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To cite this article:

Aparajita Agarwal, Valentina A. Assenova (2023) Mobile Money as a Stepping Stone to Financial Inclusion: How Digital Multisided Platforms Fill Institutional Voids. Organization Science

Published online in Articles in Advance 06 Dec 2023

. <https://doi.org/10.1287/orsc.2022.16562>

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Mobile Money as a Stepping Stone to Financial Inclusion: How Digital Multisided Platforms Fill Institutional Voids

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Received: September 29, 2021

Revised: November 21, 2022; May 11, 2023;
August 3, 2023; September 22, 2023

Accepted: September 26, 2023

Published Online in Articles in Advance:
December 6, 2023

<https://doi.org/10.1287/orsc.2022.16562>

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Abstract. The literature on institutional voids examines how intermediaries, such as business groups and business incubators, address such voids in emerging economies. However, it remains unclear whether and how digital multisided platforms fill these voids given their unique features. This study focuses on mobile money platforms, which allow users without bank accounts or credit cards to perform financial transactions. We propose that these platforms fill institutional voids in three ways by (i) enabling data-based certification, (ii) providing unified access to distributed services, and (iii) scaling through network effects to reach previously excluded market participants. We argue that these novel mechanisms enable mobile money platforms to expand credit access to end users from formal financial institutions and thereby act as stepping stones to financial inclusion. Our analysis is based on a difference-in-difference design that leverages regulatory changes that allowed nonbanks to operate as mobile money operators and data from a representative random sample of 151,771 individuals in 78 countries. We supplement our quantitative analysis with rich, hand-collected qualitative evidence to illustrate the mechanisms underlying our findings.



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Funding: Financial support from the Wharton School of the University of Pennsylvania.

Supplemental Material: The online appendix is available at <https://doi.org/10.1287/orsc.2022.16562>.

Keywords: digital platforms • institutional voids • intermediaries • financial inclusion • mobile money

Introduction

Over the last decade, the rise of digital multisided platforms that connect users and service providers in multisided networks has revolutionized the global economy (Iansiti and Levien 2004, Eisenmann et al. 2006, Cennamo and Santalo 2013, Van Alstyne et al. 2016). These platforms have become dominant forces in emerging markets in which missing or underdeveloped institutional infrastructure, termed “institutional voids,” often limits access to products and services and constrains the growth and productivity of firms (Khanna and Palepu 1997, 2010; Dutt et al. 2016; Gao et al. 2017). A significant body of research shows how intermediating organizations, such as business groups and business incubators, fill such voids and enable market exchanges (e.g., George and Prabhu 2000, McDermott et al. 2009, Mair et al. 2012, Dutt et al. 2016, Armanios et al. 2017, Eberhart and Armanios 2022). But, even though digital platforms are rapidly transforming markets by creating

new channels for information flows and economic activity, their role in institutional intermediation is not fully understood.

Prior work on this topic largely focuses on nonplatform intermediaries that fill voids either by giving a limited group of firms access to internal capital and labor markets and capturing value (closed system) or by enabling new and nascent firms to acquire resources and creating value (open system). However, the unique characteristics of digital platforms, which allow them to both capture and create value, leave open a question about their role as intermediaries. On the one hand, through their distinct features—namely, data-driven business models, distributed value creation, and network effects—which differentiate them from nonplatforms, digital platforms disrupt existing industries, take market share from incumbents, and capture significant value (Eisenmann et al. 2006, Cennamo and Santalo 2013). On the other hand, these unique features may also

engender new ways through which platforms may enable market participants to overcome institutional voids that inhibit economic transactions. For example, the digital business models of platforms may bridge systemic information gaps, and their digital infrastructure may fill in for underdeveloped physical infrastructure in emerging economies, thereby filling institutional voids and creating positive spillover effects on economic activity. To examine this potential role of digital platforms in institutional intermediation, we pose the following research question: do digital platforms fill institutional voids by expanding market transactions among other actors, and if so, how do they do so differently from non-platform intermediaries?

Answering this question is important as it could shed light on novel mechanisms through which institutional voids may be filled. To answer our research question, we first provide a theoretical background on the primary differences between platforms and nonplatforms. We then illustrate these features in the context of mobile money platforms: digital platforms that deliver financial services to unbanked individuals in developing economies through mobile phones without the need for a bank account, credit card, or internet access (Aker and Mbiti 2010; Wormald et al. 2021, 2023). Examples of these platforms include M-Pesa, MTN Mobile Money, and M-Pawa, which provide access to financial services in many countries with underdeveloped financial sectors in sub-Saharan Africa (SSA), Latin America, and South Asia.

We focus on the role of mobile money platforms in addressing institutional voids that result from missing or underdeveloped credit market infrastructure in emerging and developing economies. These institutional voids are significant as they prevent millions of people and small businesses from accessing affordable finance. We argue that, through their differentiating features, mobile money platforms fill these voids in three unique ways that are distinct from the way nonplatforms are shown to intermediate. First, mobile money platforms certify their end users through digital data collected and deployed on the platform. This provides alternative means for lenders, such as banks, credit unions, and microfinance institutions (MFIs), to assess the creditworthiness of potential borrowers in emerging markets in the absence of credibility-enhancing infrastructure, such as robust credit history; financial status of individuals; and institutions, such as credit bureaus and credit-rating agencies, that typically collect and analyze credit information in developed markets. Second, through value creation in a distributed network, these platforms provide unified access to multiple financial products and services from platform complementors, such as commercial banks, thereby filling voids left because of underdeveloped aggregation and distribution infrastructure for financial services (e.g., bank branches). Third, these platforms leverage network effects that accelerate their expansion and enable them

to scale rapidly to reach millions of new and unbanked users (Mair et al. 2012, Cobb et al. 2016, Zhao and Wry 2016). Following from these three mechanisms, which form the crux of this paper and our contribution to the institutional intermediation literature, we hypothesize that mobile money platforms increase end-user access to credit from formal financial institutions, such as banks, credit unions, and MFIs, and thereby act as a stepping stone to financial inclusion.

We test our hypothesis by evaluating the effects of regulatory reforms enacted by central banks that allow nonbanks, such as mobile network operators and fintech start-ups, to launch mobile money platforms. Following the institutional change literature (Eesley 2016, Assenova 2021), we use a difference-in-differences (DID) design (Abadie 2005) to evaluate the spillover effects of these reforms on individual access to credit from formal financial institutions. Our analysis is based on data from a representative, random sample of 71,546 adults in 2014 (before the regulatory reforms) and 80,225 adults in 2017 (after the regulatory reforms) in 78 countries with operational mobile money platforms. We study the effect of these reforms on individual access to credit postreform compared with prereform in the affected countries. To examine the underlying mechanisms, we analyze qualitative data from 540 minutes of primary interviews with industry insiders; transcripts of eight secondary interviews with senior executives at leading mobile money platform operators (MMPOs) and their bank partners; and more than 90 online sources including company websites, industry reports, and white papers.

In our quantitative analysis, we find that, at the baseline, only about 11% of respondents sampled in 2014 had access to formal financial services with even lower rates for women, the poorest quantile of the income distribution, and those with primary schooling or less. In our postreform sample, by contrast, we find increased mobile money use among respondents and increased access to credit from formal financial institutions. On average, the reforms were associated with a 22% increase in the probability that respondents borrowed from formal financial institutions with even higher increases for women, individuals in the poorest quantile of income, and those with primary schooling or less. These findings support our hypothesis and suggest that mobile money platforms play a significant role in expanding access to financial services in emerging and developing economies. Our qualitative analysis further provides us with insights from managers and industry experts and helps us validate the underlying mechanisms that explain our results.

Our study contributes to the literature on institutional intermediaries in two primary ways. First, we make a theoretical contribution to this literature by linking it with the research on digital platforms and identifying three novel mechanisms through which digital platforms fill institutional voids by taking advantage of their

unique, distinguishing features. In doing so, we also show that digital platforms create value by having spillover effects on economic activity among other market participants. Second, we make an empirical contribution by demonstrating that mobile money platforms can reduce financial exclusion resulting from voids in credit markets. In countries with a lack of credit information and banking infrastructure, mobile money platforms can expand access to formal credit for previously unbanked individuals, thereby acting as a stepping stone to financial inclusion. For policymakers and regulators, our findings suggest regulatory reforms that open up the financial services industry to new entrants could potentially expand financial access. Additionally, the mechanisms identified in this study inform the design of policies and interventions aimed at promoting financial inclusion.

Theoretical Background

Platform vs. Nonplatform Intermediaries in Markets with Institutional Voids

The literature on institutional voids has long examined the role of intermediaries in addressing missing and underdeveloped institutional infrastructure that impedes transparent and efficient market transactions in developing countries (Arrow 1969, North 1990, Khanna and Palepu 2000). Examples of these intermediaries include business incubators, accelerators, development finance institutions, nongovernmental organizations, public–private partnerships, and science parks (McDermott et al. 2009, Mair et al. 2012, Dutt et al. 2016, Armanios et al. 2017). This literature suggests that closed-system intermediaries, such as family firms and business groups, use their size and clout to overcome institutional voids and capture value by facilitating transactions among their group companies, suppliers, and customers through internal capital and labor markets (Mahmood and Mitchell 2004) and informal mechanisms of reputation (Gao et al. 2017) and relational ties (Khanna and Palepu 1999, Khanna and Rivkin 2006, Luo and Chung 2013). In contrast to such intermediaries, open-system intermediaries, such as business incubators and development finance institutions, improve the general business environment by creating institutional infrastructure that creates value for a broad set of market participants (McDermott et al. 2009, Mair et al. 2012, Dutt et al. 2016).

