EVIDENCE OF DIGITAL FINANCIAL SERVICES IMPACTING WOMEN’S ECONOMIC EMPOWERMENT

WHAT EXPLAINS THE IMPACTS AND WHAT IS LEFT TO LEARN

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1. INTRODUCTION

The use of digital financial services (DFS) is growing rapidly and digitization renders formal finance increasingly accessible to many of those that remain unbanked. To the extent that growth in DFS and mobile money, in particular, can be harnessed to reduce gender disparities in access to finance and advance women’s economic empowerment (WEE) within their households and local economies, the growth of DFS offers great promise for advancing gender equality more broadly.

Yet, existing data and evidence offer a mixed message. Despite stark advances in financial inclusion globally, the gender gap in access to finance remained almost unchanged between 2011 and 2017 (Demirgüç-Kunt et al., 2018).

Nevertheless, DFS has demonstrated promising impacts on a number of important outcomes for women’s economic empowerment, though the specific channels that explain these impacts remain understudied. Unpacking these specific channels – the causal mechanisms that mediate impacts of DFS on WEE – remains as a critical research challenge if public policy, development interventions, and financial service designs are to reach and empower women more effectively, and advance gender equality more broadly. This paper aims to review the existing evidence, develop a conceptual framework for investigating specific mechanisms, and highlight promising topics for future research as part of the WEE-DiFine Initiative’s effort to catalyze and deepen our collective understanding of the relationship between DFS and WEE in low and middle income countries.

1 Notably, there were reductions in the gender gap in South Asia largely due to the provision of near universal basic accounts in India.

2 Conceived by the Brac Institute of Governance and Development (BIGD) and funded by the Bill & Melinda Gates Foundation, the Women’s Economic Empowerment and Digital Finance (WEE-DiFine) Initiative seeks to generate evidence about the causal mechanisms that mediate the impacts of DFS on WEE.

Growth in DFS has been rapid since the launch of the earliest sustained large-scale mobile money services in the mid-2000s. In sub-Saharan Africa, 39% of adults had made or received digital payments in the prior year as of 2017, and by 2019 there were already 181 million active mobile money accounts up by 15% year-on-year (GSMA, 2020). While Africa has led the expansion of mobile money, countries in Asia have been catching up with Bangladesh Bank (2020) reporting that there are now over 92 million clients with mobile money accounts in the country, doubling the total from early 2017. Despite this stark growth in DFS, the gender gap in access to finance persists. Even as 500 million adults opened an account with a financial institution or mobile money provider between 2014 and 2017 (Demirgüç-Kunt et al., 2018), women in developing countries were, on average, less likely to own an account compared to men (59% and 67%, respectively). Nevertheless, the near ubiquity of mobile phones even in low income countries is a source of optimism for reaching those that remain unbanked and women, in particular. Globally, two-thirds of the 1.7 billion adults who did not have an account with any financial institution in 2017 owned a mobile phone, suggesting DFS may be harnessed to achieve close to universal access to finance. Advancing our nuanced understanding of benefit and of the risks that DFS may pose for women is needed to reduce the persistent gender disparity in financial access in a manner that empowers and does not harm.

Increasing WEE is an important motivation for expanding DFS access for women. Existing studies have found that DFS (primarily mobile money) increase household spending (Lee et al., 2019; Munyegera and Matsumoto, 2016; Suri and Jack, 2016), promote household savings (Bastian et al., 2018; de Mel et al., 2018; Suri and Jack, 2016), and smooth spending when households are faced with shocks by providing increased access to payments and transfers (Batista and Vicente, 2020; Lee et al., 2019; Riley, 2018; Jack and Suri, 2014). However, there is less evidence on
gender-differentiated impacts. While there are numerous theoretical reasons to believe that access to DFS can increase WEE, DFS may also have unintended consequences that actually reduce WEE if, for example, undermine around financial information or displaces important social networks related to existing financial arrangements. Given the gender disparity in enabling factors for financial access, such as mobile phones and identification, DFS could also further exacerbate gender disparities if not developed with women in mind. Fortunately, policymakers, commercial providers, and development practitioners are increasingly taking seriously the challenge of designing DFS products and services to increase women’s access and economic empowerment. Studying the impacts of DFS at the individual level can help inform the specific policies designed to make DFS more gender inclusive and empowering.

To provide a theoretical framework for understanding the potential impacts of DFS on WEE, section 2 of this paper draws on two canonical models of women’s empowerment from the economics literature. In the first model, DFS can increase WEE by improving a woman’s “outside options” to her status quo social arrangement and, thus, her bargaining power within the household. In the second model, DFS can increase a woman’s “ability to enact her preferences,” for example, by enhancing the privacy around a woman’s finances or enabling her to carry out more of her own choices in other ways (without necessarily changing her outside options).

In addition to presenting these two alternative, but not mutually exclusive, models of women’s empowerment, section 2 also lays out a framework for three broad channels by which DFS may impact WEE, focusing on a) the role of DFS in affecting gender disparities in financial access, b) the implication of technological features enabled by digitization of financial services on WEE, and c) the effects of DFS on women’s access to nonfinancial services. These broad channels are further broken down into a list of plausible and specific mechanisms that may mediate DFS impacts on WEE, which include:

- access to finance,
- bargaining power,
- privacy,
- opportunity cost of time,
- velocity of transfers and breadth of support network,
- transaction costs,
- behavioral influence,
- systematic discrimination,
- safety,
- mobility, and
- access to digital nonfinancial services.

In section 3, we review the empirical evidence for each of these mechanisms. We focus on experimental studies but also discuss a few nonexperimental studies that have used natural experiments with sophisticated research designs to show causality between DFS and WEE. Deeper understanding of these causal mechanisms can inform policies and product designs to increase DFS’s potential in fostering WEE. This review paper, therefore, identifies a set of priority questions for the WEE-DiFine Initiative. A summary of the papers and causal mechanisms discussed in section 3 is also provided in Annex A.

Section 4 discusses two key methodological issues that emerge when reviewing the evidence and gaps on causal pathways between DFS and WEE. In this section we also offer some ideas for how future research can address these issues. Section 5 concludes the paper with a summary of considerations that cut across the different mechanisms discussed in section 3 including, the role of contextual factors, the relationship among different mechanisms, and the importance of measuring later downstream WEE outcomes.
2. THEORY LINKING DFS AND WEE

Before we discuss theoretical linkages between DFS and WEE, we need working definitions of both concepts. For DFS, we follow the definition from the Alliance for Financial Inclusion’s (AFI) DFS working group: a “broad range of financial services accessed and delivered through digital channels, including payments, credit, savings, remittances, and insurance” (AFI, 2019). The term digital channel refers to a range of digital systems, including the internet, mobile phones, ATMs, POS terminals, and electronically enabled cards. Basic examples of DFS use include sending or receiving payments with a mobile money account or using a debit card to withdraw funds from a savings account at an ATM. In fact, we find the majority of studies that investigate the effect of DFS on WEE focus on interventions that use mobile money accounts for person-to-person (P2P) and government-to-person (G2P) transfers (Annex A). Although mobile money’s prominence in the literature may reflect the growing popularity, policy attention, and general economic promise of mobile money, future investigations of causal mechanisms mediating impacts on WEE should not be limited to a particular set of DFS technologies or use cases.

