved liquidity needs forecasting
- Supporting more reliable power and connectivity for rural agents
- Encouraging entry and competition in retail-DF
- Disclosing price information and enforcing transparency initiatives

## V. CONCLUSION, POLICY, AND PRACTICE

We reflect on three broad DF retailing issues of prime importance to policymakers, practitioners and researchers in LMI countries: (i) the organization of retail-DF, (ii) vendor incentives and behavior, and (iii) constraints to expansion of DF retail distribution networks. We highlight unique organizational features of retail markets for digital finance and the ambiguous effects of different forms of competition and management incentives on possible interventions aimed at improving the reach, density, and growth of retail agents. We advance a number of hypotheses to

speculate on why agents are sparse, absent, or small in regions that would otherwise benefit from access to DFS. We emphasize several open research questions that remain to be answered. These call for rigorous experimental and quasi-experimental variation in the market to generate actionable evidence and to justify commercial interventions, policies, and regulations. Pursuing these require meaningful partnerships between academic researchers and various actors in the DF marketplace including, service providers, businesses, lenders, regulators, and practitioners.

**SUMMARY OF OPEN QUESTIONS**

| Questions | (Relevant) Actors | DF-Retail Surveys and / or Research Methods |
|---|---|---|
| I. ORGANIZATION OF RETAIL DF | | |
| a. What factors inform the choice of DFS model in the various countries, that is, Bank-led, MNO-led or mixed? | Regulators; MNOs; banks; consumers | Comparative study between countries - Qualitative survey |
| b. To what extent does the efficiency objective of DFS providers and the environment in which they operate influence the choice of model? | MNOs; banks; consumers | Comparative study across countries -- Qualitative and Quantitative surveys |
| c. Do partnerships between providers promote efficiency/ profitability/service quality in DFS operations and which forms of partnerships are likely to yield better results? | MNOs; banks; agents; consumers | Quantitative survey |
| d. Do the drivers of competition (infrastructure control, economies of scale, regulation) influence services quality, prices and profitability in the DFS market? | MNOs; banks; agents | Qualitative survey, possibly a comparative study |
| e. How are agents' commissions determined and do they differ by provider type? | Agents; MNOs; banks | Quantitative study; RCTs |
| g. What factors determine entry into DFS retail markets and does formalisation (e.g., business registration requirements) pose any restrictions to DFS retail entry? – does entry requirement affect business performance? | Agents | Assessment, RCTs |

| Questions | (Relevant) Actors | DF-Retail Surveys and / or Research Methods |
|---|---|---|
| h. Does bundling of services improve DFS sales and how does the cost of operating the non-DFS activities affect the efficiency of DFS provision? | Agents | Assessment, RCTS |
| i. Does bundling affect or facilitate consumer switching tendencies - given that overseeing several businesses may lead to reallocation of time to any of the other businesses. | Agents | Comparative quantitative studies; RCTs; quasi-experiments |
| j. Does (non) exclusivity of retail vendors affect downstream vendor competition? If so, how? | Agents | |
| II. MANAGEMENT INCENTIVES | | |
| a. Is competition among DFS providers able to drive prices down and how? | MNOs, banks, regulators | Qualitative survey |
| b. How has interoperability affected competition and general operations of DFS providers? | Banks, MNOs and regulators | Qualitative survey |
| c. Given the potential benefits of interoperability, why have some countries failed to adopt interoperability? - Is there a latent demand for interoperability services? | Banks, MNOs and regulators | Qualitative survey - Comparative study across countries |
| d. Which models of digital collateral have a higher potential to succeed? - How can digital collateral improve microfinance? | Banks; MNOs; third-party firms; agents; regulators | Quantitative survey; RCTs |
| What interventions will work to promote good supply-side behavior, either (1) Monitoring and punishment mechanisms by providers or regulator(s) vs (2) Vertical incentives that make vendors residual claimants of business output (e.g., *tying* agent commissions and profits to good customer service)? | | |
| e. What are the impacts of competition on business outcomes (profits, revenues) and consumer welfare? | Agents; consumers | Quantitative survey; RCTs |

| Questions | (Relevant) Actors | DF-Retail Surveys and / or Research Methods |
|---|---|---|
| f. Should vendor commissions be regulated in a market characterized by shrouded attributes and/ or hidden prices? | Agents | RCTs |
| g. Could differential incentives at the vendor level lead to price convergence or homogeneity in the market? and likely induce better vendor conduct and supply-side market growth? | MNO; banks | RCTs |
| h. Could this (g) matter in provider expansion decisions E.G., crowd-in new microenterprises vs use existing DF-retail vendors to expand? | MNOs; banks; businesses | Qualitative survey; RCTs |
| i. Does DFS unlock the potential of businesses, especially for those run by women? - Why and why not? | MNOs; banks; government | Quantitative survey; RCTs |
| j. What are the tradeoffs between digitization/DFS and taxation, and how does this constrain the overall adoption of DFS by SMEs in LMI countries?<br>k. Is DF the intervention itself (i.e., creating new businesses or startups via DF retailing)? Or is DF the vehicle to unlock growth of existing business? Or both. | Businesses; MNOs; banks; agents | RCTs |
| III. CONTRAINTS TO EXPANSION AND REACH OF RETAIL DF OUTLETS | | |
| a. Which models do agents use in raising funds for their daily operations? How do these models influence profitability? | Agents; Lenders (liquidity providers) | Assessment of existing methods being used by agents – survey |
| b. Are there any gender differences and biases in DFS agency market? | | Survey; KIIs and FGDs; Ethnographic studies; Administrative data |
| c. What factors pose as barriers to entry in the DFS markets? | Agents; prospective agents (other | Survey |

| Questions | (Relevant) Actors | DF-Retail Surveys and / or Research Methods |
|---|---|---|
| | MSMEs), MNOs | |
| d. Do barriers to entry influence the profitability of DFS providers and agents? Theoretically, since barriers to entry allow firms to have above average profits, do firms and agents in countries with significant barriers to the DFS market experience higher profits? | MNOs; Agents | Qualitative interviews and survey; Administrative data across different regulatory contexts |
| e. Saturation of agents in an area reduces market share - how does this influence profit in the rural and urban areas? | MNOs; Agents | Survey, RCTs |
| f. Are there differences in the factors that influence barriers to entry in MNO-led vs Bank-led regions? | Agents; other MSMEs | Survey; qualitative interviews |
| g. What interventions—public and commercial solutions—will work to develop and expand viable DF-retail agent networks, especially in rural areas? | Regulators; MNOs; Agents | Survey; RCTs; quasi experiments |
| h. What are the impacts of relaxing the above hypothesized constraints on agents reach, density, and growth? Which of the interventions are *cost-effective*? Which of the interventions generate larger impacts (multi-faceted treatments; meta-analysis)? | Regulators; MNOs; Agents | RCTs; quasi-experiments |
| i. How do we introduce new retail-DF agents into brand new "virgin" markets? What efficient market forms can this take with respect to *gender composition*, *location*, *existing micro-businesses*, etc.? | MNOs; Agents | RCTs; quasi-experiments, surveys |

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