Although digital platforms are also intermediaries in that they connect multiple actors, their unique characteristics make them theoretically distinct from nonplatform intermediaries and allow them to both capture and create value. Digital platforms enable exchanges of products and services by bringing together groups of users in multisided networks of service providers, customers, and third-party agents (Iansiti and Levien 2004, Eisenmann et al. 2006, Cennamo and Santalo 2013, Van Alstyne et al. 2016). Three primary features

set digital platforms apart from nonplatform intermediaries: data-driven business models, distributed value creation, and network effects. We provide a brief theoretical background to each of these features and discuss how they differentiate platforms from nonplatform intermediaries.

First, digital platforms operate data-driven business models, which rely on data as a primary strategic resource unlike nonplatform intermediaries for which data as a resource is secondary to financial capital, physical infrastructure, and human capital. With the help of a digital user interface, the internet, and mobile networks, digital platforms generate, collect, and utilize large volumes of diverse digital data from user transactions and substantially lower the search and transaction costs of exchanges (Goldfarb and Tucker 2019). These data allow them to learn from user preferences and behaviors and enhance their products and services, thereby making them more valuable to users and partners (Gregory et al. 2021). Digital representation enables platforms to aggregate, analyze, and algorithmically manipulate previously disjointed data to answer questions previously constrained by human rationality (Adner et al. 2019). By analyzing usage history and patterns of end users and organizations, digital platforms can act as an authoritative intermediary that creates data-based indicators of reliability and trust in these actors and facilitates transactions among them.

Second, unlike nonplatform intermediaries, for which the locus of value creation resides within the firm, digital platforms enable distributed value creation—value creation by participants outside the traditional boundaries of the firm—by facilitating the exchange and recombination of geographically dispersed resources in novel ways (Yoo et al. 2012). A large part of distributed value creation relies on complementors: third-party organizations ranging from rural entrepreneurs (Koo and Eesley 2021) to developers for iOS and Android apps (Kapoor and Agarwal 2017). Complementors often cooperate with platforms to create value for multiple actors, including platform operators, platform partners, and end users (Ansari et al. 2016, Cozzolino and Rothaermel 2018, Cozzolino et al. 2018, Hannah and Eisenhardt 2018). They use the platform’s digital resources and systems to provide new products and services, enhancing the platform’s core offering and attracting more users and partners (Kapoor 2018).

Finally, digital platforms have a unique advantage over nonplatform intermediaries in their ability to scale rapidly through network effects, which occur when new users and partners make the platform more attractive to existing and potential users and partners. Network effects enable platforms to grow quickly, facilitating intermediation at scale. Two types of network effects are recognized in platform literature: same-side network effects, which occur when the platform becomes more

attractive to users as other users join the platform, and cross-side network effects, which occur when the platform becomes more attractive to users and complements as more of the other type join the platform (Iansiti and Levien 2004, Eisenmann et al. 2006, Cennamo and Santalo 2013, Van Alstyne et al. 2016).

These three unique features—data-based business models, distributed value creation, and network effects—enable digital platforms to disrupt existing industries, take market share from incumbents, and appropriate significant value (Eisenmann et al. 2006, Cennamo and Santalo 2013). In what follows, we argue that these features also enable digital platforms to fill institutional voids in unique ways and create positive spillovers for market transactions. We develop our hypothesis in the context of mobile money platforms.

Hypothesis Development

Mobile Money Platforms as Intermediaries for Voids in Credit-Market Institutions

Mobile money platforms are digital multisided platforms that provide financial services through a mobile phone interface and enable unbanked customers to transact using their mobile phones without requiring a linked bank account, credit card, or the internet. These features make mobile money platforms distinct from other mobile payment services, such as Venmo, Apple Pay, Zelle, PayPal, and WeChat Pay (Aker and Mbiti 2010, Groupe Speciale Mobile Association 2019).¹ MMPOs—primarily mobile network operators and fintech start-ups—have launched these platforms mainly in emerging economies to address the unmet demand for financial services. Examples of such platforms include M-Pesa, MTN Mobile Money, and Airtel Money, which provide a wide range of financial services, including money transfer and bill payments, to unbanked customers through mobile phones. Many of these services operate on unstructured supplementary service data (USSD) technology—the underlying technology behind short messaging service (SMS or text messages)—which does not require a smartphone or the internet for money transfer. MMPOs also typically have a network of physical transactional points (such as agents) different from bank branches or ATMs that make their services widely accessible.² As well, they often partner with other organizations, including commercial banks, credit unions, and MFIs, that offer new products and services, such as savings, credit, and insurance to end users on the rails of the platforms.

Mobile money platforms have proliferated mostly in emerging and developing economies, which are often marked by voids in credit-market institutions that result in low access to finance for individuals and businesses (Cihák et al. 2012). Such voids occur when the absence or inadequacy of specialized intermediaries and the

associated institutional infrastructure hinders market transactions (Khanna and Palepu 2010). In the terminology of Khanna and Palepu (2010), three types of institutions result in voids in credit markets, namely, (1) credibility (creditworthiness) enhancers, (2) credit information analyzers and advisers, and (3) credit aggregators and distributors.³ Together, these voids leave about two billion individuals and 200 million small businesses without access to banking services (Andersson and Naghavi 2021).

First, credibility (creditworthiness) enhancers—institutions that are crucial for establishing the trustworthiness and credibility of potential borrowers—are either lacking or insufficiently established in many emerging and developing economies. Examples of credibility enhancers in credit markets include credit history, payment stubs, and audited financial statements that aid formal financial institutions, such as banks, in validating the creditworthiness of individuals and businesses (Petersen and Rajan 1994, Levine et al. 2020). Potential borrowers who do not have a record of such traditional means of establishing their credibility are too risky for banks to lend to and, as a result, are unable to access credit. These problems are particularly acute in rural and remote areas and for individuals and small and medium-sized enterprises in the informal sector, which accounts for as much as 60% of total economic output in emerging and developing economies (La Porta and Shleifer 2014, Assenova and Sorenson 2017).

Second, credit information analyzers and advisers—institutions that provide insights into the creditworthiness and risk profiles of borrowers—are also often missing or underdeveloped in emerging and developing economies. Examples of these institutions include credit bureaus and credit reporting agencies, which collect and research credit information about individuals and businesses and broker it to formal lenders, such as commercial banks to inform decisions about extending credit. The lack of such robust information analyzers and advisers makes it challenging for lenders to assess the creditworthiness of potential borrowers, leading to under-provision of credit. As a result, many borrowers in these countries end up relying on local, informal money lenders and seeking loans with interest rates as high as 40% per month (Banerjee and Duflo 2007).

Third, credit aggregators and distributors—institutions that provide credit to individuals and businesses—often lack sufficient physical and digital banking infrastructure in emerging and developing economies. Examples of credit aggregators and distributors include commercial banks, MFIs, and credit unions, which do not (and often cannot) extend their physical branches to rural and remote areas because of limited road connectivity, safety concerns in transporting cash, and the high cost of operations. These areas also have poor internet connectivity and smartphone penetration. The lack of physical infrastructure, coupled with poor physical and

digital connectivity and low digital literacy among many financially excluded individuals, hinders the efficient dissemination and distribution of credit products and services.

We argue that mobile money platforms may inter-mediate to overcome these credit-market voids through three mechanisms that leverage the unique features of digital platforms. First, through the digital data collected and deployed on the platform, they may certify platform users who otherwise lack credit history or whose information from credit bureaus is unavailable, thereby filling the voids left by missing credibility enhancers and information analyzers. Second, they may provide unified access to previously inaccessible financial products and services to their end users through a distributed network of financial services partners. End users may leverage the mobile and agent network of the platforms to overcome voids in aggregation and distribution and be able to obtain multiple financial products and services through a single point of access. Finally, network effects may enable the platforms to rapidly scale to both new, financially excluded users and new complementors; increase transaction activity between the two sides; and thereby further accelerate both data-based certification and access to products and services. As we discuss, these mechanisms work jointly as the first and second mechanisms are necessary but not sufficient on their own to overcome problems of financial exclusion and require the third mechanism to scale. We present the schematic depicting these mechanisms, their interrelationships, and their implications for financial inclusion in Figure 1.