Instead of framing the investigation of the causal mechanisms by DFS and WEE in terms of specific technologies or use cases, this review and the broader WEE-DiFine initiative prefer to organize investigation of the relationship between DFS and WEE around the following three general channels (see Figure 1):

- The role of DFS in affecting gender disparities in financial access,
- The implication of technological features enabled by digitization of financial services on WEE, and
- The effects of DFS on women’s access to nonfinancial services.

As depicted in Figure 1 and validated by the evidence discussed below, DFS may impact men and women differently with important implications for the three general channels mentioned above. The first channel, the role of DFS in affecting gender disparities in financial access, is by construct about the relative impacts of DFS on financial access by gender. However, in many of the other specific potential mechanisms discussed below, WEE achievements do not depend on differential impacts by gender. Figure 2 zooms in on several specific mechanisms within the technological induced changes channel that can potentially influence WEE through digitization of financial services. These specific mechanisms are discussed in detail below.

Definitions of women’s economic empowerment (WEE) are often nested within definitions of the broader concept of women’s empowerment, which is typically conceptualized as the ability to act on one’s preferences (e.g., Kabeer, 1999). One oft-cited definition of women’s empowerment by the UN (2001) frames it in terms of five components:

Women’s sense of self-worth; their right to have and determine choices; their right to have access to opportunities and resources; their right to have the power to control their own lives, both within and outside the home; and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally.

In exploring the relationship between DFS and WEE in this paper, we avoid relying on any one specific definition, other than
to invoke the core idea that WEE outcomes should reflect a woman’s preferences. Within this framework, there are two broad approaches in the economic literature for modeling the potential impact of DFS on WEE. We look at each in turn.

A. DFS Influencing Women’s Bargaining Power

Benchmark household bargaining models (e.g., Manser and Brown, 1980; McElroy and Horney, 1981) theorize that household decisions are a function of each household member’s bargaining power, which is a function of their outside option, i.e. the utility each member would have if they terminated the relationship. In this framework, then they will also increase. The key question implied by this framework, therefore, is whether DFS improve a woman’s outside option compared to the outside options of those she bargains with, such as her husband. If men benefit from DFS more than women do, then DFS could lower a woman’s bargaining power.

The following list suggests several potential reasons why DFS could improve a woman’s relative outside option, though these mechanisms remain theoretical and require empirical validation.

- When women’s mobility is constrained by safety concerns or social norms, DFS may increase a woman’s ability to access financial services from home.
- If women have less time to access traditional financial services than men do, such services may be costlier for women (referred to as an opportunity cost).
- If women are discriminated against in traditional financial institutions, DFS interventions may reduce or eliminate such discrimination and increase women’s access to finance.
- If it is risky to hold cash (and women are especially vulnerable), DFS could allow them to save money and perform transactions by lowering the risks of losing money.
- Given previous evidence that DFS can enhance risk sharing by lowering transfer costs (Jack and Suri, 2014) and the possibility that women who leave traditional households could lose access to traditional risk-sharing networks, DFS could improve women’s outside option by allowing them to better share risk on their own.

Importantly, it is also possible that DFS could decrease a woman’s bargaining power. For instance, if women lack access to phones and other technology required to access DFS, and depend on men for that access, then DFS could decrease women’s outside options and, thus, decrease their bargaining power.

B. DFS Influencing a Woman’s Ability to Enact Her Preferences

While the outside option is a key determinant of household outcomes in many bargaining models, it is not the only one. Household outcomes are also determined by each household member’s choice set and bargaining ability, and the transaction costs of enacting different outcomes.

Privacy and observability are a clear way DFS can help a woman enact her preferences in household decisions. In models of household bargaining with partial pooling (e.g., Kabeer, 1997), the amount of money over which women can exert control is related to the difficulty of keeping money private. DFS could reduce this difficulty by reducing the fees needed to hide money. For example, Anderson and Baland (2002) argue that women pay a fee in a rotating savings and credit association (ROSCA) to keep the money
safe from a spouse. Alternatively, DFS may increase the possibility that hidden money will be discovered, reducing women’s wellbeing. Some evidence from the family planning literature, in fact, demonstrates that women retaining information over contraceptive access privately improves their control of family planning, but at the cost of diminished psychosocial well-being from fear of retribution (Ashraf, Field, and Lee, 2014).

DFS may also encourage women to hold money because money accessed digitally is more secure than cash. While controlling access to money does not automatically translate into a woman controlling spending decisions, holding money should increase her say in spending particularly if DFS enable her to retain greater privacy. There is also growing evidence that the ability to bargain helps women achieve their preferred outcomes (e.g., Ashraf et al., 2020). For example, one study demonstrates that even just exposure to successful women who could serve as role models increases a woman’s bargaining power through changes to her own perception of gender norms (Uckat, 2020). Similarly, greater access to, control of, or privacy over finances resulting from DFS may change a woman’s perceptions of gender norms and enhance her ability to bargain. Relatedly, changes in her husband’s perceived gender norms and willingness to bargain with her (or the psychic cost to him of bargaining with an economically empowered spouse) may also result in a woman being able to influence household decisions. Alternatively, DFS could actually reduce women’s knowledge about and ability to bargain by displacing constructive interactions with outside resources required in an analog financial context, such as the face-to-face interaction with other women common in traditional group microfinance settings (Harigaya, 2016). Notably, this concept of ability to bargain within the broader “ability to enact her preferences” framework, implies a different model of bargaining than that implied by the “women’s bargaining power” model described above by which bargaining power is influenced by outside options.

C. A Note on Reverse Causality: WEE Causing DFS Adoption

While we focus on understanding DFS’s causal effects on WEE, we note that an empirical correlation between the two phenomena could also reflect causal impacts flowing in the opposite direction, i.e. that non-DFS related increases in WEE lead to DFS adoption. For instance, women who gain access to jobs (a key source of WEE increases) may then choose to adopt DFS because they now control a greater fraction of the household’s budget. Note that a lot of the same mechanisms that we review in section 3 are also likely to influence this decision. For example, the increased opportunities from DFS may be particularly striking to economically empowered women who work and/or pursue other activities outside of the home. Since the WEE-DiFine Initiative is focused on the causal mechanisms for DFS (as interventions) to influence WEE (as outcomes), this paper does not cover this reverse causality, which merits a separate review. However, we do cite evidence that demonstrates complementarities between non-DFS economic empowerment interventions and DFS interventions, which we note offers a promising focus for future investigations.

3. RESEARCH ON MECHANISMS

In a systematic review of almost 600 papers on financial inclusion up to 2017, of which 116 were on digital finance, Gammage et al. (2017) find that WEE is far less emphasized as an outcome of digital finance interventions when compared to the financial inclusion literature at large. Although the review did not investigate causal mechanisms and focused on assessing the quality of evidence, the authors counted only eight high quality DFS papers that include WEE as outcomes, illustrating the general lack of evidence of DFS’s effects on WEE. Building on Gammage et. al (2017), we organize
our review of the literature here specifically in terms of potential mechanisms by which DFS influence WEE either through the role of DFS in increasing bargaining power (channel A in the previous subsection) and/or the role of DFS in enhancing a woman’s ability to enact her preferences (channel B in the previous subsection).

To be clear, when we refer here to mechanisms that mediate impacts of DFS on WEE, we mean the specific reasons why access to and use of DFS may cause women to become more empowered. In fact, it is the specific ambition of the WEE-DiFine initiative to shine light into the black box of how impact to more precisely examine why women become empowered (or disempowered). As our hypothetical list of mechanisms below suggests, there are numerous plausible hypotheses for why DFS could lead to WEE and evidence on the specific mechanisms that do and do not matter is essential for crafting effective policies to accelerate empowerment and for improving the design features of DFS that matter most for WEE. We organize the following review around what we think are particularly promising mechanisms, however, we do not claim that the following categories are comprehensive or mutually exclusive since most of these mechanisms are interlinked. We would encourage researchers to investigate other mechanisms that this review may have left out.