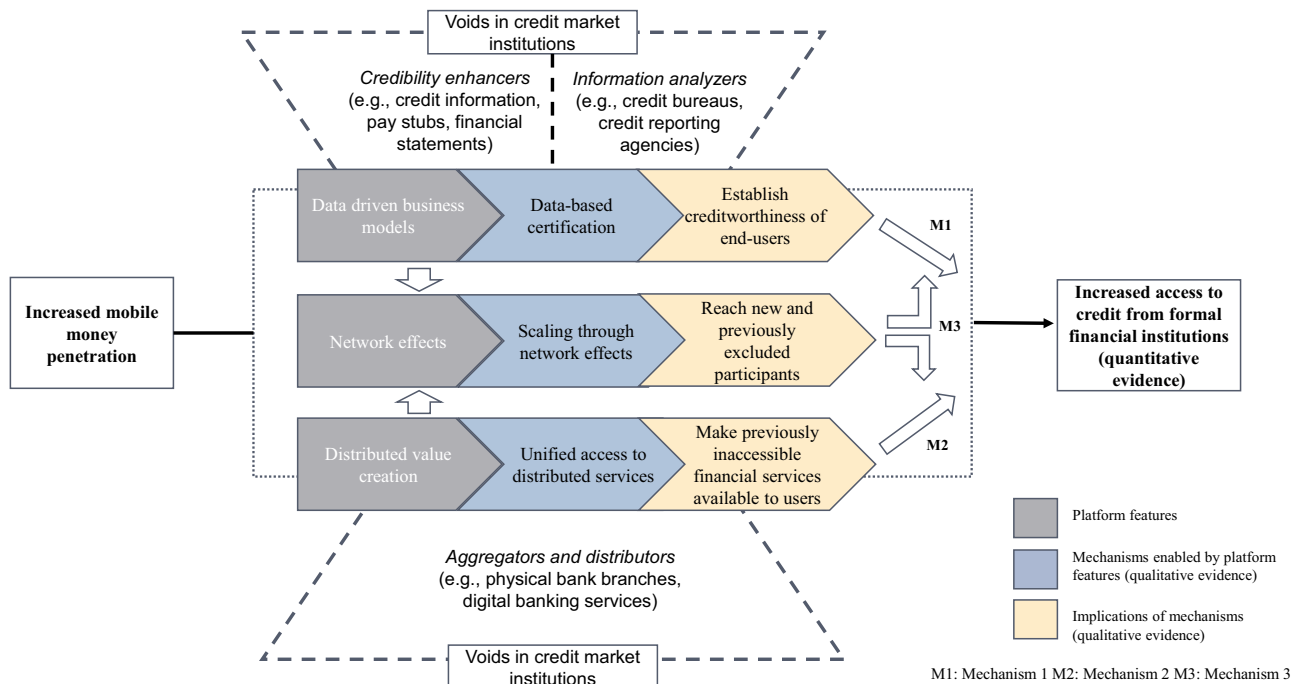
Next, we discuss each of these mechanisms in detail and explain their intermediation function.

Intermediation Mechanisms of Mobile Money Platforms

Data-Based Certification. The first way in which mobile money platforms may inter-mediate to fill voids in credit-market institutions is through data-based certification of end users. Certification is a process in which a central organizational actor acknowledges that an individual or organization meets a particular standard (Sine et al. 2007). It signals that an actor’s activities are appropriate, increasing its ability to acquire resources (Armanios et al. 2017), and is one of the fundamental mechanisms through which institutional intermediaries benefit entrepreneurs in emerging economies (McEvily and Zaheer 1999, Sine et al. 2007, Dutt et al. 2016). Digital, data-driven business models may offer a novel approach to certification by providing platforms the ability to aggregate, analyze, and algorithmically process previously disjointed data to extract unique insights about user preferences, behavior, and actions (Adner et al. 2019, Gregory et al. 2021) and, correspondingly, their likely compliance to a particular standard.

In geographies with voids in credit-market institutions left by missing or insufficiently established credibility enhancers (e.g., credit history and pay stubs) and information analyzers (e.g., credit bureaus), lenders, such as banks, require alternative ways to evaluate if potential borrowers meet the standards of financial stability and repayment history to be offered new loans

Figure 1. (Color online) Conceptual Schematic



M1: Mechanism 1 M2: Mechanism 2 M3: Mechanism 3

such that the probability of default or delinquency is minimized. Money platforms may address this need as they can certify their end users by accumulating and processing large volumes and variety of granular digital data, such as that on peer-to-peer transfers, utility bill payments, ratings, and feedback from counterparties. These data can help establish end users' creditworthiness by providing visibility into their transaction activity, cash flow status, and history of on-time payments. This can also be combined with other nontraditional data linked to the mobile phone and Subscriber Identity Module (SIM) connection, such as geolocation data, phone usage patterns, and types of applications that provide insights into the behaviors and actions of users. Banks and other financial organizations that partner with mobile money platforms can use these different data in their credit-scoring models to assess the risk profile of potential borrowers, make decisions about accepting or rejecting loan applications, and set credit limits. Thereby, mobile money platforms can potentially change the rules of the game (Fligstein 2001, Lawrence and Suddaby 2006) by making it acceptable to use digital data as the basis for certifying the creditworthiness of potential borrowers instead of the traditional modes usually used by formal financial institutions.

Unified Access to Distributed Services. The second way in which mobile money platforms may fill institutional voids in credit markets is by providing unified, single-point access to previously inaccessible financial products and services to their end users. They may do so through commercial partnerships with complementors, third-party organizations, such as banks, credit unions, MFIs, and insurance companies, which are the traditional aggregators and distributors of credit but often lack adequate physical and digital presence in emerging economies. By leveraging the digital infrastructure and agent network of the platforms, these complementors can offer one-stop access to additional products and services, such as loans, savings, and insurance to end users. MMPOs also organize partnerships with fintech start-ups, remittance service providers, government bodies (for subsidy and grant payments), utility providers (for bill payments and e-commerce), and healthcare and education providers (for medical and educational expenses) to make payments and other financial services easily accessible to end users in markets in which aggregation and distribution infrastructure of service providers is inadequate. Through these distributed partnerships, MMPOs have the potential to create value for both end users and complementors in several ways.

First, end users may benefit from having a single point of access to various interdependent, complementary, and previously inaccessible products and services, such as payments, savings, loans, and insurance, which these distributed partnerships offer. For example, having

enough savings often makes a user eligible for loans and insurance, and microloans support essential consumption, which could enhance eligibility for larger loans. Moreover, users are able to access these complementary products and services through their mobile network. As many mobile money services are based on USSD technology, which works on simple feature phones and text (SMS) interface, even individuals without smartphones or with low digital literacy find it easier to understand and use them. Additionally, mobile money agents, typically microentrepreneurs operating retail establishments, such as grocery shops or mobile phone servicing kiosks and selling prepaid airtime for telecom operators, enable mobile money platform end users to access banking services in rural and remote areas.

Through their distributed partnerships, MMPOs may create value for complementors as well. The partners can take advantage of the extensive agent network to provide access to essential financial products and services to customers who may not be reachable through traditional bank branches. They can also utilize the simplicity of technology to serve individuals with lower levels of education and income, who may lack access to the internet, smartphones, or mobile or internet-based banking. Hence, they are likely to overcome their own infrastructure and capability limitations and provide unified access to many more innovative products and services to every customer on the rails of the platforms. Overall, the mobile network, coupled with the agent network of mobile money platforms, is likely to enable traditional financial institutions, such as commercial banks, to capture more value from every customer and create more value overall.

Scaling Through Network Effects. The third and final way in which mobile money platforms intermediate to overcome voids in credit-market institutions is by scaling to new market participants through powerful platform network effects. Network effects augment and accelerate the platform's ability to reach new customers and partners. As more end users adopt mobile money services, the platform becomes more valuable for other end users through same-side network effects as users can now conduct more peer-to-peer financial transactions, such as remitting money. Moreover, the addition of more users attracts more commercial partners, such as commercial banks, MFIs, merchants, utility providers, and government bodies, to the platform, thereby triggering cross-side network effects. Vice versa, as more service providers join mobile money platforms, they attract more end users and expand the pool of new customers seeking financial products and services. Moreover, mobile money agents play an equally vital role in fueling growth through cross-side network effects. The more agents on the platform and the higher their geographical density, the more accessible mobile money services are

to end users, thereby making it more attractive for users to join the platform. A higher number and density of agents also make the platform more valuable to its commercial partners, who are likely to benefit from its agent reach. In parallel, a larger user base and partner network attract more agents by offering the proposition of more income per agent. These processes may enhance a platform's intermediation among an increasing number of new users, partners, and agents. By bringing new actors into the fold and increasing the volume of financial transactions between mobile money platform participants, network effects may also enhance the efficacy of the other two mechanisms of data-based certification and unified access to multiple services. However, the benefits of network effects are contingent on the platform acquiring the right set of initial users, agents, and complementors. In the absence of appropriate guardrails and institutions, MMPOs need to be cautious in accumulating network effects and balance the quantity with the quality of participants to prevent misconduct and value misappropriation on the platform.⁴

Our arguments imply that, as their penetration increases in emerging and developing economies, mobile money platforms intermediate through the three proposed mechanisms and expand access to formal financial services, leading to the following hypothesis.

Hypothesis 1. *An increase in mobile money platform penetration in a country increases access to credit among end users from formal financial institutions, such as banks, credit unions, and MFIs.*

Methods

Overview

Following the literature on institutional changes (Easley 2016, Assenova 2021), we employed a canonical (two-period, binary intervention) difference-in-differences research design (Abadie 2005) to test our hypothesis and examine the relationship between mobile money platform penetration and access to credit among individuals from formal financial institutions, such as banks, credit unions, and MFIs. To implement this design, we analyzed financial access data from a representative sample of respondents in 78 countries with operational mobile money platforms. We identified a source of variation in national policies that was plausibly exogenous to individual borrowers but increased the penetration of mobile money platforms: central bank-led regulatory changes that allowed nonbanks in some countries in our sample to issue e-money and launch mobile money platforms as MMPOs. Further, we corroborated our results through a qualitative investigation to gain a deeper understanding of the underlying mechanisms through which mobile money platforms increase access to credit from formal financial institutions. We describe our data and methodology in more detail as follows.

Data and Sample

The primary quantitative data for our study come from the World Bank's Global Findex Database, the largest source of data on financial inclusion and digital payments based on nationally representative surveys of adults, covering almost 300 indicators on topics such as account ownership, payments, saving, credit, and financial resilience. The data also include information about the gender, income, labor force participation, age, and country of respondents. Our sample comprises 151,771 respondents of which 71,546 respondents were sampled before the regulatory changes in 2014, and 80,225 respondents were sampled after these changes in 2017. Our qualitative data come from 540 minutes of primary interviews with industry insiders; transcripts of eight secondary interviews with senior executives at leading MMPOs and their commercial partners; media coverage of 35 online news articles and press releases; 15 industry reports and white papers; and detailed review of 45 corporate websites, including "about us" pages, product-specific pages, FAQs, and product manuals. These data provided us with insights from managers at some of the leading MMPOs, including MTN, M-Pesa, Telenor Financial Services, Dialog Axiata PLC, Millicom Group, and the Vodafone Group, that helped us validate the mechanisms.

Research Design

We implemented a DID design (Abadie 2005) to assess the impact of regulatory changes enabling greater mobile money penetration on end-users' access to financial services from formal financial institutions. For our analyses, we compared changes in financial inclusion before and after regulatory changes enacted in either 2015 or 2016, using data from two waves of surveys conducted in 2014 and 2017. Because we have one pre and one post time period and a binary intervention, this is equivalent to a canonical difference in differences design (Roth et al. 2023). This design allowed us to compare the differences in the dependent variable (access to credit from formal financial institutions) between our *affected* and *nonaffected* groups before and after the regulatory reforms.

To ensure that the respondents in our sample were observationally similar on key demographic characteristics that could affect both access to credit and the use of mobile money services, we preprocessed the data using coarsened exact matching (CEM) (Iacus et al. 2012). This matching procedure produced a matched sample of respondents in the countries affected by the central bank reforms (*affected group*) and those in countries not affected by these reforms (*nonaffected group*) and ensured that our sample of respondents was balanced on *income, gender, age, and education*—covariates that could affect both access to credit and the use of mobile money services—across the affected and

nonaffected groups. Our matching procedure reduced the multivariate imbalance between these groups from 0.229 before matching to 0.073 after matching (an imbalance of zero denotes identical groups). Our matched sample comprises 151,125 respondents from 78 countries with operational mobile money platforms, of which 26,271 respondents were from countries in the affected group, and 124,854 respondents were from countries in the nonaffected group.

To identify regulatory changes enacted by central banks that enabled nonbanks to issue e-money and launch new mobile money platforms, we hand-collected data from Groupe Speciale Mobile Association (GSMA) Mobile Money Regulatory Index Reports and the official websites of central banks in the countries in our sample. In our sample, 13 of the 78 countries (16%) with mobile money services had central banks that enacted regulatory changes, whereas the remainder (84%) did not enact these changes.⁵ Of the central banks that enacted these changes, 7.7% were in East Asia and the Pacific, 7.7% were in South Asia, 15.4% were in Latin America and the Caribbean, and 69.2% were in sub-Saharan Africa.⁶ We chose to focus on these reforms as they would be expected to increase mobile money platform penetration, the focal independent variable in our study. These reforms were also plausibly exogenous to the actions of respondents in our sample because they were enacted by central banks independently from the direct influence of respondents. Moreover, these reforms did not directly affect commercial banks, and any changes in commercial bank lending to mobile money end users would be an indirect result. The key assumption of this design is that the prereform differences in financial inclusion between the two groups would have remained the same in the absence of the reforms as these differences would have followed parallel trends over time (Bertrand et al. 2004). We tested this assumption by plotting prereform and postreform outcomes for the two groups, finding that the differences followed parallel trends as shown in Figure 2.

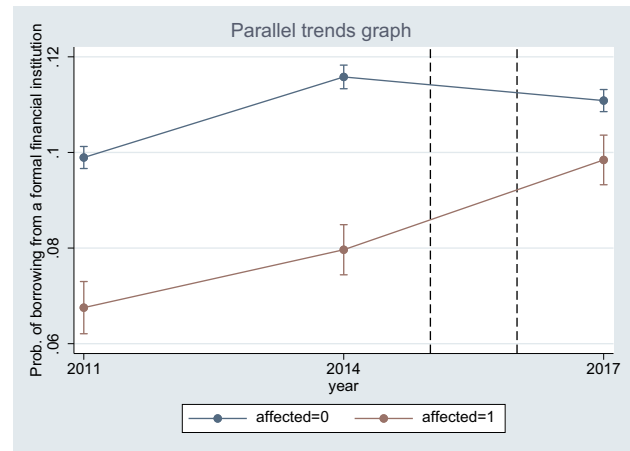
Model Estimation

We estimated a difference-in-differences model using the following specification:

$$Y_{ijt} = \beta_0 + \beta_1 \times Post_t + \beta_2 \times Affected_j + \beta_{DID} \times (Affected_j \times Post_t) + \varepsilon_{ijt}.$$

In this model, Y_{ijt} is the outcome for respondent i in country j in year t , where t corresponds to 2014 and 2017. The main dependent variable in our analyses is a binary variable coding for whether a respondent *borrowed from a formal financial institution* as applicable in the country where the survey was conducted. This variable enables us to compare the rates of financial inclusion prereform and postreform for respondents in our sample. This variable was coded as one if a

Figure 2. (Color online) Parallel Trends Graph



Notes. Regulatory reforms happened in years 2015 and 2016. Reforms allowed nonbanks to issue e-money and launch new mobile money platforms. Data available for the years 2011, 2014, and 2017. Data are not available for the years in between.

respondent borrowed money from a formal financial institution (e.g., commercial bank, credit union, MFI) in the past year and zero otherwise.⁷ $Post_t$ is a binary indicator that takes the value of one postregulatory reforms (in 2017) and zero preregulatory reforms (in 2014). $Affected_j$ is a binary indicator that takes the value of one if a respondent was in a country where the central bank implemented regulatory reforms allowing nonbanks to launch mobile money platforms in 2015 or 2016 and zero otherwise. β_{DID} is the difference-in-differences coefficient, testing our hypothesis.

Descriptive Statistics

We report the descriptive statistics for our full sample in Table 1 and the balance statistics for our matched sample in Table 2.

Results

Mobile Money Platform Reach and Growth

Figure 3 shows the geographic distribution and primary organizations launching mobile money platforms worldwide between 2001 and 2021. As this figure shows, mobile money platforms are predominantly prevalent in emerging economies with voids in credit-market institutions. Most of the new platform launches were either direct launches by nonbanks, such as telecom companies, or collaborations between nonbanks and banks and MFIs.

Hypothesis Tests

We report the results from our models in Table 3. Models 1 and 2 test the main hypothesis. Overall, we find support for our hypothesis. The results show that, on average, respondents in our sample were 2.4% (standard error (se) = 0.004, $p = 0.000$, $t = 6.02$, Model 1) more likely

Table 1. Descriptive Statistics for the Full Sample

Panel A. Descriptive Statistics for 2014 (prereform) <i>N</i> = 71,546											
Variables	Percentage of sample	Has mobile money (percentage of row)		Borrowed from a fin institution (percentage of row)		Has mobile money		Borrowed from a financial institution (percentage of row)			
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Gender											
Male	47.30	91.42	8.58	88.45	11.55	89.28	10.72	79.65	20.35		
Female	52.70	94.04	5.96	89.64	10.36	90.22	9.78	80.52	19.48		
Income quintile											
Poorest 20%	16.97	96.14	3.86	92.02	7.98	92.30	7.70	85.07	14.93		
Second 20%	18.07	95.33	4.67	91.02	8.98	91.32	8.68	84.93	15.07		
Middle 20%	19.02	93.99	6.01	89.24	10.76	89.71	10.29	81.78	18.22		
Fourth 20%	20.88	92.36	7.64	88.64	11.36	89.30	10.70	80.72	19.28		
Richest 20%	25.06	88.17	11.83	85.93	14.07	87.19	12.81	76.46	23.54		
Education completed											
Primary or less	46.90	94.73	5.27	92.22	7.78	92.60	7.40	85.35	14.65		
Secondary	44.20	91.42	8.58	87.82	12.18	88.54	11.46	80.06	19.94		
Tertiary or more	8.89	89.46	10.54	78.76	21.24	80.27	19.73	65.87	34.13		
Overall, %	100	92.80	7.20	89.08	10.92	89.78	10.22	80.03	19.97		