A. Digital Technology for Access to Financial Services

Digitizing financial services present opportunities for reducing existing gender disparities in access to financial services in at least two distinct ways. First, DFS may simply be more effective than analog services in reaching citizens that lack formal financial accounts who are disproportionately female. In other words, it is simply the improved access to basic formal payment, savings, and credit that provide compared to analog services, and not some innovative new account features that are enabled by digital. For example, a microfinance institution that historically deals in cash could digitize and offer credit to their primarily female clients through mobile money accounts. If these mobile accounts are their clients’ first formal account, this digitization would by construction reduce gender disparities in access to finance. However, those female clients with new accounts may prefer cash and choose to immediately get cash from a mobile money agent without otherwise taking advantage of the digital features of their new mobile accounts. Second, beyond providing more pervasive access, the digital nature of DFS accounts may enable new behavior, improving the usefulness of formal accounts for women and enabling women to overcome specific constraints that men may not face. Using the same microfinance digitization example above, access to a mobile money account may encourage women to keep some of the loan funds in their mobile account for safety reasons. This form of DFS-enabled empowerment, through improved safety, would not have occurred by merely improving access to an analog account and is, therefore, a result of the digitization of loan disbursements.

Despite the promise of DFS for women, expanding DFS may not automatically reduce gender disparities in financial access. In fact, global data on access to digital technology suggests that expanding DFS may even make the gender disparities more severe. For example, of men and women globally who do not have a bank account (the “unbanked”), 72% of unbanked men own a mobile phone versus only 62% of unbanked women (Demirgüç-Kunt et al., 2018). Therefore, even if the world were to achieve the laudable goal of universal access to financial services for all mobile phone owners, gender disparities would persist. Of course, this general observation obscures the fact that there are substantial differences in the gender disparities in access to digital technologies across developing countries. In some contexts, expanding DFS could clearly reduce the gender gap in financial inclusion.
To improve the design of DFS and our understanding of WEE, future research should go beyond merely establishing benefits of DFS on WEE to distinguishing between the relative importance of improved financial access versus improved usefulness of financial services resulting from digitization. This distinction is still underexplored, despite the handful of existing studies that do compare cash and mobile money, such as Aker et al. (2016) in the context of cash transfers and Riley (2019) in the context of credit transfers. Wieser et al. (2019) studied the impacts of access to mobile money services by randomizing unbanked villages in Northern Uganda into a treatment (to set up an agent) and a control group. The study found that setting up a mobile money agent increased the use of financial services, especially in P2P transfers. However, the study did not measure differences in results between men and women. Since DFS, by definition, will have digital features that are different from nondigital financial services, this distinction can also be challenging to pin down empirically. Further research should consider the following question.

- Do DFS impact WEE as a result of the expanded financial access facilitated by digitization versus new account features and behaviors enabled by digital accounts that improve the usefulness of formal accounts for women?

B. Bargaining Power

In the framework laid out in section 2, increasing bargaining power is important in both theoretical models through which DFS will influence WEE. While theoretical literature on bargaining power looks at the changes in outside options, the changes in bargaining power itself is often measured through decisions made at the household or spousal level, such as spending patterns (e.g., Dunbar, Lewis, and Pendakur, 2013; Brown, Calvi, and Penglase, 2018) or women’s reporting of their participation in household economic decisions (e.g., Anderson and Eswaran 2009; Roy et al. 2015; Majlesi, 2016; Heath and Tan, 2019). Therefore, women’s ability to enact their preferences becomes the proxy for bargaining power. We should note, however, that decisions that seem driven by gender could also be driven by other cultural contexts (Ashraf, 2009).

In the context of DFS to WEE, DFS access and use may directly influence outside options (e.g., individual registration and/or directed payments, allowing women more direct control over resources), as well as through other potential intermediary channels (e.g., reducing the time it takes to make transactions or allowing more information privacy). Aker et al. (2016) discussed the effects of DFS on women’s bargaining power. They showed that social-safety-net transfers conducted via mobile money in Niger resulted in more diverse diets and increased child feeding. They also demonstrated that this occurs because the transfer is conducted through mobile money instead of access to the mobile money (their second treatment arm). Although Aker et al. (2016) argue in favor of bargaining power as the mechanism, they did not find any difference between the treatment and control arms in the women’s self-reported control over decisions on how to use the transfers. In their look at the short-term (six months after the intervention started) effects of a mobile savings service in Tanzania, Bastian et al. (2018) found a significant increase in women’s empowerment, which is measured by their reported participation in household decision-making. While this is highly encouraging and in line with findings from nondigital savings interventions (e.g., Ashraf et al., 2010; Holloway et al., 2017), the study does not differentiate between the access to finance and improved usefulness of the service from digitization.

Using a natural experiment of ATM card rollout by Mexico’s BANSEFI bank, Bachas et al. (2020) study the benefits of the Oportunidades program’s conditional transfers. The study shows that card ownership increased average household savings by Mex$ 768, or 2% of a household’s annual income, after two years.
The study also shows that women with lower bargaining power at the baseline were more likely to save at the bank after receiving the ATM card. Yet, the study’s main thesis is that the ATM cards increased trust in banks among card users who were now able to check their balances more frequently. To the extent that women who trust banks less also have lower intrahousehold bargaining power, the observed heterogeneity in impact could be driven entirely by trust and not bargaining power. Bachas et al. (2020) are aware of the assumptions embedded in their interpretation of the bargaining power mechanism and mention it as “speculative.” This finding raises another possible implication for DFS: it is possible that digitizing services can be more effective for women than men if women have less trust in the formal financial systems because of other possible reasons, such as less experience with banks.

Still, digital services may exacerbate women’s weaker bargaining power, as shown by Schaner’s (2017) experiment with ATM cards in Kenya. This study finds that issuing ATM cards to women resulted in less control over their savings because the cards made it convenient for their spouses to withdraw cash. Other restrictions, such as biometric identification, could limit such unintended consequences. Given the existing evidence on bargaining power, further research should consider the following questions.

- What research designs will improve our ability to effectively interpret heterogeneity in impacts (e.g. incorporate measures of bargaining power into experimental baseline surveys, etc.)?
- What innovative methods and research designs can be used to distinguish bargaining power from enacting one’s preference?

C. Privacy

Digital accounts may offer women greater control over their resources by increasing privacy around women’s finances. This improved control could derive from reduced demands on their resources and reduced appropriation of their income (see Figure 3), as has been found in prior literature. The role of privacy (information asymmetry) of financial information on women’s bargaining power and intrahousehold resource allocation is relatively well established among studies that do not focus on DFS per se (e.g., Ashraf, 2009; Castilla and Walker, 2013; Duflo and Udry, 2004; Doss, 2006; Morawczynski and Pickens, 2009; Ashraf et al., 2014; Doepke and Tertilt, 2019). The literature suggests that a woman’s control over her resources, as reflected by types of household spending, increases with financial privacy and an awareness of her spouse’s financial information. While privacy is often considered a benefit of DFS, if and how

Figure 3. Example of Causal Chain: Privacy of Information

- MOBILE MONEY
- PRIVACY
- BARGAINING POWER
- WEE
increase privacy is not firmly established. To the extent DFS does enhance privacy, it would be valuable to explore whether the impacts of this improved privacy on control of resources was similar or different to that found among non-DFS privacy enhancing interventions.

Riley (2019) found that providing microloans through mobile money results in higher business capital and profits in Uganda and argued that this is because information privacy leads to greater control over finances. The author’s interpretation of the mechanisms at work primarily relies on the heterogeneity in impacts by which impacts were larger for women who reported more family pressure at the baseline. Disbursing loans over mobile money also resulted in fewer women giving cash to their spouse while having no effect on the amount of cash received from the spouse. The study did not measure the influence of mobile disbursement on family pressure as an intermediary outcome to business success. Nor did the study find that a second treatment arm, where cash loan disbursement was combined with opening a mobile money account, had any effect. So why didn’t female borrowers in the second treatment arm use their mobile account to take advantage of privacy benefits? It is possible that the value of privacy is not principally related to information about money in an account, but is more closely dependent on information about the amounts or timing of loan disbursement. In a related study, Aker et al. (2016) ruled out hiding information from spouses as a potential channel of impact to argue that impacts on WEE from mobile money reflected changes in intrahousehold bargaining power. The authors asserted that the main mechanism of impact is women being able to convince their partners about the value of nutritious food in order to change spending and consuming patterns, not control derived from private information on finances.

Given the evidence on how privacy of financial information affects women’s bargaining power and their ability to enact their preferences, as well as the potential use of DFS in increasing privacy, further research should address the following questions.

- Do DFS increase women’s privacy over financial information? Are there particular product features or added interventions that can enhance women’s privacy via DFS?
- How does DFS-enabled privacy over different types of financial information (presence of funds, timing and size of transfers, uses of funds, etc.) yield different impacts on WEE?
- Can the potential privacy offered by DFS lead to intrahousehold conflicts in the general population or in certain subgroups of women? If so, are there ways to design DFS products to mitigate these negative consequences?

D. Opportunity Cost of Time

One of DFS’s most visible advantages is that transfer recipients do not need to spend as much time accessing finance. In a large experiment in India connected with the Mahatma Gandhi National Rural Employment Guarantee Act (NREGA), Muralidharan et al. (2016) found that biometrically authenticated payments using smartcards reduces the time spent collecting each payment by 19% compared to the control group. The study found further advantages of digitization in reduced delay in payments and lower leakages. Aker et al. (2016) found that with a public transfer program, study participants saved the equivalent of 2.5 days over 5 months. Blumenstock et al. (2015) found that paying a salary as mobile money can also reduce transaction costs for both firms and workers. How they affect WEE.
Aker et al. (2016) argued that this time savings and the added flexibility\(^5\) of being able to cash out their transfer at their convenience may have allowed the female beneficiaries of a cash transfer program to spend additional time on more productive agriculture, such as producing cash crops that are primarily grown by the women in the study. Harigaya (2016) estimated that mobile money transactions saved 30% of the time spent on depositing and 70% of time spent on withdrawals in a rural bank experiment in the Philippines. Yet the author found that access to this time-saving technology did not increase the overall use of banking services. In fact, the treatment of shifting deposits and loan repayments from a bank officer and withdrawals from the bank to a mobile phone for all three tasks reduced the amount of money kept with the bank. Overall, the study found little evidence that time savings impact monetary savings. There was, however, heterogeneity of impact by time savings: those who lived nearer the bank (i.e., who had less potential time savings) saw a larger decline in their savings account balance. Since both studies primarily used female samples, gender differences in benefits of time saved could not be analyzed.\(^6\) Additional research should consider the following open questions on the impact of time savings on WEE.

- Does DFS-enabled time savings empower women?
- What type of DFS are more likely to benefit women in terms of time savings?
- How do women reallocate their time savings between economic activities, unpaid work, and leisure?

\(^5\) Flexibility in cashing out may relax mobility constraints and is discussed under the mobility mechanism sub-section.

\(^6\) In Aker et al. (2016) all participants were women, and in Harigaya (2017) 90% were women (among 521 participants).

E. Velocity of Transfers and Breadth of Support Network

Among the range of reasons why DFS is potentially beneficial, the existing evidence is possibly the strongest in demonstrating that the faster money transfers enabled by DFS can increase a household’s ability to cope with a crisis. A number of studies have found this effect, which comes primarily through the expansion of social support networks (e.g., Jack and Suri, 2014; Blumenstock et al., 2016; Lee et al., 2019; Riley, 2018; Batista and Vicente, 2020). In Kenya, Jack, and Suri (2014) found that access to mobile money significantly affects the likelihood of receiving informal transfers, the amount of money received as transfers, and the receipt of transfers from wider networks when faced with a crisis. Using data on mobile phone activity during quasi-random natural disasters in Rwanda, Blumenstock et al. (2016) found that individuals made calls and transferred airtime to people in the affected region. These effects were more prominent for wealthier groups and among pairs of individuals with a history of reciprocal favor exchange. In their experiment of training poor migrant-sending households to use mobile money in Bangladesh, Lee et al. (2019) found that treatment households that experienced negative health conditions and agricultural productivity shocks were better insured than those in the control group. Riley (2018) measured the impact of mobile money on consumption after rainfall shocks by comparing households with and without access to mobile money in Tanzania, finding the speed of transfer and informal risk sharing were significantly affected. Batista and
Vicente (2020) experimented with setting up mobile money agents and information dissemination on mobile money services to find that treatment households were better able to smooth spending mainly by receiving payments. However, none of these studies measured whether the effects differ between men and women.

Among a few studies that find negative effects of digital finance on social networks, Harigaya (2016) showed that a shift from cash transactions in a group setting to mobile money transactions reduced the importance of group meetings, group cohesion, and peer support. About 90% of the study sample were women. If DFS take away the need for group meetings, but those meetings contribute to women’s intrahousehold bargaining power, then DFS can reduce WEE. When Dizon et al. (2019) looked at the spillover effect of promoting savings through mobile money on informal risk-sharing networks, they did not find any negative spillover effect on untreated individuals, although participants were more likely to use their own savings to cope with crises. While the effects of DFS on support networks and informal risk sharing is relatively well documented, the gender dimension is not explored in as much detail. The following questions should be priorities for additional work on this important mechanism.

- Does the improved ability to draw on informal support networks enabled through DFS benefit men and women equally?
- Does the informal support network enabled through DFS crowd out any other networks that are more important to WEE?
- Can DFS foster any particular support network that is more helpful for WEE?

**F. Transaction Costs**

Although digitization has the potential to lower financial service fees, the real cost of DFS will depend on local policies and regulations. To the extent women value the savings from using DFS and control these savings, cost reductions are a potential mechanism for increasing WEE. However, it is not obvious whether women gain control over those potential savings. For example, the experiment in Kenya by Schaner (2017), where ATM cards cut withdrawal charges in half, found that women preferred the costlier option because it allowed them to maintain control over their savings. Since the ATM cards made it more convenient for their spouses to make withdrawals, female savers lost more control over their savings than the control group did. In an experiment with different transaction fees for mobile-linked deposit services to bank accounts in Sri Lanka, De Mel et al. (2018) found that female account holders were responsive to the fees in terms of their total savings, while male account holders were not. These contrasting results suggest that the effect of DFS’s cost advantages on WEE can be highly context specific. Future research on transaction costs as a mechanism for WEE should investigate the following questions.