Panel B. Descriptive statistics for 2017 (postreform) <i>N</i> = 80,225											
Variables	Percentage of sample	Has mobile money (percentage of row)		Borrowed from a fin institution (percentage of row)		Has mobile money		Borrowed from a financial institution (percentage of row)			
		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Gender											
Male	45.68	82.01	17.99	88.40	11.60	89.75	10.25	82.22	17.78		
Female	54.32	88.01	11.99	89.73	10.27	90.50	9.50	84.09	15.91		
Income quintile											
Poorest 20%	17.25	91.43	8.57	91.95	8.05	92.46	7.54	86.50	13.50		
Second 20%	17.71	88.68	11.32	90.84	9.16	91.35	8.65	86.88	13.12		
Middle 20%	19.02	86.89	13.11	89.54	10.46	90.25	9.75	84.81	15.19		
Fourth 20%	20.96	84.37	15.63	88.44	11.56	89.71	10.29	81.59	18.41		
Richest 20%	25.06	78.15	21.85	86.21	13.79	87.72	12.28	80.79	19.21		
Education completed											
Primary or less	47.24	90.62	9.38	91.96	8.04	92.42	7.58	87.52	12.48		
Secondary	43.75	81.08	18.92	88.19	11.81	89.28	10.72	83.53	16.47		
Tertiary or more	9.00	77.61	22.39	78.73	21.27	80.90	19.10	71.24	28.76		

Table 1. (Continued)

Panel B. Descriptive statistics for 2017 (postreform) $N = 80,225$

Variables	Percentage of sample	Has mobile money (percentage of row)		Borrowed from a fin institution (percentage of row)		Borrowed from a financial institution (percentage of row)		Has mobile money	
		No	Yes	No	Yes	No	Yes	No	Yes
Has national ID									
Yes	84.81	85.51	14.49	88.19	11.81	89.22	10.78	82.14	17.86
No	15.19	87.79	12.21	94.13	5.87	94.85	5.15	88.94	11.06
In workforce									
Yes	63.51	81.62	18.38	86.65	13.35	87.75	12.25	81.72	18.28
No	36.49	91.62	8.38	93.43	6.57	93.91	6.09	88.13	11.87
Overall, %	100	85.27	14.73	89.12	10.88	90.17	9.83	83.05	16.95

Note. National ID and in workforce variables are available only in 2017.

to borrow from a formal financial institution after the regulatory reforms enabling nonbanks to launch mobile money platforms compared with before these reforms. Restricting these analyses to only matched respondents, we find that respondents were 2.1% ($se = 0.004$, $p = 0.000$, $t = 5.23$, Model 2) more likely to borrow from a formal financial institution after the regulatory reforms compared with before these reforms.

These effects represent significant increases in the rates of financial inclusion as in our sample, only 11% of respondents, on average, had access to formal finance prior to these reforms. These rates were even lower for socially marginalized groups: only 10.36% of women, 7.98% of respondents from the lowest income quantile, and 7.78% of respondents with only primary schooling or less had access to any form of formal financial services. Our effects, therefore, represent meaningful increases in the rates of inclusion following the reforms: 19%–22% higher financial access, on average, among respondents in our sample after the regulatory reforms compared with before the reforms. Moreover, given the lower baseline values of financial inclusion among the socially marginalized groups, our effects correspond to even higher increases in financial access for these groups: 23% higher financial access among women, 30% higher financial access among the poorest quantile, and 31% higher access among individuals with less formal education. Our results also suggest that these changes were associated with respondents' increase in mobile money usage: respondents in our sample were 7% more likely to have mobile money accounts after the reforms compared with before ($se = 0.005$, $p = 0.000$, $t = 15.40$, Model 3). These findings suggest that, in countries with underdeveloped financial institutions, the increased penetration of mobile money platforms was associated, on average, with greater financial inclusion among individuals.

Mechanism Checks

To investigate the mechanisms that underlie our findings, we analyzed additional qualitative data from 540 minutes of primary, semistructured interviews⁸ with 13 industry experts, including current and former managers from MMPOs, investors with active fintech portfolios, and the data and insights team at GSMA.⁹ Each interview lasted between 40 and 45 minutes and was conducted online. The interviews consisted of both open- and closed-ended questions about the role of mobile money platforms in expanding access to credit from banks and about the nature of the relationship between mobile money platforms, banks, and other complementors. We also asked questions to better understand how data sharing and credit scoring models work behind the scenes. Additionally, we analyzed transcripts of eight public secondary interviews⁹ and more than 90 other online sources, including company websites, industry reports, FAQ pages, and product manuals from mobile

Table 2. Coarsened Exact Matching Balance Statistics

Matching summary								
Number of strata	532							
Number of matched strata	473							
	Not affected by reforms	Affected by reforms	Total					
Full sample	125,499	26,272	151,771					
Matched sample	124,854	26,271	151,125					
Unmatched	645	1	646					
Before matching								
Multivariate L1 distance	0.229							
Univariate imbalance	L1	Mean	Minimum	25%	50%	75%	Maximum	
Respondent gender: female	0.078	−0.077	0.000	−0.083	−0.090	−0.105	0.000	
Respondent age (log)	0.187	−0.249	0.000	0.000	−1.000	0.000	0.000	
Respondent education	0.016	0.038	0.000	0.000	0.000	1.000	0.000	
Respondent income, %	0.045	−0.045	0.000	0.000	−1.000	0.000	0.000	
After matching								
Multivariate L1 distance	0.073							
Univariate imbalance	L1	Mean	Minimum	25%	50%	75%	Maximum	
Respondent gender: female	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Respondent age (log)	0.03	0.00	0.00	0.00	0.00	0.00	0.00	
Respondent education	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Respondent income, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

money platforms.¹⁰ To identify the themes, we began with the core features of digital platforms identified in the academic literature and followed an iterative process of collecting primary and secondary data on participants’ experiences, noting their reflections and identifying how platform features enabled or constrained access to financial services. To group insights into themes, we reviewed interview transcripts for patterns in the reflections of our respondents. We also analyzed secondary data from company websites, such as details of mobile money services, to understand the specific ways in which platform features enabled financial access among platform end users.¹¹ We present the summary of our qualitative insights in Table 4 and then discuss them in relation to each mechanism that we evaluated.

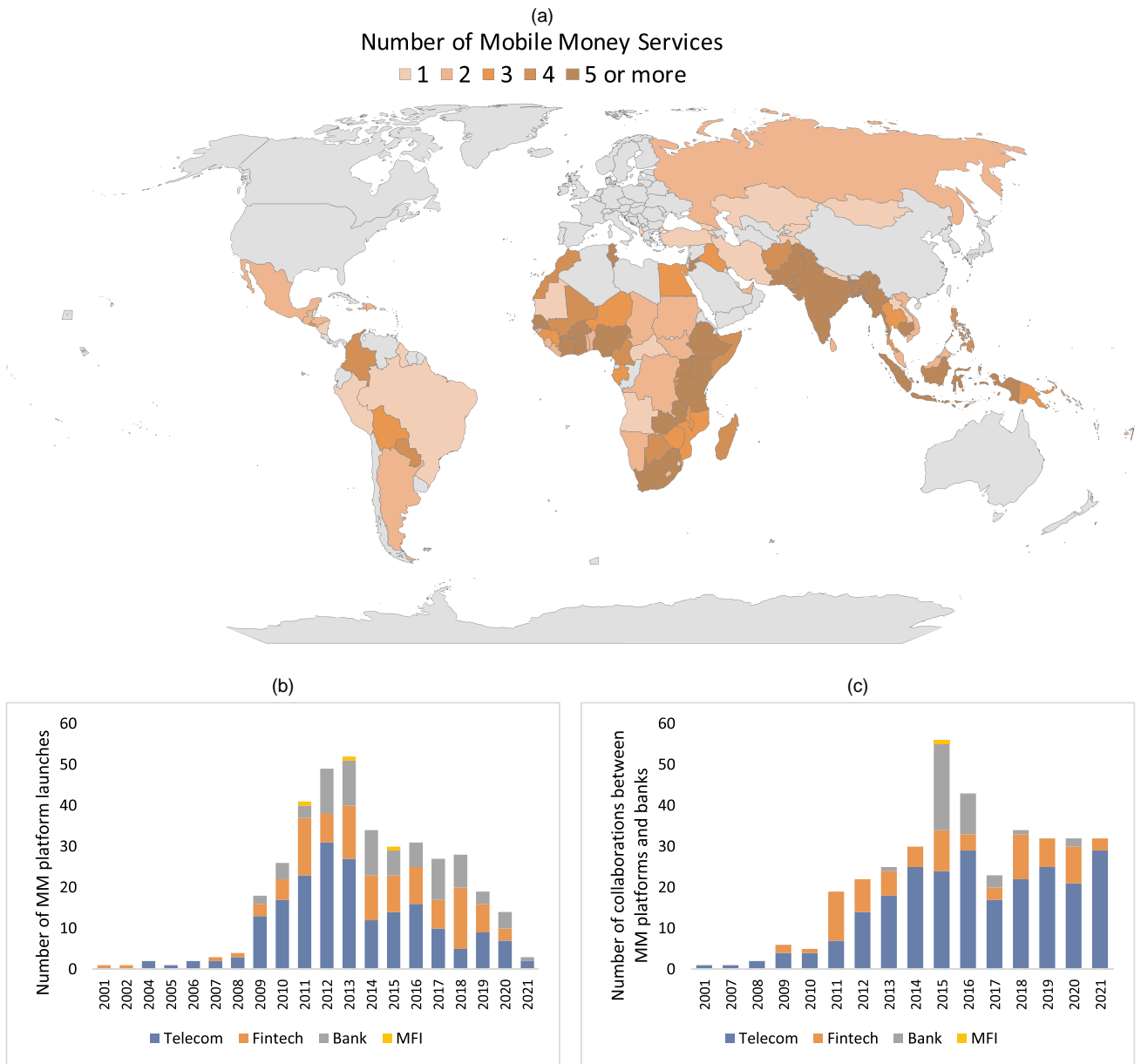
Data-Based Certification. Multiple sources corroborated the certification effects of mobile money platforms: the first proposed mechanism. For instance, during our interview, a senior executive who oversees Fintech at MTN, Africa’s largest mobile network operator, noted the importance of mobile money data in enabling platforms to establish financial records for previously unbanked customers, stating, “Without this data, these people do not have any financial transactions record.” Another informant—a former head of strategic partnerships at M-Pesa—explained how digital data were processed by mobile money platforms and partner banks to certify users. She said, “We had data sharing agreements with partner banks,” and also noted the volume and diversity of data used in the credit scoring process when she said, “There were over 100 variables.” Our informant added that these data were

used to certify unbanked customers, noting, “Most of the customers who accessed loans through M-Shwari were first-time customers for the bank,” indicating that the use of data helped in verifying the creditworthiness of financially excluded customers in accessing financial services.

Our research also revealed several examples of specific credit services offered by banks on mobile money platforms (cf. Table 5). These services rely on platform-generated data, such as airtime credit, length of time as a customer, and mobile money usage, to assess the creditworthiness of end users who otherwise lack financial history. For example, M-Shwari, a loan service offered in partnership between Safaricom and Commercial Bank of Africa in Kenya, and M-Pawa, a loan product offered in partnership between Vodacom and Commercial Bank of Africa in Tanzania, follow this model. Users request loans on their mobile phones, and the credit-scoring algorithm of the bank instantly scores the customer using user data from the mobile money platform and decides the outcome. In this way, mobile money platforms certify end users and enable them to access financial services from formal financial institutions.¹²

Unified Access to Distributed Services. We further find evidence around the second proposed mechanism, that mobile money platforms provide unified access to distributed financial products and services to end users through a network of partnerships with complementors. Our interviews with industry experts revealed that many commercial banks responded to the growing penetration of mobile money by taking a collaborative approach as complementors on these platforms. A fintech manager in India highlighted the benefits of these

Figure 3. (Color online) Mobile Money Platform Launches Worldwide, 2001–2021



Notes. (a) Number of mobile money platforms live as of Oct 2021. Countries that did not have any live mobile money platform as per GSMA are greyed out. Source: GSMA Mobile Money Deployment Tracker (b) Direct launches by banks and non banks (c) Collaborations between banks and nonbanks. No data available between 2002 and 2006.

partnerships for complementors, stating, “Through these partnerships, banks are able to pass on some of the customer acquisition cost to these mobile banking players who have a wide network.” Similarly, a vice president at a credit rating agency in India noted the mutually beneficial nature of these collaborations, saying, “For telcos, it is about monetization of their network, and for banks, it is about reaching new-to-bank customers.” These insights suggest that, through these partnerships, formal financial institutions leverage the infrastructure and network of mobile money platforms to provide access to financial products and services to platform end users.

We also find several examples of mobile money services that provide evidence for the second mechanism at play. For example, MoKash, a service offered in partnership between MTN Mobile and Commercial Bank of Africa (CBA) uses the combined digital infrastructure of MTN and the banking capabilities of CBA to provide one-stop access to valuable and affordable financial services, including loans and savings to Ugandans in rural and peri-urban areas, which are remote and lack traditional banking infrastructure. Another example of value creation through partnerships is seen in M-Pawa in Tanzania, which is a partnership between Vodacom

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Table 3. Difference-in-Differences Estimation Results

	Model 1: Full sample			Model 2: CEM sample			Model 3: Effect check, CEM sample					
	Pre	Post	Total	Pre	Post	Total	Pre	Post	Total			
Not Affected	58,552	66,947	125,499	58,281	66,573	124,854	58,281	66,573	124,854			
Affected	12,994	13,278	26,272	12,993	13,278	26,271	12,993	13,278	26,271			
Total	71,546	80,225	151,771	71,274	79,851	151,125	71,274	79,851	151,125			
Outcome	Stepping stone effect: Respondent borrowed in past 12 months from a formal financial institution			Stepping stone effect: Respondent borrowed in past 12 months from a formal financial institution			Check effect of reforms: Respondent reported having an active mobile money account					
Before	Coefficient	Standard error	t	$P > t $	Coefficient	Standard error	t	$P > t $	Coefficient	Standard error	t	$P > t $
Not affected	0.116				0.096				0.076			
Affected	0.08				0.08				0.069			
Diff (Pre)	-0.036	0.003	13.29	0.000***	-0.017	0.003	6.15	0.000***	-0.007	0.003	2.84	0.005**
After	Coefficient	Standard error	t	$P > t $	Coefficient	Standard error	t	$P > t $	Coefficient	Standard error	t	$P > t $
Not affected	0.111				0.094				0.133			
Affected	0.098				0.098				0.195			
Diff (Post)	-0.012	0.003	4.35	0.000***	0.004	0.003	1.38	0.168	0.062	0.004	16.71	0.000***
Diff-in-Diff	0.024	0.004	6.02	0.000***	0.021	0.004	5.23	0.000***	0.070	0.005	15.40	0.000***

Notes. Effect of regulatory changes in 2015 or 2016 that enabled nonbanks to operate as mobile money operators, which reduced the barriers to entry by nonbanks and increased the availability of mobile money. *Affected*: respondents who resided in countries that implemented the regulatory changes. *Not affected*: respondents who resided in countries that did not implement the regulatory changes. *Pre*: denotes observations in 2014 before the regulatory changes. *Post*: denotes observations in 2017 after the regulatory changes. The countries that implemented these regulatory changes are listed in Online Table A3.

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; + $p < 0.10$.

Table 4. Qualitative Evidence from Interviews with Industry Insiders Supporting Proposed Mechanisms**Illustrative quotes demonstrating mechanism 1: Data-based certification**

- “This is not alternative data. It is the only data. Without this [mobile money] data, these people do not have any financial transactions record” – **fintech leader, MTN^a**
- “We had data sharing agreements with partner banks. We internally processed large volumes of data in-house including customers’ age on network, device details, how long the SIM had been active, transaction history, top-ups, money movement between bank account and wallet to create a credit score. There were over 100 variables. Most of the customers who accessed loans through M-Shwari were first time customers for the bank.” – **former head of strategic partnerships at M-Pesa^a**
- “I remember when I was building the product in 2012, our first savings and lending product, we used about 500 parameters from GSM and M-Pesa to create a credit score. We did that credit score on an Excel spreadsheet. We were able to let customers opt-in and still get credit within a couple of seconds. But it has evolved significantly since then and become more sophisticated. Today we use roughly 3,500 to 10,000 parameters to do lending. But we’re still scratching the surface.” – **Sitoyo Lopokoiyit, CEO M-Pesa^b**
- “Who owns and processes the data [between MMPOs and banks] really depends on who has the capability and who has the competence, and the nature of the revenue sharing arrangement.” – **fintech leader, MTN^a**
- “We are a high-volume service. We have a lot more data than banks have. When it comes to credit products, we get our internal data and credit reference bureau data (if available), to create scores for customers. We work with banks where we use their balance sheet to lend using the score card. We collaborate to make sure that the scorecard we develop has input from their side and our side to manage the NPL” – **manager, M-Pesa^a**
- “In many of our markets, we have yet to launch financial services, and transaction data is not available. Customer data is limited to telco data, such as call data records (CDR), and top up and demographic data collected at sign up. However, the richness of telecom data provides insights that are far more accurate on predicting human behavior than transaction data alone.” – **senior analyst, Telenor Financial Services^b**
- “Banks are risk averse. Using bank’s criteria alone, a lot of people who can be [considered] creditworthy based on GSM data and behavioral data, will be locked out. We have reached a stage where we can offer credit-scoring as a service using the internal data we have. When we come up with a joint product with a bank, we can be confident that it is a reliable score of the customer” – **manager, M-Pesa^a**
- “GSM data gives a good sense of the ability to pay. The mobile money data gives a good idea about the willingness to pay” – **ex senior manager, MTN^a**
- “I think information as collateral is more valuable than somebody providing a fixed asset to lend.” – **Sitoyo Lopokoiyit, CEO M-Pesa^b**

Illustrative quotes demonstrating mechanism 2: Unified access to distributed services