- How do women prioritize DFS’s transactional cost advantages compared to other benefits, such as the opportunity cost of time saved?
- How are the benefits of DFS’s reduced transaction costs distributed between men and women?

**G. Behavioral Influence**

Technological features of DFS may lead to behavioral changes in financial management that can influence WEE. Dupas and Robinson (2013) showed that mental accounting can drive different financial behaviors, although they did not use digital finance in their experiment. By providing a simple “safe box” labeled for savings for health expenses, they found that women saved more for health expenses, were more likely to reach health savings goals, and were more likely to have enough funds to pay for health expenses at the time.
of need. The paper argued that the main mechanism of impact was reduction in the cost of mental accounting for different expenditures, which enabled participants to reduce other expenses and resist attempts by their spouses and non-household members to share the earmarked savings. The paper also found evidence that the safe box intervention was more effective for married women, which suggests its influence on intrahousehold bargaining power. Dizon et al. (2019) used female M-Pesa account holders in Kenya to test the effects of a soft intervention—labeling a second account for emergency expenses. They found that an emergency expenses account increased savings for children’s schooling. DFS may also positively influence other behaviors, such as impulsive buying, though further research on this behavioral dimension is needed and should consider the following questions.

- Do DFS reduce mental costs and improve women’s mental health or welfare in a way that can be identified?
- Are there DFS induced behavioral changes that contribute to women’s bargaining power or enactment of preference? How can those be strengthened for fostering WEE?
- Are there behavioral biases that are particularly relevant for women in poor households that DFS can help overcome?

### H. Systematic Discrimination

DFS may be provided in a way that is less discriminatory than analog approaches, creating greater access to, encouraging greater use of, and improving women’s satisfaction with financial services. For example, women can be denied access to a loan due to taste-based or statistical discrimination. For the former, DFS might reduce taste-based discrimination if a platform can be designed to anonymize the identity of a potential loan recipient or otherwise make loan decisions more subjective beyond the discretion of biased individuals. For statistical discrimination, women may suffer because they are more likely to be “thin-file” clients, i.e. they are less likely to have formal financial histories and less likely to have formal identification. New DFS enabled solutions, such as mobile based digital credit apps, may overcome this statistical discrimination by processing new data, such as call patterns and mobile money payment histories, that are not traditionally considered in loan decisions, leading to increased lending to women. Of course, these digital lending algorithms can be as biased as human loan officers and the complex dynamic of which women choose to borrow digitally and why could actually result in higher default for women and lead to increased statistical discrimination against all women. For example, women might be more vulnerable to digital credit offers that may result in over-indebtedness because of their lower levels of financial experience (Bharadwaj, Jack, and Suri, 2019). This is still a relatively unexplored area in DFS and WEE literature, and future work should consider the following open questions.

- Do DFS reduce discrimination, as postulated by the theories above?
- If so, are the results more consistent with taste-based or statistical discrimination?
- Are digital financial service providers (e.g., mobile money agents) more or less likely to discriminate against women than traditional financial service providers (e.g., banks)?
- What can digital financial service providers do to reduce discrimination towards women (in lending decisions, agent networks, etc.)?
I. Safety

Digital accounts and digital transactions may reduce safety concerns related to carrying cash and transacting in cash, which may empower women to join in market activities, though there is still little evidence on increased safety as a mechanism for WEE. Riley (2019) compared the effects of giving microloans over mobile money to creating mobile money accounts with the loan disbursed as cash (with a control group that received a cash loan). While mobile disbursements resulted in higher business capital and profits, there was no similar effect in the case of providing cash loans with mobile money accounts. If mobile money provides safety, then women in the second treatment group could deposit their cash loan into the account after receiving it, which they did not do. This is taken as evidence for rejecting safety as a potential mechanism. Aker et al. (2016) also found that delivering a transfer in cash coupled with providing a mobile money enabled phone had no effects relative to a transfer in cash without a phone. In the context of generally high levels of violence and safety concerns in Afghanistan, Blumenstock et al. (2014) found that saving with mobile money was less desirable than saving cash in the face of greater possibilities of violence. The study found that people in areas with greater violence withdraw mobile money to keep cash savings, despite cost advantages to saving with mobile money. This evidence illustrates how the issue of safety is complex. On one hand, DFS may improve safety during travel between the market and home, for example. On the other hand, greater general insecurity may lead individuals to prefer cash.

DFS may influence safety in financial transactions differently for men and women. In an experiment of randomly matching vendors with customers for mobile money transactions in Ghana, Annan (2020) found that female vendors are 10 percentage points more likely to overcharge their customers than are male vendors. More importantly, the random gender matching shows that both male and female vendors are more likely to cheat female customers (by 8 and 11 percentage points, respectively) than male customers. For expanding our understanding of the relevance of safety for WEE, future research should consider the following questions.

- How do increases/decreases in safety resulting from DFS affect women and men differently?
- How do safety considerations differ across DFS platforms, such as mobile money and ATM cards?
- Can design features, such as biometric identifiers, or complementary intervention, such as training on safely using DFS, increase safety for women compared to men?

J. Mobility

We consider DFS impacts on WEE through the mechanism of mobility both in the narrow literal sense of physical mobility (e.g., accessing services and performing financial transactions) and the broader more abstract sense of occupational mobility (e.g., engaging in different economic activities). As discussed below, we avoid characterizing occupational mobility as a distinct mechanism because it is also likely an important outcome of DFS working through a variety of other more specific mechanisms.

Physical mobility is an interesting and understudied mechanism given that DFS may both reduce women’s need to travel by enabling remote transactions and may increase women’s physical mobility by normalizing women’s engagement with financial agents and institutions. Using nighttime light intensity as a proxy for physical infrastructure in 11 countries in sub-Saharan Africa, Mothobi and Grzybowski (2017) showed that mobile phones allow access to financial services to people who would otherwise lack it. This is
Figure 4. Example of Causal Chain: Credit Access

MOBILE MONEY → DIGITAL CREDIT/LIQUID MONEY → OCCUPATION CHANGE → WEE

a good example of how DFS, mobile money in particular, can address the constraint of physical mobility in accessing financial services. While lack of physical mobility (due to social norms and time costs) is likely to be a more binding constraint for women than men, there is lack of evidence on gender differences in DFS’s role in mitigating this constraint. Murshid et al. (2020) used the distance to financial services agents to measure the impact of access to bKash mobile money services in Bangladesh. The study found that distance significantly affected women’s freedom of movement, among several other indicators of women’s empowerment. They use a variety of indicators as proxies for mobility, including being able to visit markets, banks, relatives, and friends.

The more abstract concept of occupation mobility begs the question of when mechanisms of longer-term WEE are simultaneously outcomes that indicate WEE themselves. It may be easier to think of occupational mobility as an indicator for WEE outcomes that emerge as a result of DFS direct impacts on the other mediating mechanisms discussed in this paper rather than as a direct effect of DFS (see Figure 4). However, we include occupational mobility here in the mobility mechanism section because of the importance of this topic in the existing literature and the methodological insights gained from previous treatment of this mechanism/outcome in prior work.

Suri and Jack (2016) found that, among women specifically, the M-Pesa expansion in Kenya created an occupational shift from farming to business. Although their study did not explore the specific mechanisms mediating occupational shifts, they suggested a few possible channels: women’s reduced need for multiple part-time occupations; efficiency gains in their labor allocation facilitated by mobile payment; reduced time pressure on childcare, as children were more likely to be attending boarding school; and reducing fertility. Lee et al. (2019) studied the impacts of mobile financial services onboarding on migration and payment flow (as well as poverty and consumption effects), finding that onboarding to mobile money affects the number of household members migrating for work. They also found that the DFS intervention had a larger effect on female migrants’ work hours, which can be considered an indicator of WEE. Notably, Lee et al. also found worrying evidence of harmful effects on the health status of those who work in garment factories, suggesting that empowerment may have some side effects on women. Batista and Vicente (2020) also found that introducing mobile money in the community influenced

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7 The large effect size could be partly due to the unique sampling of households with a migrant worker in the primary urban location. That said, the effect size (Intention-to-treat of 0.12 person compared to baseline mean of 0.69) is quite substantial, given a relatively simple intervention of training household members on how to use mobile money functions.
rural–urban migration as a coping mechanism to shocks. They asserted that the introduction of mobile money created a specific occupational change: a shift from agricultural activities in rural areas to occupations performed by migrants outside of the rural areas of origin. However, the study did not measure whether such occupational shifts differ between men and women.

Biljon et al. (2018) used a rollout of bank cards for a cash transfer program in South Africa to measure the effects of women’s autonomy on their labor supply. The study found that a woman becoming a primary decision-maker increases the likelihood of her participating in the labor market by 92 percentage points. Although the study showed strong correlation between access to bank cards and an increase in women’s decision-making (the first-stage results in instrumental variable regression), this cannot be interpreted as a causal relationship. De Gasperin et al. (2019) took a similar approach by using data from eight countries in Asia and Africa to find an occupational shift to self-employment work. Field et al. (2020) found experimental evidence of not just occupational shifts but also increased labor supply. They randomly offered bank accounts to female workers in the Indian NREGA scheme and then further randomized whether the woman’s earnings were directly deposited in that account compared to the household head’s account (the previous default). While receiving an account alone did not have a large effect, receiving an account and having wages directly deposited into it increased labor supply in both NREGA and outside work. The authors interpreted their findings as suggesting that increasing women’s control of income (through DFS) increased their gains from working, and thus labor supply increased. The authors also find that social norms were liberalized: both men and women exposed to direct deposit treatments perceived fewer social costs to women’s work, suggesting a “virtuous” cycle of further labor supply and WEE. This study is also an example of a potentially beneficial relationship between DFS access and other economic empowerment initiatives.

In this context, the following questions should be priorities for advancing research on the mobility mechanism(s).

- Do DFS encourage women to overcome social norms constraining physical mobility, for example, by normalizing travel to and interaction with male mobile money agents?
- Do DFS relax the need for physical mobility in accessing services differently between men and women?
- Does relaxing the need for physical mobility to access financial services (besides time saved) enable women to engage in any new activity to increase WEE, such as trading, home production, etc.?
- How do DFS lead to occupational mobility for women and what are positive and negative effects of this occupational change?
- Are effects of DFS on occupational mobility different for men and women, and why?
- How might DFS complement other economic empowerment initiatives targeting women particularly around labor/employment?

K. Access to Digital Nonfinancial Services

Access to DFS can have spillover effects on the nonfinancial lives of women that can, in turn, influence WEE. This can be either by design (e.g., receiving socially or economically valuable information from DFS providers) or by coincidence (e.g., general increase in digital literacy due to increased use of DFS). Aker et al. (2016) did not find any evidence that mobile transfers of money influenced access to market information, although those who
received the transfers digitally were likely to make more mobile phone calls than those who received cash. The authors do not, however, rule out possible effects on other mobile services because their study looks at the short-term impacts over six months while the spillover effect on other mobile services can take place over a longer term. The availability of mobile money, for example, can over time induce mobile phone adoption by increasing the value proposition of phone ownership for women, with mobile phone enabling WEE for reasons unrelated to finance. Conversely, DFS-enabled lending may enable women to purchase and control mobile phones. Additionally, new digital platforms are increasingly bundling payments with other services, such as e-commerce or digital farmer services (crop information, digital procurement of fertilizer, etc.). DFS may be a gateway into these platforms that may have distinct benefits for women. Additional research should anticipate the relationship between DFS and nonfinancial digital services and consider the following questions.

- Can access to DFS create spillover effects on women’s access to digital nonfinancial services that results in greater WEE?
- What is the relationship between DFS and phone ownership? Can DFS improve women’s access to personal phone ownership or control of their household’s mobile phones? Is personal phone ownership a clear pre-requisite for women’s use of DFS and a necessary condition for achieving the WEE benefits of DFS?
- What digital nonfinancial services with high impact potential on WEE be linked with DFS (agricultural services, access to market information, access to digital platforms, etc.)?

4. CHALLENGES IN INVESTIGATING CAUSAL PATHWAYS BETWEEN DFS AND WEE

Two key methodological issues emerge in reviewing the evidence and gaps on causal pathways between DFS and WEE. First, heterogeneity in treatment effects based on baseline conditions is commonly used to argue that women’s economic empowerment is driven by a particular mechanism. Nine of the 16 studies on which we heavily relied in the previous section use impact heterogeneity as their primary statistical approach (Annex A). While this analytical approach is extremely useful when experimental variation is lacking, it also has limitations. For example, analysis of heterogeneity of impacts by gender may show that access to a particular digital financial service is more effective for women with lower intrahousehold bargaining power at baseline. This result, however, does not necessarily tell us about DFS’s effects on intrahousehold bargaining power because women with low intrahousehold bargaining power may also have lower physical mobility, lower access to mobile phones, lower levels of personal security, etc. all of which may be key mechanisms mediating the causal impacts of DFS impacts on WEE. In other words, the variable of interest in the analysis of heterogeneous impacts (e.g., baseline level of women’s intrahousehold bargaining power) could be correlated with other variables (e.g., education level), which constrains interpretation of the results.

This nuance in interpretation is important because any policy recommendations or new product designs must target the actual mediating mechanism to be effective. This issue of interpreting correlation as causation is difficult to unpack empirically because many of the mechanisms of interest (in this case, intrahousehold bargaining power) are difficult to experimentally manipulate or at
least difficult to isolate during experimental manipulation. Measuring these proxies for theoretical causal mechanisms, e.g. measures of intrahousehold bargaining power, at baseline and endline can help bring clarity. Additionally, investigators can formalize which causal mechanisms are and are not consistent with their research hypotheses ex-ante in pre-analysis plans before conducting their research to ensure interpretation of results is guided by theory. This approach will also give readers greater confidence that any findings of heterogeneous impacts by variables that proxy for some of the aforementioned mechanisms are not merely being cherrypicked during the ex-post analysis.

The second key methodological challenge relates to measurement and applies to the research not only on DFS, but on WEE in general. Measures of mechanisms of empowerment often rely on proxy variables that are also outcomes of WEE, which can lead to problematic interpretation of results. For example, finding an effect of DFS on household spending on children is sometimes interpreted as a result of increases in women’s bargaining power. While a positive effect on such an outcome is likely to reflect an underlying change in women’s control over resources, a lack of effect may wrongly be interpreted as no influence on their control if women use their control to bargain for change in other areas (e.g., migration). And, it is not always clear that greater household spending on children is a result of women’s bargaining power; it could be driven by income effects from DFS. Also, the tendency for women to spend a greater fraction of the marginal income in her control on children is common, but not universal (e.g., Akresh et al., 2016). Since it is not conceivable for a particular research study to investigate all possible outcomes of women’s improved bargaining power, improving direct measurement of observable manifestations (i.e. proxies) of the hypothesized causal mechanisms should be a priority.