- “Through these partnerships, banks are able to pass on some of the customer acquisition cost to these mobile banking players who have a wide network.” – **fintech manager, India^a**
- “For telcos, it is about monetization of their network and for banks, it is about getting to new bank customers.” – **Vice President at credit rating agency, India^a**
- “We have seen a tremendous rise in mobile to bank and bank to mobile transactions. There is increasing linkage between the two sides” – **senior data and insights manager, GSMA^a**
- “Banks know that mobile money operators can provide extended reach through different channels. On the other hand, banks have big loan books that mobile money players may not have” – **fintech leader, MTN^a**
- “Banks know that fin-techs can do last mile legwork that they don’t want to do. It increases virality of the service and the mobile money companies do not have to underwrite the loans. They can only focus on managing the customer relationships” – **investor, Quona Capital^a**
- “We all want safe, easy, and convenient access to our money wherever we are and as such we must innovate past the notion of branches and traditional banking practices. Our partnership with Airtel to launch Akiba Mkononi and Mobile Banking services is the first step along this path to provide Kenyans with a rich bouquet of mobile-based banking services.” – **Isaac Mwigie, UBA Kenya Bank Ltd. managing director and CEO^c**
- “As a bank, AGIB cannot afford to ignore that reality especially when the opportunity has arrived knocking on their doors. With the pressing need for innovative solutions in banking for service delivery, [mobile money] will certainly lead to a greater customer experience and efficiency.” – **Managing Director of AGIB Bank, The Gambia^c**
- “This product [KCB M-Pesa] is a crucial answer to our country’s effort to empower millions of Kenyans by availing credit conveniently through their mobile phones.” – **Kenya Commercial Bank CEO^c**
- “The partnership with MTN Mobile Money Uganda Limited allows us to continuously extend financial services to millions of Ugandans through the mobile channel.” – **CEO of National Commercial Bank of Africa^c**

Illustrative quotes demonstrating mechanism 3: Scaling through network effects

- “Another issue critical to a successful launch and operation is getting the number and geographical spread of the agent network right. You need agents on literally every corner in every village. This will help ensure the trust and acceptability of the system. If people know that when someone sends them money, they can withdraw it ‘just around the corner,’ then people start to believe in the system.” – **Michael Joseph, former CEO of Safaricom^b**
- “They [Vodacom Tanzania] have reached a tipping point where customers are now telling each other about the benefits of M-PESA; this has contributed to the 19% month-on-month transaction growth which we have been enjoying for the last 12 months in a row.” – **Greg Reeve, former head of mobile payment solutions at Vodafone^b**
- “If you let your agents abuse the system and get away with it, it’s very difficult to fix the problem later on. It’s so important to manage your agent network rigorously. And that includes managing the speed of agent-network growth. Yes, you need a critical mass of agents, but your agents need to be successful, so they’re encouraged to do business. Keep track of your agents’ average revenue per day.” – **Michael Joseph, former CEO Safaricom Ltd.^b**

Table 4. (Continued)

“Mobile money has grown rapidly over the last six to seven years. What we see is increased adoption among businesses, small entrepreneurs, as well as rural consumers of financial services. We launched mobile money in 2012, and we have over 3 million Sri Lankans using mobile money in the Dialog network.” – **Director and Group CEO, Dialog Axiata PLC, Sri Lanka**^b

“Tigo-Pesa Tanzania has enabled millions of unbanked Tanzanians to access financial services.” – **global risk & control manager, mobile financial services, Millicom Group, Tanzania**^c

“We currently have more than 27 million active customers across our markets.” – **group head of mobile financial services, MTN Group, Côte d’Ivoire and Uganda**^b

^aPrimary interview.

^bPublic secondary interview.

^cMedia article.

and CBA. M-Pawa users, many of whom are farmers who have historically lacked access to formal loans, can request a loan, and CBA instantly scores the request based on the user’s historical mobile phone data and money usage. This is again evidence of how the data and network infrastructure of the mobile money platform complements a formal financial institution to make financial services, such as credit, easily accessible to previously unbanked, platform end users.¹³ Our secondary research further reveals that mobile money platforms have established collaborations with various organizations, including fintech start-ups, remittance service providers, government bodies for subsidy and grant payments, and utility providers for bill payments as well as healthcare and education players. This approach further enables unified access to multiple products and services and enhances the value created for end users through a distributed network of complementors.¹⁴

Scaling Through Network Effects. Our qualitative assessment unveils two important drivers behind the rapid scaling of mobile money platforms to reach new and excluded market participants through network effects: building a vast and trustworthy agent network and user validation. M-Pesa, one of the earliest mobile money platforms launched in Africa and one of the fastest growing on the continent, provides an excellent example. As Michael Joseph, the former CEO of Safaricom, who oversaw the launch and expansion of M-Pesa in Kenya, noted, “Critical to a successful launch and operation is getting the number and geographical spread of the agent network right.” He further explained the reason as follows: “If people know that, when someone sends them money, they can withdraw it ‘just around the corner,’ then people start to believe in the system.” In fact, agents emerged as the most important side of the market in driving network effects—even more so than commercial partners, such as banks. However, getting just the scale of the agent network right is not enough. Platforms also have to ensure that agents are trustworthy. Insights from the former CEO of Safaricom stress the importance of balancing quality with scale: “If you let your agents abuse the system and get away with it, it’s very difficult to fix the problem

later on.”¹⁵ Further, we discovered that, in addition to the agent network, word-of-mouth endorsements by existing users about the benefits of mobile money increased other users’ desire to join these platforms and was a key driver of scaling through network effects. As Greg Reeve, the former head of mobile payments at Vodacom in Tanzania said, “Customers are now telling each other about the benefits” of mobile money, and “this has contributed to the 19% month-on-month transaction growth.”

In these ways, successful platforms, such as M-Pesa, scaled rapidly to reach millions of financially excluded customers. In our secondary research, we find that it took 14 years for M-Pesa to acquire its first 25 million users but only five years to double that number. The growth in its agent network—250,000 in the first 15 years and then double that in half the time—further accelerated its expansion to new users. Further, as noted by senior executives from other MMPOs such as MTN, Millicom Group, and Dialog Axiata, these organizations have adopted the same strategies to scale, reaching millions of previously unbanked customers.

Discussion and Conclusion

This study highlights the significance of digital multisided platforms—particularly, mobile money platforms—in developing countries, where institutional voids limit market transactions. We show that these platforms play a critical role as intermediaries and fill institutional voids in credit markets by certifying end users through digital data and providing unified access to previously inaccessible financial products and services through commercial partnerships with complementors, such as banks. Further, by leveraging network effects, they scale rapidly and reach previously excluded populations. Through these novel mechanisms, mobile money platforms have positive spillover effects on end users’ access to credit from formal financial institutions. In this way, they serve as a stepping stone to financial inclusion for previously excluded segments.

We have attempted to rule out potential alternative explanations for our results. For example, increased competition from nonbank MMPOs may have led commercial banks to loosen their lending standards,

Table 5. Example of Loan Services Offered Through Partnerships Between MMPOs and Banks with Digital Data Based Certification

Platform	Country	Loan services (partner banks)	Excerpts from websites demonstrating end-user certification through digital data
Airtel Money	Kenya	KopaCash & KopaFloat (Jumo) M-Fanisi (Maisha MicroFinance) Express Loans (EcoBank)	Customers can increase their loan limits on M-Fanisi in three ways: (i) increase usage of Airtel Money services, (ii) increase activity on your M-Fanisi account by moving money in and out of your account, (iii) increase savings on your M-Fanisi account.
M-PESA	Kenya	KCB M-PESA Loan (Kenya Commercial Bank (KCB) M-Shwari (Commercial Bank of Africa(CBA) M-Fanisi (Maisha MicroFinance) Fuliza (CBA) Halal Pesa (Gulf African Bank)	In order to qualify for a loan, you will have to be an active M-PESA user for at least six months, save regularly on M-Shwari account, and continuously use other Safaricom services such as Voice, DATA, and M-PESA. The loan amount will be determined by the amount of M-PESA balance that a customer has, their savings on Safaricom and KCB platforms, and usage of their suite of products. To grow your loan limit, increase activity on M-Pesa account by moving money in and out, increase savings on KCB M-Pesa account, and increase usage of M-Pesa services.
Equitel	Kenya	Eazzy (Equity Bank)	You are eligible for an Eazzy Loan if you've had an active Equity Bank accounts or active Equitel line for a minimum period of six months.
Orange Money	Côte d'Ivoire	Tik Tak Loan (Orange Bank in partnership with NSIA Bank)	The bank makes a personalized offer to each client. The amounts offered depend on your use of Orange Money, your Orange chip, and your savings account.
MTN Mobile Money	Ghana	QwikLoan (AFB Ghana), Jumo)	Your loan qualification depends on how long you have been on the MTN network as well as your MTN Mobile Money and Airtime usage.
MTN Mobile Money	Uganda	MoKash (CBA)	The amount of money you can borrow is determined entirely by your credit score—called the loan limit—which is computed based on assessments of the user's repayment behavior, savings amount, and their use of mobile money as well as other MTN services.
Airtel Money	Uganda	Airtel Quick Loans (Housing Finance Bank)	Customers can take multiple loans up to their credit limit. You will need to be an active Airtel Money customer for six months and had at least one Airtel money transaction every month for the past six months.
Tigo Pesa	Tanzania	Tigo Nivushe (Absa Bank & Jumo)	This mobile lending product is an easily accessible, short-term loan option available to Tigo Pesa's customers and funded by Absa Bank. Customers who are registered and sufficiently active on Tigo Pesa can borrow depending on their requirements and eligibility.
Vodacom M-Pesa	Tanzania	M-Pawa (CBA)	To be eligible, you should be with Vodacom for at least six months; the longer you are with Vodacom the better. Use your phone regularly to call, text, and browse. Ensure you regularly top-up (any amount) when you run out of airtime. Use M-Pesa regularly to receive money send money, pay bills.
bKash	Bangladesh	In partnership with City Bank	The City Bank will be offering the digital loan service to a selected group of bKash users in line with Bangladesh Bank regulations. To qualify for taking a loan under the credit policy of City Bank, please keep using bKash more frequently.