These general observations from the DFS-WEE literature highlight the need for research to take seriously the following methodological considerations.

- Research on WEE should be transparent about the hypothesized mechanisms at work and consider pre-specifying detailed hypotheses according to emerging research best practices.
- Experimental research on WEE should take seriously stratifying samples before randomization by variables that will be key to unpacking heterogeneous impacts during data analysis, such as gender, baseline control over household expenditures, etc.
- Research should improve measurement of proxies for specific causal mechanisms and consider measuring those proxies at least before and after interventions, and even at higher frequency, if possible.
- Research should specifically improve the measurement of bargaining power as distinguished from preferences, comparative advantage, and household level effects of DFS, such as income effects.

5. CONCLUSION

As this evidence review shows, there are many gaps in our understanding of the causal mechanisms from DFS to WEE. While research to disentangle the specific mechanisms discussed should be prioritized, we conclude with a few general cross-cutting observations related to the (a) role of contextual factors and digital literacy specifically; (b) relationships among DFS mechanisms; and (c) importance of measuring downstream outcomes of WEE. Preexisting gender gaps in digital literacy can influence the direction and magnitude of DFS effects on WEE. Aggarwal et al. (2020) and Lee et al. (2019) provided training on how to use mobile money services. Both
studies found a positive effect on service usage, demonstrating mobile literacy as an obstacle to using the services. Neither of the studies looked at impact heterogeneity on service usage by gender to learn whether the mobile literacy constraint differs between men and women. Tiwari et al. (2019) reviewed a graduation program for the ultra-poor that supports business and savings groups utilizing digital financial products; they found that education and familiarity with technology determine uptake. On the other hand, Harigaya (2016) did not find mobile banking affected clients’ transaction behavior according to their baseline mobile literacy level. Despite this contrast, mobile literacy is likely to be an important factor in accessing and using DFS in most developing country contexts. Researchers investigating causal mechanisms, then, can also look into whether mobile literacy is a particular barrier to women adopting DFS and whether DFS can be designed to be more easily usable for those with a low mobile literacy.

Along with researching different causal mechanisms, the relationships between DFS and other WEE initiatives should be considered. This can be particularly useful in generating evidence with more direct policy implications. Another relationship that can be researched is that between the different mechanisms discussed earlier. For example, DFS may contribute to WEE when both safety and privacy mechanisms are stimulated simultaneously, but not when these two mechanisms are stimulated individually. Research on specific mechanisms should consider both types of relationships.

We have focused on the causal mechanisms – the channels – through which DFS can lead to greater WEE. While WEE is a desirable outcome in and of itself, it also leads to a variety of later outcomes that have important welfare consequences, both positive and negative. On the positive side, WEE could increase human capital investment, given that women’s marginal propensity to spend on children is higher than men’s (Duflo and Udry, 2004; Qian, 2008; Atkin, 2009), although this finding is not universal (Akresh et al., 2016). However, experimental evidence also points to possible unintended consequences, such as stress (Ashraf, Field, and Lee, 2014), or hints at partner violence (Anderson and Eswaran, 2009; Luke and Munshi, 2011; Anderson and Genicot, 2015; Erten and Keskin, 2019). Therefore, measuring relevant later outcomes of DFS on WEE should complement research on mechanisms.
REFERENCES


### Annex A. Summary of Existing Studies and their Causal Mechanisms

<table>
<thead>
<tr>
<th>Reference</th>
<th>Use case</th>
<th>Study design</th>
<th>Sample</th>
<th>Outcomes</th>
<th>Effect</th>
<th>Mechanism</th>
<th>Approach</th>
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</thead>
<tbody>
<tr>
<td>Aker et al. (2016) in Niger</td>
<td>Cash transfer: “transfer on mobile account” against “cash transfer + mobile account” or “cash transfer”</td>
<td>Randomized control trial (RCT)</td>
<td>Women only</td>
<td>Intrahousehold decision-making</td>
<td>NS</td>
<td>Privacy of transfers and delayed cashing out of transfers could have provided opportunities for intrahousehold consultation. However, mobile account did not have any effect.</td>
<td>Qualitative information (focus group discussions with women) on how they interacted with their husbands after private arrival of transfers.</td>
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<td>Women’s mobility</td>
<td>+ve</td>
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<td>Spending on children</td>
<td>-ve</td>
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<td>Women’s time saving</td>
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<td>Savings</td>
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<td>Household spending</td>
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<td>Migration</td>
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<td>Remittances</td>
<td>NS</td>
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<tr>
<td>Bachas et al. (2020) in Mexico</td>
<td>Digitizing G2P transfers: debit cards for recipients who were savings account holders</td>
<td>Natural experiment</td>
<td>Women only</td>
<td>Savings</td>
<td>+ve</td>
<td>Trust growth in safety and privacy perception, increase bargaining power, lowering mental cost [temptation spending]</td>
<td>Correlation: savings effects with effects on trust. Heterogeneity by women’s baseline bargaining power</td>
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<tr>
<td>Bastian et al. (2018) in Tanzania</td>
<td>Digitizing microfinance institute (MFI) borrowing and repayment: interest-bearing mobile savings account</td>
<td>RCT</td>
<td>Women only</td>
<td>Intrahousehold decision-making</td>
<td>+ve</td>
<td>Through women’s control over business earnings, and safety and privacy to limit social pressures to share incomes</td>
<td>Conjecture</td>
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<td></td>
<td>Savings</td>
<td>+ve</td>
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<td></td>
<td>Credit</td>
<td>+ve</td>
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</table>