Note. List of sources provided in Online Table C4.

resulting in greater lending. However, our analysis shows that increased financial access is associated with the rate of collaboration between MMPOs and banks rather than aggressive competition by banks.¹⁶ It is also possible that more financially sophisticated or credit-worthy users access mobile money services and are also more likely to be banked by commercial banks. Although we cannot fully rule out the effect of unobservable factors, to mitigate this concern, we match respondents based on income, education level, and gender to

ensure that our sample in affected and nonaffected countries is comparable.

We make significant contributions to two primary areas of research through our study. First, the findings of our study are significant against the backdrop of the current literature on how organizations fill institutional voids (e.g., George and Prabhu 2000, McDermott et al. 2009, Mair et al. 2012, Dutt et al. 2016, Armanios et al. 2017, Armanios and Eesley 2021). We add to this literature by suggesting that, through data-driven business models, distributed value

creation, and network effects, digital multisided platforms intermediate in environments with missing and underdeveloped institutions in ways that are unique and distinct from nonplatform intermediaries previously studied in the literature. We also identify the distinctive mechanisms through which platforms intermediate in these contexts and provide evidence of their spillover effects on access to financial services. Our arguments suggest that digital platforms can expand the scope of analysis on institutional intermediation in novel ways not yet explored in the literature with important implications about the roles of these platforms in addressing institutional voids and expanding market transactions. Our study is also potentially relevant for a growing literature on scaling, which focuses on ventures in developed markets (e.g., DeSantola et al. 2023). We contribute to this literature by providing a novel perspective on scaling in contexts with institutional voids, in which such voids create opportunities for new entrants with digital business models to address unmet demand for products and services.

Second, our study contributes to the literature on organizational and institutional factors promoting financial inclusion (e.g., Mair et al. 2012, Cobb et al. 2016, Zhao and Wry 2016) and mobile money platforms (e.g., Jack and Suri 2014, Munyegeera and Matsumoto 2016, Suri and Jack 2016, Wormald et al. 2021, Batista and Vicente 2023). We provide a unique perspective on how mobile money platforms expand access to financial services for previously excluded market participants by filling the gaps left by the lack of credit information and traditional banking infrastructure. Moreover, the mechanisms discussed in our study shed light on the complementary roles of digital multisided platforms and traditional financial institutions in addressing institutional voids and promoting financial inclusion.

Our study also has important policy implications for governments and regulators seeking to promote financial inclusion and mitigate institutional voids in emerging markets. Policymakers can leverage the potential of mobile money platforms by encouraging collaboration between nonbank platform operators and traditional financial institutions, promoting investments in digital infrastructure, and establishing enabling regulatory frameworks that foster innovation and cocreation in the financial sector. This implication builds quite well on the recent qualitative work on regulatory cocreation by new ventures operating in regulatory voids (e.g., Gao and McDonald 2022) and, more generally, on the literature on entrepreneurship and regulation (Eesley 2016, Eesley et al. 2016, Eberhart et al. 2017, Armanios and Eesley 2021, Assenova 2021).

Our study has some limitations that future research can address. First, whereas our data are comprehensive, they exclude some types of services and operators based on the definition of mobile money platforms used by GSMA. To strengthen our findings, future data collection

efforts can assess the robustness of our results. Second, although the difference-in-differences design is suitable for studying institutional reforms, unobserved factors could affect our results. The exogeneity assumption cannot be tested directly, and parallel trends only partially validate some of our assumptions. Future studies can improve upon our research design by collecting more information on end-user transactions with more details on the type of data generated on the platform and on the data-sharing approaches of these platforms. Future work can also evaluate platforms in other sectors and the trade-offs involved in scaling platforms in emerging markets.

Our study shows that mobile money platforms have become increasingly important intermediaries that help to overcome voids in credit market institutions in emerging and developing economies. Our work contributes to the growing literature on digital multisided platforms and institutional intermediaries by explaining how digital platforms can potentially address institutional voids and drive financial inclusion. By unveiling fresh perspectives on institutional intermediation, our findings underscore the transformative potential that digital platforms hold for emerging and developing markets. As these platforms continue to soar in influence within the global digital economy, our research equips policymakers, practitioners, and scholars with invaluable insights to foster inclusive economic development in environments marked by institutional voids. With our work, we pave the way for a promising avenue for scholarly investigation in which digital platforms serve as dynamic catalysts of financial inclusion and institutional intermediation, bridging gaps in service provision and propelling emerging and developing economies toward greater inclusion.

Acknowledgments

The authors gratefully acknowledge and thank senior editor Timothy Werner and two anonymous reviewers as well as (in alphabetical order) Aline Gagnon, Audra Wormald, Emilie Feldman, Exequiel Hernandez, Raffi Amit, Tyler Wry, and Witold Henisz as well as participants at the 2021 Virtual Meeting of the Strategic Management Society, 2021 Wharton-INSEAD Doctoral Consortium, 2022 Alliance for Research on Corporate Sustainability (ARCS) Conference, 2022 Academy of Management Conference 2022 and Virtual Seminar at Indian Institute of Management (IIM) Bangalore for their valuable feedback. The authors declare no relevant or material financial interest that pertains to the research in this article.

Endnotes

¹ The Groupe Speciale Mobile Association (GSMA) Mobile Money program considers services that meet the following definitions of mobile money service: (i) a mobile money service includes transferring money and making and receiving payments using the mobile phone; (ii) the service must be available to the unbanked, for example, people who do not have access to a formal account at a financial institution; and (iii) the service must offer a network of physical transactional points that can include agents, outside-of-bank branches, and

ATMs, that make the service widely accessible to everyone. The agent network must be larger than the service's formal outlets; (iv) mobile banking that offers the mobile phone as just another channel to access a traditional banking product are not included, and (v) payment services linked to traditional banking or credit card, such as Apple Pay, Google Pay, and Samsung Pay are not included. Based on these definitions, services such as WeChatPay, PayPal, etc., are classified as mobile financial services (mobile wallets or mobile banking) and not mobile money services as per the definition of GSMA.

² Online Figure A1 and the accompanying note further explain how a mobile money transaction usually works.

³ We show how voids in credit markets map to the typology in Khanna and Palepu (2010) in Online Table A2.

⁴ These issues underscore the complexities involved in platform strategy and the trade-offs between autonomy and control as platforms scale (cf. Wareham et al. 2014). We are grateful to an anonymous reviewer for these points.

⁵ We provide the full list of the countries that implemented these regulatory changes in Online Table A3. We use the definition of mobile money services as defined by GSMA, which excludes payment services linked to traditional banking or credit cards. WeChatPay requires users in China to have a bank account, which means it falls under the category of mobile financial services, not mobile money services.

⁶ We think several reasons may account for this concentration of reforms in SSA. First, SSA has been a leader in mobile money since the introduction of M-PESA, one of the first such platforms worldwide. This has increased the receptivity of end users to mobile payments. Second, the widespread penetration of mobile phones and the lack of commercial bank branches in rural areas has made mobile money services more attractive.

⁷ We provide the full survey instruments and phrasing of the questions used to collect the data in the Online Table A4.

⁸ We provide the interview protocol in supplementary text C1 in the online appendix.

⁹ We provide respondent details in Online Table C2.

¹⁰ We provide more information on these sources in Online Table C3.

¹¹ For example, we coded the information on the use of data and the construction of credit scoring models as being related to how platforms certified users' creditworthiness; we categorized information on the variety of products and services offered on platforms through complementors and the benefits of such partnerships under the theme of unified access to distributed services; and finally, we coded information and insights about the drivers of platform scale and the scaling strategies employed by successful players, such as M-Pesa, under the theme of scaling through network effects. We provide a detailed description of our qualitative analysis in supplementary text C5.

¹² In our supplementary analyses in Online Table B2, we also provide quantitative evidence that is consistent with this mechanism. We find that each additional mobile money service used on a platform is associated with an increase in the likelihood of borrowing from a financial institution among respondents in our sample.

¹³ In our supplemental analyses, we find that collaborations between MMPOs and banks are associated with an increase in the number of loans extended to households by commercial banks in the subsequent year. We report the results from these analyses in Online Table B3.

¹⁴ Online Table A5 lists the variety of services offered on mobile money platforms.

¹⁵ Online Figure A6 shows the growth of M-Pesa agents and customers between 2007 and 2009. When scaling rapidly, M-Pesa also managed its agent network to maintain consistent transactions per agent and ensure focus on quality.

¹⁶ Supplementary analysis is in Online Table B3.

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