-ve Negative Effect  
NS No Significance  
+ve Positive Effect
<table>
<thead>
<tr>
<th>Reference</th>
<th>Use case</th>
<th>Study design</th>
<th>Sample</th>
<th>Outcomes</th>
<th>Effect</th>
<th>Mechanism</th>
<th>Approach</th>
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<tbody>
<tr>
<td>Biljon et al. (2018) in South Africa</td>
<td>Digitizing G2P transfers: grants through women’s bank cards</td>
<td>Quasi-experimental</td>
<td>Men and women</td>
<td>Intrahousehold decision-making</td>
<td>+ve</td>
<td>Acted a stepping-stone toward more financial inclusion among women</td>
<td>Heterogeneity of bank account ownership by sex</td>
</tr>
<tr>
<td>De Gasperin et al. (2019) in Africa and Asia</td>
<td>P2P transfers: mobile money</td>
<td>Quasi-experimental</td>
<td>Men and women</td>
<td>Women labor (self-employment)</td>
<td>+ve</td>
<td>More remittances, private savings that support her agency and willingness to work outside the household</td>
<td>Conjecture</td>
</tr>
<tr>
<td>De Mel et al. (2018) in Sri Lanka</td>
<td>P2P transfers: mobile money to deposit mobile airtime balances into a bank account</td>
<td>RCT</td>
<td>Men and women</td>
<td>Savings</td>
<td>+ve</td>
<td>Reduced transaction costs for depositing small and frequent bank deposits</td>
<td>Heterogeneity by sex and distance to the bank</td>
</tr>
<tr>
<td>Dizon et al. (2019) in Kenya</td>
<td>P2P transfers: labeled mobile money savings account</td>
<td>RCT</td>
<td>Women only</td>
<td>Savings</td>
<td>+ve</td>
<td>Reduced mental cost as a soft commitment, as well as enhancing privacy of information, easing social pressure to share</td>
<td>Heterogeneity: baseline difference in facing temptation spending and social pressure to share income.</td>
</tr>
<tr>
<td>Habyarimana et al. (2018) in Kenya</td>
<td>P2P transfers: mobile-linked (lock vs. no lock) savings account</td>
<td>RCT</td>
<td>Men and women</td>
<td>Savings</td>
<td>-ve</td>
<td>Not argued</td>
<td>NA</td>
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<td>Reference</td>
<td>Use case</td>
<td>Study design</td>
<td>Sample</td>
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<td>Harigaya (2017) in the Philippines</td>
<td>Digitizing MFI borrowing and repayment: instead of cash transactions at group members’ meetings, they individually transacted over mobile money for small fees</td>
<td>RCT</td>
<td>Women only</td>
<td>Savings</td>
<td>-ve</td>
<td>Reduced group cohesion, which reduced peer-enforcement effects as well as increased transaction fees sensitivity</td>
<td>Heterogeneity in distance to transaction point; nearer had more adverse effects in group defection index and transaction fee sensitivity compared to those far</td>
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<td>Ky et al. (2018) in Burkina Faso</td>
<td>P2P transfers: mobile money</td>
<td>Quasi-experimental</td>
<td>Men and women</td>
<td>Savings for emergencies</td>
<td>+ve</td>
<td>Provision of access to financial services that are otherwise not available</td>
<td>Heterogeneity: bank deposit between men and women</td>
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<td>Lee et al. (2019) in Bangladesh</td>
<td>P2P transfers: training on signup for and use of the mobile banking and facilitated account setup</td>
<td>RCT</td>
<td>Men and women</td>
<td>Women labor (migration)</td>
<td>+ve</td>
<td>Higher payment facilitated by mobile money to rural areas increased rural–urban migration</td>
<td>Heterogeneity between male and female migrants</td>
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<td>Women labor (work hours)</td>
<td>+ve</td>
<td>Payments created new expectations, thus increasing pressure on urban female migrants</td>
<td>Conjecture</td>
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<td>Reference</td>
<td>Use case</td>
<td>Study design</td>
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<td>Morawczynski (2009) in Kenya</td>
<td>P2P transfers: mobile money</td>
<td>Ethnographic</td>
<td>Men and Women</td>
<td>Remittances</td>
<td>+ve</td>
<td>Ease of sending money: time and cost</td>
<td>Qualitative responses from women and men in rural and urban areas</td>
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<td></td>
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<td>Savings</td>
<td>+ve</td>
<td>Privacy of mobile money increased women’s secret savings and payments.</td>
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<td>Savings</td>
<td>-ve</td>
<td>Ease of sending money increased interhousehold sharing pressure</td>
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<td>Intrahousehold decision-making</td>
<td>+ve</td>
<td>Privacy savings information accord women financial autonomy</td>
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<td>Intrahousehold decision-making</td>
<td>-ve</td>
<td>Cultural discrimination: men (senders) and women (recipients) reinforces women’s dependence on men</td>
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<tr>
<td>Murshid et al. (2020) in Bangladesh</td>
<td>P2P transfers: mobile money</td>
<td>Quasi-experimental</td>
<td>Women only</td>
<td>Women mobility</td>
<td>+ve</td>
<td>Not argued</td>
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<td>Intrahousehold decision-making (finance)</td>
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<td></td>
<td></td>
<td>Women labor</td>
<td>+ve</td>
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<td></td>
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<td></td>
<td></td>
<td>Women assets</td>
<td>+ve</td>
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<tr>
<td>Riley (2019) in Uganda</td>
<td>Digitizing MFI borrowing and repayment: loan disbursement using mobile money account</td>
<td>RCT</td>
<td>Women only</td>
<td>Control over loans</td>
<td>+ve</td>
<td>Reduced mental costs (default &amp; earmarking) and signaled privacy allow resisting family pressure to share</td>
<td>Heterogeneity in family pressure to share and between default mobile disbursement and cash with mobile account</td>
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<tr>
<td></td>
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<td></td>
<td>Payments</td>
<td>NS</td>
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<tr>
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<td>Savings</td>
<td>NS</td>
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<td>Use case</td>
<td>Study design</td>
<td>Sample</td>
<td>Outcomes</td>
<td>Effect</td>
<td>Mechanism</td>
<td>Approach</td>
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<td>Schaner (2017) in Kenya</td>
<td>P2P transfers: free ATMs to couple savings accounts when the couples were sitting together</td>
<td>RCT</td>
<td>Men and women</td>
<td>Savings</td>
<td>-ve</td>
<td>ATM cards made women’s bank savings less private and less secure from their spouses</td>
<td>Heterogeneity between male and female account versus bargaining power proxy</td>
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<tr>
<td>Suri and Jack (2016) in Kenya</td>
<td>P2P transfers: mobile money</td>
<td>Quasi-experimental</td>
<td>Men and women</td>
<td>Savings</td>
<td>+ve</td>
<td>Women accessed more safe and convenient saving mechanism, saved time for childcare, allowing occupational mobility from agriculture to small-scale trade by saving time from childcare</td>
<td>Impact estimate on household size and number of children as proxy indicator for time for childcare</td>
</tr>
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</table>
## Annex B: Taxonomy of DFS and Use Cases

<table>
<thead>
<tr>
<th>Mobile money (m-money)</th>
<th>M-money is a mobile-based transactional service that can be transferred electronically using mobile networks.</th>
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</thead>
<tbody>
<tr>
<td>Mobile banking</td>
<td>Mobile banking uses a mobile phone to access banking services or execute financial transactions. This covers both transactional services, such as transferring funds, and nontransactional services, such as viewing financial information on a mobile phone.</td>
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<tr>
<td>Digitizing MFI</td>
<td>This involves microfinance institutes (MFIs) adapting their products and services to be conducted on a digital platform either on their own or with DFS partners.</td>
</tr>
<tr>
<td>Digitizing/onboarding women’s groups</td>
<td>The goal is to engage women’s groups, including village savings and lending associations and rotating savings and credit associations, to conduct their group’s financial transaction on digital platforms.</td>
</tr>
<tr>
<td>Person-to-person (P2P) transfers</td>
<td>Money is transferred between individuals, including remittances and payments.</td>
</tr>
<tr>
<td>Government-to-person (G2P) transfers</td>
<td>G2P transfers move funds from a government-held account to an individual’s account, including salary payments and government benefits such as social transfer payments.</td>
</tr>
<tr>
<td>Person-to-government (P2G) transfers</td>
<td>P2G transfers move funds from an individual’s account to a government-held account, including tax and fee payments.</td>
</tr>
<tr>
<td>Business-to-government (B2G) transfers</td>
<td>B2G transfers move funds from a business account to a government-held account, including tax and fee payments.</td>
</tr>
<tr>
<td>Business-to-business (B2B) transfers</td>
<td>B2B transfers move funds between two organizations engaged in commercial activities.</td>
</tr>
<tr>
<td>Business-to-person (B2P) transfers</td>
<td>B2P transfers include salary and business payments.</td>
</tr>
<tr>
<td>Bill payment</td>
<td>These include payments made by a biller of billing organization in exchange for services provided.</td>
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<tr>
<td>Merchant payment</td>
<td>These include payments made from an individual to a retailer, or online merchant, in exchange for goods or services.</td>
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<tr>
<td>International remittances</td>
<td>These include cross-border transfers of funds from one individual’s digital account to another. They include direct account-to-account remittances, as well as those completed through an intermediary money transfer organization.</td>
</tr>
</tbody>
</table>